

CLEAN HARBORS CANADA INC.
2023 ANNUAL LANDFILL
OPERATIONS REPORT

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Title: Facility Manager

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Annual Landfill Operations Report – Clean Harbors Ryley

1.0 Introduction

Clean Harbors Canada Inc. (Clean Harbors) owns and operates the industrial waste management facility located at SE/4 and NE/4 9-50-17 W4M, Ryley, Alberta under Alberta Environment and Parks (AEP) Approval No. 10348-03-01. The facility consists of a Class I Industrial Landfill and a Hazardous Waste/Recyclable Storage and Processing Facility. This document has been prepared to fulfill the annual reporting requirements specified in Section 4.6.60 of the approval.

The reporting requirements outlined in Section 4.6.60 have been summarized in the concordance table below (Table A). Table A references the relevant approval requirements and the corresponding sections, figures, table and/or appendices that address each requirement.

TABLE A Reporting Requirements – Annual Landfill Operations Report

Approval Section Number	Requirement	Location Herein
4.6.60(a)	Name and contact information of person responsible for the facility	Section 2
4.6.60(b)	Summary of all information collected as required in TABLE 4.6-D	Section 3
4.6.60(b)(i)	Quantity and type of waste received	Section 3.1, Appendix A
4.6.60(b)(ii)	Quantity and type of material removed	Section 3.2
4.6.60(b)(iii)	General location of waste deposited	Section 3.3, Appendix B
4.6.60(b)(iv)	Leachate head	Section 3.4, Appendix C
4.6.60(b)(v)	Leachate analysis, as per TABLE 4.4-A	Section 3.5, Appendix D
4.6.60(b)(vi)	Volume of leachate removed from the leachate collection system	Section 3.6, Appendix E
4.6.60(b)(vii)	Leak detection liquid analysis, as per TABLE 4.4-A	Section 3.7, Appendix F
4.6.60(b)(viii)	Volume of leak detection liquid removed from the leak detection system	Section 3.8, Appendix G
4.6.60(b)(ix)	Final cover	Section 3.9
4.6.60(c)	Summary of the results of any audit conducted in accordance with 4.1.7	Section 4, Appendix H
4.6.60(d)	Summary of the operations of the waste stabilization area	Section 5, Appendix I
4.6.60(e)	Summary of the performance of the run-on and run-off control systems, including a comparison to the limits in TABLES 4.3-B and 4.3-C	Section 6

Approval Section Number	Requirement	Location Herein
4.6.60(f)	Summary of the performance of the leachate collection system, including a comparison to the maximum acceptable leachate head	Section 7
4.6.60(g)	Summary of the performance of the leak detection system, including a comparison to the action leakage rate limit	Section 8
4.6.60(h)	The Response Action Plan for the leak detection system pursuant to 4.4.10	Section 9, Appendix J
4.6.60(i)	Annual Dugout and Water Well Sampling Program Report pursuant to 4.5.4	Section 10, Appendix K
4.6.60(j)	Summary of all revisions to the Landfill Operations Plan pursuant to 4.6.33(b)	Section 11, Appendix L
4.6.60(k)	Any groundwater remedial action taken pursuant to 4.6.34(r)	Section 12
4.6.60(l)	Summary of records of landfill inspections pursuant to 4.6.53	Section 13, Appendix M
4.6.60(m)(i), (ii) & (iii)	Summary of operational issues, emergencies and actions taken	Section 14
4.6.60(n)(i) & (ii)	Summary of records of public complaints and approval holder's responses	Section 15, Appendix Q
4.6.60(o)	Up-to-date financial security estimate pursuant to 5.1.2	Section 16, Appendix N
4.6.60(p)(i), (ii), (iii) & (iv)	Updated site development plan showing the status of the landfill progression at the end of the operating year, including contour mapping, location of active & inactive disposal areas, areas where final cover has been placed & location of new landfill cells constructed	Section 17, Appendix O
4.6.60(q)	Annual Landfill Cell Closure Report pursuant to 7.1.7	Section 18, Appendix P
4.6.60(r)	Summary of contraventions reported pursuant to 2.1.1 related to landfill operations	Section 19, Appendix Q
4.6.60(s)	Any other information as required in writing by the Director	Section 20

2.0 Facility Contact Information

The primary contact for the Facility is:

Stan Yuha, Facility Manager

PO Box 390

Ryley, AB T0B 4A0

Phone: (780) 662-2509

Mobile: (780) 717-9606

3.0 Summary of Information Collected as Required in TABLE 4.6-D

3.1 Quantity and type of waste received.

In 2023, the facility landfilled a total of 277,705.055 tonnes of waste. 212,432.084 tonnes were hazardous waste. Non-hazardous waste landfilled totaled 65,272.971 tonnes.

The full description of the waste landfilled at the Facility by IWIC code and Transportation of Dangerous Goods numbers can be found in Appendix A.

There were no operational or other issues associated with the disposal of the waste.

3.2 Quantity and type of material removed.

No waste was removed from the landfill in 2023.

3.3 General location of waste deposited.

The year-end unmanned aerial survey was conducted on December 29, 2023, and the report is included in the TetraTech Technical Memo – Remaining Airspace – January 9, 2024.

114,315 cubic metres of landfill capacity was consumed in 2023. Waste was placed in Cells 3D, 3E, and 4. All other cells are either inactive or capped.

The January 9, 2024, Technical Memo - Remaining Airspace – December 29, 2023 Clean Harbors Facility, Ryley, Alberta is included as Appendix B.

3.4 Leachate head

Approval 1.0348-03 sets out the following limits regarding leachate head in the landfill cells.

4.4.3 Subject to 4.4.4, the approval holder shall not exceed the maximum acceptable leachate head in any landfill cell.

4.4.4 Subsequent to a storm event, the leachate head in any landfill cell shall not exceed the maximum acceptable leachate head for more than fourteen (14) days, unless otherwise authorized in writing by the Director.

4.4.6 The approval holder shall monitor the leachate collection and leak detection systems as required in TABLE 4.6-D and for all parameters specified in TABLE 4.4-A, subject to 4.4.8 and 4.4.9.

The “maximum acceptable leachate head” is defined by Section 1.1.2(jjj) as:

“the maximum depth of leachate above the lowest part of the primary liner, not including the sumps or leachate collection pipe trenches, and is:

- (i) 1.0 m in each of the existing landfill cells, and*
- (ii) 0.3 m in each of the new landfill cells*

during active landfill life, landfill cell closure, final landfill closure, and post-closure;”

Section 1.1.2(cc) defines existing cells as:

“existing landfill cells” means Cell 1, Cell 2, Cell 3A, Cell 3B and Cell 3C as described in application No. 005-10348;”

Cell 1 was capped prior to the creation of the *Standards for Landfills in Alberta* and does not have the capability to measure leachate head. The leachate volume from Cell 1 has been steadily decreasing since capping was completed. Cell 1 primary sump is pumped periodically throughout the year to remove any leachate accumulation. In 2023, 850 litres of leachate were removed from Cell 1.

The leachate head monitoring data for Cells 2, 3A, 3B, 3C, 3D, 3E and 4 is provided in Appendix C.

3.5 Leachate Analysis

TABLE 4.6-D of the approval requires that the landfill leachate from each primary leachate collection sump be analyzed at least once every quarter year for the parameters outlined in TABLE 4.4-A, unless insufficient sample volume is available.

Appendix D contains a table showing the Field pH and Electrical Conductivity and the laboratory analytical reports for the parameters in TABLE 4.4-A.

3.6 Volume of Leachate Removed from Leachate Collection System

The approval requires that leachate be removed from the leachate collection systems to maintain the leachate head level as described in Section 3.4 above.

Appendix E contains a table showing the volume of leachate removed from each of the landfill cells in 2023.

3.7 Leak Detection Liquid Analysis

TABLE 4.6-D of the approval requires that the leak detection liquid from each landfill cell be analyzed at least once every quarter year for the parameters outlined in TABLE 4.4-A, unless insufficient sample volume is available.

Appendix F contains a table showing the Field pH and Electrical Conductivity and the laboratory analytical reports for the parameters in TABLE 4.4-A.

3.8 Volume of Leak Detection Liquid Removed

TABLE 4.6-D requires that the volume of leak detection liquid removed be monitored and recorded at least each working day as removed. Cell 1 has been capped for approximately 20 years and generated only 5700 litres in 2023.

Appendix G contains a table showing the volume of leak detection liquid removed from the leak detection systems of each landfill cell in 2023.

3.9 Final Cover

No final cover was applied to the cells in 2023.

4.0 Summary of Results of Any Audit Performed in Accordance with 4.1.7

The third-party compliance audit was conducted in 2021. A copy of that Audit Report is in Appendix H. The next compliance audit will take place in 2024.

5.0 Summary of the Operations of the Waste Stabilization Area

In 2023, 17,361.035 tonnes of waste were processed through the Stabilization Facility. This volume was broken down as follows:

1. Hazardous Waste Solidified	9147.000 tonnes
2. Non-hazardous Waste Solidified	5070.826 tonnes
3. Encapsulation (with cement)	2725.776 tonnes
4. pH adjustment	42.152 tonnes
5. Sulfur treatment	123.761 tonnes
6. Quenched	95.506 tonnes
7. Asbestos	155.014 tonnes

There were no operational issues encountered during 2023.

The thickness tests conducted on the two stabilization vessels can be found in Appendix I.

6.0 Summary of the Performance of Run-on and Run-off Systems

The run-on and run-off control systems performed in accordance with the design plan. Water was discharged from Ponds B and C in July 2023 and from Pond B in October 2023. A Summary of the analytical results for each Pond is shown in the Tables below. The Industrial Wastewater Report has been submitted which includes the required Annual Sampling as per TABLE 4.3-E.

No water was discharged from the tank farm area.

Pond B – 2023 Summary of analytical results

Parameter	Limit	July 10 Not discharged	July 12 Not discharged	July 13	Oct 5 Not discharged	Oct 10
pH	6.0 – 9.5	8.46			8.1	
COD, mg/L	50	45			54	47
Total Dissolved Solids, mg/L	2500	850			630	
Total Suspended Solids, mg/L	25	10.6			22	
Ammonia, Total Dissolved (as N) mg/L	5	0.168			2.62	
Chloride, mg/L	250	41.3			13.3	
Sodium, mg/L	200	225	227	196	148	
Sulphate, mg/L	500	442			231	
Oil or other substances	No visible sheen	No visible sheen			Not tested	No visible sheen
Rainbow Trout	50% or greater survival	Pass			Not tested	Pass
Daphnia Magna		Pass			Not tested	Pass

Pond C – 2023 Summary of Analytical Results

Parameter	Limit	July 10
pH	6.0 – 9.5	8.53
COD, mg/L	50	39
Total Dissolved Solids, mg/L	2500	778
Total Suspended Solids, mg/L	25	7
Ammonia, Total Dissolved (as N) mg/L	5	0.0597
Chloride, mg/L	250	61.9
Sodium, mg/L	200	187
Sulphate, mg/L	500	384
Oil or other substances	No visible sheen	No visible sheen
Rainbow Trout	50% or greater survival	Pass
Daphnia Magna		Pass

7.0 Summary of the Performance of the Leachate Collection System

The leachate collection systems performed as designed. There were normal maintenance issues throughout the year including meter and pump servicing or replacement, frozen lines due to heat trace issues, and plugged filter screens that required cleaning. All issues were dealt with to restore normal operations as quickly as possible.

Some operational changes were made in 2023. It was decided to remove the Cell 2 leachate tank, due to the decreasing amount of leachate collected from Cell 2 and Cell 3A. Cell 2 and Cell 3A leachate removal lines were plumbed into the Cell 3B tank through an above-ground, insulated, and heat-traced line. Removing the Cell 2 tank allowed the facility to complete a slope maintenance project for Cells 1, 2, 3A, 3B, 3C, and 3D. The lower berm slopes were re-graded to a 3:1 slope from the original 2:1 slope.

The relevant approval clauses and definitions regarding leachate head are included in Section 3.4 of this report. The tabular report of leachate head values is in Appendix C. Section 4.4.4, states that “subsequent to a storm event, the leachate head in any landfill cell shall not exceed the maximum acceptable leachate head for more than fourteen (14) days, unless otherwise authorized in writing by the Director. Leachate head exceedances were reported to the EPA under Reference Number 424618. The 7-day letter is included in Appendix Q.

The flow rates of precipitation into the collection trench and sump are dependent upon the composition and permeability of the waste in the landfill cell. This impacts the length of time required to achieve the desired leachate head level after precipitation events.

No leachate was used for dust control in 2023.

8.0 Summary of the Performance of the Leak Detection System

The Leak Detection Systems functioned as designed during 2023. There were normal maintenance issues throughout the year including meter and pump servicing or replacement, frozen lines due to heat trace issues, and plugged filter screens that required cleaning. All issues were dealt with to restore normal operations as quickly as possible.

Cell 1 is not designed to monitor leak detection liquid in the same manner as Cells 2 to 4. The leak detection liquid drains continuously via gravity feed to a leachate manhole. A submersible pump is used to remove any Leak Detection Liquid that accumulates on an as needed basis. At no time during the year did the Cell 1 Leak Detection System daily inflow exceed 790 litres/hectare/day. Cell 1 has an area of 0.688 hectares and during 2023 only 5700 litres of leak detection liquid was removed. Four exceedances of the action leachate rate were reported on to EPA under Reference Number 424618. A copy of the 7-day letter is included in Appendix Q.

Some operational changes were made in 2023. It was decided to remove the Cell 2 leachate tank, due to the decreasing amount of leachate collected from Cell 2 and Cell 3A. Cell 2 and Cell 3A leachate removal lines were plumbed into the Cell 3B tank through an above-ground, insulated, and heat-traced line. Removing the Cell 2 tank allowed the facility to complete a slope maintenance project for Cells 1, 2, 3A, 3B, 3C, and 3D. The lower berm slopes were re-graded to a 3:1 slope from the original 2:1 slope.

9.0 Response Action Plan Pursuant to 4.4.10

No Response Action Plans were required in 2023. Response Action Plans if required would be in Appendix J.

10.0 Annual Dugout and Water Well Sampling Program

The Annual Dugout and Water Well Sampling Program pursuant to Section 4.5 of the approval was conducted in October 2023. Water samples were collected from each water well and dugout within an approximate 1.6-kilometre radius of the facility and analyzed for the parameters listed in TABLE 4.5-A. The Annual Dugout and Water Well Sampling Program Report is attached as Appendix K.

11.0 Summary of Revisions to the Landfill Operations Plan

The Operations Plan for the Landfill and Hazardous Waste/Recyclable Storage and Processing Facility was revised this year and split into two documents. Copies of the two Operations Plans are included in Appendix L.

12.0 Groundwater Remedial Action Taken Pursuant to 4.6.34(p)

No groundwater issues requiring remedial action have been detected. No remedial action has been taken at the facility.

13.0 Summary of Records of Landfill Inspections Pursuant to 4.6.53

Section 4.6.52 requires:

“The approval holder shall inspect the landfill, at a minimum:

- (a) weekly; and
- (b) immediately after each storm event to:
 - i. detect evidence of deterioration of any infrastructure components, including the composite liner,
 - ii. detect any malfunction or improper operation of the run-on and runoff control systems, leachate collection system, or leak detection system, and
 - iii. take corrective measures to repair any damage to infrastructure components, including the composite liner.”

Section 4.6.53 requires:

“The approval holder shall:

- a) keep a record of inspections conducted pursuant to 4.6.52;
- b) have the record of inspections available for review upon written request from the Director; and
- c) immediately report any deficiencies detected by the inspection in 4.6.52 to the Director in writing along with any corrective measures taken or proposed.”

Clean Harbors inspects the landfill each operating day. These inspections are entered into the electronic report form and saved on the corporate server. Inspection reports can be retrieved as necessary from the system. Examples of blank and completed Inspection Report forms can be found in Appendix M.

Issues arising from inspections have been identified previously in Sections 7 and 8. No liner deterioration issues were observed during the year. The surface run-on and runoff control systems functioned as per design.

14.0 Summary of Operational Issues, Emergencies and Actions Taken

There were no major operational issues or emergencies in 2023. All operational issues were of a maintenance nature, such as heat trace failures freezing leachate transfer lines, pump replacement, filter issues and maintenance of flow meters and pump lines plugging.

A small fire occurred in the landfill dump on November 1. Area of approximately one foot square was involved. There were no injuries or environmental impacts. The incident was reported to EPA on Reference Number 421520.

15.0 Summary of Public Complaints and Approval Holder’s Responses

The facility received complaints from the public on twelve occasions in 2023.

1. April 26, 2023 – A phone call and email from EPA was received regarding an odor complaint at 6:05 pm April 25 from a Ryley resident. The complaint was described as a noxious chemical odor. The Facility Manager was able to confirm the wind was from the NNW/N/NNE on that evening. Two loads had been received around 5:00 pm that had an odor. The operators checked the windsock and thought the wind was blowing from the west enough to miss the Village. After the loads were dumped the wind shifted towards town. They thought they had covered the waste with enough cover. The manager reviewed the strict acceptance conditions for odorous waste with the landfill operators and reminded them to double check with management if there is any doubt. The customer was contacted and informed that no more odorous loads would be accepted from that facility and that they were not

- allowed to deliver loads after management and the lab manager had left for the day. The deodorizer fans were re-installed after being removed during the freezing temperatures of winter. EPA Reference Number 412087.
2. May 2, 2023 – Clean Harbors received a phone call followed by an email from EPA regarding an odor complaint received at 9:25 am from a Ryley resident. The odor was described as noxious, toxic, gross chemical smell. The Facility Manager confirmed that the wind was blowing from the NNE at the time of the call. After the call from EPA was received at approximately 11:00 am, the Manager, Compliance VP and Compliance Manager drove into Ryley. As they drove past the sewage lagoon on Hwy 854, they noticed a strong lagoon odor. They turned on 57 Ave. into Ryley and past 49 St. and could still smell the lagoon but not as strong. They drove down 49 St. to 55 Ave. and could still detect a faint lagoon odor. They drove west on 55 Ave. and by the time they crossed main street could not detect any odor. Continuing west on 55 Ave., they could detect a faint odor from the Clean Harbors landfill as they approached 51 St. The landfill was treated with deodorizer at 8:30 am that morning. The odor control fans were operational at the time of the call. As a result of the investigation, it is felt that the odor was most likely from the sewage lagoon and not the landfill. At 11:30 am, as a preventative measure and according to our procedure, a load that had potential to cause an odor towards the village was rejected. EPA Reference #412333.
 3. May 8, 2023 – Facility Manager was contacted by EPA via text at 2:05 pm regarding a strong, terrible chemical odor complaint from an anonymous caller located at 49 St. and 55 Ave. in Ryley. Manager was away from the facility but called facility and verified that the wind was blowing from the southeast as it had been all day. It was noted that the Ryley lagoon had a strong odor that day. Due to the strong wind from the southeast, any source of odor in Ryley could not be coming from Clean Harbors. No further investigation taken. EPA Reference #412682
 4. May 9, 2023 – Facility Manager received email notification of two odor complaints at 6:00 am and 6:05 am. Both callers described the odor as a chemical smell. The notification was received at approximately 8:30 am. The wind data was downloaded and verified that the wind was very light that morning, shifting back and forth from the W, NW, N, NE, and NNE. At approximately 8:50 am the manager drove into Ryley, noticing a slight odor on Hwy 854. The wind was blowing from the west at that time. No odors were detected in Ryley. The deodorizer fans were started. The manager and the operator walked the landfill for over an hour and no significant odors were detected. The manager instructed the operators to spray the landfill with deodorizer. EPA Reference Numbers 412724 & 412725.
 5. May 10, 2023 – At approximately 9:45 am, the manager was notified of another odor complaint from a resident of Ryley located at the same address as all the other

- complaints. Within minutes of receiving the email, the manager and one other employee drove into Ryley and past the area and the blocks around. The wind was calm at the time. No odors were detected anywhere. They drove down the back alley between the house address and the landfill. They noticed a neighbor directly across the alley from the complainant working in his backyard. He was asked if he noticed any odors that morning and he replied that he had not. They continued to drive around not detecting any odors. A return call was made to the inspector during this time. EPA Reference Number 412800.
6. May 25, 2023 – Clean Harbors received a text followed by an email at 8:29 am from EPA regarding an odor complaint they received at 7:21 am from a Ryley resident located near 49 St. and 55 Ave. The odor was described as a very bad nasty chemical smell. Upon investigation, no activities were going on at the site at the time of the complaint. The wind was light out of the north/northeast. The odour control fans had not been started yet that morning. The Facility Manager drove into Ryley about 8:45 am and drove around the area for about 5 minutes but could not detect any odors. A 20 minute conversation was had with some residents in their front yard and no odors were noticed during that time. Just as the manager was leaving a faint odor was detected for about 10 seconds and then dissipated. The residents said it come and goes. The manager drove around for about 5 more minutes but did not detect any more odors. The conclusion was that a faint landfill odor may have entered town for a short period of time. The odor control fans were turned on at approximately 8:15 am that morning. Clean Harbors will continue to cover non-active areas with non-odorous material. EPA Reference Number 413712.
 7. May 29, 2023 – Clean Harbors received a text followed by an email from EPA regarding an odor complaint they received at 5:30 am from a Ryley resident. The odor was described as a nasty chemical smell. The facility manager was on his way to work and drove through Ryley at about 7:40 am. He was unable to detect any odors in Ryley. When he arrived at the facility a short time later, he noticed that the wind was blowing from the west and south. The wind data for earlier that morning was uploaded and it had been calm all morning with wind direction from the west, northwest and north but basically at zero speed. The source of the odor was unknown. The landfill was sprayed with a load of deodorizer even though the wind was blowing away from town at the time. The facility will continue to use non-odorous material to cover non-operating areas. EPA Reference Number 413875.
 8. July 4, 2023 Clean Harbors received an email at 10:57 am from EPA regarding an odor complaint they received on July 1st at 1:00 from a Ryley resident. The odor was described as a 10 out of 10 nasty chemical smell. The loads received on June 30th were reviewed and no odorous loads were received during the day. The wind station data from the school and the facility were reviewed and they both recorded the

- wind blowing from the east and south during the time of the complaint. Therefore the source of the odor could not have been Clean Harbors. No other action was required. EPA Reference Number 415751.
9. August 3, 2023, Clean Harbors received a phone call at 9:47 am from a Ryley resident regarding an odor coming from the Clean Harbors Landfill since approximately 4:00 am. No odorous loads had been received that morning and landfill operations didn't start until after 8:00 am. The wind data was uploaded and the wind was blowing from the north that morning. It was originally thought that the source of the odor may have been when the operators were treating some leachate water from the Cell 4 leachate tank which was done about 9:30 am that morning, however that would not explain odors that may have occurred earlier than that. The facility manager and the Compliance VP drove into Ryley at approximately 10 am to investigate any odors and neither of them could detect any odors anywhere in the village and the wind was still blowing from the north. They also drove the road just south of the landfill berms and did not detect any odors there either. The odor control fans were operating at the time of the call. They were unable to verify the source of the odor. EPA Reference Number 417409.
 10. August 30, 2023 – Clean Harbors received an email notification for EPA regarding an odor complaint they received on August 29 at 10:00 pm from a Ryley resident at 49 St. and 59 Ave. in Ryley. The wind data for the time of the complaint was uploaded and the wind was blowing directly from the east at 2 to 4 km/hr, before, during and after the time of the complaint. Therefore, Clean Harbors could not have been the source of the odor at that time. No further investigation was done. EPA Reference Number 418553.
 11. On October 24, 2023 – Clean Harbors received an email notification from EPA regarding an odor complaint they received on October 22 at 7:40 am from a Ryley resident. The wind data for the time of the complaint and the wind was from the N/NNW between 3-4 km/hr before during and after the time of the complaint. Landfill operations had not started for the day at that time. Only 3 loads of waste were received that day, with the first load arriving at approximately 8:45 am, the next around noon and the last load around 2:00 pm. They were all normal, non-odorous loads. Good quality cover is being used daily at the landfill. No further investigation was done due to the delay in receiving the report. EPA Reference Number 421101.

The Contravention Reports for these complaints are provided in Appendix Q.

16.0 Up-to-Date Financial Security Estimate Pursuant to Section 5.1.2

Section 5 of the Approval requires that the financial security estimate for the facility be reviewed annually and submitted as part of the Annual Landfill Operations Report.

The current Security Estimate calculation is provided in Appendix N.

17.0 Site Development Plan

The Site Development Plan drawings are in Appendix O. This plan shows the progression of the landfill operation. The active area includes portions of Cells 3D, 3E and Cell 4. Other areas are inactive or have a final cover placed on them. The first two drawings show the activity in 2023. The third drawing labelled “Overall Site Plan” shows the whole site, describes the status of the active landfill, and shows the newly completed Cell 5.

18.0 Annual Landfill Closure Report

No landfill cells were closed in 2023, therefore no Closure Report required.

19.0 Summary of Landfill Contraventions Reported

The 2023 landfill contraventions can be grouped into six categories as shown in the following table.

Summary of Landfill Contraventions

Category	Date	Reference Number
Wind Speed & Direction Equipment Problems – Auxiliary Equipment	February 3, 2023	409379
	May 28, 2023	409379 – update
	August 1, 2023	417300
Odor Complaint	April 26, 2023	412087
	August 4, 2023	412087 - Update
	May 2, 2023	412333
	May 8, 2023	412682
	May 9, 2023	412724/412725
	May 10, 2023	412800
	May 25, 2023	413712
	May 29, 2023	413875
	July 4, 2023	415751
	August 3, 2023	417409
	August 30, 2023	418533
	October 24, 2023	421101
	Late submission of Monthly Air Monitoring Report	May 1, 2023
Damage to 3 Groundwater Monitoring Wells	May 5, 2023	412578
Liner Tear on Berm During Construction	July 28, 2023	415610
Additional Wetland Assessment	October 11, 2023	420627

Client Shipped Waste that did not meet Profile and Landfill Criteria	October 23, 2023	421225
	November 15, 2023	421225 – Risk Assessment
Small fire in Landfill	November 1, 2023	421520
Leachate Head Exceedance in 2023	February 5, 2024	424618
	March 5, 2024	424618 - Revised

Copies of the 7-Day Letters to the Director are provided in Appendix Q.

20.0 Any Other Information as Required in Writing by the Director

No additional information was required by the Director.

Appendix A

Quantity and Type of Waste Received

Hazardous Waste Landfilled

Hazardous Recycle or Waste Name	PIN	Class	Waste Code	Management Code	Hazardous (kg/L)	Non-hazardous (kg/L)	Store On-site
Acid solutions, sludges and residues containing heavy metals	UN1759	8	H112	D5	205		Clean Harbors, Ryley
Acid solutions, sludges and residues containing heavy metals	UN3244	8	H112	D5	114		Clean Harbors, Ryley
Acid solutions, sludges and residues containing heavy metals	UN3260	8	H112	D5	6640		Clean Harbors, Ryley
Other inorganic acid wastes	UN3260	8	H114	D5	330		Clean Harbors, Ryley
Alk. Soln sludge/residue - metals, non-metals, no cyanide	UN1759	8	H122	D5	3538		Clean Harbors, Ryley
Alk. Soln sludge/residue - metals, non-metals, no cyanide	UN1760	8	H122	D5	410		Clean Harbors, Ryley
Alk. Soln sludge/residue - metals, non-metals, no cyanide	UN1823	8	H122	D5	200		Clean Harbors, Ryley
Alk. Soln sludge/residue - metals, non-metals, no cyanide	UN3190	4.2	H122	D5	3690		Clean Harbors, Ryley
Alk. Soln sludge/residue - metals, non-metals, no cyanide	UN3262	8	H122	D5	1200		Clean Harbors, Ryley
Alk. Soln sludge/residue - metals, non-metals, no cyanide	UN3266	8	H122	D5	6276		Clean Harbors, Ryley
Neutralized solutions, sludges, residues with heavy metals	NONE	N/A	H131	D5	480250		Clean Harbors, Ryley
Contaminated debris & soil from spills, accidents & leaks	NONE	N/A	H138	D5	2824220		Clean Harbors, Ryley
Contaminated debris & soil from spills, accidents & leaks	UN1759	8	H138	D5	250		Clean Harbors, Ryley
Contaminated debris & soil from spills, accidents & leaks	UN3175	4.1	H138	D5	143980		Clean Harbors, Ryley
Residues from steel making	NONE	N/A	H143	D5	5273920		Clean Harbors, Ryley
Residues from steel making	UN3262	8	H143	D5	1004374		Clean Harbors, Ryley
Waste from the use of paints, pigments & coatings	NONE	N/A	H145	D5	11524240		Clean Harbors, Ryley
Waste from the use of paints, pigments & coatings	UN1210	3	H145	D5	410		Clean Harbors, Ryley
Waste from the use of paints, pigments & coatings	UN1263	3	H145	D5	2290		Clean Harbors, Ryley
Waste from the use of paints, pigments & coatings	UN3175	4.1	H145	D5	298198		Clean Harbors, Ryley
Other specified inorganic sludges, slurries or solids	NONE	N/A	H146	D5	1347169		Clean Harbors, Ryley
Other specified inorganic sludges, slurries or solids	UN1759	8	H146	D5	11318		Clean Harbors, Ryley
Other specified inorganic sludges, slurries or solids	UN3077	9	H146	D5	38712		Clean Harbors, Ryley
Other specified inorganic sludges, slurries or solids	UN3260	8	H146	D5	3000		Clean Harbors, Ryley
Other specified inorganic sludges, slurries or solids	UN3262	8	H146	D5	1845		Clean Harbors, Ryley
Chemical fertilizer wastes	NONE	N/A	H147	D5	138355340		Clean Harbors, Ryley
Miscellaneous waste inorganic chemicals	NONE	N/A	H148	D5	1387114		Clean Harbors, Ryley
Miscellaneous waste inorganic chemicals	UN1350	4.1	H148	D5	93014		Clean Harbors, Ryley
Miscellaneous waste inorganic chemicals	UN1760	8	H148	D5	410		Clean Harbors, Ryley
Miscellaneous waste inorganic chemicals	UN2693	8	H148	D5	1880		Clean Harbors, Ryley
Miscellaneous waste inorganic chemicals	UN3260	8	H148	D5	22580		Clean Harbors, Ryley
Inert inorganic waste	NONE	N/A	H150	D5	177735		Clean Harbors, Ryley
Inert inorganic waste	UN2212	9	H150	D5	4916		Clean Harbors, Ryley
Inert inorganic waste	UN2291	6.1	H150	D5	2630		Clean Harbors, Ryley

Hazardous Recycle or Waste Name	PIN	Class	Waste Code	Management Code	Hazardous (kg/L)	Non-hazardous (kg/L)	Store On-site
Inert inorganic waste	UN2590	9	H150	D5	13129		Clean Harbors, Ryley
Inert inorganic waste	UN3175	4.1	H150	D5	3580		Clean Harbors, Ryley
Empty packages, bags, containers	NONE	N/A	H152	D5	4138		Clean Harbors, Ryley
Empty packages, bags, containers	UN3509	9	H152	D5	15250		Clean Harbors, Ryley
Spent catalysts	NONE	N/A	H153	D5	931598		Clean Harbors, Ryley
Spent catalysts	UN3077	9	H153	D5	1250		Clean Harbors, Ryley
Spent catalysts	UN3175	4.1	H153	D5	32190		Clean Harbors, Ryley
Spent catalysts	UN3190	4.2	H153	D5	1384744		Clean Harbors, Ryley
Spent catalysts	UN3260	8	H153	D5	22597		Clean Harbors, Ryley
Spent catalysts	UN3262	8	H153	D5	7140		Clean Harbors, Ryley
Desiccants - Silica gel, activated alumina & molecular sieves	NONE	N/A	H154	D5	1068180		Clean Harbors, Ryley
Desiccants - Silica gel, activated alumina & molecular sieves	UN3175	4.1	H154	D5	21810		Clean Harbors, Ryley
Aromatic solvents and residues	NONE	N/A	H211	D5	18630		Clean Harbors, Ryley
Petroleum distillates	NONE	N/A	H213	D5	205		Clean Harbors, Ryley
Petroleum distillates	UN1362	4.2	H213	D5	400		Clean Harbors, Ryley
Petroleum distillates	UN1993	3	H213	D5	5		Clean Harbors, Ryley
Polymeric resins	NONE	NONE	H232	D5	205		Clean Harbors, Ryley
Polymeric resins	UN1759	8	H232	D5	58750		Clean Harbors, Ryley
Polymeric resins	UN2925	4.1	H232	D5	24320		Clean Harbors, Ryley
Other polymeric waste	UN3082	9	H233	D5	228		Clean Harbors, Ryley
Halogenated solvents and residues	NONE	N/A	H241	D5	810068		Clean Harbors, Ryley
Halogenated pesticides & herbicides	NONE	N/A	H242	D5	5820		Clean Harbors, Ryley
Polychlorinated biphenyls (PCB)	UN2315	9	H243	D5	286		Clean Harbors, Ryley
Waste oils/sludges (petroleum based)	NONE	N/A	H251	D5	4555577		Clean Harbors, Ryley
Waste oils/sludges (petroleum based)	UN3175	4.1	H251	D5	2003850		Clean Harbors, Ryley
Waste crankcase oils & lubricants	NONE	N/A	H252	D5	2618		Clean Harbors, Ryley
Emulsified oils	NONE	N/A	H253	D5	2255		Clean Harbors, Ryley
Filters from oils & gas processing	NONE	N/A	H256	D5	17870		Clean Harbors, Ryley
Filters from oils & gas processing	UN3190	4.2	H256	D5	101410		Clean Harbors, Ryley
Filters from oils & gas processing	UN3200	4.2	H256	D5	20540		Clean Harbors, Ryley
Miscellaneous waste organic chemicals	NONE	N/A	H263	D5	4920		Clean Harbors, Ryley
Miscellaneous waste organic chemicals	UN1654	6.1	H263	D5	480		Clean Harbors, Ryley
Miscellaneous waste organic chemicals	UN1993	3	H263	D5	4000		Clean Harbors, Ryley
Miscellaneous waste organic chemicals	UN2212	9	H263	D5	3		Clean Harbors, Ryley

Appendix B
2023 Year-end Survey
Report

To: Clean Harbors Inc.
Stan Yuha – Facility Manager

Date: March 8, 2024

c: Michael E. Parker – Vice President
Canadian Environmental Compliance

Memo No.: 02

From: Spencer Smith, P.Eng.
Sean Buckles, M.Sc., P.Eng.

File: 704-SWM.SWOP04490-01

Subject: REV 01 - Remaining Airspace – December 29, 2023
Clean Harbors Facility, Ryley, Alberta

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was requested to complete the remaining airspace calculations for the Clean Harbors Facility located near Ryley, Alberta. These calculations are based on the topographic waste survey completed by Clean Harbors Industrial Services – Unmanned Aerial Systems on December 29, 2023. This work was completed as requested by the Clean Harbors Inc. (Clean Harbors) Ryley Landfill Facility Manager on November 24, 2023.

2.0 AIRSPACE MODELLING

Using AutoCAD Civil 3D software, Tetra Tech completed airspace modelling based on the December 29, 2023 survey data provided by Clean Harbors, and design top of waste elevations previously completed by Tetra Tech. The 3D Drawing models are done in Universal Transverse Mercator (UTM) NAD83, Zone 12.

As of December 29, 2023, the total estimated remaining airspace at the Clean Harbors Ryley Facility is estimated to be 78,176 m³, excluding the tipping pad area and the newly constructed Cell 5. It is noted that this calculation also excludes the 2023 capping area that was completed (clay barrier layer only) in October 2023.

The total estimated remaining airspace is shown in green on Drawing C100. This information is presented in Table 1 below and on the attached Drawing C100 and Drawing C101.

Table 1: Airspace Modelling Summary

Area	Remaining Airspace Volume	Notes
Active Cells 3C, 3D, 3E, & 4	78,176 m ³	Approximately 114,315 m ³ of waste was placed since the December 31, 2022 survey.

3.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Clean Harbors Canada Inc. and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Clean Harbors Canada Inc., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

4.0 CLOSURE

We trust this technical memo meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

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/as

<p align="center">PERMIT TO PRACTICE TETRA TECH CANADA INC.</p> <p>RM SIGNATURE: _____</p> <p>RM APEGA ID #: _____</p> <p>DATE: _____</p> <p align="center">PERMIT NUMBER: P013774 The Association of Professional Engineers and Geoscientists of Alberta (APEGA)</p>

Enclosure: Tetra Tech's Limitations on the Use of this Document
2023 Waste Survey Drawing C100 and Drawing C101

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The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

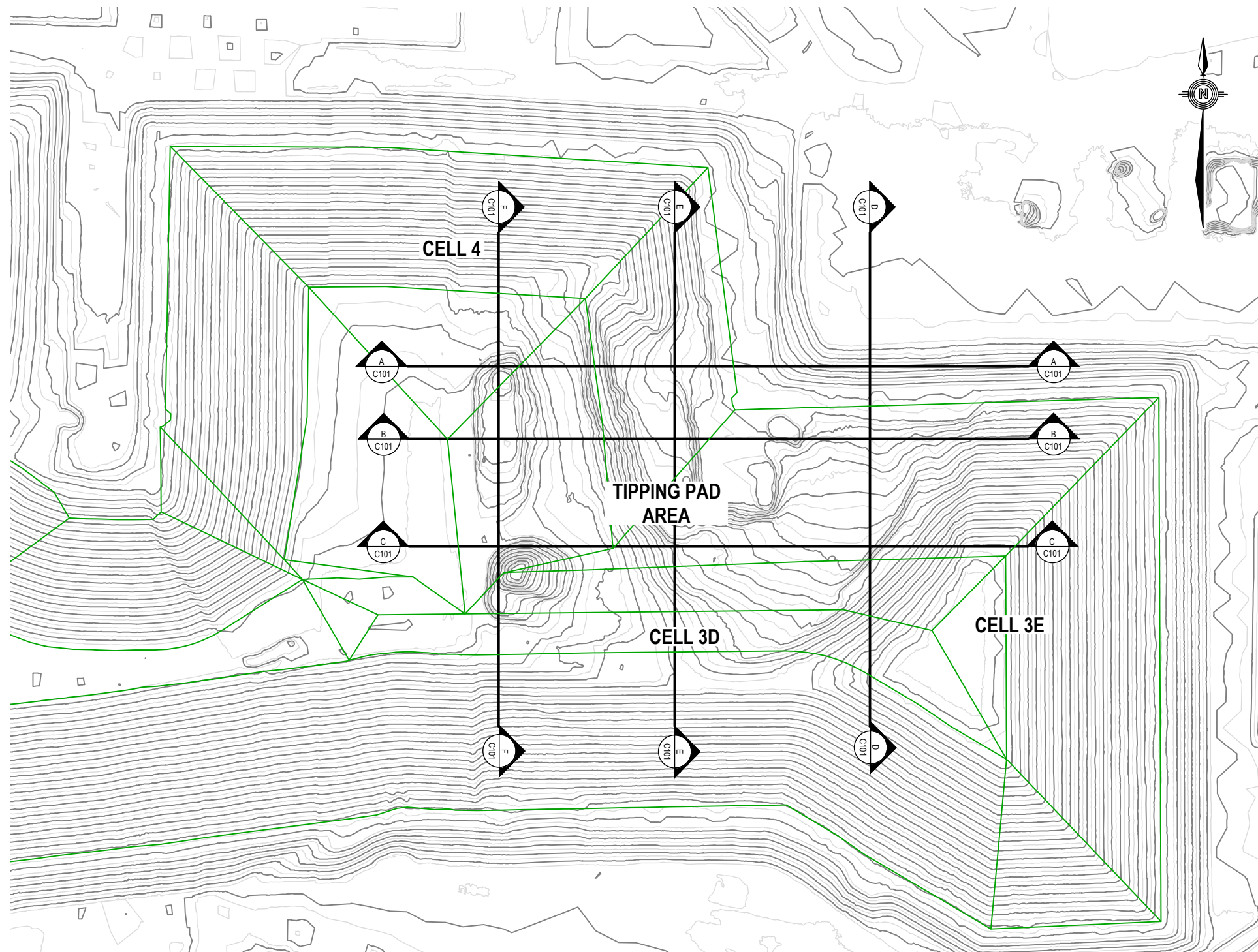
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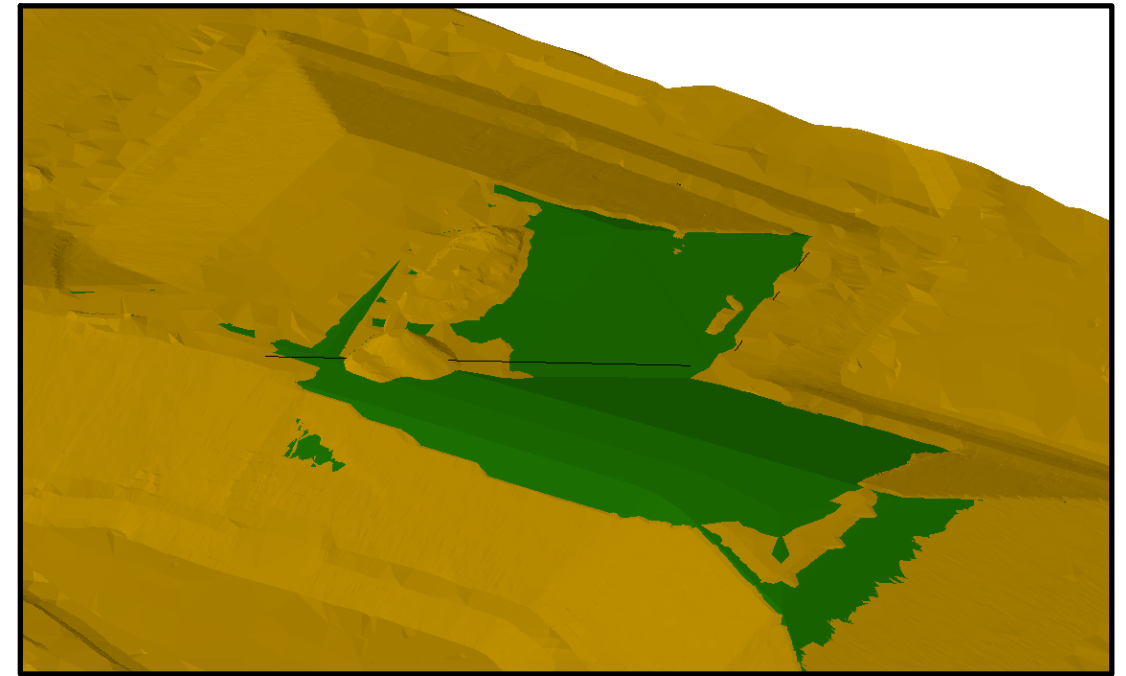
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In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

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EXISTING WASTE TOPOGRAPHY - YEAR END 2023 SURVEY
(Flown on December 29, 2023)



DESIGN TOP OF WASTE (GREEN) VS. YEAR END 2023 WASTE SURVEY (ORANGE)

REMAINING AIRSPACE TOTAL.....78,176 m³
(Cut: 7,753, Fill: 85,929, Net: 78,176)

WASTE PLACED SINCE DECEMBER 2022 SURVEY.....114,315 m³

- NOTES:
1. TOPOGRAPHY SHOWN IS THE 2023 YEAR END WASTE SURVEY (Surveyed by Clean Harbors on Dec 29, 2023)
 2. UTM with NAD83 datum, Zone 12, Meter; Central Meridian 111d W

STATUS
ISSUED FOR USE

NUM	DATE	APR	DESCRIPTION
0	JAN 08/24	SB	ISSUED FOR USE
REVISIONS			
A	JAN 08/24	SB	ISSUED FOR REVIEW
DRAWING STATUS			

PERMIT

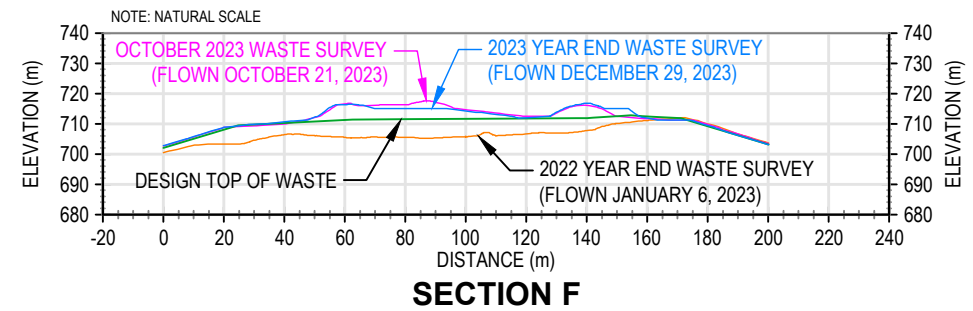
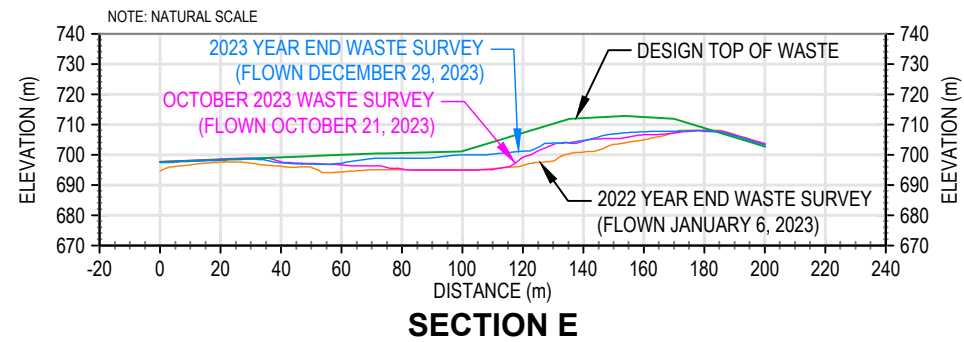
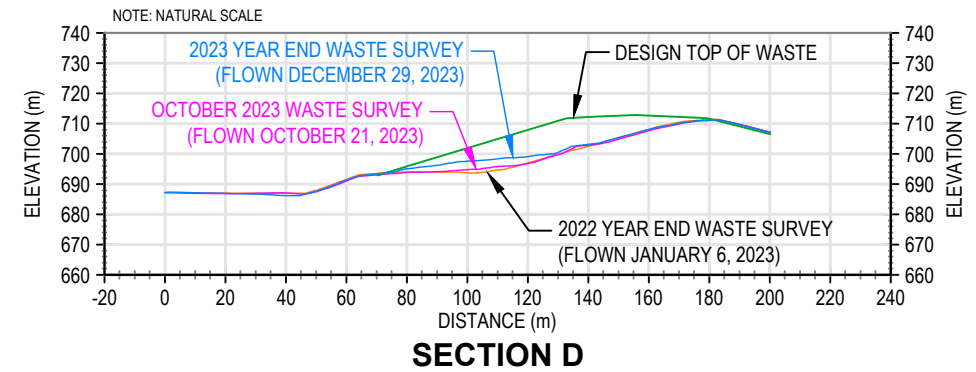
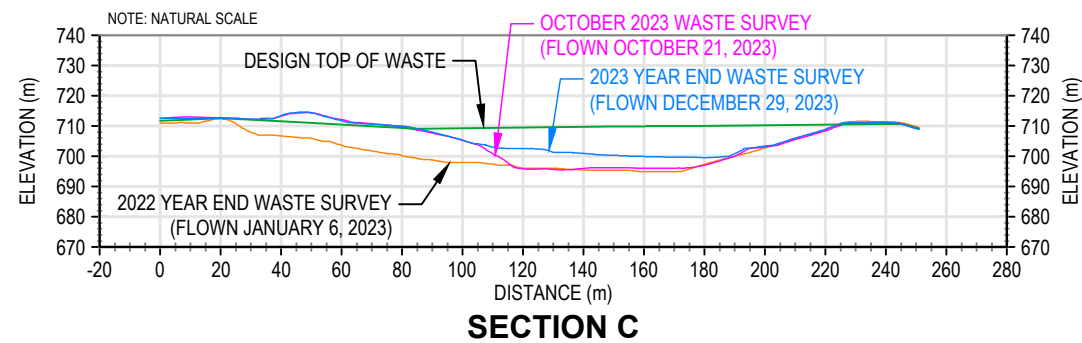
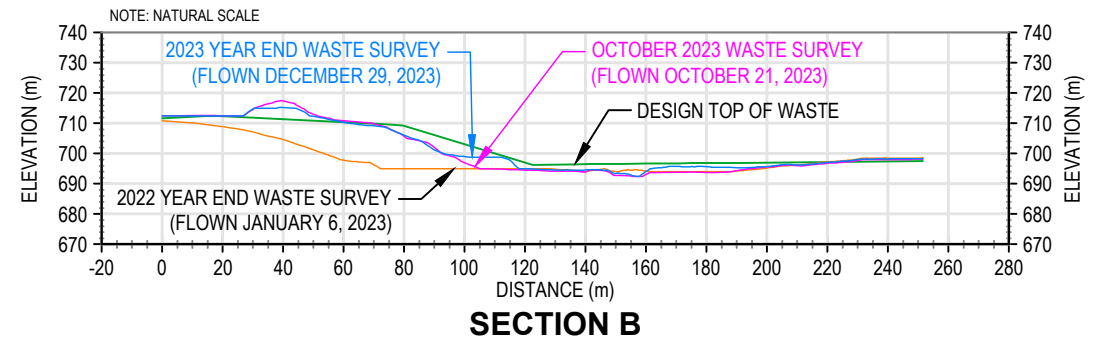
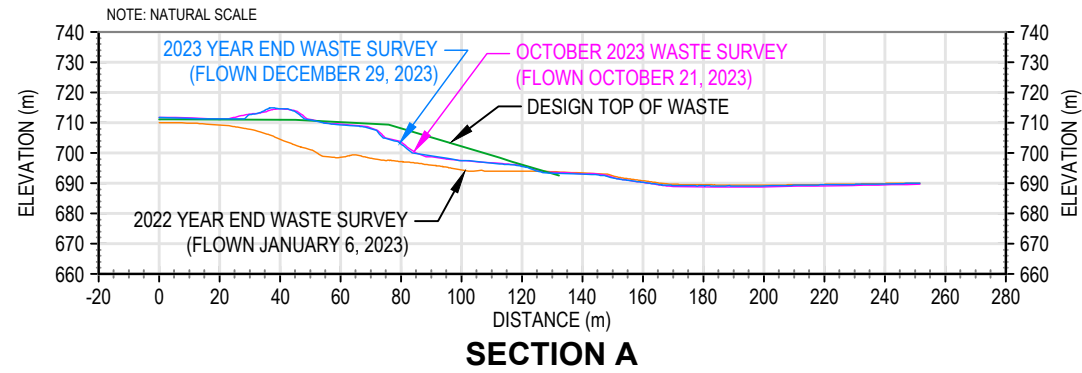
PROFESSIONAL SEAL

CLIENT



CLEAN HARBORS					
2023 YEAR END WASTE SURVEY					
PLAN					
2023 YEAR END WASTE SURVEY					
PROJECT No. SWM.SWOP04490-01	OFFICE EDM	DES -	CKD SB	REV 0	DRAWING C100
DATE: January 2024	SHEET No. 1 of 2	DWN DRG / DBD	APP SB	STATUS -	

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STATUS
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NUM	DATE	APR	DESCRIPTION
0	JAN 08/24	SB	ISSUED FOR USE
REVISIONS			
A	JAN 08/24	SB	ISSUED FOR REVIEW
DRAWING STATUS			

PERMIT

PROFESSIONAL SEAL

CLIENT



CLEAN HARBORS
2023 YEAR END WASTE SURVEY

CROSS-SECTIONS A - F
2023 YEAR END WASTE SURVEY

PROJECT No. SWM.SWOP04490-01	OFFICE EDM	DES -	CKD SB	REV 0	DRAWING
DATE: January 2024	SHEET No. 2 of 2	DWN DRG / DBD	APP SB	STATUS -	C101

Appendix C
Leachate Head Level
Table

Date	Cell 2 Head Level (m)	Cell 3A Head Level (m)	Cell 3B Head Level (m)	Cell 3C Head Level (m)	Cell 3D Head Level (m)	Cell 3E Head Level (m)	Cell 4 Head Level (m)	Precipitation (mm)
Maximum Acceptable Leachate Head	1.0	1.0	1.0	1.0	0.30	0.3	0.30	
1-Jan-23			Last precip Dec. 28th					
2-Jan-23								
3-Jan-23	0.08	0.26	0.20	0.19	0.20	0.19	0.20	
4-Jan-23	0.09	0.22	0.21	0.19	0.20	0.19	0.20	
5-Jan-23	0.07	0.21	0.22	0.19	0.21	0.20	0.20	
6-Jan-23	0.08	0.22	0.23	0.21	0.20	0.20	0.21	
7-Jan-23								
8-Jan-23								
9-Jan-23	0.08	0.21	0.21	0.19	0.20	0.19	0.19	
10-Jan-23	0.08	0.22	0.21	0.19	0.20	0.19	0.19	
11-Jan-23	0.10	0.23	0.23	0.20	0.21	0.20	0.22	
12-Jan-23	0.08	0.21	0.22	0.20	0.20	0.20	0.20	1
13-Jan-23	0.08	0.21	0.21	0.20	0.21	0.20	0.20	
14-Jan-23								
15-Jan-23								
16-Jan-23	0.11	0.22	0.22	0.20	0.21	0.20	0.20	
17-Jan-23	0.10	0.21	0.21	0.19	0.20	0.20	0.19	
18-Jan-23	0.10	0.22	0.22	0.20	0.20	0.20	0.20	
19-Jan-23	0.10	0.22	0.22	0.20	0.21	0.20	0.20	
20-Jan-23	0.09	0.22	0.21	0.19	0.20	0.20	0.19	
21-Jan-23								
22-Jan-23								
23-Jan-23	0.09	0.19	0.22	0.16	0.20	0.15	0.19	
24-Jan-23	0.11	0.25	0.24	0.21	0.20	0.19	0.19	
25-Jan-23	0.08	0.21	0.21	0.19	0.20	0.19	0.19	
26-Jan-23	0.72	0.22	0.22	0.20	0.21	0.20	0.21	2
27-Jan-23	0.21	0.23	0.23	0.20	0.20	0.19	0.22	2
28-Jan-23								
29-Jan-23								
30-Jan-23	0.03	0.21	0.21	0.19	0.20	0.19	0.20	10
31-Jan-23	0.07	0.21	0.21	0.19	0.20	0.19	0.20	5

Date	Cell 2 Head Level (m)	Cell 3A Head Level (m)	Cell 3B Head Level (m)	Cell 3C Head Level (m)	Cell 3D Head Level (m)	Cell 3E Head Level (m)	Cell 4 Head Level (m)	Precipitation (mm)
Maximum Acceptable Leachate Head	1.0	1.0	1.0	1.0	0.30	0.3	0.30	
1-Feb-23	0.06	0.22	0.22	0.20	0.20	0.19	0.20	5
2-Feb-23	0.05	0.18	0.19	0.18	0.19	0.19	0.17	
3-Feb-23	0.09	0.21	0.21	0.19	0.20	0.19	0.20	
4-Feb-23								
5-Feb-23								
6-Feb-23	0.08	0.19	0.21	0.19	0.20	0.20	0.19	
7-Feb-23	0.10	0.22	0.25	0.20	0.21	0.20	0.21	
8-Feb-23	0.08	0.23	0.22	0.20	0.20	0.20	0.21	5
9-Feb-23	0.08	0.20	0.21	0.20	0.20	0.20	0.20	
10-Feb-23	0.11	0.21	0.21	0.19	0.20	0.20	0.20	
11-Feb-23								
12-Feb-23								
13-Feb-23	0.86	0.22	0.21	0.20	0.20	0.20	0.21	
14-Feb-23	0.24	0.20	0.23	0.19	0.20	0.19	0.19	
15-Feb-23	0.05	0.22	0.21	0.20	0.21	0.20	0.20	
16-Feb-23	0.01	0.20	0.20	0.19	0.20	0.19	0.19	
17-Feb-23	0.03	0.22	0.21	0.20	0.21	0.20	0.20	
18-Feb-23								
19-Feb-23								
20-Feb-23								
21-Feb-23	0.03	0.22	0.21	0.20	0.20	0.19	0.20	
22-Feb-23	0.02	0.21	0.21	0.19	0.20	0.19	0.19	
23-Feb-23	0.02	0.21	0.21	0.19	0.20	0.19	0.19	
24-Feb-23	0.03	0.20	0.21	0.19	0.20	0.20	0.19	
25-Feb-23								
26-Feb-23								
27-Feb-23	0.09	0.22	0.21	0.20	0.20	0.20	0.20	
28-Feb-23	0.07	0.25	0.22	0.20	0.20	0.20	0.19	1
1-Mar-23	0.06	0.20	0.20	0.19	0.19	0.20	0.19	5
2-Mar-23	0.09	0.40	0.30	0.20	0.03	0.20	0.20	
3-Mar-23	0.07	0.22	0.21	0.22	0.21	0.20	0.20	

Date	Cell 2 Head Level (m)	Cell 3A Head Level (m)	Cell 3B Head Level (m)	Cell 3C Head Level (m)	Cell 3D Head Level (m)	Cell 3E Head Level (m)	Cell 4 Head Level (m)	Precipitation (mm)
Maximum Acceptable Leachate Head	1.0	1.0	1.0	1.0	0.30	0.3	0.30	
4-Mar-23								
5-Mar-23								
6-Mar-23	0.06	0.22	0.22	0.56	0.21	0.20	0.20	
7-Mar-23	0.06	0.21	0.21	0.86	0.20	0.19	0.19	3
8-Mar-23	0.06	0.21	0.21	0.99	0.20	0.19	0.19	
9-Mar-23	0.07	0.20	0.21	1.11	0.20	0.20	0.19	1
10-Mar-23	0.09	0.20	0.20	1.25	0.20	0.19	0.19	1
11-Mar-23								
12-Mar-23								
13-Mar-23	0.1	0.20	0.20	1.22	0.20	0.27	0.28	
14-Mar-23	0.12	0.22	0.21	0.29	0.21	0.31	0.34	1
15-Mar-23	0.10	0.23	0.21	0.29	0.20	0.35	0.22	
16-Mar-23	0.09	0.22	0.21	0.26	0.20	0.20	0.20	
17-Mar-23	0.08	0.21	0.24	0.24	0.20	0.19	0.18	
18-Mar-23								
19-Mar-23								
20-Mar-23	0.14	0.21	0.22	0.22	0.20	0.20	0.19	
21-Mar-23	0.12	0.22	0.40	0.24	0.20	0.20	0.19	
22-Mar-23	0.11	0.20	0.20	0.23	0.20	0.19	0.19	
23-Mar-23	0.11	0.21	0.21	0.24	0.20	0.19	0.19	
24-Mar-23	0.13	0.22	0.19	0.22	0.20	0.19	0.19	
25-Mar-23								
26-Mar-23								
27-Mar-23	0.10	0.21	0.21	0.20	0.20	0.19	0.19	
28-Mar-23	0.10	0.21	0.20	0.20	0.20	0.19	0.19	
29-Mar-23	0.12	0.22	0.20	0.19	0.20	0.20	0.19	
30-Mar-23	0.13	0.21	0.20	0.19	0.20	0.19	0.19	
31-Mar-23	0.14	0.21	0.21	0.19	0.20	0.20	0.25	
1-Apr-23								
2-Apr-23								
3-Apr-23	0.14	0.22	0.21	0.19	0.20	0.20	0.19	2

Date	Cell 2 Head Level (m)	Cell 3A Head Level (m)	Cell 3B Head Level (m)	Cell 3C Head Level (m)	Cell 3D Head Level (m)	Cell 3E Head Level (m)	Cell 4 Head Level (m)	Precipitation (mm)
Maximum Acceptable Leachate Head	1.0	1.0	1.0	1.0	0.30	0.3	0.30	
4-Apr-23	0.14	0.22	0.22	0.19	0.21	0.20	0.20	6
5-Apr-23	0.13	0.21	0.20	0.18	0.20	0.20	0.19	
6-Apr-23	0.14	0.22	0.21	0.20	0.21	0.20	0.20	
7-Apr-23								
8-Apr-23								
9-Apr-23								
10-Apr-23	0.17	0.21	0.20	0.19	0.20	0.19	0.20	
11-Apr-23	0.17	0.21	0.21	0.19	0.20	0.20	0.19	8
12-Apr-23	0.15	0.21	0.20	0.19	0.20	0.20	0.20	10
13-Apr-23	0.14	0.21	0.20	0.19	0.20	0.19	0.20	
14-Apr-23	0.13	0.21	0.20	0.19	0.20	0.19	0.20	
15-Apr-23								
16-Apr-23								
17-Apr-23	0.17	0.21	0.21	0.19	0.20	0.20	0.21	1
18-Apr-23	0.16	0.21	0.21	0.19	0.20	0.19	0.21	20
19-Apr-23	0.29	0.22	0.20	0.20	0.20	0.19	0.23	
20-Apr-23	0.47	0.22	0.21	0.20	0.21	0.20	0.20	
21-Apr-23	0.56	0.22	0.21	0.20	0.21	0.20	0.21	
22-Apr-23								
23-Apr-23								
24-Apr-23	1.03	0.22	0.20	0.19	0.20	0.19	0.25	
25-Apr-23	1.17	0.22	0.21	0.20	0.20	0.20	0.20	
26-Apr-23	1.29	0.20	0.20	0.19	0.20	0.19	0.18	
27-Apr-23	1.41	0.22	0.21	0.20	0.20	0.19	0.21	
28-Apr-23	1.48	0.22	0.21	0.20	0.21	0.20	0.21	
29-Apr-23								
30-Apr-23								
1-May-23	1.62	0.22	0.21	0.20	0.21	0.20	0.20	
2-May-23	1.67	0.23	0.21	0.20	0.21	0.20	0.21	
3-May-23	1.68	0.20	0.23	0.19	0.22	0.20	0.24	
4-May-23	1.71	0.21	0.20	0.19	0.20	0.20	0.23	

Date	Cell 2 Head Level (m)	Cell 3A Head Level (m)	Cell 3B Head Level (m)	Cell 3C Head Level (m)	Cell 3D Head Level (m)	Cell 3E Head Level (m)	Cell 4 Head Level (m)	Precipitation (mm)
Maximum Acceptable Leachate Head	1.0	1.0	1.0	1.0	0.30	0.3	0.30	
5-Jun-23	1.24	0.21	0.20	0.25	0.20	0.20	0.23	
6-Jun-23	0.67	0.21	0.20	0.25	0.20	0.20	0.24	
7-Jun-23	0.06	0.22	0.21	0.25	0.21	0.20	0.24	
8-Jun-23	0.03	0.22	0.21	0.25	0.21	0.20	0.25	
9-Jun-23	0.02	0.22	0.21	0.27	0.21	0.20	0.24	
10-Jun-23								
11-Jun-23								
12-Jun-23	0.01	0.21	0.20	0.25	0.20	0.20	0.23	
13-Jun-23	0.02	0.20	0.19	0.26	0.20	0.20	0.23	
14-Jun-23	0.04	0.21	0.20	0.26	0.20	0.20	0.24	
15-Jun-23	0.07	0.22	0.21	0.27	0.21	0.20	0.27	24
16-Jun-23	0.02	0.21	0.20	0.25	0.20	0.19	0.23	2
17-Jun-23								
18-Jun-23								
19-Jun-23	0.27	0.22	0.21	0.28	0.21	0.20	1.23	40
20-Jun-23	0.09	0.22	0.21	0.28	0.21	0.20	1.73	6
21-Jun-23	0.06	0.21	0.20	0.28	0.20	0.19	1.49	7
22-Jun-23	0.05	0.20	0.19	0.28	0.20	0.19	1.11	
23-Jun-23	0.05	0.21	0.20	0.28	0.20	0.19	0.50	
24-Jun-23								
25-Jun-23								
26-Jun-23	0.05	0.21	0.20	0.28	0.21	0.20	0.29	11
27-Jun-23	0.07	0.22	0.21	0.28	0.21	0.20	0.28	
28-Jun-23	0.06	0.22	0.20	0.55	0.20	0.20	0.27	
29-Jun-23	0.07	0.21	0.20	1.06	0.21	0.20	0.27	
30-Jun-23	0.07	0.22	0.21	1.19	0.21	0.20	0.34	
1-Jul-23								
2-Jul-23								
3-Jul-23								
4-Jul-23	0.09	0.23	0.22	1.44	0.22	0.20	1.98	10
5-Jul-23	0.08	0.22	0.20	1.51	0.21	0.22	1.33	

Date	Cell 2 Head Level (m)	Cell 3A Head Level (m)	Cell 3B Head Level (m)	Cell 3C Head Level (m)	Cell 3D Head Level (m)	Cell 3E Head Level (m)	Cell 4 Head Level (m)	Precipitation (mm)
Maximum Acceptable Leachate Head	1.0	1.0	1.0	1.0	0.30	0.3	0.30	
6-Aug-23								
7-Aug-23								
8-Aug-23	1.49	0.21	0.20	0.47	0.22	0.20	6.10	3
9-Aug-23	1.67	0.21	0.20	0.88	0.24	0.25	6.18	10
10-Aug-23	1.85	0.21	0.20	1.43	0.26	0.31	5.23	8
11-Aug-23	0.11	0.22	0.21	1.52	0.29	0.20	3.78	
12-Aug-23								
13-Aug-23								
14-Aug-23	0.07	0.21	0.20	0.49	0.18	0.19	5.35	
15-Aug-23	0.05	0.20	0.20	0.29	0.18	0.20	5.48	
16-Aug-23	0.08	0.21	0.21	0.27	0.19	0.20	2.75	
17-Aug-23	0.08	0.21	0.20	0.26	0.19	0.20	1.53	
18-Aug-23	0.25	0.21	0.20	0.29	0.20	0.20	2.49	12
19-Aug-23								
20-Aug-23								
21-Aug-23	0.11	0.21	0.21	0.44	0.21	0.20	4.50	
22-Aug-23	0.11	0.21	0.20	0.43	0.20	0.20	5.34	
23-Aug-23	0.11	0.20	0.20	0.40	0.20	0.20	2.30	
24-Aug-23	0.14	0.22	0.21	0.37	0.20	0.20	0.74	4
25-Aug-23	0.12	0.21	0.20	0.71	0.21	0.22	1.78	
26-Aug-23								
27-Aug-23								
28-Aug-23	0.10	0.21	0.20	1.49	0.20	0.20	4.42	
29-Aug-23	0.10	0.21	0.20	1.58	0.20	0.20	4.11	
30-Aug-23	0.12	0.21	0.20	1.71	0.20	0.20	1.71	
31-Aug-23	0.15	0.21	0.21	1.80	0.20	0.20	0.48	
1-Sep-23	0.14	0.22	0.21	1.88	0.22	0.20	0.34	
2-Sep-23								
3-Sep-23								
4-Sep-23								
5-Sep-23	0.13	0.21	0.20	0.37	0.20	0.20	3.29	

Date	Cell 2 Head Level (m)	Cell 3A Head Level (m)	Cell 3B Head Level (m)	Cell 3C Head Level (m)	Cell 3D Head Level (m)	Cell 3E Head Level (m)	Cell 4 Head Level (m)	Precipitation (mm)
Maximum Acceptable Leachate Head	1.0	1.0	1.0	1.0	0.30	0.3	0.30	
6-Sep-23	0.15	0.22	0.33	0.33	0.21	0.20	3.33	4
7-Sep-23	0.15	0.22	0.21	0.81	0.21	0.20	3.64	
8-Sep-23	0.14	0.22	0.21	1.35	0.21	0.20	0.99	
9-Sep-23								
10-Sep-23								
11-Sep-23	0.14	0.21	0.20	1.37	0.20	0.20	0.30	
12-Sep-23	0.16	0.22	0.21	1.45	0.21	0.20	0.99	
13-Sep-23	0.17	0.22	0.21	1.44	0.21	0.20	0.47	
14-Sep-23	0.16	0.22	0.21	0.49	0.21	0.20	1.12	
15-Sep-23	0.15	0.22	0.21	0.42	0.21	0.20	0.29	
16-Sep-23								
17-Sep-23								
18-Sep-23	1.31	0.24	0.24	logger error	0.21	0.20	0.31	
19-Sep-23	1.16	0.20	0.22	2.90	0.21	0.20	0.28	
20-Sep-23	1.32	0.21	0.21	2.86	0.20	0.19	0.29	8
21-Sep-23	1.42	0.21	0.21	2.85	0.23	0.20	0.37	
22-Sep-23	1.48	0.21	0.26	2.86	0.25	0.20	0.28	
23-Sep-23								
24-Sep-23								
25-Sep-23	1.66	0.22	0.34	2.88	0.22	0.20	1.16	
26-Sep-23	1.71	0.22	0.33	2.91	0.35	0.20	1.25	
27-Sep-23	0.13	0.22	0.20	2.88	0.37	0.20	1.61	
28-Sep-23	0.12	0.21	0.19	2.85	0.41	0.20	1.45	
29-Sep-23								
30-Sep-23								
1-Oct-23								
2-Oct-23	1.39	0.20	0.26	2.90	2.15	0.19	0.26	
3-Oct-23	1.51	0.22	0.21	2.86	2.53	0.19	0.28	
4-Oct-23	1.61	0.22	0.22	2.87	2.89	0.20	0.49	1
5-Oct-23	1.49	0.21	0.21	2.84	1.73	0.20	0.29	
6-Oct-23	1.53	0.20	0.20	2.84	1.97	0.20	0.24	

Date	Cell 2 Head Level (m)	Cell 3A Head Level (m)	Cell 3B Head Level (m)	Cell 3C Head Level (m)	Cell 3D Head Level (m)	Cell 3E Head Level (m)	Cell 4 Head Level (m)	Precipitation (mm)
Maximum Acceptable Leachate Head	1.0	1.0	1.0	1.0	0.30	0.3	0.30	
7-Oct-23								
8-Oct-23								
9-Oct-23								
10-Oct-23	0.10	0.21	0.21	2.89	0.32	0.19	3.08	
11-Oct-23	0.12	0.22	0.21	2.92	0.31	0.20	3.39	
12-Oct-23	0.11	0.22	0.22	2.84	0.34	0.20	2.85	
13-Oct-23	0.10	0.15	0.22	0.04	0.37	0.20	3.14	
14-Oct-23								
15-Oct-23								
16-Oct-23	1.12	0.22	0.22	0.06	1.29	0.20	2.02	
17-Oct-23	1.36	0.22	0.25	0.07	1.88	0.20	2.21	
18-Oct-23	1.45	0.21	0.21	0.06	2.26	0.20	1.45	
19-Oct-23	0.73	0.21	0.21	0.07	2.65	0.20	0.30	
20-Oct-23	1.22	0.22	0.21	0.06	2.97	0.20	0.24	
21-Oct-23								
22-Oct-23								
23-Oct-23	0.06	0.21	0.22	0.06	3.30	0.22	0.77	3
24-Oct-23	0.06	0.21	0.22	0.06	3.32	0.26	0.65	10
25-Oct-23	0.37	0.21	0.21	0.05	3.35	0.29	0.22	
26-Oct-23	0.79	0.21	0.21	0.05	3.39	0.20	0.20	
27-Oct-23	1.13	0.21	0.21	0.06	3.45	0.20	0.20	
28-Oct-23								
29-Oct-23								
30-Oct-23	1.48	0.22	0.23	0.06	3.61	0.20	0.19	
31-Oct-23	1.55	0.22	0.22	0.07	1.48	0.20	0.24	
1-Nov-23	1.60	0.21	0.22	0.06	0.52	0.19	0.17	
2-Nov-23	1.67	0.22	0.22	0.07	0.42	0.20	0.18	
3-Nov-23	1.71	0.21	0.22	0.07	0.32	0.20	0.23	
4-Nov-23								
5-Nov-23								
6-Nov-23	2.13	0.21	0.22	0.08	0.20	0.20	1.11	

Date	Cell 2 Head Level (m)	Cell 3A Head Level (m)	Cell 3B Head Level (m)	Cell 3C Head Level (m)	Cell 3D Head Level (m)	Cell 3E Head Level (m)	Cell 4 Head Level (m)	Precipitation (mm)
Maximum Acceptable Leachate Head	1.0	1.0	1.0	1.0	0.30	0.3	0.30	
7-Nov-23	0.10	0.21	0.21	0.08	0.20	0.19	0.95	
8-Nov-23	0.09	0.22	0.23	0.05	0.21	0.20	0.52	4
9-Nov-23	0.38	0.21	0.21	0.05	0.20	0.23	0.20	
10-Nov-23								
11-Nov-23								
12-Nov-23								
13-Nov-23	1.54	0.20	0.21	0.06	0.20	0.37	0.16	
14-Nov-23	1.63	0.23	0.23	0.06	0.20	0.39	0.25	
15-Nov-23	1.70	0.22	0.27	0.06	0.21	0.43	0.18	
16-Nov-23	1.71	0.19	0.35	0.03	0.19	0.45	0.15	
17-Nov-23	1.77	0.21	0.40	0.06	0.20	0.48	0.19	
18-Nov-23								
19-Nov-23								
20-Nov-23	0.11	0.24	0.24	0.02	0.20	0.56	0.25	
21-Nov-23	0.10	0.21	0.21	0.04	0.20	0.58	0.23	
22-Nov-23	0.10	0.22	0.23	0.03	0.20	0.45	0.28	
23-Nov-23	0.10	0.22	0.22	0.02	0.20	0.34	0.37	
24-Nov-23	0.10	0.21	0.21	0.03	0.19	0.19	0.53	
25-Nov-23								
26-Nov-23								
27-Nov-23	0.11	0.22	0.22	0.05	0.20	0.20	1.76	
28-Nov-23	0.12	0.22	0.22	0.04	0.20	0.20	1.96	
29-Nov-23	0.12	0.22	0.22	0.05	0.20	0.20	2.27	
30-Nov-23	0.12	0.21	0.22	0.04	0.20	0.20	2.45	
1-Dec-23	0.13	0.21	0.22	0.05	0.20	0.20	2.73	
2-Dec-23								
3-Dec-23								
4-Dec-23	0.59	0.23	0.24	0.05	0.22	0.21	3.19	15
5-Dec-23	0.80	0.21	0.21	0.07	0.21	0.20	3.34	
6-Dec-23	1.17	0.21	0.22	0.04	0.25	0.20	3.41	
7-Dec-23	1.41	0.21	0.22	0.07	0.28	0.20	3.00	35

Appendix D

Primary Leachate Analyses

Clean Harbors Canada, Inc. - Approval 10348-02							
2023 Annual Report							
Section 1.5 Primary Leachate							
Field pH & Electrical Conductivity Measurements							
Qtr 1				Qtr 2			
Date	pH	Conductivity (uS/cm)		Date	pH	Conductivity (uS/cm)	
Cell 1	2023-03-06	7.5	22990	Cell 1	2023-06-22	7.6	22740
Cell 2	2023-03-06	8.2	40930	Cell 2	2023-06-22	8.4	39240
Cell 3A	2023-03-06	7.4	29920	Cell 3A	2023-06-22	7.5	30770
Cell 3B	2023-03-06	9.3	48810	Cell 3B	2023-06-22	9.3	46630
Cell 3C	2023-03-06	8.5	18230	Cell 3C	2023-06-22	8.6	13470
Cell 3D	2023-03-06	8.0	26140	Cell 3D	2023-06-22	7.8	17580
Cell 3E	2023-03-06	7.7	18360	Cell 3E	2023-06-22	7.7	14310
Cell 4	2023-03-06	7.8	20070	Cell 4	2023-06-22	7.8	18420
Qtr 3				Qtr 4			
Date	pH	Conductivity (uS/cm)		Date	pH	Conductivity (uS/cm)	
Cell 1	2023-09-18	7.7	11590	Cell 1	2023-12-04	7.4	18940
Cell 2	2023-09-18	8.1	37990	Cell 2	2023-12-04	8.2	40540
Cell 3A	2023-09-18	7.5	29170	Cell 3A	2023-12-04	7.5	32500
Cell 3B	2023-09-18	9.4	41860	Cell 3B	2023-12-04	9.3	47130
Cell 3C	2023-09-18	8.7	13740	Cell 3C	2023-12-04	8.6	16450
Cell 3D	2023-09-19	8.1	18190	Cell 3D	2023-12-04	8.4	20590
Cell 3E	2023-09-18	7.8	10870	Cell 3E	2023-12-04	7.9	14530
Cell 4	2023-09-18	7.8	9173	Cell 4	2023-12-04	7.5	18800

Appendix D
Primary Leachate Analyses
Quarter 1



CERTIFICATE OF ANALYSIS

Work Order	: EO2301874	Page	: 1 of 19
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 1 2023	Date Samples Received	: 07-Mar-2023 13:40
PO	: Pending	Date Analysis	: 07-Mar-2023
		Commenced	
C-O-C number	: ----	Issue Date	: 14-Mar-2023 16:33
Sampler	: Murray		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
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General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	Description
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
IB:INT	Ion Balance Reviewed: Imbalance is due to interference or non-measured component.
SFP	Sample was filtered and preserved at the laboratory.
SHMI	Surrogate recovery was outside ALS DQO (High) due to Matrix Interference
SP	Sample was preserved at the laboratory.



Analytical Results

EO2301874-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 1 (PC1)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	6560 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	5370 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	21000 ^{DLM.}	10.0	µS/cm	E100	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	2130	2.5	mg/L	EC100	-	10-Mar-2023	-
pH	----	7.81 ^{DLM.}	0.10	pH units	E108	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	17000	1.0	mg/L	EC103	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	98.8	3.0	mg/L	E160	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	887 ^{SP.}	10.0	mg/L	E298	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	3240 ^{DLDS.}	10.0	mg/L	E235.Cl	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	2.68 ^{DLDS.}	0.400	mg/L	E235.F	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	81.7 ^{DLDS.}	0.400	mg/L	E235.NO3	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	84.5	0.447	mg/L	EC235.N+N	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	2.81 ^{DLDS.}	0.200	mg/L	E235.NO2	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	11.3 ^{SP.}	0.200	mg/L	E372-S	09-Mar-2023	10-Mar-2023	857246
Phosphorus, total dissolved	7723-14-0	10.4 ^{SPF.}	0.200	mg/L	E375-U	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	3340 ^{DLDS.}	6.00	mg/L	E235.SO4	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	1390 ^{SP.}	50.0	mg/L	E318	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	1070 ^{SPF.}	25.0	mg/L	E358-L	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	97.1	0.010	%	EC101	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.477	0.0250	mg/L	E420	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	0.000126	0.0000500	mg/L	E508	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.362	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	0.0142	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.0554	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.313	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLM.}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLM.}	0.00250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	17.8	0.500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.00593	0.000250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	282	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.00178	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.457	0.0250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.110	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	0.0758	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	103	0.500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	0.171	0.00250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	0.457	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	347	0.250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	17.4	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301874-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 1 (PC1)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Molybdenum, dissolved	7439-98-7	9.24	0.00250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	9.56	0.0250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	12.6	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	538	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.0697	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	<0.00250 ^{DLM}	0.00250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	12.6	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	0.000742	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	3270	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	2.34	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	1110	25.0	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLM}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000500 ^{DLM}	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00500 ^{DLM}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00500 ^{DLM}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.124	0.0150	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.0835	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.0125	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	16.4	0.0250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	1.78	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.301	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	2320 ^{DLHC}	100	mg/L	E559-L	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	0.0308 ^{DLM, SP}	0.0030	mg/L	E562	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	24.0	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	1.37	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	3.53	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	1.44	0.40	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	2.09	0.30	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	3.53	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	400	100	µg/L	E581.F1	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	368	105	µg/L	EC580	-	11-Mar-2023	-
F2 (C10-C16)	----	490	100	µg/L	E601	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	102	1.0	%	E601	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	80.7	1.0	%	E581.F1	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	112	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	102	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

EO2301874-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 2 (PC2)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	13700 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO3)	3812-32-6	814 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO3)	----	12600 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	38000 ^{DLM.}	1.0	µS/cm	E100	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO3), dissolved	----	1960	5	mg/L	EC100	-	10-Mar-2023	-
pH	----	8.51 ^{DLM.}	0.10	pH units	E108	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	33600	1.0	mg/L	EC103	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	172	3.0	mg/L	E160	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	764 ^{SP.}	10.0	mg/L	E298	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	10300 ^{DLDS.}	10.0	mg/L	E235.Cl	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	2.25 ^{DLDS.}	0.400	mg/L	E235.F	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS.}	0.400	mg/L	E235.NO3	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447 ^{DLDS.}	0.447	mg/L	EC235.N+N	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS.}	0.200	mg/L	E235.NO2	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	7.26 ^{SP.}	0.100	mg/L	E372-S	09-Mar-2023	10-Mar-2023	857246
Phosphorus, total dissolved	7723-14-0	6.49 ^{SFP.}	0.100	mg/L	E375-U	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO4)	14808-79-8	891 ^{DLDS.}	6.00	mg/L	E235.SO4	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	1020 ^{SP.}	50.0	mg/L	E318	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	2960 ^{SFP.}	50.0	mg/L	E358-L	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	93.2	0.010	%	EC101	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.383	0.0500	mg/L	E420	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{DLM.}	0.0000500	mg/L	E508	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.116	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	0.0906	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.115	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	1.36	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.00200 ^{DLM.}	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00500 ^{DLM.}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	67.4	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.00404	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	64.0	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.00184	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.321	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	<0.0100 ^{DLM.}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	<0.0200 ^{DLM.}	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	<1.00 ^{DLM.}	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.00500 ^{DLM.}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	9.62	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	436	0.500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	1.46	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301874-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 2 (PC2)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Molybdenum, dissolved	7439-98-7	11.1	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.436	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	7.85	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	1290	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.184	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00972	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	9.96	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.00100 ^{DLM}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	9110	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	4.48	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	1230	50.0	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.0200 ^{DLM}	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.00100 ^{DLM}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.0100 ^{DLM}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.0100 ^{DLM}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.229	0.0300	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	14.3	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.00145	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	0.620	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	<0.100 ^{DLM}	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.339	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	9580 ^{DLHC}	100	mg/L	E559-L	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	5.30 ^{SP}	0.100	mg/L	E562	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	62.7	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	11.7	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	1.41	0.40	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	2.09	0.30	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	3.50	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	630	100	µg/L	E581.F1	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	552	167	µg/L	EC580	-	11-Mar-2023	-
F2 (C10-C16)	----	1420	100	µg/L	E601	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	101	1.0	%	E601	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	83.3	1.0	%	E581.F1	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	112	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	109	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

EO2301874-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3A (PC3A)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	6810 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	5580 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	27500 ^{DLM.}	1.0	µS/cm	E100	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	2780	5	mg/L	EC100	-	10-Mar-2023	-
pH	----	7.82 ^{DLM.}	0.10	pH units	E108	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	22000	1.0	mg/L	EC103	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	27.2	3.0	mg/L	E160	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	665 ^{SP.}	10.0	mg/L	E298	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	9930 ^{DLDS.}	10.0	mg/L	E235.Cl	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	3.27 ^{DLDS.}	0.400	mg/L	E235.F	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS.}	0.400	mg/L	E235.NO3	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447 ^{DLDS.}	0.447	mg/L	EC235.N+N	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS.}	0.200	mg/L	E235.NO2	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	4.08 ^{SP.}	0.100	mg/L	E372-S	09-Mar-2023	10-Mar-2023	857246
Phosphorus, total dissolved	7723-14-0	4.68 ^{SFP.}	0.100	mg/L	E375-U	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	655 ^{DLDS.}	6.00	mg/L	E235.SO4	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	886 ^{SP.}	50.0	mg/L	E318	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	778 ^{SFP.}	5.00	mg/L	E358-L	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	82.2 ^{IB.INT.}	0.010	%	EC101	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.212	0.0500	mg/L	E420	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{DLM.}	0.0000500	mg/L	E508	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.100 ^{DLM.}	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	<0.0100 ^{DLM.}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.243	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	2.07	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.00200 ^{DLM.}	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00500 ^{DLM.}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	34.5	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	<0.000500 ^{DLM.}	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	315	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	<0.00100 ^{DLM.}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.196	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	<0.0100 ^{DLM.}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	<0.0200 ^{DLM.}	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	<1.00 ^{DLM.}	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.00500 ^{DLM.}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	2.55	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	484	0.500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	1.70	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301874-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3A (PC3A)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Molybdenum, dissolved	7439-98-7	0.507	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.470	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	7.19	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	798	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.488	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00756	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	19.7	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.00100 ^{DLM}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	4810	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	5.94	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	294	50.0	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.0200 ^{DLM}	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.00100 ^{DLM}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.0100 ^{DLM}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.0100 ^{DLM}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.0596	0.0300	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	1.74	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	<0.00100 ^{DLM}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	0.174	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	<0.100 ^{DLM}	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.153	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	2280 ^{DLHC}	100	mg/L	E559-L	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	4.41 ^{SP}	0.100	mg/L	E562	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	291	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	13.7	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	164	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	81.1	0.40	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	29.4	0.30	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	110	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	740	100	µg/L	E581.F1	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	<236	236	µg/L	EC580	-	11-Mar-2023	-
F2 (C10-C16)	----	2140	100	µg/L	E601	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	100	1.0	%	E601	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	72.6	1.0	%	E581.F1	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	112	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	103	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

EO2301874-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3B (PC3B)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	7320 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	3750 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	12200 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	44200 ^{DLM.}	1.0	µS/cm	E100	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	246	5	mg/L	EC100	-	10-Mar-2023	-
pH	----	9.28 ^{DLM.}	0.10	pH units	E108	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	41800	1.0	mg/L	EC103	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	68.0	3.0	mg/L	E160	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	1940 ^{SP.}	25.0	mg/L	E298	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	12000 ^{DLDS.}	50.0	mg/L	E235.Cl	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	8.91 ^{DLDS.}	2.00	mg/L	E235.F	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<2.00 ^{DLDS.}	2.00	mg/L	E235.NO3	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<2.24 ^{DLDS.}	2.24	mg/L	EC235.N+N	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<1.00 ^{DLDS.}	1.00	mg/L	E235.NO2	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	5.80 ^{SP.}	0.100	mg/L	E372-S	09-Mar-2023	10-Mar-2023	857246
Phosphorus, total dissolved	7723-14-0	5.50 ^{SFP.}	0.100	mg/L	E375-U	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	1490 ^{DLDS.}	30.0	mg/L	E235.SO4	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	3090 ^{SP.}	50.0	mg/L	E318	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	6230 ^{SFP.}	50.0	mg/L	E358-L	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	99.0	0.010	%	EC101	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.730	0.0500	mg/L	E420	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{DLM.}	0.0000500	mg/L	E508	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.100 ^{DLM.}	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	<0.0100 ^{DLM.}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.165	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.656	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.00200 ^{DLM.}	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00500 ^{DLM.}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	152	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.0121	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	16.4	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.130	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.612	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.0220	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	0.137	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	1.50	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	0.00801	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	10.3	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	49.9	0.500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	0.804	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301874-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3B (PC3B)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Molybdenum, dissolved	7439-98-7	37.2	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	1.31	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	10.3	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	3280	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	5.27	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.0643	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	36.2	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.00100 ^{DLM}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	8760	5.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	0.868	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	740	50.0	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.0200 ^{DLM}	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.00100 ^{DLM}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.0100 ^{DLM}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	0.0277	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.259	0.0300	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	12.4	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.00129	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	0.374	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	<0.100 ^{DLM}	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.104	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	16900 ^{DLHC}	100	mg/L	E559-L	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	18.6 ^{SP}	0.400	mg/L	E562	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	11.3	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	1.01	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	11.3	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	2.34	0.40	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	2.58	0.30	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	4.92	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	2000	100	µg/L	E581.F1	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	1970	529	µg/L	EC580	-	11-Mar-2023	-
F2 (C10-C16)	----	3250	100	µg/L	E601	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	102	1.0	%	E601	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	73.4	1.0	%	E581.F1	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	128	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	111	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

EO2301874-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3C (PC3C)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	4640 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	452 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	4560 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	16300 ^{DLM.}	1.0	µS/cm	E100	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	765	1	mg/L	EC100	-	10-Mar-2023	-
pH	----	8.70 ^{DLM.}	0.10	pH units	E108	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	12200	1.0	mg/L	EC103	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	69.4	3.0	mg/L	E160	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	756 ^{SP.}	10.0	mg/L	E298	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	3420 ^{DLDS.}	10.0	mg/L	E235.Cl	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	2.70 ^{DLDS.}	0.400	mg/L	E235.F	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS.}	0.400	mg/L	E235.NO3	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447 ^{DLDS.}	0.447	mg/L	EC235.N+N	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS.}	0.200	mg/L	E235.NO2	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	3.47 ^{SP.}	0.100	mg/L	E372-S	09-Mar-2023	10-Mar-2023	857246
Phosphorus, total dissolved	7723-14-0	3.47 ^{SFP.}	0.100	mg/L	E375-U	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	934 ^{DLDS.}	6.00	mg/L	E235.SO4	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	989 ^{SP.}	50.0	mg/L	E318	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	805 ^{SFP.}	5.00	mg/L	E358-L	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	93.7	0.010	%	EC101	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLM.}	0.0100	mg/L	E420	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{DLM.}	0.0000500	mg/L	E508	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0204	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	<0.00200 ^{DLM.}	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.0157	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.108	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLM.}	0.000400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLM.}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	47.2	0.200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.000224	0.000100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	45.9	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.00269	0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.0132	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.00248	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	0.0156	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	0.371	0.200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.00100 ^{DLM.}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	2.29	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	158	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	0.294	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301874-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3C (PC3C)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Molybdenum, dissolved	7439-98-7	0.660	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.481	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	4.46	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	531	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.355	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00892	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	11.2	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.000200	^{DLM.} 0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	2560	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	0.374	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	919	10.0	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.00400	^{DLM.} 0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000200	^{DLM.} 0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00200	^{DLM.} 0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00200	^{DLM.} 0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	<0.00600	^{DLM.} 0.00600	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.272	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.00590	0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	5.58	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	0.0395	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.0633	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	2400	^{DLHC.} 100	mg/L	E559-L	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	1.25	^{SP.} 0.0200	mg/L	E562	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	24.5	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	113	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	386	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	403	0.40	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	222	0.30	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	625	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	2040	100	µg/L	E581.F1	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	890	600	µg/L	EC580	-	11-Mar-2023	-
F2 (C10-C16)	----	1950	100	µg/L	E601	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	105	1.0	%	E601	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	73.1	1.0	%	E581.F1	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	174	^{SHMI.} 1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	108	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

EO2301874-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3D (PC3D)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	5920 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Alkalinity, carbonate (as CO ₃)	3812-32-6	<10.0 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Alkalinity, total (as CaCO ₃)	----	4860 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Conductivity	----	23700 ^{DLM.}	1.0	µS/cm	E100	08-Mar-2023	08-Mar-2023	855799
Hardness (as CaCO ₃), dissolved	----	1330	2.5	mg/L	EC100	-	10-Mar-2023	-
pH	----	8.26 ^{DLM.}	0.10	pH units	E108	08-Mar-2023	08-Mar-2023	855798
Solids, total dissolved [TDS], calculated	----	18400	1.0	mg/L	EC103	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	99.2	3.0	mg/L	E160	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	513 ^{SP.}	10.0	mg/L	E298	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	7320 ^{DLS.}	10.0	mg/L	E235.Cl	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	4.58 ^{DLS.}	0.400	mg/L	E235.F	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{DLS.}	0.400	mg/L	E235.NO3	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447 ^{DLS.}	0.447	mg/L	EC235.N+N	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLS.}	0.200	mg/L	E235.NO2	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	1.56 ^{SP.}	0.0200	mg/L	E372-S	09-Mar-2023	10-Mar-2023	857246
Phosphorus, total dissolved	7723-14-0	1.22 ^{SFP.}	0.0200	mg/L	E375-U	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	292 ^{DLS.}	6.00	mg/L	E235.SO4	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	618 ^{SP.}	15.0	mg/L	E318	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	1380 ^{SFP.}	50.0	mg/L	E358-L	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	90.3	0.010	%	EC101	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0250 ^{DLM.}	0.0250	mg/L	E420	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{DLM.}	0.0000500	mg/L	E508	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0500 ^{DLM.}	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	<0.00500 ^{DLM.}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.0164	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.490	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLM.}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLM.}	0.00250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	84.3	0.500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.000350	0.000250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	187	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.00389	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	<0.0250 ^{DLM.}	0.0250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.00525	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	<0.0100 ^{DLM.}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	1.04	0.500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.00250 ^{DLM.}	0.00250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	2.71	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	210	0.250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	1.43	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301874-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3D (PC3D)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Molybdenum, dissolved	7439-98-7	0.807	0.00250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	3.49	0.0250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	<2.50 ^{DLM.}	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	831	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.590	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00977	0.00250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	21.4	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.000500 ^{DLM.}	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	4490	2.50	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	2.25	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	305	25.0	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLM.}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000500 ^{DLM.}	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00500 ^{DLM.}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00500 ^{DLM.}	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	<0.0150 ^{DLM.}	0.0150	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.0852	0.00500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.00269	0.000500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	5.86	0.0250	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	<0.0500 ^{DLM.}	0.0500	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.0625	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	3520 ^{DLHC.}	100	mg/L	E559-L	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	4.98 ^{SP.}	0.200	mg/L	E562	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	21.6	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	2.42	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	17.7	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	4.83	0.40	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	3.87	0.30	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	8.70	0.50	µg/L	E611A	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	650	100	µg/L	E581.F1	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	600	172	µg/L	EC580	-	11-Mar-2023	-
F2 (C10-C16)	----	1230	100	µg/L	E601	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	103	1.0	%	E601	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	70.6	1.0	%	E581.F1	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	115	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	112	1.0	%	E611A	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

EO2301874-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3E (PC3E)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	5430 ^{DLM}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0 ^{DLM}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{DLM}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Alkalinity, total (as CaCO ₃)	----	4450 ^{DLM}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Conductivity	----	16100 ^{DLM}	1.0	µS/cm	E100	08-Mar-2023	08-Mar-2023	855799
Hardness (as CaCO ₃), dissolved	----	1580	1	mg/L	EC100	-	10-Mar-2023	-
pH	----	8.13 ^{DLM}	0.10	pH units	E108	08-Mar-2023	08-Mar-2023	855798
Solids, total dissolved [TDS], calculated	----	12000	1.0	mg/L	EC103	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	237	3.0	mg/L	E160	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	482 ^{SP}	10.0	mg/L	E298	08-Mar-2023	08-Mar-2023	855401
Chloride	16887-00-6	4190 ^{DLDS}	10.0	mg/L	E235.Cl	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	3.77 ^{DLDS}	0.400	mg/L	E235.F	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS}	0.400	mg/L	E235.NO3	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447 ^{DLDS}	0.447	mg/L	EC235.N+N	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	1.24 ^{SP}	0.0200	mg/L	E372-S	09-Mar-2023	10-Mar-2023	857246
Phosphorus, total dissolved	7723-14-0	1.14 ^{SFP}	0.0200	mg/L	E375-U	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	766 ^{DLDS}	6.00	mg/L	E235.SO4	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	563 ^{SP}	15.0	mg/L	E318	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	166 ^{SFP}	5.00	mg/L	E358-L	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	87.4	0.010	%	EC101	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLM}	0.0100	mg/L	E420	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0200 ^{DLM}	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	<0.00200 ^{DLM}	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.00774	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.425	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLM}	0.000400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLM}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	10.1	0.200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.000584	0.000100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	125	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.00378	0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	<0.0100 ^{DLM}	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.00658	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	<0.00400 ^{DLM}	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	0.274	0.200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.00100 ^{DLM}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	1.14	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	308	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	0.969	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301874-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3E (PC3E)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Molybdenum, dissolved	7439-98-7	2.05	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.899	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	1.34	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	384	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.354	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00163	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	14.3	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	0.000283	0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	2750	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	3.36	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	268	10.0	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLM}	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000200 ^{DLM}	0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00200 ^{DLM}	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00200 ^{DLM}	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.00758	0.00600	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.0304	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.0136	0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	6.88	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	<0.0200 ^{DLM}	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.139	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	1790 ^{DLHC}	100	mg/L	E559-L	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	0.0250 ^{DLM, SP}	0.0050	mg/L	E562	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Toluene	108-88-3	<0.50	0.50	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Xylene, m+p-	179601-23-1	0.45	0.40	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Xylene, o-	95-47-6	0.44	0.30	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Xylenes, total	1330-20-7	0.89	0.50	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1	13-Mar-2023	13-Mar-2023	861180
F1-BTEX	----	<100	100	µg/L	EC580	-	14-Mar-2023	-
F2 (C10-C16)	----	99800	420	µg/L	E601	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	124	4.2	%	E601	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	80.7	1.0	%	E581.F1	13-Mar-2023	13-Mar-2023	861180
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	126	1.0	%	E611A	13-Mar-2023	13-Mar-2023	861181
Difluorobenzene, 1,4-	540-36-3	107	1.0	%	E611A	13-Mar-2023	13-Mar-2023	861181

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

EO2301874-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 4 (PC4)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	5570 ^{DLM.}	10.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Alkalinity, total (as CaCO3)	----	4570 ^{DLM.}	1.0	mg/L	E290	08-Mar-2023	08-Mar-2023	855797
Conductivity	----	17400 ^{DLM.}	1.0	µS/cm	E100	08-Mar-2023	08-Mar-2023	855799
Hardness (as CaCO3), dissolved	----	1200	1	mg/L	EC100	-	10-Mar-2023	-
pH	----	8.28 ^{DLM.}	0.10	pH units	E108	08-Mar-2023	08-Mar-2023	855798
Solids, total dissolved [TDS], calculated	----	14800	1.0	mg/L	EC103	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	94.6	3.0	mg/L	E160	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	616 ^{SP.}	10.0	mg/L	E298	08-Mar-2023	08-Mar-2023	855401
Chloride	16887-00-6	4430 ^{DLS.}	10.0	mg/L	E235.Cl	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	<0.400 ^{DLS.}	0.400	mg/L	E235.F	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{DLS.}	0.400	mg/L	E235.NO3	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447 ^{DLS.}	0.447	mg/L	EC235.N+N	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLS.}	0.200	mg/L	E235.NO2	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	3.20 ^{SP.}	0.100	mg/L	E372-S	09-Mar-2023	10-Mar-2023	857246
Phosphorus, total dissolved	7723-14-0	3.03 ^{SFP.}	0.100	mg/L	E375-U	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO4)	14808-79-8	57.8 ^{DLS.}	6.00	mg/L	E235.SO4	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	816 ^{SP.}	50.0	mg/L	E318	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	2830 ^{SFP.}	50.0	mg/L	E358-L	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	98.6	0.010	%	EC101	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLM.}	0.0100	mg/L	E420	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{DLM.}	0.0000500	mg/L	E508	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.135	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	<0.00200 ^{DLM.}	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.0151	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.484	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLM.}	0.000400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLM.}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	26.0	0.200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.000170	0.000100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	187	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.0238	0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.0102	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.00689	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	<0.00400 ^{DLM.}	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	0.540	0.200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.00100 ^{DLM.}	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	0.222	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	177	0.100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	1.06	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301874-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 4 (PC4)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Molybdenum, dissolved	7439-98-7	0.440	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.504	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	5.46	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	494	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.526	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00856	0.00100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	14.8	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.000200	^{DLM.} 0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	3060	1.00	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	1.68	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	167	10.0	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.00400	^{DLM.} 0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000200	^{DLM.} 0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00200	^{DLM.} 0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00200	^{DLM.} 0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.0450	0.00600	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.120	0.00200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.00244	0.000200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	0.644	0.0100	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	0.0348	0.0200	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.0502	0.00400	mg/L	E421	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	7800	^{DLHC.} 100	mg/L	E559-L	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	6.48	^{SP.} 0.100	mg/L	E562	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	195	0.50	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Ethylbenzene	100-41-4	130	0.50	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Toluene	108-88-3	892	10.0	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Xylene, m+p-	179601-23-1	426	0.40	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Xylene, o-	95-47-6	185	0.30	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Xylenes, total	1330-20-7	611	0.50	µg/L	E611A	13-Mar-2023	13-Mar-2023	861181
Hydrocarbons								
F1 (C6-C10)	----	2430	100	µg/L	E581.F1	13-Mar-2023	13-Mar-2023	861180
F1-BTEX	----	<765	765	µg/L	EC580	-	14-Mar-2023	-
F2 (C10-C16)	----	5390	100	µg/L	E601	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	101	1.0	%	E601	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	85.4	1.0	%	E581.F1	13-Mar-2023	13-Mar-2023	861180
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	114	1.0	%	E611A	13-Mar-2023	13-Mar-2023	861181
Difluorobenzene, 1,4-	540-36-3	118	1.0	%	E611A	13-Mar-2023	13-Mar-2023	861181

Please refer to the General Comments section for an explanation of any qualifiers detected.





QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2301874</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Primary Leachate Qtr 1 2023</p> <p>PO : Pending</p> <p>C-O-C number : ----</p> <p>Sampler : Murray</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 8</p> <p>No. of samples analysed : 8</p>	<p>Page : 1 of 31</p> <p>Laboratory : Edmonton - Environmental</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 07-Mar-2023 13:40</p> <p>Issue Date : 14-Mar-2023 16:35</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Page : 3 of 31
Work Order : EO2301874
Client : Clean Harbors Environmental Services, Inc.
Project : Primary Leachate Qtr 1 2023



Regular Sample Surrogates

Sub-Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Result	Limits	Comment
Samples Submitted							
Volatile Organic Compounds Surrogates	EO2301874-005	Primary Leachate Cell 3C (PC3C)	Bromofluorobenzene, 4-	460-00-4	174 %	70.0-130 %	Recovery greater than upper data quality objective



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E298	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E298	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 3A (PC3A)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 3B (PC3B)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 3C (PC3C)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 3D (PC3D)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 3E (PC3E)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 4 (PC4)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3A (PC3A)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3B (PC3B)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3C (PC3C)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3D (PC3D)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3E (PC3E)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 4 (PC4)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 1 (PC1)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 2 (PC2)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 3A (PC3A)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 3B (PC3B)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 3C (PC3C)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 3D (PC3D)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 3E (PC3E)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 4 (PC4)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrite in Water by IC										
HDPE Primary Leachate Cell 1 (PC1)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrite in Water by IC										
HDPE Primary Leachate Cell 2 (PC2)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrite in Water by IC										
HDPE Primary Leachate Cell 3A (PC3A)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔
Anions and Nutrients : Nitrite in Water by IC										
HDPE Primary Leachate Cell 3B (PC3B)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 3C (PC3C)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 3D (PC3D)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 3E (PC3E)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 4 (PC4)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 3A (PC3A)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 3B (PC3B)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 3C (PC3C)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Sulfate in Water by IC										
HDPE Primary Leachate Cell 3D (PC3D)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE Primary Leachate Cell 3E (PC3E)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE Primary Leachate Cell 4 (PC4)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 1 (PC1)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 2 (PC2)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 4 (PC4)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Primary Leachate Cell 1 (PC1)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Primary Leachate Cell 2 (PC2)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Primary Leachate Cell 3A (PC3A)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Primary Leachate Cell 3B (PC3B)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Primary Leachate Cell 3C (PC3C)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Primary Leachate Cell 3D (PC3D)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Primary Leachate Cell 3E (PC3E)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Primary Leachate Cell 4 (PC4)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Primary Leachate Cell 1 (PC1)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 2 (PC2)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3A (PC3A)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3B (PC3B)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3C (PC3C)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3D (PC3D)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3E (PC3E)	E581.F1	06-Mar-2023	13-Mar-2023	----	----		13-Mar-2023	14 days	7 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 4 (PC4)	E581.F1	06-Mar-2023	13-Mar-2023	----	----		13-Mar-2023	14 days	7 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 1 (PC1)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 2 (PC2)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3A (PC3A)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3B (PC3B)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3C (PC3C)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3D (PC3D)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3E (PC3E)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 4 (PC4)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 1 (PC1)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 2 (PC2)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 4 (PC4)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Primary Leachate Cell 1 (PC1)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Primary Leachate Cell 2 (PC2)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Primary Leachate Cell 3A (PC3A)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Primary Leachate Cell 3B (PC3B)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 3C (PC3C)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 3D (PC3D)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 3E (PC3E)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 4 (PC4)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 1 (PC1)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 2 (PC2)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 3A (PC3A)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 3B (PC3B)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 3C (PC3C)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE Primary Leachate Cell 3D (PC3D)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE Primary Leachate Cell 3E (PC3E)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE Primary Leachate Cell 4 (PC4)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✓	
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 1 (PC1)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 2 (PC2)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 3A (PC3A)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 3B (PC3B)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 3C (PC3C)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 3D (PC3D)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 3E (PC3E)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 4 (PC4)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	*	EHTR-FM
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 1 (PC1)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 2 (PC2)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3A (PC3A)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3B (PC3B)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3C (PC3C)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3D (PC3D)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3E (PC3E)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE Primary Leachate Cell 4 (PC4)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	* EHT
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 1 (PC1)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✓
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 2 (PC2)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✓
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3A (PC3A)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✓
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3B (PC3B)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✓
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3C (PC3C)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✓
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3D (PC3D)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✓
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3E (PC3E)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✓
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 4 (PC4)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 1 (PC1)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 2 (PC2)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 3A (PC3A)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 3B (PC3B)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 3C (PC3C)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 3D (PC3D)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 3E (PC3E)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 4 (PC4)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 1 (PC1)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 2 (PC2)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 3A (PC3A)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 3B (PC3B)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 3C (PC3C)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 3D (PC3D)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 3E (PC3E)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 4 (PC4)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 1 (PC1)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 2 (PC2)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 3A (PC3A)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 3B (PC3B)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 3C (PC3C)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 3D (PC3D)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 3E (PC3E)	E611A	06-Mar-2023	13-Mar-2023	----	----		13-Mar-2023	14 days	7 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 4 (PC4)	E611A	06-Mar-2023	13-Mar-2023	----	----		13-Mar-2023	14 days	7 days	✓	

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 EHT: Exceeded ALS recommended hold time prior to analysis.
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	855300	2	23	8.7	5.0	✓
Ammonia by Fluorescence	E298	855346	2	26	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	855765	2	33	6.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	855764	2	29	6.9	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	857594	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	855369	1	20	5.0	5.0	✓
Conductivity in Water	E100	855302	2	23	8.7	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	856108	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	856202	1	15	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	859593	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	855370	1	18	5.5	5.0	✓
Nitrate in Water by IC	E235.NO3	855371	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	855372	1	18	5.5	5.0	✓
pH by Meter	E108	855301	2	23	8.7	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	855241	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	855373	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	857247	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	858832	1	19	5.2	5.0	✓
Total Mercury in Water by CVAAS	E508	857347	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	855841	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	857246	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	862291	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	855300	2	23	8.7	5.0	✓
Ammonia by Fluorescence	E298	855346	2	26	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	855765	2	33	6.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	855764	2	29	6.9	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	856138	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	857594	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	855369	1	20	5.0	5.0	✓
Conductivity in Water	E100	855302	2	23	8.7	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	856108	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	856202	1	15	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	859593	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	855370	1	18	5.5	5.0	✓
Nitrate in Water by IC	E235.NO3	855371	1	18	5.5	5.0	✓



Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	855372	1	18	5.5	5.0	✓
pH by Meter	E108	855301	2	23	8.7	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	855241	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	855373	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	857247	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	858832	1	19	5.2	5.0	✓
Total Mercury in Water by CVAAS	E508	857347	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	855841	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	857246	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	862291	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	855300	2	23	8.7	5.0	✓
Ammonia by Fluorescence	E298	855346	2	26	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	855765	2	33	6.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	855764	2	29	6.9	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	856138	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	857594	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	855369	1	20	5.0	5.0	✓
Conductivity in Water	E100	855302	2	23	8.7	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	856108	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	856202	1	15	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	859593	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	855370	1	18	5.5	5.0	✓
Nitrate in Water by IC	E235.NO3	855371	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	855372	1	18	5.5	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	855241	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	855373	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	857247	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	858832	1	19	5.2	5.0	✓
Total Mercury in Water by CVAAS	E508	857347	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	855841	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	857246	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	862291	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	855346	2	26	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	855765	2	33	6.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	857594	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	855369	1	20	5.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	856108	1	15	6.6	5.0	✓



Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	856202	1	15	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	859593	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	855370	1	18	5.5	5.0	✓
Nitrate in Water by IC	E235.NO3	855371	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	855372	1	18	5.5	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	855241	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	855373	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	857247	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	858832	1	19	5.2	5.0	✓
Total Mercury in Water by CVAAS	E508	857347	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	855841	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	857246	1	20	5.0	5.0	✓



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Edmonton - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Edmonton - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Edmonton - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Edmonton - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Edmonton - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Edmonton - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Edmonton - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total metals in Water by CRC ICPMS	E420 Edmonton - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Edmonton - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Edmonton - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A Edmonton - Environmental	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Edmonton - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 Edmonton - Environmental	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
CCME PHC - F1 by Headspace GC-FID	E581.F1 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHCs - F2-F4 by GC-FID	E601 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Edmonton - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Edmonton - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Edmonton - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 Edmonton - Environmental	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Edmonton - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Edmonton - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Edmonton - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Edmonton - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Edmonton - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
VOCs Preparation for Headspace Analysis	EP581 Edmonton - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Edmonton - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2301874	Page	: 1 of 17
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 1 2023	Date Samples Received	: 07-Mar-2023 13:40
PO	: Pending	Date Analysis Commenced	: 07-Mar-2023
C-O-C number	: ----	Issue Date	: 14-Mar-2023 16:34
Sampler	: Murray 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Christian Murera	Lab Analyst	Edmonton Organics, Edmonton, Alberta
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Yan Zhang	Lab Analyst	Edmonton Organics, Edmonton, Alberta



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 855300)											
EO2301862-020	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	421	448	6.14%	20%	----
Physical Tests (QC Lot: 855301)											
EO2301862-020	Anonymous	pH	----	E108	0.10	pH units	7.74	7.73	0.129%	3%	----
Physical Tests (QC Lot: 855302)											
EO2301862-020	Anonymous	Conductivity	----	E100	1.0	µS/cm	744	748	0.536%	10%	----
Physical Tests (QC Lot: 855797)											
EO2301874-008	Primary Leachate Cell 4 (PC4)	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	4570	4640	1.50%	20%	----
Physical Tests (QC Lot: 855798)											
EO2301874-008	Primary Leachate Cell 4 (PC4)	pH	----	E108	0.10	pH units	8.28	8.27	0.121%	3%	----
Physical Tests (QC Lot: 855799)											
EO2301874-008	Primary Leachate Cell 4 (PC4)	Conductivity	----	E100	1.0	µS/cm	17400	17800	2.62%	10%	----
Physical Tests (QC Lot: 862291)											
EO2301873-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	108	123	12.5%	20%	----
Anions and Nutrients (QC Lot: 855346)											
FC2300540-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0210	0.0174	0.0036	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 855369)											
EO2301880-003	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	121	121	0.249%	20%	----
Anions and Nutrients (QC Lot: 855370)											
EO2301880-003	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.076	0.072	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 855371)											
EO2301880-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.184	0.182	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 855372)											
EO2301880-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 855373)											
EO2301880-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	33.9	33.4	1.45%	20%	----
Anions and Nutrients (QC Lot: 855401)											
EO2301866-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0291	0.0306	0.0015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 857246)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 857246) - continued											
EO2301874-001	Primary Leachate Cell 1 (PC1)	Phosphorus, total	7723-14-0	E372-S	0.200	mg/L	11.3	11.1	1.87%	20%	----
Anions and Nutrients (QC Lot: 857247)											
EO2301873-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	0.0100	mg/L	0.395	0.414	4.65%	20%	----
Anions and Nutrients (QC Lot: 858832)											
EO2301873-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	20.0	mg/L	99.2	98.1	1.15	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 859593)											
EO2301961-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	6.50	7.32	11.8%	20%	----
Total Metals (QC Lot: 855841)											
EO2301873-001	Anonymous	Chromium, total	7440-47-3	E420	0.00500	mg/L	0.140	0.143	2.37%	20%	----
Total Metals (QC Lot: 857347)											
EO2301894-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 856202)											
EO2301873-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0100	mg/L	0.0373	0.0438	0.0064	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00100	mg/L	0.00109	<0.00100	0.00009	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00100	mg/L	0.0103	0.0104	1.53%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00100	mg/L	0.125	0.128	2.40%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.100	mg/L	10.8	11.4	5.19%	20%	----
		Cadmium, dissolved	7440-43-9	E421	0.0000500	mg/L	0.000346	0.000341	0.0000046	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.500	mg/L	560	573	2.42%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00500	mg/L	0.137	0.137	0.146%	20%	----
		Cobalt, dissolved	7440-48-4	E421	0.00100	mg/L	2.44	2.59	6.17%	20%	----
		Copper, dissolved	7440-50-8	E421	0.00200	mg/L	0.0116	0.0119	0.00028	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.100	mg/L	52.2	51.8	0.707%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000500	mg/L	0.0265	0.0269	1.50%	20%	----
		Lithium, dissolved	7439-93-2	E421	0.0100	mg/L	0.599	0.608	1.45%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0500	mg/L	236	239	1.24%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00100	mg/L	37.4	38.6	3.44%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000500	mg/L	0.0173	0.0185	6.48%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00500	mg/L	12.4	13.1	5.43%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.500	mg/L	0.811	0.832	0.020	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 856202) - continued											
EO2301873-001	Anonymous	Potassium, dissolved	7440-09-7	E421	0.500	mg/L	27.3	27.9	2.21%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00200	mg/L	0.00555	0.00613	0.00058	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000500	mg/L	0.00141	0.00138	0.000029	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.500	mg/L	9.43	9.41	0.225%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.500	mg/L	2290	2350	2.61%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00200	mg/L	3.55	3.59	1.04%	20%	----
		Sulfur, dissolved	7704-34-9	E421	5.00	mg/L	1280	1290	0.890%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00300	mg/L	0.00526	0.00550	0.00024	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000100	mg/L	0.0412	0.0410	0.692%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00500	mg/L	0.0763	0.0777	1.89%	20%	----
		Zinc, dissolved	7440-66-6	E421	0.0100	mg/L	0.932	0.966	3.57%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.00200	mg/L	0.0140	0.0142	0.00021	Diff <2x LOR	----
Speciated Metals (QC Lot: 856108)											
EO2301874-008	Primary Leachate Cell 4 (PC4)	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 855241)											
VA23A4663-002	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 857594)											
EO2301862-020	Anonymous	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	13	13	0.3	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 855765)											
EO2301862-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.00040 mg/L	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.00030 mg/L	<0.30	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 861181)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 861181) - continued											
EO2301874-007	Primary Leachate Cell 3E (PC3E)	Benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	0.45	<0.40	0.05	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	0.44	0.31	0.13	Diff <2x LOR	----
Hydrocarbons (QC Lot: 855764)											
EO2301862-001	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<0.10 mg/L	<100	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 861180)											
EO2301874-007	Primary Leachate Cell 3E (PC3E)	F1 (C6-C10)	----	E581.F1	100	µg/L	<100	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 855300)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 855302)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 855797)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 855799)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 862291)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 855346)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 855369)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 855370)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 855371)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 855372)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 855373)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 855401)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 857246)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 857247)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 858832)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Organic / Inorganic Carbon (QCLot: 859593)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Total Metals (QCLot: 855841)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 855841) - continued						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---
Total Metals (QCLot: 857347)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
Dissolved Metals (QCLot: 856202)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	---
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 856202) - continued						
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 856108)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 855241)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Aggregate Organics (QCLot: 857594)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Volatile Organic Compounds (QCLot: 855765)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Volatile Organic Compounds (QCLot: 861181)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 855764)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 856138)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 861180)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 855300)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 855301)									
pH	----	E108	----	pH units	6 pH units	100	97.0	103	----
Physical Tests (QCLot: 855302)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	94.4	90.0	110	----
Physical Tests (QCLot: 855797)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
Physical Tests (QCLot: 855798)									
pH	----	E108	----	pH units	6 pH units	100	97.0	103	----
Physical Tests (QCLot: 855799)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	95.0	90.0	110	----
Physical Tests (QCLot: 862291)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 855346)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	109	85.0	115	----
Anions and Nutrients (QCLot: 855369)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 855370)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 855371)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 855372)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	92.6	90.0	110	----
Anions and Nutrients (QCLot: 855373)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 855401)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	109	85.0	115	----
Anions and Nutrients (QCLot: 857246)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 857247)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	94.2	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 858832)									
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	4 mg/L	112	75.0	125	---
Organic / Inorganic Carbon (QCLot: 859593)									
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	8.57 mg/L	92.8	80.0	120	---
Total Metals (QCLot: 855841)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	106	80.0	120	---
Total Metals (QCLot: 857347)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	---
Dissolved Metals (QCLot: 856202)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	91.7	80.0	120	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	98.5	80.0	120	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	103	80.0	120	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.4	80.0	120	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	107	80.0	120	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.4	80.0	120	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.0	80.0	120	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	95.1	80.0	120	---
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	94.6	80.0	120	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	99.4	80.0	120	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.8	80.0	120	---
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.4	80.0	120	---
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	92.1	80.0	120	---
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	---
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.2	80.0	120	---
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.7	80.0	120	---
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	96.4	80.0	120	---
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	95.4	80.0	120	---
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.7	80.0	120	---
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	110	80.0	120	---
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	---
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	104	80.0	120	---
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	96.1	80.0	120	---
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	97.9	80.0	120	---



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 856202) - continued									
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	105	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	93.7	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	96.9	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	102	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	86.7	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	91.1	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	105	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	93.6	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.9	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	90.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	107	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	97.6	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	99.2	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
Speciated Metals (QCLot: 856108)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Aggregate Organics (QCLot: 855241)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	95.9	85.0	115	----
Aggregate Organics (QCLot: 857594)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	105	85.0	115	----
Volatile Organic Compounds (QCLot: 855765)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	87.0	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	91.5	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	90.4	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	97.1	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	97.8	70.0	130	----
Volatile Organic Compounds (QCLot: 861181)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	91.0	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	89.8	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	94.7	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	95.2	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	93.6	70.0	130	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Hydrocarbons (QCLot: 855764)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	93.4	70.0	130	----
Hydrocarbons (QCLot: 856138)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	117	70.0	130	----
Hydrocarbons (QCLot: 861180)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	93.2	70.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 855346)										
FC2300540-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 855369)										
EO2301880-003	Anonymous	Chloride	16887-00-6	E235.Cl	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 855370)										
EO2301880-003	Anonymous	Fluoride	16984-48-8	E235.F	0.974 mg/L	1 mg/L	97.4	75.0	125	----
Anions and Nutrients (QCLot: 855371)										
EO2301880-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.55 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 855372)										
EO2301880-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.484 mg/L	0.5 mg/L	96.8	75.0	125	----
Anions and Nutrients (QCLot: 855373)										
EO2301880-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	96.6 mg/L	100 mg/L	96.6	75.0	125	----
Anions and Nutrients (QCLot: 855401)										
EO2301866-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0950 mg/L	0.1 mg/L	95.0	75.0	125	----
Anions and Nutrients (QCLot: 857246)										
EO2301874-002	Primary Leachate Cell 2 (PC2)	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 857247)										
EO2301873-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 858832)										
EO2301873-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 859593)										
EO2301971-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 855841)										
EO2301873-002	Anonymous	Chromium, total	7440-47-3	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
Total Metals (QCLot: 857347)										
EO2301895-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000994 mg/L	0.0001 mg/L	99.4	70.0	130	----
Dissolved Metals (QCLot: 856202)										
EO2301873-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 856202) - continued										
EO2301873-002	Anonymous	Antimony, dissolved	7440-36-0	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0230 mg/L	0.02 mg/L	115	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0423 mg/L	0.04 mg/L	106	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00936 mg/L	0.01 mg/L	93.6	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00418 mg/L	0.004 mg/L	104	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0465 mg/L	0.04 mg/L	116	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		Iron, dissolved	7439-89-6	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	11.8 mg/L	10 mg/L	118	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0447 mg/L	0.04 mg/L	112	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00393 mg/L	0.004 mg/L	98.2	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0387 mg/L	0.04 mg/L	96.8	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00370 mg/L	0.004 mg/L	92.5	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0488 mg/L	0.04 mg/L	122	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----



Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 856202) - continued										
EO2301873-002	Anonymous	Vanadium, dissolved	7440-62-2	E421	0.113 mg/L	0.1 mg/L	113	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	ND mg/L	0.4 mg/L	ND	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0438 mg/L	0.04 mg/L	109	70.0	130	----
Speciated Metals (QCLot: 856108)										
EO2301874-008	Primary Leachate Cell 4 (PC4)	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0498 mg/L	0.05 mg/L	99.6	70.0	130	----
Aggregate Organics (QCLot: 855241)										
VA23A4663-002	Anonymous	Phenols, total (4AAP)	----	E562	0.0180 mg/L	0.02 mg/L	89.8	75.0	125	----
Aggregate Organics (QCLot: 857594)										
EO2301862-021	Anonymous	Chemical oxygen demand [COD]	----	E559-L	112 mg/L	100 mg/L	112	75.0	125	----
Volatile Organic Compounds (QCLot: 855765)										
EO2301862-002	Anonymous	Benzene	71-43-2	E611A	101 µg/L	100 µg/L	101	50.0	140	----
		Ethylbenzene	100-41-4	E611A	93.1 µg/L	100 µg/L	93.1	50.0	140	----
		Toluene	108-88-3	E611A	90.7 µg/L	100 µg/L	90.7	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	202 µg/L	200 µg/L	101	50.0	140	----
		Xylene, o-	95-47-6	E611A	106 µg/L	100 µg/L	106	50.0	140	----
Volatile Organic Compounds (QCLot: 861181)										
EO2301874-008	Primary Leachate Cell 4 (PC4)	Benzene	71-43-2	E611A	ND µg/L	100 µg/L	ND	50.0	140	MS-B
		Ethylbenzene	100-41-4	E611A	ND µg/L	100 µg/L	ND	50.0	140	MS-B
		Toluene	108-88-3	E611A	ND µg/L	100 µg/L	ND	50.0	140	MS-B
		Xylene, m+p-	179601-23-1	E611A	ND µg/L	200 µg/L	ND	50.0	140	MS-B
		Xylene, o-	95-47-6	E611A	ND µg/L	100 µg/L	ND	50.0	140	MS-B

Qualifiers

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.



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Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page of

Canada Toll Free: 1 800 668 9878

Contact and company name below will appear on the final report

Reports / Recipients

Turnaround Time (TAT) Requested

AFFIX ALS BARCODE LABEL HERE (ALS use only)

- Routine (R) if received by 3pm M-F - no surcharges apply
- 4 day (P4) if received by 3pm M-F - 20% rush surcharge minimum
- 3 day (P3) if received by 3pm M-F - 25% rush surcharge minimum
- 2 day (P2) if received by 3pm M-F - 50% rush surcharge minimum
- 1 day (E) if received by 3pm M-F - 100% rush surcharge minimum
- Same day (E2) if received by 10am M-S - 200% rush surcharge

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests. Data and Time Required for all E&P TATs: 3-5 minimum by 10:00am 2019/01/01

For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Report To: Clean Harbors Canada
 Company: Todd Webb, Stan Yuha
 Contact: (780) 663-2513
 Phone: Company address below will appear on the final report
 Street: PO Box 390, 50114 Range Road 173
 City/Province: Ryley, AB
 Postal Code: T0B 4A0

Invoice To: Same as Report To
 Invoice Recipients: YES NO

Company: Clean Harbors Canada
 Contact: Stephanie Dennis

Project Information
 ALS Account # / Quote #: EO22-CHE5100-008
 Job #: Primary Leachate Qtr 1 2023
 PO / AFE: Pending
 LSD: Table 4.4A

ALS Lab Work Order # (ALS use only): **EO2301874**

ALS Sample # (ALS use only):
 Sample Identification and/or Coordinates (This description will appear on the report)

ALS Sample #	Sample Identification and/or Coordinates	ALS Contact:	Megha Walia	Date	Time	Sampler:	Murray	Sample Type
(ALS use only)	(This description will appear on the report)	(dd-mm-yy)	(hh:mm)					
	Primary Leachate Cell 1 (PC1)			6-Mar-23	11:00			R
	Primary Leachate Cell 2 (PC2)			6-Mar-23	11:00			R
	Primary Leachate Cell 3A (PC3A)			6-Mar-23	11:00			R
	Primary Leachate Cell 3B (PC3B)			6-Mar-23	11:00			R
	Primary Leachate Cell 3C (PC3C)			6-Mar-23	11:00			R
	Primary Leachate Cell 3D (PC3D)			6-Mar-23	11:00			R
	Primary Leachate Cell 3E (PC3E)			6-Mar-23	11:00			R
	Primary Leachate Cell 4 (PC4)			6-Mar-23	11:00			R

NUMBER OF CONTAINERS	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
Table 4.4A Leachate			

Environment
 Division
 Work Order Reference
EO2301874
 Telephone : + 1 780 413 9227



Are samples taken from a Regulated DW System?
 YES NO

Are samples for human consumption/ use?
 YES NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Drinking Water (DW) Samples¹ (client use)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A

INITIAL COOLER TEMPERATURES °C: _____ FINAL COOLER TEMPERATURES °C: _____

Released by: Todd Webb Date: 7-Mar-23 Time: 11:00

Received by: _____ Date: 7-Mar-2023 Time: 12:10pm

SHIPMENT RELEASE (client use)

INITIAL SHIPMENT RECEPTION (ALS use only)

FINAL SHIPMENT RECEPTION (ALS use only)

REFER TO BACK PAGE FOR CHECKS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

FEB 2022 PROXY

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus

Appendix D
Primary Leachate Analyses
Quarter 2



CERTIFICATE OF ANALYSIS

Work Order	: EO2305295	Page	: 1 of 9
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 2 2023	Date Samples Received	: 23-Jun-2023 14:30
PO	: 234479	Date Analysis	: 24-Jun-2023
C-O-C number	: ----	Commenced	
Sampler	: MURRY	Issue Date	: 04-Jul-2023 16:59
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Adrian Hilts	Lab Analyst	Metals, Edmonton, Alberta
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Christian Murera	Lab Analyst	Organics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Kari Mulroy	Lab Supervisor - Environmental	Organics, Edmonton, Alberta
Kiara Fuchs	Lab Analyst	Organics, Edmonton, Alberta
Leah Yee	Lab Assistant	Inorganics, Edmonton, Alberta
Logan Carroll	Laboratory Analyst	Inorganics, Edmonton, Alberta
Michelle Schroder	Laboratory Analyst	Inorganics, Edmonton, Alberta
Saron Gebremariam	Lab Assistant	Inorganics, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Inorganics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
 LOR: Limit of Reporting (detection limit).
 Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.
 Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Unit	Description
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
IB:INT	Ion Balance Reviewed: Imbalance is due to interference or non-measured component.
RRV	Reported result verified by repeat analysis.
SFP	Sample was filtered and preserved at the laboratory.
SP	Sample was preserved at the laboratory.



Analytical Results

EO2305295-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 1 (PC1)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	7580	1.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Alkalinity, total (as CaCO ₃)	----	6210	10.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Conductivity	----	18100	1.0	µS/cm	E100/EO	24-Jun-2023	24-Jun-2023	1007529
Hardness (as CaCO ₃), dissolved	----	2210	0.50	mg/L	EC100/EO	-	28-Jun-2023	-
pH	----	8.07	0.10	pH units	E108/EO	24-Jun-2023	24-Jun-2023	1007528
Solids, total dissolved [TDS], calculated	----	16100	1.0	mg/L	EC103/EO	-	26-Jun-2023	-
Solids, total suspended [TSS]	----	41.4	3.0	mg/L	E160/EO	-	29-Jun-2023	1012752
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	764 ^{SP.}	25.0	mg/L	E298/EO	29-Jun-2023	29-Jun-2023	1016514
Chloride	16887-00-6	2920 ^{DLDS.}	50.0	mg/L	E235.Cl/EO	24-Jun-2023	24-Jun-2023	1007590
Fluoride	16984-48-8	79.0 ^{DLDS.}	2.00	mg/L	E235.F/EO	24-Jun-2023	24-Jun-2023	1007587
Nitrate (as N)	14797-55-8	12.2 ^{DLDS.}	2.00	mg/L	E235.NO3/EO	24-Jun-2023	24-Jun-2023	1007588
Nitrate + Nitrite (as N)	----	16.0	2.24	mg/L	EC235.N+N/EO	-	27-Jun-2023	-
Nitrite (as N)	14797-65-0	3.76 ^{DLDS.}	1.00	mg/L	E235.NO2/EO	24-Jun-2023	24-Jun-2023	1007589
Phosphorus, total	7723-14-0	10.1 ^{SP.}	0.200	mg/L	E372-S/EO	30-Jun-2023	30-Jun-2023	1017368
Phosphorus, total dissolved	7723-14-0	9.51 ^{SFP.}	0.200	mg/L	E375-U/EO	30-Jun-2023	30-Jun-2023	1017367
Sulfate (as SO ₄)	14808-79-8	2530 ^{DLDS.}	30.0	mg/L	E235.SO4/EO	24-Jun-2023	24-Jun-2023	1007591
Kjeldahl nitrogen, total [TKN]	----	1160	50.0	mg/L	E318/EO	29-Jun-2023	29-Jun-2023	1012815
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	775 ^{SFP.}	5.00	mg/L	E358-L/EO	27-Jun-2023	27-Jun-2023	1011732
Ion Balance								
Ion balance (cations/anions)	----	104 ^{IB.INT.}	0.010	%	EC101/EO	-	26-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.519	0.00500	mg/L	E420/EO	27-Jun-2023	28-Jun-2023	1008934
Mercury, total	7439-97-6	0.000299 ^{RRV.}	0.0000050	mg/L	E508/EO	26-Jun-2023	26-Jun-2023	1008358
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.356	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Antimony, dissolved	7440-36-0	0.0140	0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Arsenic, dissolved	7440-38-2	0.0672	0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Barium, dissolved	7440-39-3	0.316	0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS.}	0.000200	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS.}	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Boron, dissolved	7440-42-8	17.9	0.100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Cadmium, dissolved	7440-43-9	0.00534	0.0000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Calcium, dissolved	7440-70-2	296	0.500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Cesium, dissolved	7440-46-2	0.00116	0.000100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Chromium, dissolved	7440-47-3	0.518	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Cobalt, dissolved	7440-48-4	0.157	0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Copper, dissolved	7440-50-8	0.121	0.00200	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Iron, dissolved	7439-89-6	119	0.100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Lead, dissolved	7439-92-1	0.206	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Lithium, dissolved	7439-93-2	0.452	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Magnesium, dissolved	7439-95-4	358	0.0500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313



Analytical Results

EO2305295-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 1 (PC1)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Dissolved Metals								
Manganese, dissolved	7439-96-5	22.1	0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Molybdenum, dissolved	7439-98-7	7.09	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Nickel, dissolved	7440-02-0	9.91	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Phosphorus, dissolved	7723-14-0	14.8	0.500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Potassium, dissolved	7440-09-7	539	0.500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Rubidium, dissolved	7440-17-7	0.0582	0.00200	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Selenium, dissolved	7782-49-2	0.00273	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Silicon, dissolved	7440-21-3	14.0	0.500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Silver, dissolved	7440-22-4	0.000740	0.000100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Sodium, dissolved	7440-23-5	3650	0.500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Strontium, dissolved	7440-24-6	2.35	0.00200	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Sulfur, dissolved	7704-34-9	1170	5.00	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Tellurium, dissolved	13494-80-9	<0.00200	^{DLDS} 0.00200	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Thallium, dissolved	7440-28-0	<0.000100	^{DLDS} 0.000100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Thorium, dissolved	7440-29-1	<0.00100	^{DLDS} 0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Tin, dissolved	7440-31-5	<0.00100	^{DLDS} 0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Titanium, dissolved	7440-32-6	0.132	0.00300	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Tungsten, dissolved	7440-33-7	0.0771	0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Uranium, dissolved	7440-61-1	0.0134	0.000100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Vanadium, dissolved	7440-62-2	18.4	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Zinc, dissolved	7440-66-6	1.75	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Zirconium, dissolved	7440-67-7	0.303	0.00200	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	27-Jun-2023	1010313
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	27-Jun-2023	1011734
Aggregate Organics								
Chemical oxygen demand [COD]	----	2600	^{DLHC} 100	mg/L	E559-L/EO	-	29-Jun-2023	1015003
Phenols, total (4AAP)	----	0.0457	^{DLM, SP} 0.0100	mg/L	E562/EO	30-Jun-2023	30-Jun-2023	1018368
Volatile Organic Compounds								
Benzene	71-43-2	27.0	0.50	µg/L	E611A/EO	27-Jun-2023	28-Jun-2023	1010253
Ethylbenzene	100-41-4	1.98	0.50	µg/L	E611A/EO	27-Jun-2023	28-Jun-2023	1010253
Toluene	108-88-3	0.67	0.50	µg/L	E611A/EO	27-Jun-2023	28-Jun-2023	1010253
Xylene, m+p-	179601-23-1	1.52	0.40	µg/L	E611A/EO	27-Jun-2023	28-Jun-2023	1010253
Xylene, o-	95-47-6	2.59	0.30	µg/L	E611A/EO	27-Jun-2023	28-Jun-2023	1010253
Xylenes, total	1330-20-7	4.11	0.50	µg/L	E611A/EO	27-Jun-2023	28-Jun-2023	1010253
Hydrocarbons								
F1 (C6-C10)	----	140	100	µg/L	E581.F1/EO	27-Jun-2023	28-Jun-2023	1010254
F1-BTEX	----	106	100	µg/L	EC580/EO	-	29-Jun-2023	-
F2 (C10-C16)	----	310	100	µg/L	E601/EO	26-Jun-2023	27-Jun-2023	1008909
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	98.5	1.0	%	E601/EO	26-Jun-2023	27-Jun-2023	1008909
Dichlorotoluene, 3,4-	95-75-0	80.1	1.0	%	E581.F1/EO	27-Jun-2023	28-Jun-2023	1010254
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	96.7	1.0	%	E611A/EO	27-Jun-2023	28-Jun-2023	1010253
Difluorobenzene, 1,4-	540-36-3	94.8	1.0	%	E611A/EO	27-Jun-2023	28-Jun-2023	1010253



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305295-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 2 (PC2)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	14700	1.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Alkalinity, carbonate (as CO ₃)	3812-32-6	1140	1.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Alkalinity, total (as CaCO ₃)	----	14000	10.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Conductivity	----	34800	1.0	µS/cm	E100/EO	24-Jun-2023	24-Jun-2023	1007529
Hardness (as CaCO ₃), dissolved	----	1460	2.5	mg/L	EC100/EO	-	28-Jun-2023	-
pH	----	8.78	0.10	pH units	E108/EO	24-Jun-2023	24-Jun-2023	1007528
Solids, total dissolved [TDS], calculated	----	30200	1.0	mg/L	EC103/EO	-	26-Jun-2023	-
Solids, total suspended [TSS]	----	9.6	3.0	mg/L	E160/EO	-	29-Jun-2023	1012752
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	652 ^{SP}	10.0	mg/L	E298/EO	29-Jun-2023	29-Jun-2023	1016514
Chloride	16887-00-6	5810 ^{DLDS}	50.0	mg/L	E235.Cl/EO	24-Jun-2023	24-Jun-2023	1007590
Fluoride	16984-48-8	12.5 ^{DLDS}	2.00	mg/L	E235.F/EO	24-Jun-2023	24-Jun-2023	1007587
Nitrate (as N)	14797-55-8	<2.00 ^{DLDS}	2.00	mg/L	E235.NO3/EO	24-Jun-2023	24-Jun-2023	1007588
Nitrate + Nitrite (as N)	----	<2.24	2.24	mg/L	EC235.N+N/EO	-	27-Jun-2023	-
Nitrite (as N)	14797-65-0	<1.00 ^{DLDS}	1.00	mg/L	E235.NO2/EO	24-Jun-2023	24-Jun-2023	1007589
Phosphorus, total	7723-14-0	4.84 ^{SP}	0.100	mg/L	E372-S/EO	30-Jun-2023	30-Jun-2023	1017368
Phosphorus, total dissolved	7723-14-0	4.68 ^{SFP}	0.100	mg/L	E375-U/EO	30-Jun-2023	30-Jun-2023	1017367
Sulfate (as SO ₄)	14808-79-8	1210 ^{DLDS}	30.0	mg/L	E235.SO4/EO	24-Jun-2023	24-Jun-2023	1007591
Kjeldahl nitrogen, total [TKN]	----	914	25.0	mg/L	E318/EO	29-Jun-2023	29-Jun-2023	1012815
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	2400	25.0	mg/L	E358-L/EO	27-Jun-2023	28-Jun-2023	1011732
Ion Balance								
Ion balance (cations/anions)	----	113	0.010	%	EC101/EO	-	26-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.343 ^{RRV}	0.0100	mg/L	E420/EO	27-Jun-2023	30-Jun-2023	1008934
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	26-Jun-2023	26-Jun-2023	1008358
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.141	0.0500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Antimony, dissolved	7440-36-0	0.0197	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Arsenic, dissolved	7440-38-2	0.0465	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Barium, dissolved	7440-39-3	0.860	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLDS}	0.00250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Boron, dissolved	7440-42-8	64.8	0.500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Cadmium, dissolved	7440-43-9	0.00475	0.000250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Calcium, dissolved	7440-70-2	32.8	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Cesium, dissolved	7440-46-2	0.00177	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Chromium, dissolved	7440-47-3	0.342	0.0250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Cobalt, dissolved	7440-48-4	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Copper, dissolved	7440-50-8	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Iron, dissolved	7439-89-6	0.772	0.500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Lead, dissolved	7439-92-1	<0.00250 ^{DLDS}	0.00250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313



Analytical Results

EO2305295-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 2 (PC2)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Dissolved Metals								
Lithium, dissolved	7439-93-2	6.84	0.0500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Magnesium, dissolved	7439-95-4	336	0.250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Manganese, dissolved	7439-96-5	0.980	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Molybdenum, dissolved	7439-98-7	14.5	0.00250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Nickel, dissolved	7440-02-0	0.315	0.0250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Phosphorus, dissolved	7723-14-0	7.07	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Potassium, dissolved	7440-09-7	1530	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Rubidium, dissolved	7440-17-7	0.216	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Selenium, dissolved	7782-49-2	0.0306	0.00250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Silicon, dissolved	7440-21-3	8.06	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Silver, dissolved	7440-22-4	0.000818	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Sodium, dissolved	7440-23-5	9560	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Strontium, dissolved	7440-24-6	2.64	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Sulfur, dissolved	7704-34-9	1060	25.0	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Tellurium, dissolved	13494-80-9	<0.0100	^{DLDS} 0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Thallium, dissolved	7440-28-0	<0.000500	^{DLDS} 0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Thorium, dissolved	7440-29-1	<0.00500	^{DLDS} 0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Tin, dissolved	7440-31-5	<0.00500	^{DLDS} 0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Titanium, dissolved	7440-32-6	0.260	0.0150	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Tungsten, dissolved	7440-33-7	14.4	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Uranium, dissolved	7440-61-1	0.00185	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Vanadium, dissolved	7440-62-2	1.02	0.0250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Zinc, dissolved	7440-66-6	<0.0500	^{DLDS} 0.0500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Zirconium, dissolved	7440-67-7	0.383	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	27-Jun-2023	1010313
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	27-Jun-2023	1011734
Aggregate Organics								
Chemical oxygen demand [COD]	----	9970	^{DLHC} 100	mg/L	E559-L/EO	-	29-Jun-2023	1015003
Phenols, total (4AAP)	----	5.86	^{SP} 0.100	mg/L	E562/EO	30-Jun-2023	30-Jun-2023	1018368
Volatile Organic Compounds								
Benzene	71-43-2	52.1	0.50	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Toluene	108-88-3	4.14	0.50	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Xylene, m+p-	179601-23-1	0.86	0.40	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Xylene, o-	95-47-6	0.56	0.30	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Xylenes, total	1330-20-7	1.42	0.50	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Hydrocarbons								
F1 (C6-C10)	----	220	100	µg/L	E581.F1/EO	27-Jun-2023	27-Jun-2023	1011314
F1-BTEX	----	162	100	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	1200	100	µg/L	E601/EO	26-Jun-2023	27-Jun-2023	1008909
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	96.9	1.0	%	E601/EO	26-Jun-2023	27-Jun-2023	1008909
Dichlorotoluene, 3,4-	95-75-0	127	1.0	%	E581.F1/EO	27-Jun-2023	27-Jun-2023	1011314
Volatile Organic Compounds Surrogates								



Analytical Results

EO2305295-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 2 (PC2)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	72.2	1.0	%	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Difluorobenzene, 1,4-	540-36-3	91.6	1.0	%	E611A/EO	27-Jun-2023	27-Jun-2023	1011315

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305295-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3A (PC3A)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	7780	1.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Alkalinity, total (as CaCO ₃)	----	6380	10.0	mg/L	E290/EO	24-Jun-2023	24-Jun-2023	1007527
Conductivity	----	31300	1.0	µS/cm	E100/EO	24-Jun-2023	24-Jun-2023	1007529
Hardness (as CaCO ₃), dissolved	----	2420	2.5	mg/L	EC100/EO	-	28-Jun-2023	-
pH	----	8.03	0.10	pH units	E108/EO	24-Jun-2023	24-Jun-2023	1007528
Solids, total dissolved [TDS], calculated	----	20000	1.0	mg/L	EC103/EO	-	26-Jun-2023	-
Solids, total suspended [TSS]	----	20.4	3.0	mg/L	E160/EO	-	29-Jun-2023	1012752
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	599 ^{SP}	10.0	mg/L	E298/EO	29-Jun-2023	29-Jun-2023	1016523
Chloride	16887-00-6	7690 ^{D.LDS.}	50.0	mg/L	E235.Cl/EO	24-Jun-2023	24-Jun-2023	1007590
Fluoride	16984-48-8	<2.00 ^{D.LDS.}	2.00	mg/L	E235.F/EO	24-Jun-2023	24-Jun-2023	1007587
Nitrate (as N)	14797-55-8	<2.00 ^{D.LDS.}	2.00	mg/L	E235.NO3/EO	24-Jun-2023	24-Jun-2023	1007588
Nitrate + Nitrite (as N)	----	<2.24	2.24	mg/L	EC235.N+N/EO	-	27-Jun-2023	-
Nitrite (as N)	14797-65-0	<1.00 ^{D.LDS.}	1.00	mg/L	E235.NO2/EO	24-Jun-2023	24-Jun-2023	1007589
Phosphorus, total	7723-14-0	3.96 ^{SP}	0.100	mg/L	E372-S/EO	30-Jun-2023	30-Jun-2023	1017368
Phosphorus, total dissolved	7723-14-0	4.12 ^{SFP}	0.100	mg/L	E375-U/EO	30-Jun-2023	30-Jun-2023	1017367
Sulfate (as SO ₄)	14808-79-8	222 ^{D.LDS.}	30.0	mg/L	E235.SO4/EO	24-Jun-2023	24-Jun-2023	1007591
Kjeldahl nitrogen, total [TKN]	----	808	25.0	mg/L	E318/EO	29-Jun-2023	29-Jun-2023	1012815
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	745 ^{SFP}	5.00	mg/L	E358-L/EO	27-Jun-2023	27-Jun-2023	1011732
Ion Balance								
Ion balance (cations/anions)	----	97.1 ^{IB.INT.}	0.010	%	EC101/EO	-	26-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.266	0.0100	mg/L	E420/EO	27-Jun-2023	28-Jun-2023	1008934
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	26-Jun-2023	26-Jun-2023	1008358
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0554	0.0500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Antimony, dissolved	7440-36-0	0.00914	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Arsenic, dissolved	7440-38-2	0.442	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Barium, dissolved	7440-39-3	1.14	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313



Analytical Results

EO2305295-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3A (PC3A)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLDS}	0.00250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Boron, dissolved	7440-42-8	37.0	0.500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Cadmium, dissolved	7440-43-9	<0.000250 ^{DLDS}	0.000250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Calcium, dissolved	7440-70-2	177	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Cesium, dissolved	7440-46-2	0.000890	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Chromium, dissolved	7440-47-3	0.218	0.0250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Cobalt, dissolved	7440-48-4	0.00908	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Copper, dissolved	7440-50-8	0.0103	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Iron, dissolved	7439-89-6	<0.500 ^{DLDS}	0.500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Lead, dissolved	7439-92-1	<0.00250 ^{DLDS}	0.00250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Lithium, dissolved	7439-93-2	2.57	0.0500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Magnesium, dissolved	7439-95-4	480	0.250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Manganese, dissolved	7439-96-5	0.860	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Molybdenum, dissolved	7439-98-7	0.607	0.00250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Nickel, dissolved	7440-02-0	0.487	0.0250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Phosphorus, dissolved	7723-14-0	6.58	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Potassium, dissolved	7440-09-7	924	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Rubidium, dissolved	7440-17-7	0.646	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Selenium, dissolved	7782-49-2	0.00897	0.00250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Silicon, dissolved	7440-21-3	21.6	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Silver, dissolved	7440-22-4	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Sodium, dissolved	7440-23-5	5160	2.50	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Strontium, dissolved	7440-24-6	4.34	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Sulfur, dissolved	7704-34-9	282	25.0	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Thallium, dissolved	7440-28-0	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Thorium, dissolved	7440-29-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Tin, dissolved	7440-31-5	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Titanium, dissolved	7440-32-6	0.0658	0.0150	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Tungsten, dissolved	7440-33-7	1.73	0.00500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Uranium, dissolved	7440-61-1	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Vanadium, dissolved	7440-62-2	0.196	0.0250	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Zinc, dissolved	7440-66-6	<0.0500 ^{DLDS}	0.0500	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Zirconium, dissolved	7440-67-7	0.155	0.0100	mg/L	E421/EO	27-Jun-2023	27-Jun-2023	1010313
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	27-Jun-2023	1010313
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	27-Jun-2023	1011734
Aggregate Organics								
Chemical oxygen demand [COD]	----	2950 ^{DLHC}	100	mg/L	E559-L/EO	-	29-Jun-2023	1015003
Phenols, total (4AAP)	----	7.96 ^{SP}	0.100	mg/L	E562/EO	30-Jun-2023	30-Jun-2023	1018368
Volatile Organic Compounds								
Benzene	71-43-2	272	0.50	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Ethylbenzene	100-41-4	5.06	0.50	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Toluene	108-88-3	103	0.50	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315



Analytical Results

EO2305295-003

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: Primary Leachate Cell 3A (PC3A)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	28.1	0.40	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Xylene, o-	95-47-6	10.4	0.30	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Xylenes, total	1330-20-7	38.5	0.50	µg/L	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Hydrocarbons								
F1 (C6-C10)	----	600	100	µg/L	E581.F1/EO	27-Jun-2023	27-Jun-2023	1011314
F1-BTEX	----	<186	186	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	1880	100	µg/L	E601/EO	26-Jun-2023	27-Jun-2023	1008909
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	95.7	1.0	%	E601/EO	26-Jun-2023	27-Jun-2023	1008909
Dichlorotoluene, 3,4-	95-75-0	119	1.0	%	E581.F1/EO	27-Jun-2023	27-Jun-2023	1011314
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	71.5	1.0	%	E611A/EO	27-Jun-2023	27-Jun-2023	1011315
Difluorobenzene, 1,4-	540-36-3	90.5	1.0	%	E611A/EO	27-Jun-2023	27-Jun-2023	1011315

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2305295</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Primary Leachate Qtr 2 2023</p> <p>PO : 234479</p> <p>C-O-C number : ----</p> <p>Sampler : MURRY</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 3</p> <p>No. of samples analysed : 3</p>	<p>Page : 1 of 18</p> <p>Laboratory : Edmonton - Environmental</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 23-Jun-2023 14:30</p> <p>Issue Date : 04-Jul-2023 16:56</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
 - CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
 - DQO: Data Quality Objective.
 - LOR: Limit of Reporting (detection limit).
 - RPD: Relative Percent Difference.
-

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Matrix Spike (MS) Recoveries								
Dissolved Metals	Anonymous	Anonymous	Silver, dissolved	7440-22-4	E421	65.8 % ^{MS-Ag}	70.0-130%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
MS-Ag	<i>MS-Ag: Matrix Spike recovery for silver was marginally below DQO (40 to <60%) due to its instability in the sample matrix. Silver was not detected. Reported result (< LOR) is reliable</i>



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E559-L	22-Jun-2023	----	----	----		29-Jun-2023	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E559-L	22-Jun-2023	----	----	----		29-Jun-2023	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E559-L	22-Jun-2023	----	----	----		29-Jun-2023	28 days	7 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E562	22-Jun-2023	30-Jun-2023	----	----		30-Jun-2023	28 days	8 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E562	22-Jun-2023	30-Jun-2023	----	----		30-Jun-2023	28 days	8 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E562	22-Jun-2023	30-Jun-2023	----	----		30-Jun-2023	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E298	22-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E298	22-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E298	22-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.Cl	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.Cl	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Primary Leachate Cell 3A (PC3A)	E235.Cl	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.F	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.F	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Primary Leachate Cell 3A (PC3A)	E235.F	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.NO3	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	3 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.NO3	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Primary Leachate Cell 3A (PC3A)	E235.NO3	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.NO2	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.NO2	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 3A (PC3A)	E235.NO2	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.SO4	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.SO4	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 3A (PC3A)	E235.SO4	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 1 (PC1)	E375-U	22-Jun-2023	30-Jun-2023	----	----		30-Jun-2023	28 days	8 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 2 (PC2)	E375-U	22-Jun-2023	30-Jun-2023	----	----		30-Jun-2023	28 days	8 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E375-U	22-Jun-2023	30-Jun-2023	----	----		30-Jun-2023	28 days	8 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E318	22-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E318	22-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E318	22-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E372-S	22-Jun-2023	30-Jun-2023	----	----		30-Jun-2023	28 days	8 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E372-S	22-Jun-2023	30-Jun-2023	----	----		30-Jun-2023	28 days	8 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E372-S	22-Jun-2023	30-Jun-2023	----	----		30-Jun-2023	28 days	8 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Primary Leachate Cell 1 (PC1)	E421	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	180 days	5 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Primary Leachate Cell 2 (PC2)	E421	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Primary Leachate Cell 3A (PC3A)	E421	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	180 days	5 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 2 (PC2)	E581.F1	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	14 days	5 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3A (PC3A)	E581.F1	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	14 days	5 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 1 (PC1)	E581.F1	22-Jun-2023	27-Jun-2023	----	----		28-Jun-2023	14 days	6 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 1 (PC1)	E601	22-Jun-2023	26-Jun-2023	14 days	4 days	✔	27-Jun-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 2 (PC2)	E601	22-Jun-2023	26-Jun-2023	14 days	4 days	✔	27-Jun-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3A (PC3A)	E601	22-Jun-2023	26-Jun-2023	14 days	4 days	✔	27-Jun-2023	40 days	1 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 1 (PC1)	E358-L	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	5 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 2 (PC2)	E358-L	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E358-L	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 1 (PC1)	E290	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 2 (PC2)	E290	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 3A (PC3A)	E290	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	14 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 1 (PC1)	E100	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 2 (PC2)	E100	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 3A (PC3A)	E100	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE Primary Leachate Cell 1 (PC1)	E108	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	0.25 hrs	1.28 hrs	* EHTR-FM



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 2 (PC2)	E108	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	0.25 hrs	1.28 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 3A (PC3A)	E108	22-Jun-2023	24-Jun-2023	----	----		24-Jun-2023	0.25 hrs	1.28 hrs	*	EHTR-FM
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 1 (PC1)	E160	22-Jun-2023	----	----	----		29-Jun-2023	7 days	7 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 2 (PC2)	E160	22-Jun-2023	----	----	----		29-Jun-2023	7 days	7 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3A (PC3A)	E160	22-Jun-2023	----	----	----		29-Jun-2023	7 days	7 days	✓	
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC											
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 1 (PC1)	E532A	22-Jun-2023	----	----	----		27-Jun-2023	28 days	5 days	✓	
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC											
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 2 (PC2)	E532A	22-Jun-2023	----	----	----		27-Jun-2023	28 days	5 days	✓	
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC											
HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3A (PC3A)	E532A	22-Jun-2023	----	----	----		27-Jun-2023	28 days	5 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 1 (PC1)	E508	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 2 (PC2)	E508	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	4 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Primary Leachate Cell 3A (PC3A)	E508	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	4 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 1 (PC1)	E420	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	180 days	5 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 2 (PC2)	E420	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	180 days	5 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Primary Leachate Cell 3A (PC3A)	E420	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	180 days	5 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 2 (PC2)	E611A	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	14 days	5 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 3A (PC3A)	E611A	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	14 days	5 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 1 (PC1)	E611A	22-Jun-2023	27-Jun-2023	----	----		28-Jun-2023	14 days	6 days	✔	

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1007527	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	1016514	2	40	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1010253	2	40	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1010254	2	40	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1015003	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1007590	1	5	20.0	5.0	✔
Conductivity in Water	E100	1007529	1	12	8.3	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1011734	1	8	12.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1010313	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1011732	2	39	5.1	5.0	✔
Fluoride in Water by IC	E235.F	1007587	1	3	33.3	5.0	✔
Nitrate in Water by IC	E235.NO3	1007588	1	3	33.3	5.0	✔
Nitrite in Water by IC	E235.NO2	1007589	1	3	33.3	5.0	✔
pH by Meter	E108	1007528	1	19	5.2	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1018368	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1007591	1	3	33.3	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1017367	1	14	7.1	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1012815	1	18	5.5	5.0	✔
Total Mercury in Water by CVAAS	E508	1008358	1	15	6.6	5.0	✔
Total metals in Water by CRC ICPMS	E420	1008934	1	9	11.1	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1017368	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1012752	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1007527	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	1016514	2	40	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1010253	2	40	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1010254	2	40	5.0	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1008909	1	18	5.5	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1015003	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1007590	1	5	20.0	5.0	✔
Conductivity in Water	E100	1007529	1	12	8.3	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1011734	1	8	12.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1010313	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1011732	2	39	5.1	5.0	✔
Fluoride in Water by IC	E235.F	1007587	1	3	33.3	5.0	✔
Nitrate in Water by IC	E235.NO3	1007588	1	3	33.3	5.0	✔



Matrix: **Water**

Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	1007589	1	3	33.3	5.0	✓
pH by Meter	E108	1007528	1	19	5.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1018368	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1007591	1	3	33.3	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1017367	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1012815	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	1008358	1	15	6.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	1008934	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1017368	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1012752	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1007527	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	1016514	2	40	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1010253	2	40	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1010254	2	40	5.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1008909	1	18	5.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1015003	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1007590	1	5	20.0	5.0	✓
Conductivity in Water	E100	1007529	1	12	8.3	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1011734	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1010313	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1011732	2	39	5.1	5.0	✓
Fluoride in Water by IC	E235.F	1007587	1	3	33.3	5.0	✓
Nitrate in Water by IC	E235.NO3	1007588	1	3	33.3	5.0	✓
Nitrite in Water by IC	E235.NO2	1007589	1	3	33.3	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1018368	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1007591	1	3	33.3	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1017367	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1012815	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	1008358	1	15	6.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	1008934	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1017368	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1012752	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1016514	2	40	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1010253	2	40	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1015003	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1007590	1	5	20.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1011734	1	8	12.5	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	1010313	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1011732	2	39	5.1	5.0	✔
Fluoride in Water by IC	E235.F	1007587	1	3	33.3	5.0	✔
Nitrate in Water by IC	E235.NO3	1007588	1	3	33.3	5.0	✔
Nitrite in Water by IC	E235.NO2	1007589	1	3	33.3	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1018368	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1007591	1	3	33.3	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1017367	1	14	7.1	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1012815	1	18	5.5	5.0	✔
Total Mercury in Water by CVAAS	E508	1008358	1	15	6.6	5.0	✔
Total metals in Water by CRC ICPMS	E420	1008934	1	9	11.1	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1017368	1	20	5.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Edmonton - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Edmonton - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Edmonton - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Edmonton - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Edmonton - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Edmonton - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Edmonton - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total metals in Water by CRC ICPMS	E420 Edmonton - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Edmonton - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Edmonton - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A Edmonton - Environmental	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Edmonton - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 Edmonton - Environmental	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
CCME PHC - F1 by Headspace GC-FID	E581.F1 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A Edmonton - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Edmonton - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Edmonton - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 Edmonton - Environmental	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Edmonton - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Edmonton - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Edmonton - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Edmonton - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Edmonton - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
VOCs Preparation for Headspace Analysis	EP581 Edmonton - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Edmonton - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2305295	Page	: 1 of 16
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 2 2023	Date Samples Received	: 23-Jun-2023 14:30
PO	: 234479	Date Analysis Commenced	: 24-Jun-2023
C-O-C number	: ----	Issue Date	: 04-Jul-2023 16:59
Sampler	: MURRY 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Adrian Hilts	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Edmonton Inorganics, Edmonton, Alberta
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Shruti Mudliar	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1007527)											
FC2301685-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	10.0	mg/L	890	905	1.67%	20%	----
Physical Tests (QC Lot: 1007528)											
FC2301685-001	Anonymous	pH	----	E108	0.10	pH units	8.59	8.59	0.00%	3%	----
Physical Tests (QC Lot: 1007529)											
FC2301685-001	Anonymous	Conductivity	----	E100	1.0	µS/cm	4230	4200	0.712%	10%	----
Physical Tests (QC Lot: 1012752)											
EO2305286-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	11.8	10.6	1.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1007587)											
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Fluoride	16984-48-8	E235.F	2.00	mg/L	<2.00	<2.00	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1007588)											
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Nitrate (as N)	14797-55-8	E235.NO3	2.00	mg/L	<2.00	<2.00	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1007589)											
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Nitrite (as N)	14797-65-0	E235.NO2	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1007590)											
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Chloride	16887-00-6	E235.Cl	50.0	mg/L	7690	7400	3.91%	20%	----
Anions and Nutrients (QC Lot: 1007591)											
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Sulfate (as SO4)	14808-79-8	E235.SO4	30.0	mg/L	222	205	17.0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1012815)											
EO2305289-004	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.200	mg/L	0.415	0.371	0.044	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1016514)											
EO2305286-005	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1016523)											
EO2305317-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.149	0.152	1.46%	20%	----
Anions and Nutrients (QC Lot: 1017367)											
EO2305326-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	0.0010	mg/L	0.0196	0.0215	9.05%	20%	----
Anions and Nutrients (QC Lot: 1017368)											
EO2305313-001	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0050	mg/L	0.100	0.0995	0.850%	20%	----
Organic / Inorganic Carbon (QC Lot: 1011732)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Organic / Inorganic Carbon (QC Lot: 1011732) - continued											
EO2304441-008	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	22.4	21.7	2.96%	20%	----
Organic / Inorganic Carbon (QC Lot: 1014417)											
GP2301174-021	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	56.9	55.5	2.55%	20%	----
Total Metals (QC Lot: 1008358)											
EO2305283-005	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1008934)											
EO2305136-006	Anonymous	Chromium, total	7440-47-3	E420	0.00250	mg/L	0.198	0.176	11.8%	20%	----
Dissolved Metals (QC Lot: 1010313)											
EO2305289-004	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0031	0.0026	0.0005	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00465	0.00435	6.69%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.465	0.447	4.02%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.033	0.032	0.002	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000102	0.0000057	0.0000044	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	148	150	1.93%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.000010	mg/L	0.00270	0.00271	0.247%	20%	----
		Copper, dissolved	7440-50-8	E421	0.000020	mg/L	0.00070	0.00069	0.00001	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	6.71	6.76	0.683%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0268	0.0266	0.581%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	40.0	40.1	0.222%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.446	0.446	0.0280%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000598	0.000617	3.14%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.000050	mg/L	0.00233	0.00232	0.000008	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.95	1.95	0.0371%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.000020	mg/L	0.00038	0.00032	0.00005	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	10.1	10.2	0.788%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1010313) - continued											
EO2305289-004	Anonymous	Sodium, dissolved	7440-23-5	E421	0.050	mg/L	16.1	16.4	1.61%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.732	0.733	0.174%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.65	0.58	0.08	Diff <2x LOR	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.00010	mg/L	0.00221	0.00214	3.19%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0036	0.0035	0.0001	Diff <2x LOR	----
Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----		
Speciated Metals (QC Lot: 1011734)											
SK2303065-047	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1015003)											
EO2305282-001	Anonymous	Chemical oxygen demand [COD]	----	E559-L	100	mg/L	6990	6800	2.73%	20%	----
Aggregate Organics (QC Lot: 1018368)											
EO2305289-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1010253)											
EO2305295-001	Primary Leachate Cell 1 (PC1)	Benzene	71-43-2	E611A	0.50	µg/L	27.0	27.4	1.15%	30%	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	1.98	2.16	0.18	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	0.67	0.73	0.06	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	1.52	1.56	0.05	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	2.59	2.91	11.7%	30%	----
Volatile Organic Compounds (QC Lot: 1011315)											
EO2305295-002	Primary Leachate Cell 2 (PC2)	Benzene	71-43-2	E611A	0.50	µg/L	52.1	51.0	2.25%	30%	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	4.14	4.03	2.58%	30%	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	0.86	0.83	0.03	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	0.56	0.60	0.04	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1010254)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Hydrocarbons (QC Lot: 1010254) - continued											
EO2305295-001	Primary Leachate Cell 1 (PC1)	F1 (C6-C10)	----	E581.F1	100	µg/L	140	140	4	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1011314)											
EO2305295-002	Primary Leachate Cell 2 (PC2)	F1 (C6-C10)	----	E581.F1	100	µg/L	220	190	20	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1007527)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1007529)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1012752)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 1007587)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1007588)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1007589)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1007590)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1007591)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1012815)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1016514)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 1016523)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 1017367)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1017368)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Organic / Inorganic Carbon (QCLot: 1011732)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Organic / Inorganic Carbon (QCLot: 1014417)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Total Metals (QCLot: 1008358)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
Total Metals (QCLot: 1008934)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1008934) - continued						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---
Dissolved Metals (QCLot: 1010313)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	---
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1010313) - continued						
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 1011734)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 1015003)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Aggregate Organics (QCLot: 1018368)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Volatile Organic Compounds (QCLot: 1010253)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Volatile Organic Compounds (QCLot: 1011315)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 1008909)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 1010254)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1011314)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1007527)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 1007528)									
pH	----	E108	----	pH units	6 pH units	101	97.0	103	----
Physical Tests (QCLot: 1007529)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	105	90.0	110	----
Physical Tests (QCLot: 1012752)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 1007587)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.7	90.0	110	----
Anions and Nutrients (QCLot: 1007588)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1007589)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	94.3	90.0	110	----
Anions and Nutrients (QCLot: 1007590)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	95.3	90.0	110	----
Anions and Nutrients (QCLot: 1007591)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	97.0	90.0	110	----
Anions and Nutrients (QCLot: 1012815)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 1016514)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	90.7	85.0	115	----
Anions and Nutrients (QCLot: 1016523)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.0	85.0	115	----
Anions and Nutrients (QCLot: 1017367)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	108	80.0	120	----
Anions and Nutrients (QCLot: 1017368)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	105	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1011732)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	98.1	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1014417)									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 1014417) - continued									
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	8.57 mg/L	85.0	80.0	120	---
Total Metals (QCLot: 1008358)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	93.6	80.0	120	---
Total Metals (QCLot: 1008934)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	---
Dissolved Metals (QCLot: 1010313)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	99.4	80.0	120	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	90.2	80.0	120	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	97.6	80.0	120	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	99.4	80.0	120	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	90.1	80.0	120	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.8	80.0	120	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	89.7	80.0	120	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	94.5	80.0	120	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	92.2	80.0	120	---
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	91.6	80.0	120	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.8	80.0	120	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	96.4	80.0	120	---
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.3	80.0	120	---
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	95.8	80.0	120	---
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	92.8	80.0	120	---
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	92.3	80.0	120	---
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.9	80.0	120	---
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	95.6	80.0	120	---
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	91.5	80.0	120	---
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.6	80.0	120	---
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	104	80.0	120	---
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.4	80.0	120	---
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	---
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	95.0	80.0	120	---
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	98.3	80.0	120	---
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	87.6	80.0	120	---
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	94.5	80.0	120	---
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	91.3	80.0	120	---



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 1010313) - continued									
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	105	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	94.6	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	93.3	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	112	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	91.1	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.0	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	92.5	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	93.5	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	97.3	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	94.9	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	85.2	80.0	120	----
Speciated Metals (QCLot: 1011734)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
Aggregate Organics (QCLot: 1015003)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	107	85.0	115	----
Aggregate Organics (QCLot: 1018368)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	95.0	85.0	115	----
Volatile Organic Compounds (QCLot: 1010253)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	95.4	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	116	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	94.9	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	102	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	113	70.0	130	----
Volatile Organic Compounds (QCLot: 1011315)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	120	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	100	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	99.1	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	118	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	88.8	70.0	130	----
Hydrocarbons (QCLot: 1008909)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	104	70.0	130	----
Hydrocarbons (QCLot: 1010254)									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Hydrocarbons (QCLot: 1010254) - continued									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	104	70.0	130	----
Hydrocarbons (QCLot: 1011314)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	109	70.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1007587)										
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1007588)										
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Nitrate (as N)	14797-55-8	E235.NO3	2.36 mg/L	2.5 mg/L	94.6	75.0	125	----
Anions and Nutrients (QCLot: 1007589)										
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Nitrite (as N)	14797-65-0	E235.NO2	0.506 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1007590)										
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Chloride	16887-00-6	E235.Cl	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1007591)										
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1012815)										
EO2305289-005	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.34 mg/L	2.5 mg/L	93.8	70.0	130	----
Anions and Nutrients (QCLot: 1016514)										
EO2305286-005	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0936 mg/L	0.1 mg/L	93.6	75.0	125	----
Anions and Nutrients (QCLot: 1016523)										
EO2305317-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1017367)										
EO2305326-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	0.0621 mg/L	0.067 mg/L	92.6	70.0	130	----
Anions and Nutrients (QCLot: 1017368)										
EO2305314-001	Anonymous	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1011732)										
EO2305136-006	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1014417)										
GP2301174-025	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1008358)										
EO2305283-005	Anonymous	Mercury, total	7439-97-6	E508	0.000108 mg/L	0.0001 mg/L	108	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1008934)										
EO2305136-006	Anonymous	Chromium, total	7440-47-3	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 1010313)										
EO2305289-004	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.210 mg/L	0.2 mg/L	105	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0218 mg/L	0.02 mg/L	109	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00936 mg/L	0.01 mg/L	93.6	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00413 mg/L	0.004 mg/L	103	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0199 mg/L	0.02 mg/L	99.7	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		Iron, dissolved	7439-89-6	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0195 mg/L	0.02 mg/L	97.3	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0377 mg/L	0.04 mg/L	94.2	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	11.1 mg/L	10 mg/L	111	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.02 mg/L	4 mg/L	100	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0480 mg/L	0.04 mg/L	120	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00263 mg/L	0.004 mg/L	65.8	70.0	130	MS-Ag
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	23.0 mg/L	20 mg/L	115	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0426 mg/L	0.04 mg/L	106	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00391 mg/L	0.004 mg/L	97.6	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0207 mg/L	0.02 mg/L	103	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1010313) - continued										
EO2305289-004	Anonymous	Titanium, dissolved	7440-32-6	E421	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00393 mg/L	0.004 mg/L	98.2	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.404 mg/L	0.4 mg/L	101	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
Speciated Metals (QCLot: 1011734)										
SK2303065-047	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0504 mg/L	0.05 mg/L	101	70.0	130	----
Aggregate Organics (QCLot: 1015003)										
EO2305283-007	Anonymous	Chemical oxygen demand [COD]	----	E559-L	106 mg/L	100 mg/L	106	75.0	125	----
Aggregate Organics (QCLot: 1018368)										
EO2305289-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0182 mg/L	0.02 mg/L	90.8	75.0	125	----
Volatile Organic Compounds (QCLot: 1010253)										
EO2305299-018	Anonymous	Benzene	71-43-2	E611A	90.2 µg/L	100 µg/L	90.2	50.0	140	----
		Ethylbenzene	100-41-4	E611A	76.7 µg/L	100 µg/L	76.7	50.0	140	----
		Toluene	108-88-3	E611A	93.2 µg/L	100 µg/L	93.2	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	218 µg/L	200 µg/L	109	50.0	140	----
		Xylene, o-	95-47-6	E611A	80.9 µg/L	100 µg/L	80.9	50.0	140	----
Volatile Organic Compounds (QCLot: 1011315)										
EO2305295-003	Primary Leachate Cell 3A (PC3A)	Benzene	71-43-2	E611A	ND µg/L	100 µg/L	ND	50.0	140	MS-B
		Ethylbenzene	100-41-4	E611A	79.9 µg/L	100 µg/L	79.9	50.0	140	----
		Toluene	108-88-3	E611A	ND µg/L	100 µg/L	ND	50.0	140	MS-B
		Xylene, m+p-	179601-23-1	E611A	182 µg/L	200 µg/L	90.8	50.0	140	----
		Xylene, o-	95-47-6	E611A	75.3 µg/L	100 µg/L	75.3	50.0	140	----

Qualifiers

Qualifier	Description
MS-Ag	MS-Ag: Matrix Spike recovery for silver was marginally below DQO (40 to <60%) due to its instability in the sample matrix. Silver was not detected. Reported result (< LOR) is reliable
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 22 -

Page of

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Turnaround Time (TAT) Requested

- Routine [R] if received by 3pm M-F - no surcharges apply
- 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- 1 day [E] if received by 3pm M-F - 100% rush surcharge
- Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.
 3d-mm-yy hh:mm am/pm
 Date and Time Required for all E&P TATs:
 For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below

SAMPLES ON HOLD
EXTENDED STORAGE REQUIRED
SUSPECTED HAZARD (see notes)

Reports / Recipients

- Select Report Format: PDF EXCEL EDD (DIGITAL)
- Merge QC/QCI Reports with COA YES NO N/A
- Compare Results to Criteria on Report - provide details below if box checked
- Select Distribution: EMAIL MAIL FAX
- Email 1 or Fax: webh.todd@cleanharbors.com
- Email 2: yulha.stan@cleanharbors.com
- Email 3:

Invoice Recipients

- Select Invoice Distribution: EMAIL MAIL FAX
- Email 1 or Fax: dennis.stephanie@cleanharbors.com
- Email 2

Oil and Gas Required Fields (client use)

ATE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner: Location:

ALS Account # / Quote #: EO22-CHES100-008

Job #: Primary Leachate Ctr 2 2023

PO / A/E: 234479

LSD: Table 4.4A

ALS Lab Work Order # (ALS use only): **EO2305295**

Sample Identification and/or Coordinates (This description will appear on the report)

ALS Sample # (ALS use only)

Primary Leachate Cell 1 (PC1)

Primary Leachate Cell 2 (PC2)

Primary Leachate Cell 3A (PC3A)

Date (dd-mm-yy)

Time (hh:mm)

Sample Type

22-Jun-23 11:00 R

22-Jun-23 11:00 R

22-Jun-23 11:00 R

SAMPLE RECI

Cooling Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A NO

INITIAL COOLER TEMPERATURES °C

INITIAL COOLER TEMPERATURES °C

FINAL COOLER TEMPERATURES °C

Drinking Water (DW) Samples (client use)

Are samples taken from a Regulated DW System? YES NO

Are samples for human consumption/ use? YES NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please add to EO2305134, and report on same report. Analyze as per Quote EO22-CHES100-008, Table 4.4A package (Attached). Same as EO2301874. Metals bottles not preserved

SHIPMENT RELEASE (client use)

Released by: Todd Webb Date: 23-Jun-23 Time: 9:00

Received by: *[Signature]* Date: 23/23 Time: 9:30

INITIAL SHIPMENT RECEPTION (ALS use only)

Date: 23/23

FINAL SHIPMENT RECEPTION (ALS use only)

Date:

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.
1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



Environmental Division
Edmonton
Work Order Reference
EO2305295

Telephone : +1 780 413 6227

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus



CERTIFICATE OF ANALYSIS

Work Order	: EO2305134	Page	: 1 of 13
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 2 2023	Date Samples Received	: 21-Jun-2023 12:14
PO	: 234479	Date Analysis	: 22-Jun-2023
		Commenced	
C-O-C number	: ----	Issue Date	: 29-Jun-2023 11:50
Sampler	: Murray		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Adrian Hilts	Lab Analyst	Metals, Edmonton, Alberta
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Andrew Fox		Metals, Calgary, Alberta
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Christian Murera	Lab Analyst	Organics, Edmonton, Alberta
Elke Tabora		Inorganics, Calgary, Alberta
George Huang	Supervisor - Inorganic	Inorganics, Calgary, Alberta
George Huang	Supervisor - Inorganic	Metals, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Michelle Schroder	Laboratory Analyst	Inorganics, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
Remy Gatabazi	Lab Analyst	Organics, Edmonton, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Metals, Calgary, Alberta
Yan Zhang	Lab Analyst	Organics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
 LOR: Limit of Reporting (detection limit).
 Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.
 Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

<i>Unit</i>	<i>Description</i>
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
RRV	Reported result verified by repeat analysis.
SFP	Sample was filtered and preserved at the laboratory.
SP	Sample was preserved at the laboratory.



Analytical Results

EO2305134-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3B (PC3B)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	7260	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, carbonate (as CO ₃)	3812-32-6	4470	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, total (as CaCO ₃)	----	13400	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Conductivity	----	44900	1.0	µS/cm	E100/CG	26-Jun-2023	26-Jun-2023	1008459
Hardness (as CaCO ₃), dissolved	----	268	2.5	mg/L	EC100/CG	-	27-Jun-2023	-
pH	----	9.41	0.10	pH units	E108/CG	26-Jun-2023	26-Jun-2023	1008458
Solids, total dissolved [TDS], calculated	----	40900	1.0	mg/L	EC103/CG	-	25-Jun-2023	-
Solids, total suspended [TSS]	----	172	3.0	mg/L	E160/CG	-	26-Jun-2023	1008944
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	2030	^{SP.} 50.0	mg/L	E298/EO	27-Jun-2023	27-Jun-2023	1012041
Chloride	16887-00-6	9580	25.0	mg/L	E235.Cl/CG	22-Jun-2023	22-Jun-2023	1002629
Fluoride	16984-48-8	12.8	1.00	mg/L	E235.F/CG	22-Jun-2023	22-Jun-2023	1002632
Nitrate (as N)	14797-55-8	<1.00	^{DLDS.} 1.00	mg/L	E235.NO3/CG	22-Jun-2023	22-Jun-2023	1002628
Nitrate + Nitrite (as N)	----	<1.12	1.12	mg/L	EC235.N+N/CG	-	28-Jun-2023	1014276
Nitrite (as N)	14797-65-0	<0.500	^{DLDS.} 0.500	mg/L	E235.NO2/CG	22-Jun-2023	22-Jun-2023	1002630
Phosphorus, total	7723-14-0	5.72	^{SP.} 0.100	mg/L	E372-S/EO	24-Jun-2023	26-Jun-2023	1006886
Phosphorus, total dissolved	7723-14-0	6.31	^{SFP.} 0.100	mg/L	E375-U/EO	24-Jun-2023	26-Jun-2023	1006889
Sulfate (as SO ₄)	14808-79-8	1300	15.0	mg/L	E235.SO4/CG	22-Jun-2023	22-Jun-2023	1002631
Kjeldahl nitrogen, total [TKN]	----	2610	50.0	mg/L	E318/EO	24-Jun-2023	26-Jun-2023	1004718
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	5240	50.0	mg/L	E358-L/CG	22-Jun-2023	24-Jun-2023	1003616
Ion Balance								
Ion balance (cations/anions)	----	123	0.010	%	EC101/CG	-	27-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.871	0.00500	mg/L	E420/CG	24-Jun-2023	26-Jun-2023	1005056
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	22-Jun-2023	22-Jun-2023	1002429
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.182	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Antimony, dissolved	7440-36-0	0.00851	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Arsenic, dissolved	7440-38-2	0.149	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Barium, dissolved	7440-39-3	0.752	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Beryllium, dissolved	7440-41-7	<0.00100	^{DLDS.} 0.00100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Bismuth, dissolved	7440-69-9	<0.00250	^{DLDS.} 0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Boron, dissolved	7440-42-8	163	^{RRV.} 0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cadmium, dissolved	7440-43-9	0.00838	0.000250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Calcium, dissolved	7440-70-2	15.5	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cesium, dissolved	7440-46-2	0.139	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Chromium, dissolved	7440-47-3	0.842	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cobalt, dissolved	7440-48-4	0.0251	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Copper, dissolved	7440-50-8	0.103	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Iron, dissolved	7439-89-6	2.20	0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Lead, dissolved	7439-92-1	0.00775	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Lithium, dissolved	7439-93-2	10.9	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Magnesium, dissolved	7439-95-4	55.8	0.250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053



Analytical Results

EO2305134-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3B (PC3B)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Dissolved Metals								
Manganese, dissolved	7439-96-5	1.01	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Molybdenum, dissolved	7439-98-7	44.6	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Nickel, dissolved	7440-02-0	1.39	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Phosphorus, dissolved	7723-14-0	12.1	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Potassium, dissolved	7440-09-7	3440	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Rubidium, dissolved	7440-17-7	5.32	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Selenium, dissolved	7782-49-2	0.0911	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silicon, dissolved	7440-21-3	40.8	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silver, dissolved	7440-22-4	0.000933	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sodium, dissolved	7440-23-5	10500	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Strontium, dissolved	7440-24-6	1.06	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sulfur, dissolved	7704-34-9	845	25.0	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thallium, dissolved	7440-28-0	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thorium, dissolved	7440-29-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tin, dissolved	7440-31-5	0.0175	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Titanium, dissolved	7440-32-6	0.367	0.0150	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tungsten, dissolved	7440-33-7	20.3	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Uranium, dissolved	7440-61-1	0.00154	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Vanadium, dissolved	7440-62-2	0.825	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Zinc, dissolved	7440-66-6	<0.0500 ^{DLDS}	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Zirconium, dissolved	7440-67-7	0.163	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	23-Jun-2023	1005053
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	22-Jun-2023	1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	17400 ^{DLHC}	100	mg/L	E559-L/EO	-	23-Jun-2023	1004729
Phenols, total (4AAP)	----	23.3 ^{RRV, SP}	0.500	mg/L	E562/EO	27-Jun-2023	27-Jun-2023	1010728
Volatile Organic Compounds								
Benzene	71-43-2	11.0	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Ethylbenzene	100-41-4	1.08	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Toluene	108-88-3	6.45	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylene, m+p-	179601-23-1	2.34	0.40	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylene, o-	95-47-6	2.06	0.30	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylenes, total	1330-20-7	4.40	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Hydrocarbons								
F1 (C6-C10)	----	480	100	µg/L	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
F1-BTEX	----	457	126	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	2600	100	µg/L	E601/EO	22-Jun-2023	22-Jun-2023	1002382
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	104	1.0	%	E601/EO	22-Jun-2023	22-Jun-2023	1002382
Dichlorotoluene, 3,4-	95-75-0	80.2	1.0	%	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	114	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Difluorobenzene, 1,4-	540-36-3	103	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305134-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3C (PC3C)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	3000	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, carbonate (as CO ₃)	3812-32-6	612	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, total (as CaCO ₃)	----	3480	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Conductivity	----	13000	1.0	µS/cm	E100/CG	26-Jun-2023	26-Jun-2023	1008459
Hardness (as CaCO ₃), dissolved	----	1250	2.5	mg/L	EC100/CG	-	27-Jun-2023	-
pH	----	8.82	0.10	pH units	E108/CG	26-Jun-2023	26-Jun-2023	1008458
Solids, total dissolved [TDS], calculated	----	9300	1.0	mg/L	EC103/CG	-	25-Jun-2023	-
Solids, total suspended [TSS]	----	65.2	3.0	mg/L	E160/CG	-	26-Jun-2023	1008944
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	380 ^{SP}	10.0	mg/L	E298/EO	27-Jun-2023	27-Jun-2023	1012041
Chloride	16887-00-6	2200	10.0	mg/L	E235.Cl/CG	22-Jun-2023	22-Jun-2023	1002629
Fluoride	16984-48-8	3.86	0.400	mg/L	E235.F/CG	22-Jun-2023	22-Jun-2023	1002632
Nitrate (as N)	14797-55-8	3.67	0.400	mg/L	E235.NO3/CG	22-Jun-2023	22-Jun-2023	1002628
Nitrate + Nitrite (as N)	----	6.89	0.447	mg/L	EC235.N+N/CG	-	28-Jun-2023	1014276
Nitrite (as N)	14797-65-0	3.22	0.200	mg/L	E235.NO2/CG	22-Jun-2023	22-Jun-2023	1002630
Phosphorus, total	7723-14-0	7.97 ^{SP}	0.100	mg/L	E372-S/EO	24-Jun-2023	26-Jun-2023	1006886
Phosphorus, total dissolved	7723-14-0	4.56 ^{SPP}	0.100	mg/L	E375-U/EO	24-Jun-2023	26-Jun-2023	1006889
Sulfate (as SO ₄)	14808-79-8	912	6.00	mg/L	E235.SO4/CG	22-Jun-2023	22-Jun-2023	1002631
Kjeldahl nitrogen, total [TKN]	----	544	10.0	mg/L	E318/EO	24-Jun-2023	26-Jun-2023	1004718
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	302	2.50	mg/L	E358-L/CG	22-Jun-2023	23-Jun-2023	1003616
Ion Balance								
Ion balance (cations/anions)	----	112	0.010	%	EC101/CG	-	27-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.00586	0.00500	mg/L	E420/CG	24-Jun-2023	26-Jun-2023	1005056
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	22-Jun-2023	22-Jun-2023	1002429
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0807	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Antimony, dissolved	7440-36-0	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Arsenic, dissolved	7440-38-2	0.0337	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Barium, dissolved	7440-39-3	0.0781	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Boron, dissolved	7440-42-8	45.2	0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cadmium, dissolved	7440-43-9	0.00219	0.000250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Calcium, dissolved	7440-70-2	107	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cesium, dissolved	7440-46-2	0.000547	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Chromium, dissolved	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cobalt, dissolved	7440-48-4	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Copper, dissolved	7440-50-8	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Iron, dissolved	7439-89-6	0.974	0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Lead, dissolved	7439-92-1	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053



Analytical Results

EO2305134-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3C (PC3C)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/lot
Dissolved Metals								
Lithium, dissolved	7439-93-2	1.98	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Magnesium, dissolved	7439-95-4	239	0.250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Manganese, dissolved	7439-96-5	0.570	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Molybdenum, dissolved	7439-98-7	10.7	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Nickel, dissolved	7440-02-0	0.779	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Phosphorus, dissolved	7723-14-0	5.27	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Potassium, dissolved	7440-09-7	406	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Rubidium, dissolved	7440-17-7	0.221	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Selenium, dissolved	7782-49-2	0.0443	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silicon, dissolved	7440-21-3	14.9	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silver, dissolved	7440-22-4	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sodium, dissolved	7440-23-5	2480	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Strontium, dissolved	7440-24-6	0.698	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sulfur, dissolved	7704-34-9	475	25.0	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thallium, dissolved	7440-28-0	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thorium, dissolved	7440-29-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tin, dissolved	7440-31-5	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Titanium, dissolved	7440-32-6	<0.0150 ^{DLDS}	0.0150	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tungsten, dissolved	7440-33-7	0.0681	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Uranium, dissolved	7440-61-1	0.00901	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Vanadium, dissolved	7440-62-2	26.7	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Zinc, dissolved	7440-66-6	<0.0500 ^{DLDS}	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Zirconium, dissolved	7440-67-7	0.0689	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	23-Jun-2023	1005053
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	22-Jun-2023	1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	1400 ^{DLHC}	100	mg/L	E559-L/EO	-	23-Jun-2023	1004729
Phenols, total (4AAP)	----	0.815 ^{RRV, SP}	0.0200	mg/L	E562/EO	27-Jun-2023	27-Jun-2023	1010728
Volatile Organic Compounds								
Benzene	71-43-2	15.0	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Ethylbenzene	100-41-4	74.1	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Toluene	108-88-3	181	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylene, m+p-	179601-23-1	188	0.40	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylene, o-	95-47-6	99.6	0.30	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylenes, total	1330-20-7	288	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Hydrocarbons								
F1 (C6-C10)	----	510	100	µg/L	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
F1-BTEX	----	<186	186	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	760	100	µg/L	E601/EO	22-Jun-2023	22-Jun-2023	1002382
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	102	1.0	%	E601/EO	22-Jun-2023	22-Jun-2023	1002382
Dichlorotoluene, 3,4-	95-75-0	75.0	1.0	%	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
Volatile Organic Compounds Surrogates								



Analytical Results

EO2305134-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3C (PC3C)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	123	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Difluorobenzene, 1,4-	540-36-3	96.5	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305134-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3D (PC3D)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	4480	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, total (as CaCO ₃)	----	3670	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Conductivity	----	17600	1.0	µS/cm	E100/CG	26-Jun-2023	26-Jun-2023	1008459
Hardness (as CaCO ₃), dissolved	----	1120	2.5	mg/L	EC100/CG	-	27-Jun-2023	-
pH	----	8.18	0.10	pH units	E108/CG	26-Jun-2023	26-Jun-2023	1008458
Solids, total dissolved [TDS], calculated	----	12500	1.0	mg/L	EC103/CG	-	25-Jun-2023	-
Solids, total suspended [TSS]	----	55.4	3.0	mg/L	E160/CG	-	26-Jun-2023	1008944
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	298 ^{SP}	10.0	mg/L	E298/EO	27-Jun-2023	27-Jun-2023	1012041
Chloride	16887-00-6	4080	12.5	mg/L	E235.Cl/CG	22-Jun-2023	22-Jun-2023	1002629
Fluoride	16984-48-8	5.37	0.500	mg/L	E235.F/CG	22-Jun-2023	22-Jun-2023	1002632
Nitrate (as N)	14797-55-8	<0.500 ^{DLDS}	0.500	mg/L	E235.NO3/CG	22-Jun-2023	22-Jun-2023	1002628
Nitrate + Nitrite (as N)	----	<0.559	0.559	mg/L	EC235.N+N/CG	-	28-Jun-2023	1014276
Nitrite (as N)	14797-65-0	<0.250 ^{DLDS}	0.250	mg/L	E235.NO2/CG	22-Jun-2023	22-Jun-2023	1002630
Phosphorus, total	7723-14-0	1.29 ^{SP}	0.100	mg/L	E372-S/EO	24-Jun-2023	26-Jun-2023	1006886
Phosphorus, total dissolved	7723-14-0	1.16 ^{SFP}	0.100	mg/L	E375-U/EO	24-Jun-2023	26-Jun-2023	1006889
Sulfate (as SO ₄)	14808-79-8	186	7.50	mg/L	E235.SO4/CG	22-Jun-2023	22-Jun-2023	1002631
Kjeldahl nitrogen, total [TKN]	----	401	10.0	mg/L	E318/EO	24-Jun-2023	26-Jun-2023	1004718
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	804	25.0	mg/L	E358-L/CG	22-Jun-2023	24-Jun-2023	1003616
Ion Balance								
Ion balance (cations/anions)	----	116	0.010	%	EC101/CG	-	27-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0260	0.00500	mg/L	E420/CG	24-Jun-2023	26-Jun-2023	1005056
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	22-Jun-2023	22-Jun-2023	1002429
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.112	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Antimony, dissolved	7440-36-0	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Arsenic, dissolved	7440-38-2	0.0428	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Barium, dissolved	7440-39-3	0.584	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053



Analytical Results

EO2305134-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3D (PC3D)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Boron, dissolved	7440-42-8	34.9	0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cadmium, dissolved	7440-43-9	0.00121	0.000250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Calcium, dissolved	7440-70-2	177	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cesium, dissolved	7440-46-2	0.00153	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Chromium, dissolved	7440-47-3	0.0219	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cobalt, dissolved	7440-48-4	0.00535	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Copper, dissolved	7440-50-8	0.0320	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Iron, dissolved	7439-89-6	1.85	0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Lead, dissolved	7439-92-1	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Lithium, dissolved	7439-93-2	1.87	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Magnesium, dissolved	7439-95-4	164	0.250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Manganese, dissolved	7439-96-5	1.27	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Molybdenum, dissolved	7439-98-7	6.85	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Nickel, dissolved	7440-02-0	3.01	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Phosphorus, dissolved	7723-14-0	<2.50 ^{DLDS}	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Potassium, dissolved	7440-09-7	706	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Rubidium, dissolved	7440-17-7	0.470	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Selenium, dissolved	7782-49-2	0.0199	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silicon, dissolved	7440-21-3	21.7	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silver, dissolved	7440-22-4	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sodium, dissolved	7440-23-5	3700	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Strontium, dissolved	7440-24-6	2.46	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sulfur, dissolved	7704-34-9	200	25.0	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thallium, dissolved	7440-28-0	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thorium, dissolved	7440-29-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tin, dissolved	7440-31-5	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Titanium, dissolved	7440-32-6	0.0207	0.0150	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tungsten, dissolved	7440-33-7	0.0626	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Uranium, dissolved	7440-61-1	0.00168	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Vanadium, dissolved	7440-62-2	3.55	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Zinc, dissolved	7440-66-6	<0.0500 ^{DLDS}	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Zirconium, dissolved	7440-67-7	0.0578	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	23-Jun-2023	1005053
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	22-Jun-2023	1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	3200 ^{DLHC}	100	mg/L	E559-L/EO	-	23-Jun-2023	1004729
Phenols, total (4AAP)	----	6.60 ^{RRV.SP.}	0.100	mg/L	E562/EO	27-Jun-2023	27-Jun-2023	1010728
Volatile Organic Compounds								
Benzene	71-43-2	33.8	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Ethylbenzene	100-41-4	3.52	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Toluene	108-88-3	19.1	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878



Analytical Results

EO2305134-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3D (PC3D)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	6.33	0.40	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylene, o-	95-47-6	4.29	0.30	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylenes, total	1330-20-7	10.6	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Hydrocarbons								
F1 (C6-C10)	----	160	100	µg/L	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	1710	100	µg/L	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	102	1.0	%	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Dichlorotoluene, 3,4-	95-75-0	70.9	1.0	%	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	107	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Difluorobenzene, 1,4-	540-36-3	103	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305134-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3E (PC3E)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	4360	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, total (as CaCO3)	----	3580	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Conductivity	----	14300	1.0	µS/cm	E100/CG	26-Jun-2023	26-Jun-2023	1008459
Hardness (as CaCO3), dissolved	----	1640	2.5	mg/L	EC100/CG	-	27-Jun-2023	-
pH	----	8.03	0.10	pH units	E108/CG	26-Jun-2023	26-Jun-2023	1008458
Solids, total dissolved [TDS], calculated	----	9470	1.0	mg/L	EC103/CG	-	25-Jun-2023	-
Solids, total suspended [TSS]	----	173	3.0	mg/L	E160/CG	-	26-Jun-2023	1008944
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	256 ^{SP}	10.0	mg/L	E298/EO	27-Jun-2023	27-Jun-2023	1012041
Chloride	16887-00-6	2790	12.5	mg/L	E235.Cl/CG	22-Jun-2023	22-Jun-2023	1002629
Fluoride	16984-48-8	3.12	0.500	mg/L	E235.F/CG	22-Jun-2023	22-Jun-2023	1002632
Nitrate (as N)	14797-55-8	<0.500 ^{D.L.D.S.}	0.500	mg/L	E235.NO3/CG	22-Jun-2023	22-Jun-2023	1002628
Nitrate + Nitrite (as N)	----	<0.559	0.559	mg/L	EC235.N+N/CG	-	28-Jun-2023	1014276
Nitrite (as N)	14797-65-0	<0.250 ^{D.L.D.S.}	0.250	mg/L	E235.NO2/CG	22-Jun-2023	22-Jun-2023	1002630
Phosphorus, total	7723-14-0	1.04 ^{SP}	0.100	mg/L	E372-S/EO	24-Jun-2023	26-Jun-2023	1006886
Phosphorus, total dissolved	7723-14-0	1.09 ^{S.F.P.}	0.100	mg/L	E375-U/EO	24-Jun-2023	26-Jun-2023	1006889
Sulfate (as SO4)	14808-79-8	439	7.50	mg/L	E235.SO4/CG	22-Jun-2023	22-Jun-2023	1002631
Kjeldahl nitrogen, total [TKN]	----	359	10.0	mg/L	E318/EO	24-Jun-2023	26-Jun-2023	1004718
Organic / Inorganic Carbon								



Analytical Results

EO2305134-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3E (PC3E)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	115	10.0	mg/L	E358-L/CG	22-Jun-2023	23-Jun-2023	1003616
Ion Balance								
Ion balance (cations/anions)	----	114	0.010	%	EC101/CG	-	27-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0114	0.00500	mg/L	E420/CG	24-Jun-2023	26-Jun-2023	1005056
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	22-Jun-2023	22-Jun-2023	1002429
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0500 ^{DLDS}	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Antimony, dissolved	7440-36-0	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Arsenic, dissolved	7440-38-2	0.00711	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Barium, dissolved	7440-39-3	0.494	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Boron, dissolved	7440-42-8	6.66	0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cadmium, dissolved	7440-43-9	<0.000250 ^{DLDS}	0.000250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Calcium, dissolved	7440-70-2	125	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cesium, dissolved	7440-46-2	0.00443	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Chromium, dissolved	7440-47-3	0.00531	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cobalt, dissolved	7440-48-4	0.00624	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Copper, dissolved	7440-50-8	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Iron, dissolved	7439-89-6	<0.500 ^{DLDS}	0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Lead, dissolved	7439-92-1	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Lithium, dissolved	7439-93-2	1.08	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Magnesium, dissolved	7439-95-4	322	0.250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Manganese, dissolved	7439-96-5	0.855	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Molybdenum, dissolved	7439-98-7	0.584	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Nickel, dissolved	7440-02-0	0.858	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Phosphorus, dissolved	7723-14-0	<2.50 ^{DLDS}	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Potassium, dissolved	7440-09-7	284	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Rubidium, dissolved	7440-17-7	0.338	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Selenium, dissolved	7782-49-2	0.00278	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silicon, dissolved	7440-21-3	16.6	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silver, dissolved	7440-22-4	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sodium, dissolved	7440-23-5	2870	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Strontium, dissolved	7440-24-6	3.76	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sulfur, dissolved	7704-34-9	219	25.0	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thallium, dissolved	7440-28-0	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thorium, dissolved	7440-29-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tin, dissolved	7440-31-5	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Titanium, dissolved	7440-32-6	<0.0150 ^{DLDS}	0.0150	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tungsten, dissolved	7440-33-7	0.0291	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Uranium, dissolved	7440-61-1	0.0103	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Vanadium, dissolved	7440-62-2	4.72	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Zinc, dissolved	7440-66-6	<0.0500 ^{DLDS}	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053



Analytical Results

EO2305134-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3E (PC3E)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Zirconium, dissolved	7440-67-7	0.0932	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	23-Jun-2023	1005053
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	22-Jun-2023	1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	110	10	mg/L	E559-L/EO	-	23-Jun-2023	1004729
Phenols, total (4AAP)	----	0.0466 ^{RRV, SP.}	0.0010	mg/L	E562/EO	27-Jun-2023	27-Jun-2023	1010728
Volatile Organic Compounds								
Benzene	71-43-2	17.4	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Ethylbenzene	100-41-4	2.30	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Toluene	108-88-3	1.34	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylene, m+p-	179601-23-1	2.99	0.40	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylene, o-	95-47-6	2.29	0.30	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylenes, total	1330-20-7	5.28	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	46000	420	µg/L	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	126	4.2	%	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Dichlorotoluene, 3,4-	95-75-0	91.0	1.0	%	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	114	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Difluorobenzene, 1,4-	540-36-3	98.6	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305134-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 4 (PC4)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	5680	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Alkalinity, total (as CaCO3)	----	4660	1.0	mg/L	E290/CG	26-Jun-2023	26-Jun-2023	1008460
Conductivity	----	18300	1.0	µS/cm	E100/CG	26-Jun-2023	26-Jun-2023	1008459
Hardness (as CaCO3), dissolved	----	1070	2.5	mg/L	EC100/CG	-	27-Jun-2023	-
pH	----	8.20	0.10	pH units	E108/CG	26-Jun-2023	26-Jun-2023	1008458
Solids, total dissolved [TDS], calculated	----	13500	1.0	mg/L	EC103/CG	-	25-Jun-2023	-
Solids, total suspended [TSS]	----	96.6	3.0	mg/L	E160/CG	-	26-Jun-2023	1008944
Anions and Nutrients								



Analytical Results

EO2305134-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 4 (PC4)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	508 ^{SP}	10.0	mg/L	E298/EO	27-Jun-2023	27-Jun-2023	1012041
Chloride	16887-00-6	3210	12.5	mg/L	E235.Cl/CG	22-Jun-2023	22-Jun-2023	1002629
Fluoride	16984-48-8	1.94	0.500	mg/L	E235.F/CG	22-Jun-2023	22-Jun-2023	1002632
Nitrate (as N)	14797-55-8	<0.500 ^{DLDS}	0.500	mg/L	E235.NO3/CG	22-Jun-2023	22-Jun-2023	1002628
Nitrate + Nitrite (as N)	----	<0.559	0.559	mg/L	EC235.N+N/CG	-	28-Jun-2023	1014276
Nitrite (as N)	14797-65-0	<0.250 ^{DLDS}	0.250	mg/L	E235.NO2/CG	22-Jun-2023	22-Jun-2023	1002630
Phosphorus, total	7723-14-0	6.09 ^{SP}	0.100	mg/L	E372-S/EO	24-Jun-2023	26-Jun-2023	1006886
Phosphorus, total dissolved	7723-14-0	7.05 ^{SFP}	0.100	mg/L	E375-U/EO	24-Jun-2023	26-Jun-2023	1006889
Sulfate (as SO4)	14808-79-8	48.8	7.50	mg/L	E235.SO4/CG	22-Jun-2023	22-Jun-2023	1002631
Kjeldahl nitrogen, total [TKN]	----	638	10.0	mg/L	E318/EO	24-Jun-2023	26-Jun-2023	1004718
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	2140	50.0	mg/L	E358-L/CG	22-Jun-2023	24-Jun-2023	1003616
Ion Balance								
Ion balance (cations/anions)	----	127	0.010	%	EC101/CG	-	27-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0183	0.00500	mg/L	E420/CG	24-Jun-2023	26-Jun-2023	1005056
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	22-Jun-2023	22-Jun-2023	1002429
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.184	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Antimony, dissolved	7440-36-0	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Arsenic, dissolved	7440-38-2	0.0260	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Barium, dissolved	7440-39-3	0.460	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Boron, dissolved	7440-42-8	31.5	0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cadmium, dissolved	7440-43-9	<0.000250 ^{DLDS}	0.000250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Calcium, dissolved	7440-70-2	125	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cesium, dissolved	7440-46-2	0.0264	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Chromium, dissolved	7440-47-3	0.0117	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Cobalt, dissolved	7440-48-4	0.00614	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Copper, dissolved	7440-50-8	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Iron, dissolved	7439-89-6	1.57	0.500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Lead, dissolved	7439-92-1	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Lithium, dissolved	7439-93-2	0.409	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Magnesium, dissolved	7439-95-4	185	0.250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Manganese, dissolved	7439-96-5	0.766	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Molybdenum, dissolved	7439-98-7	1.11	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Nickel, dissolved	7440-02-0	0.523	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Phosphorus, dissolved	7723-14-0	11.3	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Potassium, dissolved	7440-09-7	581	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Rubidium, dissolved	7440-17-7	0.548	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Selenium, dissolved	7782-49-2	0.0328	0.00250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silicon, dissolved	7440-21-3	15.4	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Silver, dissolved	7440-22-4	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sodium, dissolved	7440-23-5	3740	2.50	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053



Analytical Results

EO2305134-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 4 (PC4)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Strontium, dissolved	7440-24-6	1.56	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Sulfur, dissolved	7704-34-9	203	25.0	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thallium, dissolved	7440-28-0	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Thorium, dissolved	7440-29-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tin, dissolved	7440-31-5	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Titanium, dissolved	7440-32-6	0.0243	0.0150	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Tungsten, dissolved	7440-33-7	0.0910	0.00500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Uranium, dissolved	7440-61-1	0.000962	0.000500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Vanadium, dissolved	7440-62-2	0.548	0.0250	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Zinc, dissolved	7440-66-6	<0.0500 ^{DLDS}	0.0500	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Zirconium, dissolved	7440-67-7	0.0762	0.0100	mg/L	E421/CG	23-Jun-2023	26-Jun-2023	1005053
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	23-Jun-2023	1005053
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	22-Jun-2023	1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	401	10	mg/L	E559-L/EO	-	23-Jun-2023	1004729
Phenols, total (4AAP)	----	7.11 ^{RRV, SP.}	0.100	mg/L	E562/EO	27-Jun-2023	27-Jun-2023	1010728
Volatile Organic Compounds								
Benzene	71-43-2	146	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Ethylbenzene	100-41-4	133	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Toluene	108-88-3	626	10.0	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylene, m+p-	179601-23-1	362	0.40	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylene, o-	95-47-6	167	0.30	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Xylenes, total	1330-20-7	529	0.50	µg/L	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Hydrocarbons								
F1 (C6-C10)	----	4810	1000	µg/L	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
F1-BTEX	----	3380	1310	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	3900	100	µg/L	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	101	1.0	%	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Dichlorotoluene, 3,4-	95-75-0	81.1	1.0	%	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	122	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Difluorobenzene, 1,4-	540-36-3	98.6	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2305134</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Primary Leachate Qtr 2 2023</p> <p>PO : 234479</p> <p>C-O-C number : ----</p> <p>Sampler : Murray</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 5</p> <p>No. of samples analysed : 5</p>	<p>Page : 1 of 23</p> <p>Laboratory : Edmonton - Environmental</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 21-Jun-2023 12:14</p> <p>Issue Date : 29-Jun-2023 11:49</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E559-L	20-Jun-2023	----	----	----		23-Jun-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E559-L	20-Jun-2023	----	----	----		23-Jun-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E559-L	20-Jun-2023	----	----	----		23-Jun-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E559-L	20-Jun-2023	----	----	----		23-Jun-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E559-L	20-Jun-2023	----	----	----		23-Jun-2023	28 days	3 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E562	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E562	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E562	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E562	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E562	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E298	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E298	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E298	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E298	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E298	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E421	20-Jun-2023	23-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E421	20-Jun-2023	23-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E421	20-Jun-2023	23-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E421	20-Jun-2023	23-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 4 (PC4)	E421	20-Jun-2023	23-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3B (PC3B)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3C (PC3C)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3D (PC3D)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3E (PC3E)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 4 (PC4)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 3B (PC3B)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 3C (PC3C)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 3D (PC3D)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 3E (PC3E)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 4 (PC4)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E358-L	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	28 days	3 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E358-L	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	28 days	3 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E358-L	20-Jun-2023	22-Jun-2023	----	----		24-Jun-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E358-L	20-Jun-2023	22-Jun-2023	----	----		24-Jun-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E358-L	20-Jun-2023	22-Jun-2023	----	----		24-Jun-2023	28 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E290	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	14 days	6 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E290	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	14 days	6 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E290	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	14 days	6 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E290	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	14 days	6 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Alkalinity Species by Titration											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E290	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	14 days	6 days	✓	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E100	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✓	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E100	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✓	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E100	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✓	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E100	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✓	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E100	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✓	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E108	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E108	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E108	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	0.25 hrs	0.26 hrs	* EHTR-FM	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E108	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	0.25 hrs	0.26 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E108	20-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	0.25 hrs	0.26 hrs	*	EHTR-FM
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✓	
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC											
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 3B (PC3B)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✓	
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC											
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 3C (PC3C)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 3D (PC3D)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 3E (PC3E)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 4 (PC4)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 4 (PC4)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E420	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E420	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E420	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E420	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 4 (PC4)	E420	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	180 days	6 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3B (PC3B)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3C (PC3C)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3D (PC3D)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3E (PC3E)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 4 (PC4)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	

[Legend & Qualifier Definitions](#)

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Work Order : EO2305134
Client : Clean Harbors Environmental Services, Inc.
Project : Primary Leachate Qtr 2 2023



EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1008460	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1012041	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1002878	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1002879	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1004729	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1002629	1	7	14.2	5.0	✓
Conductivity in Water	E100	1008459	1	20	5.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1003507	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1005053	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1003616	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1002632	1	6	16.6	5.0	✓
Nitrate in Water by IC	E235.NO3	1002628	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1002630	1	18	5.5	5.0	✓
pH by Meter	E108	1008458	1	20	5.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1010728	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1002631	1	8	12.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1006889	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1004718	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1002429	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	1005056	1	5	20.0	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1006886	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	1008944	1	18	5.5	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1008460	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1012041	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1002878	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1002879	1	20	5.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1002382	2	40	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1004729	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1002629	1	7	14.2	5.0	✓
Conductivity in Water	E100	1008459	1	20	5.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1003507	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1005053	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1003616	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1002632	1	6	16.6	5.0	✓
Nitrate in Water by IC	E235.NO3	1002628	1	18	5.5	5.0	✓



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	1002630	1	18	5.5	5.0	✔
pH by Meter	E108	1008458	1	20	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1010728	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1002631	1	8	12.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1006889	1	19	5.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1004718	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1002429	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	1005056	1	5	20.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1006886	1	19	5.2	5.0	✔
TSS by Gravimetry	E160	1008944	1	18	5.5	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1008460	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	1012041	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1002878	1	20	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1002879	1	20	5.0	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1002382	2	40	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1004729	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1002629	1	7	14.2	5.0	✔
Conductivity in Water	E100	1008459	1	20	5.0	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1003507	1	17	5.8	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1005053	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1003616	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	1002632	1	6	16.6	5.0	✔
Nitrate in Water by IC	E235.NO3	1002628	1	18	5.5	5.0	✔
Nitrite in Water by IC	E235.NO2	1002630	1	18	5.5	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1010728	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1002631	1	8	12.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1006889	1	19	5.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1004718	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1002429	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	1005056	1	5	20.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1006886	1	19	5.2	5.0	✔
TSS by Gravimetry	E160	1008944	1	18	5.5	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1012041	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1002878	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1004729	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1002629	1	7	14.2	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1003507	1	17	5.8	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	1005053	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1003616	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	1002632	1	6	16.6	5.0	✔
Nitrate in Water by IC	E235.NO3	1002628	1	18	5.5	5.0	✔
Nitrite in Water by IC	E235.NO2	1002630	1	18	5.5	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1010728	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1002631	1	8	12.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1006889	1	19	5.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1004718	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1002429	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	1005056	1	5	20.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1006886	1	19	5.2	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Calgary - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Calgary - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Edmonton - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Edmonton - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Calgary - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total metals in Water by CRC ICPMS	E420 Calgary - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Calgary - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Edmonton - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A Edmonton - Environmental	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Edmonton - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 Edmonton - Environmental	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
CCME PHC - F1 by Headspace GC-FID	E581.F1 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHCs - F2-F4 by GC-FID	E601 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Edmonton - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Calgary - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Calgary - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 Calgary - Environmental	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Calgary - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Edmonton - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Edmonton - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Dissolved Organic Carbon for Combustion	EP358 Calgary - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Calgary - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
VOCs Preparation for Headspace Analysis	EP581 Edmonton - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Edmonton - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2305134	Page	: 1 of 15
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 2 2023	Date Samples Received	: 21-Jun-2023 12:14
PO	: 234479	Date Analysis Commenced	: 22-Jun-2023
C-O-C number	: ----	Issue Date	: 29-Jun-2023 11:50
Sampler	: Murray 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

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General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1008458)											
EO2305129-001	Anonymous	pH	----	E108	0.10	pH units	8.00	8.01	0.125%	4%	----
Physical Tests (QC Lot: 1008459)											
EO2305131-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	367	367	0.00%	10%	----
Physical Tests (QC Lot: 1008460)											
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Alkalinity, total (as CaCO ₃)	----	E290	1.0	mg/L	13400	15700	16.0%	20%	----
Physical Tests (QC Lot: 1008944)											
EO2305079-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	89.2	87.0	2.50%	20%	----
Anions and Nutrients (QC Lot: 1002628)											
CG2308302-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.222	0.228	2.40%	20%	----
Anions and Nutrients (QC Lot: 1002629)											
CG2308302-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	3.52	3.53	0.010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1002630)											
CG2308302-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1002631)											
CG2308302-001	Anonymous	Sulfate (as SO ₄)	14808-79-8	E235.SO4	0.30	mg/L	6.72	6.68	0.536%	20%	----
Anions and Nutrients (QC Lot: 1002632)											
CG2308302-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.073	0.071	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1004718)											
EO2305079-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.00	mg/L	30.3	27.2	10.7%	20%	----
Anions and Nutrients (QC Lot: 1006886)											
EO2305125-002	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0100	mg/L	0.327	0.363	10.4%	20%	----
Anions and Nutrients (QC Lot: 1006889)											
EO2304961-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	0.0050	mg/L	0.111	0.112	0.573%	20%	----
Anions and Nutrients (QC Lot: 1012041)											
EO2305127-011	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1003616)											
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Carbon, dissolved organic [DOC]	----	E358-L	50.0	mg/L	5240	5240	0.0633%	20%	----
Total Metals (QC Lot: 1002429)											
EO2305127-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 1005056)											
CG2308336-002	Anonymous	Chromium, total	7440-47-3	E420	0.00050	mg/L	0.00106	0.00116	0.00010	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1005053)											
CG2308336-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0048	0.0042	0.0006	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00119	0.00115	3.10%	20%	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00080	0.00080	0.000007	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0272	0.0293	7.38%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.017	0.016	0.0005	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0333 µg/L	0.0000331	0.0000002	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	244	245	0.245%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.93 µg/L	0.00091	0.00002	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00392	0.00389	0.658%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.051	0.051	0.0001	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000119	0.000118	0.0000009	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0994	0.0947	4.80%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	270	273	1.02%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.134	0.136	1.79%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0123	0.0118	4.42%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.0225	0.0226	0.370%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	8.42	8.74	3.70%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00227	0.00237	4.33%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	209 µg/L	0.204	2.42%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.81	4.70	2.35%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	13.2	13.2	0.114%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.311	0.305	2.04%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	464	433	6.78%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000037	0.000036	0.000001	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1005053) - continued											
CG2308336-002	Anonymous	Tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00011	0.00011	0.000006	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00031	0.00030	0.000005	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.0153	0.0155	0.868%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0052	0.0054	0.0001	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	0.00104	0.00100	0.00005	Diff <2x LOR	----
Speciated Metals (QC Lot: 1003507)											
EO2305136-005	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1004729)											
EO2305127-004	Anonymous	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	50	53	2	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1010728)											
YL2300629-015	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1002878)											
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Benzene	71-43-2	E611A	0.50	µg/L	11.0	11.5	4.06%	30%	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	1.08	1.07	0.007	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	6.45	6.75	4.51%	30%	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	2.34	2.41	0.08	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	2.06	2.07	0.223%	30%	----
Hydrocarbons (QC Lot: 1002879)											
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	F1 (C6-C10)	----	E581.F1	100	µg/L	480	480	3	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1008459)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1008460)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1008944)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 1002628)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1002629)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1002630)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1002631)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1002632)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1004718)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1006886)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1006889)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1012041)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Organic / Inorganic Carbon (QCLot: 1003616)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Total Metals (QCLot: 1002429)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
Total Metals (QCLot: 1005056)						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---
Dissolved Metals (QCLot: 1005053)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1005053) - continued						
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1005053) - continued						
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 1003507)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 1004729)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Aggregate Organics (QCLot: 1010728)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Volatile Organic Compounds (QCLot: 1002878)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 1002382)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 1002391)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 1002879)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 1008458)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1008459)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	108	90.0	110	----
Physical Tests (QCLot: 1008460)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
Physical Tests (QCLot: 1008944)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	89.8	85.0	115	----
Anions and Nutrients (QCLot: 1002628)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1002629)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1002630)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	97.5	90.0	110	----
Anions and Nutrients (QCLot: 1002631)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1002632)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1004718)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	95.5	75.0	125	----
Anions and Nutrients (QCLot: 1006886)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 1006889)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	111	80.0	120	----
Anions and Nutrients (QCLot: 1012041)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	110	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1003616)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	92.8	80.0	120	----
Total Metals (QCLot: 1002429)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	108	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	
Total Metals (QCLot: 1005056)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.3	80.0	120	----
Dissolved Metals (QCLot: 1005053)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.8	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	96.6	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	95.9	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.6	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	96.0	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	98.5	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.9	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	96.7	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	92.7	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	115	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	100	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	103	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.0	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.6	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.9	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	95.6	70.0	130	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	99.5	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	95.1	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	107	60.0	140	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.8	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.7	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	92.6	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	95.9	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.6	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.6	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 1005053) - continued									
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.1	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	94.3	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	96.6	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	97.0	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Speciated Metals (QCLot: 1003507)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Aggregate Organics (QCLot: 1004729)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	111	85.0	115	----
Aggregate Organics (QCLot: 1010728)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	110	85.0	115	----
Volatile Organic Compounds (QCLot: 1002878)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	102	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	107	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	99.7	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	99.0	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	112	70.0	130	----
Hydrocarbons (QCLot: 1002382)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	108	70.0	130	----
Hydrocarbons (QCLot: 1002391)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	115	70.0	130	----
Hydrocarbons (QCLot: 1002879)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	94.0	70.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1002628)										
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Nitrate (as N)	14797-55-8	E235.NO3	2.27 mg/L	2.5 mg/L	90.8	75.0	125	----
Anions and Nutrients (QCLot: 1002629)										
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Chloride	16887-00-6	E235.Cl	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1002630)										
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Nitrite (as N)	14797-65-0	E235.NO2	0.377 mg/L	0.5 mg/L	75.4	75.0	125	----
Anions and Nutrients (QCLot: 1002631)										
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1002632)										
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Fluoride	16984-48-8	E235.F	ND mg/L	1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1004718)										
EO2305125-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.80 mg/L	2.5 mg/L	112	70.0	130	----
Anions and Nutrients (QCLot: 1006886)										
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1006889)										
EO2305022-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1012041)										
EO2305127-011	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0960 mg/L	0.1 mg/L	96.0	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1003616)										
EO2305134-001	PRIMARY LEACHATE CELL 3B (PC3B)	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1002429)										
EO2305127-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000981 mg/L	0.0001 mg/L	98.1	70.0	130	----
Total Metals (QCLot: 1005056)										
CG2308336-003	Anonymous	Chromium, total	7440-47-3	E420	0.390 mg/L	0.4 mg/L	97.6	70.0	130	----
Dissolved Metals (QCLot: 1005053)										



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1005053) - continued										
CG2308336-003	Anonymous	Aluminum, dissolved	7429-90-5	E421	2.02 mg/L	2 mg/L	101	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.190 mg/L	0.2 mg/L	95.2	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.200 mg/L	0.2 mg/L	99.9	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.198 mg/L	0.2 mg/L	98.8	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.382 mg/L	0.4 mg/L	95.4	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.959 mg/L	1 mg/L	95.9	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.105 mg/L	0.1 mg/L	105	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.392 mg/L	0.4 mg/L	97.9	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.198 mg/L	0.2 mg/L	99.0	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.190 mg/L	0.2 mg/L	95.1	70.0	130	----
		Iron, dissolved	7439-89-6	E421	19.9 mg/L	20 mg/L	99.5	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.196 mg/L	0.2 mg/L	97.8	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.929 mg/L	1 mg/L	92.9	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.201 mg/L	0.2 mg/L	100	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.192 mg/L	0.2 mg/L	96.2	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.402 mg/L	0.4 mg/L	100	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	94.2 mg/L	100 mg/L	94.2	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	39.9 mg/L	40 mg/L	99.9	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.194 mg/L	0.2 mg/L	97.1	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.408 mg/L	0.4 mg/L	102	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	99.6 mg/L	100 mg/L	99.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.0383 mg/L	0.04 mg/L	95.8	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	185 mg/L	200 mg/L	92.7	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.400 mg/L	0.4 mg/L	99.9	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.207 mg/L	0.2 mg/L	103	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.192 mg/L	0.2 mg/L	96.3	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.390 mg/L	0.4 mg/L	97.6	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.190 mg/L	0.2 mg/L	94.8	70.0	130	----



Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1005053) - continued										
CG2308336-003	Anonymous	Uranium, dissolved	7440-61-1	E421	0.0389 mg/L	0.04 mg/L	97.2	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	1.00 mg/L	1 mg/L	100	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	3.98 mg/L	4 mg/L	99.6	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.410 mg/L	0.4 mg/L	102	70.0	130	----
Speciated Metals (QCLot: 1003507)										
EO2305136-005	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0480 mg/L	0.05 mg/L	96.0	70.0	130	----
Aggregate Organics (QCLot: 1004729)										
EO2305127-005	Anonymous	Chemical oxygen demand [COD]	----	E559-L	108 mg/L	100 mg/L	108	75.0	125	----
Aggregate Organics (QCLot: 1010728)										
YL2300629-015	Anonymous	Phenols, total (4AAP)	----	E562	0.0216 mg/L	0.02 mg/L	108	75.0	125	----
Volatile Organic Compounds (QCLot: 1002878)										
EO2305134-002	PRIMARY LEACHATE CELL 3C (PC3C)	Benzene	71-43-2	E611A	87.7 µg/L	100 µg/L	87.7	50.0	140	----
		Ethylbenzene	100-41-4	E611A	110 µg/L	100 µg/L	110	50.0	140	----
		Toluene	108-88-3	E611A	ND µg/L	100 µg/L	ND	50.0	140	MS-B
		Xylene, m+p-	179601-23-1	E611A	176 µg/L	200 µg/L	88.0	50.0	140	----
		Xylene, o-	95-47-6	E611A	101 µg/L	100 µg/L	101	50.0	140	----

Qualifiers

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.



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Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page 1 of 1

Canada Toll Free: 1 800 668 9878

Contact and company name below will appear on the final report

Reports / Recipients

Turnaround Time (TAT) Requested

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Company: Clean Harbors Canada
 Contact: Todd Webb, Stan Yuha
 Phone: (780) 663-2513
 Company address below will appear on the final report

Street: PO Box 390, 50114 Range Road 173
 City/Province: Ryley, AB
 Postal Code: T0B 4A0

Invoice To: Same as Report To
 Invoice Recipients: Select Invoice Distribution: EMAIL MAIL FAX

Company: Clean Harbors Canada
 Contact: Stephanie Dennis
 Email 1 or Fax: denis.stephanie@cleanharbors.com
 Email 2

Oil and Gas Required Fields (client use)

ALS Account # / Quote #: EO22-CHE5100-008
 Job #: Primary Leachate Qtr 2 2023
 PO / AFE: 234479
 Location: Table 4.4A

ALS Lab Work Order # (ALS use only): E02305134

ALS Contact: Megha Walia

Sampler: Murray

ALS Sample # (ALS use only) Sample Identification and/or Coordinates (This description will appear on the report)

Date (dd-mm-yy) Time (hh:mm) Sample Type

NUMBER OF CONTAINERS

Table 4.4A Leachate

Edmonton Environmental Division

Work Order Reference E02305134

Telephone : +1 780 413 5227

Drinking Water (DW) Samples' (client use)

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Are samples taken from a Regulated DW System?
 YES NO
 Are samples for human consumption/ use?
 YES NO

Analyze as per Quote EO22-CHE5100-008, Table 4.4A package (Attached). Same as EO2301874. Metals bottles not preserved.

SHIPMENT RELEASE (client use)

INITIAL SHIPMENT RECEPTION (ALS use only)

FINAL SHIPMENT RECEPTION (ALS use only)

Released by: Todd Webb Date: 21-Jun-23 Time: 9:00

Received by: [Signature] Date: 21 June 2023

Time: 10:34 Received by: [Signature] Date: [Signature]

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION
 Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.
 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

WHITE - LABORATORY COPY
 YELLOW - CLIENT COPY

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TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus

Appendix D
Primary Leachate Analyses
Quarter 3



CERTIFICATE OF ANALYSIS

Work Order	: EO2308496	Page	: 1 of 20
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 3 2023	Date Samples Received	: 19-Sep-2023 15:43
PO	: 236264	Date Analysis	: 20-Sep-2023
		Commenced	
C-O-C number	: ----	Issue Date	: 26-Sep-2023 16:40
Sampler	: Murray		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Daniel Nguyen	Lab Assistant	Metals, Edmonton, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Kari Mulroy	Lab Supervisor - Environmental	Organics, Edmonton, Alberta
Leah Yee	Lab Assistant	Inorganics, Edmonton, Alberta
Michelle Schroder	Laboratory Analyst	Inorganics, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
Saron Gebremariam	Lab Assistant	Inorganics, Edmonton, Alberta
Yan Zhang	Lab Analyst	Organics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Unit	Description
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
IB:INT	Ion Balance Reviewed: Imbalance is due to interference or non-measured component.
RRV	Reported result verified by repeat analysis.
SFP	Sample was filtered and preserved at the laboratory.
SP	Sample was preserved at the laboratory.



Analytical Results

EO2308496-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 1 (PC1)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	2190 RRV.	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0 RRV.	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 RRV.	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	1790 RRV.	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	10000	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	1000	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.10 RRV.	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	8450	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	42.0	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	675 SP.	10.0	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1149170
Chloride	16887-00-6	1410 DLDS. RRV.	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143736
Fluoride	16984-48-8	2.04 DLDS.	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143733
Nitrate (as N)	14797-55-8	122 DLDS.	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143734
Nitrate + Nitrite (as N)	----	123	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	1.44 DLDS.	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143735
Phosphorus, total	7723-14-0	3.53 SP.	0.100	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	3.36 SFP.	0.100	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	2280 DLDS. RRV.	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143737
Kjeldahl nitrogen, total [TKN]	----	667 SP.	25.0	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	148 SFP.	5.00	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	108	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0594	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.100 RRV.	0.0200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Antimony, dissolved	7440-36-0	0.0108 RRV.	0.00200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.0144 RRV.	0.00200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.142 RRV.	0.00200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.000400	0.000400	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100	0.00100	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Boron, dissolved	7440-42-8	3.28 RRV.	0.200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.00243 RRV.	0.000100	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Calcium, dissolved	7440-70-2	131 RRV.	1.00	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Cesium, dissolved	7440-46-2	0.00119 RRV.	0.000200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Chromium, dissolved	7440-47-3	0.0570 RRV.	0.0100	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.0277 RRV.	0.00200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.0362 RRV.	0.00400	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Iron, dissolved	7439-89-6	10.9 RRV.	0.200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Lead, dissolved	7439-92-1	0.0224 RRV.	0.00100	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Lithium, dissolved	7439-93-2	0.281 RRV.	0.0200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	164 RRV.	0.100	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515



Analytical Results

EO2308496-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 1 (PC1)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	2.18 ^{RRV}	0.00200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	6.68 ^{RRV}	0.00100	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Nickel, dissolved	7440-02-0	2.23 ^{RRV}	0.0100	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	2.82 ^{RRV}	1.00	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Potassium, dissolved	7440-09-7	253 ^{RRV}	1.00	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.0407 ^{RRV}	0.00400	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.00125 ^{RRV}	0.00100	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Silicon, dissolved	7440-21-3	6.04 ^{RRV}	1.00	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Silver, dissolved	7440-22-4	0.000327 ^{RRV}	0.000200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Sodium, dissolved	7440-23-5	1540 ^{RRV}	1.00	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Strontium, dissolved	7440-24-6	1.12 ^{RRV}	0.00400	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	736 ^{RRV}	10.0	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLM}	0.00400	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 ^{DLM}	0.000200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 ^{DLM}	0.00200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00200 ^{DLM}	0.00200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Titanium, dissolved	7440-32-6	0.0270 ^{RRV}	0.00600	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	0.0457 ^{RRV}	0.00200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.0167 ^{RRV}	0.000200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	2.14 ^{RRV}	0.0100	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Zinc, dissolved	7440-66-6	0.615 ^{RRV}	0.0200	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	0.109 ^{RRV}	0.00400	mg/L	E421/EO	20-Sep-2023	22-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	454 ^{DLM}	100	mg/L	E559-L/EO	-	21-Sep-2023	1146956
Phenols, total (4AAP)	----	0.0130 ^{SP}	0.0010	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147942
Volatile Organic Compounds								
Benzene	71-43-2	8.12	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	1.04	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	1.47	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	1.47	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	105	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	99.3	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	87.4	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	94.2	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308496-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 2 (PC2)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	15100	1.0	mg/L	E290/EO	20-Sep-2023	22-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	22-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	22-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	12400	5.0	mg/L	E290/EO	20-Sep-2023	22-Sep-2023	1143777
Conductivity	----	33000	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	1710	2.5	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.44	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	30200	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	184	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	846 ^{SP}	10.0	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1149170
Chloride	16887-00-6	7920 ^{D.L.D.S.}	50.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143727
Fluoride	16984-48-8	2.68 ^{D.L.D.S.}	2.00	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143724
Nitrate (as N)	14797-55-8	5.02 ^{D.L.D.S.}	2.00	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143725
Nitrate + Nitrite (as N)	----	5.02	2.24	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<1.00 ^{D.L.D.S.}	1.00	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143726
Phosphorus, total	7723-14-0	8.43 ^{SP}	0.100	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	6.28 ^{SFP}	0.100	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	975 ^{D.L.D.S.}	30.0	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143728
Kjeldahl nitrogen, total [TKN]	----	815 ^{SP}	25.0	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	2430 ^{D.L.M. SFP}	50.0	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	103	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.340	0.0250	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{D.L.M.}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0962	0.0500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	0.755	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.533	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	1.34	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.00100 ^{D.L.D.S.}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00250 ^{D.L.D.S.}	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	60.6	0.500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.00782	0.000250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	51.3	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	0.00161	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	0.330	0.0250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.0116	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.0277	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	<0.500 ^{D.L.D.S.}	0.500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00250 ^{D.L.D.S.}	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308496-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 2 (PC2)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Lithium, dissolved	7439-93-2	10.1	0.0500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	384	0.250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	0.843	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	26.8	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	0.435	0.0250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	7.65	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	1060	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.141	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.00392	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	10.3	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	0.000747	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	8810	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	3.77	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	885	25.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000500 ^{DLS}	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00500 ^{DLS}	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	0.00962	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	0.205	0.0150	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	20.0	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.00102	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.491	0.0250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	<0.0500 ^{DLS}	0.0500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	0.335	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	12500 ^{DLM}	100	mg/L	E559-L/EO	-	21-Sep-2023	1146956
Phenols, total (4AAP)	----	7.23 ^{SP}	0.200	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147942
Volatile Organic Compounds								
Benzene	71-43-2	80.4	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	0.90	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	18.1	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	2.97	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	2.68	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	5.65	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	560	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	455	149	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	1590	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	103	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	106	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								



Analytical Results

EO2308496-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 2 (PC2)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	98.8	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	104	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308496-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3A (PC3A)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	7810	1.0	mg/L	E290/EO	20-Sep-2023	22-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	22-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	22-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	6400	5.0	mg/L	E290/EO	20-Sep-2023	22-Sep-2023	1143777
Conductivity	----	24100	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	2030	2.5	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	7.93	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	20600	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	133	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	725 ^{SP}	10.0	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1149170
Chloride	16887-00-6	7750 ^{DLDS}	50.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143736
Fluoride	16984-48-8	<2.00 ^{DLDS}	2.00	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143733
Nitrate (as N)	14797-55-8	<2.00 ^{DLDS}	2.00	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143734
Nitrate + Nitrite (as N)	----	<2.24	2.24	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	1.32 ^{DLDS}	1.00	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143735
Phosphorus, total	7723-14-0	4.07 ^{SP}	0.100	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	4.00 ^{SFP}	0.100	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	302 ^{DLDS}	30.0	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143737
Kjeldahl nitrogen, total [TKN]	----	685 ^{SP}	25.0	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143332
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	1020 ^{SFP}	50.0	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	97.4	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.193	0.0250	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0735	0.0500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	0.0252	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.320	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.815	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308496-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3A (PC3A)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLDS}	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	33.5	0.500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	<0.000250 ^{DLDS}	0.000250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	147	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	0.00140	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	0.173	0.0250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.00694	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	<0.500 ^{DLDS}	0.500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00250 ^{DLDS}	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	2.68	0.0500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	403	0.250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	0.602	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	0.802	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	0.371	0.0250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	6.46	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	856	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.695	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.00781	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	17.5	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	0.000774	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	5280	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	3.94	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	278	25.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	0.0664	0.0150	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	1.93	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.000816	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.160	0.0250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	<0.0500 ^{DLDS}	0.0500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	0.141	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	3600 ^{DLM}	100	mg/L	E559-L/EO	-	21-Sep-2023	1146956
Phenols, total (4AAP)	----	12.2 ^{SP}	0.200	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147942
Volatile Organic Compounds								
Benzene	71-43-2	297	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	22.3	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	306	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383



Analytical Results

EO2308496-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3A (PC3A)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	180	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	57.4	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	237	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	1090	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	<350	350	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	5670	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	109	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	92.7	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	115	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	99.3	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308496-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3B (PC3B)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	7240	1.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Alkalinity, carbonate (as CO ₃)	3812-32-6	3760	1.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Alkalinity, total (as CaCO ₃)	----	12200	5.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Conductivity	----	36900	1.0	µS/cm	E100/EO	22-Sep-2023	22-Sep-2023	1145773
Hardness (as CaCO ₃), dissolved	----	206	2.5	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	9.31	0.10	pH units	E108/EO	22-Sep-2023	22-Sep-2023	1145772
Solids, total dissolved [TDS], calculated	----	37400	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	29.4	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	1810 ^{SP}	25.0	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1149170
Chloride	16887-00-6	9100 ^{DLDS}	50.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143736
Fluoride	16984-48-8	4.42 ^{DLDS}	2.00	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143733
Nitrate (as N)	14797-55-8	<2.00 ^{DLDS}	2.00	mg/L	E235.NO ₃ /EO	20-Sep-2023	20-Sep-2023	1143734
Nitrate + Nitrite (as N)	----	<2.24	2.24	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<1.00 ^{DLDS}	1.00	mg/L	E235.NO ₂ /EO	20-Sep-2023	20-Sep-2023	1143735
Phosphorus, total	7723-14-0	6.42 ^{SP}	0.100	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	6.18 ^{SFP}	0.100	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	1130 ^{DLDS}	30.0	mg/L	E235.SO ₄ /EO	20-Sep-2023	20-Sep-2023	1143737
Kjeldahl nitrogen, total [TKN]	----	1980 ^{SP}	50.0	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143332
Organic / Inorganic Carbon								



Analytical Results

EO2308496-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3B (PC3B)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	5330 ^{DLM, SFP}	50.0	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	114	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.447	0.0250	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0500 ^{DLDS}	0.0500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	0.00960	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.153	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.671	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLDS}	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	130	0.500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.0132	0.000250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	17.3	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	0.103	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	0.448	0.0250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.0256	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.0617	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	1.39	0.500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	0.00608	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	10.8	0.0500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	39.6	0.250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	0.774	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	44.7	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	1.24	0.0250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	10.9	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	3180	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	4.75	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.0716	0.00250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	44.9	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	0.00106	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	8820	2.50	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	0.842	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	733	25.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	0.0112	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	0.113	0.0150	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	3.64	0.00500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.000868	0.000500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.331	0.0250	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	<0.0500 ^{DLDS}	0.0500	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308496-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3B (PC3B)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Zirconium, dissolved	7440-67-7	0.0642	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	18400	DLHC, DLM, SP, 100	mg/L	E559-L/EO	-	21-Sep-2023	1146956
Phenols, total (4AAP)	----	31.0	1.00	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147942
Volatile Organic Compounds								
Benzene	71-43-2	13.0	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	1.32	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	13.6	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	3.71	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	2.95	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	6.66	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	1340	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	1300	353	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	3580	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	109	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	79.0	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	103	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	103	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308496-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3C (PC3C)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	3360	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO3)	3812-32-6	492	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO3)	----	3570	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	12300	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO3), dissolved	----	710	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.82	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	9720	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	6.8	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								



Analytical Results

EO2308496-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3C (PC3C)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	567 ^{SP}	10.0	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1149170
Chloride	16887-00-6	2500 ^{DLDS}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143736
Fluoride	16984-48-8	1.84 ^{DLDS}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143733
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143734
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143735
Phosphorus, total	7723-14-0	4.71 ^{SP}	0.100	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	4.47 ^{SFP}	0.100	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO4)	14808-79-8	898 ^{DLDS}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143737
Kjeldahl nitrogen, total [TKN]	----	548 ^{SP}	15.0	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143332
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	349 ^{DLM, SFP}	5.00	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	107 ^{IB.INT.}	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0204	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.0184	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.0615	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	49.6	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.000864	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	46.9	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	0.00159	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.00311	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.0116	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	0.383	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	1.68	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	144	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	0.347	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	2.74	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	0.693	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	5.18	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	403	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.270	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.0145	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	10.3	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	0.000265	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	2480	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308496-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3C (PC3C)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Strontium, dissolved	7440-24-6	0.339	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	492	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	0.00718	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	0.0991	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.00698	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	12.7	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	0.0672	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	1440 ^{DLM}	100	mg/L	E559-L/EO	-	21-Sep-2023	1146956
Phenols, total (4AAP)	----	0.897 ^{SP}	0.0200	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147942
Volatile Organic Compounds								
Benzene	71-43-2	17.4	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	72.5	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	224	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	278	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	128	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	406	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	1170	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	450	349	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	880	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	101	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	89.8	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	81.0	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	103	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308496-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3D (PC3D)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
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Analytical Results

EO2308496-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3D (PC3D)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	4110	1.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Alkalinity, total (as CaCO ₃)	----	3370	10.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Conductivity	----	15700	1.0	µS/cm	E100/EO	22-Sep-2023	22-Sep-2023	1145773
Hardness (as CaCO ₃), dissolved	----	979	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.37	0.10	pH units	E108/EO	22-Sep-2023	22-Sep-2023	1145772
Solids, total dissolved [TDS], calculated	----	12900	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	37.6	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	421 ^{SP}	10.0	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1149170
Chloride	16887-00-6	4210 ^{D.LDS.}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143736
Fluoride	16984-48-8	1.13 ^{D.LDS.}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143733
Nitrate (as N)	14797-55-8	<0.400 ^{D.LDS.}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143734
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{D.LDS.}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143735
Phosphorus, total	7723-14-0	1.17 ^{SP}	0.0100	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	0.946 ^{SFP}	0.0200	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	418 ^{D.LDS.}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143737
Kjeldahl nitrogen, total [TKN]	----	432 ^{SP}	15.0	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143332
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	1310 ^{D.LM, SFP}	50.0	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	111	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0248	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{D.LM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0795	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	<0.00200 ^{D.LDS.}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.0392	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.466	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.000400 ^{D.LDS.}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{D.LDS.}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	27.4	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.00117	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	166	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	0.00105	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	0.0185	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.00414	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.00960	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	1.89	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	0.00159	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	1.45	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	137	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308496-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3D (PC3D)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Dissolved Metals								
Manganese, dissolved	7439-96-5	1.48	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	3.92	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	2.34	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	1.67	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	641	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.467	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.0201	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	19.3	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	<0.000200	DLDS, 0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	3440	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	1.87	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	317	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400	DLDS, 0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200	DLDS, 0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200	DLDS, 0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00200	DLDS, 0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	0.0186	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	0.0538	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.00207	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	3.24	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	0.0277	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	0.0459	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	4350	DLHC, DLM, 100	mg/L	E559-L/EO	-	21-Sep-2023	1146956
Phenols, total (4AAP)	----	10.6	SP, 0.200	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147942
Volatile Organic Compounds								
Benzene	71-43-2	49.3	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	3.83	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	31.0	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	7.47	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	5.11	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	12.6	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	520	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	423	138	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	1740	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	101	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	94.9	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	103	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	103	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308496-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3E (PC3E)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	3720	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	3050	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	10000	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	1090	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.28	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	7490	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	24.6	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	296 ^{SP}	5.00	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1149170
Chloride	16887-00-6	2140 ^{DLDS}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143736
Fluoride	16984-48-8	0.931 ^{DLDS}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143733
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143734
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143735
Phosphorus, total	7723-14-0	0.740 ^{SP}	0.0010	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	0.784 ^{SFP}	0.0010	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	510 ^{DLDS}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143737
Kjeldahl nitrogen, total [TKN]	----	300 ^{SP}	5.00	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143332
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	129 ^{SFP}	5.00	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	101 ^{IB.INT.}	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Arsenic, dissolved	7440-38-2	0.00611	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Barium, dissolved	7440-39-3	0.292	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Boron, dissolved	7440-42-8	8.46	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Cadmium, dissolved	7440-43-9	0.000207	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Calcium, dissolved	7440-70-2	105	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Cesium, dissolved	7440-46-2	0.00292	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Chromium, dissolved	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Cobalt, dissolved	7440-48-4	0.00523	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Copper, dissolved	7440-50-8	0.00754	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Iron, dissolved	7439-89-6	<0.200 ^{DLDS}	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517



Analytical Results

EO2308496-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3E (PC3E)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Dissolved Metals								
Lithium, dissolved	7439-93-2	0.642	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Magnesium, dissolved	7439-95-4	202	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Manganese, dissolved	7439-96-5	0.857	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Molybdenum, dissolved	7439-98-7	0.863	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Nickel, dissolved	7440-02-0	0.620	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Phosphorus, dissolved	7723-14-0	<1.00 ^{DLDS}	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Potassium, dissolved	7440-09-7	185	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Rubidium, dissolved	7440-17-7	0.208	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Selenium, dissolved	7782-49-2	0.00189	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Silicon, dissolved	7440-21-3	12.3	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Silver, dissolved	7440-22-4	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Sodium, dissolved	7440-23-5	1970	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Strontium, dissolved	7440-24-6	2.41	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Sulfur, dissolved	7704-34-9	204	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Titanium, dissolved	7440-32-6	<0.00600 ^{DLDS}	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Tungsten, dissolved	7440-33-7	0.0203	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Uranium, dissolved	7440-61-1	0.00891	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Vanadium, dissolved	7440-62-2	3.47	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Zinc, dissolved	7440-66-6	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Zirconium, dissolved	7440-67-7	0.0613	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143517
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	739 ^{DLM}	100	mg/L	E559-L/EO	-	21-Sep-2023	1146956
Phenols, total (4AAP)	----	0.0451 ^{SP}	0.0200	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147942
Volatile Organic Compounds								
Benzene	71-43-2	14.9	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	3.70	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	2.20	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	2.51	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	1.42	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	3.93	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	9020	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	106	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	114	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								



Analytical Results

EO2308496-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 3E (PC3E)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	96.4	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	101	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308496-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 4 (PC4)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	3000	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1144351
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1144351
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1144351
Alkalinity, total (as CaCO ₃)	----	2460	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1144351
Conductivity	----	8050	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1144353
Hardness (as CaCO ₃), dissolved	----	1530	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.21	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1144352
Solids, total dissolved [TDS], calculated	----	6240	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	61.8	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	228 ^{SP}	5.00	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1149170
Chloride	16887-00-6	1520 ^{D LDS}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143736
Fluoride	16984-48-8	0.635 ^{D LDS}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143733
Nitrate (as N)	14797-55-8	<0.400 ^{D LDS}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143734
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{D LDS}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143735
Phosphorus, total	7723-14-0	1.09 ^{SP}	0.0100	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	1.19 ^{SFP}	0.0200	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	393 ^{D LDS}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143737
Kjeldahl nitrogen, total [TKN]	----	252 ^{SP}	5.00	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143332
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	456 ^{SFP}	5.00	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	114	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0164	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{D LM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0322	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Antimony, dissolved	7440-36-0	<0.00200 ^{D LDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Arsenic, dissolved	7440-38-2	0.0167	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Barium, dissolved	7440-39-3	0.225	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517



Analytical Results

EO2308496-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PRIMARY LEACHATE CELL 4 (PC4)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Boron, dissolved	7440-42-8	20.4	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Cadmium, dissolved	7440-43-9	0.000232	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Calcium, dissolved	7440-70-2	254	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Cesium, dissolved	7440-46-2	0.00560	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Chromium, dissolved	7440-47-3	0.0150	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Cobalt, dissolved	7440-48-4	0.00698	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Copper, dissolved	7440-50-8	0.00494	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Iron, dissolved	7439-89-6	0.258	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Lithium, dissolved	7439-93-2	0.338	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Magnesium, dissolved	7439-95-4	218	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Manganese, dissolved	7439-96-5	2.76	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Molybdenum, dissolved	7439-98-7	0.567	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Nickel, dissolved	7440-02-0	0.368	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Phosphorus, dissolved	7723-14-0	1.78	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Potassium, dissolved	7440-09-7	144	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Rubidium, dissolved	7440-17-7	0.108	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Selenium, dissolved	7782-49-2	0.00457	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Silicon, dissolved	7440-21-3	12.4	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Silver, dissolved	7440-22-4	0.000207	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Sodium, dissolved	7440-23-5	1450	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Strontium, dissolved	7440-24-6	1.64	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Sulfur, dissolved	7704-34-9	321	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Titanium, dissolved	7440-32-6	0.0123	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Tungsten, dissolved	7440-33-7	0.0529	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Uranium, dissolved	7440-61-1	0.00244	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Vanadium, dissolved	7440-62-2	0.357	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Zinc, dissolved	7440-66-6	0.0249	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Zirconium, dissolved	7440-67-7	0.0352	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143517
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143517
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	1960 ^{DLM}	100	mg/L	E559-L/EO	-	21-Sep-2023	1146956
Phenols, total (4AAP)	----	1.11 ^{SP}	0.200	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147942
Volatile Organic Compounds								
Benzene	71-43-2	54.5	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	53.5	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	268	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383



Analytical Results

EO2308496-008

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: PRIMARY LEACHATE CELL 4 (PC4)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	199	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	73.7	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	273	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	1030	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	381	310	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	2170	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	86.1	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	106	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	114	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	101	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2308496</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Primary Leachate Qtr 3 2023</p> <p>PO : 236264</p> <p>C-O-C number : ----</p> <p>Sampler : Murray</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 8</p> <p>No. of samples analysed : 8</p>	<p>Page : 1 of 31</p> <p>Laboratory : ALS Environmental - Edmonton</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 19-Sep-2023 15:43</p> <p>Issue Date : 26-Sep-2023 16:40</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Matrix Spike (MS) Recoveries								
Dissolved Metals	EO2308496-008	PRIMARY LEACHATE CELL 4 (PC4)	Selenium, dissolved	7782-49-2	E421	67.5 % ^{MES}	70.0-130%	Recovery less than lower data quality objective
Dissolved Metals	EO2308496-008	PRIMARY LEACHATE CELL 4 (PC4)	Tellurium, dissolved	13494-80-9	E421	68.8 % ^{MES}	70.0-130%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 1 (PC1)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 2 (PC2)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 1 (PC1)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✔	22-Sep-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 2 (PC2)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✔	22-Sep-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✔	22-Sep-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✔	22-Sep-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✔	22-Sep-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✔	22-Sep-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✔	22-Sep-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✔	22-Sep-2023	28 days	4 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 1 (PC1)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 2 (PC2)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PRIMARY LEACHATE CELL 1 (PC1)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE PRIMARY LEACHATE CELL 2 (PC2)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PRIMARY LEACHATE CELL 3A (PC3A)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PRIMARY LEACHATE CELL 1 (PC1)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PRIMARY LEACHATE CELL 2 (PC2)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3A (PC3A)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 1 (PC1)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 2 (PC2)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3A (PC3A)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 1 (PC1)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 2 (PC2)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 3A (PC3A)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 1 (PC1)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 2 (PC2)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3A (PC3A)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 1 (PC1)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	21-Sep-2023	28 days	3 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 2 (PC2)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	21-Sep-2023	28 days	3 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	21-Sep-2023	28 days	3 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	21-Sep-2023	28 days	3 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	21-Sep-2023	28 days	3 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	21-Sep-2023	28 days	3 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 1 (PC1)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 2 (PC2)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 1 (PC1)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 2 (PC2)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 1 (PC1)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 2 (PC2)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) PRIMARY LEACHATE CELL 4 (PC4)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 1 (PC1)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 2 (PC2)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3A (PC3A)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3B (PC3B)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3C (PC3C)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3D (PC3D)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3E (PC3E)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 4 (PC4)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 1 (PC1)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	20-Sep-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 2 (PC2)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	20-Sep-2023	40 days	0 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 3A (PC3A)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	20-Sep-2023	40 days	0 days	✓	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 3B (PC3B)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	20-Sep-2023	40 days	0 days	✓	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 3C (PC3C)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	20-Sep-2023	40 days	0 days	✓	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 3D (PC3D)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	20-Sep-2023	40 days	0 days	✓	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 3E (PC3E)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	20-Sep-2023	40 days	0 days	✓	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) PRIMARY LEACHATE CELL 4 (PC4)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	20-Sep-2023	40 days	0 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 1 (PC1)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 2 (PC2)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PRIMARY LEACHATE CELL 4 (PC4)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE PRIMARY LEACHATE CELL 1 (PC1)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE PRIMARY LEACHATE CELL 2 (PC2)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE PRIMARY LEACHATE CELL 3A (PC3A)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Alkalinity Species by Titration											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E290	18-Sep-2023	22-Sep-2023	14 days	4 days	✔	22-Sep-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E290	18-Sep-2023	22-Sep-2023	14 days	4 days	✔	22-Sep-2023	14 days	4 days	✔	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 1 (PC1)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 2 (PC2)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 3A (PC3A)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	21-Sep-2023	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E100	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E100	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 1 (PC1)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 2 (PC2)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 3A (PC3A)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E108	18-Sep-2023	22-Sep-2023	0.25 hrs	93 hrs	* EHTR-FM	22-Sep-2023	0.25 hrs	99 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E108	18-Sep-2023	22-Sep-2023	0.25 hrs	93 hrs	* EHTR-FM	22-Sep-2023	0.25 hrs	99 hrs	* EHTR-FM	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 1 (PC1)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 2 (PC2)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 3A (PC3A)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 3B (PC3B)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 3C (PC3C)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 3D (PC3D)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE PRIMARY LEACHATE CELL 3E (PC3E)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE PRIMARY LEACHATE CELL 4 (PC4)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 1 (PC1)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 2 (PC2)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 3A (PC3A)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 3B (PC3B)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 3C (PC3C)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 3D (PC3D)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 3E (PC3E)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) PRIMARY LEACHATE CELL 4 (PC4)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 1 (PC1)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 2 (PC2)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) PRIMARY LEACHATE CELL 4 (PC4)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 1 (PC1)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 2 (PC2)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 3A (PC3A)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 3B (PC3B)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 3C (PC3C)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 3D (PC3D)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 3E (PC3E)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) PRIMARY LEACHATE CELL 4 (PC4)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 1 (PC1)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 2 (PC2)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3A (PC3A)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3B (PC3B)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3C (PC3C)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3D (PC3D)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 3E (PC3E)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PRIMARY LEACHATE CELL 4 (PC4)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1143777	3	47	6.3	5.0	✔
Ammonia by Fluorescence	E298	1149170	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1143383	1	19	5.2	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1143382	1	19	5.2	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1146956	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1143727	2	36	5.5	5.0	✔
Conductivity in Water	E100	1143776	3	47	6.3	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1144038	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1143515	2	40	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1144576	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1143724	2	35	5.7	5.0	✔
Nitrate in Water by IC	E235.NO3	1143725	2	39	5.1	5.0	✔
Nitrite in Water by IC	E235.NO2	1143726	2	39	5.1	5.0	✔
pH by Meter	E108	1143778	3	49	6.1	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1147942	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1143728	2	36	5.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1143226	1	16	6.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1143331	2	33	6.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1143229	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1145564	1	13	7.6	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1143225	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1146684	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1143777	3	47	6.3	5.0	✔
Ammonia by Fluorescence	E298	1149170	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1143383	1	19	5.2	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1143382	1	19	5.2	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1143263	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1146956	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1143727	2	36	5.5	5.0	✔
Conductivity in Water	E100	1143776	3	47	6.3	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1144038	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1143515	2	40	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1144576	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1143724	2	35	5.7	5.0	✔
Nitrate in Water by IC	E235.NO3	1143725	2	39	5.1	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	1143726	2	39	5.1	5.0	✔
pH by Meter	E108	1143778	3	49	6.1	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1147942	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1143728	2	36	5.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1143226	1	16	6.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1143331	2	33	6.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1143229	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1145564	1	13	7.6	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1143225	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1146684	1	20	5.0	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1143777	3	47	6.3	5.0	✔
Ammonia by Fluorescence	E298	1149170	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1143383	1	19	5.2	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1143382	1	19	5.2	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1143263	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1146956	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1143727	2	36	5.5	5.0	✔
Conductivity in Water	E100	1143776	3	47	6.3	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1144038	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1143515	2	40	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1144576	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1143724	2	35	5.7	5.0	✔
Nitrate in Water by IC	E235.NO3	1143725	2	39	5.1	5.0	✔
Nitrite in Water by IC	E235.NO2	1143726	2	39	5.1	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1147942	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1143728	2	36	5.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1143226	1	16	6.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1143331	2	33	6.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1143229	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1145564	1	13	7.6	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1143225	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1146684	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1149170	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1143383	1	19	5.2	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1146956	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1143727	2	36	5.5	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1144038	1	20	5.0	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	1143515	2	40	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1144576	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1143724	2	35	5.7	5.0	✔
Nitrate in Water by IC	E235.NO3	1143725	2	39	5.1	5.0	✔
Nitrite in Water by IC	E235.NO2	1143726	2	39	5.1	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1147942	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1143728	2	36	5.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1143226	1	16	6.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1143331	2	33	6.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1143229	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1145564	1	13	7.6	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1143225	1	20	5.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Edmonton	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Edmonton	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Edmonton	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Edmonton	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Edmonton	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Edmonton	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 ALS Environmental - Edmonton	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A ALS Environmental - Edmonton	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L ALS Environmental - Edmonton	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 ALS Environmental - Edmonton	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
CCME PHC - F1 by Headspace GC-FID	E581.F1 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Edmonton	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Edmonton	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Edmonton	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Edmonton	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Edmonton	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Edmonton	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Edmonton	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Edmonton	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Edmonton	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 ALS Environmental - Edmonton	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2308496	Page	: 1 of 22
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 3 2023	Date Samples Received	: 19-Sep-2023 15:43
PO	: 236264	Date Analysis Commenced	: 20-Sep-2023
C-O-C number	: ----	Issue Date	: 26-Sep-2023 16:41
Sampler	: Murray 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
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Yan Zhang	Lab Analyst	Edmonton Organics, Edmonton, Alberta



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1143776)											
EO2308462-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	1250	1260	0.874%	10%	----
Physical Tests (QC Lot: 1143777)											
EO2308462-001	Anonymous	Alkalinity, total (as CaCO ₃)	----	E290	2.0	mg/L	597	605	1.26%	20%	----
Physical Tests (QC Lot: 1143778)											
EO2308462-001	Anonymous	pH	----	E108	0.10	pH units	8.88	8.89	0.112%	3%	----
Physical Tests (QC Lot: 1144351)											
EO2308505-004	Anonymous	Alkalinity, total (as CaCO ₃)	----	E290	2.0	mg/L	459	461	0.456%	20%	----
Physical Tests (QC Lot: 1144352)											
EO2308505-004	Anonymous	pH	----	E108	0.10	pH units	8.24	8.24	0.00%	3%	----
Physical Tests (QC Lot: 1144353)											
EO2308505-004	Anonymous	Conductivity	----	E100	2.0	µS/cm	1640	1640	0.122%	10%	----
Physical Tests (QC Lot: 1145771)											
EO2308536-007	Anonymous	Alkalinity, total (as CaCO ₃)	----	E290	2.0	mg/L	508	492	3.22%	20%	----
Physical Tests (QC Lot: 1145772)											
EO2308536-007	Anonymous	pH	----	E108	0.10	pH units	7.57	7.57	0.00%	3%	----
Physical Tests (QC Lot: 1145773)											
EO2308536-007	Anonymous	Conductivity	----	E100	2.0	µS/cm	944	943	0.106%	10%	----
Physical Tests (QC Lot: 1146684)											
EO2308495-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	116	114	1.39%	20%	----
Anions and Nutrients (QC Lot: 1143225)											
EO2308495-006	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0010	mg/L	0.568	0.564	0.716%	20%	----
Anions and Nutrients (QC Lot: 1143226)											
EO2308495-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	0.0010	mg/L	0.157	0.149	5.65%	20%	----
Anions and Nutrients (QC Lot: 1143331)											
EO2308461-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	10.0	mg/L	493	482	2.23%	20%	----
Anions and Nutrients (QC Lot: 1143332)											
EO2308501-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.200	mg/L	<0.200	<0.200	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143724)											
EO2308481-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.158	0.158	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143725)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 1143725) - continued											
EO2308481-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.698	0.690	1.17%	20%	----
Anions and Nutrients (QC Lot: 1143726)											
EO2308481-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143727)											
EO2308481-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	4.71	4.62	0.10	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143728)											
EO2308481-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	377	371	1.48%	20%	----
Anions and Nutrients (QC Lot: 1143733)											
EO2308502-008	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.142	0.139	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143734)											
EO2308502-008	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.112	0.113	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143735)											
EO2308502-008	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143736)											
EO2308502-008	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.79	0.77	0.02	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143737)											
EO2308502-008	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	165	166	0.338%	20%	----
Anions and Nutrients (QC Lot: 1149170)											
FC2302681-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0184	0.0193	0.0009	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1144576)											
EO2308479-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	12.0	12.8	6.50%	20%	----
Total Metals (QC Lot: 1143229)											
EO2308495-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000500	mg/L	<0.0000500	<0.0000500	0	Diff <2x LOR	----
Total Metals (QC Lot: 1145564)											
EO2308495-004	Anonymous	Chromium, total	7440-47-3	E420	0.0100	mg/L	0.103	0.106	2.84%	20%	----
Dissolved Metals (QC Lot: 1143515)											
EO2308466-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.367	0.359	1.97%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00023	0.00016	0.00007	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00011	<0.00010	0.00001	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.395	0.386	2.19%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.089	0.087	0.002	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1143515) - continued											
EO2308466-001	Anonymous	Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000186	0.0000258	0.0000072	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	6.10	6.15	0.850%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000015	0.000013	0.000001	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.000050	mg/L	0.0183	0.0175	4.65%	20%	----
		Cobalt, dissolved	7440-48-4	E421	0.000010	mg/L	0.00034	0.00032	0.00001	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.000020	mg/L	0.00362	0.00359	0.737%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	1.00	1.00	0.119%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000411	0.000415	0.000004	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0019	0.0020	0.00008	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	3.17	3.12	1.68%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.000010	mg/L	0.0257	0.0254	1.52%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00110	0.00105	4.80%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.000050	mg/L	0.00842	0.00843	0.0828%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.062	0.058	0.003	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.07	1.05	1.60%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.000020	mg/L	0.00066	0.00065	0.000009	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.93	3.01	2.73%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	0.000031	0.000029	0.000002	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	7.37	7.34	0.392%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.000020	mg/L	0.0132	0.0130	1.65%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	3.13	3.09	0.04	Diff <2x LOR	----
		Tellurium, dissolved	13494-80-9	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.000010	mg/L	0.00013	<0.00010	0.00003	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.000010	mg/L	0.00015	0.00015	0.000002	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.000030	mg/L	0.0520	0.0525	1.07%	20%	----
		Tungsten, dissolved	7440-33-7	E421	0.000010	mg/L	0.00017	0.00016	0.00001	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.000050	mg/L	0.00422	0.00423	0.000009	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.134	0.131	1.81%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.000030	mg/L	0.00101	0.00096	0.00005	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1143517)											
EO2308496-007	PRIMARY LEACHATE CELL 3E (PC3E)	Aluminum, dissolved	7429-90-5	E421	0.0200	mg/L	<0.0200	<0.0200	0	Diff <2x LOR	----



Sub-Matrix: Water

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1143517) - continued											
EO2308496-007	PRIMARY LEACHATE CELL 3E (PC3E)	Antimony, dissolved	7440-36-0	E421	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00200	mg/L	0.00611	0.00575	0.00036	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00200	mg/L	0.292	0.296	1.23%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000400	mg/L	<0.000400	<0.000400	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.200	mg/L	8.46	8.25	2.48%	20%	----
		Cadmium, dissolved	7440-43-9	E421	0.000100	mg/L	0.000207	0.000218	0.0000116	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	1.00	mg/L	105	103	1.41%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000200	mg/L	0.00292	0.00295	1.14%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00200	mg/L	0.00523	0.00518	0.00005	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00400	mg/L	0.00754	0.00728	0.00026	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.200	mg/L	<0.200	<0.200	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0200	mg/L	0.642	0.645	0.345%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	202	207	2.26%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00200	mg/L	0.857	0.854	0.300%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.00100	mg/L	0.863	0.837	3.00%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.0100	mg/L	0.620	0.623	0.395%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	1.00	mg/L	185	186	0.440%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00400	mg/L	0.208	0.212	1.81%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.00100	mg/L	0.00189	0.00196	0.000072	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	1.00	mg/L	12.3	11.9	2.93%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	1.00	mg/L	1970	2030	3.14%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00400	mg/L	2.41	2.45	1.63%	20%	----
		Sulfur, dissolved	7704-34-9	E421	10.0	mg/L	204	208	1.80%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00400	mg/L	<0.00400	<0.00400	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00600	mg/L	<0.00600	<0.00600	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00200	mg/L	0.0203	0.0194	0.00090	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1143517) - continued											
EO2308496-007	PRIMARY LEACHATE CELL 3E (PC3E)	Uranium, dissolved	7440-61-1	E421	0.000200	mg/L	0.00891	0.00910	2.22%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.0100	mg/L	3.47	3.44	0.679%	20%	----
		Zinc, dissolved	7440-66-6	E421	0.0200	mg/L	<0.0200	<0.0200	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00400	mg/L	0.0613	0.0612	0.118%	20%	----
Speciated Metals (QC Lot: 1144038)											
SK2304895-001	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1146956)											
EO2308546-001	Anonymous	Chemical oxygen demand [COD]	----	E559-L	20	mg/L	404	419	3.71%	20%	----
Aggregate Organics (QC Lot: 1147942)											
SK2304957-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1143383)											
EO2308492-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	0.46	0.44	0.02	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1143382)											
EO2308492-001	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<100	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1143776)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1143777)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1144351)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1144353)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1145771)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1145773)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1146684)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 1143225)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1143226)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1143331)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1143332)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1143724)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1143725)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1143726)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1143727)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1143728)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1143733)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1143733) - continued						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1143734)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1143735)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1143736)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1143737)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1149170)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 1144576)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1143229)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 1145564)						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Dissolved Metals (QCLot: 1143515)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1143515) - continued						
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1143517)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1143517) - continued						
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 1144038)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 1146956)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Aggregate Organics (QCLot: 1147942)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Volatile Organic Compounds (QCLot: 1143383)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----

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 Work Order : EO2308496
 Client : Clean Harbors Environmental Services, Inc.
 Project : Primary Leachate Qtr 3 2023



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 1143383) - continued						
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 1143263)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 1143382)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 1143776)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	103	90.0	110	----
Physical Tests (QCLot: 1143777)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
Physical Tests (QCLot: 1143778)									
pH	----	E108	----	pH units	6 pH units	101	97.0	103	----
Physical Tests (QCLot: 1144351)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
Physical Tests (QCLot: 1144352)									
pH	----	E108	----	pH units	6 pH units	101	97.0	103	----
Physical Tests (QCLot: 1144353)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	102	90.0	110	----
Physical Tests (QCLot: 1145771)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 1145772)									
pH	----	E108	----	pH units	6 pH units	100	97.0	103	----
Physical Tests (QCLot: 1145773)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	104	90.0	110	----
Physical Tests (QCLot: 1146684)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	98.5	85.0	115	----
Anions and Nutrients (QCLot: 1143225)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1143226)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1143331)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1143332)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1143724)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.2	90.0	110	----
Anions and Nutrients (QCLot: 1143725)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	101	90.0	110	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1143726)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 1143727)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1143728)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	96.7	90.0	110	----
Anions and Nutrients (QCLot: 1143733)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1143734)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 1143735)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	108	90.0	110	----
Anions and Nutrients (QCLot: 1143736)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	106	90.0	110	----
Anions and Nutrients (QCLot: 1143737)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	106	90.0	110	----
Anions and Nutrients (QCLot: 1149170)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	104	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1144576)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Total Metals (QCLot: 1143229)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
Total Metals (QCLot: 1145564)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Dissolved Metals (QCLot: 1143515)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	101	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	97.9	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	99.9	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.2	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.6	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	104	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1143515) - continued									
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	100.0	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.8	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	101	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	104	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.2	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	112	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	110	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.5	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	110	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	96.5	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.0	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	90.2	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	107	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	96.2	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	103	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.5	80.0	120	----
Dissolved Metals (QCLot: 1143517)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	110	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	110	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	103	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 1143517) - continued									
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.2	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	108	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	111	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	108	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	107	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	109	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	103	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	108	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	108	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	114	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	106	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	112	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	107	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	108	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	114	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	104	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	110	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	111	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	109	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	103	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	105	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	110	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	107	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	108	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	106	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	111	80.0	120	----
Speciated Metals (QCLot: 1144038)									



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					<i>Spike</i>	<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		<i>Qualifier</i>
<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Concentration</i>	<i>LCS</i>	<i>Low</i>	<i>High</i>	
Speciated Metals (QCLot: 1144038) - continued									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
Aggregate Organics (QCLot: 1146956)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	111	85.0	115	----
Aggregate Organics (QCLot: 1147942)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	98.4	85.0	115	----
Volatile Organic Compounds (QCLot: 1143383)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	83.8	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	82.5	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	85.4	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	97.8	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	101	70.0	130	----
Hydrocarbons (QCLot: 1143263)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	106	70.0	130	----
Hydrocarbons (QCLot: 1143382)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	111	70.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1143225)										
EO2308495-007	Anonymous	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1143226)										
EO2308495-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1143331)										
EO2308461-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1143332)										
EO2308496-004	PRIMARY LEACHATE CELL 3B (PC3B)	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1143724)										
EO2308481-001	Anonymous	Fluoride	16984-48-8	E235.F	1.00 mg/L	1 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1143725)										
EO2308481-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.39 mg/L	2.5 mg/L	95.7	75.0	125	----
Anions and Nutrients (QCLot: 1143726)										
EO2308481-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.478 mg/L	0.5 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 1143727)										
EO2308481-001	Anonymous	Chloride	16887-00-6	E235.Cl	98.4 mg/L	100 mg/L	98.4	75.0	125	----
Anions and Nutrients (QCLot: 1143728)										
EO2308481-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1143733)										
EO2308502-008	Anonymous	Fluoride	16984-48-8	E235.F	0.990 mg/L	1 mg/L	99.0	75.0	125	----
Anions and Nutrients (QCLot: 1143734)										
EO2308502-008	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.49 mg/L	2.5 mg/L	99.5	75.0	125	----
Anions and Nutrients (QCLot: 1143735)										
EO2308502-008	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.490 mg/L	0.5 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 1143736)										
EO2308502-008	Anonymous	Chloride	16887-00-6	E235.Cl	99.4 mg/L	100 mg/L	99.4	75.0	125	----
Anions and Nutrients (QCLot: 1143737)										
EO2308502-008	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1149170)										
FC2302681-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.103 mg/L	0.1 mg/L	103	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1144576)										
EO2308479-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1143229)										
EO2308495-002	Anonymous	Mercury, total	7439-97-6	E508	0.0000890 mg/L	0.0001 mg/L	89.0	70.0	130	----
Total Metals (QCLot: 1145564)										
EO2308495-005	Anonymous	Chromium, total	7440-47-3	E420	0.0375 mg/L	0.04 mg/L	93.6	70.0	130	----
Dissolved Metals (QCLot: 1143515)										
EO2308478-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.184 mg/L	0.2 mg/L	91.9	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0398 mg/L	0.04 mg/L	99.6	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00764 mg/L	0.01 mg/L	76.4	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.085 mg/L	0.1 mg/L	84.9	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00378 mg/L	0.004 mg/L	94.6	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00948 mg/L	0.01 mg/L	94.8	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0184 mg/L	0.02 mg/L	92.1	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0178 mg/L	0.02 mg/L	88.8	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.84 mg/L	2 mg/L	92.1	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0176 mg/L	0.02 mg/L	88.1	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0185 mg/L	0.02 mg/L	92.5	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0355 mg/L	0.04 mg/L	88.8	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	11.2 mg/L	10 mg/L	112	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.70 mg/L	4 mg/L	92.6	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0190 mg/L	0.02 mg/L	94.8	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.56 mg/L	10 mg/L	95.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00348 mg/L	0.004 mg/L	86.9	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1143515) - continued										
EO2308478-001	Anonymous	Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00355 mg/L	0.004 mg/L	88.7	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0402 mg/L	0.04 mg/L	101	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0185 mg/L	0.02 mg/L	92.6	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0990 mg/L	0.1 mg/L	99.0	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.353 mg/L	0.4 mg/L	88.2	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
Dissolved Metals (QCLot: 1143517)										
EO2308496-008	PRIMARY LEACHATE CELL 4 (PC4)	Aluminum, dissolved	7429-90-5	E421	0.191 mg/L	0.2 mg/L	95.4	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0177 mg/L	0.02 mg/L	88.6	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0183 mg/L	0.02 mg/L	91.4	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0380 mg/L	0.04 mg/L	95.1	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00762 mg/L	0.01 mg/L	76.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00380 mg/L	0.004 mg/L	95.0	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00951 mg/L	0.01 mg/L	95.1	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0364 mg/L	0.04 mg/L	91.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0186 mg/L	0.02 mg/L	92.8	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0146 mg/L	0.02 mg/L	73.0	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.91 mg/L	2 mg/L	95.6	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0178 mg/L	0.02 mg/L	89.2	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.5 mg/L	10 mg/L	105	70.0	130	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1143517) - continued										
EO2308496-008	PRIMARY LEACHATE CELL 4 (PC4)	Potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0270 mg/L	0.04 mg/L	67.5	70.0	130	MES
		Silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00344 mg/L	0.004 mg/L	86.0	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0275 mg/L	0.04 mg/L	68.8	70.0	130	MES
		Thallium, dissolved	7440-28-0	E421	0.00358 mg/L	0.004 mg/L	89.4	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0151 mg/L	0.02 mg/L	75.6	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0184 mg/L	0.02 mg/L	92.2	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0384 mg/L	0.04 mg/L	96.0	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00378 mg/L	0.004 mg/L	94.6	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
Zinc, dissolved	7440-66-6	E421	0.380 mg/L	0.4 mg/L	94.9	70.0	130	----		
Zirconium, dissolved	7440-67-7	E421	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----		
Speciated Metals (QCLot: 1144038)										
SK2304895-001	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0485 mg/L	0.05 mg/L	97.0	70.0	130	----
Aggregate Organics (QCLot: 1146956)										
EO2308546-002	Anonymous	Chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----
Aggregate Organics (QCLot: 1147942)										
SK2304957-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0203 mg/L	0.02 mg/L	101	75.0	125	----
Volatile Organic Compounds (QCLot: 1143383)										
EO2308492-002	Anonymous	Benzene	71-43-2	E611A	86.7 µg/L	100 µg/L	86.7	50.0	140	----
		Ethylbenzene	100-41-4	E611A	80.6 µg/L	100 µg/L	80.6	50.0	140	----
		Toluene	108-88-3	E611A	82.0 µg/L	100 µg/L	82.0	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	178 µg/L	200 µg/L	89.2	50.0	140	----
		Xylene, o-	95-47-6	E611A	96.8 µg/L	100 µg/L	96.8	50.0	140	----



Qualifiers

Qualifier	Description
MES	<i>Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).</i>

Report To Contact and company name below will appear on the final report Company: Clean Harbors Canada Contact: Todd Webb, Stan Yuha Phone: (780) 663-2513 Company address below will appear on the final report Street: PO Box 390, 50114 Range Road 173 City/Province: Ryley, AB Postal Code: T0B 4A0		Reports / Recipients Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL) Merge QC/QCI Reports with COA <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A <input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax webh.todd@cleanharbors.com Email 2 yuha.stan@cleanharbors.com Email 3		Turnaround Time (TAT) Requested <input checked="" type="checkbox"/> Routine [R] if received by 3pm M-F - no surcharges apply <input type="checkbox"/> 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum <input type="checkbox"/> 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum <input type="checkbox"/> 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum <input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum <input type="checkbox"/> Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests. Date and Time Required for all E&P TATs: dd-mm-yy hh:mm am/pm For all tests with rush TATs requested, please contact your AM to confirm availability.	
Invoice To Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO Company: Clean Harbors Canada Contact: Stephanie Dennis		Invoice Recipients Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax dennis.stephanie@cleanharbors.com Email 2 Email 3		Analysis Request Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below	
Project Information ALS Account # / Quote #: EO22-CHE5100-008 Job #: Primary Leachate Qtr 3 2023 PO / AFE: 236284 LSD: Table 4, 4A		Oil and Gas Required Fields (client use) AFE/Coast Center: PO# Major/Minor Code: Routing Code: Requisitioner: Location:		NUMBER OF CONTAINERS Table 4.4A Leachate	
ALS Lab Work Order # (ALS use only): E02308496		ALS Contact: Megha Walla		SAMPLER: Murray	
ALS Sample # (ALS use only) Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mm-yy)		Time (hh:mm)	
Primary Leachate Cell 1 (PC1)		18-Sep-23		11:00	
Primary Leachate Cell 2 (PC2)		18-Sep-23		11:00	
Primary Leachate Cell 3A (PC3A)		18-Sep-23		11:00	
Primary Leachate Cell 3B (PC3B)		18-Sep-23		11:00	
Primary Leachate Cell 3C (PC3C)		18-Sep-23		11:00	
Primary Leachate Cell 3D (PC3D)		18-Sep-23		11:00	
Primary Leachate Cell 3E (PC3E)		18-Sep-23		11:00	
Primary Leachate Cell 4 (PC4)		18-Sep-23		11:00	
Drinking Water (DW) Samples¹ (client use) Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO Are samples for human consumption/ user? <input type="checkbox"/> YES <input type="checkbox"/> NO		Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only) Analyze as per Quote EO22-CHE5100-008, Table 4.4A package (Attached). Same as EO2305136.			
SHIPPING RELEASE (client use) Released by: Todd Webb Date: 19-Sep-23 Time: 11:00		INITIAL SHIPMENT RECEPTION (ALS use only) Received by: [Signature] Date: 19-Sep-2023 Time: 3:43		FINAL SHIPMENT RECEPTION (ALS use only) Received by: [Signature] Date: [Signature] Time: [Signature]	
SAMPLE RECEIPT DETAILS (ALS use only) Cooling Method: <input type="checkbox"/> NONE <input type="checkbox"/> ICE <input checked="" type="checkbox"/> ICE PACKS <input type="checkbox"/> FROZEN <input type="checkbox"/> COOLING INITIATED Submission Comments identified on Sample Receipt Notification: <input type="checkbox"/> YES <input type="checkbox"/> NO Cooler Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A <input type="checkbox"/> Sample Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A INITIAL COOLER TEMPERATURES °C: 17.3 13.9 FINAL COOLER TEMPERATURES °C:		Environmental Division Work Order Reference E02308496 Telephone: +1 780 413 6227			
REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION		WHITE - LABORATORY COPY			
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.		YELLOW - CLIENT COPY			
1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.		RED - REPORT COPY			

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus

Appendix D
Primary Leachate Analyses
Quarter 4



CERTIFICATE OF ANALYSIS

Work Order	: EO2311189	Page	: 1 of 20
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 4 2023	Date Samples Received	: 05-Dec-2023 15:45
PO	: 238108	Date Analysis	: 06-Dec-2023
		Commenced	
C-O-C number	: ----	Issue Date	: 12-Dec-2023 18:38
Sampler	: Murray		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Daniel Nguyen	Lab Assistant	Metals, Edmonton, Alberta
Garrett Nodin	Lab Analyst	Inorganics, Edmonton, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Logan Carroll	Laboratory Analyst	Inorganics, Edmonton, Alberta
Michelle Schroder	Laboratory Analyst	Inorganics, Edmonton, Alberta
Remy Gatabazi	Lab Analyst	Organics, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Inorganics, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Metals, Edmonton, Alberta
Yan Zhang	Lab Analyst	Organics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
 LOR: Limit of Reporting (detection limit).
 Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.
 Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

<i>Unit</i>	<i>Description</i>
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
RRV	Reported result verified by repeat analysis.
SP	Sample was preserved at the laboratory.



Analytical Results

EO2311189-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 1 (PC1)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	7140	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	5860	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Conductivity	----	16900	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	1940	1	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	7.62	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	13900	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	44.7	5.0	mg/L	E160/EO	-	08-Dec-2023	1267842
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	541	RRV, 10.0	mg/L	E298/EO	06-Dec-2023	09-Dec-2023	1266054
Chloride	16887-00-6	2610	DLDS, RRV, 5.00	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	4.00	DLDS, 0.200	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<0.200	DLDS, 0.200	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	<0.224	0.224	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.100	DLDS, 0.100	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	23.6	RRV, 0.100	mg/L	E372-S/EO	07-Dec-2023	11-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	23.3	RRV, 0.100	mg/L	E375-U/EO	07-Dec-2023	11-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	1580	DLDS, RRV, 3.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	847	RRV, 25.0	mg/L	E318/EO	08-Dec-2023	11-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	1260	25.0	mg/L	E358-L/EO	07-Dec-2023	08-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	101	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.507	0.0100	mg/L	E420/EO	07-Dec-2023	08-Dec-2023	1266522
Mercury, total	7439-97-6	0.000449	0.0000050	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.267	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00200	DLDS, 0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.0421	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.356	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.000400	DLDS, 0.000400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.00100	DLDS, 0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	15.6	0.200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.000487	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	279	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.000629	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.489	0.0100	mg/L	E421/EO	06-Dec-2023	08-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.107	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.0151	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	151	0.200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	0.00702	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lithium, dissolved	7439-93-2	0.302	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	302	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311189-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 1 (PC1)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Dissolved Metals								
Manganese, dissolved	7439-96-5	16.2	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	1.75	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	9.80	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	26.8	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	351	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.0357	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.00258	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	14.6	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	0.000501	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	3090	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	2.37	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	600	10.0	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.105	0.00600	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.0298	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.00223	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	21.2	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	0.238	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.152	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	3050 ^{DLA, DLHC}	100	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	0.0632	0.0100	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	15.7	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	0.61	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	1.26	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	0.53	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	1.10	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	1.63	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	460	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	441	122	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	800	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	101	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	98.0	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	92.3	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	99.1	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311189-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 2 (PC2)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	14300 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	685 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{RRV}	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	12900 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Conductivity	----	35800 ^{RRV}	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	1720	5	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	8.45 ^{RRV}	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	30300	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	260	7.5	mg/L	E160/EO	-	07-Dec-2023	1268362
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	610 ^{SP}	10.0	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	7690 ^{DLDS, RRV}	50.0	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	21.7 ^{DLDS}	2.00	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<2.00 ^{DLDS}	2.00	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	<2.24	2.24	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<1.00 ^{DLDS}	1.00	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	7.85	0.100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	7.37	0.100	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	878 ^{DLDS, RRV}	30.0	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	910	50.0	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	2740	25.0	mg/L	E358-L/EO	07-Dec-2023	08-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	99.6	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.321	0.0500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.117	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Antimony, dissolved	7440-36-0	0.259	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.227	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Barium, dissolved	7440-39-3	1.30	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Boron, dissolved	7440-42-8	70.6	1.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.00598	0.000500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Calcium, dissolved	7440-70-2	50.7	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.00165	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.310	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.0209	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Iron, dissolved	7439-89-6	<1.00 ^{DLDS}	1.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868



Analytical Results

EO2311189-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 2 (PC2)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Lithium, dissolved	7439-93-2	8.44	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	386	0.500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Manganese, dissolved	7439-96-5	0.894	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	20.8	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.321	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	7.34	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Potassium, dissolved	7440-09-7	1130	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.160	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.0610	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Silicon, dissolved	7440-21-3	8.66	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Sodium, dissolved	7440-23-5	8870	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Strontium, dissolved	7440-24-6	3.62	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	636	50.0	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.191	0.0300	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	15.5	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Uranium, dissolved	7440-61-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.570	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Zinc, dissolved	7440-66-6	<0.100 ^{DLDS}	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.305	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	9370 ^{DLA, DLHC}	100	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	3.93	1.00	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	34.8	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	6.17	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	1.24	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	1.50	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	2.74	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	690	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	646	182	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	1520	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	104	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	104	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								



Analytical Results

EO2311189-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 2 (PC2)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	98.0	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	100	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311189-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3A (PC3A)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	8130 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0 ^{RRV}	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{RRV}	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	6670 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Conductivity	----	30000 ^{RRV}	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	2370	5	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	7.78 ^{RRV}	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	21700	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	21.6	3.0	mg/L	E160/EO	-	07-Dec-2023	1268362
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	788 ^{SP}	10.0	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	8220 ^{DLDS, RRV}	50.0	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	2.27 ^{DLDS}	2.00	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	2.76 ^{DLDS}	2.00	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	4.18	2.24	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	1.42 ^{DLDS}	1.00	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	4.01	0.100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	3.76	0.100	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	350 ^{DLDS, RRV}	30.0	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	844	50.0	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	1010	25.0	mg/L	E358-L/EO	07-Dec-2023	08-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	97.0	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.188	0.0500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.100 ^{DLDS}	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Antimony, dissolved	7440-36-0	0.0104	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.300	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Barium, dissolved	7440-39-3	1.55	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868



Analytical Results

EO2311189-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3A (PC3A)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Boron, dissolved	7440-42-8	41.8	1.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Calcium, dissolved	7440-70-2	236	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.00134	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.189	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Copper, dissolved	7440-50-8	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Iron, dissolved	7439-89-6	<1.00 ^{DLDS}	1.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Lithium, dissolved	7439-93-2	2.61	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	433	0.500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Manganese, dissolved	7439-96-5	1.13	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	0.460	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.420	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	6.64	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Potassium, dissolved	7440-09-7	946	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.671	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.0294	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Silicon, dissolved	7440-21-3	18.0	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Sodium, dissolved	7440-23-5	5390	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Strontium, dissolved	7440-24-6	4.86	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	281	50.0	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.0714	0.0300	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	1.12	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Uranium, dissolved	7440-61-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.163	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Zinc, dissolved	7440-66-6	<0.100 ^{DLDS}	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.172	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	3220 ^{DLA, DLHC}	200	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	9.74	1.00	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	261	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	16.1	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	239	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856



Analytical Results

EO2311189-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3A (PC3A)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	138	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	46.1	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	184	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	910	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	<288	288	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	3940	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	104	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	86.0	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	96.1	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	94.3	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311189-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3B (PC3B)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	7880 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	4090 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{RRV}	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	13300 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Conductivity	----	43100 ^{RRV}	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	200	5	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	9.28 ^{RRV}	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	40800	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	390	5.0	mg/L	E160/EO	-	07-Dec-2023	1268362
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	1650 ^{SP}	25.0	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	10500 ^{D.L.D.S. RRV}	50.0	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	15.1 ^{D.L.D.S.}	2.00	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	4.22 ^{D.L.D.S.}	2.00	mg/L	E235.NO ₃ /EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	4.22	2.24	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<1.00 ^{D.L.D.S.}	1.00	mg/L	E235.NO ₂ /EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	6.67	0.100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	6.48	0.100	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	1380 ^{D.L.D.S. RRV}	30.0	mg/L	E235.SO ₄ /EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	2180	50.0	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								



Analytical Results

EO2311189-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3B (PC3B)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	6420	50.0	mg/L	E358-L/EO	07-Dec-2023	08-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	100	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.512	0.0500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.100 ^{DLDS}	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.113	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.633	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Boron, dissolved	7440-42-8	168	1.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.00900	0.000500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Calcium, dissolved	7440-70-2	15.0	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.100	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.464	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.0247	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.0480	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Iron, dissolved	7439-89-6	1.19	1.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Lead, dissolved	7439-92-1	0.00543	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Lithium, dissolved	7439-93-2	11.2	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	39.4	0.500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Manganese, dissolved	7439-96-5	0.826	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	31.7	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Nickel, dissolved	7440-02-0	1.22	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	9.48	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Potassium, dissolved	7440-09-7	3140	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	4.42	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.0772	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Silicon, dissolved	7440-21-3	38.9	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Sodium, dissolved	7440-23-5	9040	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Strontium, dissolved	7440-24-6	0.774	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	706	50.0	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.108	0.0300	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	4.36	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Uranium, dissolved	7440-61-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.294	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Zinc, dissolved	7440-66-6	<0.100 ^{DLDS}	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868



Analytical Results

EO2311189-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3B (PC3B)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Zirconium, dissolved	7440-67-7	0.0699	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	18300 ^{DLA, DLHC}	200	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	21.1	1.00	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	11.9	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	1.36	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	12.0	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	4.68	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	4.06	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	8.74	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	2080	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	2050	550	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	2650	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	110	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	70.0	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	108	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	99.1	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311189-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3C (PC3C)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	3980 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, carbonate (as CO3)	3812-32-6	490 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{RRV}	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, total (as CaCO3)	----	4080 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Conductivity	----	14800	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO3), dissolved	----	696	0.50	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	8.73	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	10500	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	77.6	3.0	mg/L	E160/EO	-	07-Dec-2023	1268362
Anions and Nutrients								



Analytical Results

EO2311189-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3C (PC3C)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	668 ^{SP}	25.0	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	2590 ^{DLDS}	10.0	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	5.14 ^{DLDS}	0.400	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS}	0.400	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	8.24	0.0100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	7.45 ^{RRV}	0.0100	mg/L	E375-U/EO	07-Dec-2023	11-Dec-2023	1267473
Sulfate (as SO4)	14808-79-8	793 ^{DLDS}	6.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	689	50.0	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	646	5.00	mg/L	E358-L/EO	07-Dec-2023	07-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	106	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0164	0.0100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.00978	0.00100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.0512	0.00100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Boron, dissolved	7440-42-8	66.0	0.100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	<0.0000500 ^{DLDS}	0.0000500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Calcium, dissolved	7440-70-2	48.0	0.500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.00171	0.000100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.00782	0.00500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.00189	0.00100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Copper, dissolved	7440-50-8	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Iron, dissolved	7439-89-6	0.295	0.100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Lithium, dissolved	7439-93-2	1.81	0.0100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	140	0.0500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Manganese, dissolved	7439-96-5	0.362	0.00100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	0.136	0.000500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.504	0.00500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	8.59	0.500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Potassium, dissolved	7440-09-7	422	0.500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.296	0.00200	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.0355	0.000500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Silicon, dissolved	7440-21-3	9.60	0.500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Silver, dissolved	7440-22-4	0.000119	0.000100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Sodium, dissolved	7440-23-5	2500	0.500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868



Analytical Results

EO2311189-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3C (PC3C)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Strontium, dissolved	7440-24-6	0.344	0.00200	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	1540	5.00	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.00368	0.00300	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.0856	0.00100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.00522	0.000100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	9.93	0.00500	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Zinc, dissolved	7440-66-6	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.0532	0.00200	mg/L	E421/EO	06-Dec-2023	11-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	2170 ^{DLA, DLHC}	200	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	1.53	0.100	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	11.2	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	30.2	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	131	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	188	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	101	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	289	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	1100	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	639	310	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	1240	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	111	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	76.5	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	111	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	97.2	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311189-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3D (PC3D)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
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Analytical Results

EO2311189-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3D (PC3D)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	4040	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	202	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	3650	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Conductivity	----	18800	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	811	1	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	8.57	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	14600	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	80.3	5.0	mg/L	E160/EO	-	07-Dec-2023	1268362
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	353 ^{SP}	5.00	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	5190 ^{DLDS}	10.0	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	5.51 ^{DLDS}	0.400	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS}	0.400	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	0.606	0.447	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	0.606 ^{DLDS}	0.200	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	1.10	0.0100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	1.07	0.0100	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	343 ^{DLDS}	6.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	351	5.00	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	1880	25.0	mg/L	E358-L/EO	07-Dec-2023	08-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	94.7	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0266	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.0317	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.339	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	35.6	0.200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.00117	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	102	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.00139	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.0125	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.00576	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.00680	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	1.41	0.200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lithium, dissolved	7439-93-2	1.75	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	135	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311189-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3D (PC3D)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	1.02	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	4.11	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	3.10	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	1.85	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	753	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.565	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.0276	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	17.5	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000200	DLDS, 0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	3550	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	1.69	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	322	10.0	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00400	DLDS, 0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000200	DLDS, 0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00200	DLDS, 0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00200	DLDS, 0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.0109	0.00600	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.0562	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.000905	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	4.20	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	<0.0200	DLDS, 0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.0380	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	6240	DLA, DLHC, 200	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	10.3	1.00	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	81.2	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	4.07	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	40.9	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	10.2	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	6.60	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	16.8	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	610	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	467	164	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	2030	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	110	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	98.5	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	111	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	102	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311189-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3E (PC3E)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	4260	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	3490	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Conductivity	----	13300	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	1270	1	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	8.10	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	9340	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	72.8	3.0	mg/L	E160/EO	-	07-Dec-2023	1268362
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	295 ^{SP}	5.00	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	3250 ^{DLDS}	10.0	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	4.12 ^{DLDS}	0.400	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS}	0.400	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	0.787	0.0010	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267462
Phosphorus, total dissolved	7723-14-0	0.737	0.0010	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	511 ^{DLDS}	6.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	367	5.00	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	150	2.50	mg/L	E358-L/EO	07-Dec-2023	08-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	89.5	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	0.0000053	0.0000050	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.00644	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.339	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	8.48	0.200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.000284	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	98.1	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.00332	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.00526	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	0.207	0.200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311189-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3E (PC3E)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Lithium, dissolved	7439-93-2	0.719	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	249	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Manganese, dissolved	7439-96-5	0.747	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	0.938	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.868	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	<1.00 ^{DLDS}	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	244	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.262	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.00279	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	12.2	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	2330	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	2.56	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	174	10.0	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	<0.00600 ^{DLDS}	0.00600	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.0240	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.00900	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	4.50	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.0768	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	814 ^{DLA, DLHC}	200	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	0.0156	0.0010	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	13.4	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	2.39	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	1.26	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	2.40	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	1.59	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	3.99	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	100	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	24900	420	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	114	4.2	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	86.7	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								



Analytical Results

EO2311189-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 3E (PC3E)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	109	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	102	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311189-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 4 (PC4)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	6600	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, total (as CaCO3)	----	5410	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Conductivity	----	16900	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO3), dissolved	----	1680	1	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	8.13	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	13400	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	101	3.0	mg/L	E160/EO	-	07-Dec-2023	1268362
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	571 ^{SP}	10.0	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	3360 ^{DLDS}	10.0	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	2.66 ^{DLDS}	0.400	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS}	0.400	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	3.67	0.100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267462
Phosphorus, total dissolved	7723-14-0	2.60	0.100	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO4)	14808-79-8	142 ^{DLDS}	6.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	670	50.0	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	2070	25.0	mg/L	E358-L/EO	07-Dec-2023	08-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	102	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0198	0.0100	mg/L	E420/EO	07-Dec-2023	08-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.106	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.0264	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.391	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311189-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Primary Leachate Cell 4 (PC4)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	35.2	0.200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.000239	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	146	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.0175	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.0193	0.0100	mg/L	E421/EO	06-Dec-2023	08-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.00711	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.00917	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	0.368	0.200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lithium, dissolved	7439-93-2	0.526	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	319	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Manganese, dissolved	7439-96-5	0.795	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	0.811	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.637	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	5.86	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	383	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.290	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.0332	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	14.7	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	2920	1.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	1.55	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	794	10.0	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.0412	0.00600	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.0790	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.000477	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.799	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.0764	0.00400	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	7710 ^{DLA, DLHC}	200	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	4.41	0.100	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	118	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	102	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	609	1.00	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856



Analytical Results

EO2311189-008

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: Primary Leachate Cell 4 (PC4)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	326	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	154	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	480	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	2180	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	870	649	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	3400	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	107	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	78.8	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	116	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	102	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2311189</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Primary Leachate Qtr 4 2023</p> <p>PO : 238108</p> <p>C-O-C number : ----</p> <p>Sampler : Murray</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 8</p> <p>No. of samples analysed : 8</p>	<p>Page : 1 of 31</p> <p>Laboratory : ALS Environmental - Edmonton</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 05-Dec-2023 15:45</p> <p>Issue Date : 12-Dec-2023 18:36</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Matrix Spike (MS) Recoveries								
Dissolved Metals	Anonymous	Anonymous	Selenium, dissolved	7782-49-2	E421	131 %	70.0-130%	Recovery greater than upper data quality objective



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Primary Leachate Cell 1 (PC1)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE Primary Leachate Cell 2 (PC2)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Primary Leachate Cell 3A (PC3A)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Primary Leachate Cell 3B (PC3B)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Primary Leachate Cell 3C (PC3C)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Primary Leachate Cell 3D (PC3D)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Primary Leachate Cell 3E (PC3E)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Primary Leachate Cell 4 (PC4)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 1 (PC1)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 2 (PC2)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3A (PC3A)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3B (PC3B)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3C (PC3C)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3D (PC3D)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 3E (PC3E)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Primary Leachate Cell 4 (PC4)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 1 (PC1)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 2 (PC2)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE Primary Leachate Cell 3A (PC3A)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE Primary Leachate Cell 3B (PC3B)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Primary Leachate Cell 3C (PC3C)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Primary Leachate Cell 3D (PC3D)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Primary Leachate Cell 3E (PC3E)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Primary Leachate Cell 4 (PC4)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 3A (PC3A)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 3B (PC3B)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 3C (PC3C)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 3D (PC3D)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 3E (PC3E)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Primary Leachate Cell 4 (PC4)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 1 (PC1)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 2 (PC2)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 3A (PC3A)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 3B (PC3B)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 3C (PC3C)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 3D (PC3D)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 3E (PC3E)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Primary Leachate Cell 4 (PC4)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 1 (PC1)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 2 (PC2)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 4 (PC4)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✓	08-Dec-2023	28 days	3 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 1 (PC1)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 2 (PC2)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Primary Leachate Cell 4 (PC4)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Primary Leachate Cell 1 (PC1)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Primary Leachate Cell 2 (PC2)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Primary Leachate Cell 3A (PC3A)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Primary Leachate Cell 3B (PC3B)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Primary Leachate Cell 3C (PC3C)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Primary Leachate Cell 3D (PC3D)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Primary Leachate Cell 3E (PC3E)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Primary Leachate Cell 4 (PC4)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 1 (PC1)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 2 (PC2)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✔	07-Dec-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3A (PC3A)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✔	07-Dec-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3B (PC3B)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✔	07-Dec-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3C (PC3C)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✔	07-Dec-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3D (PC3D)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✔	07-Dec-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 3E (PC3E)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✔	07-Dec-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Primary Leachate Cell 4 (PC4)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✔	07-Dec-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 1 (PC1)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 2 (PC2)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3A (PC3A)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3B (PC3B)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3C (PC3C)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3D (PC3D)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 3E (PC3E)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Primary Leachate Cell 4 (PC4)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 1 (PC1)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 2 (PC2)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3A (PC3A)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3B (PC3B)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3C (PC3C)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3D (PC3D)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 3E (PC3E)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Primary Leachate Cell 4 (PC4)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 1 (PC1)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	14 days	1 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 2 (PC2)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	14 days	1 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 3A (PC3A)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	14 days	1 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Primary Leachate Cell 3B (PC3B)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	14 days	1 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Alkalinity Species by Titration											
HDPE Primary Leachate Cell 3C (PC3C)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	14 days	1 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Primary Leachate Cell 3D (PC3D)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	14 days	1 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Primary Leachate Cell 3E (PC3E)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	14 days	1 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Primary Leachate Cell 4 (PC4)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	14 days	1 days	✔	
Physical Tests : Conductivity in Water											
HDPE Primary Leachate Cell 1 (PC1)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	
Physical Tests : Conductivity in Water											
HDPE Primary Leachate Cell 2 (PC2)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	
Physical Tests : Conductivity in Water											
HDPE Primary Leachate Cell 3A (PC3A)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	
Physical Tests : Conductivity in Water											
HDPE Primary Leachate Cell 3B (PC3B)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	
Physical Tests : Conductivity in Water											
HDPE Primary Leachate Cell 3C (PC3C)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 3D (PC3D)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 3E (PC3E)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Primary Leachate Cell 4 (PC4)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Physical Tests : pH by Meter										
HDPE Primary Leachate Cell 1 (PC1)	E108	05-Dec-2023	06-Dec-2023	0.25 hrs	23 hrs	* EHTR-FM	06-Dec-2023	0.25 hrs	29 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE Primary Leachate Cell 2 (PC2)	E108	05-Dec-2023	06-Dec-2023	4 hrs	23 hrs	* EHTL	06-Dec-2023	4 hrs	29 hrs	* EHTL
Physical Tests : pH by Meter										
HDPE Primary Leachate Cell 3A (PC3A)	E108	05-Dec-2023	06-Dec-2023	4 hrs	23 hrs	* EHTL	06-Dec-2023	4 hrs	29 hrs	* EHTL
Physical Tests : pH by Meter										
HDPE Primary Leachate Cell 3B (PC3B)	E108	05-Dec-2023	06-Dec-2023	4 hrs	23 hrs	* EHTL	06-Dec-2023	4 hrs	29 hrs	* EHTL
Physical Tests : pH by Meter										
HDPE Primary Leachate Cell 3C (PC3C)	E108	05-Dec-2023	06-Dec-2023	4 hrs	23 hrs	* EHTL	06-Dec-2023	4 hrs	29 hrs	* EHTL
Physical Tests : pH by Meter										
HDPE Primary Leachate Cell 3D (PC3D)	E108	05-Dec-2023	06-Dec-2023	4 hrs	23 hrs	* EHTL	06-Dec-2023	4 hrs	29 hrs	* EHTL



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 3E (PC3E)	E108	05-Dec-2023	06-Dec-2023	4 hrs	23 hrs	* EHTL	06-Dec-2023	4 hrs	29 hrs	* EHTL	
Physical Tests : pH by Meter											
HDPE Primary Leachate Cell 4 (PC4)	E108	05-Dec-2023	06-Dec-2023	4 hrs	23 hrs	* EHTL	06-Dec-2023	4 hrs	29 hrs	* EHTL	
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 2 (PC2)	E160	05-Dec-2023	----	----	----		07-Dec-2023	7 days	2 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3A (PC3A)	E160	05-Dec-2023	----	----	----		07-Dec-2023	7 days	2 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3B (PC3B)	E160	05-Dec-2023	----	----	----		07-Dec-2023	7 days	2 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3C (PC3C)	E160	05-Dec-2023	----	----	----		07-Dec-2023	7 days	2 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3D (PC3D)	E160	05-Dec-2023	----	----	----		07-Dec-2023	7 days	2 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 3E (PC3E)	E160	05-Dec-2023	----	----	----		07-Dec-2023	7 days	2 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Primary Leachate Cell 4 (PC4)	E160	05-Dec-2023	----	----	----		07-Dec-2023	7 days	2 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE Primary Leachate Cell 1 (PC1)	E160	05-Dec-2023	----	----	----		08-Dec-2023	7 days	3 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 1 (PC1)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 2 (PC2)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3A (PC3A)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3B (PC3B)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3C (PC3C)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3D (PC3D)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 3E (PC3E)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Primary Leachate Cell 4 (PC4)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Primary Leachate Cell 1 (PC1)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Primary Leachate Cell 2 (PC2)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Primary Leachate Cell 3A (PC3A)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Primary Leachate Cell 3B (PC3B)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Primary Leachate Cell 3C (PC3C)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Primary Leachate Cell 3D (PC3D)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Primary Leachate Cell 3E (PC3E)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Primary Leachate Cell 4 (PC4)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Primary Leachate Cell 1 (PC1)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✓	07-Dec-2023	180 days	2 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Primary Leachate Cell 2 (PC2)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✓	07-Dec-2023	180 days	2 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Primary Leachate Cell 3A (PC3A)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✓	07-Dec-2023	180 days	2 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Primary Leachate Cell 3B (PC3B)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✓	07-Dec-2023	180 days	2 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Primary Leachate Cell 3C (PC3C)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✓	07-Dec-2023	180 days	2 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Primary Leachate Cell 3D (PC3D)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✓	07-Dec-2023	180 days	2 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Primary Leachate Cell 3E (PC3E)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✓	07-Dec-2023	180 days	2 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Primary Leachate Cell 4 (PC4)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✓	07-Dec-2023	180 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 1 (PC1)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Primary Leachate Cell 2 (PC2)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Primary Leachate Cell 3A (PC3A)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Primary Leachate Cell 3B (PC3B)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Primary Leachate Cell 3C (PC3C)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Primary Leachate Cell 3D (PC3D)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Primary Leachate Cell 3E (PC3E)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Primary Leachate Cell 4 (PC4)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1265937	2	21	9.5	5.0	✓
Ammonia by Fluorescence	E298	1266054	2	34	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	1265856	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1265857	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1268684	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1265815	1	20	5.0	5.0	✓
Conductivity in Water	E100	1265935	1	18	5.5	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1266556	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1265868	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1268529	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1265812	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1265813	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1265814	1	20	5.0	5.0	✓
pH by Meter	E108	1265936	1	19	5.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1272122	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1265816	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1267473	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1268287	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1267968	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1266522	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1267461	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1267842	2	39	5.1	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1265937	2	21	9.5	5.0	✓
Ammonia by Fluorescence	E298	1266054	2	34	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	1265856	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1265857	1	20	5.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1265862	1	19	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1268684	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1265815	1	20	5.0	5.0	✓
Conductivity in Water	E100	1265935	1	18	5.5	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1266556	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1265868	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1268529	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1265812	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1265813	1	20	5.0	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	1265814	1	20	5.0	5.0	✔
pH by Meter	E108	1265936	1	19	5.2	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1272122	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1265816	1	20	5.0	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1267473	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1268287	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1267968	1	19	5.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1266522	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1267461	2	40	5.0	5.0	✔
TSS by Gravimetry	E160	1267842	2	39	5.1	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1265937	2	21	9.5	5.0	✔
Ammonia by Fluorescence	E298	1266054	2	34	5.8	5.0	✔
BTEX by Headspace GC-MS	E611A	1265856	1	20	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1265857	1	20	5.0	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1265862	1	19	5.2	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1268684	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1265815	1	20	5.0	5.0	✔
Conductivity in Water	E100	1265935	1	18	5.5	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1266556	1	19	5.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1265868	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1268529	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1265812	1	20	5.0	5.0	✔
Nitrate in Water by IC	E235.NO3	1265813	1	20	5.0	5.0	✔
Nitrite in Water by IC	E235.NO2	1265814	1	20	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1272122	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1265816	1	20	5.0	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1267473	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1268287	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1267968	1	19	5.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1266522	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1267461	2	40	5.0	5.0	✔
TSS by Gravimetry	E160	1267842	2	39	5.1	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1266054	2	34	5.8	5.0	✔
BTEX by Headspace GC-MS	E611A	1265856	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1268684	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1265815	1	20	5.0	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1266556	1	19	5.2	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	1265868	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1268529	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1265812	1	20	5.0	5.0	✔
Nitrate in Water by IC	E235.NO3	1265813	1	20	5.0	5.0	✔
Nitrite in Water by IC	E235.NO2	1265814	1	20	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1272122	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1265816	1	20	5.0	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1267473	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1268287	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1267968	1	19	5.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1266522	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1267461	2	40	5.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Edmonton	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Edmonton	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Edmonton	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Edmonton	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Edmonton	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Edmonton	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 ALS Environmental - Edmonton	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A ALS Environmental - Edmonton	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L ALS Environmental - Edmonton	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 ALS Environmental - Edmonton	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
CCME PHC - F1 by Headspace GC-FID	E581.F1 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Edmonton	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Edmonton	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Edmonton	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Edmonton	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Edmonton	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Edmonton	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Edmonton	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Edmonton	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Edmonton	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 ALS Environmental - Edmonton	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2311189	Page	: 1 of 14
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Primary Leachate Qtr 4 2023	Date Samples Received	: 05-Dec-2023 15:45
PO	: 238108	Date Analysis Commenced	: 06-Dec-2023
C-O-C number	: ----	Issue Date	: 12-Dec-2023 18:39
Sampler	: Murray 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Edmonton Inorganics, Edmonton, Alberta
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Shruti Mudliar	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Yan Zhang	Lab Analyst	Edmonton Organics, Edmonton, Alberta



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1265935)											
EO2311188-001	Anonymous	Conductivity	----	E100	1.0	µS/cm	10800	10600	1.49%	10%	----
Physical Tests (QC Lot: 1265936)											
EO2311188-001	Anonymous	pH	----	E108	0.10	pH units	7.45	7.37	1.08%	3%	----
Physical Tests (QC Lot: 1265937)											
EO2311188-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	1360	1360	0.287%	20%	----
Physical Tests (QC Lot: 1267842)											
EO2311182-002	Anonymous	Solids, total suspended [TSS]	----	E160	7.5	mg/L	250	272	8.44%	20%	----
Physical Tests (QC Lot: 1268362)											
EO2311182-001	Anonymous	Solids, total suspended [TSS]	----	E160	7.5	mg/L	308	334	8.11%	20%	----
Physical Tests (QC Lot: 1268594)											
FC2303473-005	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	153	153	0.00%	20%	----
Anions and Nutrients (QC Lot: 1265812)											
EO2311190-003	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.611	0.617	0.977%	20%	----
Anions and Nutrients (QC Lot: 1265813)											
EO2311190-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.080	0.077	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1265814)											
EO2311190-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1265815)											
EO2311190-003	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	5.96	5.96	0.0336%	20%	----
Anions and Nutrients (QC Lot: 1265816)											
EO2311190-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	55.0	55.1	0.132%	20%	----
Anions and Nutrients (QC Lot: 1266054)											
FC2303459-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0250	mg/L	0.918	0.942	2.57%	20%	----
Anions and Nutrients (QC Lot: 1267461)											
EO2311162-001	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0100	mg/L	1.61	1.64	1.72%	20%	----
Anions and Nutrients (QC Lot: 1267462)											
EO2311189-007	Primary Leachate Cell 3E (PC3E)	Phosphorus, total	7723-14-0	E372-S	0.0010	mg/L	0.787	0.786	0.126%	20%	----
Anions and Nutrients (QC Lot: 1267473)											
EO2311188-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	0.0010	mg/L	0.330	0.331	0.402%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 1268287)											
EO2311182-003	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.200	mg/L	3.85	3.89	0.953%	20%	----
Anions and Nutrients (QC Lot: 1270974)											
EO2311301-003	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1268529)											
FC2303468-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	6.41	5.36	17.9%	20%	----
Total Metals (QC Lot: 1266522)											
EO2311190-001	Anonymous	Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1267968)											
EO2311213-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1265868)											
EO2311190-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0100	0.0105	4.92%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00020	0.00017	0.00003	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.345	0.340	1.37%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.093	0.094	0.001	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	34.2	33.7	1.35%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000067	0.000071	0.000004	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0769	0.0775	0.741%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	7.62	7.62	0.111%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0114	0.0116	1.95%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000526	0.000508	3.32%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.423	0.384	0.039	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.55	1.55	0.220%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00307	0.00300	2.32%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000085	0.000090	0.000005	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1265868) - continued											
EO2311190-001	Anonymous	Silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.02	3.04	0.678%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	464	465	0.273%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.388	0.377	2.70%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10.2	10.2	0.254%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000216	0.000212	1.78%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 1266556)											
SK2306898-002	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1268684)											
EO2311188-001	Anonymous	Chemical oxygen demand [COD]	----	E559-L	100	mg/L	1240	1230	1.29%	20%	----
Aggregate Organics (QC Lot: 1272122)											
EO2311188-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	0.0020	0.0022	0.0003	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1265856)											
EO2311194-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1265857)											
EO2311194-001	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<100	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1265935)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1265937)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1267842)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Physical Tests (QCLot: 1268362)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Physical Tests (QCLot: 1268594)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Anions and Nutrients (QCLot: 1265812)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1265813)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1265814)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1265815)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1265816)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1266054)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 1267461)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1267462)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1267473)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1268287)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1270974)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Organic / Inorganic Carbon (QCLot: 1268529)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Organic / Inorganic Carbon (QCLot: 1268529) - continued						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1266522)						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Total Metals (QCLot: 1267968)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 1265868)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1265868) - continued						
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 1266556)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 1268684)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Aggregate Organics (QCLot: 1272122)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Volatile Organic Compounds (QCLot: 1265856)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 1265857)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1265862)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 1265935)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	98.2	90.0	110	----
Physical Tests (QCLot: 1265936)									
pH	----	E108	----	pH units	6 pH units	100	97.0	103	----
Physical Tests (QCLot: 1265937)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 1267842)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	91.1	85.0	115	----
Physical Tests (QCLot: 1268362)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	95.7	85.0	115	----
Physical Tests (QCLot: 1268594)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
Anions and Nutrients (QCLot: 1265812)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1265813)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1265814)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	99.3	90.0	110	----
Anions and Nutrients (QCLot: 1265815)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1265816)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1266054)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 1267461)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1267462)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 1267473)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1268287)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1270974)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1268529)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	97.8	80.0	120	----
Total Metals (QCLot: 1266522)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	96.2	80.0	120	----
Total Metals (QCLot: 1267968)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	98.6	80.0	120	----
Dissolved Metals (QCLot: 1265868)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	96.3	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	93.8	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	94.3	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	95.3	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.5	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.5	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	97.3	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	99.9	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.3	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	97.5	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	92.9	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	92.6	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	100.0	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	114	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.8	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	100	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1265868) - continued									
Silver, dissolved	7440-22-4	E421	0.0001	mg/L	0.1 mg/L	89.7	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	94.7	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	97.6	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	96.0	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	92.4	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	91.9	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.6	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	107	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	95.0	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	99.6	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	93.1	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	94.9	80.0	120	----
Speciated Metals (QCLot: 1266556)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
Aggregate Organics (QCLot: 1268684)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	104	85.0	115	----
Aggregate Organics (QCLot: 1272122)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	99.3	85.0	115	----
Volatile Organic Compounds (QCLot: 1265856)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	98.2	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	85.6	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	95.9	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	94.6	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	105	70.0	130	----
Hydrocarbons (QCLot: 1265857)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	97.7	70.0	130	----
Hydrocarbons (QCLot: 1265862)									
F2 (C10-C16)	----	E601	100	µg/L	3820 µg/L	99.1	70.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1265812)										
EO2311190-003	Anonymous	Fluoride	16984-48-8	E235.F	0.963 mg/L	1 mg/L	96.3	75.0	125	----
Anions and Nutrients (QCLot: 1265813)										
EO2311190-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.48 mg/L	2.5 mg/L	99.3	75.0	125	----
Anions and Nutrients (QCLot: 1265814)										
EO2311190-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.455 mg/L	0.5 mg/L	91.0	75.0	125	----
Anions and Nutrients (QCLot: 1265815)										
EO2311190-003	Anonymous	Chloride	16887-00-6	E235.Cl	99.4 mg/L	100 mg/L	99.4	75.0	125	----
Anions and Nutrients (QCLot: 1265816)										
EO2311190-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	93.3 mg/L	100 mg/L	93.3	75.0	125	----
Anions and Nutrients (QCLot: 1266054)										
FC2303459-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1267461)										
EO2311171-001	Anonymous	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1267462)										
EO2311189-008	Primary Leachate Cell 4 (PC4)	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1267473)										
EO2311188-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1268287)										
EO2311182-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1270974)										
EO2311301-003	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0945 mg/L	0.1 mg/L	94.5	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1268529)										
FC2303468-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1266522)										
EO2311190-002	Anonymous	Chromium, total	7440-47-3	E420	0.0378 mg/L	0.04 mg/L	94.6	70.0	130	----
Total Metals (QCLot: 1267968)										



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1267968) - continued										
EO2311213-001	Anonymous	Mercury, total	7439-97-6	E508	0.000106 mg/L	0.0001 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 1265868)										
EO2311190-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.199 mg/L	0.2 mg/L	99.7	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0224 mg/L	0.02 mg/L	112	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0418 mg/L	0.04 mg/L	105	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00815 mg/L	0.01 mg/L	81.5	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00400 mg/L	0.004 mg/L	100	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0400 mg/L	0.04 mg/L	100.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		Iron, dissolved	7439-89-6	E421	2.03 mg/L	2 mg/L	101	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0170 mg/L	0.02 mg/L	85.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	1.04 mg/L	1 mg/L	104	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0394 mg/L	0.04 mg/L	98.4	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	12.9 mg/L	10 mg/L	129	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.21 mg/L	4 mg/L	105	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0526 mg/L	0.04 mg/L	131	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.80 mg/L	10 mg/L	98.0	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00308 mg/L	0.004 mg/L	77.0	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	21.8 mg/L	20 mg/L	109	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00346 mg/L	0.004 mg/L	86.6	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0207 mg/L	0.02 mg/L	103	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1265868) - continued										
EO2311190-002	Anonymous	Titanium, dissolved	7440-32-6	E421	0.0450 mg/L	0.04 mg/L	112	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0188 mg/L	0.02 mg/L	94.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00383 mg/L	0.004 mg/L	95.8	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.106 mg/L	0.1 mg/L	106	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.369 mg/L	0.4 mg/L	92.2	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
Speciated Metals (QCLot: 1266556)										
SK2306898-002	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0497 mg/L	0.05 mg/L	99.4	70.0	130	----
Aggregate Organics (QCLot: 1268684)										
EO2311188-002	Anonymous	Chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----
Aggregate Organics (QCLot: 1272122)										
EO2311188-002	Anonymous	Phenols, total (4AAP)	----	E562	0.0221 mg/L	0.02 mg/L	111	75.0	125	----
Volatile Organic Compounds (QCLot: 1265856)										
EO2311194-002	Anonymous	Benzene	71-43-2	E611A	97.2 µg/L	100 µg/L	97.2	50.0	140	----
		Ethylbenzene	100-41-4	E611A	81.7 µg/L	100 µg/L	81.7	50.0	140	----
		Toluene	108-88-3	E611A	95.3 µg/L	100 µg/L	95.3	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	188 µg/L	200 µg/L	94.2	50.0	140	----
		Xylene, o-	95-47-6	E611A	105 µg/L	100 µg/L	105	50.0	140	----



Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page 1 of 1

Canada Toll Free: 1 800 668 9878

Contact and company name below will appear on the final report

Report To: Clean Harbors Canada

Company: Clean Harbors Canada

Contact: Todd Webb, Stan Yuha

Phone: (780) 663-2513

Street: PO Box 390, 50114 Range Road 173

City/Province: Ryley, AB

Postal Code: T0B 4A0

Invoice To: Same as Report To

Company: Clean Harbors Canada

Contact: Stephanie Dennis

ALS Account # / Quote #: EO22-CHE3100-008

Job #: Primary Leachate Qtr 4 2023

PO / AFE: 238108

LSD: Table 4.4A

ALS Lab Work Order # (ALS use only): EO231189

Project Information

ALS Sample # (ALS use only)

Sample Identification and/or Coordinates (This description will appear on the report)

Primary Leachate Cell 1 (PC1)

Primary Leachate Cell 2 (PC2)

Primary Leachate Cell 3A (PC3A)

Primary Leachate Cell 3B (PC3B)

Primary Leachate Cell 3C (PC3C)

Primary Leachate Cell 3D (PC3D)

Primary Leachate Cell 3E (PC3E)

Primary Leachate Cell 4 (PC4)

Drinking Water (DW) Samples (client use)

Are samples taken from a Regulated DW System?

Are samples for human consumption/use?

SHIPMENT RELEASE (client use)

Released by: Todd Webb

Date: 5-Dec-23

Time: 5:12/2023

Received by: PP

Date: 5/12/2023

Time: 3:40

Reports / Recipients

Select Report Format: PDF EXCEL EDD (DIGITAL)

Merge QC/QCI Reports with COA YES NO N/A

Select Distribution: EMAIL MAIL FAX

Email 1 or Fax web.todd@cleanharbors.com

Email 2 yuha.stan@cleanharbors.com

Email 3

Select Invoice Distribution: EMAIL MAIL FAX

Email 1 or Fax denis.stephanie@cleanharbors.com

Email 2

Oil and Gas Required Fields (client use)

AFC/Center: PO#

Major/Minor Code: Routing Code:

Requisitioner: Location:

ALS Contact: Megha Walia

Sampler: Murray

Date (dd-mm-yy)

Time (hh:mm)

Sample Type

11-Dec-23 11:00 R

11-Dec-23 11:00 R

11-Dec-23 11:00 R

11-Dec-23 11:00 R

11-Dec-23 11:00 R

11-Dec-23 11:00 R

11-Dec-23 11:00 R

11-Dec-23 11:00 R

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Analyze as per Quote EO22-CHE3100-008, Table 4.4A package (Attached). Same as EO2308496.

Initial Shipment Reception (ALS use only)

Time: 13:43

Received by: 3:40

Date: 5-Dec-23

Time: 3:40

Received by: 3:40

Date: 5-Dec-23

Time: 3:40

Turnaround Time (TAT) Requested

Routine [R] if received by 3pm M-F - no surcharges apply

4 day [P4] if received by 3pm M-F - 20% rush surcharge mt

3 day [P3] if received by 3pm M-F - 25% rush surcharge mt

2 day [P2] if received by 3pm M-F - 50% rush surcharge mt

1 day [E] if received by 3pm M-F - 100% rush surcharge mt

Same day [E2] if received by 10am M-S - 200% rush surch

Additional fees may apply to rush requests on weeks

Date and Time Required for all EAP TATs:

For all tests with rush TATs requested, please

Indicate Filtered (F), Preserved (P) or Filtered

Analysis F

Telephone: +1 780 413 8227

Environmental Division

Edmonton

Work Order Reference

EO231189

NUMBER OF CONTAINERS

Table 4.4A Leachate

Table with columns for Date, Time, Sample Type, and various status indicators like 'SUSPECTED HAZARD'.

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A

INITIAL COOLER TEMPERATURES °C: 13.9 FINAL COOLER TEMPERATURES °C:

INITIAL SHIPMENT RECEPTION (ALS use only)

Time: 3:40

Received by: 3:40

Date: 5-Dec-23

Time: 3:40

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus

APPENDIX E

Volume of Leachate Removed

Date	Cell 1	Cell 2		Cell 3A		Cell 3B		Cell 3C		Cell 3D		Cell 3E		Cell 4	
2023-02-05															
2023-02-06		658		161		2273		433		5926		3020		24199	
2023-02-07		200		52		521		623		987		861		6000	
2023-02-08		194		52		512		380		2216		778		11282	
2023-02-09		153		22		391		539		786		672		8489	
2023-02-10		200		59		498		1713		1436		562		8928	
2023-02-11															
2023-02-12															
2023-02-13		0	F	0	F	1761		603		5901		2195		3478	
2023-02-14		395		0	F	644		0	F	1903		1608		12826	
2023-02-15		284		146		424		638		694		457		7422	
2023-02-16		205		6		474		638		1448		596		8168	
2023-02-17		229		101		526		600		1611		780		8462	
2023-02-18															
2023-02-19															
2023-02-20															
2023-02-21		823		203		2032		2207		6344		3349		33402	
2023-02-22		195		0		489		479		1451		707		7625	
2023-02-23		179		0		334		461		1344		522		6989	
2023-02-24		170		0		0		489		1330		528		6609	
2023-02-25															
2023-02-26															
2023-02-27		691		0		4565		1683		5413		3300		24845	
2023-02-28		217		0		852		505		1690		1137		5352	
2023-03-01		218		157		672		45		1519		758		7208	
2023-03-02		211		129		588		0	F	1572		650		7566	
2023-03-03		272		186		796		0	F	1809		1015		6263	
2023-03-04															
2023-03-05															
2023-03-06	100	538		199		1671		15	F	4296		1990		20219	
2023-03-07		152		66		487		9	F	1356		507		6537	
2023-03-08		335		52		572		0	F	1408		483		6678	
2023-03-09		172		75		552		0	F	1354		526		6663	
2023-03-10		192		57		738		0	F	1460		538		7022	

Date	Cell 1	Cell 2	Cell 3A	Cell 3B	Cell 3C	Cell 3D	Cell 3E	Cell 4	
2023-03-11									
2023-03-12									
2023-03-13		566	62	1929	0	F 4543	2	F 6833	
2023-03-14		265	49	803	2004	2412	0	F 0	F
2023-03-15		190	0	1481	877	1145	0	F 25524	
2023-03-16		187	0	638	1001	1498	17656	9348	
2023-03-17		173	111	603	961	1354	1260	6978	
2023-03-18									
2023-03-19									
2023-03-20		610	168	0	F 2869	3590	2167	18609	
2023-03-21		228	55	0	F 515	0	F 792	4290	
2023-03-22		214	0	6204	983	0	F 782	6104	
2023-03-23		140	0	1896	823	6394	821	8415	
2023-03-24		230	0	1121	949	2063	906	8039	
2023-03-25									
2023-03-26									
2023-03-27		574	0	2204	2712	4361	1844	24927	
2023-03-28		179	0	611	874	1329	494	7917	
2023-03-29		187	70	653	879	1465	536	9191	
2023-03-30		192	134	730	876	1641	696	6295	
2023-03-31		202	192	656	873	1670	716	0	F
2023-04-01									
2023-04-02									
2023-04-03		614	208	2150	2523	4976	2506	35195	
2023-04-04		180	57	645	797	1446	613	7580	
2023-04-05		189	51	633	782	1467	579	7536	
2023-04-06		185	49	593	785	1508	594	7776	
2023-04-07									
2023-04-08									
2023-04-09									
2023-04-10		884	208	2791	3246	7022	2906	47209	
2023-04-11		206	44	655	721	1036	744	12029	
2023-04-12		212	44	681	776	2123	765	1135	
2023-04-13		183	45	618	613	1079	749	11421	
2023-04-14		189	73	577	736	1541	1086	5911	

Date	Cell 1	Cell 2		Cell 3A		Cell 3B		Cell 3C		Cell 3D		Cell 3E		Cell 4	
2023-04-15															
2023-04-16															
2023-04-17		572		107		1934		2135		4535		4400		25000	E
2023-04-18		181		42		782		704		1758		2658		13430	
2023-04-19		248		45		712		731		1595		3807		34309	
2023-04-20		0	F	0	F	606		855		1799		3125		37341	
2023-04-21		0	F	0	F	487		589		874		2193		22261	
2023-04-22															
2023-04-23															
2023-04-24		0	F	0	F	1844		2205		4625		7036		66377	
2023-04-25		0	F	0	F	624		714		1637		2295		27974	
2023-04-26		0	F	0	F	646		706		1539		1822		15743	
2023-04-27		0	F	0	F	664		701		1546		1739		17063	
2023-04-28		0	F	0	F	630		667		1541		1587		12608	
2023-04-29															
2023-04-30															
2023-05-01		0	F	0	F	1785		1949		4576		3675		44512	
2023-05-02		0	F	0	F	679		617		1627		1511		9310	
2023-05-03		0	*	0	*	740		773		1964		1251		14292	
2023-05-04		0	*	0	*	611		643		1920		1332		13880	
2023-05-05		0	*	0	*	573		502		1165		1310		10490	
2023-05-06															
2023-05-07															
2023-05-08		0	*	0	*	1865		1818		5058		3077		19083	
2023-05-09		0	*	0	*	680		744		1661		1049		25629	
2023-05-10		0	*	0	*	549		448		1845		1690		9614	
2023-05-11		0	*	0	*	612		437		2223		2547		8940	
2023-05-12		0	*	0	*	579		353		1761		2557		10140	
2023-05-13															
2023-05-14															
2023-05-15		0	*	0	*	1585		1111		5339		7318		30751	
2023-05-16		0	*	0	*	756		410		2082		2940		10953	
2023-05-17		0	*	0	*	563		413		2010		2951		10820	
2023-05-18		0	*	0	*	601		424		1940		2754		10357	
2023-05-19		0	*	0	*	621		446		1946		2716		10341	

Date	Cell 1	Cell 2		Cell 3A		Cell 3B		Cell 3C		Cell 3D		Cell 3E		Cell 4	
2023-05-20															
2023-05-21															
2023-05-22															
2023-05-23		0	*	0	*	2590		1934		8345		11804		36243	
2023-05-24		0	*	0	*	656		494		2026		2945		12140	
2023-05-25		0	*	0	*	0		0		0		0		0	F
2023-05-26		589		0	*	0		0		0		5352		0	F
2023-05-27															
2023-05-28															
2023-05-29		325		0	*	0		11639		9523		8700		33781	
2023-05-30		225		0	*	5555		3619		1961		2870		7884	
2023-05-31		155		0	*	1290		3579		1961		2759		7181	
2023-06-01		164		0	*	639		3632		1893		2723		7078	
2023-06-02		0	*	0	*	537		4966		1809		2543		6744	
2023-06-03															
2023-06-04															
2023-06-05		0	*	0	*	1689		10801		5671		7413		22375	
2023-06-06		307		5852		627		3186		1965		2646		5429	
2023-06-07		386		3188		722		3230		1966		2572		6252	
2023-06-08		375		1287		602		3486		2031		2655		6565	
2023-06-09		233		597		672		1632		1991		2502		6589	
2023-06-10															
2023-06-11															
2023-06-12		692		1854		1873		10011		701		7814		19610	
2023-06-13		284		597		661		3271		1394		2569		6647	
2023-06-14		194		615		581		3321		2180		2901		6928	
2023-06-15		317		418		736		3310		2235		3051		7448	
2023-06-16		229		421		668		3214		2357		2686		7891	
2023-06-17															
2023-06-18															
2023-06-19		1034		1386		1940		10107		7728		8284		5547	
2023-06-20		341		1305		664		3776		2807		3409		61	F
2023-06-21		316		73		751		3476		2304		3157		18540	
2023-06-22	300	233		137		619		3498		2332		3378		18213	
2023-06-23		212		84		518		3549		2354		3450		18910	

Date	Cell 1	Cell 2		Cell 3A		Cell 3B		Cell 3C		Cell 3D		Cell 3E		Cell 4	
2023-06-24															
2023-06-25															
2023-06-26		676		301		1420		10438		6966		9969		53770	
2023-06-27		259		128		787		3569		2663		3384		15955	
2023-06-28		220		151		680		315		2588		3484		13538	
2023-06-29		243		287		660		0	F	2461		3243		13284	
2023-06-30		196		130		644		0	F	2414		3171		5195	
2023-07-01															
2023-07-02															
2023-07-03															
2023-07-04		832		782		2680		0	F	9626		12071		0	F
2023-07-05		194		237		615		0	F	2304		2633		7255	
2023-07-06		206		415		514		0	F	2397		2791		4	F
2023-07-07		0	F	1	F	0	F	0	F	2370		2851		19109	
2023-07-08															
2023-07-09															
2023-07-10		791		0	*	2807		17392		7231		8759		50085	
2023-07-11		393		0	*	811		6277		2441		3066		18945	
2023-07-12		323		0	*	859		6826		2543		4161		11475	
2023-07-13		221		0	*	706		6481		2450		4519		19623	
2023-07-14		226		1571		686		6475		2314		4515		19585	
2023-07-15															
2023-07-16															
2023-07-17		620		2016		2014		16953		6962		13032		11885	
2023-07-18		524		673		2150		1635		2762		4902		36	
2023-07-19		975		816		5969		7709		203		2264		72793	
2023-07-20		487		194		1533		7639		4513		12364		63491	
2023-07-21		408		607		862		11305		2619		7217		42812	
2023-07-22															
2023-07-23															
2023-07-24		19	F	0	F	2285		22210		7168		17550		53581	
2023-07-25		0	F	0	F	0	F	0	F	2267		1138		56979	
2023-07-26		0	F	0	F	10	F	7998		2181		11014		24605	
2023-07-27		0	F	0	F	0	F	0	F	2060		6410		3815	
2023-07-28		0	F	0	F	0	F	8117		1982		5373		56323	

Date	Cell 1	Cell 2		Cell 3A		Cell 3B		Cell 3C		Cell 3D		Cell 3E		Cell 4	
2023-07-29															
2023-07-30															
2023-07-31		0	F	0	F	0	F	21236		6107		15623		85600	
2023-08-01		0	F	0	F	0	F	6506		662		0	F	9912	
2023-08-02		0	F	0	F	0	F	6255		0	F	0	F	56775	
2023-08-03		0	F	0	F	0	F	6111		0	F	0	F	52717	
2023-08-04		728		2440		3930		5804		0	F	2	F	40052	
2023-08-05															
2023-08-06															
2023-08-07															
2023-08-08		0	F	0	F	4534		21791		0	F	38478		0	F
2023-08-09		0	F	0	F	0	F	2149		0	F	0	F	0	F
2023-08-10		0	F	0	F	0	F	0	F	0	F	0	F	14162	
2023-08-11		948		3744		4433		0	F	0	F	14493		58962	
2023-08-12															
2023-08-13															
2023-08-14		863		1515		3922		17878		18434		16454		73852	
2023-08-15		283		1068		739		9369		10661		4426		0	F
2023-08-16		304		934		958		7235		2335		4591		52101	
2023-08-17		273		141		666		7031		2271		4424		54817	
2023-08-18		358		518		836		4051		2480		4859		42107	
2023-08-19															
2023-08-20															
2023-08-21		957		185		1997		15700		6316		13443		9933	
2023-08-22		273		682		760		5457		2229		4507		0	F
2023-08-23		274		281		713		5349		2350		4566		56189	
2023-08-24		284		257		750		5222		2475		4636		61768	
2023-08-25		279		153		705		2254		2307		4321		34700	
2023-08-26															
2023-08-27															
2023-08-28		732		346		1820		0	F	7130		12813		0	F
2023-08-29		278		240		766		0	F	2438		2440		3974	
2023-08-30		310		398		767		0	F	2534		0	F	55836	
2023-08-31		262		934		632		0	F	2716		9942		53081	
2023-09-01		290		871		767		0	F	2568		4969		41334	

Date	Cell 1	Cell 2		Cell 3A		Cell 3B		Cell 3C		Cell 3D		Cell 3E		Cell 4	
2023-09-02															
2023-09-03															
2023-09-04															
2023-09-05		1128		148		2687		27513		9696		16107		21260	
2023-09-06		255		494		656		5924		2452		3721		10434	
2023-09-07		261		241		683		2375		2417		3777		0	F
2023-09-08		269		274		0	F	0	F	2342		3625		45898	
2023-09-09															
2023-09-10															
2023-09-11		746		444		3392		0	F	7190		10101		99361	
2023-09-12		262		206		757		0	F	2638		3640		4	F
2023-09-13		277		229		777		13998		2698		3674		21397	
2023-09-14		274		229		735		7887		2708		3471		6780	
2023-09-15		247		2167		685		5676		2551		3132		37993	
2023-09-16															
2023-09-17															
2023-09-18	350	0	F	0	F	0	F	16253		5950		10226		55886	
2023-09-19		100	F	108	F	0	F	145		773		3371		15842	
2023-09-20		0	F	0	F	0	F	0	F	886		3108		12423	
2023-09-21		0	F	0	F	0	F	6686		0	F	2823		8320	
2023-09-22		0	F	0	F	0	F	6974		1432		2759		19007	
2023-09-23															
2023-09-24															
2023-09-25		0	F	0	F	195		17146		0	F	9440		15712	
2023-09-26		0	F	0	F	0	F	4988		0	F	2760		5855	
2023-09-27		857		1533		5008		4834		0	F	4	F	6336	
2023-09-28		303		1273		2216		3202		0	F	5	F	7273	
2023-09-29															
2023-09-30															
2023-10-01															
2023-10-02		6	*	0	*	3561		6476		0	F	14994		92995	
2023-10-03		0	*	0	*	1	F	5906		0	F	6741		13218	
2023-10-04		0	*	0	*	1698		5468		0	F	3619		0	F
2023-10-05		0	*	271		679		9379		6900		3108		21573	
2023-10-06		410		2222		731		3646		1506		2586		14750	

Date	Cell 1	Cell 2		Cell 3A		Cell 3B		Cell 3C		Cell 3D		Cell 3E		Cell 4	
2023-11-11															
2023-11-12															
2023-11-13		0	*	0	*	55	F	19911		286		0	F	47426	
2023-11-14		0	*	0	*	0	F	4598		709		0	F	0	
2023-11-15		0	*	0	*	0	F	4508		710		0	F	21177	
2023-11-16		0	*	0	*	0	F	4463		659		0	F	11292	
2023-11-17		0	*	0	*	0	F	4437		2950		0	F	5771	
2023-11-18															
2023-11-19															
2023-11-20		1572		4070		8384		12026		8199		0	F	24182	
2023-11-21		279		526		867		0	F	2327		0	F	9457	
2023-11-22		241		472		667		0	F	2659		17012		3976	
2023-11-23		269		435		739		0	F	2488		15627		0	F
2023-11-24		243		400		683		0	F	2394		15725		0	F
2023-11-25															
2023-11-26															
2023-11-27		830		1103		2003		0	F	7768		13722		0	F
2023-11-28		273		351		765		0	F	2783		3208		0	F
2023-11-29		278		345		755		0	F	2676		3244		0	F
2023-11-30		285		397		737		0	F	2555		3123		0	F
2023-12-01		270		347		593		0	F	2696		3084		0	F
2023-12-02															
2023-12-03															
2023-12-04	100	606		738		966		0	F	4312		10300		0	F
2023-12-05		0	F	82		130		0	F	0	F	2889		0	F
2023-12-06		0	F	0	F	0	F	10837		0	F	2939		0	F
2023-12-07		0	F	0	F	0	F	9818		0	F	2924		13776	
2023-12-08		0	F	0	F	0	F	9166		0	F	2926		6770	
2023-12-09															
2023-12-10															
2023-12-11		1360		2118		7396		11625		0	F	8154		60007	
2023-12-12		285		483		953		0	*	6962		2567		0	
2023-12-13		0	*	0	*	795		0	*	7118		2734		37668	
2023-12-14		425		541		795		0	*	7640		3082		18486	
2023-12-15		283		469		699		0	*	6983		2629		13110	

APPENDIX F

Leak Detection Liquid Analysis

Quarter 4

Clean Harbors Canada, Inc. - Approval 10348-02							
2023 Annual Report							
Section 1.5 Secondary Leachate							
Field pH & Electrical Conductivity Measurements							
Qtr 1				Qtr 2			
Date	pH	Conductivity (uS/cm)		Date	pH	Conductivity (uS/cm)	
Cell 1	2023-03-06	7.2	12460	Cell 1	2023-06-22	7.2	12480
Cell 2	2023-03-06	4.1	16330	Cell 2	2023-06-22	5.3	12150
Cell 3A	2023-03-06	7.1	13860	Cell 3A	2023-06-22	7.3	13440
Cell 3B	2023-03-06	9.1	41330	Cell 3B	2023-06-22	9.3	46260
Cell 3C	2023-03-14	7.8	11710	Cell 3C	2023-06-22	7.7	11530
Cell 3D	2023-03-06	7.8	14250	Cell 3D	2023-06-22	7.6	13630
Cell 3E	2023-03-06	8.0	5872	Cell 3E	2023-06-22	8.0	6355
Cell 4	2023-03-06	7.5	16220	Cell 4	2023-06-22	7.6	15890
Qtr 3				Qtr 4			
Date	pH	Conductivity (uS/cm)		Date	pH	Conductivity (uS/cm)	
Cell 1	2023-09-18	7.3	10260	Cell 1	2023-12-04	7.3	12580
Cell 2	2023-09-18	6.3	11800	Cell 2	2023-12-04	6.3	13840
Cell 3A	2023-09-18	7.2	11800	Cell 3A	2023-12-04	7.2	14130
Cell 3B	2023-09-18	8.6	17170	Cell 3B	2023-12-04	9.0	33530
Cell 3C	2023-09-18	7.5	9750	Cell 3C	2023-12-04	7.6	11310
Cell 3D	2023-09-18	7.4	11680	Cell 3D	2023-12-04	7.5	13720
Cell 3E	2023-09-18	8.2	4346	Cell 3E	2023-12-04	7.7	5154
Cell 4	2023-09-18	7.6	12230	Cell 4	2023-12-04	7.6	14820

APPENDIX F

Leak Detection Liquid Analysis

Quarter 1



CERTIFICATE OF ANALYSIS

Work Order	: EO2301873	Page	: 1 of 18
Amendment	: 1		
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 1 2023	Date Samples Received	: 07-Mar-2023 12:10
PO	: Pending	Date Analysis	: 07-Mar-2023
		Commenced	
C-O-C number	: ----	Issue Date	: 30-May-2023 11:54
Sampler	: Murray		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 7		
No. of samples analysed	: 7		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Christian Murera	Lab Analyst	Organics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Daniel Nguyen	Lab Assistant	Metals, Edmonton, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Kari Mulroy	Lab Supervisor - Environmental	Organics, Edmonton, Alberta
Leah Yee	Lab Assistant	Inorganics, Edmonton, Alberta
Muzammil Ali	Lab Analyst	Inorganics, Edmonton, Alberta
Remy Gatabazi	Lab Analyst	Organics, Edmonton, Alberta
Samantha Mayor	Lab Assistant	Inorganics, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Inorganics, Edmonton, Alberta
Yan Zhang	Lab Analyst	Organics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
 LOR: Limit of Reporting (detection limit).
 Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.
 Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Unit	Description
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
IB:INT	Ion Balance Reviewed: Imbalance is due to interference or non-measured component.
SFP	Sample was filtered and preserved at the laboratory.
SP	Sample was preserved at the laboratory.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.



Analytical Results

EO2301873-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 1 (SC1)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	164	10.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	135	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	11600	1.0	µS/cm	E100/EO	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	2370	0.50	mg/L	EC100/EO	-	10-Mar-2023	-
pH	----	7.50	0.10	pH units	E108/EO	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	9010	1.0	mg/L	EC103/EO	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	108	3.0	mg/L	E160/EO	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	7.02	0.250	mg/L	E298/EO	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	1910 ^{DLDS.}	10.0	mg/L	E235.Cl/EO	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	0.891 ^{DLDS.}	0.400	mg/L	E235.F/EO	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS.}	0.400	mg/L	E235.NO3/EO	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS.}	0.200	mg/L	E235.NO2/EO	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	0.409	0.0100	mg/L	E372-S/EO	09-Mar-2023	10-Mar-2023	857245
Phosphorus, total dissolved	7723-14-0	0.395	0.0100	mg/L	E375-U/EO	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	3420 ^{DLDS.}	6.00	mg/L	E235.SO4/EO	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	99.2	20.0	mg/L	E318/EO	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	363	10.0	mg/L	E358-L/EO	08-Mar-2023	10-Mar-2023	856872
Ion Balance								
Ion balance (cations/anions)	----	118 ^{IB.INT.}	0.010	%	EC101/EO	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.140	0.00500	mg/L	E420/EO	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	0.000153	0.0000500	mg/L	E508/EO	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0373	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	0.00109	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.0103	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.125	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLM.}	0.000200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLM.}	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	10.8	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.000346	0.0000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	560	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	<0.000100 ^{DLM.}	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.137	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	2.44	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	0.0116	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	52.2	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	0.0265	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	0.599	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	236	0.0500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301873-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 1 (SC1)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/LOT
Dissolved Metals								
Manganese, dissolved	7439-96-5	37.4	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Molybdenum, dissolved	7439-98-7	0.0173	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	12.4	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	0.811	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	27.3	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.00555	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00141	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	9.43	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.000100	DLM, 0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	2290	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	3.55	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	1280	5.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.00200	DLM, 0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000100	DLM, 0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00100	DLM, 0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00100	DLM, 0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.00526	0.00300	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	<0.00100	DLM, 0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.0412	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	0.0763	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	0.932	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.0140	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	1040	10	mg/L	E559-L/EO	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	0.0012	0.0010	mg/L	E562/EO	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	2.35	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	150	100	µg/L	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	148	100	µg/L	EC580/EO	-	11-Mar-2023	-
F2 (C10-C16)	----	500	100	µg/L	E601/EO	08-Mar-2023	08-Mar-2023	855827
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	96.2	1.0	%	E601/EO	08-Mar-2023	08-Mar-2023	855827
Dichlorotoluene, 3,4-	95-75-0	83.7	1.0	%	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	101	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	106	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2301873-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 2 (SC2)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	17600	1.0	µS/cm	E100/EO	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	2300	1	mg/L	EC100/EO	-	10-Mar-2023	-
pH	----	4.12	0.10	pH units	E108/EO	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	14400	1.0	mg/L	EC103/EO	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	139	3.0	mg/L	E160/EO	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	9.15	0.250	mg/L	E298/EO	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	312 ^{D.L.S.}	10.0	mg/L	E235.Cl/EO	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	5.49 ^{D.L.S.}	0.400	mg/L	E235.F/EO	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{D.L.S.}	0.400	mg/L	E235.NO3/EO	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{D.L.S.}	0.200	mg/L	E235.NO2/EO	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	0.581	0.0100	mg/L	E372-S/EO	09-Mar-2023	10-Mar-2023	857245
Phosphorus, total dissolved	7723-14-0	0.107	0.0100	mg/L	E375-U/EO	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	9400 ^{D.L.S.}	6.00	mg/L	E235.SO4/EO	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	13.0	2.00	mg/L	E318/EO	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	61.1	0.50	mg/L	E358-L/EO	08-Mar-2023	08-Mar-2023	856872
Ion Balance								
Ion balance (cations/anions)	----	104	0.010	%	EC101/EO	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0721	0.0100	mg/L	E420/EO	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{D.L.M.}	0.0000500	mg/L	E508/EO	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	23.1	0.0200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	<0.00200 ^{D.L.M.}	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.00475	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.0947	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	0.00262	0.000400	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00100 ^{D.L.M.}	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	1.22	0.200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.000484	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	470	1.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.000809	0.000200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.0393	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.0372	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	0.0177	0.00400	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	10.3	0.200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.00100 ^{D.L.M.}	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301873-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 2 (SC2)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Lithium, dissolved	7439-93-2	0.630	0.0200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	274	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	17.6	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Molybdenum, dissolved	7439-98-7	0.105	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.175	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	<1.00	DLM, 1.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	34.4	1.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.0404	0.00400	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00104	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	24.8	1.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.000200	DLM, 0.000200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	3730	1.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	7.94	0.00400	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	3600	10.0	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.00400	DLM, 0.00400	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000200	DLM, 0.000200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00200	DLM, 0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00200	DLM, 0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	<0.00600	DLM, 0.00600	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.00562	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.0364	0.000200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	<0.0100	DLM, 0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	0.417	0.0200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	<0.00400	DLM, 0.00400	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	169	10	mg/L	E559-L/EO	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	0.0011	0.0010	mg/L	E562/EO	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	11-Mar-2023	-
F2 (C10-C16)	----	120	100	µg/L	E601/EO	08-Mar-2023	08-Mar-2023	855827
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	99.6	1.0	%	E601/EO	08-Mar-2023	08-Mar-2023	855827
Dichlorotoluene, 3,4-	95-75-0	75.6	1.0	%	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								



Analytical Results

EO2301873-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 2 (SC2)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	110	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	104	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2301873-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3A (SC3A)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	933	10.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	765	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	12600	1.0	µS/cm	E100/EO	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	2400	0.50	mg/L	EC100/EO	-	10-Mar-2023	-
pH	----	7.45	0.10	pH units	E108/EO	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	15500	1.0	mg/L	EC103/EO	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	81.4	3.0	mg/L	E160/EO	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	4.71	0.100	mg/L	E298/EO	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	364 ^{D.L.D.S.}	10.0	mg/L	E235.Cl/EO	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	1.23 ^{D.L.D.S.}	0.400	mg/L	E235.F/EO	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{D.L.D.S.}	0.400	mg/L	E235.NO3/EO	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{D.L.D.S.}	0.200	mg/L	E235.NO2/EO	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	0.126	0.0100	mg/L	E372-S/EO	09-Mar-2023	10-Mar-2023	857245
Phosphorus, total dissolved	7723-14-0	0.0399	0.0010	mg/L	E375-U/EO	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	10400 ^{D.L.D.S.}	6.00	mg/L	E235.SO4/EO	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	9.95	1.00	mg/L	E318/EO	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	79.7	0.50	mg/L	E358-L/EO	08-Mar-2023	08-Mar-2023	856872
Ion Balance								
Ion balance (cations/anions)	----	80.6 ^{IB.INT.}	0.010	%	EC101/EO	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.00616	0.00500	mg/L	E420/EO	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{D.L.M.}	0.0000500	mg/L	E508/EO	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.286	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	0.00129	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.00284	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.0602	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301873-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3A (SC3A)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.000200	DLM, 0.000200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.000500	DLM, 0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	0.205	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.000117	0.0000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	483	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	<0.000100	DLM, 0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	<0.00500	DLM, 0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.00858	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	0.00669	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	0.278	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.000500	DLM, 0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	0.596	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	290	0.0500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	4.96	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Molybdenum, dissolved	7439-98-7	0.266	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.162	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	<0.500	DLM, 0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	36.6	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.0332	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.000891	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	7.29	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.000100	DLM, 0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	3350	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	6.45	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	3350	5.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.00200	DLM, 0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000100	DLM, 0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00100	DLM, 0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	0.00375	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	<0.00300	DLM, 0.00300	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.00688	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.0760	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	<0.00500	DLM, 0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	0.171	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.00381	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	203	10	mg/L	E559-L/EO	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	<0.0010	0.0010	mg/L	E562/EO	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	1.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	0.99	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765



Analytical Results

EO2301873-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3A (SC3A)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	0.44	0.40	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	11-Mar-2023	-
F2 (C10-C16)	----	110	100	µg/L	E601/EO	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	96.2	1.0	%	E601/EO	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	71.3	1.0	%	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	104	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	104	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2301873-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3B (SC3B)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	7460	10.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	2600	10.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	10400	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	38400	1.0	µS/cm	E100/EO	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	379	5	mg/L	EC100/EO	-	10-Mar-2023	-
pH	----	9.10	0.10	pH units	E108/EO	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	33300	1.0	mg/L	EC103/EO	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	250	3.0	mg/L	E160/EO	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	1430 ^{SP}	25.0	mg/L	E298/EO	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	11100 ^{D.LDS.}	10.0	mg/L	E235.Cl/EO	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	5.47 ^{D.LDS.}	0.400	mg/L	E235.F/EO	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	<0.400 ^{D.LDS.}	0.400	mg/L	E235.NO ₃ /EO	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{D.LDS.}	0.200	mg/L	E235.NO ₂ /EO	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	5.47 ^{SP}	0.100	mg/L	E372-S/EO	09-Mar-2023	10-Mar-2023	857245
Phosphorus, total dissolved	7723-14-0	4.18 ^{SFP}	0.100	mg/L	E375-U/EO	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	2560 ^{D.LDS.}	6.00	mg/L	E235.SO ₄ /EO	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	2050 ^{SP}	50.0	mg/L	E318/EO	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								



Analytical Results

EO2301873-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3B (SC3B)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	1100 ^{SFP}	50.0	mg/L	E358-L/EO	08-Mar-2023	10-Mar-2023	856872
Ion Balance								
Ion balance (cations/anions)	----	88.8	0.010	%	EC101/EO	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.592	0.0500	mg/L	E420/EO	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.100 ^{DLM}	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	<0.0100 ^{DLM}	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.0459	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.387	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.00200 ^{DLM}	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.00500 ^{DLM}	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	121	1.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.00195	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	26.7	5.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.0966	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.428	0.0500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.0145	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	<0.0200 ^{DLM}	0.0200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	1.12	1.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.00500 ^{DLM}	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	8.01	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	75.9	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	0.794	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Molybdenum, dissolved	7439-98-7	6.34	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.884	0.0500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	8.56	5.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	2560	5.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	4.06	0.0200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.0450	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	28.1	5.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.00100 ^{DLM}	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	7710	5.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	0.991	0.0200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	941	50.0	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.0200 ^{DLM}	0.0200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.00100 ^{DLM}	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.0100 ^{DLM}	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.0100 ^{DLM}	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.114	0.0300	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	10.4	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.00720	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	0.724	0.0500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	<0.100 ^{DLM}	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301873-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3B (SC3B)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Zirconium, dissolved	7440-67-7	0.0967	0.0200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	11300 ^{DLHC}	100	mg/L	E559-L/EO	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	12.0 ^{SP}	0.200	mg/L	E562/EO	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	2.60	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	1.48	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	1210	100	µg/L	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	1200	319	µg/L	EC580/EO	-	11-Mar-2023	-
F2 (C10-C16)	----	1690	100	µg/L	E601/EO	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	102	1.0	%	E601/EO	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	71.9	1.0	%	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	112	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	113	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2301873-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3D (SC3D)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	445	10.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO3)	----	365	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	13200	1.0	µS/cm	E100/EO	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO3), dissolved	----	3090	0.50	mg/L	EC100/EO	-	10-Mar-2023	-
pH	----	7.97	0.10	pH units	E108/EO	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	10500	1.0	mg/L	EC103/EO	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	68.2	3.0	mg/L	E160/EO	-	14-Mar-2023	862291
Anions and Nutrients								



Analytical Results

EO2301873-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3D (SC3D)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	0.0468	0.0050	mg/L	E298/EO	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	3050 ^{DLDS}	10.0	mg/L	E235.CI/EO	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	3.78 ^{DLDS}	0.400	mg/L	E235.F/EO	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	447 ^{DLDS}	0.400	mg/L	E235.NO3/EO	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	447	0.447	mg/L	EC235.N+N/EO	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2/EO	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	0.819	0.0100	mg/L	E372-S/EO	09-Mar-2023	10-Mar-2023	857245
Phosphorus, total dissolved	7723-14-0	0.678	0.0100	mg/L	E375-U/EO	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO4)	14808-79-8	1950 ^{DLDS}	6.00	mg/L	E235.SO4/EO	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	1.47 ^{TKNI}	0.200	mg/L	E318/EO	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	44.4	0.50	mg/L	E358-L/EO	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	93.4	0.010	%	EC101/EO	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.00500 ^{DLM}	0.00500	mg/L	E420/EO	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0100 ^{DLM}	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	<0.00100 ^{DLM}	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.0199	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.156	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLM}	0.000200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLM}	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	33.0	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.00186	0.0000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	585	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	<0.000100 ^{DLM}	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	<0.00500 ^{DLM}	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.00404	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	0.0218	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	0.106	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.000500 ^{DLM}	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	1.08	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	395	0.0500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	0.689	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Molybdenum, dissolved	7439-98-7	5.61	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.976	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	0.845	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	238	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.0480	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00780	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	11.6	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.000100 ^{DLM}	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	2010	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301873-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3D (SC3D)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Strontium, dissolved	7440-24-6	2.99	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	690	5.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.00200	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000100	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00100	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00100	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.00512	0.00300	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.00394	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.00886	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	36.7	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	0.0658	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.00212	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	218	10	mg/L	E559-L/EO	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	<0.0010	0.0010	mg/L	E562/EO	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	11-Mar-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	99.8	1.0	%	E601/EO	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	80.7	1.0	%	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	110	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	105	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2301873-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3E (SC3E)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
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Analytical Results

EO2301873-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3E (SC3E)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	600	10.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	492	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	5660	1.0	µS/cm	E100/EO	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	756	0.50	mg/L	EC100/EO	-	10-Mar-2023	-
pH	----	8.19	0.10	pH units	E108/EO	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	4670	1.0	mg/L	EC103/EO	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	162	3.0	mg/L	E160/EO	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	4.22	0.100	mg/L	E298/EO	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	336 ^{D.L.S.}	5.00	mg/L	E235.Cl/EO	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	1.59 ^{D.L.S.}	0.200	mg/L	E235.F/EO	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	12.9 ^{D.L.S.}	0.200	mg/L	E235.NO3/EO	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	13.3	0.224	mg/L	EC235.N+N/EO	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	0.437 ^{D.L.S.}	0.100	mg/L	E235.NO2/EO	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	0.141	0.0100	mg/L	E372-S/EO	09-Mar-2023	10-Mar-2023	857245
Phosphorus, total dissolved	7723-14-0	0.146	0.0100	mg/L	E375-U/EO	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	2500 ^{D.L.S.}	3.00	mg/L	E235.SO4/EO	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	6.63	1.00	mg/L	E318/EO	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	34.6	0.50	mg/L	E358-L/EO	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	92.0	0.010	%	EC101/EO	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.00916	0.00250	mg/L	E420/EO	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{D.L.M.}	0.0000500	mg/L	E508/EO	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0227	0.0050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	0.00088	0.00050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.00148	0.00050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.111	0.00050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.000100 ^{D.L.M.}	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.000250 ^{D.L.M.}	0.000250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	1.22	0.050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.000289	0.0000250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	123	0.250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	<0.000050 ^{D.L.M.}	0.000050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	<0.00250 ^{D.L.M.}	0.00250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.00079	0.00050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	0.0371	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	<0.050 ^{D.L.M.}	0.050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	0.000270	0.000250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lithium, dissolved	7439-93-2	0.288	0.0050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	109	0.0250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301873-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3E (SC3E)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Dissolved Metals								
Manganese, dissolved	7439-96-5	0.0666	0.00050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Molybdenum, dissolved	7439-98-7	0.479	0.000250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.0858	0.00250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	<0.250	DLM, 0.250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	30.2	0.250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.00751	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00154	0.000250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	5.50	0.250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.000050	DLM, 0.000050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	1160	0.250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	1.71	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	831	2.50	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.00100	DLM, 0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000050	DLM, 0.000050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00050	DLM, 0.00050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00050	DLM, 0.00050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.00212	0.00150	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.00074	0.00050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.0390	0.000050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	0.0673	0.00250	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	0.0481	0.0050	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.00202	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	93	10	mg/L	E559-L/EO	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	<0.0010	0.0010	mg/L	E562/EO	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	11-Mar-2023	-
F2 (C10-C16)	----	120	100	µg/L	E601/EO	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	100	1.0	%	E601/EO	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	96.7	1.0	%	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	116	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	107	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2301873-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 4 (SC4)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	1980	10.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Alkalinity, total (as CaCO ₃)	----	1620	1.0	mg/L	E290/EO	08-Mar-2023	08-Mar-2023	855300
Conductivity	----	14800	1.0	µS/cm	E100/EO	08-Mar-2023	08-Mar-2023	855302
Hardness (as CaCO ₃), dissolved	----	2460	0.50	mg/L	EC100/EO	-	10-Mar-2023	-
pH	----	7.83	0.10	pH units	E108/EO	08-Mar-2023	08-Mar-2023	855301
Solids, total dissolved [TDS], calculated	----	14000	1.0	mg/L	EC103/EO	-	08-Mar-2023	-
Solids, total suspended [TSS]	----	83.6	3.0	mg/L	E160/EO	-	14-Mar-2023	862291
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	57.9	1.00	mg/L	E298/EO	07-Mar-2023	08-Mar-2023	855346
Chloride	16887-00-6	1760 ^{D.L.S.}	10.0	mg/L	E235.Cl/EO	07-Mar-2023	07-Mar-2023	855369
Fluoride	16984-48-8	2.68 ^{D.L.S.}	0.400	mg/L	E235.F/EO	07-Mar-2023	07-Mar-2023	855370
Nitrate (as N)	14797-55-8	13.5 ^{D.L.S.}	0.400	mg/L	E235.NO3/EO	07-Mar-2023	07-Mar-2023	855371
Nitrate + Nitrite (as N)	----	14.0	0.447	mg/L	EC235.N+N/EO	-	08-Mar-2023	-
Nitrite (as N)	14797-65-0	0.495 ^{D.L.S.}	0.200	mg/L	E235.NO2/EO	07-Mar-2023	07-Mar-2023	855372
Phosphorus, total	7723-14-0	0.859	0.0100	mg/L	E372-S/EO	09-Mar-2023	10-Mar-2023	857245
Phosphorus, total dissolved	7723-14-0	0.713	0.0100	mg/L	E375-U/EO	09-Mar-2023	10-Mar-2023	857247
Sulfate (as SO ₄)	14808-79-8	6500 ^{D.L.S.}	6.00	mg/L	E235.SO4/EO	07-Mar-2023	07-Mar-2023	855373
Kjeldahl nitrogen, total [TKN]	----	68.1	10.0	mg/L	E318/EO	11-Mar-2023	11-Mar-2023	858832
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	166	1.00	mg/L	E358-L/EO	10-Mar-2023	10-Mar-2023	859593
Ion Balance								
Ion balance (cations/anions)	----	98.2	0.010	%	EC101/EO	-	08-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.00912	0.00500	mg/L	E420/EO	09-Mar-2023	09-Mar-2023	855841
Mercury, total	7439-97-6	<0.0000500 ^{D.L.M.}	0.0000500	mg/L	E508/EO	09-Mar-2023	09-Mar-2023	857347
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0100 ^{D.L.M.}	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Antimony, dissolved	7440-36-0	0.00247	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Arsenic, dissolved	7440-38-2	0.00595	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Barium, dissolved	7440-39-3	0.0670	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Beryllium, dissolved	7440-41-7	<0.000200 ^{D.L.M.}	0.000200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Bismuth, dissolved	7440-69-9	<0.000500 ^{D.L.M.}	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Boron, dissolved	7440-42-8	8.67	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cadmium, dissolved	7440-43-9	0.00194	0.0000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Calcium, dissolved	7440-70-2	381	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cesium, dissolved	7440-46-2	0.00107	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Chromium, dissolved	7440-47-3	0.00800	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Cobalt, dissolved	7440-48-4	0.00829	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Copper, dissolved	7440-50-8	0.00433	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Iron, dissolved	7439-89-6	0.509	0.100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Lead, dissolved	7439-92-1	<0.000500 ^{D.L.M.}	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202



Analytical Results

EO2301873-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 4 (SC4)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Lithium, dissolved	7439-93-2	0.577	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Magnesium, dissolved	7439-95-4	367	0.0500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Manganese, dissolved	7439-96-5	1.51	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Molybdenum, dissolved	7439-98-7	5.93	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Nickel, dissolved	7440-02-0	0.188	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Phosphorus, dissolved	7723-14-0	0.842	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Potassium, dissolved	7440-09-7	106	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Rubidium, dissolved	7440-17-7	0.0597	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Selenium, dissolved	7782-49-2	0.00309	0.000500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silicon, dissolved	7440-21-3	8.04	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Silver, dissolved	7440-22-4	<0.000100	DLM, 0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sodium, dissolved	7440-23-5	3640	0.500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Strontium, dissolved	7440-24-6	5.48	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Sulfur, dissolved	7704-34-9	2250	5.00	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tellurium, dissolved	13494-80-9	<0.00200	DLM, 0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thallium, dissolved	7440-28-0	<0.000100	DLM, 0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Thorium, dissolved	7440-29-1	<0.00100	DLM, 0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tin, dissolved	7440-31-5	<0.00100	DLM, 0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Titanium, dissolved	7440-32-6	0.00992	0.00300	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Tungsten, dissolved	7440-33-7	0.141	0.00100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Uranium, dissolved	7440-61-1	0.104	0.000100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Vanadium, dissolved	7440-62-2	0.108	0.00500	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zinc, dissolved	7440-66-6	0.0499	0.0100	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Zirconium, dissolved	7440-67-7	0.0325	0.00200	mg/L	E421/EO	09-Mar-2023	09-Mar-2023	856202
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	09-Mar-2023	856202
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	08-Mar-2023	856108
Aggregate Organics								
Chemical oxygen demand [COD]	----	431	10	mg/L	E559-L/EO	-	09-Mar-2023	857594
Phenols, total (4AAP)	----	0.0088	0.0010	mg/L	E562/EO	07-Mar-2023	08-Mar-2023	855241
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	11-Mar-2023	-
F2 (C10-C16)	----	250	100	µg/L	E601/EO	08-Mar-2023	09-Mar-2023	856138
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	99.5	1.0	%	E601/EO	08-Mar-2023	09-Mar-2023	856138
Dichlorotoluene, 3,4-	95-75-0	83.1	1.0	%	E581.F1/EO	08-Mar-2023	08-Mar-2023	855764
Volatile Organic Compounds Surrogates								



Analytical Results

EO2301873-007

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: Secondary Leachate Cell 4 (SC4)

Client sampling date / time: 06-Mar-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	108	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765
Difluorobenzene, 1,4-	540-36-3	104	1.0	%	E611A/EO	08-Mar-2023	08-Mar-2023	855765

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2301873</p> <p>Amendment : 1</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Secondary Leachate Qtr 1 2023</p> <p>PO : Pending</p> <p>C-O-C number : ----</p> <p>Sampler : Murray</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 7</p> <p>No. of samples analysed : 7</p>	<p style="text-align: right;">Page : 1 of 28</p> <p>Laboratory : Edmonton - Environmental</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 07-Mar-2023 12:10</p> <p>Issue Date : 30-May-2023 11:54</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E559-L	06-Mar-2023	----	----	----		09-Mar-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry											
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E562	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E298	06-Mar-2023	07-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Secondary Leachate Cell 3B (SC3B)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 3D (SC3D)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 3E (SC3E)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 4 (SC4)	E235.Cl	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 1 (SC1)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 2 (SC2)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3A (SC3A)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3B (SC3B)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3D (SC3D)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3E (SC3E)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE Secondary Leachate Cell 4 (SC4)	E235.F	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 3B (SC3B)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 3D (SC3D)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 3E (SC3E)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 4 (SC4)	E235.NO3	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3B (SC3B)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3D (SC3D)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3E (SC3E)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 4 (SC4)	E235.NO2	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	3 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Sulfate in Water by IC										
HDPE Secondary Leachate Cell 3B (SC3B)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE Secondary Leachate Cell 3D (SC3D)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE Secondary Leachate Cell 3E (SC3E)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE Secondary Leachate Cell 4 (SC4)	E235.SO4	06-Mar-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	1 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E375-U	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E318	06-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	5 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E372-S	06-Mar-2023	09-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Secondary Leachate Cell 1 (SC1)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Secondary Leachate Cell 2 (SC2)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Secondary Leachate Cell 3A (SC3A)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Secondary Leachate Cell 3B (SC3B)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Secondary Leachate Cell 3D (SC3D)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Secondary Leachate Cell 3E (SC3E)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Secondary Leachate Cell 4 (SC4)	E421	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 1 (SC1)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 2 (SC2)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3A (SC3A)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3B (SC3B)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3D (SC3D)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3E (SC3E)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 4 (SC4)	E581.F1	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 1 (SC1)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	08-Mar-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 2 (SC2)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	08-Mar-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3A (SC3A)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3B (SC3B)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3D (SC3D)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3E (SC3E)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 4 (SC4)	E601	06-Mar-2023	08-Mar-2023	14 days	2 days	✔	09-Mar-2023	40 days	1 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E358-L	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E358-L	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E358-L	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E358-L	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E358-L	06-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 1 (SC1)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 2 (SC2)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 3A (SC3A)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 3B (SC3B)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 3D (SC3D)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 3E (SC3E)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 4 (SC4)	E290	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔	
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 1 (SC1)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 2 (SC2)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 3A (SC3A)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 3B (SC3B)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 3D (SC3D)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 3E (SC3E)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 4 (SC4)	E100	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	28 days	2 days	✓	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 1 (SC1)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 2 (SC2)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3A (SC3A)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3B (SC3B)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3D (SC3D)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3E (SC3E)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 4 (SC4)	E108	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	0.25 hrs	0.26 hrs	*	EHTR-FM
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 1 (SC1)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 2 (SC2)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3A (SC3A)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3B (SC3B)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3D (SC3D)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3E (SC3E)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 4 (SC4)	E160	06-Mar-2023	----	----	----		14-Mar-2023	7 days	8 days	*	EHT



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 1 (SC1)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 2 (SC2)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3A (SC3A)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3B (SC3B)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3D (SC3D)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3E (SC3E)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 4 (SC4)	E532A	06-Mar-2023	----	----	----		08-Mar-2023	28 days	2 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Secondary Leachate Cell 1 (SC1)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Secondary Leachate Cell 2 (SC2)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3A (SC3A)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3B (SC3B)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3D (SC3D)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3E (SC3E)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 4 (SC4)	E508	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	28 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 1 (SC1)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 2 (SC2)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 3A (SC3A)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 3B (SC3B)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 3D (SC3D)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✓	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 3E (SC3E)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✓	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 4 (SC4)	E420	06-Mar-2023	09-Mar-2023	----	----		09-Mar-2023	180 days	3 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 1 (SC1)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 2 (SC2)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3A (SC3A)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3B (SC3B)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3D (SC3D)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3E (SC3E)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Secondary Leachate Cell 4 (SC4)	E611A	06-Mar-2023	08-Mar-2023	----	----		08-Mar-2023	14 days	2 days	✔

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	855300	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	855346	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	855765	1	20	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	855764	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	857594	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	855369	1	20	5.0	5.0	✔
Conductivity in Water	E100	855302	1	20	5.0	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	856108	1	15	6.6	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	856202	1	15	6.6	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	856872	2	37	5.4	5.0	✔
Fluoride in Water by IC	E235.F	855370	1	18	5.5	5.0	✔
Nitrate in Water by IC	E235.NO3	855371	1	18	5.5	5.0	✔
Nitrite in Water by IC	E235.NO2	855372	1	18	5.5	5.0	✔
pH by Meter	E108	855301	1	20	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	855241	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	855373	1	18	5.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	857247	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	858832	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	857347	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	855841	1	15	6.6	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	857245	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	862291	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	855300	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	855346	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	855765	1	20	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	855764	1	20	5.0	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	855827	2	35	5.7	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	857594	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	855369	1	20	5.0	5.0	✔
Conductivity in Water	E100	855302	1	20	5.0	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	856108	1	15	6.6	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	856202	1	15	6.6	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	856872	2	37	5.4	5.0	✔
Fluoride in Water by IC	E235.F	855370	1	18	5.5	5.0	✔
Nitrate in Water by IC	E235.NO3	855371	1	18	5.5	5.0	✔



Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	855372	1	18	5.5	5.0	✓
pH by Meter	E108	855301	1	20	5.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	855241	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	855373	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	857247	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	858832	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	857347	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	855841	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	857245	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	862291	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	855300	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	855346	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	855765	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	855764	1	20	5.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	855827	2	35	5.7	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	857594	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	855369	1	20	5.0	5.0	✓
Conductivity in Water	E100	855302	1	20	5.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	856108	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	856202	1	15	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	856872	2	37	5.4	5.0	✓
Fluoride in Water by IC	E235.F	855370	1	18	5.5	5.0	✓
Nitrate in Water by IC	E235.NO3	855371	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	855372	1	18	5.5	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	855241	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	855373	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	857247	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	858832	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	857347	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	855841	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	857245	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	862291	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	855346	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	855765	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	857594	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	855369	1	20	5.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	856108	1	15	6.6	5.0	✓



Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	856202	1	15	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	856872	2	37	5.4	5.0	✓
Fluoride in Water by IC	E235.F	855370	1	18	5.5	5.0	✓
Nitrate in Water by IC	E235.NO3	855371	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	855372	1	18	5.5	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	855241	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	855373	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	857247	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	858832	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	857347	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	855841	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	857245	1	20	5.0	5.0	✓



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Edmonton - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Edmonton - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Edmonton - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Edmonton - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Edmonton - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Edmonton - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Edmonton - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total metals in Water by CRC ICPMS	E420 Edmonton - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Edmonton - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Edmonton - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A Edmonton - Environmental	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Edmonton - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 Edmonton - Environmental	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
CCME PHC - F1 by Headspace GC-FID	E581.F1 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHCs - F2-F4 by GC-FID	E601 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Edmonton - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Edmonton - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Edmonton - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 Edmonton - Environmental	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Edmonton - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Edmonton - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Edmonton - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Edmonton - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Edmonton - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
VOCs Preparation for Headspace Analysis	EP581 Edmonton - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Edmonton - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2301873	Page	: 1 of 14
Amendment	: 1		
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 1 2023	Date Samples Received	: 07-Mar-2023 12:10
PO	: Pending	Date Analysis Commenced	: 07-Mar-2023
C-O-C number	: ----	Issue Date	: 30-May-2023 11:54
Sampler	: Murray 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 7		
No. of samples analysed	: 7		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Christian Murera	Lab Analyst	Edmonton Organics, Edmonton, Alberta
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Yan Zhang	Lab Analyst	Edmonton Organics, Edmonton, Alberta



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 855300)											
EO2301862-020	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	421	448	6.14%	20%	----
Physical Tests (QC Lot: 855301)											
EO2301862-020	Anonymous	pH	----	E108	0.10	pH units	7.74	7.73	0.129%	3%	----
Physical Tests (QC Lot: 855302)											
EO2301862-020	Anonymous	Conductivity	----	E100	1.0	µS/cm	744	748	0.536%	10%	----
Physical Tests (QC Lot: 862291)											
EO2301873-001	Secondary Leachate Cell 1 (SC1)	Solids, total suspended [TSS]	----	E160	3.0	mg/L	108	123	12.5%	20%	----
Anions and Nutrients (QC Lot: 855346)											
FC2300540-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0210	0.0174	0.0036	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 855369)											
EO2301880-003	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	121	121	0.249%	20%	----
Anions and Nutrients (QC Lot: 855370)											
EO2301880-003	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.076	0.072	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 855371)											
EO2301880-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.184	0.182	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 855372)											
EO2301880-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 855373)											
EO2301880-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	33.9	33.4	1.45%	20%	----
Anions and Nutrients (QC Lot: 857245)											
EO2301862-011	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 857247)											
EO2301873-001	Secondary Leachate Cell 1 (SC1)	Phosphorus, total dissolved	7723-14-0	E375-U	0.0100	mg/L	0.395	0.414	4.65%	20%	----
Anions and Nutrients (QC Lot: 858832)											
EO2301873-001	Secondary Leachate Cell 1 (SC1)	Kjeldahl nitrogen, total [TKN]	----	E318	20.0	mg/L	99.2	98.1	1.15	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 856872)											
EO2301880-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	28.6	34.0	17.3%	20%	----
Organic / Inorganic Carbon (QC Lot: 859593)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Organic / Inorganic Carbon (QC Lot: 859593) - continued											
EO2301961-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	6.50	7.32	11.8%	20%	----
Total Metals (QC Lot: 855841)											
EO2301873-001	Secondary Leachate Cell 1 (SC1)	Chromium, total	7440-47-3	E420	0.00500	mg/L	0.140	0.143	2.37%	20%	----
Total Metals (QC Lot: 857347)											
EO2301894-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 856202)											
EO2301873-001	Secondary Leachate Cell 1 (SC1)	Aluminum, dissolved	7429-90-5	E421	0.0100	mg/L	0.0373	0.0438	0.0064	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00100	mg/L	0.00109	<0.00100	0.00009	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00100	mg/L	0.0103	0.0104	1.53%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00100	mg/L	0.125	0.128	2.40%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.100	mg/L	10.8	11.4	5.19%	20%	----
		Cadmium, dissolved	7440-43-9	E421	0.0000500	mg/L	0.000346	0.000341	0.0000046	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.500	mg/L	560	573	2.42%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00500	mg/L	0.137	0.137	0.146%	20%	----
		Cobalt, dissolved	7440-48-4	E421	0.00100	mg/L	2.44	2.59	6.17%	20%	----
		Copper, dissolved	7440-50-8	E421	0.00200	mg/L	0.0116	0.0119	0.00028	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.100	mg/L	52.2	51.8	0.707%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000500	mg/L	0.0265	0.0269	1.50%	20%	----
		Lithium, dissolved	7439-93-2	E421	0.0100	mg/L	0.599	0.608	1.45%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0500	mg/L	236	239	1.24%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00100	mg/L	37.4	38.6	3.44%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000500	mg/L	0.0173	0.0185	6.48%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00500	mg/L	12.4	13.1	5.43%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.500	mg/L	0.811	0.832	0.020	Diff <2x LOR	----
Potassium, dissolved	7440-09-7	E421	0.500	mg/L	27.3	27.9	2.21%	20%	----		
Rubidium, dissolved	7440-17-7	E421	0.00200	mg/L	0.00555	0.00613	0.00058	Diff <2x LOR	----		
Selenium, dissolved	7782-49-2	E421	0.000500	mg/L	0.00141	0.00138	0.000029	Diff <2x LOR	----		
Silicon, dissolved	7440-21-3	E421	0.500	mg/L	9.43	9.41	0.225%	20%	----		
Silver, dissolved	7440-22-4	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----		
Sodium, dissolved	7440-23-5	E421	0.500	mg/L	2290	2350	2.61%	20%	----		



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 856202) - continued											
EO2301873-001	Secondary Leachate Cell 1 (SC1)	Strontium, dissolved	7440-24-6	E421	0.00200	mg/L	3.55	3.59	1.04%	20%	----
		Sulfur, dissolved	7704-34-9	E421	5.00	mg/L	1280	1290	0.890%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00300	mg/L	0.00526	0.00550	0.00024	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000100	mg/L	0.0412	0.0410	0.692%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00500	mg/L	0.0763	0.0777	1.89%	20%	----
Zinc, dissolved	7440-66-6	E421	0.0100	mg/L	0.932	0.966	3.57%	20%	----		
Zirconium, dissolved	7440-67-7	E421	0.00200	mg/L	0.0140	0.0142	0.00021	Diff <2x LOR	----		
Speciated Metals (QC Lot: 856108)											
EO2301874-008	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 855241)											
VA23A4663-002	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 857594)											
EO2301862-020	Anonymous	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	13	13	0.3	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 855765)											
EO2301862-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.00040 mg/L	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.00030 mg/L	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 855764)											
EO2301862-001	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<0.10 mg/L	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 855300)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 855302)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 862291)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 855346)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 855369)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 855370)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 855371)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 855372)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 855373)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 857245)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 857247)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 858832)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Organic / Inorganic Carbon (QCLot: 856872)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Organic / Inorganic Carbon (QCLot: 859593)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Total Metals (QCLot: 855841)						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---
Total Metals (QCLot: 857347)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
Dissolved Metals (QCLot: 856202)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 856202) - continued						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 856202) - continued						
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 856108)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 855241)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Aggregate Organics (QCLot: 857594)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Volatile Organic Compounds (QCLot: 855765)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 855764)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 855827)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 856138)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 855300)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 855301)									
pH	----	E108	----	pH units	6 pH units	100	97.0	103	----
Physical Tests (QCLot: 855302)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	94.4	90.0	110	----
Physical Tests (QCLot: 862291)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 855346)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	109	85.0	115	----
Anions and Nutrients (QCLot: 855369)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 855370)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 855371)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 855372)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	92.6	90.0	110	----
Anions and Nutrients (QCLot: 855373)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 857245)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 857247)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	94.2	80.0	120	----
Anions and Nutrients (QCLot: 858832)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	112	75.0	125	----
Organic / Inorganic Carbon (QCLot: 856872)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	90.4	80.0	120	----
Organic / Inorganic Carbon (QCLot: 859593)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	92.8	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 855841)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
Total Metals (QCLot: 857347)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
Dissolved Metals (QCLot: 856202)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	91.7	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	98.5	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.4	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	107	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.4	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.0	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	95.1	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	94.6	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	99.4	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.8	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.4	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	92.1	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.2	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.7	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	96.4	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	95.4	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.7	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	110	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	96.1	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	97.9	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	105	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	93.7	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	96.9	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	102	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	86.7	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	91.1	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 856202) - continued									
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	105	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	93.6	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.9	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	90.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	107	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	97.6	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	99.2	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
Speciated Metals (QCLot: 856108)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Aggregate Organics (QCLot: 855241)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	95.9	85.0	115	----
Aggregate Organics (QCLot: 857594)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	105	85.0	115	----
Volatile Organic Compounds (QCLot: 855765)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	87.0	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	91.5	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	90.4	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	97.1	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	97.8	70.0	130	----
Hydrocarbons (QCLot: 855764)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	93.4	70.0	130	----
Hydrocarbons (QCLot: 855827)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	110	70.0	130	----
Hydrocarbons (QCLot: 856138)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	117	70.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 855346)										
FC2300540-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 855369)										
EO2301880-003	Anonymous	Chloride	16887-00-6	E235.Cl	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 855370)										
EO2301880-003	Anonymous	Fluoride	16984-48-8	E235.F	0.974 mg/L	1 mg/L	97.4	75.0	125	----
Anions and Nutrients (QCLot: 855371)										
EO2301880-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.55 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 855372)										
EO2301880-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.484 mg/L	0.5 mg/L	96.8	75.0	125	----
Anions and Nutrients (QCLot: 855373)										
EO2301880-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	96.6 mg/L	100 mg/L	96.6	75.0	125	----
Anions and Nutrients (QCLot: 857245)										
EO2301862-012	Anonymous	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 857247)										
EO2301873-002	Secondary Leachate Cell 2 (SC2)	Phosphorus, total dissolved	7723-14-0	E375-U	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 858832)										
EO2301873-002	Secondary Leachate Cell 2 (SC2)	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 856872)										
EO2301880-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 859593)										
EO2301971-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 855841)										
EO2301873-002	Secondary Leachate Cell 2 (SC2)	Chromium, total	7440-47-3	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
Total Metals (QCLot: 857347)										
EO2301895-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000994 mg/L	0.0001 mg/L	99.4	70.0	130	----
Dissolved Metals (QCLot: 856202)										



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 856202) - continued										
EO2301873-002	Secondary Leachate Cell 2 (SC2)	Aluminum, dissolved	7429-90-5	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0230 mg/L	0.02 mg/L	115	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0423 mg/L	0.04 mg/L	106	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00936 mg/L	0.01 mg/L	93.6	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00418 mg/L	0.004 mg/L	104	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0465 mg/L	0.04 mg/L	116	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		Iron, dissolved	7439-89-6	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	11.8 mg/L	10 mg/L	118	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0447 mg/L	0.04 mg/L	112	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00393 mg/L	0.004 mg/L	98.2	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0387 mg/L	0.04 mg/L	96.8	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00370 mg/L	0.004 mg/L	92.5	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0488 mg/L	0.04 mg/L	122	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 856202) - continued										
EO2301873-002	Secondary Leachate Cell 2 (SC2)	Uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.113 mg/L	0.1 mg/L	113	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	ND mg/L	0.4 mg/L	ND	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0438 mg/L	0.04 mg/L	109	70.0	130	----
Speciated Metals (QCLot: 856108)										
EO2301874-008	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0498 mg/L	0.05 mg/L	99.6	70.0	130	----
Aggregate Organics (QCLot: 855241)										
VA23A4663-002	Anonymous	Phenols, total (4AAP)	----	E562	0.0180 mg/L	0.02 mg/L	89.8	75.0	125	----
Aggregate Organics (QCLot: 857594)										
EO2301862-021	Anonymous	Chemical oxygen demand [COD]	----	E559-L	112 mg/L	100 mg/L	112	75.0	125	----
Volatile Organic Compounds (QCLot: 855765)										
EO2301862-002	Anonymous	Benzene	71-43-2	E611A	101 µg/L	100 µg/L	101	50.0	140	----
		Ethylbenzene	100-41-4	E611A	93.1 µg/L	100 µg/L	93.1	50.0	140	----
		Toluene	108-88-3	E611A	90.7 µg/L	100 µg/L	90.7	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	202 µg/L	200 µg/L	101	50.0	140	----
		Xylene, o-	95-47-6	E611A	106 µg/L	100 µg/L	106	50.0	140	----



Environmental Division
Edmonton
Work Order Reference
EO2301873



Telephone: +1 780 413 5227

Contact and company name below will appear on the final report

Reports / Recipients

Turnaround Time (TAT) Requested

Company: Clean Harbors Canada
Contact: Todd Webb, Stan Yuha
Phone: (780) 663-2513
Company address below will appear on the final report
Street: PO Box 380, 50114 Range Road 173
City/Province: Ryley, AB
Postal Code: T0B 4A0
Invoice To: Same as Report To
Copy of Invoice with Report: YES NO
Company: Clean Harbors Canada
Contact: Stephanie Dennis
Project Information
ALS Account # / Quote #: EO22-CHESS100-008
Job #: Primary Leachate Qtr 1 2023
PO / AFE: Pending
LSD: Table 4.4A

Select Report Format: PDF EXCEL EDD (DIGITAL)
Merge QC/QCI Reports with COA YES NO N/A
Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: EMAIL MAIL FAX
Email 1 or Fax: webb.todd@cleanharbors.com
Email 2: yuha.stan@cleanharbors.com
Email 3:
Invoice Recipients
Select Invoice Distribution: EMAIL MAIL FAX
Email 1 or Fax: dennis.stephanie@cleanharbors.com
Email 2:
Email 3:
Oil and Gas Required Fields (client use)
AFE/Coast Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only): EO2301873

Routing Code:
Location:
ALS Contact: Megha Walla
Date (dd-mm-yy)
Time (h:mm)
Sampler: Murray
Sample Type

NUMBER OF CONTAINERS
Table 4.4A Leachate
Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	ALS Contact:	Date	Time	Sampler	Sample Type	Filtered (F)	Preserved (P)	Filtered and Preserved (FP)
	Secondary Leachate Cell 1 (SC1)		6-Mar-23	11:00					
	Secondary Leachate Cell 2 (SC2)		6-Mar-23	11:00					
	Secondary Leachate Cell 3A (SC3A)		6-Mar-23	11:00					
	Secondary Leachate Cell 3B (SC3B)		6-Mar-23	11:00					
	Secondary Leachate Cell 3D (SC3D)		6-Mar-23	11:00					
	Secondary Leachate Cell 3E (SC3E)		6-Mar-23	11:00					
	Secondary Leachate Cell 4 (SC4)		6-Mar-23	11:00					

Drinking Water (DW) Samples (client use)
Are samples taken from a Regulated DW System? YES NO
Are samples for human consumption/ use? YES NO
SHIPMENT RELEASE (client use)
Released by: Todd Webb Date: 7-Mar-23 Time: 11:00
INITIAL SHIPMENT RECEPTION (ALS use only)
Received by: Date: 9-Mar-2023 Time: 12:10
FINAL SHIPMENT RECEPTION (ALS use only)
Received by: Date:
Cooling Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED
Submission Comments Identified on Sample Receipt Notification: YES NO
Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A
INITIAL COOLER TEMPERATURES °C
FINAL COOLER TEMPERATURES °C

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Notes: Analyze as per Quote EO22-CHESS100-008, Table 4.4A package (Attached). Same as COC 966636
WHITE - LABORATORY COPY YELLOW - CLIENT COPY
REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION
Failure to complete all portions of this form may delay analysis. Please fill in this form. EGI:BL.Y. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.
1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus



CERTIFICATE OF ANALYSIS

Work Order	: EO2302111	Page	: 1 of 5
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 1 2023	Date Samples Received	: 15-Mar-2023 12:00
PO	: PO 0000232474	Date Analysis	: 15-Mar-2023
C-O-C number	: ----	Commenced	
Sampler	: Murray	Issue Date	: 21-Mar-2023 17:18
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Christian Murera	Lab Analyst	Organics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Geoff Berg	Lab Analyst	Organics, Edmonton, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Kari Mulroy	Lab Supervisor - Environmental	Organics, Edmonton, Alberta
Leah Yee	Lab Assistant	Inorganics, Edmonton, Alberta
Muzammil Ali	Lab Analyst	Inorganics, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Metals, Edmonton, Alberta
Samantha Mayor	Lab Assistant	Inorganics, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Inorganics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).
Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

<i>Unit</i>	<i>Description</i>
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



Analytical Results

EO2302111-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3C (SC3C)

Client sampling date / time: 14-Mar-2023 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	1420	1.0	mg/L	E290	15-Mar-2023	15-Mar-2023	864508
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290	15-Mar-2023	15-Mar-2023	864508
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290	15-Mar-2023	15-Mar-2023	864508
Alkalinity, total (as CaCO ₃)	----	1170	1.0	mg/L	E290	15-Mar-2023	15-Mar-2023	864508
Conductivity	----	10700	1.0	µS/cm	E100	15-Mar-2023	15-Mar-2023	864507
Hardness (as CaCO ₃), dissolved	----	1730	0.50	mg/L	EC100	-	17-Mar-2023	-
pH	----	8.01	0.10	pH units	E108	15-Mar-2023	15-Mar-2023	864506
Solids, total dissolved [TDS], calculated	----	10500	1.0	mg/L	EC103	-	15-Mar-2023	-
Solids, total suspended [TSS]	----	58.0	3.0	mg/L	E160	-	21-Mar-2023	868300
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	4.52	0.100	mg/L	E298	15-Mar-2023	15-Mar-2023	864493
Chloride	16887-00-6	241 ^{DLDS}	2.50	mg/L	E235.Cl	15-Mar-2023	16-Mar-2023	864601
Fluoride	16984-48-8	0.575 ^{DLDS}	0.100	mg/L	E235.F	15-Mar-2023	16-Mar-2023	864598
Nitrate (as N)	14797-55-8	2.69 ^{DLDS}	0.100	mg/L	E235.NO3	15-Mar-2023	16-Mar-2023	864599
Nitrate + Nitrite (as N)	----	2.77	0.112	mg/L	EC235.N+N	-	16-Mar-2023	-
Nitrite (as N)	14797-65-0	0.084 ^{DLDS}	0.050	mg/L	E235.NO2	15-Mar-2023	16-Mar-2023	864602
Phosphorus, total	7723-14-0	0.0773	0.0010	mg/L	E372-S	16-Mar-2023	17-Mar-2023	865093
Phosphorus, total dissolved	7723-14-0	0.0419	0.0010	mg/L	E375-U	17-Mar-2023	20-Mar-2023	866663
Sulfate (as SO ₄)	14808-79-8	6340 ^{DLDS}	3.00	mg/L	E235.SO4	15-Mar-2023	17-Mar-2023	864600
Kjeldahl nitrogen, total [TKN]	----	7.23	1.00	mg/L	E318	16-Mar-2023	16-Mar-2023	864264
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	126	5.00	mg/L	E358-L	16-Mar-2023	17-Mar-2023	866206
Ion Balance								
Ion balance (cations/anions)	----	88.9	0.010	%	EC101	-	15-Mar-2023	-
Total Metals								
Chromium, total	7440-47-3	0.00364	0.00250	mg/L	E420	16-Mar-2023	16-Mar-2023	865116
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508	16-Mar-2023	16-Mar-2023	865117
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0018	0.0010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Antimony, dissolved	7440-36-0	0.00026	0.00010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Arsenic, dissolved	7440-38-2	0.00268	0.00010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Barium, dissolved	7440-39-3	0.0322	0.00010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Beryllium, dissolved	7440-41-7	0.000027	0.000020	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Bismuth, dissolved	7440-69-9	<0.000050	0.000050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Boron, dissolved	7440-42-8	0.818	0.010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Cadmium, dissolved	7440-43-9	0.0000117	0.0000050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Calcium, dissolved	7440-70-2	293	0.050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Cesium, dissolved	7440-46-2	0.000051	0.000010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Chromium, dissolved	7440-47-3	0.00133	0.00050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Cobalt, dissolved	7440-48-4	0.00097	0.00010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Copper, dissolved	7440-50-8	0.00408	0.00020	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Iron, dissolved	7439-89-6	0.040	0.010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Lead, dissolved	7439-92-1	0.000098	0.000050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Lithium, dissolved	7439-93-2	0.220	0.0010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Magnesium, dissolved	7439-95-4	243	0.0050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Manganese, dissolved	7439-96-5	1.11	0.00010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112



Analytical Results

EO2302111-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3C (SC3C)

Client sampling date / time: 14-Mar-2023 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Molybdenum, dissolved	7439-98-7	0.0156	0.000050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Nickel, dissolved	7440-02-0	0.0175	0.000050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Phosphorus, dissolved	7723-14-0	0.067	0.050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Potassium, dissolved	7440-09-7	19.6	0.050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Rubidium, dissolved	7440-17-7	0.00606	0.00020	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Selenium, dissolved	7782-49-2	0.00143	0.000050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Silicon, dissolved	7440-21-3	8.68	0.050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Silver, dissolved	7440-22-4	0.000015	0.000010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Sodium, dissolved	7440-23-5	2490	0.050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Strontium, dissolved	7440-24-6	2.99	0.00020	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Sulfur, dissolved	7704-34-9	2040	0.50	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Tellurium, dissolved	13494-80-9	<0.00020	0.00020	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Thallium, dissolved	7440-28-0	0.000014	0.000010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Thorium, dissolved	7440-29-1	<0.00010	0.00010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Tin, dissolved	7440-31-5	<0.00010	0.00010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Titanium, dissolved	7440-32-6	0.00042	0.00030	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Tungsten, dissolved	7440-33-7	<0.00010	0.00010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Uranium, dissolved	7440-61-1	0.0288	0.000010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Vanadium, dissolved	7440-62-2	0.00671	0.00050	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Zinc, dissolved	7440-66-6	0.0430	0.0010	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Zirconium, dissolved	7440-67-7	0.00546	0.00020	mg/L	E421	16-Mar-2023	16-Mar-2023	865112
Dissolved metals filtration location	----	Field	-	-	EP421	-	16-Mar-2023	865112
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A	-	20-Mar-2023	870403
Aggregate Organics								
Chemical oxygen demand [COD]	----	272	10	mg/L	E559-L	-	21-Mar-2023	870261
Phenols, total (4AAP)	----	<0.0010	0.0010	mg/L	E562	15-Mar-2023	15-Mar-2023	864513
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A	17-Mar-2023	17-Mar-2023	866674
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A	17-Mar-2023	17-Mar-2023	866674
Toluene	108-88-3	<0.50	0.50	µg/L	E611A	17-Mar-2023	17-Mar-2023	866674
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A	17-Mar-2023	17-Mar-2023	866674
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A	17-Mar-2023	17-Mar-2023	866674
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A	17-Mar-2023	17-Mar-2023	866674
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1	17-Mar-2023	17-Mar-2023	866675
F1-BTEX	----	<100	100	µg/L	EC580	-	18-Mar-2023	-
F2 (C10-C16)	----	110	100	µg/L	E601	16-Mar-2023	16-Mar-2023	865896
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	99.5	1.0	%	E601	16-Mar-2023	16-Mar-2023	865896
Dichlorotoluene, 3,4-	95-75-0	95.7	1.0	%	E581.F1	17-Mar-2023	17-Mar-2023	866675
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	91.3	1.0	%	E611A	17-Mar-2023	17-Mar-2023	866674
Difluorobenzene, 1,4-	540-36-3	103	1.0	%	E611A	17-Mar-2023	17-Mar-2023	866674

Please refer to the General Comments section for an explanation of any qualifiers detected.





QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2302111</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Secondary Leachate Qtr 1 2023</p> <p>PO : PO 0000232474</p> <p>C-O-C number : ----</p> <p>Sampler : Murray</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 1</p> <p>No. of samples analysed : 1</p>	<p>Page : 1 of 12</p> <p>Laboratory : Edmonton - Environmental</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 15-Mar-2023 12:00</p> <p>Issue Date : 21-Mar-2023 17:18</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E559-L	14-Mar-2023	----	----	----		21-Mar-2023	28 days	7 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E562	14-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E298	14-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 3C (SC3C)	E235.Cl	14-Mar-2023	15-Mar-2023	----	----		16-Mar-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3C (SC3C)	E235.F	14-Mar-2023	15-Mar-2023	----	----		16-Mar-2023	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE Secondary Leachate Cell 3C (SC3C)	E235.NO3	14-Mar-2023	15-Mar-2023	----	----		16-Mar-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE Secondary Leachate Cell 3C (SC3C)	E235.NO2	14-Mar-2023	15-Mar-2023	----	----		16-Mar-2023	3 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Sulfate in Water by IC										
HDPE Secondary Leachate Cell 3C (SC3C)	E235.SO4	14-Mar-2023	15-Mar-2023	----	----		16-Mar-2023	28 days	2 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E375-U	14-Mar-2023	17-Mar-2023	----	----		17-Mar-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E318	14-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	28 days	2 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E372-S	14-Mar-2023	16-Mar-2023	----	----		17-Mar-2023	28 days	3 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Secondary Leachate Cell 3C (SC3C)	E421	14-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	180 days	2 days	✔
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Secondary Leachate Cell 3C (SC3C)	E581.F1	14-Mar-2023	17-Mar-2023	----	----		17-Mar-2023	14 days	3 days	✔
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3C (SC3C)	E601	14-Mar-2023	16-Mar-2023	14 days	2 days	✔	16-Mar-2023	40 days	0 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E358-L	14-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	28 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Secondary Leachate Cell 3C (SC3C)	E290	14-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	14 days	1 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 3C (SC3C)	E100	14-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	1 days	✓	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3C (SC3C)	E108	14-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	0.25 hrs	0.26 hrs	* EHTR-FM	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3C (SC3C)	E160	14-Mar-2023	----	----	----		21-Mar-2023	7 days	7 days	✓	
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC											
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3C (SC3C)	E532A	14-Mar-2023	----	----	----		20-Mar-2023	28 days	6 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3C (SC3C)	E508	14-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	28 days	2 days	✓	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 3C (SC3C)	E420	14-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	180 days	2 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3C (SC3C)	E611A	14-Mar-2023	17-Mar-2023	----	----		17-Mar-2023	14 days	3 days	✓	

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	864508	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	864493	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	866674	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	866675	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	870261	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	864601	1	9	11.1	5.0	✓
Conductivity in Water	E100	864507	1	14	7.1	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	870403	1	1	100.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	865112	1	13	7.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	866206	2	35	5.7	5.0	✓
Fluoride in Water by IC	E235.F	864598	1	9	11.1	5.0	✓
Nitrate in Water by IC	E235.NO3	864599	1	9	11.1	5.0	✓
Nitrite in Water by IC	E235.NO2	864602	1	9	11.1	5.0	✓
pH by Meter	E108	864506	1	14	7.1	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	864513	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	864600	2	21	9.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	866663	1	12	8.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	864264	1	17	5.8	5.0	✓
Total Mercury in Water by CVAAS	E508	865117	1	12	8.3	5.0	✓
Total metals in Water by CRC ICPMS	E420	865116	1	5	20.0	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	865093	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	868300	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	864508	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	864493	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	866674	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	866675	1	20	5.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	865896	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	870261	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	864601	1	9	11.1	5.0	✓
Conductivity in Water	E100	864507	1	14	7.1	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	870403	1	1	100.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	865112	1	13	7.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	866206	2	35	5.7	5.0	✓
Fluoride in Water by IC	E235.F	864598	1	9	11.1	5.0	✓
Nitrate in Water by IC	E235.NO3	864599	1	9	11.1	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	864602	1	9	11.1	5.0	✔
pH by Meter	E108	864506	1	14	7.1	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	864513	1	7	14.2	5.0	✔
Sulfate in Water by IC	E235.SO4	864600	2	21	9.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	866663	1	12	8.3	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	864264	1	17	5.8	5.0	✔
Total Mercury in Water by CVAAS	E508	865117	1	12	8.3	5.0	✔
Total metals in Water by CRC ICPMS	E420	865116	1	5	20.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	865093	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	868300	1	20	5.0	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	864508	1	14	7.1	5.0	✔
Ammonia by Fluorescence	E298	864493	1	13	7.6	5.0	✔
BTEX by Headspace GC-MS	E611A	866674	1	20	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	866675	1	20	5.0	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	865896	1	17	5.8	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	870261	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	864601	1	9	11.1	5.0	✔
Conductivity in Water	E100	864507	1	14	7.1	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	870403	1	1	100.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	865112	1	13	7.6	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	866206	2	35	5.7	5.0	✔
Fluoride in Water by IC	E235.F	864598	1	9	11.1	5.0	✔
Nitrate in Water by IC	E235.NO3	864599	1	9	11.1	5.0	✔
Nitrite in Water by IC	E235.NO2	864602	1	9	11.1	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	864513	1	7	14.2	5.0	✔
Sulfate in Water by IC	E235.SO4	864600	2	21	9.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	866663	1	12	8.3	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	864264	1	17	5.8	5.0	✔
Total Mercury in Water by CVAAS	E508	865117	1	12	8.3	5.0	✔
Total metals in Water by CRC ICPMS	E420	865116	1	5	20.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	865093	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	868300	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	864493	1	13	7.6	5.0	✔
BTEX by Headspace GC-MS	E611A	866674	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	870261	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	864601	1	9	11.1	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	870403	0	1	0.0	5.0	✖



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	865112	1	13	7.6	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	866206	2	35	5.7	5.0	✔
Fluoride in Water by IC	E235.F	864598	1	9	11.1	5.0	✔
Nitrate in Water by IC	E235.NO3	864599	1	9	11.1	5.0	✔
Nitrite in Water by IC	E235.NO2	864602	1	9	11.1	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	864513	1	7	14.2	5.0	✔
Sulfate in Water by IC	E235.SO4	864600	2	21	9.5	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	866663	1	12	8.3	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	864264	1	17	5.8	5.0	✔
Total Mercury in Water by CVAAS	E508	865117	1	12	8.3	5.0	✔
Total metals in Water by CRC ICPMS	E420	865116	1	5	20.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	865093	1	20	5.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Edmonton - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Edmonton - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Edmonton - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Edmonton - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Edmonton - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Edmonton - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Edmonton - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total metals in Water by CRC ICPMS	E420 Edmonton - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Edmonton - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Edmonton - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A Edmonton - Environmental	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Edmonton - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 Edmonton - Environmental	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
CCME PHC - F1 by Headspace GC-FID	E581.F1 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHCs - F2-F4 by GC-FID	E601 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Edmonton - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Edmonton - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Edmonton - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 Edmonton - Environmental	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Edmonton - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Edmonton - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Edmonton - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Edmonton - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Edmonton - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
VOCs Preparation for Headspace Analysis	EP581 Edmonton - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Edmonton - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2302111	Page	: 1 of 14
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 1 2023	Date Samples Received	: 15-Mar-2023 12:00
PO	: PO 0000232474	Date Analysis Commenced	: 15-Mar-2023
C-O-C number	: ----	Issue Date	: 21-Mar-2023 17:18
Sampler	: Murray 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Christian Murera	Lab Analyst	Edmonton Organics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Edmonton Metals, Edmonton, Alberta
Geoff Berg	Lab Analyst	Edmonton Organics, Edmonton, Alberta
Jing Liu	Lab Assistant	Edmonton Inorganics, Edmonton, Alberta
Kari Mulroy	Lab Supervisor - Environmental	Edmonton Organics, Edmonton, Alberta
Leah Yee	Lab Assistant	Edmonton Inorganics, Edmonton, Alberta
Muzammil Ali	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Edmonton Metals, Edmonton, Alberta
Samantha Mayor	Lab Assistant	Edmonton Inorganics, Edmonton, Alberta
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General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 864506)											
EO2302099-002	Anonymous	pH	----	E108	0.10	pH units	7.50	7.49	0.133%	3%	----
Physical Tests (QC Lot: 864507)											
EO2302099-002	Anonymous	Conductivity	----	E100	2.0	µS/cm	1960	1960	0.204%	10%	----
Physical Tests (QC Lot: 864508)											
EO2302099-002	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	672	628	6.70%	20%	----
Physical Tests (QC Lot: 868300)											
FC2300610-002	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 864264)											
EO2301984-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	2.29	2.34	2.28%	20%	----
Anions and Nutrients (QC Lot: 864493)											
FC2300602-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0202	0.0300	0.0098	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 864598)											
EO2302099-006	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.239	0.240	0.418%	20%	----
Anions and Nutrients (QC Lot: 864599)											
EO2302099-006	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.022	<0.020	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 864600)											
EO2302099-006	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	237	238	0.195%	20%	----
Anions and Nutrients (QC Lot: 864601)											
EO2302099-006	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	1.47	1.46	0.02	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 864602)											
EO2302099-006	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 865093)											
EO2302073-021	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0100	mg/L	0.232	0.227	1.93%	20%	----
Anions and Nutrients (QC Lot: 866663)											
EO2302092-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	0.0100	mg/L	0.210	0.222	5.44%	20%	----
Anions and Nutrients (QC Lot: 867669)											
EO2302171-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	3.09	2.97	3.93%	20%	----
Organic / Inorganic Carbon (QC Lot: 866206)											
EO2302073-019	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	44.6	47.1	5.44%	20%	----
Organic / Inorganic Carbon (QC Lot: 867567)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Organic / Inorganic Carbon (QC Lot: 867567) - continued											
EO2302171-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.57	<0.50	0.07	Diff <2x LOR	----
Total Metals (QC Lot: 865116)											
EO2302099-006	Anonymous	Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Total Metals (QC Lot: 865117)											
EO2302110-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 865112)											
EO2302111-001	Secondary Leachate Cell 3C (SC3C)	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0018	0.0020	0.0001	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00026	0.00021	0.00005	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00268	0.00270	0.781%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0322	0.0326	0.963%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	0.000027	<0.000020	0.000007	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.818	0.880	7.22%	20%	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000117	0.0000114	0.0000003	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	293	296	1.09%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000051	0.000048	0.000002	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00133	0.00134	0.00001	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00097	0.00094	0.00002	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00408	0.00397	2.85%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.040	0.040	0.0005	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000098	0.000077	0.000020	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.220	0.251	12.9%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	243	235	3.17%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	1.11	1.13	1.39%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0156	0.0157	0.845%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.0175	0.0170	3.30%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.067	0.064	0.002	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	19.6	19.2	1.86%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00606	0.00577	4.95%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00143	0.00156	8.41%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	8.68	8.66	0.278%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	0.000015	0.000013	0.000002	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	2490	2660	6.64%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	2.99	3.00	0.583%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 865112) - continued											
EO2302111-001	Secondary Leachate Cell 3C (SC3C)	Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	2040	1930	5.41%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000014	<0.000010	0.000004	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00042	0.00046	0.00004	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.0288	0.0268	7.11%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00671	0.00669	0.192%	20%	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0430	0.0432	0.328%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	0.00546	0.00538	1.47%	20%	----
Speciated Metals (QC Lot: 870403)											
EO2302111-001	Secondary Leachate Cell 3C (SC3C)	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 864513)											
CG2302924-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 870261)											
EO2302073-017	Anonymous	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	<10	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 866674)											
EO2302073-010	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.00040 mg/L	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.00030 mg/L	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 866675)											
EO2302073-010	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<0.10 mg/L	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 864507)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 864508)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 868300)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 864264)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 864493)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 864598)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 864599)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 864600)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 864601)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 864602)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 865093)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 866663)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 867669)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Organic / Inorganic Carbon (QCLot: 866206)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Organic / Inorganic Carbon (QCLot: 867567)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Total Metals (QCLot: 865116)						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---
Total Metals (QCLot: 865117)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 865117) - continued						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 865112)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 865112) - continued						
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 870403)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 864513)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Aggregate Organics (QCLot: 870261)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Volatile Organic Compounds (QCLot: 866674)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 865896)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 866675)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 864506)									
pH	----	E108	----	pH units	6 pH units	101	97.0	103	----
Physical Tests (QCLot: 864507)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	99.1	90.0	110	----
Physical Tests (QCLot: 864508)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 868300)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	96.5	85.0	115	----
Anions and Nutrients (QCLot: 864264)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	95.8	75.0	125	----
Anions and Nutrients (QCLot: 864493)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 864598)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 864599)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 864600)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 864601)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 864602)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	94.6	90.0	110	----
Anions and Nutrients (QCLot: 865093)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	93.5	80.0	120	----
Anions and Nutrients (QCLot: 866663)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	98.2	80.0	120	----
Anions and Nutrients (QCLot: 867669)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Organic / Inorganic Carbon (QCLot: 866206)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	99.0	80.0	120	----
Organic / Inorganic Carbon (QCLot: 867567)									



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	
Organic / Inorganic Carbon (QCLot: 867567) - continued									
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	8.57 mg/L	97.4	80.0	120	---
Total Metals (QCLot: 865116)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	94.8	80.0	120	---
Total Metals (QCLot: 865117)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.5	80.0	120	---
Dissolved Metals (QCLot: 865112)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	94.8	80.0	120	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	96.1	80.0	120	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	92.5	80.0	120	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	92.0	80.0	120	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	96.6	80.0	120	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	96.7	80.0	120	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	88.5	80.0	120	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	91.8	80.0	120	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	93.0	80.0	120	---
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	95.8	80.0	120	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	92.7	80.0	120	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	93.0	80.0	120	---
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	90.2	80.0	120	---
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	99.4	80.0	120	---
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.0	80.0	120	---
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.2	80.0	120	---
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	92.7	80.0	120	---
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	91.5	80.0	120	---
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	96.1	80.0	120	---
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.7	80.0	120	---
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	99.4	80.0	120	---
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	92.5	80.0	120	---
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	96.7	80.0	120	---
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	99.2	80.0	120	---
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	105	80.0	120	---
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	89.6	80.0	120	---
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	97.9	80.0	120	---
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	95.4	80.0	120	---



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 865112) - continued									
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	88.1	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	93.1	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.3	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	97.6	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	93.9	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	91.9	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	96.7	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	96.3	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	90.7	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	96.0	80.0	120	----
Speciated Metals (QCLot: 870403)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
Aggregate Organics (QCLot: 864513)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	93.4	85.0	115	----
Aggregate Organics (QCLot: 870261)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	98.8	85.0	115	----
Volatile Organic Compounds (QCLot: 866674)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	107	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	97.5	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	110	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	105	70.0	130	----
Hydrocarbons (QCLot: 865896)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	106	70.0	130	----
Hydrocarbons (QCLot: 866675)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	112	70.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 864264)										
EO2302001-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 864493)										
FC2300602-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 864598)										
EO2302099-006	Anonymous	Fluoride	16984-48-8	E235.F	0.899 mg/L	1 mg/L	89.9	75.0	125	----
Anions and Nutrients (QCLot: 864599)										
EO2302099-006	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.53 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 864600)										
EO2302099-006	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 864601)										
EO2302099-006	Anonymous	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 864602)										
EO2302099-006	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.473 mg/L	0.5 mg/L	94.7	75.0	125	----
Anions and Nutrients (QCLot: 865093)										
EO2302073-022	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0734 mg/L	0.067 mg/L	110	70.0	130	----
Anions and Nutrients (QCLot: 866663)										
EO2302111-001	Secondary Leachate Cell 3C (SC3C)	Phosphorus, total dissolved	7723-14-0	E375-U	0.0727 mg/L	0.067 mg/L	108	70.0	130	----
Anions and Nutrients (QCLot: 867669)										
EO2302171-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	107 mg/L	100 mg/L	107	75.0	125	----
Organic / Inorganic Carbon (QCLot: 866206)										
EO2302073-020	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 867567)										
EO2302171-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	5.46 mg/L	5 mg/L	109	70.0	130	----
Total Metals (QCLot: 865116)										
EO2302110-001	Anonymous	Chromium, total	7440-47-3	E420	0.0378 mg/L	0.04 mg/L	94.5	70.0	130	----
Total Metals (QCLot: 865117)										



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 865117) - continued										
EO2302111-001	Secondary Leachate Cell 3C (SC3C)	Mercury, total	7439-97-6	E508	0.0000924 mg/L	0.0001 mg/L	92.4	70.0	130	----
Dissolved Metals (QCLot: 865112)										
EO2302114-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.151 mg/L	0.2 mg/L	75.6	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0239 mg/L	0.02 mg/L	120	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0387 mg/L	0.04 mg/L	96.9	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00922 mg/L	0.01 mg/L	92.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.078 mg/L	0.1 mg/L	78.3	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00293 mg/L	0.004 mg/L	73.3	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00955 mg/L	0.01 mg/L	95.5	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0294 mg/L	0.04 mg/L	73.6	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0146 mg/L	0.02 mg/L	73.0	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0223 mg/L	0.02 mg/L	111	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.49 mg/L	2 mg/L	74.6	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0992 mg/L	0.1 mg/L	99.2	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	0.909 mg/L	1 mg/L	90.9	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0296 mg/L	0.04 mg/L	73.9	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	7.84 mg/L	10 mg/L	78.4	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	2.83 mg/L	4 mg/L	70.7	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0148 mg/L	0.02 mg/L	74.2	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.53 mg/L	10 mg/L	95.3	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00364 mg/L	0.004 mg/L	91.0	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	1.45 mg/L	2 mg/L	72.6	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	18.6 mg/L	20 mg/L	93.0	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0362 mg/L	0.04 mg/L	90.6	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00380 mg/L	0.004 mg/L	95.1	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0152 mg/L	0.02 mg/L	76.2	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 865112) - continued										
EO2302114-001	Anonymous	Titanium, dissolved	7440-32-6	E421	0.0296 mg/L	0.04 mg/L	73.9	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00394 mg/L	0.004 mg/L	98.4	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0766 mg/L	0.1 mg/L	76.6	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.295 mg/L	0.4 mg/L	73.8	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0396 mg/L	0.04 mg/L	99.1	70.0	130	----
Aggregate Organics (QCLot: 864513)										
CG2302924-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0185 mg/L	0.02 mg/L	92.4	75.0	125	----
Aggregate Organics (QCLot: 870261)										
EO2302073-018	Anonymous	Chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 866674)										
EO2302111-001	Secondary Leachate Cell 3C (SC3C)	Benzene	71-43-2	E611A	89.4 µg/L	100 µg/L	89.4	50.0	140	----
		Ethylbenzene	100-41-4	E611A	81.6 µg/L	100 µg/L	81.6	50.0	140	----
		Toluene	108-88-3	E611A	85.0 µg/L	100 µg/L	85.0	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	171 µg/L	200 µg/L	85.6	50.0	140	----
		Xylene, o-	95-47-6	E611A	90.4 µg/L	100 µg/L	90.4	50.0	140	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 22 - Page of

Contact and company name below will appear on the final report

Reports / Recipients

Turnaround Time (TAT) Requested

Edmonton Environmental Division

Work Order Reference EO2302111



Telephone : +1 780 413 5227

Analysis Re

Indicate Filtered (F), Preserved (P) or Filled an.

Project Information

Oil and Gas Required Fields (client use)

NUMBER OF CONTAINERS

Analysis Re

SAMPLES ON HOLD
EXTENDED STORAGE REQUIRED
SUSPECTED HAZARD (see notes)

Select Report Format: PDF EXCEL EDD (DIGITAL)

Merge QC/QCI Reports with COA YES NO N/A

Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: EMAIL MAIL FAX

Email 1 or Fax web: todd@cleanharbors.com

Email 2 yuha.stan@cleanharbors.com

Email 3

Select Invoice Distribution: EMAIL MAIL FAX

Email 1 or Fax dennis.stephanie@cleanharbors.com

Email 2

Select Invoice Distribution: EMAIL MAIL FAX

Email 1 or Fax

AFE/Cast Center: PO#

Major/Minor Code: Routing Code:

Requisitioner: Location:

ALS Account # / Quote # EO22-CHEST100-008

Job #: Secondary Leachate Qtr 1 2023

PO / AFE: Pending

LSD: Table 4.4A

ALS Lab Work Order # (ALS use only): EO2302111

ALS Sample # (ALS use only)

Sample Identification and/or Coordinates (This description will appear on the report)

ALS Contact: Megha Walla

Date (dd-mm-yy)

Time (hr:mm)

Sampler: Murray

Sample Type

Secondary Leachate Cell 3C (SC3C)

14-Mar-23

10:00

11

R

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Drinking Water (DW) Samples (client use)

Are samples taken from a Regulated DW System? YES NO

Are samples for human consumption/ use? YES NO

Analyze as per Quote EO22-CHEST100-008, Table 4.4A package (Attached). Same as order EO2301873

SHIPMENT RELEASE (client use)

Released by: Todd Webb

Date: 15-Mar-23

Time: 11:00

Receiver: [Signature]

Time: 12:00

Date:

Time:

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED

Submission Comments Identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A

INITIAL COOLER TEMPERATURES °C

INITIAL COOLER TEMPERATURES °C

FINAL COOLER TEMPERATURES °C

FINAL COOLER TEMPERATURES °C

Time:

Date:

Time:

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus

APPENDIX F

Leak Detection Liquid Analysis

Quarter 2

CERTIFICATE OF ANALYSIS

Work Order	: EO2305136	Page	: 1 of 21
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 2 2023	Date Samples Received	: 21-Jun-2023 10:41
PO	: 234479	Date Analysis	: 22-Jun-2023
		Commenced	
C-O-C number	: ----	Issue Date	: 04-Jul-2023 16:44
Sampler	: Murray		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Adrian Hilts	Lab Analyst	Metals, Edmonton, Alberta
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Andrew Fox		Metals, Calgary, Alberta
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Christian Murera	Lab Analyst	Organics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Elke Tabora		Inorganics, Calgary, Alberta
George Huang	Supervisor - Inorganic	Inorganics, Calgary, Alberta
George Huang	Supervisor - Inorganic	Metals, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Kari Mulroy	Lab Supervisor - Environmental	Organics, Edmonton, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
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Kiara Fuchs	Lab Analyst	Organics, Edmonton, Alberta
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Ping Yeung	Team Leader - Inorganics	Metals, Edmonton, Alberta
Saron Gebremariam	Lab Assistant	Inorganics, Edmonton, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Shruti Mudliar	Lab Analyst	Inorganics, Edmonton, Alberta
Yan Zhang	Lab Analyst	Organics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key :
 CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
 LOR: Limit of Reporting (detection limit).
 Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.
 Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Unit	Description
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	Description	Laboratory	Address
A	CALA ISO/IEC 17025:2017	EO Edmonton - Environmental	9450 - 17 Avenue NW, Edmonton, AB
B	CALA ISO/IEC 17025:2017	CG Calgary - Environmental	2559 29th Street NE, Calgary, AB

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
IB:INT	Ion Balance Reviewed: Imbalance is due to interference or non-measured component.
RRV	Reported result verified by repeat analysis.
SFP	Sample was filtered and preserved at the laboratory.
SP	Sample was preserved at the laboratory.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.



Analytical Results

EO2305136-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3B (SC3B) -

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	32500 ^{RRV}	5.0	mg/L	E290/CG	B	27-Jun-2023	01-Jul-2023 1011173
Alkalinity, carbonate (as CO ₃)	3812-32-6	18700	5.0	mg/L	E290/CG	B	27-Jun-2023	01-Jul-2023 1011173
Alkalinity, hydroxide (as OH)	14280-30-9	<5.0 ^{DLM}	5.0	mg/L	E290/CG	B	27-Jun-2023	01-Jul-2023 1011173
Alkalinity, total (as CaCO ₃)	----	57800 ^{RRV}	5.0	mg/L	E290/CG	B	27-Jun-2023	01-Jul-2023 1011173
Conductivity	----	38800	1.0	µS/cm	E100/CG	B	27-Jun-2023	27-Jun-2023 1011172
Hardness (as CaCO ₃), dissolved	----	230	10	mg/L	EC100/CG	-	-	27-Jun-2023 -
pH	----	9.20	0.10	pH units	E108/CG	B	27-Jun-2023	27-Jun-2023 1011171
Solids, total dissolved [TDS], calculated	----	65400	1.0	mg/L	EC103/CG	-	-	25-Jun-2023 -
Solids, total suspended [TSS]	----	205	3.0	mg/L	E160/CG	B	-	26-Jun-2023 1008944
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	1630 ^{SP}	50.0	mg/L	E298/EO	A	28-Jun-2023	28-Jun-2023 1014418
Chloride	16887-00-6	10700	25.0	mg/L	E235.Cl/CG	B	22-Jun-2023	22-Jun-2023 1002708
Fluoride	16984-48-8	14.3	1.00	mg/L	E235.F/CG	B	22-Jun-2023	22-Jun-2023 1002706
Nitrate (as N)	14797-55-8	<1.00 ^{DLDS}	1.00	mg/L	E235.NO3/CG	B	22-Jun-2023	22-Jun-2023 1002705
Nitrate + Nitrite (as N)	----	<1.12	1.12	mg/L	EC235.N+N/CG	-	-	28-Jun-2023 1014263
Nitrite (as N)	14797-65-0	<0.500 ^{DLDS}	0.500	mg/L	E235.NO2/CG	B	22-Jun-2023	22-Jun-2023 1002709
Phosphorus, total	7723-14-0	6.12 ^{SP}	0.100	mg/L	E372-S/EO	A	24-Jun-2023	26-Jun-2023 1006886
Phosphorus, total dissolved	7723-14-0	6.53 ^{SFP}	0.100	mg/L	E375-U/EO	A	24-Jun-2023	26-Jun-2023 1006889
Sulfate (as SO ₄)	14808-79-8	1470	15.0	mg/L	E235.SO4/CG	B	22-Jun-2023	22-Jun-2023 1002707
Kjeldahl nitrogen, total [TKN]	----	2460	50.0	mg/L	E318/EO	A	24-Jun-2023	26-Jun-2023 1004718
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	5180	50.0	mg/L	E358-L/CG	B	22-Jun-2023	24-Jun-2023 1003616
Ion Balance								
Ion balance (cations/anions)	----	37.3 ^{IBINT}	0.010	%	EC101/CG	-	-	27-Jun-2023 -
Total Metals								
Chromium, total	7440-47-3	0.659	0.0200	mg/L	E420/CG	B	24-Jun-2023	25-Jun-2023 1005164
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	A	22-Jun-2023	22-Jun-2023 1002429
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.778	0.200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Antimony, dissolved	7440-36-0	<0.0200 ^{DLDS}	0.0200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Arsenic, dissolved	7440-38-2	0.114	0.0200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Barium, dissolved	7440-39-3	0.521	0.0200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Beryllium, dissolved	7440-41-7	<0.00400 ^{DLDS}	0.00400	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Bismuth, dissolved	7440-69-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Boron, dissolved	7440-42-8	148	2.00	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Cadmium, dissolved	7440-43-9	0.00586	0.00100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Calcium, dissolved	7440-70-2	18.6	10.0	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Cesium, dissolved	7440-46-2	0.107	0.00200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Chromium, dissolved	7440-47-3	0.571	0.0200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Cobalt, dissolved	7440-48-4	0.0219	0.0200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Copper, dissolved	7440-50-8	<0.0400 ^{DLDS}	0.0400	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Iron, dissolved	7439-89-6	<2.00 ^{DLDS}	2.00	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Lead, dissolved	7439-92-1	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162



Analytical Results

EO2305136-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3B (SC3B) -

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/OT
Dissolved Metals								
Lithium, dissolved	7439-93-2	9.12	0.200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Magnesium, dissolved	7439-95-4	44.5	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Manganese, dissolved	7439-96-5	0.827	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Molybdenum, dissolved	7439-98-7	37.4	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Nickel, dissolved	7440-02-0	1.16	0.100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Phosphorus, dissolved	7723-14-0	<10.0 ^{DLDS}	10.0	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Potassium, dissolved	7440-09-7	2650	10.0	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Rubidium, dissolved	7440-17-7	4.33	0.0400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Selenium, dissolved	7782-49-2	0.0655	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Silicon, dissolved	7440-21-3	32.0	10.0	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Silver, dissolved	7440-22-4	<0.00200 ^{DLDS}	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Sodium, dissolved	7440-23-5	8440	10.0	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Strontium, dissolved	7440-24-6	0.788	0.0400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Sulfur, dissolved	7704-34-9	675	100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tellurium, dissolved	13494-80-9	<0.0400 ^{DLDS}	0.0400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Thallium, dissolved	7440-28-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Thorium, dissolved	7440-29-1	<0.0200 ^{DLDS}	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tin, dissolved	7440-31-5	<0.0200 ^{DLDS}	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Titanium, dissolved	7440-32-6	0.258	0.0600	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tungsten, dissolved	7440-33-7	12.6	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Uranium, dissolved	7440-61-1	0.00276	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Vanadium, dissolved	7440-62-2	0.295	0.100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Zinc, dissolved	7440-66-6	<0.200 ^{DLDS}	0.200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Zirconium, dissolved	7440-67-7	0.102	0.0400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	24-Jun-2023	1005162
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	A -	22-Jun-2023	1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	17700 ^{DLHC}	100	mg/L	E559-L/EO	A -	23-Jun-2023	1004729
Phenols, total (4AAP)	----	20.2 ^{SP}	1.00	mg/L	E562/EO	A 29-Jun-2023	29-Jun-2023	1015734
Volatile Organic Compounds								
Benzene	71-43-2	9.18	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Ethylbenzene	100-41-4	0.61	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Toluene	108-88-3	5.03	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylene, m+p-	179601-23-1	2.75	0.40	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylene, o-	95-47-6	1.51	0.30	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylenes, total	1330-20-7	4.26	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Hydrocarbons								
F1 (C6-C10)	----	520	100	µg/L	E581.F1/EO	A 22-Jun-2023	23-Jun-2023	1002879
F1-BTEX	----	501	137	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	2480	100	µg/L	E601/EO	A 22-Jun-2023	22-Jun-2023	1002391
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	104	1.0	%	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Dichlorotoluene, 3,4-	95-75-0	77.3	1.0	%	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
Volatile Organic Compounds Surrogates								



Analytical Results

EO2305136-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3B (SC3B) -

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	128	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Difluorobenzene, 1,4-	540-36-3	96.2	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305136-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3C (SC3C)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	1460	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, total (as CaCO3)	----	1200	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Conductivity	----	9280	1.0	µS/cm	E100/CG	B 27-Jun-2023	27-Jun-2023	1011172
Hardness (as CaCO3), dissolved	----	1780	1	mg/L	EC100/CG	-	27-Jun-2023	-
pH	----	8.16	0.10	pH units	E108/CG	B 27-Jun-2023	27-Jun-2023	1011171
Solids, total dissolved [TDS], calculated	----	9860	1.0	mg/L	EC103/CG	-	25-Jun-2023	-
Solids, total suspended [TSS]	----	48.2	3.0	mg/L	E160/CG	B -	26-Jun-2023	1008944
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	9.47	0.500	mg/L	E298/EO	A 28-Jun-2023	28-Jun-2023	1014418
Chloride	16887-00-6	238	10.0	mg/L	E235.Cl/CG	B 22-Jun-2023	22-Jun-2023	1002708
Fluoride	16984-48-8	1.15	0.400	mg/L	E235.F/CG	B 22-Jun-2023	22-Jun-2023	1002706
Nitrate (as N)	14797-55-8	9.61	0.400	mg/L	E235.NO3/CG	B 22-Jun-2023	22-Jun-2023	1002705
Nitrate + Nitrite (as N)	----	9.87	0.447	mg/L	EC235.N+N/CG	-	28-Jun-2023	1014263
Nitrite (as N)	14797-65-0	0.261	0.200	mg/L	E235.NO2/CG	B 22-Jun-2023	22-Jun-2023	1002709
Phosphorus, total	7723-14-0	0.0600	RRV. 0.0010	mg/L	E372-S/EO	A 24-Jun-2023	30-Jun-2023	1006886
Phosphorus, total dissolved	7723-14-0	0.105	RRV. 0.0050	mg/L	E375-U/EO	A 24-Jun-2023	30-Jun-2023	1006889
Sulfate (as SO4)	14808-79-8	5520	6.00	mg/L	E235.SO4/CG	B 22-Jun-2023	22-Jun-2023	1002707
Kjeldahl nitrogen, total [TKN]	----	17.6	2.00	mg/L	E318/EO	A 24-Jun-2023	26-Jun-2023	1004718
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	137	10.0	mg/L	E358-L/CG	B 22-Jun-2023	23-Jun-2023	1003616
Ion Balance								
Ion balance (cations/anions)	----	102	0.010	%	EC101/CG	-	27-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.00223	DTC. 0.00200	mg/L	E420/CG	B 24-Jun-2023	25-Jun-2023	1005164
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	A 22-Jun-2023	22-Jun-2023	1002429
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0209	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Antimony, dissolved	7440-36-0	<0.00200	DLDS. 0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162



Analytical Results

EO2305136-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3C (SC3C)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Dissolved Metals								
Arsenic, dissolved	7440-38-2	0.00312	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Barium, dissolved	7440-39-3	0.0419	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Beryllium, dissolved	7440-41-7	<0.000400 DLDS	0.000400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Bismuth, dissolved	7440-69-9	<0.00100 DLDS	0.00100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Boron, dissolved	7440-42-8	2.50	0.200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Cadmium, dissolved	7440-43-9	<0.000100 DLDS	0.000100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Calcium, dissolved	7440-70-2	312	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Cesium, dissolved	7440-46-2	0.000868	0.000200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Chromium, dissolved	7440-47-3	<0.00200 DTC	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Cobalt, dissolved	7440-48-4	<0.00200 DLDS	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Copper, dissolved	7440-50-8	<0.00400 DLDS	0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Iron, dissolved	7439-89-6	<0.200 DLDS	0.200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Lead, dissolved	7439-92-1	<0.00100 DLDS	0.00100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Lithium, dissolved	7439-93-2	0.292	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Magnesium, dissolved	7439-95-4	244	0.100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Manganese, dissolved	7439-96-5	1.24	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Molybdenum, dissolved	7439-98-7	0.324	0.00100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Nickel, dissolved	7440-02-0	0.0282	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Phosphorus, dissolved	7723-14-0	<1.00 DLDS	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Potassium, dissolved	7440-09-7	38.7	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Rubidium, dissolved	7440-17-7	0.0381	0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Selenium, dissolved	7782-49-2	0.00140	0.00100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Silicon, dissolved	7440-21-3	8.80	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Silver, dissolved	7440-22-4	<0.000200 DLDS	0.000200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Sodium, dissolved	7440-23-5	2570	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Strontium, dissolved	7440-24-6	3.24	0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Sulfur, dissolved	7704-34-9	2000	10.0	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tellurium, dissolved	13494-80-9	<0.00400 DLDS	0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Thallium, dissolved	7440-28-0	<0.000200 DLDS	0.000200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Thorium, dissolved	7440-29-1	<0.00200 DLDS	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tin, dissolved	7440-31-5	<0.00200 DLDS	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Titanium, dissolved	7440-32-6	<0.00600 DLDS	0.00600	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tungsten, dissolved	7440-33-7	0.0958	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Uranium, dissolved	7440-61-1	0.0234	0.000200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Vanadium, dissolved	7440-62-2	<0.0100 DLDS	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Zinc, dissolved	7440-66-6	0.0349	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Zirconium, dissolved	7440-67-7	0.00527	0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	24-Jun-2023	1005162
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	A -	22-Jun-2023	1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	302	10	mg/L	E559-L/EO	A -	23-Jun-2023	1004729
Phenols, total (4AAP)	----	0.0094	0.0010	mg/L	E562/EO	A 29-Jun-2023	29-Jun-2023	1015734
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878



Analytical Results

EO2305136-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3C (SC3C)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/lot
Volatile Organic Compounds								
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	A 22-Jun-2023	23-Jun-2023	1002879
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	A 22-Jun-2023	22-Jun-2023	1002391
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	98.8	1.0	%	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Dichlorotoluene, 3,4-	95-75-0	73.3	1.0	%	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	108	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Difluorobenzene, 1,4-	540-36-3	96.5	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305136-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3D (SC3D)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/lot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	442	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, total (as CaCO3)	----	362	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Conductivity	----	10800	1.0	µS/cm	E100/CG	B 27-Jun-2023	27-Jun-2023	1011172
Hardness (as CaCO3), dissolved	----	2580	2.5	mg/L	EC100/CG	-	27-Jun-2023	-
pH	----	8.08	0.10	pH units	E108/CG	B 27-Jun-2023	27-Jun-2023	1011171
Solids, total dissolved [TDS], calculated	----	9510	1.0	mg/L	EC103/CG	-	25-Jun-2023	-
Solids, total suspended [TSS]	----	58.2	3.0	mg/L	E160/CG	B -	26-Jun-2023	1008944
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	0.228	0.0050	mg/L	E298/EO	A 28-Jun-2023	28-Jun-2023	1014418
Chloride	16887-00-6	2710	10.0	mg/L	E235.Cl/CG	B 22-Jun-2023	22-Jun-2023	1002708
Fluoride	16984-48-8	2.15	0.400	mg/L	E235.F/CG	B 22-Jun-2023	22-Jun-2023	1002706
Nitrate (as N)	14797-55-8	392	0.400	mg/L	E235.NO3/CG	B 22-Jun-2023	22-Jun-2023	1002705
Nitrate + Nitrite (as N)	----	392	0.447	mg/L	EC235.N+N/CG	-	28-Jun-2023	1014263
Nitrite (as N)	14797-65-0	0.299	0.200	mg/L	E235.NO2/CG	B 22-Jun-2023	22-Jun-2023	1002709
Phosphorus, total	7723-14-0	0.742	0.0100	mg/L	E372-S/EO	A 24-Jun-2023	26-Jun-2023	1006886
Phosphorus, total dissolved	7723-14-0	0.685	0.0100	mg/L	E375-U/EO	A 24-Jun-2023	26-Jun-2023	1006889



Analytical Results

EO2305136-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3D (SC3D)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Anions and Nutrients								
Sulfate (as SO4)	14808-79-8	1810	6.00	mg/L	E235.SO4/CG	B 22-Jun-2023	22-Jun-2023	1002707
Kjeldahl nitrogen, total [TKN]	----	2.22 ^{TKN}	0.200	mg/L	E318/EO	A 24-Jun-2023	26-Jun-2023	1004718
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	41.8	10.0	mg/L	E358-L/CG	B 22-Jun-2023	23-Jun-2023	1003616
Ion Balance								
Ion balance (cations/anions)	----	94.6	0.010	%	EC101/CG	-	27-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E420/CG	B 24-Jun-2023	25-Jun-2023	1005164
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	A 22-Jun-2023	22-Jun-2023	1002429
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0500 ^{DLDS}	0.0500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Antimony, dissolved	7440-36-0	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Arsenic, dissolved	7440-38-2	0.0177	0.00500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Barium, dissolved	7440-39-3	0.144	0.00500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Beryllium, dissolved	7440-41-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Bismuth, dissolved	7440-69-9	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Boron, dissolved	7440-42-8	39.7	0.500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Cadmium, dissolved	7440-43-9	0.00116	0.000250	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Calcium, dissolved	7440-70-2	474	2.50	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Cesium, dissolved	7440-46-2	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Chromium, dissolved	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Cobalt, dissolved	7440-48-4	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Copper, dissolved	7440-50-8	0.0178	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Iron, dissolved	7439-89-6	<0.500 ^{DLDS}	0.500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Lead, dissolved	7439-92-1	<0.00250 ^{DLDS}	0.00250	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Lithium, dissolved	7439-93-2	1.00	0.0500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Magnesium, dissolved	7439-95-4	338	0.250	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Manganese, dissolved	7439-96-5	0.811	0.00500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Molybdenum, dissolved	7439-98-7	5.36	0.00250	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Nickel, dissolved	7440-02-0	0.920	0.0250	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Phosphorus, dissolved	7723-14-0	<2.50 ^{DLDS}	2.50	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Potassium, dissolved	7440-09-7	208	2.50	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Rubidium, dissolved	7440-17-7	0.0431	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Selenium, dissolved	7782-49-2	0.00528	0.00250	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Silicon, dissolved	7440-21-3	10.5	2.50	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Silver, dissolved	7440-22-4	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Sodium, dissolved	7440-23-5	1940	2.50	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Strontium, dissolved	7440-24-6	2.65	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Sulfur, dissolved	7704-34-9	620	25.0	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tellurium, dissolved	13494-80-9	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Thallium, dissolved	7440-28-0	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Thorium, dissolved	7440-29-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tin, dissolved	7440-31-5	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Titanium, dissolved	7440-32-6	<0.0150 ^{DLDS}	0.0150	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tungsten, dissolved	7440-33-7	<0.00500 ^{DLDS}	0.00500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162



Analytical Results

EO2305136-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3D (SC3D)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Dissolved Metals								
Uranium, dissolved	7440-61-1	0.00884	0.000500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Vanadium, dissolved	7440-62-2	37.0	0.0250	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Zinc, dissolved	7440-66-6	0.112	0.0500	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Zirconium, dissolved	7440-67-7	<0.0100 ^{DLDS}	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	24-Jun-2023	1005162
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	A -	22-Jun-2023	1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	166 ^{DLM}	20	mg/L	E559-L/EO	A -	27-Jun-2023	1010875
Phenols, total (4AAP)	----	0.0047	0.0010	mg/L	E562/EO	A 29-Jun-2023	29-Jun-2023	1015734
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	A 22-Jun-2023	23-Jun-2023	1002879
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	A 22-Jun-2023	22-Jun-2023	1002391
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	99.4	1.0	%	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Dichlorotoluene, 3,4-	95-75-0	71.8	1.0	%	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	108	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Diffuorobenzene, 1,4-	540-36-3	100	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305136-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3E (SC3E)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	573	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, carbonate (as CO ₃)	3812-32-6	21.0	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, total (as CaCO ₃)	----	505	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Conductivity	----	5180	1.0	µS/cm	E100/CG	B 27-Jun-2023	27-Jun-2023	1011172
Hardness (as CaCO ₃), dissolved	----	792	0.50	mg/L	EC100/CG	-	27-Jun-2023	-
pH	----	8.57	0.10	pH units	E108/CG	B 27-Jun-2023	27-Jun-2023	1011171



Analytical Results

EO2305136-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3E (SC3E)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Physical Tests								
Solids, total dissolved [TDS], calculated	----	4910	1.0	mg/L	EC103/CG	-	25-Jun-2023	-
Solids, total suspended [TSS]	----	1660	3.0	mg/L	E160/CG	B	27-Jun-2023	1011585
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	0.222	0.0050	mg/L	E298/EO	A	28-Jun-2023	1014418
Chloride	16887-00-6	343	5.00	mg/L	E235.Cl/CG	B	22-Jun-2023	1002708
Fluoride	16984-48-8	0.887	0.200	mg/L	E235.F/CG	B	22-Jun-2023	1002706
Nitrate (as N)	14797-55-8	21.6	0.200	mg/L	E235.NO3/CG	B	22-Jun-2023	1002705
Nitrate + Nitrite (as N)	----	21.6	0.224	mg/L	EC235.N+N/CG	-	28-Jun-2023	1014263
Nitrite (as N)	14797-65-0	<0.100 ^{DLDS}	0.100	mg/L	E235.NO2/CG	B	22-Jun-2023	1002709
Phosphorus, total	7723-14-0	0.651	0.0100	mg/L	E372-S/EO	A	24-Jun-2023	1006886
Phosphorus, total dissolved	7723-14-0	0.135	0.0100	mg/L	E375-U/EO	A	24-Jun-2023	1006889
Sulfate (as SO4)	14808-79-8	2380	3.00	mg/L	E235.SO4/CG	B	22-Jun-2023	1002707
Kjeldahl nitrogen, total [TKN]	----	3.53	0.200	mg/L	E318/EO	A	24-Jun-2023	1004718
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	89.0	10.0	mg/L	E358-L/CG	B	22-Jun-2023	1003616
Ion Balance								
Ion balance (cations/anions)	----	109	0.010	%	EC101/CG	-	27-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0406	0.00100	mg/L	E420/CG	B	24-Jun-2023	1005164
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	A	22-Jun-2023	1002429
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0648	0.0100	mg/L	E421/CG	B	24-Jun-2023	1005162
Antimony, dissolved	7440-36-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/CG	B	24-Jun-2023	1005162
Arsenic, dissolved	7440-38-2	0.00254	0.00100	mg/L	E421/CG	B	24-Jun-2023	1005162
Barium, dissolved	7440-39-3	0.389	0.00100	mg/L	E421/CG	B	24-Jun-2023	1005162
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS}	0.000200	mg/L	E421/CG	B	24-Jun-2023	1005162
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	B	24-Jun-2023	1005162
Boron, dissolved	7440-42-8	3.02	0.100	mg/L	E421/CG	B	24-Jun-2023	1005162
Cadmium, dissolved	7440-43-9	0.000184	0.0000500	mg/L	E421/CG	B	24-Jun-2023	1005162
Calcium, dissolved	7440-70-2	126	0.500	mg/L	E421/CG	B	24-Jun-2023	1005162
Cesium, dissolved	7440-46-2	0.00134	0.000100	mg/L	E421/CG	B	24-Jun-2023	1005162
Chromium, dissolved	7440-47-3	0.00979	0.00100	mg/L	E421/CG	B	24-Jun-2023	1005162
Cobalt, dissolved	7440-48-4	<0.00100 ^{DLDS}	0.00100	mg/L	E421/CG	B	24-Jun-2023	1005162
Copper, dissolved	7440-50-8	0.0236	0.00200	mg/L	E421/CG	B	24-Jun-2023	1005162
Iron, dissolved	7439-89-6	<0.100 ^{DLDS}	0.100	mg/L	E421/CG	B	24-Jun-2023	1005162
Lead, dissolved	7439-92-1	<0.000500 ^{DLDS}	0.000500	mg/L	E421/CG	B	24-Jun-2023	1005162
Lithium, dissolved	7439-93-2	0.419	0.0100	mg/L	E421/CG	B	24-Jun-2023	1005162
Magnesium, dissolved	7439-95-4	116	0.0500	mg/L	E421/CG	B	24-Jun-2023	1005162
Manganese, dissolved	7439-96-5	0.0120	0.00100	mg/L	E421/CG	B	24-Jun-2023	1005162
Molybdenum, dissolved	7439-98-7	1.07	0.000500	mg/L	E421/CG	B	24-Jun-2023	1005162
Nickel, dissolved	7440-02-0	0.108	0.00500	mg/L	E421/CG	B	24-Jun-2023	1005162
Phosphorus, dissolved	7723-14-0	<0.500 ^{DLDS}	0.500	mg/L	E421/CG	B	24-Jun-2023	1005162
Potassium, dissolved	7440-09-7	60.4	0.500	mg/L	E421/CG	B	24-Jun-2023	1005162



Analytical Results

EO2305136-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3E (SC3E)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Dissolved Metals								
Rubidium, dissolved	7440-17-7	0.0600	0.00200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Selenium, dissolved	7782-49-2	0.00201	0.000500	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Silicon, dissolved	7440-21-3	6.23	0.500	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Silver, dissolved	7440-22-4	<0.000100	0.000100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Sodium, dissolved	7440-23-5	1380	0.500	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Strontium, dissolved	7440-24-6	1.95	0.00200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Sulfur, dissolved	7704-34-9	904	5.00	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Tellurium, dissolved	13494-80-9	<0.00200	0.00200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Thallium, dissolved	7440-28-0	<0.000100	0.000100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Thorium, dissolved	7440-29-1	<0.00100	0.00100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Tin, dissolved	7440-31-5	<0.00100	0.00100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Titanium, dissolved	7440-32-6	0.00766	0.00300	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Tungsten, dissolved	7440-33-7	0.205	0.00100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Uranium, dissolved	7440-61-1	0.0400	0.000100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Vanadium, dissolved	7440-62-2	0.0185	0.00500	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Zinc, dissolved	7440-66-6	0.0334	0.0100	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Zirconium, dissolved	7440-67-7	0.00233	0.00200	mg/L	E421/CG	B	24-Jun-2023	25-Jun-2023 1005162
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	24-Jun-2023	1005162
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	A	-	22-Jun-2023 1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	141	10	mg/L	E559-L/EO	A	-	27-Jun-2023 1010875
Phenols, total (4AAP)	----	0.0024	0.0010	mg/L	E562/EO	A	29-Jun-2023	29-Jun-2023 1015734
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	A	22-Jun-2023	23-Jun-2023 1002878
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	A	22-Jun-2023	23-Jun-2023 1002878
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	A	22-Jun-2023	23-Jun-2023 1002878
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	A	22-Jun-2023	23-Jun-2023 1002878
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	A	22-Jun-2023	23-Jun-2023 1002878
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	A	22-Jun-2023	23-Jun-2023 1002878
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	A	22-Jun-2023	23-Jun-2023 1002879
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	-	28-Jun-2023 -
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	A	22-Jun-2023	22-Jun-2023 1002391
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	102	1.0	%	E601/EO	-	22-Jun-2023	22-Jun-2023 1002391
Dichlorotoluene, 3,4-	95-75-0	92.2	1.0	%	E581.F1/EO	-	22-Jun-2023	23-Jun-2023 1002879
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	108	1.0	%	E611A/EO	-	22-Jun-2023	23-Jun-2023 1002878
Difluorobenzene, 1,4-	540-36-3	98.6	1.0	%	E611A/EO	-	22-Jun-2023	23-Jun-2023 1002878

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Analytical Results

EO2305136-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 4 (SC4)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	1370	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Alkalinity, total (as CaCO ₃)	----	1120	1.0	mg/L	E290/CG	B 27-Jun-2023	27-Jun-2023	1011173
Conductivity	----	12700	1.0	µS/cm	E100/CG	B 27-Jun-2023	27-Jun-2023	1011172
Hardness (as CaCO ₃), dissolved	----	2190	1	mg/L	EC100/CG	-	27-Jun-2023	-
pH	----	8.19	0.10	pH units	E108/CG	B 27-Jun-2023	27-Jun-2023	1011171
Solids, total dissolved [TDS], calculated	----	13400	1.0	mg/L	EC103/CG	-	25-Jun-2023	-
Solids, total suspended [TSS]	----	67.4	3.0	mg/L	E160/CG	B -	26-Jun-2023	1008944
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	19.2	0.500	mg/L	E298/EO	A 28-Jun-2023	28-Jun-2023	1014418
Chloride	16887-00-6	1570	12.5	mg/L	E235.Cl/CG	B 22-Jun-2023	22-Jun-2023	1002708
Fluoride	16984-48-8	1.19	0.500	mg/L	E235.F/CG	B 22-Jun-2023	22-Jun-2023	1002706
Nitrate (as N)	14797-55-8	22.4	0.500	mg/L	E235.NO ₃ /CG	B 22-Jun-2023	22-Jun-2023	1002705
Nitrate + Nitrite (as N)	----	23.3	0.559	mg/L	EC235.N+N/CG	-	28-Jun-2023	1014263
Nitrite (as N)	14797-65-0	0.936	0.250	mg/L	E235.NO ₂ /CG	B 22-Jun-2023	22-Jun-2023	1002709
Phosphorus, total	7723-14-0	0.472	0.0100	mg/L	E372-S/EO	A 24-Jun-2023	26-Jun-2023	1006886
Phosphorus, total dissolved	7723-14-0	0.376	0.0100	mg/L	E375-U/EO	A 24-Jun-2023	26-Jun-2023	1006889
Sulfate (as SO ₄)	14808-79-8	6740	7.50	mg/L	E235.SO ₄ /CG	B 22-Jun-2023	22-Jun-2023	1002707
Kjeldahl nitrogen, total [TKN]	----	30.6	4.00	mg/L	E318/EO	A 24-Jun-2023	26-Jun-2023	1004718
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	103	10.0	mg/L	E358-L/CG	B 22-Jun-2023	23-Jun-2023	1003616
Ion Balance								
Ion balance (cations/anions)	----	92.8	0.010	%	EC101/CG	-	27-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.00785	0.00200	mg/L	E420/CG	B 24-Jun-2023	25-Jun-2023	1005164
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	A 22-Jun-2023	22-Jun-2023	1002430
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0226	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Antimony, dissolved	7440-36-0	0.00346	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Arsenic, dissolved	7440-38-2	0.00240	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Barium, dissolved	7440-39-3	0.0612	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Beryllium, dissolved	7440-41-7	<0.000400	DLDS. 0.000400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Bismuth, dissolved	7440-69-9	<0.00100	DLDS. 0.00100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Boron, dissolved	7440-42-8	7.47	0.200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Cadmium, dissolved	7440-43-9	0.00161	0.000100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Calcium, dissolved	7440-70-2	341	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Cesium, dissolved	7440-46-2	<0.000200	DLDS. 0.000200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Chromium, dissolved	7440-47-3	<0.00200	DLDS. 0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Cobalt, dissolved	7440-48-4	0.0177	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Copper, dissolved	7440-50-8	<0.00400	DLDS. 0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Iron, dissolved	7439-89-6	0.234	0.200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Lead, dissolved	7439-92-1	<0.00100	DLDS. 0.00100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162



Analytical Results

EO2305136-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 4 (SC4)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Dissolved Metals								
Lithium, dissolved	7439-93-2	0.431	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Magnesium, dissolved	7439-95-4	326	0.100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Manganese, dissolved	7439-96-5	1.48	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Molybdenum, dissolved	7439-98-7	9.19	0.00100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Nickel, dissolved	7440-02-0	0.190	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Phosphorus, dissolved	7723-14-0	<1.00 DLDS	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Potassium, dissolved	7440-09-7	66.1	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Rubidium, dissolved	7440-17-7	0.0125	0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Selenium, dissolved	7782-49-2	0.00357	0.00100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Silicon, dissolved	7440-21-3	6.53	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Silver, dissolved	7440-22-4	<0.000200 DLDS	0.000200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Sodium, dissolved	7440-23-5	3390	1.00	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Strontium, dissolved	7440-24-6	5.64	0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Sulfur, dissolved	7704-34-9	2340	10.0	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tellurium, dissolved	13494-80-9	<0.00400 DLDS	0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Thallium, dissolved	7440-28-0	<0.000200 DLDS	0.000200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Thorium, dissolved	7440-29-1	<0.00200 DLDS	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tin, dissolved	7440-31-5	<0.00200 DLDS	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Titanium, dissolved	7440-32-6	0.00950	0.00600	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Tungsten, dissolved	7440-33-7	0.00225	0.00200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Uranium, dissolved	7440-61-1	0.116	0.000200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Vanadium, dissolved	7440-62-2	0.0191	0.0100	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Zinc, dissolved	7440-66-6	0.104	0.0200	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Zirconium, dissolved	7440-67-7	0.0110	0.00400	mg/L	E421/CG	B 24-Jun-2023	25-Jun-2023	1005162
Dissolved metals filtration location	----	Field	-	-	EP421/CG	-	24-Jun-2023	1005162
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	A -	22-Jun-2023	1003507
Aggregate Organics								
Chemical oxygen demand [COD]	----	351 DLM	20	mg/L	E559-L/EO	A -	27-Jun-2023	1010875
Phenols, total (4AAP)	----	0.0050	0.0010	mg/L	E562/EO	A 29-Jun-2023	29-Jun-2023	1015734
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	A 22-Jun-2023	23-Jun-2023	1002878
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	A 22-Jun-2023	23-Jun-2023	1002879
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	28-Jun-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	A 22-Jun-2023	22-Jun-2023	1002391
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	98.5	1.0	%	E601/EO	22-Jun-2023	22-Jun-2023	1002391
Dichlorotoluene, 3,4-	95-75-0	75.0	1.0	%	E581.F1/EO	22-Jun-2023	23-Jun-2023	1002879
Volatile Organic Compounds Surrogates								



Analytical Results

EO2305136-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 4 (SC4)

Client sampling date / time: 20-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	114	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878
Difluorobenzene, 1,4-	540-36-3	93.2	1.0	%	E611A/EO	22-Jun-2023	23-Jun-2023	1002878

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305136-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 1 (SC1)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	1710	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Alkalinity, total (as CaCO3)	----	1400	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Conductivity	----	10800	1.0	µS/cm	E100/EO	A 26-Jun-2023	26-Jun-2023	1008595
Hardness (as CaCO3), dissolved	----	2190	0.50	mg/L	EC100/EO	-	27-Jun-2023	-
pH	----	7.39	0.10	pH units	E108/EO	A 26-Jun-2023	26-Jun-2023	1008594
Solids, total dissolved [TDS], calculated	----	9170	1.0	mg/L	EC103/EO	-	26-Jun-2023	-
Solids, total suspended [TSS]	----	146	3.0	mg/L	E160/EO	A -	28-Jun-2023	1010542
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	8.39	0.250	mg/L	E298/EO	A 28-Jun-2023	28-Jun-2023	1014418
Chloride	16887-00-6	1720 ^{DLDS}	5.00	mg/L	E235.Cl/EO	A 26-Jun-2023	26-Jun-2023	1009842
Fluoride	16984-48-8	<0.200 ^{DLDS}	0.200	mg/L	E235.F/EO	A 26-Jun-2023	26-Jun-2023	1009843
Nitrate (as N)	14797-55-8	<0.200 ^{DLDS}	0.200	mg/L	E235.NO3/EO	A 26-Jun-2023	26-Jun-2023	1009839
Nitrate + Nitrite (as N)	----	<0.224	0.224	mg/L	EC235.N+N/EO	-	27-Jun-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{DLDS}	0.100	mg/L	E235.NO2/EO	A 26-Jun-2023	26-Jun-2023	1009840
Phosphorus, total	7723-14-0	0.632	0.0100	mg/L	E372-S/EO	A 28-Jun-2023	28-Jun-2023	1011158
Phosphorus, total dissolved	7723-14-0	0.166	0.0050	mg/L	E375-U/EO	A 28-Jun-2023	28-Jun-2023	1012755
Sulfate (as SO4)	14808-79-8	3060 ^{DLDS}	3.00	mg/L	E235.SO4/EO	A 26-Jun-2023	26-Jun-2023	1009841
Kjeldahl nitrogen, total [TKN]	----	97.1	10.0	mg/L	E318/EO	A 28-Jun-2023	28-Jun-2023	1010295
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	378	5.00	mg/L	E358-L/EO	A 27-Jun-2023	27-Jun-2023	1011732
Ion Balance								
Ion balance (cations/anions)	----	106	0.010	%	EC101/EO	-	26-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.198	0.00250	mg/L	E420/EO	A 27-Jun-2023	28-Jun-2023	1008934
Mercury, total	7439-97-6	0.000159 ^{RRV}	0.0000050	mg/L	E508/EO	A 26-Jun-2023	26-Jun-2023	1008357
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0142	0.0050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Antimony, dissolved	7440-36-0	<0.00050 ^{DLDS}	0.00050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027



Analytical Results

EO2305136-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 1 (SC1)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Dissolved Metals								
Arsenic, dissolved	7440-38-2	0.00825	0.00050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Barium, dissolved	7440-39-3	0.0909	0.00050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Beryllium, dissolved	7440-41-7	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Bismuth, dissolved	7440-69-9	<0.000250 ^{DLDS}	0.000250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Boron, dissolved	7440-42-8	12.0	0.050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Cadmium, dissolved	7440-43-9	0.0000294	0.0000250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Calcium, dissolved	7440-70-2	506	0.250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Cesium, dissolved	7440-46-2	<0.000050 ^{DLDS}	0.000050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Chromium, dissolved	7440-47-3	0.132	0.00250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Cobalt, dissolved	7440-48-4	1.92	0.00050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Copper, dissolved	7440-50-8	0.00220	0.00100	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Iron, dissolved	7439-89-6	39.2	0.050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Lead, dissolved	7439-92-1	0.0117	0.000250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Lithium, dissolved	7439-93-2	0.538	0.0050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Magnesium, dissolved	7439-95-4	226	0.0250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Manganese, dissolved	7439-96-5	28.3	0.00050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Molybdenum, dissolved	7439-98-7	0.0170	0.000250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Nickel, dissolved	7440-02-0	11.5	0.00250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Phosphorus, dissolved	7723-14-0	<0.250 ^{DLDS}	0.250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Potassium, dissolved	7440-09-7	22.4	0.250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Rubidium, dissolved	7440-17-7	0.00378	0.00100	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Selenium, dissolved	7782-49-2	0.000739	0.000250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Silicon, dissolved	7440-21-3	8.27	0.250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Silver, dissolved	7440-22-4	<0.000050 ^{DLDS}	0.000050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Sodium, dissolved	7440-23-5	2320	0.250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Strontium, dissolved	7440-24-6	3.08	0.00100	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Sulfur, dissolved	7704-34-9	1180	2.50	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Tellurium, dissolved	13494-80-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Thallium, dissolved	7440-28-0	<0.000050 ^{DLDS}	0.000050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Thorium, dissolved	7440-29-1	<0.00050 ^{DLDS}	0.00050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Tin, dissolved	7440-31-5	<0.00050 ^{DLDS}	0.00050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Titanium, dissolved	7440-32-6	0.00336	0.00150	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Tungsten, dissolved	7440-33-7	0.00056	0.00050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Uranium, dissolved	7440-61-1	0.0370	0.000050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Vanadium, dissolved	7440-62-2	0.0484	0.00250	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Zinc, dissolved	7440-66-6	0.651	0.0050	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Zirconium, dissolved	7440-67-7	0.0144	0.00100	mg/L	E421/EO	A 26-Jun-2023	26-Jun-2023	1009027
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	26-Jun-2023	1009027
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	A -	27-Jun-2023	1011734
Aggregate Organics								
Chemical oxygen demand [COD]	----	1160 ^{DLM}	20	mg/L	E559-L/EO	A -	27-Jun-2023	1010875
Phenols, total (4AAP)	----	0.0044	0.0010	mg/L	E562/EO	A 29-Jun-2023	29-Jun-2023	1015734
Volatile Organic Compounds								
Benzene	71-43-2	2.44	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502



Analytical Results

EO2305136-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 1 (SC1)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Volatile Organic Compounds								
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	A 26-Jun-2023	27-Jun-2023	1008503
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	29-Jun-2023	-
F2 (C10-C16)	----	480	100	µg/L	E601/EO	A 26-Jun-2023	27-Jun-2023	1008907
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	106	1.0	%	E601/EO	26-Jun-2023	27-Jun-2023	1008907
Dichlorotoluene, 3,4-	95-75-0	96.0	1.0	%	E581.F1/EO	26-Jun-2023	27-Jun-2023	1008503
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	101	1.0	%	E611A/EO	26-Jun-2023	27-Jun-2023	1008502
Difluorobenzene, 1,4-	540-36-3	96.8	1.0	%	E611A/EO	26-Jun-2023	27-Jun-2023	1008502

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305136-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 2 (SC2)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	10.7	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Alkalinity, total (as CaCO3)	----	8.8	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Conductivity	----	10600	1.0	µS/cm	E100/EO	A 26-Jun-2023	26-Jun-2023	1008595
Hardness (as CaCO3), dissolved	----	1690	0.50	mg/L	EC100/EO	-	27-Jun-2023	-
pH	----	5.41	0.10	pH units	E108/EO	A 26-Jun-2023	26-Jun-2023	1008594
Solids, total dissolved [TDS], calculated	----	9900	1.0	mg/L	EC103/EO	-	26-Jun-2023	-
Solids, total suspended [TSS]	----	163	3.0	mg/L	E160/EO	A -	28-Jun-2023	1010542
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	8.03	0.250	mg/L	E298/EO	A 28-Jun-2023	28-Jun-2023	1014418
Chloride	16887-00-6	192 ^{DLDS}	5.00	mg/L	E235.Cl/EO	A 26-Jun-2023	26-Jun-2023	1009842
Fluoride	16984-48-8	2.58 ^{DLDS}	0.200	mg/L	E235.F/EO	A 26-Jun-2023	26-Jun-2023	1009843
Nitrate (as N)	14797-55-8	0.552 ^{DLDS}	0.200	mg/L	E235.NO3/EO	A 26-Jun-2023	26-Jun-2023	1009839
Nitrate + Nitrite (as N)	----	0.552	0.224	mg/L	EC235.N+N/EO	-	27-Jun-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{DLDS}	0.100	mg/L	E235.NO2/EO	A 26-Jun-2023	26-Jun-2023	1009840
Phosphorus, total	7723-14-0	0.478	0.0100	mg/L	E372-S/EO	A 28-Jun-2023	28-Jun-2023	1011158
Phosphorus, total dissolved	7723-14-0	0.0581	0.0050	mg/L	E375-U/EO	A 28-Jun-2023	28-Jun-2023	1012755



Analytical Results

EO2305136-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 2 (SC2)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Anions and Nutrients								
Sulfate (as SO4)	14808-79-8	6240 ^{DLDS}	3.00	mg/L	E235.SO4/EO	A 26-Jun-2023	26-Jun-2023	1009841
Kjeldahl nitrogen, total [TKN]	----	11.8	2.00	mg/L	E318/EO	A 28-Jun-2023	28-Jun-2023	1010295
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	49.9	0.50	mg/L	E358-L/EO	A 27-Jun-2023	27-Jun-2023	1011732
Ion Balance								
Ion balance (cations/anions)	----	115	0.010	%	EC101/EO	-	26-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0240	0.00250	mg/L	E420/EO	A 27-Jun-2023	28-Jun-2023	1008934
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	A 26-Jun-2023	26-Jun-2023	1008357
Dissolved Metals								
Aluminum, dissolved	7429-90-5	2.37	0.0050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Antimony, dissolved	7440-36-0	0.00061	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Arsenic, dissolved	7440-38-2	0.00332	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Barium, dissolved	7440-39-3	0.174	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Beryllium, dissolved	7440-41-7	0.000291	0.000100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Bismuth, dissolved	7440-69-9	<0.000250 ^{DLDS}	0.000250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Boron, dissolved	7440-42-8	0.586	0.050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Cadmium, dissolved	7440-43-9	0.000276	0.0000250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Calcium, dissolved	7440-70-2	376	0.250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Cesium, dissolved	7440-46-2	0.000513	0.000050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Chromium, dissolved	7440-47-3	0.00270	0.00250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Cobalt, dissolved	7440-48-4	0.0810	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Copper, dissolved	7440-50-8	0.00641	0.00100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Iron, dissolved	7439-89-6	0.981	0.050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Lead, dissolved	7439-92-1	<0.000250 ^{DLDS}	0.000250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Lithium, dissolved	7439-93-2	0.471	0.0050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Magnesium, dissolved	7439-95-4	183	0.0250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Manganese, dissolved	7439-96-5	13.7	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Molybdenum, dissolved	7439-98-7	0.129	0.000250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Nickel, dissolved	7440-02-0	0.194	0.00250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Phosphorus, dissolved	7723-14-0	<0.250 ^{DLDS}	0.250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Potassium, dissolved	7440-09-7	29.8	0.250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Rubidium, dissolved	7440-17-7	0.0313	0.00100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Selenium, dissolved	7782-49-2	0.000481	0.000250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Silicon, dissolved	7440-21-3	17.4	0.250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Silver, dissolved	7440-22-4	<0.000050 ^{DLDS}	0.000050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Sodium, dissolved	7440-23-5	2750	0.250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Strontium, dissolved	7440-24-6	5.30	0.00100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Sulfur, dissolved	7704-34-9	2720	2.50	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Tellurium, dissolved	13494-80-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Thallium, dissolved	7440-28-0	0.000051	0.000050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Thorium, dissolved	7440-29-1	<0.00050 ^{DLDS}	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Tin, dissolved	7440-31-5	<0.00050 ^{DLDS}	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Titanium, dissolved	7440-32-6	<0.00150 ^{DLDS}	0.00150	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Tungsten, dissolved	7440-33-7	0.00148	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027



Analytical Results

EO2305136-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 2 (SC2)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Uranium, dissolved	7440-61-1	0.00519	0.000050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Vanadium, dissolved	7440-62-2	<0.00250 ^{DLDS}	0.00250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Zinc, dissolved	7440-66-6	0.354	0.0050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Zirconium, dissolved	7440-67-7	0.00120	0.00100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	26-Jun-2023	1009027
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	A -	27-Jun-2023	1011734
Aggregate Organics								
Chemical oxygen demand [COD]	----	216	10	mg/L	E559-L/EO	A -	27-Jun-2023	1010875
Phenols, total (4AAP)	----	0.0034	0.0010	mg/L	E562/EO	A 29-Jun-2023	29-Jun-2023	1015734
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	A 26-Jun-2023	27-Jun-2023	1008503
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	29-Jun-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	A 26-Jun-2023	27-Jun-2023	1008907
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	108	1.0	%	E601/EO	26-Jun-2023	27-Jun-2023	1008907
Dichlorotoluene, 3,4-	95-75-0	121	1.0	%	E581.F1/EO	26-Jun-2023	27-Jun-2023	1008503
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	73.6	1.0	%	E611A/EO	26-Jun-2023	27-Jun-2023	1008502
Diffuorobenzene, 1,4-	540-36-3	86.9	1.0	%	E611A/EO	26-Jun-2023	27-Jun-2023	1008502

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2305136-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3A (SC3A)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	924	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Alkalinity, total (as CaCO3)	----	758	1.0	mg/L	E290/EO	A 26-Jun-2023	26-Jun-2023	1008596
Conductivity	----	11500	1.0	µS/cm	E100/EO	A 26-Jun-2023	26-Jun-2023	1008595
Hardness (as CaCO3), dissolved	----	2080	0.50	mg/L	EC100/EO	-	27-Jun-2023	-
pH	----	7.52	0.10	pH units	E108/EO	A 26-Jun-2023	26-Jun-2023	1008594



Analytical Results

EO2305136-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3A (SC3A)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Physical Tests								
Solids, total dissolved [TDS], calculated	----	11100	1.0	mg/L	EC103/EO	-	26-Jun-2023	-
Solids, total suspended [TSS]	----	105	3.0	mg/L	E160/EO	A	28-Jun-2023	1010542
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	5.36	0.250	mg/L	E298/EO	A	28-Jun-2023	1014418
Chloride	16887-00-6	226 ^{DLDS}	5.00	mg/L	E235.Cl/EO	A	26-Jun-2023	1009842
Fluoride	16984-48-8	0.751 ^{DLDS}	0.200	mg/L	E235.F/EO	A	26-Jun-2023	1009843
Nitrate (as N)	14797-55-8	0.593 ^{DLDS}	0.200	mg/L	E235.NO3/EO	A	26-Jun-2023	1009839
Nitrate + Nitrite (as N)	----	0.593	0.224	mg/L	EC235.N+N/EO	-	27-Jun-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{DLDS}	0.100	mg/L	E235.NO2/EO	A	26-Jun-2023	1009840
Phosphorus, total	7723-14-0	0.118	0.0050	mg/L	E372-S/EO	A	28-Jun-2023	1011158
Phosphorus, total dissolved	7723-14-0	0.0460	0.0010	mg/L	E375-U/EO	A	28-Jun-2023	1012755
Sulfate (as SO4)	14808-79-8	6710 ^{DLDS}	3.00	mg/L	E235.SO4/EO	A	26-Jun-2023	1009841
Kjeldahl nitrogen, total [TKN]	----	10.2	2.00	mg/L	E318/EO	A	28-Jun-2023	1010295
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	59.4	0.50	mg/L	E358-L/EO	A	27-Jun-2023	1011732
Ion Balance								
Ion balance (cations/anions)	----	106	0.010	%	EC101/EO	-	26-Jun-2023	-
Total Metals								
Chromium, total	7440-47-3	0.00458	0.00250	mg/L	E420/EO	A	27-Jun-2023	1008934
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	A	26-Jun-2023	1008357
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0163	0.0050	mg/L	E421/EO	A	26-Jun-2023	1009027
Antimony, dissolved	7440-36-0	0.00124	0.00050	mg/L	E421/EO	A	26-Jun-2023	1009027
Arsenic, dissolved	7440-38-2	0.00281	0.00050	mg/L	E421/EO	A	26-Jun-2023	1009027
Barium, dissolved	7440-39-3	0.0688	0.00050	mg/L	E421/EO	A	26-Jun-2023	1009027
Beryllium, dissolved	7440-41-7	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	A	26-Jun-2023	1009027
Bismuth, dissolved	7440-69-9	<0.000250 ^{DLDS}	0.000250	mg/L	E421/EO	A	26-Jun-2023	1009027
Boron, dissolved	7440-42-8	0.188	0.050	mg/L	E421/EO	A	26-Jun-2023	1009027
Cadmium, dissolved	7440-43-9	0.0000398	0.0000250	mg/L	E421/EO	A	26-Jun-2023	1009027
Calcium, dissolved	7440-70-2	418	0.250	mg/L	E421/EO	A	26-Jun-2023	1009027
Cesium, dissolved	7440-46-2	<0.000050 ^{DLDS}	0.000050	mg/L	E421/EO	A	26-Jun-2023	1009027
Chromium, dissolved	7440-47-3	0.00256	0.00250	mg/L	E421/EO	A	26-Jun-2023	1009027
Cobalt, dissolved	7440-48-4	0.0126	0.00050	mg/L	E421/EO	A	26-Jun-2023	1009027
Copper, dissolved	7440-50-8	0.00296	0.00100	mg/L	E421/EO	A	26-Jun-2023	1009027
Iron, dissolved	7439-89-6	<0.050 ^{DLDS}	0.050	mg/L	E421/EO	A	26-Jun-2023	1009027
Lead, dissolved	7439-92-1	<0.000250 ^{DLDS}	0.000250	mg/L	E421/EO	A	26-Jun-2023	1009027
Lithium, dissolved	7439-93-2	0.513	0.0050	mg/L	E421/EO	A	26-Jun-2023	1009027
Magnesium, dissolved	7439-95-4	251	0.0250	mg/L	E421/EO	A	26-Jun-2023	1009027
Manganese, dissolved	7439-96-5	8.97	0.00050	mg/L	E421/EO	A	26-Jun-2023	1009027
Molybdenum, dissolved	7439-98-7	0.116	0.000250	mg/L	E421/EO	A	26-Jun-2023	1009027
Nickel, dissolved	7440-02-0	0.173	0.00250	mg/L	E421/EO	A	26-Jun-2023	1009027
Phosphorus, dissolved	7723-14-0	<0.250 ^{DLDS}	0.250	mg/L	E421/EO	A	26-Jun-2023	1009027
Potassium, dissolved	7440-09-7	31.2	0.250	mg/L	E421/EO	A	26-Jun-2023	1009027



Analytical Results

EO2305136-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3A (SC3A)

Client sampling date / time: 22-Jun-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Rubidium, dissolved	7440-17-7	0.0275	0.00100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Selenium, dissolved	7782-49-2	0.000797	0.000250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Silicon, dissolved	7440-21-3	8.30	0.250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Silver, dissolved	7440-22-4	<0.000050 ^{DLDS}	0.000050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Sodium, dissolved	7440-23-5	2950	0.250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Strontium, dissolved	7440-24-6	5.47	0.00100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Sulfur, dissolved	7704-34-9	2850	2.50	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Tellurium, dissolved	13494-80-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Thallium, dissolved	7440-28-0	<0.000050 ^{DLDS}	0.000050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Thorium, dissolved	7440-29-1	<0.00050 ^{DLDS}	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Tin, dissolved	7440-31-5	0.00265	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Titanium, dissolved	7440-32-6	<0.00150 ^{DLDS}	0.00150	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Tungsten, dissolved	7440-33-7	0.00446	0.00050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Uranium, dissolved	7440-61-1	0.0512	0.000050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Vanadium, dissolved	7440-62-2	<0.00250 ^{DLDS}	0.00250	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Zinc, dissolved	7440-66-6	0.138	0.0050	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Zirconium, dissolved	7440-67-7	0.00307	0.00100	mg/L	E421/EO	A 26-Jun-2023	27-Jun-2023	1009027
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	26-Jun-2023	1009027
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	A -	27-Jun-2023	1011734
Aggregate Organics								
Chemical oxygen demand [COD]	----	206	10	mg/L	E559-L/EO	A -	27-Jun-2023	1010875
Phenols, total (4AAP)	----	0.0047	0.0010	mg/L	E562/EO	A 29-Jun-2023	29-Jun-2023	1015734
Volatile Organic Compounds								
Benzene	71-43-2	1.42	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	A 26-Jun-2023	27-Jun-2023	1008502
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	A 26-Jun-2023	27-Jun-2023	1008503
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	29-Jun-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	A 26-Jun-2023	27-Jun-2023	1008907
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	108	1.0	%	E601/EO	26-Jun-2023	27-Jun-2023	1008907
Dichlorotoluene, 3,4-	95-75-0	130	1.0	%	E581.F1/EO	26-Jun-2023	27-Jun-2023	1008503
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	72.3	1.0	%	E611A/EO	26-Jun-2023	27-Jun-2023	1008502
Difluorobenzene, 1,4-	540-36-3	88.6	1.0	%	E611A/EO	26-Jun-2023	27-Jun-2023	1008502

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2305136</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Secondary Leachate Qtr 2 2023</p> <p>PO : 234479</p> <p>C-O-C number : ----</p> <p>Sampler : Murray</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 8</p> <p>No. of samples analysed : 8</p>	<p>Page : 1 of 31</p> <p>Laboratory : Edmonton - Environmental</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 21-Jun-2023 10:41</p> <p>Issue Date : 04-Jul-2023 16:45</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Dissolved Metals	QC-1009027-002	----	Boron, dissolved	7440-42-8	E421	79.8 % ^{MES}	80.0-120%	Recovery less than lower control limit

Result Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E559-L	20-Jun-2023	----	----	----		23-Jun-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E559-L	20-Jun-2023	----	----	----		23-Jun-2023	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E559-L	22-Jun-2023	----	----	----		27-Jun-2023	28 days	5 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E559-L	22-Jun-2023	----	----	----		27-Jun-2023	28 days	5 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E559-L	22-Jun-2023	----	----	----		27-Jun-2023	28 days	5 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E559-L	20-Jun-2023	----	----	----		27-Jun-2023	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E559-L	20-Jun-2023	----	----	----		27-Jun-2023	28 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E559-L	20-Jun-2023	----	----	----		27-Jun-2023	28 days	7 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E562	22-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	8 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E562	22-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	8 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E562	22-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	8 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E562	20-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	9 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E562	20-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	9 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E562	20-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	9 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E562	20-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	9 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E562	20-Jun-2023	29-Jun-2023	----	----		29-Jun-2023	28 days	9 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E298	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E298	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E298	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E298	20-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	8 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E298	20-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	8 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E298	20-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	8 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E298	20-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	8 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E298	20-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	8 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.Cl	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.Cl	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.Cl	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.Cl	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.F	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.F	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.F	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.F	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.NO3	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.NO3	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	3 days	5 days	* EHT	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.NO3	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	3 days	5 days	* EHT	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.NO3	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	3 days	5 days	* EHT	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.NO2	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.NO2	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	3 days	5 days	* EHT	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.NO2	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	3 days	5 days	* EHT	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.NO2	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	3 days	5 days	* EHT	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.SO4	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Sulfate in Water by IC										
HDPE Secondary Leachate Cell 1 (SC1)	E235.SO4	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE Secondary Leachate Cell 2 (SC2)	E235.SO4	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE Secondary Leachate Cell 3A (SC3A)	E235.SO4	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E375-U	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E375-U	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E375-U	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E375-U	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E318	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E318	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E318	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E318	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E372-S	20-Jun-2023	24-Jun-2023	----	----		26-Jun-2023	28 days	6 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E372-S	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E372-S	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E372-S	22-Jun-2023	28-Jun-2023	----	----		28-Jun-2023	28 days	7 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Secondary Leachate Cell 1 (SC1)	E421	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Secondary Leachate Cell 2 (SC2)	E421	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Secondary Leachate Cell 3A (SC3A)	E421	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E421	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E421	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E421	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E421	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 4 (SC4)	E421	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3B (SC3B)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3C (SC3C)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3D (SC3D)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3E (SC3E)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 4 (SC4)	E581.F1	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 1 (SC1)	E581.F1	22-Jun-2023	26-Jun-2023	----	----		27-Jun-2023	14 days	6 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 2 (SC2)	E581.F1	22-Jun-2023	26-Jun-2023	----	----		27-Jun-2023	14 days	6 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3A (SC3A)	E581.F1	22-Jun-2023	26-Jun-2023	----	----		27-Jun-2023	14 days	6 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 3B (SC3B)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 3C (SC3C)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 3D (SC3D)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 3E (SC3E)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 4 (SC4)	E601	20-Jun-2023	22-Jun-2023	14 days	2 days	✔	22-Jun-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 1 (SC1)	E601	22-Jun-2023	26-Jun-2023	15 days	5 days	✔	27-Jun-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 2 (SC2)	E601	22-Jun-2023	26-Jun-2023	15 days	5 days	✔	27-Jun-2023	40 days	1 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3A (SC3A)	E601	22-Jun-2023	26-Jun-2023	15 days	5 days	✔	27-Jun-2023	40 days	1 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E358-L	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	28 days	3 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E358-L	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	28 days	3 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E358-L	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	28 days	3 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E358-L	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	28 days	3 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E358-L	20-Jun-2023	22-Jun-2023	----	----		24-Jun-2023	28 days	4 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E358-L	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	6 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E358-L	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	6 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E358-L	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	6 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 1 (SC1)	E290	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	14 days	5 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 2 (SC2)	E290	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	14 days	5 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Secondary Leachate Cell 3A (SC3A)	E290	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	14 days	5 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E290	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	14 days	7 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E290	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	14 days	7 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E290	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	14 days	7 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E290	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	14 days	7 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E290	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	14 days	7 days	✔
Physical Tests : Conductivity in Water										
HDPE Secondary Leachate Cell 1 (SC1)	E100	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔
Physical Tests : Conductivity in Water										
HDPE Secondary Leachate Cell 2 (SC2)	E100	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔
Physical Tests : Conductivity in Water										
HDPE Secondary Leachate Cell 3A (SC3A)	E100	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔
Physical Tests : Conductivity in Water										
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E100	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔
Physical Tests : Conductivity in Water										
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E100	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E100	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✓	
Physical Tests : Conductivity in Water											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E100	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✓	
Physical Tests : Conductivity in Water											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E100	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	28 days	7 days	✓	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E108	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	0.25 hrs	0.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E108	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	0.25 hrs	0.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E108	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	0.25 hrs	0.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E108	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	0.25 hrs	0.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E108	20-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	0.25 hrs	0.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 1 (SC1)	E108	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	0.25 hrs	3.25 hrs	* EHT	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 2 (SC2)	E108	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	0.25 hrs	3.25 hrs	*	EHT
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3A (SC3A)	E108	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	0.25 hrs	3.25 hrs	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 1 (SC1)	E160	22-Jun-2023	----	----	----		28-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 2 (SC2)	E160	22-Jun-2023	----	----	----		28-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3A (SC3A)	E160	22-Jun-2023	----	----	----		28-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E160	20-Jun-2023	----	----	----		26-Jun-2023	7 days	6 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 3B (SC3B)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 3C (SC3C)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 3D (SC3D)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 3E (SC3E)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 4 (SC4)	E532A	20-Jun-2023	----	----	----		22-Jun-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 1 (SC1)	E532A	22-Jun-2023	----	----	----		27-Jun-2023	28 days	5 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 2 (SC2)	E532A	22-Jun-2023	----	----	----		27-Jun-2023	28 days	5 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3A (SC3A)	E532A	22-Jun-2023	----	----	----		27-Jun-2023	28 days	5 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 4 (SC4)	E508	20-Jun-2023	22-Jun-2023	----	----		22-Jun-2023	28 days	2 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 1 (SC1)	E508	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 2 (SC2)	E508	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3A (SC3A)	E508	22-Jun-2023	26-Jun-2023	----	----		26-Jun-2023	28 days	5 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E420	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E420	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E420	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E420	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 4 (SC4)	E420	20-Jun-2023	24-Jun-2023	----	----		25-Jun-2023	180 days	5 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 1 (SC1)	E420	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	180 days	6 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 2 (SC2)	E420	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	180 days	6 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Secondary Leachate Cell 3A (SC3A)	E420	22-Jun-2023	27-Jun-2023	----	----		27-Jun-2023	180 days	6 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3B (SC3B)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3C (SC3C)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3D (SC3D)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3E (SC3E)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 4 (SC4)	E611A	20-Jun-2023	22-Jun-2023	----	----		23-Jun-2023	14 days	3 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 1 (SC1)	E611A	22-Jun-2023	26-Jun-2023	----	----		27-Jun-2023	14 days	6 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 2 (SC2)	E611A	22-Jun-2023	26-Jun-2023	----	----		27-Jun-2023	14 days	6 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3A (SC3A)	E611A	22-Jun-2023	26-Jun-2023	----	----		27-Jun-2023	14 days	6 days	✓	

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 EHT: Exceeded ALS recommended hold time prior to analysis.
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1008596	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	1014418	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1002878	2	40	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1002879	2	40	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1004729	2	40	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1002708	1	16	6.2	5.0	✓
Conductivity in Water	E100	1008595	1	17	5.8	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1003507	2	25	8.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1005162	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1003616	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1002706	1	16	6.2	5.0	✓
Nitrate in Water by IC	E235.NO3	1002705	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1002709	1	17	5.8	5.0	✓
pH by Meter	E108	1008594	1	19	5.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1015734	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1002707	1	16	6.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1006889	2	28	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1004718	2	40	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1002429	3	53	5.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	1005164	1	10	10.0	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1006886	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1008944	2	22	9.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1008596	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	1014418	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1002878	2	40	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1002879	2	40	5.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1002391	2	36	5.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1004729	2	40	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1002708	1	16	6.2	5.0	✓
Conductivity in Water	E100	1008595	1	17	5.8	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1003507	2	25	8.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1005162	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1003616	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1002706	1	16	6.2	5.0	✓
Nitrate in Water by IC	E235.NO3	1002705	1	18	5.5	5.0	✓



Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	1002709	1	17	5.8	5.0	✓
pH by Meter	E108	1008594	1	19	5.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1015734	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1002707	1	16	6.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1006889	2	28	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1004718	2	40	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1002429	3	53	5.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	1005164	1	10	10.0	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1006886	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1008944	2	22	9.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1008596	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	1014418	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1002878	2	40	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1002879	2	40	5.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1002391	2	36	5.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1004729	2	40	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1002708	1	16	6.2	5.0	✓
Conductivity in Water	E100	1008595	1	17	5.8	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1003507	2	25	8.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1005162	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1003616	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1002706	1	16	6.2	5.0	✓
Nitrate in Water by IC	E235.NO3	1002705	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1002709	1	17	5.8	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1015734	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1002707	1	16	6.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1006889	2	28	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1004718	2	40	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1002429	3	53	5.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	1005164	1	10	10.0	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1006886	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1008944	2	22	9.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1014418	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1002878	2	40	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1004729	2	40	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1002708	1	16	6.2	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1003507	2	25	8.0	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	1005162	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1003616	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	1002706	1	16	6.2	5.0	✔
Nitrate in Water by IC	E235.NO3	1002705	1	18	5.5	5.0	✔
Nitrite in Water by IC	E235.NO2	1002709	1	17	5.8	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1015734	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1002707	1	16	6.2	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1006889	2	28	7.1	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1004718	2	40	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1002429	3	53	5.6	5.0	✔
Total metals in Water by CRC ICPMS	E420	1005164	1	10	10.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1006886	2	40	5.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Edmonton - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Edmonton - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Edmonton - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Edmonton - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Edmonton - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Calgary - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U Edmonton - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total metals in Water by CRC ICPMS	E420 Calgary - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Calgary - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Edmonton - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A Edmonton - Environmental	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Edmonton - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Phenols (4AAP) in Water by Colorimetry	E562 Edmonton - Environmental	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
CCME PHC - F1 by Headspace GC-FID	E581.F1 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A Edmonton - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Calgary - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Calgary - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 Edmonton - Environmental	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Calgary - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 Edmonton - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Edmonton - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Edmonton - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Edmonton - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Edmonton - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Edmonton - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
VOCs Preparation for Headspace Analysis	EP581 Edmonton - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Edmonton - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2305136	Page	: 1 of 26
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 2 2023	Date Samples Received	: 21-Jun-2023 10:41
PO	: 234479	Date Analysis Commenced	: 22-Jun-2023
C-O-C number	: ----	Issue Date	: 04-Jul-2023 16:44
Sampler	: Murray 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
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General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1008594)											
FC2301695-013	Anonymous	pH	----	E108	0.10	pH units	7.91	7.88	0.380%	3%	----
Physical Tests (QC Lot: 1008595)											
FC2301695-013	Anonymous	Conductivity	----	E100	1.0	µS/cm	1990	1960	1.57%	10%	----
Physical Tests (QC Lot: 1008596)											
FC2301695-013	Anonymous	Alkalinity, total (as CaCO ₃)	----	E290	1.0	mg/L	152	150	1.39%	20%	----
Physical Tests (QC Lot: 1008944)											
EO2305079-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	89.2	87.0	2.50%	20%	----
Physical Tests (QC Lot: 1010542)											
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Solids, total suspended [TSS]	----	E160	3.0	mg/L	146	139	4.64%	20%	----
Physical Tests (QC Lot: 1011171)											
CG2308423-001	Anonymous	pH	----	E108	0.10	pH units	8.59	8.61	0.232%	4%	----
Physical Tests (QC Lot: 1011172)											
CG2308423-001	Anonymous	Conductivity	----	E100	1.0	µS/cm	3790	3730	1.60%	10%	----
Physical Tests (QC Lot: 1011173)											
CG2308423-001	Anonymous	Alkalinity, total (as CaCO ₃)	----	E290	1.0	mg/L	494	518	4.72%	20%	----
Physical Tests (QC Lot: 1011585)											
CG2308501-005	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	13.9	13.7	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1002705)											
CG2308304-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	7.26	7.27	0.179%	20%	----
Anions and Nutrients (QC Lot: 1002706)											
CG2308304-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.095	0.094	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1002707)											
CG2308304-001	Anonymous	Sulfate (as SO ₄)	14808-79-8	E235.SO4	0.30	mg/L	11.8	11.8	0.667%	20%	----
Anions and Nutrients (QC Lot: 1002708)											
CG2308304-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	2.97	2.92	0.05	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1002709)											
CG2308304-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1004718)											
EO2305079-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.00	mg/L	30.3	27.2	10.7%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 1006886)											
EO2305125-002	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0100	mg/L	0.327	0.363	10.4%	20%	----
Anions and Nutrients (QC Lot: 1006889)											
EO2304961-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	0.0050	mg/L	0.111	0.112	0.573%	20%	----
Anions and Nutrients (QC Lot: 1009839)											
EO2305334-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	1.32	1.32	0.167%	20%	----
Anions and Nutrients (QC Lot: 1009840)											
EO2305334-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	0.149	0.147	1.75%	20%	----
Anions and Nutrients (QC Lot: 1009841)											
EO2305334-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	143	144	0.824%	20%	----
Anions and Nutrients (QC Lot: 1009842)											
EO2305334-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	39.7	39.6	0.237%	20%	----
Anions and Nutrients (QC Lot: 1009843)											
EO2305334-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.229	0.220	4.01%	20%	----
Anions and Nutrients (QC Lot: 1010295)											
EO2304441-008	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	1.63	1.86	13.2%	20%	----
Anions and Nutrients (QC Lot: 1011158)											
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Phosphorus, total	7723-14-0	E372-S	0.0100	mg/L	0.632	0.743	16.2%	20%	----
Anions and Nutrients (QC Lot: 1012755)											
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Phosphorus, total dissolved	7723-14-0	E375-U	0.0050	mg/L	0.166	0.181	8.62%	20%	----
Anions and Nutrients (QC Lot: 1014418)											
FC2301680-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0281	0.0299	0.0018	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1003616)											
EO2305134-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	50.0	mg/L	5240	5240	0.0633%	20%	----
Organic / Inorganic Carbon (QC Lot: 1011732)											
EO2304441-008	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	22.4	21.7	2.96%	20%	----
Total Metals (QC Lot: 1002429)											
EO2305127-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1002430)											
EO2305136-005	SECONDARY LEACHATE CELL 4 (SC4)	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1005164)											
CG2308270-001	Anonymous	Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1008357)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 1008357) - continued											
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Mercury, total	7439-97-6	E508	0.0000050	mg/L	0.000159	0.000158	0.631%	20%	----
Total Metals (QC Lot: 1008934)											
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Chromium, total	7440-47-3	E420	0.00250	mg/L	0.198	0.176	11.8%	20%	----
Dissolved Metals (QC Lot: 1005162)											
CG2308270-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00013	0.00012	0.000005	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.138	0.142	2.42%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0340 µg/L	0.0000338	0.0000002	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	76.5	77.5	1.20%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00056	0.00058	0.00002	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.010	0.0002	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0043	0.0043	0.000006	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	29.9	29.7	0.462%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00197	0.00196	0.523%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00194	0.00192	1.09%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.855	0.840	1.78%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00027	0.00026	0.00001	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	8.58 µg/L	0.00845	1.48%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.06	4.08	0.526%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.61	1.55	3.80%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.132	0.132	0.451%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	39.1	39.3	0.484%	20%	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1005162) - continued											
CG2308270-001	Anonymous	Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000012	0.000011	0.0000003	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00117	0.00120	2.39%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0036	0.0035	0.00002	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1009027)											
EO2304441-008	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0012	0.0013	0.0002	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00024	0.00019	0.00004	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00019	0.00020	0.000007	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0838	0.0847	1.06%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.407	0.418	2.61%	20%	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000359	0.0000333	0.0000027	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	286	282	1.52%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00117	0.00119	0.00002	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00037	0.00038	0.000008	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00681	0.00691	1.42%	20%	----
		Iron, dissolved	7439-89-6	E421	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0701	0.0693	1.05%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	125	128	2.28%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00500	mg/L	0.0121	0.0123	0.00023	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00473	0.00474	0.0950%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00563	0.00586	3.98%	20%	----
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----		
Potassium, dissolved	7440-09-7	E421	0.050	mg/L	23.5	23.6	0.248%	20%	----		
Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00067	0.00068	0.000006	Diff <2x LOR	----		



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1009027) - continued											
EO2304441-008	Anonymous	Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000248	0.000191	0.000056	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	11.0	11.1	0.329%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	86.8	89.5	3.01%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.919	0.917	0.219%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	172	173	0.591%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00358	0.00352	1.68%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0016	0.0013	0.0003	Diff <2x LOR	----		
Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----		
Speciated Metals (QC Lot: 1003507)											
EO2305136-005	SECONDARY LEACHATE CELL 4 (SC4)	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 1011734)											
SK2303065-047	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1004729)											
EO2305127-004	Anonymous	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	50	53	2	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1010875)											
EO2304441-008	Anonymous	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	50	52	2	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1015734)											
CG2308423-005	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1002878)											
EO2305134-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	11.0	11.5	4.06%	30%	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	1.08	1.07	0.007	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	6.45	6.75	4.51%	30%	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	2.34	2.41	0.08	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	2.06	2.07	0.223%	30%	----
Volatile Organic Compounds (QC Lot: 1008502)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 1008502) - continued											
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Benzene	71-43-2	E611A	0.50	µg/L	2.44	2.33	0.10	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1002879)											
EO2305134-001	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	480	480	3	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1008503)											
EO2305136-006	Secondary Leachate Cell 1 (SC1)	F1 (C6-C10)	----	E581.F1	100	µg/L	<100	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1008595)						
Conductivity	---	E100	1	µS/cm	0.86	---
Physical Tests (QCLot: 1008596)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1008944)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Physical Tests (QCLot: 1010542)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Physical Tests (QCLot: 1011172)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1011173)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1011585)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 1002705)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1002706)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1002707)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1002708)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1002709)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1004718)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1006886)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1006889)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1009839)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1009840)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1009840) - continued						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1009841)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1009842)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1009843)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1010295)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1011158)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1012755)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1014418)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 1003616)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1011732)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1002429)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 1002430)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 1005164)						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Total Metals (QCLot: 1008357)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 1008934)						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Dissolved Metals (QCLot: 1005162)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1005162) - continued						
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1009027)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1009027) - continued						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1009027) - continued						
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 1003507)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Speciated Metals (QCLot: 1011734)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 1004729)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Aggregate Organics (QCLot: 1010875)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Aggregate Organics (QCLot: 1015734)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Volatile Organic Compounds (QCLot: 1002878)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Volatile Organic Compounds (QCLot: 1008502)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 1002391)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 1002879)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1008503)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1008907)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----

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Work Order : EO2305136
Client : Clean Harbors Environmental Services, Inc.
Project : Secondary Leachate Qtr 2 2023





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 1008594)									
pH	----	E108	----	pH units	6 pH units	101	97.0	103	----
Physical Tests (QCLot: 1008595)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	105	90.0	110	----
Physical Tests (QCLot: 1008596)									
Alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 1008944)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	89.8	85.0	115	----
Physical Tests (QCLot: 1010542)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	104	85.0	115	----
Physical Tests (QCLot: 1011171)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1011172)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1011173)									
Alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	96.8	85.0	115	----
Physical Tests (QCLot: 1011585)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	96.2	85.0	115	----
Anions and Nutrients (QCLot: 1002705)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1002706)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1002707)									
Sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1002708)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1002709)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	97.4	90.0	110	----
Anions and Nutrients (QCLot: 1004718)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	95.5	75.0	125	----
Anions and Nutrients (QCLot: 1006886)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	104	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low High		Qualifier
Analyte	CAS Number	Method	LOR	Unit					
Anions and Nutrients (QCLot: 1006889)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	111	80.0	120	----
Anions and Nutrients (QCLot: 1009839)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	92.5	90.0	110	----
Anions and Nutrients (QCLot: 1009840)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	93.1	90.0	110	----
Anions and Nutrients (QCLot: 1009841)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	95.1	90.0	110	----
Anions and Nutrients (QCLot: 1009842)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	95.3	90.0	110	----
Anions and Nutrients (QCLot: 1009843)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1010295)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	96.0	75.0	125	----
Anions and Nutrients (QCLot: 1011158)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	108	80.0	120	----
Anions and Nutrients (QCLot: 1012755)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 1014418)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.9	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1003616)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	92.8	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1011732)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	98.1	80.0	120	----
Total Metals (QCLot: 1002429)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	108	80.0	120	----
Total Metals (QCLot: 1002430)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.7	80.0	120	----
Total Metals (QCLot: 1005164)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	96.2	80.0	120	----
Total Metals (QCLot: 1008357)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	93.6	80.0	120	----
Total Metals (QCLot: 1008934)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1005162)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	93.7	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	91.3	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	94.8	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	97.4	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	89.7	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	89.6	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	94.6	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	92.4	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	90.9	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	89.4	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	91.4	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	92.1	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	88.9	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	110	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	91.1	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	95.4	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	96.0	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	91.4	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	92.3	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	91.6	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	97.2	70.0	130	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	94.4	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	94.0	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	90.7	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	94.7	60.0	140	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	86.6	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	94.1	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	96.2	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	99.0	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	88.8	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	90.6	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	91.0	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	92.8	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	87.3	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	92.4	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1005162) - continued									
Uranium, dissolved	7440-61-1	E421	0.0001	mg/L	0.005 mg/L	86.8	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	94.6	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.1	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	93.0	80.0	120	----
Dissolved Metals (QCLot: 1009027)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	108	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.7	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.8	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	97.0	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	83.2	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.7	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	# 79.8	80.0	120	MES
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.5	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	96.9	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	100	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.6	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	95.7	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	94.4	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	97.0	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	96.9	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	84.9	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	104	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.7	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	96.6	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	97.8	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	99.5	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	104	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	98.3	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	88.4	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	101	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	92.2	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	89.9	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 1009027) - continued									
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	98.7	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.6	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	94.8	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	89.8	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	96.8	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.4	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	92.1	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.6	80.0	120	----
Speciated Metals (QCLot: 1003507)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Speciated Metals (QCLot: 1011734)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
Aggregate Organics (QCLot: 1004729)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	111	85.0	115	----
Aggregate Organics (QCLot: 1010875)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	108	85.0	115	----
Aggregate Organics (QCLot: 1015734)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	104	85.0	115	----
Volatile Organic Compounds (QCLot: 1002878)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	102	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	107	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	99.7	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	99.0	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	112	70.0	130	----
Volatile Organic Compounds (QCLot: 1008502)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	81.8	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	85.1	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	103	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	84.1	70.0	130	----
Hydrocarbons (QCLot: 1002391)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	115	70.0	130	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					<i>Spike</i>	<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		<i>Qualifier</i>
<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Concentration</i>	<i>LCS</i>	<i>Low</i>	<i>High</i>	
Hydrocarbons (QCLot: 1002879)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	94.0	70.0	130	----
Hydrocarbons (QCLot: 1008503)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	104	70.0	130	----
Hydrocarbons (QCLot: 1008907)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	111	70.0	130	----

Qualifiers

<i>Qualifier</i>	<i>Description</i>
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1002705)										
CG2308304-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	ND mg/L	2.5 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1002706)										
CG2308304-002	Anonymous	Fluoride	16984-48-8	E235.F	0.951 mg/L	1 mg/L	95.1	75.0	125	----
Anions and Nutrients (QCLot: 1002707)										
CG2308304-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	91.8 mg/L	100 mg/L	91.8	75.0	125	----
Anions and Nutrients (QCLot: 1002708)										
CG2308304-002	Anonymous	Chloride	16887-00-6	E235.Cl	93.0 mg/L	100 mg/L	93.0	75.0	125	----
Anions and Nutrients (QCLot: 1002709)										
CG2308304-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.468 mg/L	0.5 mg/L	93.7	75.0	125	----
Anions and Nutrients (QCLot: 1004718)										
EO2305125-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.80 mg/L	2.5 mg/L	112	70.0	130	----
Anions and Nutrients (QCLot: 1006886)										
EO2305134-001	Anonymous	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1006889)										
EO2305022-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-U	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1009839)										
EO2305334-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.29 mg/L	2.5 mg/L	91.6	75.0	125	----
Anions and Nutrients (QCLot: 1009840)										
EO2305334-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.463 mg/L	0.5 mg/L	92.7	75.0	125	----
Anions and Nutrients (QCLot: 1009841)										
EO2305334-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1009842)										
EO2305334-001	Anonymous	Chloride	16887-00-6	E235.Cl	89.7 mg/L	100 mg/L	89.7	75.0	125	----
Anions and Nutrients (QCLot: 1009843)										
EO2305334-001	Anonymous	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1010295)										
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1011158)										
EO2305136-007	Secondary Leachate Cell 2 (SC2)	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1012755)										
EO2305136-007	Secondary Leachate Cell 2 (SC2)	Phosphorus, total dissolved	7723-14-0	E375-U	0.0725 mg/L	0.067 mg/L	108	70.0	130	----
Anions and Nutrients (QCLot: 1014418)										
FC2301680-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.112 mg/L	0.1 mg/L	112	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1003616)										
EO2305134-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1011732)										
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1002429)										
EO2305127-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000981 mg/L	0.0001 mg/L	98.1	70.0	130	----
Total Metals (QCLot: 1002430)										
EO2305136-005	SECONDARY LEACHATE CELL 4 (SC4)	Mercury, total	7439-97-6	E508	0.0000954 mg/L	0.0001 mg/L	95.4	70.0	130	----
Total Metals (QCLot: 1005164)										
CG2308270-002	Anonymous	Chromium, total	7440-47-3	E420	0.492 mg/L	0.4 mg/L	123	70.0	130	----
Total Metals (QCLot: 1008357)										
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Mercury, total	7439-97-6	E508	ND mg/L	0.0001 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1008934)										
EO2305136-006	Secondary Leachate Cell 1 (SC1)	Chromium, total	7440-47-3	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 1005162)										
CG2308270-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	1.67 mg/L	2 mg/L	83.3	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.171 mg/L	0.2 mg/L	85.4	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.169 mg/L	0.2 mg/L	84.4	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.171 mg/L	0.2 mg/L	85.5	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.326 mg/L	0.4 mg/L	81.4	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0890 mg/L	0.1 mg/L	89.0	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.909 mg/L	1 mg/L	90.9	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.0346 mg/L	0.04 mg/L	86.5	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	40 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1005162) - continued										
CG2308270-002	Anonymous	Cesium, dissolved	7440-46-2	E421	0.0868 mg/L	0.1 mg/L	86.8	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.338 mg/L	0.4 mg/L	84.4	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.171 mg/L	0.2 mg/L	85.6	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.166 mg/L	0.2 mg/L	83.2	70.0	130	----
		Iron, dissolved	7439-89-6	E421	16.9 mg/L	20 mg/L	84.3	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.173 mg/L	0.2 mg/L	86.4	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.828 mg/L	1 mg/L	82.8	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.168 mg/L	0.2 mg/L	84.1	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.168 mg/L	0.2 mg/L	84.1	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.344 mg/L	0.4 mg/L	86.0	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	89.5 mg/L	100 mg/L	89.5	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	33.5 mg/L	40 mg/L	83.8	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.173 mg/L	0.2 mg/L	86.5	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.354 mg/L	0.4 mg/L	88.4	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	78.0 mg/L	100 mg/L	78.0	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.0350 mg/L	0.04 mg/L	87.5	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	17.3 mg/L	20 mg/L	86.7	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	163 mg/L	200 mg/L	81.5	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.358 mg/L	0.4 mg/L	89.6	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.0338 mg/L	0.04 mg/L	84.5	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.179 mg/L	0.2 mg/L	89.4	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.170 mg/L	0.2 mg/L	85.0	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.356 mg/L	0.4 mg/L	89.1	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.181 mg/L	0.2 mg/L	90.3	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.0338 mg/L	0.04 mg/L	84.6	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.853 mg/L	1 mg/L	85.3	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	3.56 mg/L	4 mg/L	89.0	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.354 mg/L	0.4 mg/L	88.6	70.0	130	----
Dissolved Metals (QCLot: 1009027)										
EO2304441-008	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.224 mg/L	0.2 mg/L	112	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0209 mg/L	0.02 mg/L	105	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1009027) - continued										
EO2304441-008	Anonymous	Beryllium, dissolved	7440-41-7	E421	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00918 mg/L	0.01 mg/L	91.8	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00403 mg/L	0.004 mg/L	101	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0186 mg/L	0.02 mg/L	93.3	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0180 mg/L	0.02 mg/L	90.0	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.95 mg/L	2 mg/L	97.5	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.108 mg/L	0.1 mg/L	108	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.7 mg/L	10 mg/L	107	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0443 mg/L	0.04 mg/L	111	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00399 mg/L	0.004 mg/L	99.9	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0410 mg/L	0.04 mg/L	102	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00393 mg/L	0.004 mg/L	98.2	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0400 mg/L	0.04 mg/L	99.9	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0213 mg/L	0.02 mg/L	106	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00404 mg/L	0.004 mg/L	101	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.106 mg/L	0.1 mg/L	106	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.354 mg/L	0.4 mg/L	88.5	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0428 mg/L	0.04 mg/L	107	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Speciated Metals (QCLot: 1003507)										
EO2305136-005	SECONDARY LEACHATE CELL 4 (SC4)	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0480 mg/L	0.05 mg/L	96.0	70.0	130	----
Speciated Metals (QCLot: 1011734)										
SK2303065-047	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0504 mg/L	0.05 mg/L	101	70.0	130	----
Aggregate Organics (QCLot: 1004729)										
EO2305127-005	Anonymous	Chemical oxygen demand [COD]	----	E559-L	108 mg/L	100 mg/L	108	75.0	125	----
Aggregate Organics (QCLot: 1010875)										
EO2305136-003	SECONDARY LEACHATE CELL 3D (SC3D)	Chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----
Aggregate Organics (QCLot: 1015734)										
CG2308423-005	Anonymous	Phenols, total (4AAP)	----	E562	0.0193 mg/L	0.02 mg/L	96.4	75.0	125	----
Volatile Organic Compounds (QCLot: 1002878)										
EO2305134-002	Anonymous	Benzene	71-43-2	E611A	87.7 µg/L	100 µg/L	87.7	50.0	140	----
		Ethylbenzene	100-41-4	E611A	110 µg/L	100 µg/L	110	50.0	140	----
		Toluene	108-88-3	E611A	ND µg/L	100 µg/L	ND	50.0	140	MS-B
		Xylene, m+p-	179601-23-1	E611A	176 µg/L	200 µg/L	88.0	50.0	140	----
		Xylene, o-	95-47-6	E611A	101 µg/L	100 µg/L	101	50.0	140	----
Volatile Organic Compounds (QCLot: 1008502)										
EO2305136-007	Secondary Leachate Cell 2 (SC2)	Benzene	71-43-2	E611A	112 µg/L	100 µg/L	112	50.0	140	----
		Ethylbenzene	100-41-4	E611A	80.7 µg/L	100 µg/L	80.7	50.0	140	----
		Toluene	108-88-3	E611A	95.7 µg/L	100 µg/L	95.7	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	207 µg/L	200 µg/L	104	50.0	140	----
		Xylene, o-	95-47-6	E611A	87.8 µg/L	100 µg/L	87.8	50.0	140	----

Qualifiers

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Report To: Contact and company name below will appear on the final report

Company: Clean Harbors Canada

Contact: Todd Webb, Stan Yuha

Phone: (780) 663-2513

Street: PO Box 390, 50114 Range Road 173

City/Province: Ryley, AB

Postal Code: T0B 4A0

Invoice To: Same as Report To

Company: Clean Harbors Canada

Contact: Stephanie Dennis

ALS Account # / Quote #: EO22-CHE3100-008

Job #: Secondary Leachate Qtr 2 2023

PO / AFE: 234479

LSD: Table 4.4A

ALS Lab Work Order # (ALS use only): EO2305136

ALS Sample # (ALS use only):

Sample Identification and/or Coordinates (This description will appear on the report)

ALS Contact: Megha Wallia

Date (dd-mm-yy)

Sampler: Murray

Time (hh:mm)

Sample Type

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Are samples taken from a Regulated DW System? YES NO

Are samples for human consumption/ use? YES NO

Released by: Todd Webb

Date: 21-Jun-23

Time: 9:00

Received by: [Signature]

Date: 21 June 2023

Time: 10:45 AM

Received by: [Signature]

Date: [Signature]

Time: [Signature]

Received by: [Signature]

Date: [Signature]

Time: [Signature]

Received by: [Signature]

Date: [Signature]

Time: [Signature]

Received by: [Signature]

Date: [Signature]

Time: [Signature]

Received by: [Signature]

Date: [Signature]

Time: [Signature]

Received by: [Signature]

Date: [Signature]

Time: [Signature]

Reports / Recipients

Select Report Format: PDF EXCEL EDD (DIGITAL)

Merge QC/QCI Reports with COA YES NO N/A

Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: EMAIL MAIL FAX

Email 1 or Fax: webb.todd@cleanharbors.com

Email 2: yuha.stan@cleanharbors.com

Email 3:

Invoice Recipients

Select Invoice Distribution: EMAIL MAIL FAX

Email 1 or Fax: dennis.stephanie@cleanharbors.com

Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center:

Major/Minor Code:

Requisitioner:

Location:

Routing Code:

PO#:

Routing Code:

Turnaround Time (TAT) Requested

Routine [R] if received by 3pm M-F - no surcharges apply

4 day [P4] if received by 3pm M-F - 25% rush surcharge minimum

3 day [P3] if received by 3pm M-F - 50% rush surcharge minimum

2 day [P2] if received by 3pm M-F - 100% rush surcharge minimum

1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

Same day [E2] if received by 10am M-S - 200% rush surcharge

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all ESP TATs:

For all tests with rush TATs requested, please contact your A/E to confirm availability.

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below

Analysis Request

NUMBER OF CONTAINERS

Table 4.4A Leachate

SAMPLES ON HOLD

EXTENDED STORAGE REQUIRED

SUSPECTED HAZARD (see notes)

SAMPLE RECEIPT/DETAILS (ALS use only)

Cooling Method: NONE ICE LE PACKS FROZEN COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A NO

Sample Custody Seals Intact: YES N/A

INITIAL COOLER TEMPERATURES °C

INITIAL COOLER TEMPERATURES °C

INITIAL SHIPMENT RECEPTION (ALS use only)

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

FEB 2022 PROOF

Environmental Division
Edmonton
Work Order Reference
EO2305136



Telephone: +1 780 413 6227

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus



Environmental Division
Edmonton

Work Order Reference
EO2305136



Telephone : +1 780 413 8227

Contact and company name below will appear on the final report

Reports / Recipients

Turnaround Time (TAT) Requested

Company: Clean Harbors Canada
Contact: Todd Webb, Stan Yuha
Phone: (780) 663-2513

Select Report Format: PDF EXCEL EDD (DIGITAL)
Merge QC/QCI Reports with COA YES NO N/A
 Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: EMAIL MAIL FAX

Routine [R] if received by 3pm M-F - no surcharges apply
 4 day [P4] if received by 3pm M-F - 20% rush surcharge
 3 day [P3] if received by 3pm M-F - 25% rush surcharge
 2 day [P2] if received by 3pm M-F - 50% rush surcharge
 1 day [E] if received by 3pm M-F - 100% rush surcharge
 Same day [EZ] if received by 10am M-S - 200% rush surc
Additional fees may apply to rush requests on wee
For all tasks with rush TATs requested, please

Street: PO Box 390, 50114 Range Road 173

Email 1 or Fax: webbtodd@cleanharbors.com

Date and Time Required for all E&E TATs:

City/Province: Riley, AB

Email 2: yuha.stan@cleanharbors.com

Postal Code: T0B 4A0

Email 3:

Invoice To: Same as Report To

Select Invoice Distribution: EMAIL MAIL FAX

Company: Clean Harbors Canada

Email 1 or Fax: demnis.stephanie@cleanharbors.com

Contact: Stephanie Dennis

Email 2:

Project Information

Oil and Gas Required Fields (client use)

ALS Account # / Quote #: EO22-CHE100-008

AF/ECost Center:

PO#

Job #: Secondary Leachate Qtr 2 2023

Major/Minor Code:

Routing Code:

PO / AFE: 234479

Requisitioner:

LSD: Table 4.4A

Location:

ALS Lab Work Order # (ALS use only): EO2305136

ALS Contact: Megha Wallia

Sampler: Murray

ALS Sample # (ALS use only)

Sample Identification and/or Coordinates (This description will appear on the report)

Date (dd-mm-yy)

Time (hh:mm)

Sample Type

NUMBER OF CONTAINERS

SAMPLES ON HOLD

EXTENDED STORAGE REQUI

Secondary Leachate Cell 1 (SC1)
Secondary Leachate Cell 2 (SC2)
Secondary Leachate Cell 3A (SC3A)

22-Jun-23
22-Jun-23
22-Jun-23

11:00
11:00
11:00

R
R
R

Drinking Water (DW) Samples¹ (client use)

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Are samples taken from a Regulated DW System? YES NO

Please add to EO2305136 and report on same report. Analyze as per Quote EO22-CHE100-008, Table 4.4A package (Attached). Same as EO2301874. Metals bottles not

Cooling Method: NONE ICE ICE PACKS FROZEN

Submission Comments identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A

Sample Custody Seals Intact: YES N/A

Are samples for human consumption/ use? YES NO

SHIPMENT RELEASE (client use)

INITIAL SHIPMENT RECEPTION (ALS use only)

FINAL SHIPMENT RECEPTION (ALS use only)

Time:

Time:

Released by: Todd Webb

Date: 23-Jun-23

Time: 9:00

Received by:

Date: 6/23/23

Time: 9:30

Received by:

Date:

Time:

Received by:

Date:

Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

Form 2022 (P/04/20)

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.
1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

APPENDIX F

Leak Detection Liquid Analysis

Quarter 3



CERTIFICATE OF ANALYSIS

Work Order	: EO2308495	Page	: 1 of 20
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 3 2023	Date Samples Received	: 19-Sep-2023 15:43
PO	: 236264	Date Analysis	: 20-Sep-2023
C-O-C number	: ----	Commenced	
Sampler	: Murray	Issue Date	: 26-Sep-2023 16:39
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Daniel Nguyen	Lab Assistant	Metals, Edmonton, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Kari Mulroy	Lab Supervisor - Environmental	Organics, Edmonton, Alberta
Leah Yee	Lab Assistant	Inorganics, Edmonton, Alberta
Michelle Schroder	Laboratory Analyst	Inorganics, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
Saron Gebremariam	Lab Assistant	Inorganics, Edmonton, Alberta
Yan Zhang	Lab Analyst	Organics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Unit	Description
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
SFP	Sample was filtered and preserved at the laboratory.
SP	Sample was preserved at the laboratory.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.



Analytical Results

EO2308495-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 1 (SC1)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	1560	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	1280	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	9580	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	2150	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	7.96	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	9560	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	116	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	7.02	0.250	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1148643
Chloride	16887-00-6	1790 ^{DLDS.}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143727
Fluoride	16984-48-8	<0.400 ^{DLDS.}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143724
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS.}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143725
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS.}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143726
Phosphorus, total	7723-14-0	0.228	0.0010	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143224
Phosphorus, total dissolved	7723-14-0	0.157	0.0010	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	3450 ^{DLDS.}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143728
Kjeldahl nitrogen, total [TKN]	----	104	20.0	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	400 ^{SFP.}	5.00	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	99.3	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.133	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145562
Mercury, total	7439-97-6	<0.0000500 ^{DLM.}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0306	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS.}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.00980	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.108	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS.}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS.}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	9.44	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.000717	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	496	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	<0.000200 ^{DLDS.}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	0.127	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	2.11	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.0154	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	47.1	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	0.0485	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	0.500	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	221	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308495-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 1 (SC1)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	33.4	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	0.0228	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	11.5	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	<1.00 ^{DLDS}	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	29.9	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.00508	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	10.2	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	2290	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	3.17	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	1130	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	<0.00600 ^{DLDS}	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	0.00467	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.0362	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.0889	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	1.36	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	0.0103	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	1140	10	mg/L	E559-L/EO	-	21-Sep-2023	1146422
Phenols, total (4AAP)	----	0.0055	0.0020	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147940
Volatile Organic Compounds								
Benzene	71-43-2	2.17	0.50	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	21-Sep-2023	21-Sep-2023	1143345
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	25-Sep-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	107	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	91.3	1.0	%	E581.F1/EO	21-Sep-2023	21-Sep-2023	1143345
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	83.5	1.0	%	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Difluorobenzene, 1,4-	540-36-3	94.4	1.0	%	E611A/EO	21-Sep-2023	21-Sep-2023	1143344



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308495-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 2 (SC2)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	130	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	107	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	10800	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	1830	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	6.60	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	12100	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	448	5.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	10.2	0.250	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1148643
Chloride	16887-00-6	199 ^{DLDS}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143727
Fluoride	16984-48-8	<0.400 ^{DLDS}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143724
Nitrate (as N)	14797-55-8	0.704 ^{DLDS}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143725
Nitrate + Nitrite (as N)	----	1.99	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	1.29 ^{DLDS}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143726
Phosphorus, total	7723-14-0	2.95	0.100	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143224
Phosphorus, total dissolved	7723-14-0	0.136	0.0010	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	7960 ^{DLDS}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143728
Kjeldahl nitrogen, total [TKN]	----	14.2	2.00	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	83.0 ^{SFP}	0.50	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	99.4	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0290	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145562
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.350	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.0100	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.0777	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	0.992	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.000345	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	375	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	0.000377	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.0557	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	50.4	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308495-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 2 (SC2)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Lithium, dissolved	7439-93-2	0.423	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	218	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	7.55	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	1.21	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	0.224	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	<1.00 DLDS	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	35.0	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.0293	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.00131	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	14.5	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	<0.000200 DLDS	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	3060	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	5.40	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	2680	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 DLDS	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 DLDS	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 DLDS	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00200 DLDS	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	<0.00600 DLDS	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	0.187	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.00981	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.0162	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	0.125	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	<0.00400 DLDS	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	315	10	mg/L	E559-L/EO	-	21-Sep-2023	1146422
Phenols, total (4AAP)	----	0.0039	0.0010	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147940
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	21-Sep-2023	21-Sep-2023	1143345
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	25-Sep-2023	-
F2 (C10-C16)	----	200	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	107	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	118	1.0	%	E581.F1/EO	21-Sep-2023	21-Sep-2023	1143345
Volatile Organic Compounds Surrogates								



Analytical Results

EO2308495-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 2 (SC2)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	91.4	1.0	%	E611A/EO	21-Sep-2023	21-Sep-2023	1143344
Difluorobenzene, 1,4-	540-36-3	103	1.0	%	E611A/EO	21-Sep-2023	21-Sep-2023	1143344

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308495-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3A (SC3A)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	1280	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	1040	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	11100	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	2280	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	7.91	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	11900	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	265	5.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	35.4	1.00	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1148643
Chloride	16887-00-6	573 ^{D.L.D.S.}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143727
Fluoride	16984-48-8	<0.400 ^{D.L.D.S.}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143724
Nitrate (as N)	14797-55-8	0.522 ^{D.L.D.S.}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143725
Nitrate + Nitrite (as N)	----	1.19	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	0.672 ^{D.L.D.S.}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143726
Phosphorus, total	7723-14-0	0.307	0.0010	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143224
Phosphorus, total dissolved	7723-14-0	0.195	0.0010	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	6830 ^{D.L.D.S.}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143728
Kjeldahl nitrogen, total [TKN]	----	52.4	4.00	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	186	5.00	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	96.6	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0145	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145562
Mercury, total	7439-97-6	<0.0000500 ^{D.L.M.}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.205	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	0.00699	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.0135	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.0519	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308495-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3A (SC3A)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	0.414	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	433	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	0.0132	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.0196	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	15.6	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	0.309	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	290	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	5.97	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	0.137	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	0.693	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	<1.00 ^{DLDS}	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	50.8	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.0429	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.00162	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	12.0	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	2830	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	4.59	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	2250	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	0.00703	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	0.0164	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	0.0446	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.0252	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.0208	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	0.0219	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	0.0171	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	529 ^{DLHC}	20	mg/L	E559-L/EO	-	21-Sep-2023	1146422
Phenols, total (4AAP)	----	0.0601	0.0200	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147940
Volatile Organic Compounds								
Benzene	71-43-2	2.93	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	0.91	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383



Analytical Results

EO2308495-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3A (SC3A)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	280	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	104	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	112	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	87.0	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	101	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308495-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3B (SC3B)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	3100	1.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Alkalinity, carbonate (as CO3)	3812-32-6	178	1.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Alkalinity, total (as CaCO3)	----	2840	5.0	mg/L	E290/EO	22-Sep-2023	22-Sep-2023	1145771
Conductivity	----	15700	1.0	µS/cm	E100/EO	22-Sep-2023	22-Sep-2023	1145773
Hardness (as CaCO3), dissolved	----	1400	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.67	0.10	pH units	E108/EO	22-Sep-2023	22-Sep-2023	1145772
Solids, total dissolved [TDS], calculated	----	15800	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	81.8	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	348 ^{SP}	5.00	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1148643
Chloride	16887-00-6	1790 ^{D.L.D.S.}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143727
Fluoride	16984-48-8	<0.400 ^{D.L.D.S.}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143724
Nitrate (as N)	14797-55-8	<0.400 ^{D.L.D.S.}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143725
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{D.L.D.S.}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143726
Phosphorus, total	7723-14-0	3.66 ^{SP}	0.100	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143224
Phosphorus, total dissolved	7723-14-0	3.52 ^{SFP}	0.0100	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO4)	14808-79-8	6080 ^{D.L.D.S.}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143728
Kjeldahl nitrogen, total [TKN]	----	347 ^{SP}	10.0	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								



Analytical Results

EO2308495-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3B (SC3B)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	733 ^{DLM, SFP}	5.00	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	103	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	0.103	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0255	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.0271	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.165	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	22.3	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.00161	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	160	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	0.0189	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	0.101	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.00487	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.0102	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	0.983	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	1.74	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	242	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	1.91	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	4.74	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	0.208	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	4.16	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	554	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.851	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.00904	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	12.8	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	4010	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	2.74	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	2180	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	0.00474	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	0.0472	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	1.10	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.00936	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.0492	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308495-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3B (SC3B)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Zirconium, dissolved	7440-67-7	0.0186	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	2730 ^{DLHC}	20	mg/L	E559-L/EO	-	21-Sep-2023	1146422
Phenols, total (4AAP)	----	3.12	0.100	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147940
Volatile Organic Compounds								
Benzene	71-43-2	3.10	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	2.85	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	0.84	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	0.52	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	1.36	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	160	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	153	100	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	1550	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	106	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	92.1	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	88.5	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	103	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308495-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3C (SC3C)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	1540	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO3)	----	1270	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	9010	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO3), dissolved	----	1840	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.19	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	9860	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	152	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								



Analytical Results

EO2308495-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3C (SC3C)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	9.53	0.500	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1148643
Chloride	16887-00-6	228 ^{DLDS}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143727
Fluoride	16984-48-8	<0.400 ^{DLDS}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143724
Nitrate (as N)	14797-55-8	<0.400 ^{DLDS}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143725
Nitrate + Nitrite (as N)	----	<0.447	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143726
Phosphorus, total	7723-14-0	0.163	0.0010	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143224
Phosphorus, total dissolved	7723-14-0	0.100	0.0010	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO4)	14808-79-8	5610 ^{DLDS}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143728
Kjeldahl nitrogen, total [TKN]	----	14.5	2.00	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	115	5.00	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	98.6	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.00339	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.0543	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	1.73	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	335	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	0.000348	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	0.219	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	0.214	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	245	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	3.83	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	0.0862	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	0.0215	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	<1.00 ^{DLDS}	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	25.3	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.0167	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	8.81	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	2500	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308495-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3C (SC3C)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Strontium, dissolved	7440-24-6	3.18	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	1850	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	<0.00600 ^{DLDS}	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	0.0167	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.0162	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.0107	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	0.0216	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	0.00608	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	304	10	mg/L	E559-L/EO	-	21-Sep-2023	1146422
Phenols, total (4AAP)	----	0.0087	0.0010	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147940
Volatile Organic Compounds								
Benzene	71-43-2	4.11	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	140	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	103	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	112	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	90.1	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	97.3	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308495-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3D (SC3D)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
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Analytical Results

EO2308495-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3D (SC3D)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	451	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	370	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	10500	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	2800	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.03	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	9440	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	97.4	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	0.0842	0.0050	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1148643
Chloride	16887-00-6	2600 ^{DLDS}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143727
Fluoride	16984-48-8	1.63 ^{DLDS}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143724
Nitrate (as N)	14797-55-8	410 ^{DLDS}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143725
Nitrate + Nitrite (as N)	----	410	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143726
Phosphorus, total	7723-14-0	0.568	0.0010	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	0.554	0.0010	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	1660 ^{DLDS}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143728
Kjeldahl nitrogen, total [TKN]	----	1.48 ^{TKN}	0.200	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	42.0	0.50	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	101	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.0138	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.160	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	21.3	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.00131	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	522	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.00415	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.0110	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	<0.200 ^{DLDS}	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	0.895	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	363	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308495-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3D (SC3D)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	1.10	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	3.68	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	1.26	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	<1.00 ^{DLDS}	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	216	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.0444	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.00562	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	11.6	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	1970	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	2.63	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	577	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	<0.00600 ^{DLDS}	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	0.00285	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.00760	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	24.6	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	0.0928	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	153 ^{DLHC}	20	mg/L	E559-L/EO	-	21-Sep-2023	1146422
Phenols, total (4AAP)	----	0.0019	0.0010	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147940
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	104	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	110	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	84.0	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	96.3	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308495-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3E (SC3E)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	810	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	15.2	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	690	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	4010	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	676	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.45	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	3540	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	84.8	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	3.37	0.100	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1148643
Chloride	16887-00-6	249 ^{DLDS}	5.00	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143727
Fluoride	16984-48-8	0.787 ^{DLDS}	0.200	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143724
Nitrate (as N)	14797-55-8	17.4 ^{DLDS}	0.200	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143725
Nitrate + Nitrite (as N)	----	17.4	0.224	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{DLDS}	0.100	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143726
Phosphorus, total	7723-14-0	0.115	0.0010	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	0.0841	0.0010	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	1560 ^{DLDS}	3.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143728
Kjeldahl nitrogen, total [TKN]	----	4.71	0.600	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	23.6	0.50	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	101	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.0851	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	1.38	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	139	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.0213	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	<0.200 ^{DLDS}	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308495-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3E (SC3E)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Lithium, dissolved	7439-93-2	0.200	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	79.9	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	0.284	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	0.206	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	0.0906	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	<1.00 DLDS	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	29.2	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.00775	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	<0.00100 DLDS	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	7.69	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	<0.000200 DLDS	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	938	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	1.48	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	536	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 DLDS	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 DLDS	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 DLDS	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00200 DLDS	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	<0.00600 DLDS	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	<0.00200 DLDS	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.0253	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.353	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	0.0310	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	<0.00400 DLDS	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	66	10	mg/L	E559-L/EO	-	21-Sep-2023	1146422
Phenols, total (4AAP)	----	<0.0010	0.0010	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147940
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	96.2	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	101	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								



Analytical Results

EO2308495-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 3E (SC3E)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	85.7	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	96.1	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2308495-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 4 (SC4)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	1400	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Alkalinity, total (as CaCO ₃)	----	1150	1.0	mg/L	E290/EO	20-Sep-2023	21-Sep-2023	1143777
Conductivity	----	10700	1.0	µS/cm	E100/EO	20-Sep-2023	21-Sep-2023	1143776
Hardness (as CaCO ₃), dissolved	----	1970	1	mg/L	EC100/EO	-	21-Sep-2023	-
pH	----	8.21	0.10	pH units	E108/EO	20-Sep-2023	21-Sep-2023	1143778
Solids, total dissolved [TDS], calculated	----	11400	1.0	mg/L	EC103/EO	-	21-Sep-2023	-
Solids, total suspended [TSS]	----	104	3.0	mg/L	E160/EO	-	23-Sep-2023	1146684
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	7.32	0.100	mg/L	E298/EO	22-Sep-2023	22-Sep-2023	1149170
Chloride	16887-00-6	1030 ^{D.L.D.S.}	10.0	mg/L	E235.Cl/EO	20-Sep-2023	20-Sep-2023	1143727
Fluoride	16984-48-8	0.970 ^{D.L.D.S.}	0.400	mg/L	E235.F/EO	20-Sep-2023	20-Sep-2023	1143724
Nitrate (as N)	14797-55-8	7.37 ^{D.L.D.S.}	0.400	mg/L	E235.NO3/EO	20-Sep-2023	20-Sep-2023	1143725
Nitrate + Nitrite (as N)	----	7.68	0.447	mg/L	EC235.N+N/EO	-	21-Sep-2023	-
Nitrite (as N)	14797-65-0	0.307 ^{D.L.D.S.}	0.200	mg/L	E235.NO2/EO	20-Sep-2023	20-Sep-2023	1143726
Phosphorus, total	7723-14-0	0.382	0.0010	mg/L	E372-S/EO	20-Sep-2023	21-Sep-2023	1143225
Phosphorus, total dissolved	7723-14-0	0.312	0.0010	mg/L	E375-U/EO	20-Sep-2023	21-Sep-2023	1143226
Sulfate (as SO ₄)	14808-79-8	5900 ^{D.L.D.S.}	6.00	mg/L	E235.SO4/EO	20-Sep-2023	20-Sep-2023	1143728
Kjeldahl nitrogen, total [TKN]	----	13.5	1.00	mg/L	E318/EO	21-Sep-2023	21-Sep-2023	1143331
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	88.6	0.50	mg/L	E358-L/EO	20-Sep-2023	20-Sep-2023	1144576
Ion Balance								
Ion balance (cations/anions)	----	97.1	0.010	%	EC101/EO	-	21-Sep-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.0100 ^{D.L.D.S.}	0.0100	mg/L	E420/EO	21-Sep-2023	21-Sep-2023	1145564
Mercury, total	7439-97-6	<0.0000500 ^{D.L.M.}	0.0000500	mg/L	E508/EO	26-Sep-2023	26-Sep-2023	1143229
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0200 ^{D.L.D.S.}	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Antimony, dissolved	7440-36-0	<0.00200 ^{D.L.D.S.}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Arsenic, dissolved	7440-38-2	0.00248	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Barium, dissolved	7440-39-3	0.0462	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515



Analytical Results

EO2308495-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: SECONDARY LEACHATE CELL 4 (SC4)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.000400 ^{DLDS}	0.000400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Bismuth, dissolved	7440-69-9	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Boron, dissolved	7440-42-8	6.98	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cadmium, dissolved	7440-43-9	0.00125	0.000100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Calcium, dissolved	7440-70-2	331	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cesium, dissolved	7440-46-2	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Chromium, dissolved	7440-47-3	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Cobalt, dissolved	7440-48-4	0.0109	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Copper, dissolved	7440-50-8	0.00503	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Iron, dissolved	7439-89-6	0.221	0.200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lead, dissolved	7439-92-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Lithium, dissolved	7439-93-2	0.375	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Magnesium, dissolved	7439-95-4	277	0.100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Manganese, dissolved	7439-96-5	1.45	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Molybdenum, dissolved	7439-98-7	4.07	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Nickel, dissolved	7440-02-0	0.135	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Phosphorus, dissolved	7723-14-0	<1.00 ^{DLDS}	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Potassium, dissolved	7440-09-7	53.3	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Rubidium, dissolved	7440-17-7	0.00966	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Selenium, dissolved	7782-49-2	0.00363	0.00100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silicon, dissolved	7440-21-3	7.05	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Silver, dissolved	7440-22-4	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sodium, dissolved	7440-23-5	2970	1.00	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Strontium, dissolved	7440-24-6	4.77	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Sulfur, dissolved	7704-34-9	1950	10.0	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tellurium, dissolved	13494-80-9	<0.00400 ^{DLDS}	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thallium, dissolved	7440-28-0	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Thorium, dissolved	7440-29-1	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tin, dissolved	7440-31-5	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Titanium, dissolved	7440-32-6	<0.00600 ^{DLDS}	0.00600	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Tungsten, dissolved	7440-33-7	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Uranium, dissolved	7440-61-1	0.0857	0.000200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Vanadium, dissolved	7440-62-2	0.0221	0.0100	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zinc, dissolved	7440-66-6	0.0454	0.0200	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Zirconium, dissolved	7440-67-7	0.00658	0.00400	mg/L	E421/EO	20-Sep-2023	20-Sep-2023	1143515
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	20-Sep-2023	1143515
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	20-Sep-2023	1144038
Aggregate Organics								
Chemical oxygen demand [COD]	----	291 ^{DLHC}	20	mg/L	E559-L/EO	-	21-Sep-2023	1146422
Phenols, total (4AAP)	----	0.0028	0.0010	mg/L	E562/EO	22-Sep-2023	22-Sep-2023	1147940
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383



Analytical Results

EO2308495-008

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: SECONDARY LEACHATE CELL 4 (SC4)

Client sampling date / time: 18-Sep-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	24-Sep-2023	-
F2 (C10-C16)	----	160	100	µg/L	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	98.7	1.0	%	E601/EO	20-Sep-2023	20-Sep-2023	1143263
Dichlorotoluene, 3,4-	95-75-0	111	1.0	%	E581.F1/EO	20-Sep-2023	21-Sep-2023	1143382
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	88.3	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383
Difluorobenzene, 1,4-	540-36-3	97.0	1.0	%	E611A/EO	20-Sep-2023	21-Sep-2023	1143383

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2308495</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Secondary Leachate Qtr 3 2023</p> <p>PO : 236264</p> <p>C-O-C number : ----</p> <p>Sampler : Murray</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 8</p> <p>No. of samples analysed : 8</p>	<p>Page : 1 of 30</p> <p>Laboratory : ALS Environmental - Edmonton</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 19-Sep-2023 15:43</p> <p>Issue Date : 26-Sep-2023 16:41</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 1 (SC1)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 2 (SC2)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E559-L	18-Sep-2023	----	----	----		21-Sep-2023	28 days	3 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 1 (SC1)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 2 (SC2)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E562	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 1 (SC1)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 2 (SC2)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E298	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 1 (SC1)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 2 (SC2)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3A (SC3A)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.Cl	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SECONDARY LEACHATE CELL 1 (SC1)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SECONDARY LEACHATE CELL 2 (SC2)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride in Water by IC										
HDPE SECONDARY LEACHATE CELL 3A (SC3A)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.F	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	20-Sep-2023	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE SECONDARY LEACHATE CELL 1 (SC1)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE SECONDARY LEACHATE CELL 2 (SC2)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE SECONDARY LEACHATE CELL 3A (SC3A)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.NO3	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 1 (SC1)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 2 (SC2)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 3A (SC3A)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✓	20-Sep-2023	3 days	2 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✔	20-Sep-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✔	20-Sep-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✔	20-Sep-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.NO2	18-Sep-2023	20-Sep-2023	3 days	2 days	✔	20-Sep-2023	3 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 1 (SC1)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 2 (SC2)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3A (SC3A)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E235.SO4	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 1 (SC1)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 2 (SC2)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E375-U	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 1 (SC1)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 2 (SC2)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E318	18-Sep-2023	21-Sep-2023	28 days	3 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 1 (SC1)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 2 (SC2)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E372-S	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 1 (SC1)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 2 (SC2)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SECONDARY LEACHATE CELL 4 (SC4)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3A (SC3A)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3B (SC3B)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3C (SC3C)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3D (SC3D)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3E (SC3E)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 4 (SC4)	E581.F1	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 1 (SC1)	E581.F1	18-Sep-2023	21-Sep-2023	14 days	3 days	✓	21-Sep-2023	14 days	3 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 2 (SC2)	E581.F1	18-Sep-2023	21-Sep-2023	14 days	3 days	✓	21-Sep-2023	14 days	3 days	✓	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 1 (SC1)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	20-Sep-2023	40 days	0 days	✓	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 2 (SC2)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	20-Sep-2023	40 days	0 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 3A (SC3A)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	20-Sep-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 3B (SC3B)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	20-Sep-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 3C (SC3C)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	20-Sep-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 3D (SC3D)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	20-Sep-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 3E (SC3E)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	20-Sep-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SECONDARY LEACHATE CELL 4 (SC4)	E601	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	20-Sep-2023	40 days	0 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 1 (SC1)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 2 (SC2)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SECONDARY LEACHATE CELL 4 (SC4)	E358-L	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	20-Sep-2023	28 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 1 (SC1)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 2 (SC2)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 3A (SC3A)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E290	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	21-Sep-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E290	18-Sep-2023	22-Sep-2023	14 days	4 days	✔	22-Sep-2023	14 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE SECONDARY LEACHATE CELL 1 (SC1)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE SECONDARY LEACHATE CELL 2 (SC2)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE SECONDARY LEACHATE CELL 3A (SC3A)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✔	21-Sep-2023	28 days	3 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	21-Sep-2023	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E100	18-Sep-2023	20-Sep-2023	28 days	2 days	✓	21-Sep-2023	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E100	18-Sep-2023	22-Sep-2023	28 days	4 days	✓	22-Sep-2023	28 days	4 days	✓	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 1 (SC1)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 2 (SC2)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 3A (SC3A)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E108	18-Sep-2023	20-Sep-2023	0.25 hrs	53 hrs	* EHTR-FM	21-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E108	18-Sep-2023	22-Sep-2023	0.25 hrs	93 hrs	* EHTR-FM	22-Sep-2023	0.25 hrs	99 hrs	* EHTR-FM	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 1 (SC1)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 2 (SC2)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 3A (SC3A)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 3B (SC3B)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 3C (SC3C)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 3D (SC3D)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SECONDARY LEACHATE CELL 3E (SC3E)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE SECONDARY LEACHATE CELL 4 (SC4)	E160	18-Sep-2023	----	----	----		23-Sep-2023	7 days	5 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 1 (SC1)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 2 (SC2)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 3A (SC3A)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 3B (SC3B)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 3C (SC3C)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 3D (SC3D)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 3E (SC3E)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
HDPE - dissolved (sodium hydroxide) SECONDARY LEACHATE CELL 4 (SC4)	E532A	18-Sep-2023	----	----	----		20-Sep-2023	28 days	2 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 1 (SC1)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 2 (SC2)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SECONDARY LEACHATE CELL 4 (SC4)	E508	18-Sep-2023	26-Sep-2023	28 days	8 days	✓	26-Sep-2023	28 days	8 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 1 (SC1)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 2 (SC2)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 3A (SC3A)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 3B (SC3B)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 3C (SC3C)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 3D (SC3D)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 3E (SC3E)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SECONDARY LEACHATE CELL 4 (SC4)	E420	18-Sep-2023	21-Sep-2023	180 days	3 days	✓	21-Sep-2023	180 days	3 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3A (SC3A)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3B (SC3B)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3C (SC3C)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3D (SC3D)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 3E (SC3E)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 4 (SC4)	E611A	18-Sep-2023	20-Sep-2023	14 days	2 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 1 (SC1)	E611A	18-Sep-2023	21-Sep-2023	14 days	3 days	✓	21-Sep-2023	14 days	3 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SECONDARY LEACHATE CELL 2 (SC2)	E611A	18-Sep-2023	21-Sep-2023	14 days	3 days	✓	21-Sep-2023	14 days	3 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1143777	2	31	6.4	5.0	✓
Ammonia by Fluorescence	E298	1148643	2	40	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1143344	2	39	5.1	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1143345	2	33	6.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1146422	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1143727	1	20	5.0	5.0	✓
Conductivity in Water	E100	1143776	2	31	6.4	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1144038	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1143515	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1144576	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1143724	1	19	5.2	5.0	✓
Nitrate in Water by IC	E235.NO3	1143725	1	19	5.2	5.0	✓
Nitrite in Water by IC	E235.NO2	1143726	1	19	5.2	5.0	✓
pH by Meter	E108	1143778	2	33	6.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1147940	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1143728	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1143226	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1143331	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1143229	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1145562	2	18	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1143224	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1146684	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1143777	2	31	6.4	5.0	✓
Ammonia by Fluorescence	E298	1148643	2	40	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1143344	2	39	5.1	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1143345	2	33	6.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1143263	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1146422	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1143727	1	20	5.0	5.0	✓
Conductivity in Water	E100	1143776	2	31	6.4	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1144038	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1143515	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1144576	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1143724	1	19	5.2	5.0	✓
Nitrate in Water by IC	E235.NO3	1143725	1	19	5.2	5.0	✓



Matrix: **Water**

Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	1143726	1	19	5.2	5.0	✓
pH by Meter	E108	1143778	2	33	6.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1147940	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1143728	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1143226	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1143331	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1143229	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1145562	2	18	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1143224	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1146684	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1143777	2	31	6.4	5.0	✓
Ammonia by Fluorescence	E298	1148643	2	40	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1143344	2	39	5.1	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1143345	2	33	6.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1143263	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1146422	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1143727	1	20	5.0	5.0	✓
Conductivity in Water	E100	1143776	2	31	6.4	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1144038	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1143515	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1144576	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1143724	1	19	5.2	5.0	✓
Nitrate in Water by IC	E235.NO3	1143725	1	19	5.2	5.0	✓
Nitrite in Water by IC	E235.NO2	1143726	1	19	5.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1147940	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1143728	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1143226	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1143331	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1143229	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1145562	2	18	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1143224	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1146684	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1148643	2	40	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1143344	2	39	5.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1146422	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1143727	1	20	5.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1144038	1	20	5.0	5.0	✓



Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	1143515	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1144576	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1143724	1	19	5.2	5.0	✓
Nitrate in Water by IC	E235.NO3	1143725	1	19	5.2	5.0	✓
Nitrite in Water by IC	E235.NO2	1143726	1	19	5.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1147940	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1143728	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1143226	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1143331	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1143229	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1145562	2	18	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1143224	2	40	5.0	5.0	✓



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Edmonton	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Edmonton	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Edmonton	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Edmonton	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Edmonton	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Edmonton	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 ALS Environmental - Edmonton	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A ALS Environmental - Edmonton	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L ALS Environmental - Edmonton	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 ALS Environmental - Edmonton	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
CCME PHC - F1 by Headspace GC-FID	E581.F1 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Edmonton	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Edmonton	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Edmonton	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Edmonton	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Edmonton	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Edmonton	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Edmonton	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Edmonton	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Edmonton	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 ALS Environmental - Edmonton	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2308495	Page	: 1 of 17
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 3 2023	Date Samples Received	: 19-Sep-2023 15:43
PO	: 236264	Date Analysis Commenced	: 20-Sep-2023
C-O-C number	: ----	Issue Date	: 26-Sep-2023 16:39
Sampler	: Murray 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Edmonton Inorganics, Edmonton, Alberta
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Yan Zhang	Lab Analyst	Edmonton Organics, Edmonton, Alberta



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1143776)											
EO2308462-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	1250	1260	0.874%	10%	----
Physical Tests (QC Lot: 1143777)											
EO2308462-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	597	605	1.26%	20%	----
Physical Tests (QC Lot: 1143778)											
EO2308462-001	Anonymous	pH	----	E108	0.10	pH units	8.88	8.89	0.112%	3%	----
Physical Tests (QC Lot: 1145771)											
EO2308536-007	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	508	492	3.22%	20%	----
Physical Tests (QC Lot: 1145772)											
EO2308536-007	Anonymous	pH	----	E108	0.10	pH units	7.57	7.57	0.00%	3%	----
Physical Tests (QC Lot: 1145773)											
EO2308536-007	Anonymous	Conductivity	----	E100	2.0	µS/cm	944	943	0.106%	10%	----
Physical Tests (QC Lot: 1146684)											
EO2308495-001	SECONDARY LEACHATE CELL 1 (SC1)	Solids, total suspended [TSS]	----	E160	3.0	mg/L	116	114	1.39%	20%	----
Anions and Nutrients (QC Lot: 1143224)											
EO2308445-002	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0010	mg/L	0.252	0.254	0.718%	20%	----
Anions and Nutrients (QC Lot: 1143225)											
EO2308495-006	SECONDARY LEACHATE CELL 3D (SC3D)	Phosphorus, total	7723-14-0	E372-S	0.0010	mg/L	0.568	0.564	0.716%	20%	----
Anions and Nutrients (QC Lot: 1143226)											
EO2308495-001	SECONDARY LEACHATE CELL 1 (SC1)	Phosphorus, total dissolved	7723-14-0	E375-U	0.0010	mg/L	0.157	0.149	5.65%	20%	----
Anions and Nutrients (QC Lot: 1143331)											
EO2308461-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	10.0	mg/L	493	482	2.23%	20%	----
Anions and Nutrients (QC Lot: 1143724)											
EO2308481-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.158	0.158	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143725)											
EO2308481-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.698	0.690	1.17%	20%	----
Anions and Nutrients (QC Lot: 1143726)											
EO2308481-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143727)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 1143727) - continued											
EO2308481-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	4.71	4.62	0.10	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1143728)											
EO2308481-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	377	371	1.48%	20%	----
Anions and Nutrients (QC Lot: 1148643)											
EO2308478-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1149170)											
FC2302681-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0184	0.0193	0.0009	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1144576)											
EO2308479-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	12.0	12.8	6.50%	20%	----
Total Metals (QC Lot: 1143229)											
EO2308495-001	SECONDARY LEACHATE CELL 1 (SC1)	Mercury, total	7439-97-6	E508	0.0000500	mg/L	<0.0000500	<0.0000500	0	Diff <2x LOR	----
Total Metals (QC Lot: 1145562)											
EO2308468-001	Anonymous	Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1145564)											
EO2308495-004	SECONDARY LEACHATE CELL 3B (SC3B)	Chromium, total	7440-47-3	E420	0.0100	mg/L	0.103	0.106	2.84%	20%	----
Dissolved Metals (QC Lot: 1143515)											
EO2308466-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.367	0.359	1.97%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00023	0.00016	0.00007	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00011	<0.00010	0.00001	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.395	0.386	2.19%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.089	0.087	0.002	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000186	0.0000258	0.0000072	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	6.10	6.15	0.850%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000015	0.000013	0.000001	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.0183	0.0175	4.65%	20%	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00034	0.00032	0.00001	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00362	0.00359	0.737%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	1.00	1.00	0.119%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000411	0.000415	0.000004	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0019	0.0020	0.00008	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	3.17	3.12	1.68%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1143515) - continued											
EO2308466-001	Anonymous	Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0257	0.0254	1.52%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00110	0.00105	4.80%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00842	0.00843	0.0828%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.062	0.058	0.003	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.07	1.05	1.60%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00066	0.00065	0.000009	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.93	3.01	2.73%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	0.000031	0.000029	0.000002	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	7.37	7.34	0.392%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0132	0.0130	1.65%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	3.13	3.09	0.04	Diff <2x LOR	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	0.00013	<0.00010	0.00003	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00015	0.00015	0.000002	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.0520	0.0525	1.07%	20%	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	0.00017	0.00016	0.00001	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00422	0.00423	0.000009	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.134	0.131	1.81%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	0.00101	0.00096	0.00005	Diff <2x LOR	----
Speciated Metals (QC Lot: 1144038)											
SK2304895-001	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1146422)											
EO2308495-001	SECONDARY LEACHATE CELL 1 (SC1)	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	1140	1160	1.62%	20%	----
Aggregate Organics (QC Lot: 1147940)											
CG2313097-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0100	mg/L	0.224	0.216	3.92%	20%	----
Volatile Organic Compounds (QC Lot: 1143344)											
EO2308461-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	1.21	1.15	0.06	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	13.8	12.6	9.13%	30%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 1143344) - continued											
EO2308461-001	Anonymous	Xylene, o-	95-47-6	E611A	0.30	µg/L	6.70	6.84	2.08%	30%	----
Volatile Organic Compounds (QC Lot: 1143383)											
EO2308492-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	0.46	0.44	0.02	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1143345)											
EO2308479-001	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<100	<100	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1143382)											
EO2308492-001	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<100	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1143776)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1143777)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1145771)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1145773)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1146684)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 1143224)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1143225)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1143226)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1143331)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1143724)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1143725)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1143726)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1143727)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1143728)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1148643)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 1149170)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Organic / Inorganic Carbon (QCLot: 1144576)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Organic / Inorganic Carbon (QCLot: 1144576) - continued						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1143229)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 1145562)						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Total Metals (QCLot: 1145564)						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Dissolved Metals (QCLot: 1143515)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1143515) - continued						
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 1144038)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 1146422)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Aggregate Organics (QCLot: 1147940)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Volatile Organic Compounds (QCLot: 1143344)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Volatile Organic Compounds (QCLot: 1143383)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 1143263)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 1143345)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1143382)						



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
Hydrocarbons (QCLot: 1143382) - continued						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1143776)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	103	90.0	110	----
Physical Tests (QCLot: 1143777)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
Physical Tests (QCLot: 1143778)									
pH	----	E108	----	pH units	6 pH units	101	97.0	103	----
Physical Tests (QCLot: 1145771)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 1145772)									
pH	----	E108	----	pH units	6 pH units	100	97.0	103	----
Physical Tests (QCLot: 1145773)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	104	90.0	110	----
Physical Tests (QCLot: 1146684)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	98.5	85.0	115	----
Anions and Nutrients (QCLot: 1143224)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1143225)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1143226)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1143331)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1143724)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.2	90.0	110	----
Anions and Nutrients (QCLot: 1143725)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1143726)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 1143727)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1143728)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	96.7	90.0	110	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	
Anions and Nutrients (QCLot: 1148643)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 1149170)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	104	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1144576)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Total Metals (QCLot: 1143229)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
Total Metals (QCLot: 1145562)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	99.1	80.0	120	----
Total Metals (QCLot: 1145564)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Dissolved Metals (QCLot: 1143515)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	101	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	97.9	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	99.9	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.2	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.6	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	100.0	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.8	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	101	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	104	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.2	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	112	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 1143515) - continued									
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	110	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.5	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	110	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	96.5	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.0	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	90.2	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	107	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	96.2	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	103	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.5	80.0	120	----
Speciated Metals (QCLot: 1144038)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
Aggregate Organics (QCLot: 1146422)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	102	85.0	115	----
Aggregate Organics (QCLot: 1147940)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	101	85.0	115	----
Volatile Organic Compounds (QCLot: 1143344)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	83.9	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	82.1	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	83.0	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	92.2	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	98.4	70.0	130	----
Volatile Organic Compounds (QCLot: 1143383)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	83.8	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	82.5	70.0	130	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1143383) - continued									
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	85.4	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	97.8	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	101	70.0	130	----
Hydrocarbons (QCLot: 1143263)									
F2 (C10-C16)	----	E601	100	µg/L	3850 µg/L	106	70.0	130	----
Hydrocarbons (QCLot: 1143345)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	104	70.0	130	----
Hydrocarbons (QCLot: 1143382)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	111	70.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1143224)										
EO2308446-002	Anonymous	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1143225)										
EO2308495-007	SECONDARY LEACHATE CELL 3E (SC3E)	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1143226)										
EO2308495-002	SECONDARY LEACHATE CELL 2 (SC2)	Phosphorus, total dissolved	7723-14-0	E375-U	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1143331)										
EO2308461-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1143724)										
EO2308481-001	Anonymous	Fluoride	16984-48-8	E235.F	1.00 mg/L	1 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1143725)										
EO2308481-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.39 mg/L	2.5 mg/L	95.7	75.0	125	----
Anions and Nutrients (QCLot: 1143726)										
EO2308481-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.478 mg/L	0.5 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 1143727)										
EO2308481-001	Anonymous	Chloride	16887-00-6	E235.Cl	98.4 mg/L	100 mg/L	98.4	75.0	125	----
Anions and Nutrients (QCLot: 1143728)										
EO2308481-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1148643)										
EO2308478-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1149170)										
FC2302681-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.103 mg/L	0.1 mg/L	103	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1144576)										
EO2308479-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1143229)										
EO2308495-002	SECONDARY LEACHATE CELL 2 (SC2)	Mercury, total	7439-97-6	E508	0.0000890 mg/L	0.0001 mg/L	89.0	70.0	130	----
Total Metals (QCLot: 1145562)										



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1145562) - continued										
EO2308468-002	Anonymous	Chromium, total	7440-47-3	E420	0.0367 mg/L	0.04 mg/L	91.8	70.0	130	----
Total Metals (QCLot: 1145564)										
EO2308495-005	SECONDARY LEACHATE CELL 3C (SC3C)	Chromium, total	7440-47-3	E420	0.0375 mg/L	0.04 mg/L	93.6	70.0	130	----
Dissolved Metals (QCLot: 1143515)										
EO2308478-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.184 mg/L	0.2 mg/L	91.9	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0398 mg/L	0.04 mg/L	99.6	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00764 mg/L	0.01 mg/L	76.4	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.085 mg/L	0.1 mg/L	84.9	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00378 mg/L	0.004 mg/L	94.6	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00948 mg/L	0.01 mg/L	94.8	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0184 mg/L	0.02 mg/L	92.1	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0178 mg/L	0.02 mg/L	88.8	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.84 mg/L	2 mg/L	92.1	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0176 mg/L	0.02 mg/L	88.1	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0185 mg/L	0.02 mg/L	92.5	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0355 mg/L	0.04 mg/L	88.8	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	11.2 mg/L	10 mg/L	112	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.70 mg/L	4 mg/L	92.6	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0190 mg/L	0.02 mg/L	94.8	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.56 mg/L	10 mg/L	95.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00348 mg/L	0.004 mg/L	86.9	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1143515) - continued										
EO2308478-001	Anonymous	Thallium, dissolved	7440-28-0	E421	0.00355 mg/L	0.004 mg/L	88.7	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0402 mg/L	0.04 mg/L	101	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0185 mg/L	0.02 mg/L	92.6	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0990 mg/L	0.1 mg/L	99.0	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.353 mg/L	0.4 mg/L	88.2	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
Speciated Metals (QCLot: 1144038)										
SK2304895-001	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0485 mg/L	0.05 mg/L	97.0	70.0	130	----
Aggregate Organics (QCLot: 1146422)										
EO2308495-002	SECONDARY LEACHATE CELL 2 (SC2)	Chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----
Aggregate Organics (QCLot: 1147940)										
CG2313097-001	Anonymous	Phenols, total (4AAP)	----	E562	ND mg/L	0.02 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 1143344)										
EO2308461-002	Anonymous	Benzene	71-43-2	E611A	93.6 µg/L	100 µg/L	93.6	50.0	140	----
		Ethylbenzene	100-41-4	E611A	83.8 µg/L	100 µg/L	83.8	50.0	140	----
		Toluene	108-88-3	E611A	90.8 µg/L	100 µg/L	90.8	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	184 µg/L	200 µg/L	92.0	50.0	140	----
		Xylene, o-	95-47-6	E611A	101 µg/L	100 µg/L	101	50.0	140	----
Volatile Organic Compounds (QCLot: 1143383)										
EO2308492-002	Anonymous	Benzene	71-43-2	E611A	86.7 µg/L	100 µg/L	86.7	50.0	140	----
		Ethylbenzene	100-41-4	E611A	80.6 µg/L	100 µg/L	80.6	50.0	140	----
		Toluene	108-88-3	E611A	82.0 µg/L	100 µg/L	82.0	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	178 µg/L	200 µg/L	89.2	50.0	140	----
		Xylene, o-	95-47-6	E611A	96.8 µg/L	100 µg/L	96.8	50.0	140	----



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 22 - Page of

Report To Contact and company name below will appear on the final report

Company: Clean Harbors Canada
Contact: Todd Webb, Stan Yuha
Phone: (780) 663-2513
Company address below will appear on the final report

Street: PO Box 390, 50114 Range Road 173
City/Province: Riley, AB
Postal Code: T0B 4A0
Invoice To: Same as Report To
Copy of Invoice with Report: YES NO

Company: Clean Harbors Canada
Contact: Stephanie Dennis
Project Information
ALS Account # / Quote #: EO22-CHE3100-008
Job #: Secondary Leachate Ctr 3 2023
PO / AFE: 236284
LSD: Table 4.4A

ALS Lab Work Order # (ALS use only): E02308495
ALS Sample # (ALS use only):
Sample Identification and/or Coordinates (This description will appear on the report)

Secondary Leachate Cell 1 (SC1)
Secondary Leachate Cell 2 (SC2)
Secondary Leachate Cell 3A (SC3A)
Secondary Leachate Cell 3B (SC3B)
Secondary Leachate Cell 3C (SC3C)
Secondary Leachate Cell 3E (SC3E)
Secondary Leachate Cell 4 (SC4)

ALS Contact: Megha Walia
Date:
Time:
Sample Type: Murray

Oil and Gas Required Fields (client use)
AFECost Center:
Major/Minor Code:
Requisitioner:
Location:

Select Report Format: PDF EXCEL EDD (DIGITAL)
Merge QC/QCI Reports with COA YES NO N/A
Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: EMAIL MAIL FAX
Email 1 or Fax: webb.todd@cleanharbors.com
Email 2: yuha.stan@cleanharbors.com
Email 3:

Select Invoice Distribution: EMAIL MAIL FAX
Invoice Recipients

Turnaround Time (TAT) Requested
Routine [R] if received by 3pm M-F - no surcharges apply
4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
Same day [E2] if received by 10am M-S - 200% rush surcharge.
Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.
Date and Time Required for all EAP TATs:
For all tests with rush TATs requested, please contact your AM to confirm availability.

Shipping Water (DW) Samples (client use)
Are samples taken from a Regulated DW System? YES NO
Are samples for human consumption/ use? YES NO
Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Table with columns: ALS Sample #, Date, Time, Sample Type, ALS Contact, Sampler, Sample Type, NUMBER OF CONTAINERS. Includes handwritten entries for dates and sample types.

Shipping and Receipt Details section including: SHIPMENT RELEASE (client use), INITIAL SHIPMENT RECEPTION (ALS use only), SAMPLE RECEIPT DETAILS (ALS use only), and FINAL SHIPMENT RECEPTION (ALS use only). Includes checkboxes for cooling methods and custody seals.

Environmental Division
Edmonton
Work Order Reference
E02308495
Barcode
Telephone: +1 780 413 5227

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus

APPENDIX F

Leak Detection Liquid Analysis

Quarter 4



CERTIFICATE OF ANALYSIS

Work Order	: EO2311188	Page	: 1 of 20
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 4 2023	Date Samples Received	: 05-Dec-2023 15:45
PO	: 238108	Date Analysis	: 06-Dec-2023
		Commenced	
C-O-C number	: ----	Issue Date	: 12-Dec-2023 18:37
Sampler	: Murray		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Daniel Nguyen	Lab Assistant	Metals, Edmonton, Alberta
Garrett Nodin	Lab Analyst	Inorganics, Edmonton, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Logan Carroll	Laboratory Analyst	Inorganics, Edmonton, Alberta
Michelle Schroder	Laboratory Analyst	Inorganics, Edmonton, Alberta
Remy Gatabazi	Lab Analyst	Organics, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Inorganics, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Metals, Edmonton, Alberta
Yan Zhang	Lab Analyst	Organics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Unit	Description
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLA	Detection Limit adjusted for required dilution.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
RRV	Reported result verified by repeat analysis.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.



Analytical Results

EO2311188-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 1 (SC1)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	1660	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	1360	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Conductivity	----	10800	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	2110	0.50	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	7.45	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	9720	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	78.0	5.0	mg/L	E160/EO	-	08-Dec-2023	1267842
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	7.27	0.250	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	1830 ^{DLDS}	5.00	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	1.92 ^{DLDS}	0.200	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<0.200 ^{DLDS}	0.200	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	<0.224 ^{DLDS}	0.224	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{DLDS}	0.100	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	0.629	0.0010	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	0.330	0.0010	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	3380 ^{DLDS}	3.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	110	5.00	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	456	5.00	mg/L	E358-L/EO	06-Dec-2023	06-Dec-2023	1266617
Ion Balance								
Ion balance (cations/anions)	----	101	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.172	0.00500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	0.000201	0.0000050	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0224	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.0150	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.107	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	10.0	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.000304	0.0000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	467	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.139	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	2.02	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.00746	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	56.3	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	0.0310	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lithium, dissolved	7439-93-2	0.511	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	230	0.0500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311188-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 1 (SC1)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Dissolved Metals								
Manganese, dissolved	7439-96-5	28.5	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	0.0400	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	11.7	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	<0.500 ^{DLDS}	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	25.9	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.00406	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.00104	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	8.73	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	2400	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	3.25	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	1250	5.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.00559	0.00300	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.00173	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.0328	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.0905	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	0.684	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.0135	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	1240 ^{DLA, DLHC}	100	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	0.0020	0.0010	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	2.46	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	610	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	107	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Dichlorotoluene, 3,4-	95-75-0	97.4	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	111	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	101	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311188-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 2 (SC2)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	127	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	104	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Conductivity	----	11700	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	1920	0.50	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	6.04	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	12100	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	224	5.0	mg/L	E160/EO	-	08-Dec-2023	1267842
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	9.40	0.250	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	192 ^{DLDS}	5.00	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	1.68 ^{DLDS}	0.200	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<0.200 ^{DLDS}	0.200	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	<0.224	0.224	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{DLDS}	0.100	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	2.05	0.0100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	0.0977	0.0010	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	7960 ^{DLDS}	3.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	15.6 ^{RRV}	0.500	mg/L	E318/EO	08-Dec-2023	09-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	85.8	0.50	mg/L	E358-L/EO	06-Dec-2023	06-Dec-2023	1266617
Ion Balance								
Ion balance (cations/anions)	----	101	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0130	0.00500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.534	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.00418	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.0815	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	0.833	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.000207	0.0000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	388	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.000468	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.0267	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.00341	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	25.8	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311188-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 2 (SC2)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Lithium, dissolved	7439-93-2	0.420	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	232	0.0500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Manganese, dissolved	7439-96-5	8.29	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	0.727	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.0812	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	<0.500	DLDS, 0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	43.8	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.0341	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.000930	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	15.2	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000100	DLDS, 0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	3070	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	5.50	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	2970	5.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00200	DLDS, 0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000100	DLDS, 0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00100	DLDS, 0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00100	DLDS, 0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	<0.00300	DLDS, 0.00300	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.120	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.00962	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.00866	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	0.258	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.00232	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	254	10	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	<0.0010	0.0010	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	160	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	101	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Dichlorotoluene, 3,4-	95-75-0	91.9	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								



Analytical Results

EO2311188-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 2 (SC2)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	89.5	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	94.3	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311188-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3A (SC3A)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	1280	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	1050	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Conductivity	----	12000	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	2330	0.50	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	7.38	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	11800	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	129	3.0	mg/L	E160/EO	-	08-Dec-2023	1267842
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	33.0	0.500	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	580 ^{D.L.D.S.}	5.00	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	1.04 ^{D.L.D.S.}	0.200	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<0.200 ^{D.L.D.S.}	0.200	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	<0.224	0.224	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{D.L.D.S.}	0.100	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	0.234	0.0100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	0.0878	0.0010	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	6590 ^{D.L.D.S.}	3.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	52.6	1.50	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	176	5.00	mg/L	E358-L/EO	06-Dec-2023	06-Dec-2023	1266617
Ion Balance								
Ion balance (cations/anions)	----	103	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0123	0.00500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0514	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	0.00570	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.00570	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.0812	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311188-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3A (SC3A)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	0.401	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	<0.0000500 ^{DLDS}	0.0000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	421	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.0117	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.0457	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	1.05	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lithium, dissolved	7439-93-2	0.292	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	310	0.0500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Manganese, dissolved	7439-96-5	5.64	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	0.124	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.773	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	<0.500 ^{DLDS}	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	52.5	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.0430	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.000932	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	9.53	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	2980	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	4.57	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	2520	5.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	0.00161	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.00436	0.00300	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.0182	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.0437	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.00573	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	0.0851	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.0133	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	389 ^{DLA, DLHC}	20	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	0.0016	0.0010	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	0.64	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856



Analytical Results

EO2311188-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3A (SC3A)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	160	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	106	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Dichlorotoluene, 3,4-	95-75-0	116	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	88.4	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	96.0	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311188-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3B (SC3B)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	5870 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	1670 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0 ^{RRV}	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	7590 ^{RRV}	10.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Conductivity	----	28800 ^{RRV}	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	672	5	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	9.04 ^{RRV}	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	27400	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	176	7.5	mg/L	E160/EO	-	08-Dec-2023	1267842
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	939 ^{RRV}	25.0	mg/L	E298/EO	06-Dec-2023	11-Dec-2023	1266054
Chloride	16887-00-6	6180 ^{D.L.D.S., RRV}	5.00	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	7.86 ^{D.L.D.S.}	0.200	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	<0.200 ^{D.L.D.S.}	0.200	mg/L	E235.NO ₃ /EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	<0.224	0.224	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{D.L.D.S.}	0.100	mg/L	E235.NO ₂ /EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	3.76	0.100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	3.25	0.100	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	4360 ^{D.L.D.S., RRV}	3.00	mg/L	E235.SO ₄ /EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	1260 ^{RRV}	50.0	mg/L	E318/EO	08-Dec-2023	11-Dec-2023	1268287
Organic / Inorganic Carbon								



Analytical Results

EO2311188-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3B (SC3B)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	3060 ^{DLM}	50.0	mg/L	E358-L/EO	06-Dec-2023	06-Dec-2023	1266617
Ion Balance								
Ion balance (cations/anions)	----	93.5	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.354	0.0500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000500 ^{DLM}	0.0000500	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.100 ^{DLDS}	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.0539	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.202	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Boron, dissolved	7440-42-8	91.4	1.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.00390	0.000500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Calcium, dissolved	7440-70-2	35.0	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.0560	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Chromium, dissolved	7440-47-3	0.332	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.0121	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.0597	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Iron, dissolved	7439-89-6	1.27	1.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Lithium, dissolved	7439-93-2	5.32	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	142	0.500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Manganese, dissolved	7439-96-5	0.928	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	14.4	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.611	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	5.99	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Potassium, dissolved	7440-09-7	1560	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	2.28	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.0548	0.00500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Silicon, dissolved	7440-21-3	20.4	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Sodium, dissolved	7440-23-5	6190	5.00	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Strontium, dissolved	7440-24-6	1.21	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	1540 ^{RRV}	50.0	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.0200 ^{DLDS}	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.126	0.0300	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	3.94	0.0100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.00608	0.00100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.140	0.0500	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Zinc, dissolved	7440-66-6	<0.100 ^{DLDS}	0.100	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868



Analytical Results

EO2311188-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3B (SC3B)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Zirconium, dissolved	7440-67-7	0.0561	0.0200	mg/L	E421/EO	06-Dec-2023	07-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	10400 ^{DLA, DLHC}	200	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	8.56	1.00	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	1.64	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	0.96	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	870	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	867	231	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	1660	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	108	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Dichlorotoluene, 3,4-	95-75-0	90.6	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	98.0	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	101	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311188-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3C (SC3C)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	1450	1.0	mg/L	E290/EO	06-Dec-2023	07-Dec-2023	1265937
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, total (as CaCO3)	----	1200	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Conductivity	----	9990	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO3), dissolved	----	1840	0.50	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	7.75	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	9530	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	132	5.0	mg/L	E160/EO	-	08-Dec-2023	1267842
Anions and Nutrients								



Analytical Results

EO2311188-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3C (SC3C)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	13.4	0.250	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	259 ^{DLDS}	5.00	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	0.478 ^{DLDS}	0.200	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	1.74 ^{DLDS}	0.200	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	1.74	0.224	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{DLDS}	0.100	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	0.160	0.0100	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	0.150	0.0010	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO4)	14808-79-8	5230 ^{DLDS}	3.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	21.4	0.500	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	168	5.00	mg/L	E358-L/EO	06-Dec-2023	06-Dec-2023	1266617
Ion Balance								
Ion balance (cations/anions)	----	105	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.00305	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.0396	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	2.31	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.0000528	0.0000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	318	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	0.000598	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.00106	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.00294	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	0.117	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lithium, dissolved	7439-93-2	0.245	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	255	0.0500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Manganese, dissolved	7439-96-5	2.75	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	0.176	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.0333	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	<0.500 ^{DLDS}	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	38.3	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.0320	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.00144	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	8.67	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	2490	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311188-005

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3C (SC3C)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Strontium, dissolved	7440-24-6	3.18	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	1930	5.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	<0.00300 ^{DLDS}	0.00300	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.0369	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.0157	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.00903	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	0.0236	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.00543	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	307 ^{DLA, DLHC}	20	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	0.0027	0.0010	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	2.18	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	130	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	108	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265861
Dichlorotoluene, 3,4-	95-75-0	98.8	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	110	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	102	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311188-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3D (SC3D)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
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Analytical Results

EO2311188-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3D (SC3D)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLOT
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	461	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	378	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Conductivity	----	12000	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	2850	0.50	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	7.74	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	9330	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	6.6	3.0	mg/L	E160/EO	-	08-Dec-2023	1267842
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	0.0540	0.0050	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	2640 ^{DLDS}	10.0	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	1.70 ^{DLDS}	0.400	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	391 ^{DLDS}	0.400	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	391	0.447	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.200 ^{DLDS}	0.200	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	0.697	0.0010	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	0.690	0.0010	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	1620 ^{DLDS}	6.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	1.54 ^{TKN}	0.200	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	41.3	0.50	mg/L	E358-L/EO	07-Dec-2023	07-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	101	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	<0.0000050	0.0000050	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.0148	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.148	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	19.8	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.00122	0.0000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	521	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.00374	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.0121	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	<0.100 ^{DLDS}	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lithium, dissolved	7439-93-2	0.850	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	377	0.0500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311188-006

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3D (SC3D)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
Dissolved Metals								
Manganese, dissolved	7439-96-5	0.915	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	3.66	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	1.26	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	0.860	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	233	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.0521	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.00452	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	11.2	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000100	DLDS, 0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	1910	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	2.53	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	611	5.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00200	DLDS, 0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000100	DLDS, 0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00100	DLDS, 0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00100	DLDS, 0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.00338	0.00300	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	0.00312	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.00937	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	26.8	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	0.0567	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	<0.00200	DLDS, 0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	169	DLA, DLHC, 100	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	0.0017	0.0010	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	105	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	121	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	86.8	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	95.2	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856



Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311188-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3E (SC3E)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	839	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	688	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Conductivity	----	4440	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	701	0.50	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	7.86	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	3610	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	251	6.0	mg/L	E160/EO	-	08-Dec-2023	1267842
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	0.0293	0.0050	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	232 ^{DLDS}	5.00	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	0.523 ^{DLDS}	0.200	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	14.2 ^{DLDS}	0.200	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	14.2	0.224	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	<0.100 ^{DLDS}	0.100	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	0.209	0.0010	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	0.0504	0.0010	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	1650 ^{DLDS}	3.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	1.96	0.200	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	27.0	0.50	mg/L	E358-L/EO	07-Dec-2023	07-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	101	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	0.0225	0.00500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	0.0000263	0.0000050	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0102	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.00133	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.0732	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	1.12	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.0000908	0.0000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	138	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.00120	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.0316	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	<0.100 ^{DLDS}	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311188-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3E (SC3E)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/LOT
Dissolved Metals								
Lithium, dissolved	7439-93-2	0.199	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	86.6	0.0500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Manganese, dissolved	7439-96-5	0.170	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	0.164	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.0910	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	<0.500	DLDS, 0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	27.5	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.00451	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.000664	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	7.73	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000100	DLDS, 0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	953	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	1.44	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	587	5.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00200	DLDS, 0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000100	DLDS, 0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00100	DLDS, 0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00100	DLDS, 0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	<0.00300	DLDS, 0.00300	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	<0.00100	DLDS, 0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.0279	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.262	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	0.0480	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	<0.00200	DLDS, 0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	64	DLA, DLHC, 20	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	<0.0010	0.0010	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	<100	100	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	109	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	108	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								



Analytical Results

EO2311188-007

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 3E (SC3E)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	85.8	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	95.9	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2311188-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 4 (SC4)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	1660	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, carbonate (as CO ₃)	3812-32-6	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Alkalinity, total (as CaCO ₃)	----	1360	1.0	mg/L	E290/EO	06-Dec-2023	06-Dec-2023	1265937
Conductivity	----	12900	1.0	µS/cm	E100/EO	06-Dec-2023	06-Dec-2023	1265935
Hardness (as CaCO ₃), dissolved	----	2040	0.50	mg/L	EC100/EO	-	07-Dec-2023	-
pH	----	7.85	0.10	pH units	E108/EO	06-Dec-2023	06-Dec-2023	1265936
Solids, total dissolved [TDS], calculated	----	12200	1.0	mg/L	EC103/EO	-	07-Dec-2023	-
Solids, total suspended [TSS]	----	14.8	3.0	mg/L	E160/EO	-	08-Dec-2023	1267842
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	18.2	0.250	mg/L	E298/EO	06-Dec-2023	07-Dec-2023	1266054
Chloride	16887-00-6	1050 ^{DLDS}	5.00	mg/L	E235.Cl/EO	06-Dec-2023	06-Dec-2023	1265815
Fluoride	16984-48-8	1.32 ^{DLDS}	0.200	mg/L	E235.F/EO	06-Dec-2023	06-Dec-2023	1265812
Nitrate (as N)	14797-55-8	8.55 ^{DLDS}	0.200	mg/L	E235.NO3/EO	06-Dec-2023	06-Dec-2023	1265813
Nitrate + Nitrite (as N)	----	8.71	0.224	mg/L	EC235.N+N/EO	-	07-Dec-2023	-
Nitrite (as N)	14797-65-0	0.160 ^{DLDS}	0.100	mg/L	E235.NO2/EO	06-Dec-2023	06-Dec-2023	1265814
Phosphorus, total	7723-14-0	0.425	0.0010	mg/L	E372-S/EO	07-Dec-2023	07-Dec-2023	1267461
Phosphorus, total dissolved	7723-14-0	0.350	0.0010	mg/L	E375-U/EO	07-Dec-2023	07-Dec-2023	1267473
Sulfate (as SO ₄)	14808-79-8	6220 ^{DLDS}	3.00	mg/L	E235.SO4/EO	06-Dec-2023	06-Dec-2023	1265816
Kjeldahl nitrogen, total [TKN]	----	24.3	0.500	mg/L	E318/EO	08-Dec-2023	08-Dec-2023	1268287
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	----	137	2.50	mg/L	E358-L/EO	07-Dec-2023	08-Dec-2023	1268529
Ion Balance								
Ion balance (cations/anions)	----	97.9	0.010	%	EC101/EO	-	07-Dec-2023	-
Total Metals								
Chromium, total	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E420/EO	07-Dec-2023	07-Dec-2023	1266522
Mercury, total	7439-97-6	0.0000079	0.0000050	mg/L	E508/EO	07-Dec-2023	07-Dec-2023	1267968
Dissolved Metals								
Aluminum, dissolved	7429-90-5	<0.0100 ^{DLDS}	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Antimony, dissolved	7440-36-0	0.00198	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Arsenic, dissolved	7440-38-2	0.00347	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Barium, dissolved	7440-39-3	0.0471	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868



Analytical Results

EO2311188-008

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Secondary Leachate Cell 4 (SC4)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Beryllium, dissolved	7440-41-7	<0.000200 ^{DLDS}	0.000200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Bismuth, dissolved	7440-69-9	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Boron, dissolved	7440-42-8	8.71	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cadmium, dissolved	7440-43-9	0.00105	0.0000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Calcium, dissolved	7440-70-2	321	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cesium, dissolved	7440-46-2	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Chromium, dissolved	7440-47-3	<0.00500 ^{DLDS}	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Cobalt, dissolved	7440-48-4	0.00773	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Copper, dissolved	7440-50-8	0.00384	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Iron, dissolved	7439-89-6	0.206	0.100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lead, dissolved	7439-92-1	<0.000500 ^{DLDS}	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Lithium, dissolved	7439-93-2	0.402	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Magnesium, dissolved	7439-95-4	302	0.0500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Manganese, dissolved	7439-96-5	1.41	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Molybdenum, dissolved	7439-98-7	3.31	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Nickel, dissolved	7440-02-0	0.129	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Phosphorus, dissolved	7723-14-0	<0.500 ^{DLDS}	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Potassium, dissolved	7440-09-7	55.5	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Rubidium, dissolved	7440-17-7	0.0112	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Selenium, dissolved	7782-49-2	0.00358	0.000500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silicon, dissolved	7440-21-3	6.92	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Silver, dissolved	7440-22-4	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sodium, dissolved	7440-23-5	3210	0.500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Strontium, dissolved	7440-24-6	4.84	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Sulfur, dissolved	7704-34-9	2240	5.00	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tellurium, dissolved	13494-80-9	<0.00200 ^{DLDS}	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thallium, dissolved	7440-28-0	<0.000100 ^{DLDS}	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Thorium, dissolved	7440-29-1	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tin, dissolved	7440-31-5	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Titanium, dissolved	7440-32-6	0.00415	0.00300	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Tungsten, dissolved	7440-33-7	<0.00100 ^{DLDS}	0.00100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Uranium, dissolved	7440-61-1	0.116	0.000100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Vanadium, dissolved	7440-62-2	0.0360	0.00500	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zinc, dissolved	7440-66-6	0.0360	0.0100	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Zirconium, dissolved	7440-67-7	0.0140	0.00200	mg/L	E421/EO	06-Dec-2023	06-Dec-2023	1265868
Dissolved metals filtration location	----	Field	-	-	EP421/EO	-	06-Dec-2023	1265868
Speciated Metals								
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.00050	0.00050	mg/L	E532A/EO	-	06-Dec-2023	1266556
Aggregate Organics								
Chemical oxygen demand [COD]	----	309 ^{DLA, DLHC}	100	mg/L	E559-L/EO	-	07-Dec-2023	1268684
Phenols, total (4AAP)	----	0.0012	0.0010	mg/L	E562/EO	11-Dec-2023	11-Dec-2023	1272122
Volatile Organic Compounds								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856



Analytical Results

EO2311188-008

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: Secondary Leachate Cell 4 (SC4)

Client sampling date / time: 05-Dec-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Volatile Organic Compounds								
Xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Hydrocarbons								
F1 (C6-C10)	----	170	100	µg/L	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
F1-BTEX	----	170	100	µg/L	EC580/EO	-	12-Dec-2023	-
F2 (C10-C16)	----	140	100	µg/L	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	108	1.0	%	E601/EO	06-Dec-2023	06-Dec-2023	1265862
Dichlorotoluene, 3,4-	95-75-0	126	1.0	%	E581.F1/EO	07-Dec-2023	07-Dec-2023	1265857
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	85.1	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856
Difluorobenzene, 1,4-	540-36-3	98.7	1.0	%	E611A/EO	07-Dec-2023	07-Dec-2023	1265856

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2311188</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Secondary Leachate Qtr 4 2023</p> <p>PO : 238108</p> <p>C-O-C number : ----</p> <p>Sampler : Murray</p> <p>Site : Table 4.4A</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 8</p> <p>No. of samples analysed : 8</p>	<p>Page : 1 of 31</p> <p>Laboratory : ALS Environmental - Edmonton</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 05-Dec-2023 15:45</p> <p>Issue Date : 12-Dec-2023 18:35</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
 - CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
 - DQO: Data Quality Objective.
 - LOR: Limit of Reporting (detection limit).
 - RPD: Relative Percent Difference.
-

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Matrix Spike (MS) Recoveries								
Dissolved Metals	Anonymous	Anonymous	Selenium, dissolved	7782-49-2	E421	131 %	70.0-130%	Recovery greater than upper data quality objective



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E559-L	05-Dec-2023	----	----	----		07-Dec-2023	28 days	2 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E562	05-Dec-2023	11-Dec-2023	28 days	6 days	✔	11-Dec-2023	28 days	6 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E298	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E298	05-Dec-2023	06-Dec-2023	28 days	6 days	✔	07-Dec-2023	28 days	6 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 1 (SC1)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 2 (SC2)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 3A (SC3A)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 3B (SC3B)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 3C (SC3C)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 3D (SC3D)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 3E (SC3E)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Secondary Leachate Cell 4 (SC4)	E235.Cl	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 1 (SC1)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 2 (SC2)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3A (SC3A)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3B (SC3B)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3C (SC3C)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3D (SC3D)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 3E (SC3E)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Secondary Leachate Cell 4 (SC4)	E235.F	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE Secondary Leachate Cell 1 (SC1)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE Secondary Leachate Cell 2 (SC2)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE Secondary Leachate Cell 3A (SC3A)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 3B (SC3B)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 3C (SC3C)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 3D (SC3D)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 3E (SC3E)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Secondary Leachate Cell 4 (SC4)	E235.NO3	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3B (SC3B)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3C (SC3C)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3D (SC3D)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 3E (SC3E)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Nitrite in Water by IC											
HDPE Secondary Leachate Cell 4 (SC4)	E235.NO2	05-Dec-2023	06-Dec-2023	3 days	1 days	✓	06-Dec-2023	3 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 1 (SC1)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 2 (SC2)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 3A (SC3A)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 3B (SC3B)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 3C (SC3C)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 3D (SC3D)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 3E (SC3E)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Secondary Leachate Cell 4 (SC4)	E235.SO4	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E375-U	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E318	05-Dec-2023	08-Dec-2023	28 days	3 days	✔	08-Dec-2023	28 days	3 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E372-S	05-Dec-2023	07-Dec-2023	28 days	2 days	✔	07-Dec-2023	28 days	2 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Secondary Leachate Cell 1 (SC1)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Secondary Leachate Cell 2 (SC2)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Secondary Leachate Cell 3A (SC3A)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Secondary Leachate Cell 3B (SC3B)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Secondary Leachate Cell 3C (SC3C)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Secondary Leachate Cell 3D (SC3D)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Secondary Leachate Cell 3E (SC3E)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Secondary Leachate Cell 4 (SC4)	E421	05-Dec-2023	06-Dec-2023	180 days	1 days	✓	06-Dec-2023	180 days	1 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 1 (SC1)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 2 (SC2)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3A (SC3A)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3B (SC3B)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3C (SC3C)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3D (SC3D)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 3E (SC3E)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Secondary Leachate Cell 4 (SC4)	E581.F1	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 1 (SC1)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	40 days	0 days	✓	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 2 (SC2)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	40 days	0 days	✓	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3A (SC3A)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3B (SC3B)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3C (SC3C)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3D (SC3D)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 3E (SC3E)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Secondary Leachate Cell 4 (SC4)	E601	05-Dec-2023	06-Dec-2023	14 days	1 days	✔	06-Dec-2023	40 days	0 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 1 (SC1)	E358-L	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 2 (SC2)	E358-L	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3A (SC3A)	E358-L	05-Dec-2023	06-Dec-2023	28 days	1 days	✔	06-Dec-2023	28 days	1 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3B (SC3B)	E358-L	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3C (SC3C)	E358-L	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3D (SC3D)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 3E (SC3E)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Secondary Leachate Cell 4 (SC4)	E358-L	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Secondary Leachate Cell 1 (SC1)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Secondary Leachate Cell 2 (SC2)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Secondary Leachate Cell 3A (SC3A)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Secondary Leachate Cell 3B (SC3B)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	14 days	1 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE Secondary Leachate Cell 3C (SC3C)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Secondary Leachate Cell 3D (SC3D)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Secondary Leachate Cell 3E (SC3E)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Secondary Leachate Cell 4 (SC4)	E290	05-Dec-2023	06-Dec-2023	14 days	1 days	✓	06-Dec-2023	14 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Secondary Leachate Cell 1 (SC1)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Secondary Leachate Cell 2 (SC2)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Secondary Leachate Cell 3A (SC3A)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Secondary Leachate Cell 3B (SC3B)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Secondary Leachate Cell 3C (SC3C)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 3D (SC3D)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 3E (SC3E)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Physical Tests : Conductivity in Water											
HDPE Secondary Leachate Cell 4 (SC4)	E100	05-Dec-2023	06-Dec-2023	28 days	1 days	✓	06-Dec-2023	28 days	1 days	✓	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 1 (SC1)	E108	05-Dec-2023	06-Dec-2023	0.25 hrs	23 hrs	* EHTR-FM	06-Dec-2023	0.25 hrs	29 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 2 (SC2)	E108	05-Dec-2023	06-Dec-2023	0.25 hrs	23 hrs	* EHTR-FM	06-Dec-2023	0.25 hrs	29 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3A (SC3A)	E108	05-Dec-2023	06-Dec-2023	0.25 hrs	23 hrs	* EHTR-FM	06-Dec-2023	0.25 hrs	29 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3B (SC3B)	E108	05-Dec-2023	06-Dec-2023	0.25 hrs	23 hrs	* EHTR-FM	06-Dec-2023	0.25 hrs	29 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3C (SC3C)	E108	05-Dec-2023	06-Dec-2023	0.25 hrs	23 hrs	* EHTR-FM	06-Dec-2023	0.25 hrs	29 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3D (SC3D)	E108	05-Dec-2023	06-Dec-2023	0.25 hrs	23 hrs	* EHTR-FM	06-Dec-2023	0.25 hrs	29 hrs	* EHTR-FM	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 3E (SC3E)	E108	05-Dec-2023	06-Dec-2023	0.25 hrs	23 hrs	* EHTR-FM	06-Dec-2023	0.25 hrs	29 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Secondary Leachate Cell 4 (SC4)	E108	05-Dec-2023	06-Dec-2023	0.25 hrs	23 hrs	* EHTR-FM	06-Dec-2023	0.25 hrs	29 hrs	* EHTR-FM	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 1 (SC1)	E160	05-Dec-2023	----	----	----		08-Dec-2023	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 2 (SC2)	E160	05-Dec-2023	----	----	----		08-Dec-2023	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3A (SC3A)	E160	05-Dec-2023	----	----	----		08-Dec-2023	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3B (SC3B)	E160	05-Dec-2023	----	----	----		08-Dec-2023	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3C (SC3C)	E160	05-Dec-2023	----	----	----		08-Dec-2023	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3D (SC3D)	E160	05-Dec-2023	----	----	----		08-Dec-2023	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Secondary Leachate Cell 3E (SC3E)	E160	05-Dec-2023	----	----	----		08-Dec-2023	7 days	3 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE Secondary Leachate Cell 4 (SC4)	E160	05-Dec-2023	----	----	----		08-Dec-2023	7 days	3 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 1 (SC1)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 2 (SC2)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3A (SC3A)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3B (SC3B)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3C (SC3C)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3D (SC3D)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 3E (SC3E)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔
Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC										
UV-inhibited HDPE - dissolved (sodium hydroxide) Secondary Leachate Cell 4 (SC4)	E532A	05-Dec-2023	----	----	----		06-Dec-2023	28 days	1 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 1 (SC1)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 2 (SC2)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3A (SC3A)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3B (SC3B)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3C (SC3C)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3D (SC3D)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 3E (SC3E)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Secondary Leachate Cell 4 (SC4)	E508	05-Dec-2023	07-Dec-2023	28 days	2 days	✓	07-Dec-2023	28 days	0 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Secondary Leachate Cell 1 (SC1)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✓	07-Dec-2023	180 days	2 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Secondary Leachate Cell 2 (SC2)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✔	07-Dec-2023	180 days	2 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Secondary Leachate Cell 3A (SC3A)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✔	07-Dec-2023	180 days	2 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Secondary Leachate Cell 3B (SC3B)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✔	07-Dec-2023	180 days	2 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Secondary Leachate Cell 3C (SC3C)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✔	07-Dec-2023	180 days	2 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Secondary Leachate Cell 3D (SC3D)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✔	07-Dec-2023	180 days	2 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Secondary Leachate Cell 3E (SC3E)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✔	07-Dec-2023	180 days	2 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Secondary Leachate Cell 4 (SC4)	E420	05-Dec-2023	07-Dec-2023	180 days	2 days	✔	07-Dec-2023	180 days	2 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 1 (SC1)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✔	07-Dec-2023	14 days	2 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Secondary Leachate Cell 2 (SC2)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✔	07-Dec-2023	14 days	2 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Secondary Leachate Cell 3A (SC3A)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Secondary Leachate Cell 3B (SC3B)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Secondary Leachate Cell 3C (SC3C)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Secondary Leachate Cell 3D (SC3D)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Secondary Leachate Cell 3E (SC3E)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Secondary Leachate Cell 4 (SC4)	E611A	05-Dec-2023	07-Dec-2023	14 days	2 days	✓	07-Dec-2023	14 days	2 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1265937	2	21	9.5	5.0	✓
Ammonia by Fluorescence	E298	1266054	2	33	6.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1265856	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1265857	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1268684	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1265815	1	20	5.0	5.0	✓
Conductivity in Water	E100	1265935	1	18	5.5	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1266556	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1265868	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1266617	2	40	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1265812	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1265813	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1265814	1	20	5.0	5.0	✓
pH by Meter	E108	1265936	1	19	5.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1272122	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1265816	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1267473	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1268287	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1267968	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1266522	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1267461	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1267842	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1265937	2	21	9.5	5.0	✓
Ammonia by Fluorescence	E298	1266054	2	33	6.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1265856	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1265857	1	20	5.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1265861	2	39	5.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1268684	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1265815	1	20	5.0	5.0	✓
Conductivity in Water	E100	1265935	1	18	5.5	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1266556	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1265868	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1266617	2	40	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1265812	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1265813	1	20	5.0	5.0	✓



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Nitrite in Water by IC	E235.NO2	1265814	1	20	5.0	5.0	✔
pH by Meter	E108	1265936	1	19	5.2	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1272122	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1265816	1	20	5.0	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1267473	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1268287	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1267968	1	19	5.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1266522	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1267461	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1267842	1	19	5.2	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1265937	2	21	9.5	5.0	✔
Ammonia by Fluorescence	E298	1266054	2	33	6.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1265856	1	20	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1265857	1	20	5.0	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1265861	2	39	5.1	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1268684	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1265815	1	20	5.0	5.0	✔
Conductivity in Water	E100	1265935	1	18	5.5	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1266556	1	19	5.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1265868	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1266617	2	40	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1265812	1	20	5.0	5.0	✔
Nitrate in Water by IC	E235.NO3	1265813	1	20	5.0	5.0	✔
Nitrite in Water by IC	E235.NO2	1265814	1	20	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1272122	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1265816	1	20	5.0	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1267473	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1268287	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1267968	1	19	5.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1266522	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1267461	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1267842	1	19	5.2	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1266054	2	33	6.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1265856	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1268684	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1265815	1	20	5.0	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	1266556	1	19	5.2	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	1265868	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1266617	2	40	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1265812	1	20	5.0	5.0	✔
Nitrate in Water by IC	E235.NO3	1265813	1	20	5.0	5.0	✔
Nitrite in Water by IC	E235.NO2	1265814	1	20	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1272122	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1265816	1	20	5.0	5.0	✔
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U	1267473	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1268287	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	1267968	1	19	5.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1266522	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1267461	1	20	5.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Edmonton	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Edmonton	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Edmonton	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Edmonton	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Edmonton	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.001 mg/L)	E375-U ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Edmonton	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 ALS Environmental - Edmonton	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A ALS Environmental - Edmonton	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection. sample pretreatment involved field or lab filtration following by sample preservation.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L ALS Environmental - Edmonton	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 ALS Environmental - Edmonton	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
CCME PHC - F1 by Headspace GC-FID	E581.F1 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Edmonton	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Edmonton	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Edmonton	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Edmonton	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Edmonton	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Edmonton	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Edmonton	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Edmonton	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Edmonton	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 ALS Environmental - Edmonton	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2311188	Page	: 1 of 14
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 Ryley AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Secondary Leachate Qtr 4 2023	Date Samples Received	: 05-Dec-2023 15:45
PO	: 238108	Date Analysis Commenced	: 06-Dec-2023
C-O-C number	: ----	Issue Date	: 12-Dec-2023 18:38
Sampler	: Murray 780 663 2513		
Site	: Table 4.4A		
Quote number	: EO22-CHES100-008		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Edmonton Inorganics, Edmonton, Alberta
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Shruti Mudliar	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Yan Zhang	Lab Analyst	Edmonton Organics, Edmonton, Alberta



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1265935)											
EO2311188-001	Secondary Leachate Cell 1 (SC1)	Conductivity	----	E100	1.0	µS/cm	10800	10600	1.49%	10%	----
Physical Tests (QC Lot: 1265936)											
EO2311188-001	Secondary Leachate Cell 1 (SC1)	pH	----	E108	0.10	pH units	7.45	7.37	1.08%	3%	----
Physical Tests (QC Lot: 1265937)											
EO2311188-001	Secondary Leachate Cell 1 (SC1)	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	1360	1360	0.287%	20%	----
Physical Tests (QC Lot: 1267842)											
EO2311182-002	Anonymous	Solids, total suspended [TSS]	----	E160	7.5	mg/L	250	272	8.44%	20%	----
Physical Tests (QC Lot: 1268594)											
FC2303473-005	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	153	153	0.00%	20%	----
Anions and Nutrients (QC Lot: 1265812)											
EO2311190-003	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.611	0.617	0.977%	20%	----
Anions and Nutrients (QC Lot: 1265813)											
EO2311190-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.080	0.077	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1265814)											
EO2311190-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1265815)											
EO2311190-003	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	5.96	5.96	0.0336%	20%	----
Anions and Nutrients (QC Lot: 1265816)											
EO2311190-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	55.0	55.1	0.132%	20%	----
Anions and Nutrients (QC Lot: 1266054)											
FC2303459-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0250	mg/L	0.918	0.942	2.57%	20%	----
Anions and Nutrients (QC Lot: 1267461)											
EO2311162-001	Anonymous	Phosphorus, total	7723-14-0	E372-S	0.0100	mg/L	1.61	1.64	1.72%	20%	----
Anions and Nutrients (QC Lot: 1267473)											
EO2311188-001	Secondary Leachate Cell 1 (SC1)	Phosphorus, total dissolved	7723-14-0	E375-U	0.0010	mg/L	0.330	0.331	0.402%	20%	----
Anions and Nutrients (QC Lot: 1268287)											
EO2311182-003	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.200	mg/L	3.85	3.89	0.953%	20%	----
Anions and Nutrients (QC Lot: 1272170)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 1272170) - continued											
FC2303499-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0427	0.0434	0.0007	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1266617)											
EO2311174-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	5.95	5.18	13.8%	20%	----
Organic / Inorganic Carbon (QC Lot: 1268529)											
FC2303468-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	6.41	5.36	17.9%	20%	----
Total Metals (QC Lot: 1266522)											
EO2311190-001	Anonymous	Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1267968)											
EO2311213-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1265868)											
EO2311190-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0100	0.0105	4.92%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00020	0.00017	0.00003	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.345	0.340	1.37%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.093	0.094	0.001	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	34.2	33.7	1.35%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000067	0.000071	0.000004	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0769	0.0775	0.741%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	7.62	7.62	0.111%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0114	0.0116	1.95%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000526	0.000508	3.32%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.423	0.384	0.039	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.55	1.55	0.220%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00307	0.00300	2.32%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000085	0.000090	0.000005	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1265868) - continued											
EO2311190-001	Anonymous	Silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.02	3.04	0.678%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	464	465	0.273%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.388	0.377	2.70%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10.2	10.2	0.254%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000216	0.000212	1.78%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----		
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----		
Speciated Metals (QC Lot: 1266556)											
SK2306898-002	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1268684)											
EO2311188-001	Secondary Leachate Cell 1 (SC1)	Chemical oxygen demand [COD]	----	E559-L	100	mg/L	1240	1230	1.29%	20%	----
Aggregate Organics (QC Lot: 1272122)											
EO2311188-001	Secondary Leachate Cell 1 (SC1)	Phenols, total (4AAP)	----	E562	0.0010	mg/L	0.0020	0.0022	0.0003	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1265856)											
EO2311194-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1265857)											
EO2311194-001	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<100	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1265935)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1265937)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1267842)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Physical Tests (QCLot: 1268594)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Anions and Nutrients (QCLot: 1265812)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1265813)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1265814)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1265815)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1265816)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1266054)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 1267461)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1267473)						
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1268287)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1272170)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Organic / Inorganic Carbon (QCLot: 1266617)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Organic / Inorganic Carbon (QCLot: 1268529)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Total Metals (QCLot: 1266522)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1266522) - continued						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Total Metals (QCLot: 1267968)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 1265868)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1265868) - continued						
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 1266556)						
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
Aggregate Organics (QCLot: 1268684)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Aggregate Organics (QCLot: 1272122)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Volatile Organic Compounds (QCLot: 1265856)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 1265857)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1265861)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
Hydrocarbons (QCLot: 1265862)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1265935)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	98.2	90.0	110	----
Physical Tests (QCLot: 1265936)									
pH	----	E108	----	pH units	6 pH units	100	97.0	103	----
Physical Tests (QCLot: 1265937)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 1267842)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	91.1	85.0	115	----
Physical Tests (QCLot: 1268594)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
Anions and Nutrients (QCLot: 1265812)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1265813)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1265814)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	99.3	90.0	110	----
Anions and Nutrients (QCLot: 1265815)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1265816)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1266054)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 1267461)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1267473)									
Phosphorus, total dissolved	7723-14-0	E375-U	0.001	mg/L	0.05 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1268287)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1272170)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1266617)									



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	
Organic / Inorganic Carbon (QCLot: 1266617) - continued									
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	8.57 mg/L	94.6	80.0	120	---
Organic / Inorganic Carbon (QCLot: 1268529)									
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	8.57 mg/L	97.8	80.0	120	---
Total Metals (QCLot: 1266522)									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	96.2	80.0	120	---
Total Metals (QCLot: 1267968)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	98.6	80.0	120	---
Dissolved Metals (QCLot: 1265868)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	96.3	80.0	120	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	93.8	80.0	120	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	94.3	80.0	120	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	95.3	80.0	120	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.5	80.0	120	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.5	80.0	120	---
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	97.3	80.0	120	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	99.9	80.0	120	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	---
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.3	80.0	120	---
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	97.5	80.0	120	---
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	---
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	92.9	80.0	120	---
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	---
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	---
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	92.6	80.0	120	---
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	100.0	80.0	120	---
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	114	80.0	120	---
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	103	80.0	120	---
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	106	80.0	120	---
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.8	80.0	120	---
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	100	80.0	120	---
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	89.7	80.0	120	---



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 1265868) - continued									
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	94.7	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	97.6	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	96.0	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	92.4	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	91.9	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.6	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	107	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	95.0	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	99.6	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	93.1	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	94.9	80.0	120	----
Speciated Metals (QCLot: 1266556)									
Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
Aggregate Organics (QCLot: 1268684)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	104	85.0	115	----
Aggregate Organics (QCLot: 1272122)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	99.3	85.0	115	----
Volatile Organic Compounds (QCLot: 1265856)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	98.2	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	85.6	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	95.9	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	94.6	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	105	70.0	130	----
Hydrocarbons (QCLot: 1265857)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	97.7	70.0	130	----
Hydrocarbons (QCLot: 1265861)									
F2 (C10-C16)	----	E601	100	µg/L	3820 µg/L	101	70.0	130	----
Hydrocarbons (QCLot: 1265862)									
F2 (C10-C16)	----	E601	100	µg/L	3820 µg/L	99.1	70.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	
Anions and Nutrients (QCLot: 1265812)										
EO2311190-003	Anonymous	Fluoride	16984-48-8	E235.F	0.963 mg/L	1 mg/L	96.3	75.0	125	----
Anions and Nutrients (QCLot: 1265813)										
EO2311190-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.48 mg/L	2.5 mg/L	99.3	75.0	125	----
Anions and Nutrients (QCLot: 1265814)										
EO2311190-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.455 mg/L	0.5 mg/L	91.0	75.0	125	----
Anions and Nutrients (QCLot: 1265815)										
EO2311190-003	Anonymous	Chloride	16887-00-6	E235.Cl	99.4 mg/L	100 mg/L	99.4	75.0	125	----
Anions and Nutrients (QCLot: 1265816)										
EO2311190-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	93.3 mg/L	100 mg/L	93.3	75.0	125	----
Anions and Nutrients (QCLot: 1266054)										
FC2303459-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1267461)										
EO2311171-001	Anonymous	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1267473)										
EO2311188-002	Secondary Leachate Cell 2 (SC2)	Phosphorus, total dissolved	7723-14-0	E375-U	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1268287)										
EO2311182-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1272170)										
FC2303499-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0982 mg/L	0.1 mg/L	98.2	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1266617)										
EO2311174-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1268529)										
FC2303468-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1266522)										
EO2311190-002	Anonymous	Chromium, total	7440-47-3	E420	0.0378 mg/L	0.04 mg/L	94.6	70.0	130	----
Total Metals (QCLot: 1267968)										



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1267968) - continued										
EO2311213-001	Anonymous	Mercury, total	7439-97-6	E508	0.000106 mg/L	0.0001 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 1265868)										
EO2311190-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.199 mg/L	0.2 mg/L	99.7	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0224 mg/L	0.02 mg/L	112	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0418 mg/L	0.04 mg/L	105	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00815 mg/L	0.01 mg/L	81.5	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00400 mg/L	0.004 mg/L	100	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0400 mg/L	0.04 mg/L	100.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		Iron, dissolved	7439-89-6	E421	2.03 mg/L	2 mg/L	101	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0170 mg/L	0.02 mg/L	85.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	1.04 mg/L	1 mg/L	104	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0394 mg/L	0.04 mg/L	98.4	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	12.9 mg/L	10 mg/L	129	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.21 mg/L	4 mg/L	105	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0526 mg/L	0.04 mg/L	131	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.80 mg/L	10 mg/L	98.0	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00308 mg/L	0.004 mg/L	77.0	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	21.8 mg/L	20 mg/L	109	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00346 mg/L	0.004 mg/L	86.6	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0207 mg/L	0.02 mg/L	103	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	
Dissolved Metals (QCLot: 1265868) - continued										
EO2311190-002	Anonymous	Titanium, dissolved	7440-32-6	E421	0.0450 mg/L	0.04 mg/L	112	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0188 mg/L	0.02 mg/L	94.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00383 mg/L	0.004 mg/L	95.8	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.106 mg/L	0.1 mg/L	106	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.369 mg/L	0.4 mg/L	92.2	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
Speciated Metals (QCLot: 1266556)										
SK2306898-002	Anonymous	Chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0497 mg/L	0.05 mg/L	99.4	70.0	130	----
Aggregate Organics (QCLot: 1268684)										
EO2311188-002	Secondary Leachate Cell 2 (SC2)	Chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----
Aggregate Organics (QCLot: 1272122)										
EO2311188-002	Secondary Leachate Cell 2 (SC2)	Phenols, total (4AAP)	----	E562	0.0221 mg/L	0.02 mg/L	111	75.0	125	----
Volatile Organic Compounds (QCLot: 1265856)										
EO2311194-002	Anonymous	Benzene	71-43-2	E611A	97.2 µg/L	100 µg/L	97.2	50.0	140	----
		Ethylbenzene	100-41-4	E611A	81.7 µg/L	100 µg/L	81.7	50.0	140	----
		Toluene	108-88-3	E611A	95.3 µg/L	100 µg/L	95.3	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	188 µg/L	200 µg/L	94.2	50.0	140	----
		Xylene, o-	95-47-6	E611A	105 µg/L	100 µg/L	105	50.0	140	----



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 22 -

Page 1 of 1

Contact and company name below will appear on the final report

Company: Clean Harbors Canada

Contact: Todd Webb, Stan Yulha

Phone: (780) 663-2513

Company address below will appear on the final report

Street: PO Box 390, 50114 Range Road 173

City/Province: Ryley, AB

Postal Code: T0B 4A0

Invoice To: Same as Report To

Copy of Invoice with Report: YES NO

Company: Clean Harbors Canada

Contact: Stephanie Dennis

ALS Account # / Quote #: EO22-CHES100-008

Job #: Secondary Leachate Qtr 4 2023

PO / AFE: 238108

LSD: Table 4.4A

ALS Lab Work Order # (ALS use only): EO231188

ALS Contact: Megha Walia

Sampler: Murray

ALS Sample # (ALS use only) Sample Identification and/or Coordinates (This description will appear on the report)

Secondary Leachate Cell 1 (SC1)

Secondary Leachate Cell 2 (SC2)

Secondary Leachate Cell 3A (SC3A)

Secondary Leachate Cell 3B (SC3B)

Secondary Leachate Cell 3C (SC3C)

Secondary Leachate Cell 3E (SC3E)

Secondary Leachate Cell 4 (SC4)

Date (dd-mm-yy)

Time (hh:mm)

Sample Type

5-Dec-23

5-Dec-23

5-Dec-23

5-Dec-23

5-Dec-23

5-Dec-23

5-Dec-23

NUMBER OF CONTAINERS

Table 4.4A Leachate

Table with columns for container counts and rows for various sample types.

Reports / Recipients

Select Report Format: PDF EXCEL EDD (DIGITAL)

Merge QC/QCI Reports with COA YES NO N/A

Select Distribution: EMAIL MAIL FAX

Email 1 or Fax: todd.webb@cleanharbors.com

Email 2: yulha.stan@cleanharbors.com

Email 3

Invoice Recipients

Select Invoice Distribution: EMAIL MAIL FAX

Email 1 or Fax: dennis.stephanie@cleanharbors.com

Email 2

Oil and Gas Required Fields (client use)

AFC/Coast Center

Major/Minor Code

Requisitioner

Location

Turnaround Time (TAT) Requested

Routine [R] if received by 3pm M-F - no surcharges apply

4 day [P4] if received by 3pm M-F - 20% rush surcharge

3 day [P3] if received by 3pm M-F - 25% rush surcharge

2 day [P2] if received by 3pm M-F - 50% rush surcharge

1 day [E] if received by 3pm M-F - 100% rush surcharge

Same day [E2] if received by 10am M-S - 200% rush sur

Additional fees may apply to rush requests on we

Date and Time Required for all EBP TATs:

For all tests with rush TATs requested, pl

Environmental Division

Edmonton

Work Order Reference

EO2311188



Telephone: +1 780 413 5227

SAMPLES ON HOLD

EXTENDED STORAGE REQUIR

SUSPECTED HAZARD (see notes)

Drinking Water (DW) Samples (client use)

Are samples taken from a Regulated DW System?

YES NO

Are samples for human consumption/use?

YES NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Analyze as per Quote EO22-CHES100-008, Table 4.4A package (Attached). Same as EO2308496.

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED

Submission Comments Identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A

INITIAL COOLER TEMPERATURES °C FINAL COOLER TEMPERATURES °C

Released by: Todd Webb

Date: 5-Dec-23

Time: 5:12/2023

Received by: PP

Date: 5/12/2023

Time: 5:41

Received by:

Date:

Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

FORM 2022 FRONT

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

"metals" means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

"major ions" means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

"nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus

APPENDIX G

Volume of Leak Detection Liquid Removed

CLEAN HARBORS CANADA, INC.
Liquid Removed from Leak Detection Systems 2023
(Maximum Daily volume = 790 L/day/ha*area (ha))

CELL 1		CELL 2		CELL 3A (3)		CELL 3B (4)		Cell 3C (5)		Cell 3D (6)		Cell 3E (7)		Cell 4		
# of hectares = 0.688		# of hectares = 1.353		# of hectares = 2.125		# of hectares = 2.125		# of hectares = 2.546		# of hectares = 2.535		# of hectares = 3.08		# of hectares = 2.43		
Max Daily Volume = 543 L		Max Daily Volume = 1068 L		Max Daily Volume = 1678 L		Max Daily Volume = 1678 L		Max Daily Volume = 2011 L		Max Daily Volume = 2002 L		Max Daily Volume = 2433 L		Max Daily Volume = 1919 L		
DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	
1-1-23		1-1-23		1-1-23		1-1-23		1-1-23		1-1-23		1-1-23		1-1-23		
1-2-23		1-2-23		1-2-23		1-2-23		1-2-23		1-2-23		1-2-23		1-2-23		
1-3-23		1-3-23	1.0	1-3-23	0.0	**	1-3-23	0.0	1-3-23	1.0	1-3-23	1.0	1-3-23	0.0	1-3-23	2.0
1-4-23		1-4-23	1.0	1-4-23	0.0	**	1-4-23	3.0	1-4-23	0.0	1-4-23	4.0	1-4-23	0.0	1-4-23	115.0
1-5-23		1-5-23	0.0	1-5-23	823.0		1-5-23	0.0	1-5-23	0.0	1-5-23	1.0	1-5-23	0.0	1-5-23	172.0
1-6-23		1-6-23		1-6-23	28.0		1-6-23	3.0	1-6-23	0.0	1-6-23	1.0	1-6-23	0.0	1-6-23	0.0
1-7-23		1-7-23		1-7-23			1-7-23		1-7-23		1-7-23		1-7-23		1-7-23	
1-8-23		1-8-23		1-8-23			1-8-23		1-8-23		1-8-23		1-8-23		1-8-23	
1-9-23		1-9-23	3.0	1-9-23	47.0		1-9-23	8.0	1-9-23	3.0	1-9-23	10.0	1-9-23	0.0	1-9-23	180.0
1-10-23		1-10-23	0.0	1-10-23	16.0		1-10-23	0.0	1-10-23	3.0	1-10-23	0.0	1-10-23	0.0	1-10-23	0.0
1-11-23		1-11-23	0.0	1-11-23	13.0		1-11-23	0.0	1-11-23	0.0	1-11-23	0.0	1-11-23	0.0	1-11-23	0.0
1-12-23		1-12-23	0.0	1-12-23	10.0		1-12-23	0.0	1-12-23	0.0	1-12-23	0.0	1-12-23	2.0	1-12-23	97.0
1-13-23		1-13-23	0.0	1-13-23	9.0		1-13-23	0.0	1-13-23	0.0	1-13-23	0.0	1-13-23	0.0	1-13-23	0.0
1-14-23		1-14-23		1-14-23			1-14-23		1-14-23		1-14-23		1-14-23		1-14-23	
1-15-23		1-15-23		1-15-23			1-15-23		1-15-23		1-15-23		1-15-23		1-15-23	
1-16-23		1-16-23	3.0	1-16-23	26.0		1-16-23	40.0	1-16-23	4.0	1-16-23	0.0	1-16-23	0.0	1-16-23	509.0
1-17-23		1-17-23	0.0	1-17-23	14.0		1-17-23	0.0	1-17-23	2.0	1-17-23	0.0	1-17-23	1.0	1-17-23	0.0
1-18-23		1-18-23	1.0	1-18-23	10.0		1-18-23	0.0	1-18-23	3.0	1-18-23	0.0	1-18-23	0.0	1-18-23	0.0
1-19-23		1-19-23	0.0	1-19-23	8.0		1-19-23	0.0	1-19-23	0.0	1-19-23	0.0	1-19-23	0.0	1-19-23	0.0
1-20-23		1-20-23	2.0	1-20-23	7.0		1-20-23	0.0	1-20-23	0.0	1-20-23	0.0	1-20-23	0.0	1-20-23	0.0
1-21-23		1-21-23		1-21-23			1-21-23		1-21-23		1-21-23		1-21-23		1-21-23	
1-22-23		1-22-23		1-22-23			1-22-23		1-22-23		1-22-23		1-22-23		1-22-23	
1-23-23		1-23-23	3.0	1-23-23	27.0		1-23-23	0.0	1-23-23	0.0	1-23-23	0.0	1-23-23	0.0	1-23-23	336.0
1-24-23		1-24-23	2.0	1-24-23	14.0		1-24-23	0.0	1-24-23	0.0	1-24-23	0.0	1-24-23	0.0	1-24-23	0.0
1-25-23		1-25-23	0.0	1-25-23	1.0		1-25-23	8.0	1-25-23	0.0	1-25-23	0.0	1-25-23	0.0	1-25-23	0.0
1-26-23		1-26-23	3.0	1-26-23	2.0		1-26-23	0.0	1-26-23	10.0	1-26-23	0.0	1-26-23	0.0	1-26-23	191.0
1-27-23		1-27-23	2.0	1-27-23	5.0		1-27-23	0.0	1-27-23	0.0	1-27-23	0.0	1-27-23	6.0	1-27-23	0.0
1-28-23		1-28-23		1-28-23			1-28-23		1-28-23		1-28-23		1-28-23		1-28-23	
1-29-23		1-29-23		1-29-23			1-29-23		1-29-23		1-29-23		1-29-23		1-29-23	
1-30-23		1-30-23	4.0	1-30-23	6.0		1-30-23	0.0	1-30-23	0.0	1-30-23	0.0	1-30-23	3.0	1-30-23	153.0
1-31-23		1-31-23	2.0	1-31-23	19.0		1-31-23	0.0	1-31-23	0.0	1-31-23	0.0	1-31-23	14.0	1-31-23	0.0
2-1-23		2-1-23	0.0	2-1-23	31.0		2-1-23	0.0	2-1-23	0.0	2-1-23	0.0	2-1-23	0.0	2-1-23	0.0
2-2-23		2-2-23	4.0	2-2-23	9.0		2-2-23	0.0	2-2-23	5.0	2-2-23	0.0	2-2-23	24.0	2-2-23	0.0
2-3-23		2-3-23	1.0	2-3-23	9.0		2-3-23	0.0	2-3-23	0.0	2-3-23	0.0	2-3-23	21.0	2-3-23	0.0
2-4-23		2-4-23		2-4-23			2-4-23		2-4-23		2-4-23		2-4-23		2-4-23	
2-5-23		2-5-23		2-5-23			2-5-23		2-5-23		2-5-23		2-5-23		2-5-23	
2-6-23		2-6-23	3.0	2-6-23	7.0		2-6-23	0.0	2-6-23	0.0	2-6-23	0.0	2-6-23	8.0	2-6-23	271.0
2-7-23		2-7-23	2.0	2-7-23	4.0		2-7-23	2.0	2-7-23	0.0	2-7-23	0.0	2-7-23	2.0	2-7-23	0.0
2-8-23		2-8-23	10.0	2-8-23	9.0		2-8-23	0.0	2-8-23	0.0	2-8-23	2.0	2-8-23	25.0	2-8-23	131.0
2-9-23		2-9-23	2.0	2-9-23	8.0		2-9-23	2.0	2-9-23	0.0	2-9-23	0.0	2-9-23	4.0	2-9-23	108.0
2-10-23		2-10-23	5.0	2-10-23	8.0		2-10-23	20.0	2-10-23	40.0	2-10-23	20.0	2-10-23	30.0	2-10-23	0.0
2-11-23		2-11-23		2-11-23			2-11-23		2-11-23		2-11-23		2-11-23		2-11-23	**
2-12-23		2-12-23		2-12-23			2-12-23		2-12-23		2-12-23		2-12-23		2-12-23	
2-13-23		2-13-23	8.0	2-13-23	25.0		2-13-23	0.0	2-13-23	3.0	2-13-23	0.0	2-13-23	29.0	2-13-23	152.0
2-14-23		2-14-23	0.0	2-14-23	10.0		2-14-23	0.0	2-14-23	0.0	2-14-23	0.0	2-14-23	25.0	2-14-23	0.0
2-15-23		2-15-23	2.0	2-15-23	8.0		2-15-23	0.0	2-15-23	0.0	2-15-23	0.0	2-15-23	30.0	2-15-23	0.0
2-16-23		2-16-23	2.0	2-16-23	12.0		2-16-23	0.0	2-16-23	0.0	2-16-23	0.0	2-16-23	28.0	2-16-23	0.0
2-17-23		2-17-23	1.0	2-17-23	8.0		2-17-23	3.0	2-17-23	0.0	2-17-23	0.0	2-17-23	20.0	2-17-23	0.0
2-18-23		2-18-23		2-18-23			2-18-23		2-18-23		2-18-23		2-18-23		2-18-23	**
2-19-23		2-19-23		2-19-23			2-19-23		2-19-23		2-19-23		2-19-23		2-19-23	**
2-20-23		2-20-23		2-20-23			2-20-23		2-20-23		2-20-23		2-20-23		2-20-23	**
2-21-23		2-21-23	0.0	2-21-23	21.0		2-21-23	0.0	2-21-23	0.0	2-21-23	0.0	2-21-23	27.0	2-21-23	282.0
2-22-23		2-22-23	4.0	2-22-23	15.0		2-22-23	0.0	**	2-22-23	0.0	**	2-22-23	25.0	2-22-23	0.0
2-23-23		2-23-23	0.0	2-23-23	0.0	**	2-23-23	15.0	**	2-23-23	0.0	**	2-23-23	24.0	2-23-23	221.0
2-24-23		2-24-23	1.0	2-24-23	0.0	**	2-24-23	0.0	**	2-24-23	0.0	**	2-24-23	16.0	2-24-23	0.0
2-25-23		2-25-23		2-25-23			2-25-23		**	2-25-23		**	2-25-23		2-25-23	**
2-26-23		2-26-23		2-26-23			2-26-23		**	2-26-23		**	2-26-23		2-26-23	**
2-27-23		2-27-23	2.0	2-27-23	54.0		2-27-23	0.0	2-27-23	0.0	2-27-23	0.0	2-27-23	21.0	2-27-23	163.0
2-28-23		2-28-23	1.0	2-28-23	42.0		2-28-23	0.0	2-28-23	0.0	2-28-23	0.0	2-28-23	22.0	2-28-23	114.0
3-1-23		3-1-23	3.0	3-1-23	3.0		3-1-23	0.0	3-1-23	0.0	3-1-23	0.0	3-1-23	22.0	3-1-23	0.0
3-2-23		3-2-23	2.0	3-2-23	3.0		3-2-23	2.0	3-2-23	17.0	3-2-23	0.0	3-2-23	0.0	3-2-23	51.0
3-3-23		3-3-23	3.0	3-3-23	1.0		3-3-23	0.0	3-3-23	2.0	3-3-23	0.0	3-3-23	10.0	3-3-23	0.0
3-4-23		3-4-23		3-4-23			3-4-23		3-4-23		3-4-23		3-4-23		3-4-23	
3-5-23		3-5-23		3-5-23			3-5-23		3-5-23		3-5-23		3-5-23		3-5-23	
3-6-23	1200.0	s	3-6-23	15.0	s	3-6-23	24.0	s	3-6-23	12.0	s	3-6-23	30.0	s	3-6-23	135.0
3-7-23		3-7-23	0.0	3-7-23	8.0		3-7-23	1.0	3-7-23	0.0	3-7-23	0.0	3-7-23	10.0	3-7-23	23.0
3-8-23		3-8-23	1.0	3-8-23	2.0		3-8-23	0.0	3-8-23	0.0	3-8-23	0.0	3-8-23	16.0	3-8-23	0.0

CLEAN HARBORS CANADA, INC.
Liquid Removed from Leak Detection Systems 2023
(Maximum Daily volume = 790 L/day/ha*area (ha))

CELL 1		CELL 2		CELL 3A (3)		CELL 3B (4)		Cell 3C (5)		Cell 3D (6)		Cell 3E (7)		Cell 4	
# of hectares = 0.688		# of hectares = 1.353		# of hectares = 2.125		# of hectares = 2.125		# of hectares = 2.546		# of hectares = 2.535		# of hectares = 3.08		# of hectares = 2.43	
Max Daily Volume = 543 L		Max Daily Volume = 1068 L		Max Daily Volume = 1678 L		Max Daily Volume = 1678 L		Max Daily Volume = 2011 L		Max Daily Volume = 2002 L		Max Daily Volume = 2433 L		Max Daily Volume = 1919 L	
DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)
5-15-23		5-15-23	0.0	5-15-23	0.0	5-15-23	6.0	5-15-23	0.0	5-15-23	0.0	5-15-23	15.0	5-15-23	138.0
5-16-23		5-16-23	0.0	5-16-23	0.0	5-16-23	1.0	5-16-23	0.0	5-16-23	0.0	5-16-23	7.0	5-16-23	0.0
5-17-23		5-17-23	0.0	5-17-23	0.0	5-17-23	15.0	5-17-23	5.0	5-17-23	25.0	5-17-23	21.0	5-17-23	0.0
5-18-23		5-18-23	0.0	5-18-23	0.0	5-18-23	0.0	5-18-23	0.0	5-18-23	0.0	5-18-23	13.0	5-18-23	0.0
5-19-23		5-19-23	0.0	5-19-23	0.0	5-19-23	0.0	5-19-23	0.0	5-19-23	0.0	5-19-23	13.0	5-19-23	0.0
5-20-23		5-20-23		5-20-23		5-20-23		5-20-23		5-20-23		5-20-23		5-20-23	
5-21-23		5-21-23		5-21-23		5-21-23		5-21-23		5-21-23		5-21-23		5-21-23	
5-22-23		5-22-23		5-22-23		5-22-23		5-22-23		5-22-23		5-22-23		5-22-23	
5-23-23		5-23-23	0.0	5-23-23	0.0	5-23-23	0.0	5-23-23	6.0	5-23-23	0.0	5-23-23	20.0	5-23-23	110.0
5-24-23		5-24-23	0.0	5-24-23	0.0	5-24-23	5.0	5-24-23	0.0	5-24-23	0.0	5-24-23	13.0	5-24-23	0.0
5-25-23		5-25-23	0.0	5-25-23	0.0	5-25-23	0.0	5-25-23	0.0	5-25-23	0.0	5-25-23	4.0	5-25-23	0.0
5-26-23		5-26-23	288.0	5-26-23	0.0	5-26-23	0.0	5-26-23	0.0	5-26-23	0.0	5-26-23	2.0	5-26-23	0.0
5-27-23		5-27-23		5-27-23		5-27-23		5-27-23		5-27-23		5-27-23		5-27-23	
5-28-23		5-28-23		5-28-23		5-28-23		5-28-23		5-28-23		5-28-23		5-28-23	
5-29-23		5-29-23	21.0	5-29-23	0.0	5-29-23	0.0	5-29-23	10.0	5-29-23	0.0	5-29-23	18.0	5-29-23	261.0
5-30-23		5-30-23	26.0	5-30-23	0.0	5-30-23	0.0	5-30-23	2.0	5-30-23	0.0	5-30-23	18.0	5-30-23	0.0
5-31-23		5-31-23	9.0	5-31-23	0.0	5-31-23	6.0	5-31-23	0.0	5-31-23	0.0	5-31-23	17.0	5-31-23	0.0
6-1-23		6-1-23	14.0	6-1-23	0.0	6-1-23	2.0	6-1-23	0.0	6-1-23	0.0	6-1-23	18.0	6-1-23	214.0
6-2-23		6-2-23	18.0	6-2-23	0.0	6-2-23	0.0	6-2-23	0.0	6-2-23	0.0	6-2-23	16.0	6-2-23	0.0
6-3-23		6-3-23		6-3-23		6-3-23		6-3-23		6-3-23		6-3-23		6-3-23	
6-4-23		6-4-23		6-4-23		6-4-23		6-4-23		6-4-23		6-4-23		6-4-23	
6-5-23		6-5-23	0.0	6-5-23	0.0	6-5-23	0.0	6-5-23	0.0	6-5-23	0.0	6-5-23	16.0	6-5-23	101.0
6-6-23		6-6-23	5.0	6-6-23	937.0	6-6-23	15.0	6-6-23	0.0	6-6-23	0.0	6-6-23	15.0	6-6-23	0.0
6-7-23		6-7-23	10.0	6-7-23	68.0	6-7-23	14.0	6-7-23	8.0	6-7-23	0.0	6-7-23	14.0	6-7-23	0.0
6-8-23		6-8-23	6.0	6-8-23	31.0	6-8-23	14.0	6-8-23	0.0	6-8-23	0.0	6-8-23	15.0	6-8-23	50.0
6-9-23		6-9-23	9.0	6-9-23	36.0	6-9-23	23.0	6-9-23	0.0	6-9-23	0.0	6-9-23	13.0	6-9-23	0.0
6-10-23		6-10-23		6-10-23		6-10-23		6-10-23		6-10-23		6-10-23		6-10-23	
6-11-23		6-11-23		6-11-23		6-11-23		6-11-23		6-11-23		6-11-23		6-11-23	
6-12-23		6-12-23	5.0	6-12-23	52.0	6-12-23	45.0	6-12-23	0.0	6-12-23	0.0	6-12-23	15.0	6-12-23	100.0
6-13-23		6-13-23	10.0	6-13-23	21.0	6-13-23	42.0	6-13-23	5.0	6-13-23	0.0	6-13-23	13.0	6-13-23	0.0
6-14-23		6-14-23	0.0	6-14-23	15.0	6-14-23	38.0	6-14-23	7.0	6-14-23	0.0	6-14-23	12.0	6-14-23	0.0
6-15-23		6-15-23	0.0	6-15-23	12.0	6-15-23	36.0	6-15-23	0.0	6-15-23	0.0	6-15-23	12.0	6-15-23	0.0
6-16-23		6-16-23	2.0	6-16-23	11.0	6-16-23	25.0	6-16-23	0.0	6-16-23	0.0	6-16-23	14.0	6-16-23	0.0
6-17-23		6-17-23		6-17-23		6-17-23		6-17-23		6-17-23		6-17-23		6-17-23	
6-18-23		6-18-23		6-18-23		6-18-23		6-18-23		6-18-23		6-18-23		6-18-23	
6-19-23		6-19-23	25.0	6-19-23	46.0	6-19-23	55.0	6-19-23	25.0	6-19-23	15.0	6-19-23	65.0	6-19-23	196.0
6-20-23		6-20-23	26.0	6-20-23	10.0	6-20-23	41.0	6-20-23	0.0	6-20-23	0.0	6-20-23	77.0	6-20-23	0.0
6-21-23		6-21-23	16.0	6-21-23	13.0	6-21-23	40.0	6-21-23	0.0	6-21-23	0	6-21-23	71.0	6-21-23	106.0
6-22-23		6-22-23	9.0	6-22-23	11.0	6-22-23	38.0	6-22-23	0.0	6-22-23	0.0	6-22-23	79.0	6-22-23	3.0
6-23-23		6-23-23	10.0	6-23-23	9.0	6-23-23	33.0	6-23-23	0.0	6-23-23	0.0	6-23-23	80.0	6-23-23	0.0
6-24-23		6-24-23		6-24-23		6-24-23		6-24-23		6-24-23		6-24-23		6-24-23	
6-25-23		6-25-23		6-25-23		6-25-23		6-25-23		6-25-23		6-25-23		6-25-23	
6-26-23		6-26-23	16.0	6-26-23	32.0	6-26-23	45.0	6-26-23	0.0	6-26-23	0.0	6-26-23	73.0	6-26-23	4.0
6-27-23		6-27-23	1.0	6-27-23	14.0	6-27-23	41.0	6-27-23	0.0	6-27-23	30.0	6-27-23	72.0	6-27-23	24.0
6-28-23		6-28-23	1.0	6-28-23	14.0	6-28-23	31.0	6-28-23	0.0	6-28-23	0.0	6-28-23	71.0	6-28-23	10.0
6-29-23		6-29-23	1.0	6-29-23	15.0	6-29-23	38.0	6-29-23	0.0	6-29-23	0.0	6-29-23	70.0	6-29-23	3.0
6-30-23		6-30-23	0.0	6-30-23	10.0	6-30-23	42.0	6-30-23	5.0	6-30-23	0.0	6-30-23	69.0	6-30-23	0.0
7-1-23		7-1-23		7-1-23		7-1-23		7-1-23		7-1-23		7-1-23		7-1-23	
7-2-23		7-2-23		7-2-23		7-2-23		7-2-23		7-2-23		7-2-23		7-2-23	
7-3-23		7-3-23		7-3-23		7-3-23		7-3-23		7-3-23		7-3-23		7-3-23	
7-4-23		7-4-23	9.0	7-4-23	37.0	7-4-23	59.0	7-4-23	0.0	7-4-23	3.0	7-4-23	68.0	7-4-23	105.0
7-5-23		7-5-23	0.0	7-5-23	17.0	7-5-23	48.0	7-5-23	0.0	7-5-23	0.0	7-5-23	67.0	7-5-23	0.0
7-6-23		7-6-23	0.0	7-6-23	12.0	7-6-23	35.0	7-6-23	3.0	7-6-23	0.0	7-6-23	66.0	7-6-23	0.0
7-7-23		7-7-23	0.0	7-7-23	13.0	7-7-23	20.0	7-7-23	2.0	7-7-23	0.0	7-7-23	65.0	7-7-23	7.0
7-8-23		7-8-23		7-8-23		7-8-23		7-8-23		7-8-23		7-8-23		7-8-23	
7-9-23		7-9-23		7-9-23		7-9-23		7-9-23		7-9-23		7-9-23		7-9-23	
7-10-23		7-10-23	3.0	7-10-23	0.0	7-10-23	43.0	7-10-23	3.0	7-10-23	2.0	7-10-23	64.0	7-10-23	4.0
7-11-23		7-11-23	304.0	7-11-23	0.0	7-11-23	41.0	7-11-23	0.0	7-11-23	0.0	7-11-23	75.0	7-11-23	6.0
7-12-23		7-12-23	56.0	7-12-23	0.0	7-12-23	29.0	7-12-23	1.0	7-12-23	0.0	7-12-23	66.0	7-12-23	12.0
7-13-23		7-13-23	61.0	7-13-23	0.0	7-13-23	21.0	7-13-23	2.0	7-13-23	4.0	7-13-23	68.0	7-13-23	8.0
7-14-23		7-14-23	42.0	7-14-23	0.0	7-14-23	18.0	7-14-23	2.0	7-14-23	0.0	7-14-23	66.0	7-14-23	1.0
7-15-23		7-15-23		7-15-23		7-15-23		7-15-23		7-15-23		7-15-23		7-15-23	
7-16-23		7-16-23		7-16-23		7-16-23		7-16-23		7-16-23		7-16-23		7-16-23	
7-17-23		7-17-23	31.0	7-17-23	0.0	7-17-23	42.0	7-17-23	0.0	7-17-23	2.0	7-17-23	66.0	7-17-23	0.0
7-18-23		7-18-23	1399.0	7-18-23	0.0	7-18-23	171.0	7-18-23	99.0	7-18-23	0.0	7-18-23	2628.0	7-18-23	218.0
7-19-23		7-19-23	1738.0	7-19-23	127.0	7-19-23	873.0	7-19-23	1042.0	7-19-23	0.0	7-19-23	77.0	7-19-23	290.0
7-20-23		7-20-23	901.0	7-20-23	42.0	7-20-23	1322.0	7-20-23	1854.0	7-20-23	3.0	7-20-23	87.0	7-20-23	701.0

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CELL 1		CELL 2		CELL 3A (3)		CELL 3B (4)		Cell 3C (5)		Cell 3D (6)		Cell 3E (7)		Cell 4		
# of hectares = 0.688		# of hectares = 1.353		# of hectares = 2.125		# of hectares = 2.125		# of hectares = 2.546		# of hectares = 2.535		# of hectares = 3.08		# of hectares = 2.43		
Max Daily Volume = 543 L		Max Daily Volume = 1068 L		Max Daily Volume = 1678 L		Max Daily Volume = 1678 L		Max Daily Volume = 2011 L		Max Daily Volume = 2002 L		Max Daily Volume = 2433 L		Max Daily Volume = 1919 L		
DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	
7-21-23		7-21-23	1007.0	7-21-23	52.0	7-21-23	0.0	7-21-23	2095.0	7-21-23	0.0	7-21-23	85.0	7-21-23	398.0	
7-22-23		7-22-23		7-22-23		7-22-23		7-22-23		7-22-23		7-22-23		7-22-23		
7-23-23		7-23-23		7-23-23		7-23-23		7-23-23		7-23-23		7-23-23		7-23-23		
7-24-23		7-24-23	0.0	7-24-23	0.0	7-24-23	0.0	7-24-23	0.0	7-24-23	0.0	7-24-23	100.0	7-24-23	722.0	
7-25-23		7-25-23	0.0	7-25-23	0.0	7-25-23	1578.0	7-25-23	3847.0	7-25-23	0.0	7-25-23	85.0	7-25-23	266.0	
7-26-23		7-26-23	0.0	7-26-23	0.0	7-26-23	0.0	7-26-23	1682.0	7-26-23	2.0	7-26-23	87.0	7-26-23	27.0	
7-27-23		7-27-23	0.0	7-27-23	0.0	7-27-23	0.0	7-27-23	1161.0	7-27-23	20.0	7-27-23	89.0	7-27-23	259.0	
7-28-23		7-28-23	0.0	7-28-23	0.0	7-28-23	0.0	7-28-23	743.0	7-28-23	5.0	7-28-23	88.0	7-28-23	0.0	
7-29-23		7-29-23		7-29-23		7-29-23		7-29-23		7-29-23		7-29-23		7-29-23		
7-30-23		7-30-23		7-30-23		7-30-23		7-30-23		7-30-23		7-30-23		7-30-23		
7-31-23		7-31-23	0.0	7-31-23	0.0	7-31-23	0.0	7-31-23	712.0	7-31-23	0.0	7-31-23	90.0	7-31-23	0.0	
8-1-23		8-1-23	0.0	8-1-23	0.0	8-1-23	0.0	8-1-23	432.0	8-1-23	0.0	8-1-23	90.0	8-1-23	435.0	
8-2-23		8-2-23	0.0	8-2-23	0.0	8-2-23	0.0	8-2-23	257.0	8-2-23	0.0	8-2-23	89.0	8-2-23	52.0	
8-3-23		8-3-23	0.0	8-3-23	0.0	8-3-23	2032.0	8-3-23	209.0	8-3-23	0.0	8-3-23	84.0	8-3-23	0.0	
8-4-23		8-4-23	2799.0	8-4-23	3208.0	8-4-23	3485.0	8-4-23	152.0	8-4-23	0.0	8-4-23	83.0	8-4-23	2.0	
8-5-23		8-5-23		8-5-23		8-5-23		8-5-23		8-5-23		8-5-23		8-5-23		
8-6-23		8-6-23		8-6-23		8-6-23		8-6-23		8-6-23		8-6-23		8-6-23		
8-7-23		8-7-23		8-7-23		8-7-23		8-7-23		8-7-23		8-7-23		8-7-23		
8-8-23		8-8-23	1807.0	8-8-23	2692.0	8-8-23	1006.0	8-8-23	221.0	8-8-23	0.0	8-8-23	89.0	8-8-23	186.0	
8-9-23		8-9-23	897.0	8-9-23	957.0	8-9-23	361.0	8-9-23	133.0	8-9-23	0.0	8-9-23	88.0	8-9-23	12.0	
8-10-23		8-10-23	397.0	8-10-23	681.0	**	8-10-23	190.0	8-10-23	130.0	8-10-23	0.0	8-10-23	81.0	8-10-23	8.0
8-11-23		8-11-23	115.0	8-11-23	433.0	**	8-11-23	14.0	*	8-11-23	62.0	8-11-23	0.0	8-11-23	84.0	
8-12-23		8-12-23		8-12-23		8-12-23		8-12-23		8-12-23		8-12-23		8-12-23		
8-13-23		8-13-23		8-13-23		8-13-23		8-13-23		8-13-23		8-13-23		8-13-23		
8-14-23		8-14-23	337.0	8-14-23	1101.0	**	8-14-23	228.0	*	8-14-23	61.0	8-14-23	20.0	8-14-23	80.0	
8-15-23		8-15-23	137.0	8-15-23	348.0	**	8-15-23	138.0	*	8-15-23	66.0	8-15-23	0.0	8-15-23	0.0	
8-16-23		8-16-23	126.0	8-16-23	260.0	**	8-16-23	135.0	*	8-16-23	60.0	8-16-23	0.0	8-16-23	48.0	
8-17-23		8-17-23	109.0	8-17-23	232.0	**	8-17-23	104.0	*	8-17-23	63.0	8-17-23	0.0	8-17-23	0.0	
8-18-23		8-18-23	107.0	8-18-23	222.0	**	8-18-23	113.0	*	8-18-23	55.0	8-18-23	0.0	8-18-23	1.0	
8-19-23		8-19-23		8-19-23		**	8-19-23		*	8-19-23		8-19-23		8-19-23		
8-20-23		8-20-23		8-20-23		**	8-20-23		*	8-20-23		8-20-23		8-20-23		
8-21-23		8-21-23	237.0	8-21-23	524.0	**	8-21-23	140.0	*	8-21-23	22.0	8-21-23	0.0	8-21-23	0.0	
8-22-23		8-22-23	77.0	8-22-23	173.0	**	8-22-23	115.0	*	8-22-23	29.0	8-22-23	0.0	8-22-23	0.0	
8-23-23		8-23-23	79.0	8-23-23	154.0	**	8-23-23	106.0	*	8-23-23	32.0	8-23-23	0.0	8-23-23	0.0	
8-24-23		8-24-23	66.0	8-24-23	130.0	**	8-24-23	91.0	*	8-24-23	25.0	8-24-23	0.0	8-24-23	10.0	
8-25-23		8-25-23	70.0	8-25-23	146.0	**	8-25-23	63.0	*	8-25-23	15.0	8-25-23	0.0	8-25-23	10.0	
8-26-23		8-26-23		8-26-23		**	8-26-23		*	8-26-23		8-26-23		8-26-23		
8-27-23		8-27-23		8-27-23		**	8-27-23		*	8-27-23		8-27-23		8-27-23		
8-28-23		8-28-23	129.0	8-28-23	338.0	**	8-28-23	117.0	*	8-28-23	0.0	8-28-23	1.0	8-28-23	0.0	
8-29-23		8-29-23	106.0	8-29-23	110.0	**	8-29-23	88.0	*	8-29-23	40.0	8-29-23	35.0	8-29-23	65.0	
8-30-23		8-30-23	83.0	8-30-23	107.0	**	8-30-23	118.0	*	8-30-23	36.0	8-30-23	0.0	8-30-23	68.0	
8-31-23		8-31-23	67.0	8-31-23	89.0	**	8-31-23	77.0	*	8-31-23	28.0	8-31-23	0.0	8-31-23	31.0	
9-1-23		9-1-23	61.0	9-1-23	95.0	**	9-1-23	67.0	*	9-1-23	0.0	9-1-23	0.0	9-1-23	68.0	
9-2-23		9-2-23		9-2-23		**	9-2-23		*	9-2-23		9-2-23		9-2-23		
9-3-23		9-3-23		9-3-23		**	9-3-23		*	9-3-23		9-3-23		9-3-23		
9-4-23		9-4-23		9-4-23		**	9-4-23		*	9-4-23		9-4-23		9-4-23		
9-5-23		9-5-23	116.0	9-5-23	331.0	**	9-5-23	126.0	*	9-5-23	6.0	9-5-23	0.0	9-5-23	66.0	
9-6-23		9-6-23	77.0	9-6-23	87.0	**	9-6-23	81.0	*	9-6-23	2.0	9-6-23	0.0	9-6-23	67.0	
9-7-23		9-7-23	58.0	9-7-23	79.0	**	9-7-23	68.0	*	9-7-23	5.0	9-7-23	0.0	9-7-23	69.0	
9-8-23		9-8-23	50.0	9-8-23	75.0	**	9-8-23	31.0	*	9-8-23	0.0	9-8-23	0.0	9-8-23	66.0	
9-9-23		9-9-23	81.0	9-9-23	195.0	**	9-9-23	62.0	*	9-9-23	0.0	9-9-23	0.0	9-9-23	66.0	
9-10-23		9-10-23		9-10-23		**	9-10-23		*	9-10-23		9-10-23		9-10-23		
9-11-23		9-11-23		9-11-23		**	9-11-23		*	9-11-23		9-11-23		9-11-23		
9-12-23		9-12-23	59.0	9-12-23	62.0	**	9-12-23	66.0	*	9-12-23	14.0	9-12-23	0.0	9-12-23	66.0	
9-13-23		9-13-23	45.0	9-13-23	55.0	**	9-13-23	54.0	*	9-13-23	33.0	9-13-23	0.0	9-13-23	67.0	
9-14-23		9-14-23	43.0	9-14-23	46.0	**	9-14-23	24.0	*	9-14-23	3.0	9-14-23	0.0	9-14-23	42.0	
9-15-23		9-15-23	41.0	9-15-23	44.0	**	9-15-23	32.0	*	9-15-23	0.0	9-15-23	0.0	9-15-23	66.0	
9-16-23		9-16-23		9-16-23		**	9-16-23		*	9-16-23		9-16-23		9-16-23		
9-17-23		9-17-23		9-17-23		**	9-17-23		*	9-17-23		9-17-23		9-17-23		
9-20-23		9-20-23	39.0	9-20-23	38.0	**	9-20-23	55.0	*	9-20-23	0.0	9-20-23	0.0	9-20-23	64.0	
9-21-23		9-21-23	35.0	9-21-23	48.0	**	9-21-23	4.0	*	9-21-23	0.0	9-21-23	0.0	9-21-23	64.0	
9-22-23		9-22-23	32.0	9-22-23	35.0	**	9-22-23	0.0	*	9-22-23	0.0	9-22-23	0.0	9-22-23	10.0	
9-23-23		9-23-23		9-23-23		**	9-23-23		*	9-23-23		9-23-23		9-23-23		
9-24-23		9-24-23		9-24-23		**	9-24-23		*	9-24-23		9-24-23		9-24-23		
9-25-23		9-25-23	50.0	9-25-23	104.0	**	9-25-23	0.0	*	9-25-23	5.0	9-25-23	0.0	9-25-23	0.0	
9-26-23		9-26-23	44.0	9-26-23	37.0	**	9-26-23	1.0	*	9-26-23	32.0	9-26-23	1.0	9-26-23	0.0	
9-27-23		9-27-23	37.0	9-27-23	34.0	**	9-27-23	0.0	*	9-27-23	13.0	9-27-23	0.0	9-27-23	0.0	

CLEAN HARBORS CANADA, INC.
Liquid Removed from Leak Detection Systems 2023
(Maximum Daily volume = 790 L/day/ha*area (ha))

CELL 1		CELL 2		CELL 3A (3)		CELL 3B (4)		Cell 3C (5)		Cell 3D (6)		Cell 3E (7)		Cell 4	
# of hectares = 0.688		# of hectares = 1.353		# of hectares = 2.125		# of hectares = 2.125		# of hectares = 2.546		# of hectares = 2.535		# of hectares = 3.08		# of hectares = 2.43	
Max Daily Volume = 543 L		Max Daily Volume = 1068 L		Max Daily Volume = 1678 L		Max Daily Volume = 1678 L		Max Daily Volume = 2011 L		Max Daily Volume = 2002 L		Max Daily Volume = 2433 L		Max Daily Volume = 1919 L	
DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)
9-18-23	1800.0	9-18-23	52.0	9-18-23	121.0	9-18-23	43.0	9-18-23	14.0	9-18-23	30.0	9-18-23	32.0	9-18-23	294.0
9-19-23		9-19-23	47.0	9-19-23	44.0	9-19-23	13.0	9-19-23	1.0	9-19-23	0.0	9-19-23	51.0	9-19-23	22.0
9-28-23		9-28-23	33.0	9-28-23	39.0	9-28-23	28.0	9-28-23	11.0	9-28-23	0.0	9-28-23	0.0	9-28-23	150.0
9-29-23		9-29-23		9-29-23		9-29-23		9-29-23		9-29-23		9-29-23		9-29-23	
9-30-23		9-30-23		9-30-23		9-30-23		9-30-23		9-30-23		9-30-23		9-30-23	
10-1-23		10-1-23		10-1-23		10-1-23		10-1-23		10-1-23		10-1-23		10-1-23	
10-2-23		10-2-23	0.0	10-2-23	0.0	10-2-23	71.0	10-2-23	26.0	10-2-23	0.0	10-2-23	0.0	10-2-23	291.0
10-3-23		10-3-23	0.0	10-3-23	0.0	10-3-23	34.0	10-3-23	0.0	10-3-23	1.0	10-3-23	0.0	10-3-23	248.0
10-4-23		10-4-23	0.0	10-4-23	0.0	10-4-23	29.0	10-4-23	1.0	10-4-23	6.0	10-4-23	60.0	10-4-23	20.0
10-5-23		10-5-23	117.0	10-5-23	205.0	10-5-23	21.0	10-5-23	0.0	10-5-23	0.0	10-5-23	0.0	10-5-23	2.0
10-6-23		10-6-23	52.0	10-6-23	40.0	10-6-23	26.0	10-6-23	0.0	10-6-23	0.0	10-6-23	50.0	10-6-23	0.0
10-7-23		10-7-23		10-7-23		10-7-23		10-7-23		10-7-23		10-7-23		10-7-23	
10-8-23		10-8-23		10-8-23		10-8-23		10-8-23		10-8-23		10-8-23		10-8-23	
10-9-23		10-9-23		10-9-23		10-9-23		10-9-23		10-9-23		10-9-23		10-9-23	
10-10-23		10-10-23	73.0	10-10-23	118.0	10-10-23	63.0	10-10-23	46.0	10-10-23	0.0	10-10-23	0.0	10-10-23	225.0
10-11-23		10-11-23	39.0	10-11-23	27.0	10-11-23	35.0	10-11-23	7.0	10-11-23	0.0	10-11-23	5.0	10-11-23	0.0
10-12-23		10-12-23	42.0	10-12-23	26.0	10-12-23	27.0	10-12-23	0.0	10-12-23	0.0	10-12-23	30.0	10-12-23	0.0
10-13-23		10-13-23	36.0	10-13-23	27.0	10-13-23	26.0	10-13-23	0.0	10-13-23	0.0	10-13-23	40.0	10-13-23	6.0
10-14-23		10-14-23		10-14-23		10-14-23		10-14-23		10-14-23		10-14-23		10-14-23	
10-15-23		10-15-23		10-15-23		10-15-23		10-15-23		10-15-23		10-15-23		10-15-23	
10-16-23		10-16-23	0.0	10-16-23	0.0	10-16-23	30.0	10-16-23	0.0	10-16-23	0.0	10-16-23	80.0	10-16-23	10.0
10-17-23		10-17-23	0.0	10-17-23	0.0	10-17-23	8.0	10-17-23	35.0	10-17-23	2.0	10-17-23	52.0	10-17-23	1095.0
10-18-23		10-18-23	0.0	10-18-23	0.0	10-18-23	4.0	10-18-23	20.0	10-18-23	4.0	10-18-23	53.0	10-18-23	3.0
10-19-23		10-19-23	79.0	10-19-23	326.0	10-19-23	0.0	10-19-23	9.0	10-19-23	0.0	10-19-23	52.0	10-19-23	0.0
10-20-23		10-20-23	46.0	10-20-23	57.0	10-20-23	2.0	10-20-23	4.0	10-20-23	5.0	10-20-23	51.0	10-20-23	0.0
10-21-23		10-21-23		10-21-23		10-21-23		10-21-23		10-21-23		10-21-23		10-21-23	
10-22-23		10-22-23		10-22-23		10-22-23		10-22-23		10-22-23		10-22-23		10-22-23	
10-23-23		10-23-23	60.0	10-23-23	143.0	10-23-23	14.0	10-23-23	1.0	10-23-23	5.0	10-23-23	52.0	10-23-23	0.0
10-24-23		10-24-23	10.0	10-24-23	47.0	10-24-23	8.0	10-24-23	4.0	10-24-23	5.0	10-24-23	55.0	10-24-23	0.0
10-25-23		10-25-23	0.0	10-25-23	0.0	10-25-23	7.0	10-25-23	0.0	10-25-23	2.0	10-25-23	53.0	10-25-23	0.0
10-26-23		10-26-23	0.0	10-26-23	0.0	10-26-23	5.0	10-26-23	0.0	10-26-23	0.0	10-26-23	55.0	10-26-23	0.0
10-27-23		10-27-23	0.0	10-27-23	0.0	10-27-23	6.0	10-27-23	5.0	10-27-23	3.0	10-27-23	51.0	10-27-23	1652.0
10-28-23		10-28-23		10-28-23		10-28-23		10-28-23		10-28-23		10-28-23		10-28-23	
10-29-23		10-29-23		10-29-23		10-29-23		10-29-23		10-29-23		10-29-23		10-29-23	
10-30-23		10-30-23	0.0	10-30-23	0.0	10-30-23	12.0	10-30-23	10.0	10-30-23	10.0	10-30-23	51.0	10-30-23	178.0
10-31-23		10-31-23	0.0	10-31-23	0.0	10-31-23	12.0	10-31-23	20.0	10-31-23	10.0	10-31-23	60.0	10-31-23	6.0
11-1-23		11-1-23	0.0	11-1-23	0.0	11-1-23	11.0	11-1-23	23.0	11-1-23	0.0	11-1-23	50.0	11-1-23	0.0
11-2-23		11-2-23	0.0	11-2-23	0.0	11-2-23	19.0	11-2-23	35.0	11-2-23	0.0	11-2-23	41.0	11-2-23	201.0
11-3-23		11-3-23	0.0	11-3-23	0.0	11-3-23	8.0	11-3-23	17.0	11-3-23	0.0	11-3-23	47.0	11-3-23	11.0
11-4-23		11-4-23		11-4-23		11-4-23		11-4-23		11-4-23		11-4-23		11-4-23	
11-5-23		11-5-23		11-5-23		11-5-23		11-5-23		11-5-23		11-5-23		11-5-23	
11-6-23		11-6-23	0.0	11-6-23	0.0	11-6-23	0.0	11-6-23	38.0	11-6-23	0.0	11-6-23	46.0	11-6-23	131.0
11-7-23		11-7-23	0.0	11-7-23	0.0	11-7-23	0.0	11-7-23	38.0	11-7-23	0.0	11-7-23	0.0	11-7-23	110.0
11-8-23		11-8-23	0.0	11-8-23	0.0	11-8-23	4.0	11-8-23	5.0	11-8-23	0.0	11-8-23	0.0	11-8-23	0.0
11-9-23		11-9-23	0.0	11-9-23	0.0	11-9-23	8.0	11-9-23	0.0	11-9-23	15.0	11-9-23	0.0	11-9-23	305.0
11-10-23		11-10-23		11-10-23		11-10-23		11-10-23		11-10-23		11-10-23		11-10-23	
11-11-23		11-11-23		11-11-23		11-11-23		11-11-23		11-11-23		11-11-23		11-11-23	
11-12-23		11-12-23		11-12-23		11-12-23		11-12-23		11-12-23		11-12-23		11-12-23	
11-13-23		11-13-23	0.0	11-13-23	0.0	11-13-23	0.0	11-13-23	1.0	11-13-23	0.0	11-13-23	0.0	11-13-23	179.0
11-14-23		11-14-23	0.0	11-14-23	0.0	11-14-23	0.0	11-14-23	10.0	11-14-23	0.0	11-14-23	0.0	11-14-23	0.0
11-15-23		11-15-23	0.0	11-15-23	0.0	11-15-23	0.0	11-15-23	8.0	11-15-23	0.0	11-15-23	0.0	11-15-23	0.0
11-16-23		11-16-23	0.0	11-16-23	0.0	11-16-23	0.0	11-16-23	2.0	11-16-23	0.0	11-16-23	0.0	11-16-23	0.0
11-17-23		11-17-23	0.0	11-17-23	0.0	11-17-23	0.0	11-17-23	6.0	11-17-23	0.0	11-17-23	0.0	11-17-23	0.0
11-18-23		11-18-23		11-18-23		11-18-23		11-18-23		11-18-23		11-18-23		11-18-23	
11-19-23		11-19-23		11-19-23		11-19-23		11-19-23		11-19-23		11-19-23		11-19-23	
11-20-23		11-20-23	209.0	11-20-23	397.0	11-20-23	12.0	11-20-23	0.0	11-20-23	0.0	11-20-23	0.0	11-20-23	0.0
11-21-23		11-21-23	30.0	11-21-23	28.0	11-21-23	17.0	11-21-23	2.0	11-21-23	0.0	11-21-23	0.0	11-21-23	0.0
11-22-23		11-22-23	25.0	11-22-23	36.0	11-22-23	9.0	11-22-23	0.0	11-22-23	0.0	11-22-23	66.0	11-22-23	0.0
11-23-23		11-23-23	17.0	11-23-23	38.0	11-23-23	5.0	11-23-23	0.0	11-23-23	0.0	11-23-23	37.0	11-23-23	0.0
11-24-23		11-24-23	17.0	11-24-23	36.0	11-24-23	6.0	11-24-23	0.0	11-24-23	0.0	11-24-23	47.0	11-24-23	0.0
11-25-23		11-25-23		11-25-23		11-25-23		11-25-23		11-25-23		11-25-23		11-25-23	
11-26-23		11-26-23		11-26-23		11-26-23		11-26-23		11-26-23		11-26-23		11-26-23	
11-27-23		11-27-23	27.0	11-27-23	132.0	11-27-23	16.0	11-27-23	30.0	11-27-23	0.0	11-27-23	45.0	11-27-23	254.0
11-28-23		11-28-23	19.0	11-28-23	52.0	11-28-23	13.0	11-28-23	25.0	11-28-23	0.0	11-28-23	44.0	11-28-23	0.0
11-29-23		11-29-23	20.0	11-29-23	45.0	11-29-23	8.0	11-29-23	20.0	11-29-23	0.0	11-29-23	45.0	11-29-23	0.0
11-30-23		11-30-23	16.0	11-30-23	47.0	11-30-23	8.0	11-30-23	8.0	11-30-23	1.0	11-30-23	43.0	11-30-23	205.0
12-1-23		12-1-23	16.0	12-1-23	37.0	12-1-23	5.0	12-1-23	54.0	12-1-23	0.0	12-1-23	0.0	12-1-23	0.0

CLEAN HARBORS CANADA, INC.
Liquid Removed from Leak Detection Systems 2023
(Maximum Daily volume = 790 L/day/ha*area (ha))

CELL 1		CELL 2		CELL 3A (3)		CELL 3B (4)		Cell 3C (5)		Cell 3D (6)		Cell 3E (7)		Cell 4	
# of hectares = 0.688		# of hectares = 1.353		# of hectares = 2.125		# of hectares = 2.125		# of hectares = 2.546		# of hectares = 2.535		# of hectares = 3.08		# of hectares = 2.43	
Max Daily Volume = 543 L		Max Daily Volume = 1068 L		Max Daily Volume = 1678 L		Max Daily Volume = 1678 L		Max Daily Volume = 2011 L		Max Daily Volume = 2002 L		Max Daily Volume = 2433 L		Max Daily Volume = 1919 L	
DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)	DATE	VOLUME (litres)
12-2-23		12-2-23		12-2-23		12-2-23		12-2-23		12-2-23		12-2-23		12-2-23	
12-3-23		12-3-23		12-3-23		12-3-23		12-3-23		12-3-23		12-3-23		12-3-23	
12-4-23	1300.0	s 12-4-23	25.0	12-4-23	77.0	12-4-23	15.0	s 12-4-23	15.0	s 12-4-23	12.0	s 12-4-23	25.0	s 12-4-23	733.0
12-5-23		12-5-23	21.0	12-5-23	40.0	12-5-23	3.0	12-5-23	25.0	12-5-23	0.0	12-5-23	0.0	12-5-23	221.0
12-6-23		12-6-23	26.0	12-6-23	32.0	12-6-23	1.0	12-6-23	2.0	12-6-23	0.0	12-6-23	8.0	12-6-23	0.0
12-7-23		12-7-23	16.0	12-7-23	33.0	12-7-23	2.0	12-7-23	15.0	12-7-23	0.0	12-7-23	43.0	12-7-23	0.0
12-8-23		12-8-23	17.0	12-8-23	28.0	12-8-23	1.0	12-8-23	3.0	12-8-23	0.0	12-8-23	42.0	12-8-23	0.0
12-9-23		12-9-23		12-9-23		12-9-23		12-9-23		12-9-23		12-9-23		12-9-23	
12-10-23		12-10-23		12-10-23		12-10-23		12-10-23		12-10-23		12-10-23		12-10-23	
12-11-23		12-11-23	22.0	12-11-23	75.0	12-11-23	5.0	12-11-23	0.0	12-11-23	3.0	12-11-23	38.0	12-11-23	554.0
12-12-23		12-12-23	0.0	* 12-12-23	29.0	* 12-12-23	2.0	12-12-23	5.0	12-12-23	0.0	12-12-23	37.0	12-12-23	194.0
12-13-23		12-13-23	0.0	* 12-13-23	0.0	* 12-13-23	5.0	12-13-23	35.0	12-13-23	0.0	12-13-23	33.0	12-13-23	0.0
12-14-23		12-14-23	31.0	12-14-23	32.0	12-14-23	23.0	12-14-23	0.0	12-14-23	2.0	12-14-23	39.0	12-14-23	179.0
12-15-23		12-15-23	22.0	12-15-23	28.0	12-15-23	3.0	12-15-23	0.0	12-15-23	0.0	12-15-23	41.0	12-15-23	195.0
12-16-23		12-16-23		12-16-23		12-16-23		12-16-23		12-16-23		12-16-23		12-16-23	
12-17-23		12-17-23		12-17-23		12-17-23		12-17-23		12-17-23		12-17-23		12-17-23	
12-18-23		12-18-23	30.0	12-18-23	64.0	12-18-23	4.0	12-18-23	42.0	12-18-23	0.0	12-18-23	40.0	12-18-23	426.0
12-19-23		12-19-23	23.0	12-19-23	22.0	12-19-23	8.0	12-19-23	24.0	12-19-23	0.0	12-19-23	39.0	12-19-23	64.0
12-20-23		12-20-23	18.0	12-20-23	18.0	12-20-23	5.0	12-20-23	35.0	12-20-23	2.0	12-20-23	37.0	12-20-23	0.0
12-21-23		12-21-23	15.0	12-21-23	18.0	12-21-23	6.0	12-21-23	2.0	12-21-23	5.0	12-21-23	25.0	12-21-23	78.0
12-22-23		12-22-23	12.0	12-22-23	15.0	12-22-23	7.0	12-22-23	40.0	12-22-23	0.0	12-22-23	26.0	12-22-23	0.0
12-23-23		12-23-23		12-23-23		12-23-23		12-23-23		12-23-23		12-23-23		12-23-23	
12-24-23		12-24-23		12-24-23		12-24-23		12-24-23		12-24-23		12-24-23		12-24-23	
12-25-23		12-25-23		12-25-23		12-25-23		12-25-23		12-25-23		12-25-23		12-25-23	
12-26-23		12-26-23		12-26-23		12-26-23		12-26-23		12-26-23		12-26-23		12-26-23	
12-27-23		12-27-23	30.0	12-27-23	85.0	12-27-23	17.0	12-27-23	0.0	12-27-23	0.0	12-27-23	36.0	12-27-23	448.0
12-28-23		12-28-23	22.0	12-28-23	21.0	12-28-23	16.0	12-28-23	15.0	12-28-23	0.0	12-28-23	35.0	12-28-23	350.0
12-29-23		12-29-23	20.0	12-29-23	18.0	12-29-23	14.0	12-29-23	0.0	12-29-23	0.0	12-29-23	34.0	12-29-23	515.0
12-30-23		12-30-23		12-30-23		12-30-23		12-30-23		12-30-23		12-30-23		12-30-23	
12-31-23		12-31-23		12-31-23		12-31-23		12-31-23		12-31-23		12-31-23		12-31-23	
5700.0		16319.0		19426.0		16093		16742		417.0		10087.0		23775.0	
s = sampled				* denotes system down for repair		** denotes line, totalizer problems, level logger and pump problems				*** denotes pump replaced				**** denotes piping problem	

APPENDIX H

Third-party Compliance Audit Report



DILLON
CONSULTING

CLEAN HARBORS CANADA INC

2021 Compliance Audit Summary Report – Ryley Hazardous Waste Storage Facility and Landfill, Ryley, Alberta

Alberta Environment and Parks Approval Number 10348-03-00



December 17, 2021

Clean Harbors Canada, Inc.
P.O. Box 390
Ryley, Alberta
T0B 4A0

Attention: Mr. Stan Yuha
Facility Manager

2021 Compliance Audit Summary Report – Ryley Hazardous Waste Storage Facility
and Landfill

Dear Mr. Yuha:

Dillon Consulting Limited is pleased to submit the enclosed Final 2021 Compliance Audit Summary Report for the Ryley Facility (Facility or Site) to Clean Harbors Canada, Inc. This report describes the methodological approach used and highlights key findings resulting from the 2021 Triennial Compliance Audit completed at the Facility through a site visit conducted over September 1 to 2, 2021.

We hope you see this as a valuable tool to gain insight into current operations and Approval requirements, and discover the findings and recommendations described herein useful in informing continued operations at the Facility.

Sincerely,

DILLON CONSULTING LIMITED

A handwritten signature in blue ink, appearing to read "Jack Wallace".

Jack Wallace, P. Eng.
Lead Auditor

END:sls

cc: Mr. Mike Parker

Our file: 21-2502

334-11th Avenue SE
Suite 200
Calgary, Alberta
Canada
T2G 0Y2
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403.215.8880
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Appendices

A	Ryley Audit Checklist	
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1.0

Introduction

Clean Harbors Canada, Inc. (Clean Harbors) is required to undergo a third-party compliance audit (compliance audit or audit) of construction, operations, and closure/post-closure care of its Ryley Facility (Facility or Site), located in Ryley, Alberta, as a requirement of the Site's Alberta Environment and Parks (AEP) Approval number 10348-03-00 (Approval), at a minimum of once every three years. The audit, as part of section 4.1.7 of the Approval (valid 2017-2027), is required to be performed at least once every three years, commencing on or before October 1, 2018. Dillon Consulting Limited (Dillon) was retained to perform the 2021 Triennial Compliance Audit (2021 Audit), for which the compliance audit kick-off was held on September 1, 2021, representing the commencement of the audit activities, followed by the formal site visit, conducted on September 1 and 2, 2021.

To prepare for this exercise, an audit checklist (Appendix A following this report) was established to account for every actionable item contained within the operating Approval. During the site visit, the auditors reviewed relevant documentation, interviewed facility staff members, and took part in the site visit and associated visual inspection of the facility in order to assess the compliance level of each item contained within the audit checklist. This report summarizes the findings and results of this audit.

1.1

Scope and Objectives

The objective of this audit was to determine if the Facility was in compliance with all requirements included in the Approval from the period of September 20, 2018 (2018 compliance audit completion) to September 1, 2021 (2021 Compliance Audit commenced). This is the second audit completed at the Facility since the new Approval came into effect in 2017.

Each of the 573 line items in the audit checklist were assessed and assigned one of the following statuses:

- Compliant;
- Non-compliant;
- Opportunity for Improvement; and
- Not Applicable/Information.

Each line item consists of a clear statement identifying an obligation of the Facility to the Approval. Line items are phrased in such a way where it is easy to assign one of the above statuses without cause for confusion. Approval requirements, which state numerous conditions under one larger, enveloping condition, have been separated and added as individual line items in the audit checklist to provide further clarity. A "Not Applicable/Information" status was assigned to items which were not applicable at the time of the audit, or were for information purposes only and do not represent compliance requirements. "Opportunity for Improvement" was assigned to items for which the Facility was clearly implementing compliance measures, but where Dillon identified room to improve.

In addition to assessing compliance with each item of the audit checklist, the auditors also recorded the supporting documentation (where available), which the auditors had reviewed prior to assigning a status to each line item. Documentation is generally the strongest evidence to support interviewee statements, and was revisited, as needed, to confirm statements. Documents reviewed included, but were not limited to:

- Site Approval;
- Annual Landfill Operations Report(s);
- Annual Landfill Operations Plan(s);
- Groundwater Monitoring Report(s);
- Calibration records;
- Sample analytical results;
- Regulatory documents and guidelines;
- Regulatory correspondence;
- Design drawings; and
- Emails.

To supplement documentation review, or in cases where documentation was not available or did not exist, a Facility tour was conducted by both auditors and three senior staff members of Clean Harbors. Visual observations and inspections were performed during the tour to verify compliance with certain items in the audit checklist.

Verbal confirmation provided by Clean Harbors' personnel was accepted in cases where assigning a status based on documentation or visual inspection was not feasible. Oftentimes, more than one staff member confirmed claims by the other, increasing the confidence of the auditors in assigning a status.

Clarification from AEP on Approval terms was not sought for this audit. Dillon's Auditors used professional judgement when evaluating the Approval terms and the Facility's compliance to them.

Requirements not explicitly identified in the Approval were outside the scope of this audit.

2.0 Discussion

The completed audit checklist, identifying the status of all Approval clauses, is provided as Appendix A, following the report text.

2.1 Resolution of 2018 Audit Findings

The 2018 audit completed at the Facility has identified two non-conformant items. Specifically, it was discovered that a groundwater monitoring well (MW-10) was found to have been damaged, resulting in well cap exposure, contravening Sections 4.1.4(vi) and Sections 4.9.10 (a) and (b) of the Approval. The 2021 audit observed that the monitoring well MW-10 had been repaired and locked. The second contravention found was relating to Section 4.6.16 (b) of the Approval, which states “All tanks containing hazardous waste and all tanks containing hazardous recyclables in each building shall be equipped, at a minimum, with all of the following: (b) A written operating procedure to prevent tank overfill”. Although the “Bulk Flammable Liquid Transfer Safe Operating Procedure (SOP) Document and Checklist” is available, it is not posted next to the tanks in question. During the field observations of the 2021 audit, the Bulk Flammable Liquid Transfer SOP had not been stored next to the flammable tanks. This resulted in the non-compliance of Section 4.6.16(b) of the Approval during the 2021 Audit.

The requirements of Section 7.1 – Landfill Cell Closure and Maintenance of the Approval, which states in Section 7.1.1 “The approval holder shall submit a Landfill Cell Closure Plan for individual landfill cell closure to the Director on or before September 30, 2017, unless otherwise authorized in writing by the Director” and Section 7.1.2 “The Landfill Cell Closure Plan submitted pursuant to 7.1.1 shall be signed and stamped by a professional registered with APEGA” were found to not necessarily portray the operating practices which are actually utilized by the Facility. It was observed in the 2018 audit that Sections 7.1.1 through Sections 7.1.2 required clarification from AEP to ensure compliance to the Approval is maintained. The latest landfill cell closure would be Cell 3B. Based on further discussion with Clean Harbors, the Landfill Cell Closure Plan was formed by the stamped design work completed as part of the issued for construction and final record drawing packages, and associated documents; as such, this item appears to be not applicable to ongoing operations. Further monitoring of this requirement is recommended for future landfill cell closure activities.

2.2 2021 Audit Summary of Findings

Appendix A includes the full checklist used during the audit. Table 1 below summarizes the statuses assigned to each line item in the audit checklist.

Table 1: Statuses Assigned to Line Items in the Audit Checklist

Status	Number Assigned
Compliant	391
Non-Compliant	2
Opportunity for Improvement	17
Not Applicable/Information	163
TOTAL	573

Two line items were assigned the status “non-compliant”. They are as follows:

1. Section 4.4.5 of the Approval states “The volume of liquid in the leak detection system, as monitored in Table 4.6-D shall not exceed the action leakage rate in any landfill cell”. Action leakage rate exceedances were noted and reported June 9, June 10, July 2, and July 9, 2020, and reported to AEP within acceptable time frames with no adverse impacts from the exceedances. Several action leakage rate exceedances were also determined to have not been reported. Notification to AEP was made as soon as this information was discovered (AEP 376183), with actions taken to ensure this is not repeated. No adverse impacts resulted due to the exceedances.
2. Section 4.6.16 (b) of the Approval states “All tanks containing hazardous waste and all tanks containing hazardous recyclables in each building shall be equipped, at a minimum, with all of the following: (b) A written operating procedure to prevent tank overfill”. Although the “Bulk Flammable Liquid Transfer SOP Document and Checklist” is available, it is not posted next to the tanks in question.

Several requirements of the Approval were identified as “informational” or “non-applicable” in nature by audit and the Facility’s personnel, and were assigned these identifiers accordingly. For example, Section 4.6.41 of the Approval states “The approval holder shall not dispose of hazardous waste in any Class II landfill cell”. No Class II landfill cells exist at the Facility, and no plans or permits are in place to allow a Class II landfill cell to be constructed in the future.

For continued Approval compliance in construction and operations, Dillon recommends that the Facility’s staff regularly review the Approval in depth, and engage the AEP Director as needed during approval amendment periods to modify clauses, which may no longer be applicable to site conditions.

Conclusions

The 2021 Compliance Audit of AEP Approval number 10348-03-00 revealed two non-compliances to Approval terms and conditions between the time of the last audit completion and commencement of this audit. These non-compliances relate to the following Approval clauses and consisted of the following:

- Clause 4.4.5: Action leakage rate exceedances were noted and reported June 9, June 10, July 2, , and July 9, 2020, and reported to AEP within acceptable time frames with no adverse impacts from the exceedances. Several action leakage rate exceedances were also determined to have not been reported. Notification to AEP was made as soon as this information was discovered (AEP 376183), with actions taken to ensure this is not repeated. No adverse impacts resulted due to the exceedances.
- Clause 4.6.16 (b): The SOP for tank filling and responding to overflows was available to staff on-site, but was not posted next to the bulk liquid storage tanks at the time of the audit.

Several opportunities for improvement were identified in the course of the audit, as identified in Appendix A. They include the following:

- Clause 2.3.1 (ii); 2.3.1(iii, A); and 2.3.1(iii, B): Although it appears that the Facility is adhering to the standards referenced for the collection, preservation, storage, and analysis of effluent or runoff water, a written SOP referencing the standards is recommended to be procured and included in the Operations Plan;
- Clause 4.1.4: A 24 hour "Hotline" is maintained at the Facility. Opportunity for improvement would be to post this number at the Facility's gate and office entrance;
- Clause 4.1.5(ii): Ponding was observed in roadways near potable water tanks, which can be managed on an ongoing basis;
- Clause 4.3.9 and 4.3.13(b): Results for the runoff control system testing of 48 hour static acute lethality test using daphnia magna could be included in the Summary of Batch Analysis presented in the 2020 Annual Landfill Operations Report, along with the lethality of effluents to rainbow trout testing;
- 4.6.29(a)-(e): The Facility is adhering to the information required in the Monthly Waste Management Report, viewed for July 2021. However, the reports are currently referencing the 10348-02-00 Approval. Dillon would recommended that the referenced Approval be updated to 10348-03-00;
- Clauses 4.6.24 (i); 4.6.30 (b); and 4.6.39 (b): Although it appears that the Facility is adhering to the document in question; "Industrial Waste Identification and Management Options, Alberta Environment, May 1996", it could be explicitly referred to in the Facility's Operations Plan; and
- Clause 7.1.1 and 7.1.2: It is understood that the Landfill Cell Closure Plan is formed by the stamped design work completed as part of the issued for construction and final record drawing packages, and associated documents. Assess the requirement for future Closure Plan submissions for future landfill cell closure activities.

Audit Limitations

This limited scope regulatory compliance audit relied upon information provided by representatives of Clean Harbors, and gathered during the site visit and document review conducted by Dillon during the course of the audit works undertaken. All information was verified to the extent possible through independent observations. However, Dillon cannot warrant that all information provided by Clean Harbors or other parties is completely accurate, transparent, or correct.

5.0

Closure

This audit and report have been completed in accordance with industry best practices subject to limitations outlined herein. If you should have any questions or concerns regarding the contents of this report or findings of the audit, please direct them to Jack Wallace at jwallace@dillon.ca or by calling 403.215.8880 ext. 4364.

Appendix A

Ryley Audit Checklist

Section 2 - General

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 2 - General							
2.1.1	The approval holder must immediately report to the Director by telephone any contravention of the terms and conditions of this approval at 1-780-422-4505.	X				<ul style="list-style-type: none"> Notification to AEP regarding odour complaint (ref. #380842), dated July 12, 2021. Report to AEP regarding landfill fire (ref. #375305), dated January 25, 2021. 	<ul style="list-style-type: none"> All complaints are called into the AEP number, which then assigns a reference number. The facility aims to call in within the hour. Contraventions are mostly odour complaints, which are called in to site then reported to AEP. There was a landfill fire early in 2021 due to a non-conforming waste stream, which was reported.
2.1.2	The approval holder shall submit a written report to the Director within 7 days of the reporting pursuant to 2.1.1.	X					Confirmed through review of records and discussion that all odour complaints are investigated and findings are submitted to the AEP within the reports.
2.1.3	The approval holder shall immediately notify the director if any of the following events occurs:				X	Not applicable.	Confirmed through discussion that the facility has not had any of these events occur.
2.1.3 (a)	The approval holder is served with a petition into bankruptcy.				X		
2.1.3 (b)	The approval holder files an assignment in bankruptcy or Notice of Intent to make a proposal.				X		
2.1.3 (c)	A receiver or receiver-manager is appointed.				X		
2.1.3 (d)	An application for protection from creditors is filed for the benefit of the approval holder under any creditor protection legislation.				X		
2.1.3 (e)	Any of the assets which are the subject matter of this approval are seized for any reason.				X		
2.1.4	The approval holder shall report any monitoring of substances or parameters which are the subject of operational limits as set out in the approval if they are monitored more frequently than specified by the approval. The additional results of such monitoring are to be included as an addendum in the reports required by the approval.				X	Not applicable.	Confirmed through discussion that the monitoring frequency as specified in Approval is followed.
2.1.5	The approval holder shall submit all monthly reports required by the approval to be compiled or submitted on or before the end of the month following the month in which the information was collected.	X				<ul style="list-style-type: none"> 2020 Annual Landfill Operations Report, dated March 31, 2021. 2020 Annual Air Monitoring Report, dated March 30, 2021. 	<ul style="list-style-type: none"> Air monitoring reporting is done monthly by GHD. Reporting requirements and data were viewed in the 2020 Annual Landfill Operations Report. No late submissions noted.
2.1.6	The approval holder shall submit all annual reports require by the approval to be compiled or submitted to the Director on or before March 31 of the year following the year in which the information was collected.	X				<ul style="list-style-type: none"> 2020 Annual Landfill Operations Report, dated March 31, 2021. 2020 Annual Air Monitoring Report, dated March 30, 2021. 	Confirmed through discussion that all reporting has been on time to date.

Section 2 - General

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 2 - General							
2.2.1 (b)	The approval holder shall record and retain all the following information in respect of any sampling conducted or analyses performed in accordance with this approval for a minimum of 10 years:	X				<ul style="list-style-type: none"> Record Retention Schedule dated November 14, 2014. WIN Web records. 	Compliance confirmed through a review of multiple files and windows in the Clean Harbors Facility Compliance View system (WIN Web).
2.2.1 (b, i)	The place, date and time of sampling.	X				<ul style="list-style-type: none"> pH at scrubber daily inspection for August 31, 2021. Leachate level quarterly sampling certificate of analysis dated March 17, 2020. 	Facility Compliance View system (WIN Web) is the electronic database and data is accessible for all records of daily scrubber pH data; leachate level log data; and surface water and leachate monitoring results.
2.2.1 (b, ii)	Sample type.	X					
2.2.1 (b, iii)	The dates the analyses were performed.	X					
2.2.1 (b, iv)	The analytical techniques, methods or procedures used in the analysis.	X					
2.2.1 (b, v)	The names of the persons who collected and analysed each sample.	X					
2.2.1 (b, vi)	The number of analyses.	X					
2.2.2	The approval holder shall keep and maintain an Operating Record as per 4.6.34(a) until the end of the landfill post-closure.	X				<ul style="list-style-type: none"> Landfill annual operations reports (submissions to AEP). Landfill Operations Plan and Ryley HWRSP Facility Plan, dated February 2021. (Operations Plan). HWRSP Standard Operating Procedures. 	<ul style="list-style-type: none"> Landfill and Facility Operations Plan is updated annually per Approval as required. Latest version is dated February 22, 2021. Updates for 2021: personnel listing, procedures for sampling of new or changed landfill cells, what cells are capped Operations Report available publicly or viewing any time on the Clean Harbors website.
2.2.3	The Operating Record shall include, at minimum, all of the following information:				X		
2.2.3 (a)	The information required in section 7.3(c) of the Standards for Landfills in Alberta .	X					
2.2.3 (b)	The name and contact information of all persons who discover any contravention	X					
2.2.3 (c)	The names and contact information of all persons who take any remedial actions arising from the contravention of the Act, the regulations, or the approval.	X					
2.2.3 (d)	A description of remedial measures taken in respect of a contravention of the Act, the regulations, or the Approval.	X					
2.2.4	The approval holder shall submit a copy of the most recent Operating Record to the Director upon written request from the Director within the timeline specified by the Director.	X					
2.3.1 (i, A)	Air monitoring analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Alberta Stack Sampling Code" (AEP, 1995).	X				GHD 2016 Quality Assurance Plan - Air Monitoring Program.	Exhaust stack sampling done once per week as per Section 4.2.9.
2.3.1 (i, B)	Air monitoring analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Methods Manual for Chemical Analysis of Atmospheric Pollutants" (AEP, 1993).	X				GHD 2016 Quality Assurance Plan - Air Monitoring Program.	Referred to in Air Monitoring Program.
2.3.1 (i, C)	Air monitoring analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Air Monitoring Directive" (AEP 1989).	X				GHD 2020 AEP annual Ambient Air Monitoring Report, dated March 30, 2021.	Standard referenced in the 2020 Annual Ambient Air Monitoring Report

Section 2 - General

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 2 - General							
2.3.1 (ii)	Industrial Wastewater, Industrial runoff, groundwater and domestic wastewater analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association, American Water Works Association, Water Environment Federation, 1998).			X		Industrial run-off report for July 2020 to AEP.	<ul style="list-style-type: none"> Clean Harbors staff collects samples then send them to the lab in Edmonton. Staff are trained in proper sampling techniques consistent with the methods indicated in the Approval. There is no formal written SOP for sampling industrial wastewater which makes reference to the Approval line test method.
2.3.1 (iii, A)	Whole effluent toxicity analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Biological Test Method: Reference Method for Determining the Acute Lethality of Effluents to Rainbow Trout" (Environment and Climate Change Canada, 2000).			X			
2.3.1 (iii, B)	Whole effluent toxicity analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Biological Test Method: Reference Method for Determining the Acute Lethality of Effluents to Daphnia Magna" (Environment and Climate Change Canada, 2000).			X			
2.3.1 (iii, C)	Whole effluent toxicity analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Biological Test Method: Growth Inhibition Test Using the Freshwater Alga <i>Selenastrum capricornutum</i> " (Environment and Climate Change Canada, 1992).				X	Review of Approval requirements (Table 4.3-B, 4.3-C, 4.3-D).	Not applicable. Whole effluent control system limits analysed as outlined by the Approval in Sections 4.6.8 are for: pH, COD, TDS, TSS, ammonia, chloride, sodium, sulphate, oil and other substances, 96-hour acute lethality test using rainbow trout, 48-hour acute lethality test using daphnia magna.
2.3.1 (iii, D)	Whole effluent toxicity analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Biological Test Method: Test of Reproduction and Survival Using the Cladoceran <i>Ceriodaphnia dubia</i> " (Environment and Climate Change Canada, 1992).				X		
2.3.1 (iii, E)	Whole effluent toxicity analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Biological Test Method: Test of Larval Growth and Survival Using Fathead Minnows" (Environment and Climate Change Canada, 1992).				X		
2.3.1 (iii, F)	Whole effluent toxicity analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Biological Test Method: Toxicity Test Using Luminescent Bacteria (<i>Photobacterium phosphoreum</i>)" (Environment and Climate Change Canada, 1992).				X		
2.3.1 (iv, A)	Soil analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the Soil Monitoring Directive (AEP, 2009).	X				2019 Soil Monitoring Program Report dated January 31, 2020.	Tetra Tech performs the soil sampling. Confirmed that the Soil Monitoring Directive was followed
2.3.1 (iv, B)	Soil analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: The Soil Quality Criteria Relative to Disturbance and Reclamation (Alberta Agriculture, 1987)				X	2019 Soil Monitoring Program Report dated January 31, 2020.	Not applicable. Information only as this pertains to reclamation. The site is still operating.

Section 2 - General

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	O/I	Info, N/A		
Part 2 - General							
2.3.1 (v, A)	Waste analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (USEPA, 1986).	X				Operations Plan.	All wastes are subject to a pre-acceptance review prior to receipt. Each waste stream will have a waste profile completed prior to the receipt of the waste which includes a third party Class II Landfill analysis Package - pH, BTEX, metals, delta T and flash point. Sampling of incoming loads is performed to verify characteristics of the shipment.
2.3.1 (v, B)	Waste analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Methods Manual for Chemical Analysis of Water and Wastes" (Alberta Environmental Centre, 1996).	X					
2.3.1 (v, C)	Waste analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Toxicity Characteristic Leaching Procedure (TCLP)" (USEPA Regulation 40 CFR261, Appendix II, Method No. 1311).	X					
2.3.1 (v, D)	Waste analytical requirements for collection, preservation, storage, handling, and analysis must be in accordance with: the "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association, American Water Works Association, Water Environment Federation, 2010).	X					
2.3.2	Labs retained for analysis of parameters required by the approval are accredited pursuant to ISO/IEC 17025.	X				Certificate of Analysis for Bureau Veritas and ALS Environmental in various reports.	<ul style="list-style-type: none"> Bureau Veritas and ALS Environmental are used for all water/leachate parameters (switched to ALS from BV in Q4 2020). Alberta Innovates is used for all air parameters. Confirmed accreditations for all labs.
2.3.4	The approval holder shall comply with the terms and conditions of any written authorization issued by the Director under 2.3.2.				X	Not applicable.	Not applicable. Information only.
2.4.1	The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.				X	Not applicable.	Not applicable. Information only.
2.4.2	Any conflict between the Standards for Landfills in Alberta, as amended, and the terms and conditions of this approval shall be resolved in favour of this approval.				X	Not applicable.	Not applicable. Information only.
2.4.3	Environmental Protection and Enhancement Act Approval No. 10348-02-00, as amended, is cancelled.				X	Not applicable.	Not applicable. Information only.
2.4.4	All tanks shall conform to the "Guidelines for Secondary Containment for Above Ground Storage Tanks" (Alberta Environmental Protection, 1997).	X				Field observations.	<ul style="list-style-type: none"> Three get annually inspected by Petroleum Tank Industry (diesel tank and 2 liquid waste tanks). Safety Codes Council invoice viewed. PTMAA certificate no longer required after Aug. 31, 2020. Safety Codes Council is now the regulating body. Secondary containment observed in field.
2.4.5	All above ground storage tanks containing liquid hydrocarbons or organic compounds shall conform to the "Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks" (Canadian Council of Ministers of the Environment, 1995).	X				<ul style="list-style-type: none"> Safety Codes Council invoice dated June 10, 2021. Field observations. 	<ul style="list-style-type: none"> Waste tanks were connected to the vapour capture and scrubbing system. Leachate tank had a newly installed vapour capture and scrubbing system installed. Inspected the three waste tanks on site and the leachate tank.

Section 3 - Construction

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	O/I	Info. N/A		
Part 3 - Construction							
3.1.1	The approval holder shall not commence construction of Cell 4 unless and until updated financial security of the facility has been provided to include Cell 4 lateral expansion.	X				<ul style="list-style-type: none"> Letter to AEP regarding Cell 4 QA/QC Submission, dated February 19, 2019. Bond for financial security from Chubb dated August 16, 2021. AEP acceptance letter for bond, dated October 22, 2019. 	Compliance confirmed through a review of correspondence regarding changes to financial security for this period related to construction. AEP accepted the financial security bond for the construction period.
3.1.2	The approval holder shall construct each new Class 1 industrial landfill which has the following components, at a minimum:				X	Not applicable.	Not applicable. Information only.
3.1.2 (a)	A minimum of 0.45 metre thick cover of clean sand or soil placed over top of the uppermost drainage layer.	X				Tetra Tech Issued for Construction Drawings, dated March 2018.	Compliance confirmed; minimum of 450 mm is specified in drawing details.
3.1.2 (b, i)	GCL liner placed in direct contact with an underlying 80 mil HDPE geomembrane liner as a primary liner.	X				<ul style="list-style-type: none"> Tetra Tech Issued for Construction Drawings. AEP Letter amending GCL to Geosynthetic. 	Compliance confirmed; Detail 3 on Drawing C-04 shows GCL in direct contact with underlying geomembrane.
3.1.2 (b, ii)	GCL liner placed in direct contact with an underlying 80 mil HDPE geomembrane liner as a secondary liner.	X				<ul style="list-style-type: none"> Tetra Tech Issued for Construction Drawings. AEP Letter amending GCL to Geosynthetic. 	Compliance confirmed; Detail 3 on Drawing C-04 shows GCL in direct contact with underlying geomembrane as a secondary liner.
3.1.2 (b, iii, A)	GCL liner placed in direct contact with an underlying clay liner that has a minimum thickness of 1.0 metre at all points.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; 1000 mm indicated as a minimum thickness of the underlying clay liner, GCL indicated above in Detail 3 on Drawing C-04.
3.1.2 (b, iii, B)	GCL liner placed in direct contact with an underlying clay liner that has been compacted to achieve an in-place hydraulic conductivity of 1×10^{-9} m/s or less.	X				Clean Harbors Cell 4 Request for Quotation.	Compliance confirmed; GCL is required to have a conductivity of 5×10^{-9} cm/s at most (which is lower than the AEP requirements).
3.1.2 (c, i)	Leachate collection system that is placed over the primary liner.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; Detail 11 on Drawing C-06 shows LCS above primary layer.
3.1.2 (c, ii)	Leachate collection system that is capable of maintaining the acceptable leachate head.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; leachate collection system for most cells on timers, one cell has automatic pumping based on leachate level.
3.1.2 (c, iii, a)	Leachate collection system that consists of a geo-composite drainage layer with a transmissivity of at least 1×10^{-4} m ² /s placed over top of the primary layer.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; transmissivity is required to be 1×10^{-4} m ² /s at a minimum.
3.1.2 (c, iii, b)	Leachate collection system that consists of a network of perforated leachate collection pipes.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; Drawing C-05 shows perforation details for the leachate collection system.
3.1.2 (c, iii, c)	Leachate collection system that consists of a leachate collection sump placed over the primary layer.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; Drawing C-05 shows sump in both primary and secondary layer acting as one.
3.1.2 (d, i)	Leak detection system that is placed over the secondary layer.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; Detail 3 on Drawing C-04 shows leak detection system over the secondary layer.
3.1.2 (d, ii)	Leak detection system that is capable of detecting the leakage through the primary layer.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; Detail 3 on Drawing C-04 shows leak detection system under the primary layer.

Section 3 - Construction

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	O/I	Info. N/A		
Part 3 - Construction							
3.1.2 (d, iii, a)	Leak detection system that consists of a geo-composite drainage layer with a transmissivity of at least $1 \times 10^{-4} \text{m}^2/\text{s}$ placed over the top of the secondary layer.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; Detail 3 on Drawing C-04 shows geocomposite leak detection system over the secondary layer. Transmissivity of geocomposite satisfies requirements.
3.1.2 (d, iii, b)	Leak detection system that consists of a network of perforated leak detection liquid collection pipes.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; Detail 10 on Drawing C-05 shows perforated leachate monitoring pipes.
3.1.2 (d, iii, c)	Leak collection system that consists of a leak detection liquid collection sump placed over the secondary layer.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; Drawing C-05 shows sump in both primary and secondary layer acting as one.
3.1.2 (e, i)	A final cover that meets the requirements in Section 6.1(c) of the "Standards for Landfills in Alberta" or as specified in the Landfill Cell Closure Plan submitted by the approval holder and authorized by the Director pursuant to 7.1.1 and 7.1.4 of the approval.	X				Dillon Annual Landfill Cell Closure Report (Cell 3B), dated March 2021.	Compliance confirmed; design and installation of the Cell 3B final cover system was completed in 2020.
3.1.2 (f)	A run-on control system capable of preventing flow onto the active landfill area from at least the peak discharge from a 1 in 25 year, 24 hour duration storm event at the facility.	X				Tetra Tech Issued for Construction Drawings.	Compliance confirmed; perimeter berm is evident in Drawing C-03.
3.1.2 (g)	A runoff control system capable of collecting and controlling at least the runoff volume resulting from a 1 in 25 year, 24 hour duration storm event at the facility.	X				Tetra Tech Issued for Construction Drawings.	Leachate collections system will handle all stormwater that falls in the landfill footprint.
3.1.3	The composite liner is constructed on a foundation or base that prevents failure of the liners due to settlement, compression or uplift.	X				Tetra Tech Issued for Construction Drawings.	1000 mm minimum of compacted clay liner specified on top of compacted backfill of an unknown thickness.
3.1.4	The approval holder shall submit to the Director the following plans and specifications for the proposed construction of each of the items listed in 3.1.2, signed and stamped by a professional registered with APEGA at least 3 months prior to construction:				X	Not applicable.	Not applicable. Information only.
3.1.4 (a)	Detailed Construction Plan and Specifications	X				Tetra Tech Construction Quality Assurance Report - Cell 4 and Laydown Pond - Earthworks, dated February 2019.	Construction started 3 months after submission of the referenced plans per the Approval.
3.1.4 (b)	Construction Quality Assurance Plan	X					
3.1.4 (c)	Construction Quality Control Plan	X					
3.1.5	The approval holder shall correct all deficiencies as outlined in the Detailed Construction Plan and Specifications outlined by the Director in the timeline specified by the Director.	X				Letter from AEP: Authorization of Cell 4 Construction, dated August 21, 2018.	Deficiencies were corrected on a per item basis until final issuance of approval to proceed on August 21, 2018.
3.1.6	The approval holder shall implement the Detailed Construction Plan and Specifications in 3.1.4 as authorized in writing by the Director.	X				Tetra Tech Construction Quality Assurance Report - Cell 4 and Laydown Pond - Earthworks, dated February 2019.	Report details the construction activities and identifies compliance with the Detailed Construction Plan.
3.1.7	During construction of any of the items listed in 3.1.2, the approval holder shall not deviate from the Detailed Construction Plan and Specifications unless the following conditions are met:				X	Not applicable.	Not applicable. Information only.

Section 3 - Construction

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	O/I	Info. N/A		
Part 3 - Construction							
3.1.7 (a)	The deviation results in a minor adjustment in order to suite field conditions encountered.	X				Dillon Annual Landfill Cell Closure Report (Cell 3B), dated March 2021.	Deviation results to be communicated to AEP following construction in the summary report, per Line Item 3.1.9.
3.1.7 (b)	The deviation will result in an equivalent or better design performance of the landfill.	X				Dillon Annual Landfill Cell Closure Report (Cell 3B), dated March 2021.	Deviation results to be communicated to AEP following construction in the summary report, per Line Item 3.1.9.
3.1.8	The approval holder shall submit to the Director a summary report of the Construction Quality Assurance and Construction Quality Control results signed and stamped by a professional registered with APEGA.	X				<ul style="list-style-type: none"> • Tetra Tech Construction Quality Assurance Report - Cell 4 and Laydown Pond - Earthworks, dated February 2019. • Tetra Tech Construction Quality Assurance Report - Cell 4 and Laydown Pond Geosynthetics Installation, dated February 2019. • Dillon Annual Landfill Cell Closure Report (Cell 3B), dated March 2021. 	Confirmed through a review of the reports indicated.
3.1.9	The summary report in 3.1.9 shall contain the following information, at minimum:				X		Not applicable. Information only.
3.1.9 (a)	Confirmation that the landfill has been constructed according to the Construction Quality Assurance Plan, Construction Quality Control Plan, and the Detailed Construction Plan and Specifications.	X					Confirmed through a review of the reports indicated.
3.1.9 (b)	Description of any minor deviations as per 3.1.7	X					Confirmed that no deviations occurred.
3.1.9 (c)	Confirmation by the professional registered with APEGA, that deviations as per 3.1.7 will result in an equivalent or better design performance of the landfill.	X					Confirmed that no deviations occurred and that that design met or exceeded specifications.
3.1.9 (d)	"As-built" plans.	X					Confirmed, dated February 2019.
3.1.9 (e)	Photo-documentation of important stages of construction including any repair work or remediation activities to establish or maintain liner integrity.	X					Confirmed through a review of the reports indicated.
3.1.9 (f)	Any other information not listed or implied in 3.1.9 as required in writing by the Director.	X				Confirmed through a review of the reports indicated.	
3.1.10	The approval holder shall notify the Director in writing at least fourteen days prior to construction of commencing operations of any new landfill cell.	X				Letter to AEP, dated February 19, 2021.	Notifying that construction approval requirements fulfilled and that operations will commence in 14 days.
3.1.11	The approval holder shall construct the off-loading area as described in the application.				X	Not applicable.	Construction hasn't started on the off-loading area.
3.1.12	The approval holder shall manage landfill progression in a manner that has limited off-site visual impacts of the landfill, as described in the Landfill Cell Closure Plan.	X				<ul style="list-style-type: none"> • Dillon Annual Landfill Cell Closure Report (Cell 3B), dated March 2021. • Clean Harbors Closure and Post Closure Plan. 	Report details the construction activities and identifies compliance with the Closure and Post Closure Plan.
3.2.1 (a)	The waste stabilization area has been constructed in accordance with application No. 008-10348.	X				Correspondence between AEP and Clean Harbors.	<ul style="list-style-type: none"> • This has been completed within the constructed portions of Cell 3D to avoid tracking waste off-site. • Clean Harbors submitted specifications for stabilization area and did not receive any amendment requests from AEP.
3.2.1 (b)	The waste stabilization area has been constructed in accordance within a Class I landfill cell.	X					

Section 3 - Construction

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info. N/A		
Part 3 - Construction							
3.3.1	The approval holder shall salvage and conserve all topsoil for land reclamation of the landfill.	X				<ul style="list-style-type: none"> Field Observations Operations Plan. Annual Landfill Cell Closure Reports. 	<ul style="list-style-type: none"> Vegetated mounds for final Cell 3 closure at southern edge. Non-vegetated active stockpiles for Cell 4 construction at north end.
3.3.2	The approval holder shall salvage and conserve all upper subsoil for land reclamation of the landfill.	X					
3.3.3	The approval holder shall conserve and stockpile all topsoil separately from the upper subsoil.	X					Stockpiles are separated for topsoil and upper subsoil.
3.3.4 (a)	The approval holder shall place all top soil stockpiles at the landfill.	X					Stockpiles placed within the landfill boundary.
3.3.4 (b)	The approval holder shall place all upper subsoil stockpiles at the landfill.	X					
3.3.5 (a)	The approval holder shall stockpile all topsoil on stable foundations.	X					Topsoil stockpiles are placed on undisturbed topsoil and stable ground.
3.3.5 (b)	The approval holder shall stockpile all topsoil on undisturbed topsoil.	X					
3.3.6 (a)	The approval holder shall stockpile all upper subsoil on stable foundations.	X					Upper subsoil stockpiles are placed on areas with topsoil removed and stable ground.
3.3.6 (b)	The approval holder shall stockpile all upper subsoil on areas where the topsoil has been removed.	X					
3.3.7	The approval holder shall take all steps necessary to prevent any erosion due to wind or water.	X					Vegetation for closed stockpiles used for final closure of Cell 3. No other erosion measures required from AEP.
3.3.7 (a)	The approval holder shall revegetate stockpiles in order to prevent erosion.	X					Stockpiles appear to be vegetated from field observation.
3.3.7 (b)	The approval holder shall take all steps authorized in writing by the director in order to prevent erosion.	X					Erosion controls observed in place.
3.3.8 (a, i)	The approval holder shall suspend conservation of topsoil when wet or frozen condition would result in mixing, loss, degradation or compaction of topsoil.	X					Stockpiling of topsoil and upper subsoil is suspended during periods of adverse weather conditions, in accordance with facility operational practices.
3.3.8 (a, ii)	The approval holder shall suspend conservation of topsoil when high wind velocities or other field conditions would result in mixing, loss, or degradation of topsoil.	X					
3.3.8 (b, i)	The approval holder shall suspend conservation of upper subsoil when wet or frozen condition would result in mixing, loss, degradation or compaction of upper subsoil.	X					
3.3.8 (b, ii)	The approval holder shall suspend conservation of upper subsoil when wet or frozen condition would result in mixing, loss, degradation or compaction of upper subsoil.	X					

Section 3 - Construction

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	O/I	Info. N/A		
Part 3 - Construction							
3.3.9 (a)	The approval holder shall recommend conservation of topsoil when conditions in 3.3.8 no longer existed.				X	Not applicable.	Not applicable. Information only.
3.3.9 (b)	The approval holder shall recommend conservation of upper subsoil when conditions in 3.3.8 no longer existed.				X	Not applicable.	Not applicable. Information only.

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.1.1	The geographic boundaries of the landfill has been maintained to that located within SE ¼ of Section 9, Township 50, Range 17, West of the 4 th Meridian.	X				<ul style="list-style-type: none"> 2020 Annual Report Field observations. 	Confirmed that landfill is within the approved boundary.
4.1.2	The waste elevation of the landfill has not exceeded the maximum designated waste elevation.	X				Cell 3B Landfill Capping Top of Final Cover Elevations, Figure No. 3 in Dillon Annual Landfill Cell Closure Report (Cell 3B), dated March 2021.	<ul style="list-style-type: none"> Maximum elevation, per Part 1 (ggg) (definitions) is 714 masl. Most recent closure was Cell 3B, which is also the highest. Maximum elevation observed in final cover was 713.15 masl.
4.1.3	Access to the facility has been restricted to only authorized personnel.	X				Field observations.	<ul style="list-style-type: none"> Visitor sign in sheet at front desk. Scale house reporting for all vehicles. Security cameras on-site. Gated access.
4.1.4	A 24 hour "HOTLINE" number has been maintained for prompt response during an emergency.			X		Field observations.	A hotline is maintained but not posted at gate or office entrance. Hotline is 780-690-0614.
4.1.5	The approval owner shall operate and maintain the integrity of the following waste management facilities at the facility:				X		Not applicable. Information only.
4.1.5 (i)	HWRSP Facility	X					Confirmed during field inspection.
4.1.5 (ii)	Class I and II landfill, including Class I and II cells and waste stabilization areas.			X			Observed ponding in roadways near potable water tanks, which can be managed on an ongoing basis.
4.1.5 (iii)	Waste storage areas.	X					Confirmed during field inspection.
4.1.6	The approval holder shall operate and maintain the integrity of the following infrastructure components at the facility:				X		Not applicable. Information only.
4.1.6 (i)	Composite liner	X				<ul style="list-style-type: none"> 2020 Annual Report. Field observations. 	Confirmed during field inspection.
4.1.6 (ii)	Leachate collection system	X					Confirmed during field inspection.
4.1.6 (iii)	Leak detection system	X					Confirmed during field inspection.
4.1.6 (iv)	Run-on control system	X					Confirmed during field inspection.
4.1.6 (v)	Run-off control system	X					Confirmed during field inspection.
4.1.6 (vi)	Groundwater monitoring wells	X					<ul style="list-style-type: none"> Confirmed well MW-10 (near waste storage and HWRSP Facility) has been repaired and locked. All other wells were observed to be protected and locked.
4.1.6 (vii)	Weigh scale	X					Weigh scale is operational.
4.1.6 (viii)	Site access control	X				Field observations.	Confirmed that sign-in procedures in place, doors locked, etc.
Facility Audit							
4.1.7	The approval holder shall cause the facility to be audited by an independent third-party environmental consultant to assess compliance with the terms and conditions of this approval, commencing on or before October 1, 2018.	X				<ul style="list-style-type: none"> 2018 Compliance Audit Report. 2021 Compliance Audit Report. 	Compliance confirmed.
4.1.8	The approval holder shall submit the audit report required in 4.1.7 in the Annual Landfill Operations Report.	X				2020 Annual Report.	Reviewed the 2020 Annual Landfill Operations Report and confirmed previous Audit was included.
4.1.9	The requirements in 4.1.7 and 4.1.8 do not relieve the approval holder of any duty under the Act, or its associated regulations, or this approval.				X	Not applicable.	Not applicable. Information only.

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Operations							
4.2.1	The approval holder shall not release any air effluent streams to the atmosphere except as authorized by this approval.				X	Not applicable.	Not applicable. Information only.
4.2.2	The approval holder shall only release air effluent streams to the atmosphere from the following sources: - Scrubber exhaust stack - Drum Processing Building exhaust vent - Staging Building exhaust vent - Administrative Building exhaust vents - Laboratory fume hood and exhaust vents - Maintenance Shop equipment and exhaust vents - Leachate Collection Tanks exhaust vents - Leachate transfer lines passive gas vents - Any other source authorized in writing by the Director	X				Field observations.	<ul style="list-style-type: none"> No other sources not listed in the approval. Requested in Approval Amendment (pending) to do quenching emulsions, only if non-toxic gases are emitted.
4.2.3	The approval holder shall not operate any process equipment unless and until the pollution abatement equipment associated with the corresponding process equipment is operational and operating.	X				<ul style="list-style-type: none"> Field observations. Verbal confirmation. Sept. 1, 2021 Transfer Station Daily Inspection (including scrubber inspection). 	All pollution abatement equipment is continuously operated.
4.2.4	The approval holder shall treat all air effluent streams from the exhaust vents of the Drum Processing or Staging or both Buildings with a caustic scrubber and an activated carbon filter before directing the air effluent streams to the scrubber exhaust stack for release to the atmosphere while: - Hazardous wastes/recyclables are being processed. - Hazardous wastes/recyclables are being transferred. - Containers of hazardous wastes/recyclables are open in the Drum Processing and/or Staging Buildings.	X				<ul style="list-style-type: none"> Field observations. Discussion with site staff. 	Monitored weekly and documented as per section below. All building air is treated through the pollution abatement equipment (scrubber and filter), including drum and tank vents.
4.2.5	The approval holder shall control fugitive emissions and any source not specified in 4.2.2 in accordance with 4.2.6 of this approval.	X				Field observations.	A carbon filter was added to the leachate tank.
4.2.6	With respect to fugitive emissions and any source not specified in 4.2.2, the approval holder shall not release a substance or cause to be released a substance that causes or may cause any of the following:				X	<ul style="list-style-type: none"> Operations Plan, Appendix C (Fugitive Dust and Odour Best Management Plan). Odour Complaint notification to Village and County, dated July 30, 2021. 	<ul style="list-style-type: none"> No fugitive emissions outside of what's permitted. Odour complaints are received and managed per BMPs (report reviewed and contained in Operations Plan). As part of the Amendment Application, AEP identified concerns regarding communications to the Village of Ryley and Beaver County. Clean Harbors now notifies the Village and County of all complaints and contraventions submitted to AEP.
4.2.6 (a)	Impairment, degradation or alteration of the quality of natural resources.	X					
4.2.6 (b)	Material discomfort, harm or adverse effect to the well being or health of a person.	X					
4.2.6 (c)	Harm to property or to vegetative or animal life.	X					
4.2.7	The approval holder shall not burn any debris by means of an open fire unless authorized in writing by the Director.	X				Correspondence with AEP	A fire occurred on property in January 2021, for which AEP was notified. No burning is conducted on site.
4.2.8	If the approval holder receives complaints of offensive odours, or fugitive dust, or both, beyond the facility boundaries, the approval holder shall:				X		
4.2.8 (a)	Conduct the following to reduce the release of those odours, or fugitive dust, or both by:	X				<ul style="list-style-type: none"> Operations Plan, Appendix C (Fugitive Dust and Odour Best Management Plan). Environmental Management Program SOP #90RY-410-00. Field observations. Discussion with site staff. 	<ul style="list-style-type: none"> Response is based on the type of complaint. Recently added a carbon filter on the leachate tank vent. Material receipt may be suspended during high wind days. Cover can be immediately placed for dust suppression and dispersion prevention. Receive typically 2-3 odour complaints per year.
4.2.8 (a, i)	Placing restrictions on types, or volumes, or both, of the wastes being handled or processed or deposited that are causing those odours, or fugitive dust, or both.	X					
4.2.8 (a, ii)	Increasing the frequency of cover placement, or modifying waste handling activities, or performing both, at the landfill.	X					
4.2.8 (a, iii)	Modifying waste handling activities at the HWRSP Facility.	X					
4.2.8 (a, iv)	Performing any combination of the above.	X					
4.2.8 (b)	Activate the Odour and Fugitive Dust Response Program as specified in the Landfill Operations Plan 4.6.34U).	X					

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Limits							
4.2.9	The approval holder shall maintain the pH of the scrubbing liquid of the caustic scrubber referred to in 4.2.4 at 8.0 or higher.	X				<ul style="list-style-type: none"> Field observations. Recorded daily (viewed Aug. 22, 2021 and Nov. 5, 2020 examples) and maintained in the WIN Web system. 	<ul style="list-style-type: none"> pH data logger contains daily readings. Available to AEP upon request, confirmed in report that recordings are compliant. "Keep pH above 8.0" sign posted.
4.2.10	The approval holder shall replace activated carbon in the activated carbon filter referred to in 4.2.4 immediately when the concentration of total petroleum hydrocarbons in the air effluent streams released from the scrubber exhaust stack to the atmosphere exceeds 25 ppm.	X				<ul style="list-style-type: none"> Field observations. WIN Web records. 	<ul style="list-style-type: none"> Weekly total petroleum hydrocarbon readings are taken and recorded in log book next to the scrubber and in WINWEB. Carbon is typically replaced every 4-5 years or less frequent. Last replacement occurred July 2015. No exceedances or replacement of media in the last three year period (2019-2021).
Monitoring and Reporting							
4.2.11	The approval holder shall monitor, daily at a minimum, the pH of the scrubbing liquid of the caustic scrubber referred to in 4.2.4.	X				<ul style="list-style-type: none"> Monitoring records for Aug. 22, 2021 and Nov. 5, 2020 in WIN Web. Field observations. 	<ul style="list-style-type: none"> Data logger contains daily readings. Available to AEP upon request, confirmed in report that recordings are compliant. If pH readings are close to 8.0 limit, a secondary laboratory reading is performed to verify in-line pH meter accuracy. Aug. 22, 2021 and Nov. 5, 2020 dates sampled.
4.2.12	The approval holder shall monitor, weekly at a minimum, the air effluent streams released from the scrubber exhaust stack, using a portable total petroleum hydrocarbon analyzer while: <ul style="list-style-type: none"> - Hazardous wastes/recyclables are being processed. - Hazardous wastes/recyclables are being transferred. - Containers of hazardous wastes/recyclables are open in the Drum Processing and/or Staging Buildings. 	X				<ul style="list-style-type: none"> Field observations. WIN Web records. 	<ul style="list-style-type: none"> Weekly readings are taken and recorded in log book next to the scrubber. Carbon is replaced every 4-5 years or less frequency.
4.2.13	The portable total petroleum hydrocarbon analyzer referred to in 4.2.12 shall:				X	Not applicable.	Not applicable. Information only.
4.2.13 (a)	Have a detection limit of 1 ppm or lower for total petroleum hydrocarbons.	X				Field observations.	Confirmed that accuracy is to 0.1 ppm, as observed on calibration certificate.
4.2.13 (b)	Be located in a straight section of the scrubber exhaust stack, a minimum of one (1) metre downstream from the last flow disturbance.	X				Field observations.	Sampling location is on second story scaffolding within building, 1 m downstream from the last flow disturbance.
4.2.13 (c)	Be calibrated regularly in accordance with the analyzer manufacturer's specifications.	X				Calibration certificate from 2020.	Confirmed calibrated in 2020; expires in 2022.
4.2.14	The approval holder shall continue to implement the Ambient Air Monitoring Program as authorized in writing by the Director on June 24, 2009, unless and until otherwise authorized in writing by the Director pursuant to 4.2.18.	X					
4.2.15	The approval holder shall submit to the Director the results of the Ambient Air Monitoring Program in 4.2.14 with the following reports: <ul style="list-style-type: none"> - Monthly Ambient Air Monitoring Report - Annual Ambient Air Monitoring Report In accordance with the written authorization by the Director on June 24, 2009, unless and until otherwise authorized in writing by the Director pursuant to 4.2.18.	X				<ul style="list-style-type: none"> 2020 Operations Report. GHD Quality Assurance Plan - Air Monitoring Program Report, dated Dec. 31, 2016. "Ambient Air Monitoring Station Audit" letter from AEP, dated August 31, 2016. "Ambient Air Monitoring Station Audit" letter from AEP, dated Jan. 13, 2017 (closing out the audit findings). 	<ul style="list-style-type: none"> Clean Harbors was audited by AEP for adherence to the new Air Monitoring Directive released in 2016. Clean Harbors proposed dates and actions to address findings of the audit, which were accepted by AEP in letter December 2, 2016. Dec. 31, 2016 GHD report contains new Air Monitoring Program. AEP letter closing out the audit indicates that all findings addressed.
4.2.16	The approval holder shall submit a revised Ambient Air Monitoring Program, revised reporting requirements, or both, to the Director upon written request from the Director within the timeline specified in writing by the Director.	X					
4.2.17	If the revised Ambient Air Monitoring Program, reporting requirements, or both, submitted pursuant to 4.2.16 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.	X					

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.2.18	The approval holder shall implement the revised Ambient Air Monitoring Program, reporting requirements, or both, submitted pursuant to 4.2.16 as authorized in writing by the Director within the timeline specified in writing by the Director.	X					
Operations							
4.3.1	The approval holder shall not release any substances from the facility to the surrounding watershed except as authorized by this approval.	X				Field observations.	Compliance confirmed. 100% of the leachate is disposed of via deep well injection. Runon/runoff control systems in place and inspected during field observations.
4.3.2	The approval holder shall operate and maintain the integrity of:				X	Not applicable.	Not applicable. Information only.
4.3.2 (a)	The run-on control system to prevent flow onto the active landfill area from at least the peak discharge from a 1 in 25 year, 24 hour duration storm event at the facility.	X				Field observations.	Compliance confirmed. Run on/run off control systems were completed during Cell 4 construction. As built drawings reviewed.
4.3.2 (b)	The runoff control system for the facility to collect and control at least the runoff volume resulting from a 1 in 25 year, 24 hour duration storm event at the facility.	X				Field observations.	Compliance confirmed. Run on/run off control systems were completed during Cell 4 construction. As built drawings reviewed.
4.3.3	All runoff from the facility developed area shall be directed to the runoff control system as described in:				X	Not applicable.	Not applicable. Information only.
4.3.3 (a)	Application No. 012-10348, prior to decommissioning and reclamation of the old surface water detention pond.	X				Not applicable.	Confirmed. The old surface water detention pond was decommissioned in August 2018 prior to this audit.
4.3.3 (b)	The application, after decommissioning and reclamation of the old surface water detention pond.	X					
4.3.4	Prior to decommissioning and reclamation of the old surface water detention pond and subject to 4.3.7, the approval holder shall only make or permit a release from the old surface water detention pond:				X	Not applicable.	Not applicable. Information only.
4.3.4 (a)	At the release point as designated in application No. 012-10348, which is: • Located in the south east corner of the old surface water detention pond. • Referred to as sampling location A 1 in 4.3.11.	X				<ul style="list-style-type: none"> • 2020 Annual Report. • Field observations. • Operations Plan. • Discussions with site staff. 	Decommissioning of the old surface water detention pond was completed in August 2018. Observations were made of the new surface water detention pond, drainage ditch, and discharge point.
4.3.4 (b)	Through a pump and a release hose over the south berm into the drainage control ditch, east of the landfill access road, to the new surface water detention pond, under normal operating conditions.	X					
4.3.4 (c)	Through a pump and a release hose over the south berm directly to the culvert under Highway 854, during periods of high runoff exceeding the holding capacity of the old surface water detention pond.	X					
4.3.5	Subject to 4.3.7, the approval holder shall only make or permit a release from the new surface water detention pond:	X					
4.3.5 (a)	At the release point as designated in application No. 012-10348, which is: • Located in the north east corner of the new surface water detention pond. • Referred to as sampling location 81 in 4.3.11.	X					<ul style="list-style-type: none"> • Observed the discharge point at the new surface water detention pond. • Composite sampling is performed prior to any discharge consistent with the approval.
4.3.5 (b)	Through a pump and a release hose over the east berm into the culvert under Highway 854.	X					
4.3.6	The approval holder shall only dispose of industrial wastewaters, or specified runoff in Table 4.3-A, or both, by one or more of the following methods:				X	<ul style="list-style-type: none"> • 2020 Annual Report. • Field observations. • Operations Plan. • Discussions with site staff. 	<ul style="list-style-type: none"> • All stormwaters are discharged through pond with testing prior to discharge. • No non-compliant discharges have occurred. • When TSS exceeds limits, further settling time is done prior to re-testing and discharge, or flocculant is added. • No change to discharge.
4.3.6 (a)	To facilities holding a current Act authorization to accept such waste.	X					
4.3.6 (b)	To facilities approved by a local environmental authority outside of Alberta to accept such waste.	X					
4.3.6 (c)	To a disposal well approved by AER.	X					
4.3.6 (d)	As per 4.6.51.	X					
4.3.6 (e)	As otherwise authorized in writing by the Director.	X					

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Limits							
4.3.7	Releases of runoff from the following to the surrounding watershed shall comply with the limits specified in Table 4.3-B: - The old surface water detention pond. - The new surface water detention pond. - Or, both ponds.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	Compliance confirmed through a review of release analytical records.
4.3.8	Releases of runoff from within the tank farm bermed area to the old or new or both surface water detention ponds shall comply with the limits specified in Table 4.3-C.				X	Not applicable.	Not applicable: <ul style="list-style-type: none"> Tank farm bermed area water goes into landfill. This volume is pumped and solidified for disposal in the landfill.
Monitoring and Reporting							
4.3.9	The approval holder shall monitor the runoff control system as required in Table 4.3-D, subject to 4.3.12.			X		Surface Water Detention Pond B Summary of Batch Analysis, 2020 Annual Report.	Results for the runoff control system testing of 48 hour static acute lethality test using daphnia magna could be included in the Summary of Batch Analysis presented in the 2020 Annual Landfill Operations Report; along with the lethality of effluents to rainbow trout testing.
4.3.10	The approval holder shall report to the Director the results of the runoff control system monitoring as required in Table 4.3-D, subject to 4.3.12.	X				2020 Annual Report.	Monitoring findings reported to AEP.
4.3.11	For the purpose of Table 4.3-D:				X	Not applicable	Not applicable. Information only.
4.3.11 (a)	Sampling location A 1 is defined as the old surface water detention pond release point.				X	Field observations.	Not applicable. Old surface water detention pond has been decommissioned.
4.3.11 (b)	Sampling location A2 is defined as the old surface water detention pond.				X	Field observations.	Facility actively monitors releases.
4.3.11 (c)	Sampling location B1 is defined as the new surface water detention pond release point.	X				Field observations.	Facility actively monitors detention pond.
4.3.11 (d)	Sampling location B2 is defined as the new surface water detention pond.	X				Field observations.	Water collected in bermed area of tank farm is solidified for disposal in landfill as per 4.3.8
4.3.11 (e)	Sampling location C is defined as the tank farm bermed area.	X				Field observations.	Not applicable. The old surface water detention pond was decommissioned in August, 2018 prior to this audit.
4.3.12	The monitoring and reporting requirements in 4.3.9 and 4.3.10 for the old surface water detention pond (sampling locations A1 and A2) shall not apply after decommissioning and reclamation of the old surface water detention pond.				X	Not applicable.	Not applicable. Information only.
4.3.13	The monitoring and reporting required in Table 4.3-D for the acute lethality tests shall comply with:				X	Not applicable.	Summary of results all pass for the Surface Water Detention Pond B Summary of Batch Analyses.
4.3.13 (a)	The Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, Environment Canada, Environment Protection Series 1/RM/13, December 2000, as amended.	X				Surface Water Detention Pond B Summary of Batch Analysis - 2020 Annual Landfill Operations Report	<ul style="list-style-type: none"> Monthly Runoff and Industrial Wastewater Report. Surface Water Detention Pond B Summary of Batch Analysis - 2020 Annual Report. Results for the runoff control system testing of 48 hour static acute lethality test using daphnia magna could be included in the Summary of Batch Analysis presented in the 2020 Annual Landfill Operations Report; along with the lethality of effluents to rainbow trout testing.
4.3.13 (b)	The Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia Magna, Environment Canada, Environmental Protection Series 1/RM/14, December 2000, as amended.			X		Not applicable.	Not applicable. No deviation from corresponding test method has occurred.
4.3.14	The approval holder shall: - Treat any acute lethality test that deviates from the corresponding test method referred to in 4.3.13 as invalid. - Repeat the test as soon as logistically possible.				X	Not applicable.	Not applicable. All testing passed the criteria.
4.3.15	In the event that less than 50% of the rainbow trout survived in the 100% concentration sample, the approval holder shall: - Implement a program immediately to identify the source of the toxicity. - Submit to the Director within 90 days after the test result is available, a proposed program to reduce the toxicity of the runoff.				X	Not applicable.	Verbal confirmation from multiple parties confirming the reports are forwarded to AEP.
4.3.16	The approval holder shall submit the Monthly Runoff and Industrial Wastewater Report in Table 4.3-D to the Director.	X				Monthly Runoff and Industrial Wastewater Report.	Not applicable. Monthly reports contained in annual report, but only need to be submitted with discharges.
4.3.17	The Monthly Runoff and Industrial Wastewater Report shall include, at a minimum, all of the following information:				X	Not applicable.	

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.3.17 (a)	A monthly assessment of the monitoring results relative to the limits in Table 4.3-B.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (b)	A monthly assessment of the monitoring results relative to the limits in Table 4.3-C.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (c)	A monthly assessment of the performance of the: - Runoff control system. - Pollution abatement equipment. - Monitoring equipment.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (d)	A monthly summary of management and disposal of the industrial wastewaters and specified runoff, as per 4.3.6.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (e)	A monthly summary of management and disposal of runoff in general.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (f)	A monthly summary of runoff contraventions reported pursuant to 2. 1. 1.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (g)	Any other information as required in writing by the Director.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.18	The approval holder shall submit the Annual Runoff and Industrial Wastewater Report in Table 4.3-D to the Director.	X				Annual Runoff and Industrial Wastewater Report.	Verbal confirmation and included with annual report.
4.3.19	The Annual Runoff and Industrial Wastewater Report shall include, at a minimum, all of the following information:			X		Not applicable.	Not applicable. Information only.
4.3.19 (a)	An annual summary assessment of the monitoring results relative to the limits in Table 4.3-B.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (b)	An annual summary assessment of the monitoring results relative to the limits in Table 4.3-C.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (c)	An annual summary assessment of the performance of the: - Runoff control system. - Pollution abatement equipment. - Monitoring equipment.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (d)	An annual summary of management and disposal of the industrial wastewaters and specified runoff, as per 4.3.6.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (e)	An annual summary and evaluation of management and disposal of runoff in general.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (f)	An annual summary of the results pursuant to 4.3.21.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.3.19 (g)	An annual summary of runoff contraventions reported pursuant to 2. 1. 1.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (h)	Any other information as required in writing by the Director.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.20	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.3.20 (a)	Collect a representative grab sample from the old surface water detention pond at least once per year, prior to decommissioning and reclamation of the pond.				X	Not applicable.	Not applicable. Old surface water detention pond has been decommissioned.
4.3.20 (b)	Collect a representative grab sample from the new surface water detention pond at least once per year.	X				Annual Runoff and Industrial Wastewater Report	Details included in Report.
4.3.20 (c)	Analyze the sample(s) for all of the parameters specified in Table 4.3-E.	X				Annual Runoff and Industrial Wastewater Report	Details included in Report.
4.3.21	The approval holder shall submit the results of the analyses in 4.3.20 to the Director in the Annual Runoff and Industrial Wastewater Report.	X				Annual Runoff and Industrial Wastewater Report	Details included in Report.
Operations							
4.4.1	The approval holder shall only dispose of leachate removed from the leachate collection system by one or more of the following methods:				X	Not applicable.	Not applicable. Information only.
4.4.1 (a)	To facilities holding a current Act authorization to accept such waste.				X	Not applicable.	Not applicable. Option not used by the facility.
4.4.1 (b)	To facilities approved by a local environmental authority outside of Alberta to accept such waste.				X	Not applicable.	Not applicable. Option not used by the facility.
4.4.1 (c)	To a disposal well approved by AER.	X				<ul style="list-style-type: none"> • Alberta Energy Regulator (AER) approval for deep well. • Appendix E of 2020 Annual Report. 	Leachate is hauled to Class I deep well in Calmar. Volume summary included in annual report.
4.4.1 (d)	As per 4.6.51.				X	Not applicable.	Not applicable. Information only.
4.4.2	The approval holder shall only dispose of liquid removed from the leak detection system by one or more of the following methods:				X	Not applicable.	Not applicable. Information only.
4.4.2 (a)	To facilities holding a current Act authorization to accept such waste.				X	Not applicable.	Not applicable. Option not used by the facility.
4.4.2 (b)	To facilities approved by a local environmental authority outside of Alberta to accept such waste.				X	Not applicable.	Not applicable. Option not used by the facility.
4.4.2 (c)	To a disposal well approved by AER.	X				<ul style="list-style-type: none"> • AER approval for deep well. • Appendix E of 2020 Annual Landfill Operations Report. 	Leachate is hauled to Class I deep well in Calmar. Volume summary included in annual report.
4.4.2 (d)	As per 4.6.51.				X	Not applicable.	Option not used by the facility.
Limits							
4.4.3	Subject to 4.4.4, the approval holder shall not exceed the maximum acceptable leachate head in any landfill cell.	X				Leachate Head Level Table.	Leachate levels recorded daily. Field logs for 2020 observed, contain following parameters: - Date, time, condition, level status, personnel initial
4.4.4	Subsequent to a storm event, the leachate head in any landfill cell shall not exceed the maximum acceptable leachate head for more than fourteen (14) days, unless otherwise authorized in writing by the Director.	X				Leachate Head Level Table.	Leachate pumping infrastructure on timers in most cells, (all but Cell 1). A fire January 12, 2020 caused a fire (AEP Reference No. 362650) which destroyed the Cell 2 Leachate building until pumping capacity was restored June 30, 2020. Infrastructure is capable of removing leachate generated from a storm event in fewer than 14 days.
4.4.5	The volume of liquid in the leak detection system, as monitored in Table 4.6-D, shall not exceed the action leakage rate in any landfill cell.		X			2020 Annual Report.	Action Leakage Rate (ALR) Exceedances were noted June 9, 2020, June 10, 2020, July 2, 2020, July 9, 2020. Section 14.6 of the Annual Landfill Operations Report detail several ALR exceedances that were not reported. No negative impacts were observed and clarification of the reporting requirements were made with the Facility Manager to ensure this is not repeated in the future. (AEP 376183)

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Monitoring and Reporting							
4.4.6	The approval holder shall monitor the leachate collection and leak detection systems as required in Table 4.6-D and for all parameters specified in Table 4.4-A, subject to 4.4.8 and 4.4.9.	X				Primary Leachate Analysis Results Appendix D of 2020 Annual Report.	Leachate levels recorded daily. Field logs for 2020 observed, contain following parameters: • Date, time, condition, level status, personnel initial.
4.4.7	The approval holder shall report to the Director the results of the leachate collection and leak detection systems monitoring as required in Table 4.6-D, including the results of the analyses for all parameters specified in Table 4.4-A, subject to 4.4.8 and 4.4.9.	X				Primary Leachate Analysis Results Appendix D of 2020 Annual Report.	Submitted to AEP.
4.4.8	The requirements in 4.4.6 and 4.4.7 for monitoring and reporting the parameters in Table 4.4-A for leachate shall not apply if insufficient leachate is available for conducting the analyses.				X	Not applicable.	Not applicable. Information only.
4.4.9	The requirements in 4.4.6 and 4.4.7 for monitoring and reporting the parameters in Table 4.4-A for leak detection liquid shall not apply if insufficient leak detection liquid is available for conducting the analyses.				X	Not applicable.	Not applicable. Information only.
4.4.10	If the volume of liquid removed from the leak detection system exceeds the action leakage rate, in addition to reporting pursuant to 2.1.1, the approval holder shall submit a Response Action Plan to the Director within 30 days of the exceedance.	X				2020 Annual Report.	(AEP 376183) links exceedances to excessive rainfall and details steps taken to solve infiltration.
Monitoring and Reporting							
4.5.1	The approval holder shall, unless the approval holder is not granted access by the landowner:				X	Not applicable.	Not applicable. Information only.
4.5.1 (a)	Collect a representative sample from each of the dugouts and each of the water wells, within an approximate 1.6 kilometre radius around the facility.	X				Tetra Tech 2020 Dugout Sampling Program Report, dated March 2, 2021.	Details included in Report.
4.5.1 (b)	Analyze the sample for the parameters listed in Table 4.5-A.	X					Details included in Report.
4.5.2	The monitoring required in 4.5.1 shall be conducted once each year in October unless otherwise authorized in writing by the Director.	X					Details included in Report.
4.5.3	The approval holder shall record the analytical results of the sampling information required in 4.5.1 in an Annual Dugout and Water Well Sampling Program Report.	X					Details included in Report.
4.5.4	The approval holder shall submit the Annual Dugout and Water Well Sampling Program Report to the Director pursuant to 4.6.58(i).	X					Details included in Report.
General							
4.6.1	The approval holder shall not receive, process, dispose of, or perform any combination of the above for any of the following wastes, individually or in any combination, at the places specified below respectively: - Explosives (Class 1 TDGR wastes), at the facility. - Radioactive wastes (Class 7 TDGR wastes), at the facility. - Radioactive wastes regulated under the Nuclear Safety and Control Act (Canada), at the facility. - Biomedical waste, at the facility. - Waste containing free liquids, at the landfill, excluding the waste stabilization area. - Material containing ozone depleting substances, at the landfill. - Municipal solid waste, at the facility. - NORM waste, at the facility.	X				• Field observations. • Discussions with site staff.	Site field observations and verbal confirmation were received regarding materials receipt. Cross checked against Facility Operations Plan and SOPs for individual waste materials. WINWEB system also performs checks on waste compatibility and will issue warnings of any non-conforming waste
4.6.2	Incompatible wastes and incompatible hazardous recyclables shall be prevented from mixing.	X				• Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Landfill Operations (SOPL001). • WIN Web (compatibility workbench).	Relevant Facility SOPs confirm procedures are appropriate to prevent incompatible wastes and recyclables from mixing.
4.6.3	The approval holder shall dispose of wastes generated at the facility only:				X	Not applicable	Information only.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.3 (a)	To facilities holding a current Act authorization.	X				Discussions with site staff.	Confirmed that regulations are being followed.
4.6.3 (b)	To facilities approved by a local environmental authority outside of Alberta.	X				Discussions with site staff.	Confirmed that regulations are being followed.
4.6.3 (c)	As otherwise authorized in writing by the Director.	X				Discussions with site staff.	Confirmed that regulations are being followed.
HWRSP Facility							
Operations Plan							
4.6.4	The approval holder shall develop, keep up-to-date, and implement an HWRSP Facility Operations Plan.	X				<ul style="list-style-type: none"> Facility Standard Operating Procedures (SOPs) Operations Plan. 	Most recently dated as February 2021, with annual updates required. In 2020, procedures for Cell 4 added.
4.6.5	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.6.5 (a)	Review the HWRSP Facility Operations Plan annually, at a minimum.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	This is performed in line with the annual reporting required under the Approval.
4.6.5 (b)	Update the HWRSP Facility Operations Plan if any of the following circumstances apply: - There are facility expansions or changes in site operations or equipment. - There is an applicable change to an applicable regulation. - An update is required in writing by the Director.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	Section 14 added to 2017 Annual Report, addressing HWRSP facility operations.
4.6.6	The approval holder shall retain a copy of the most recent HWRSP Facility Operations Plan at the facility.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	Held on-site electronically and in hard copy.
4.6.7	The approval holder shall submit a copy of the most recent HWRSP Facility Operations Plan to the Director upon written request from the Director within the timeline specified in writing by the Director.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	Submitted in the 2020 Annual Report.
4.6.8	If the HWRSP Facility Operations Plan submitted pursuant to 4.6.7 is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.				X	Not applicable.	Not applicable. No response received from AEP on 2020 Annual Report.
4.6.9	The approval holder shall implement the latest HWRSP Facility Operations Plan, unless otherwise authorized in writing by the Director.	X				Operations Plan.	Up to date plan available and utilized.
Operations							
4.6.10	The approval holder shall only transfer wastes and hazardous recyclables at designated transfer areas designed to contain spills and leaks.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Relevant Facility SOPs confirm procedures for transferring wastes in the HWRSP.
4.6.11	The approval holder shall use the following when transferring substances to, from, and between containers, tanks, and trucks:				X	Not applicable.	Not applicable. Information only.
4.6.11 (a)	Couplings equipped with seals that are compatible with the substance transferred.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.11 (b)	The necessary precautions to prevent spills when the couplings are disconnected.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.11 (c)	Emergency shut-off valves.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.11 (d)	Established transfer areas and associated curbing, paving and catchment areas.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.11 (e)	Drip trays to capture potential losses under coupling devices and other connections.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.11 (f)	Manual inspections of the transfer area for leaks and spills during and after waste transfer.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.12	All wastes and all hazardous recyclables that are unloaded shall be immediately transferred to the waste storage area.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.13	All containers and unrinsed empty containers shall be stored in the waste storage area.	X				Field observations.	Confirmed during Site visit.
4.6.14	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.6.14 (a)	Provide and maintain an adequate aisle space between containers in the waste storage area to allow inspection and unobstructed movement of personnel, fire protection equipment, spill control equipment and decontamination equipment to any area of the waste storage area.	X				Field observations.	Site field operations consistent with fire code for spacing between containers.
4.6.14 (b)	Arrange inspection aisles in the waste storage area such that the identification label on each container is readable.	X				Field observations.	Identification labels clear for all containers.
4.6.15	All tanks within the tank farm area shall be equipped, at a minimum, with all of the following:				X	Not applicable.	Not applicable. Information only.
4.6.15 (a)	Sensors for detecting the level in each tank.	X				Field observations.	Sensors, alarms, and shut-off devices observed and active for each tank. The aqueous tank within the building does not contain a high level alarm but is not considered part of the tank farm.
4.6.15 (b)	High level alarms that activate when a tank overflow is imminent.	X					
4.6.15 (c)	Automatic shut-off devices or sufficient free board space above the high level sensor to allow operators time to prevent overflow from occurring.	X					
4.6.15 (d)	Earthen dikes or equivalent secondary containment structures capable of containing 110% of the volume of the largest tank within the bermed area plus 10% of the aggregate capacity of all other tanks in the bermed area.	X				Field observations.	Entire waste storage area is the building floor, which is drained to holding tank in central manhole and can be pumped.
4.6.16	All tanks containing hazardous waste and all tanks containing hazardous recyclables in each building shall be equipped, at a minimum, with all of the following:				X	Not applicable.	Not applicable. Information only.
4.6.16 (a)	Sensors or gauges for detecting the level in each tank.	X				Field observations.	Sensors observed and active for tanks.
4.6.16 (b)	A written operating procedure to prevent tank overflow.		X			<ul style="list-style-type: none"> Field observation Bulk Flammable Liquid Transfer SOP 	Bulk Flammable Liquid Transfer SOP Document and Checklist is available (part of Facility SOPs) in office area but is not stored next to tanks.
4.6.16 (c)	Secondary containment structures capable of containing 110% of the volume of the largest tank within the building plus 10% of the aggregate capacity of all other tanks containing hazardous waste and hazardous recyclables in the same building.	X				Field observations.	Secondary containment structures observed in the field.
4.6.17	Hazardous waste and hazardous recyclables stored in containers and tanks shall be stored in accordance with the Hazardous Waste Storage Guidelines, June 1988, Alberta Environment, as amended.	X				<ul style="list-style-type: none"> Field observations. Bulk Flammable Liquid Transfer SOP. 	Facility observed to be following governing regulations.
4.6.18	The approval holder shall only carry out the following activities, individually or in any combination, at the HWRSF Facility in relation to hazardous waste or hazardous recyclables or both:	X				<ul style="list-style-type: none"> Field observations. 	Field observations reviewed the activities that occur on site; which was confirmed through review of the Facility and Landfill
4.6.18 (a)	Commingling of hazardous waste or hazardous recyclables to make maximum use of available container or tank capacity, only if the resultant mixture has the same TDGR hazard classification as any one of the individual components.	X					
4.6.18 (b)	Phase separation by gravity settling, only without the addition of any chemicals designed to accelerate settling.	X					
4.6.18 (c)	Dispersion of solids into liquids by natural or mechanical means, only if the resultant mixture has the same TDGR hazard classification as the original waste.	X					

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.18 (d)	Physical segregation of hazardous from non-hazardous articles or components from the same container, only if no process equipment is used.	X				<ul style="list-style-type: none"> Operations Plan. Facility SOPs. 	Operations Plan and Facility SOPs.
4.6.18 (e)	Washing of drums or other objects, only for the purpose of removing hazardous residue.	X					
4.6.18 (f)	Crushing or shredding of used filters, rags, absorbent materials, or empty containers, only for the purpose of volume reduction or liquid recovery, unless otherwise authorized in writing by the Director.	X					
4.6.18 (g)	Treatment of hazardous waste, only as authorized in writing by the Director.	X					
4.6.19	Notwithstanding 4.6.1 B(g), the approval holder shall not incinerate waste at the facility.	X					
Limits							
4.6.20	The approval holder shall not store a total of more than 752,500 litres of hazardous waste or hazardous recyclables or both at the HWRSP Facility at any time.	X				WIN Web inventory management software.	Maximum capacity not exceeded as of September 2, 2021, per the below volumes.
4.6.21	In addition to the storage limits in 4.6.20, the approval holder shall not exceed the waste storage limits as specified in TABLE 4.6-A.	X				WIN Web inventory management software.	Observations of inventory software made on September 2, 2021: <ul style="list-style-type: none"> 254,681 L of all wastes (hazardous and non-hazardous) 64,856 L of hazardous waste in containers (drums) 15,340 L of bulk liquids
4.6.22	Containers other than 205 litre drums shall be prorated to 205 litre drum equivalents based on their nominal volumes, e.g., 10 X 20 litre pails= 1 X 205 litre drum.	X				WIN Web inventory management software.	Software automatically calculates drum equivalents.
4.6.23	The limits referred to in 4.6.20 and 4.6.21 shall be calculated based on the:				X	Not applicable.	Not applicable. Information only.
4.6.23 (a)	Total nominal volumes of all containers, treating all partially filled containers as if they were full.				X	Not applicable.	Not applicable. Information only.
4.6.23 (b)	Total filled capacities of all tanks.				X	Not applicable.	Not applicable. Information only.
Monitoring and Reporting							
4.6.24	The approval holder shall identify, characterize, and classify all waste streams and all hazardous recyclables, generated or received at the HWRSP Facility, not including runoff, industrial wastewater streams and air effluent streams in accordance with the:				X	Not applicable.	Not applicable. Information only.
4.6.24 (i)	Industrial Waste Identification and Management Options, Alberta Environment, May 1996, as amended.			X		Facility and Landfill Operations Report, Section B	The document is not referenced specifically in Landfill Operations Plan, although review of documentation indicates adherence to this standard. Recommended that this be included in the Operations Plan as a specific reference.
4.6.24 (ii)	Alberta User Guide for Waste Managers, Alberta Environment, August 1996, as amended.	X				Facility and Landfill Operations Report, Section B	Referenced in Landfill Operations Plan.
4.6.25	The approval holder shall measure or, when not feasible to measure, estimate, the quantity of each waste and hazardous recyclable identified in 4.6.24 each year.	X				Facility and Landfill Operations Report	Addressed in Appendix A of Operations Report.
4.6.26	The approval holder shall keep a daily total and inventory of all materials being stored at the HWRSP Facility.	X				<ul style="list-style-type: none"> Field observations. Various inventory logs (WIN Web). 	Observed documentation in the field.
4.6.27	The daily total and inventory records in 4.6.26 shall be available at the facility at all times for inspection by the Director or an inspector.	X				<ul style="list-style-type: none"> Field observations. Various inventory logs (WIN Web). 	Available at the time of the audit.
4.6.28	The approval holder shall submit a Monthly Waste Management Report to the Director.	X				<ul style="list-style-type: none"> July 2021 Waste Inventory Report. Discussion with site staff. 	Verbal confirmation that the monthly reports are submitted to AEP. Different documents for internal use and submission confirms submission.
4.6.29	The approval holder shall compile all of the information indicated in Table 4.6-B in the Monthly Waste Management Report which shall contain, at minimum, all of the following information:				X	Not applicable.	Not applicable. Information only.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.29 (a)	An opening waste and hazardous recyclables inventory balance in kilograms or litres by waste class or material type.			X		<ul style="list-style-type: none"> July 2021 Waste Inventory Report. Discussion with site staff. 	Compliance confirmed; included in report. The Facility is adhering to the information required in the Monthly Waste Management Report, viewed for July 2021. However the reports are currently referencing the 10348-02-00 Approval. Dillon would recommend that the referenced Approval be updated to 10348-03-00.
4.6.29 (b)	The amount and type of waste and hazardous recyclables received: - Within the province. - From outside of the province.			X			
4.6.29 (c)	The amount and type of waste and hazardous recyclables: - Shipped for recycling or product. - Shipped off-site for disposal. - Disposed on-site.			X			
4.6.29 (d)	Any adjustments, including but not limited to, consolidation, reclassification, losses to processing, spills, volume miscalculations, or any other circumstances, which would affect the mass balance of the monthly inventory report.			X			
4.6.29 (e)	Closing balance in kilograms or litres.			X			
4.6.29 (f)	A summary of contraventions reported pursuant to 2. 1. 1 related to waste and hazardous recyclables.	X				<ul style="list-style-type: none"> July 2021 Waste Inventory Report. Discussion with site staff. 	No contraventions identified in monthly report.
4.6.29 (g)	Any other information as required in writing by the Director.	X				<ul style="list-style-type: none"> July 2021 Waste Inventory Report. Discussion with site staff. 	No additional requirements by AEP.
4.6.30	The approval holder shall compile all the information required by 4.6.24 and 4.6.25 in an Annual Waste Management Summary Report:				X	Not applicable.	Not applicable. Information only.
4.6.30 (a)	As specified in Table 4.6-C.	X				2020 Annual Waste Management Summary - Table 4.6-D, Hazardous Waste Landfilled, included in the 2020 Annual Report.	In Appendix A of Operations Report.
4.6.30 (b)	In accordance with the: - Industrial Waste Identification and Management Options, Alberta Environment, May 1996, as amended. - Alberta User Guide for Waste Managers, Alberta Environment, August 1996, as amended.			X		2020 Annual Waste Management Summary - Table 4.6-D, Hazardous Waste Landfilled, included in the 2020 Annual Report.	The first document is not referenced specifically in Landfill Operations Plan, although review of documentation indicates adherence to this standard. Recommended that this be included in the Operations Plan as a specific reference.
4.6.31	The approval holder shall submit the Annual Waste Management Summary Report to the Director.	X				2020 Annual Waste Management Summary - Table 4.6-D, Hazardous Waste Landfilled, included in the 2020 Annual Report.	Submitted as part of the Annual Report for the Facility.
Landfill							
Operations Plan							
4.6.32	The approval holder shall develop, keep up-to-date, and implement a Landfill Operations Plan that does not contravene with the requirements of this approval.	X				Operations Plan.	Approval requirements are being examined in this checklist.
4.6.33	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.6.33 (a)	Review the Landfill Operations Plan annually, at a minimum.	X				Operations Plan.	Revision date on the 2021 Facility and Landfill Operations Plan is February, 2021.
4.6.33 (b)	Update the Landfill Operations Plan if any of the following circumstances apply: - There are facility expansions or changes in site operations or equipment. - There is an applicable change to the Standards for Landfills in Alberta, as amended. - An update is required in writing by the Director. - There is an update to an applicable regulation.	X				Operations Plan.	Updates to the operations plan reflect Cell 4 and Cell 3B changes.
4.6.34	The Landfill Operations Plan shall include, at a minimum, all of the following:				X	Not applicable.	Not applicable. Information only.
4.6.34 (a)	SOP for keeping and maintaining an Operating Record.	X				Operations Plan.	Addressed in section A of Operations Plan.
4.6.34 (b)	SOP for waste control, run-on and runoff controls, and nuisance controls.	X				Operations Plan.	Addressed in section B of Operations Plan.
4.6.34 (c)	SOP for the waste stabilization area operations.	X				Operations Plan.	Addressed in section C of Operations Plan.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.34 (d)	SOP for the acceptance, handling and disposal of wastes, including: - Waste characterization and classification at source. - Waste manifesting and tracking. - QA/QC waste acceptance procedures. - Waste sampling.	X				Operations Plan.	Addressed in Sections D of Operations Plan.
4.6.34 (e)	SOP for detecting, preventing and disposal of unauthorized wastes.	X				Operations Plan.	Addressed in Sections E of Operations Plan.
4.6.34 (f)	SOP for placing waste in a landfill cell including: - Working face width. - Lift depth. - Compaction. - Waste placement location using a grid system	X				Operations Plan.	Addressed in Sections F of Operations Plan.
4.6.34 (g)	SOP for managing contaminated sulphur and sulphur containing wastes.	X				Operations Plan.	Addressed in Sections G of Operations Plan.
4.6.34 (h)	SOP for managing asbestos wastes.	X				Operations Plan.	Addressed in Sections H of Operations Plan.
4.6.34 (i)	SOP for placing leachate, leak detection liquid, or other authorized wastes and liquids over the surface of the active landfill area for the purpose of evaporation or dust suppression.	X				Operations Plan.	Addressed in Sections I of Operations Plan.
4.6.34 (j)	An Odour and Fugitive Dust Response Program.	X				Operations Plan.	Addressed in Sections J of Operations Plan, referencing the Fugitive Dust and Odour Best Management Plan in Appendix C.
4.6.34 (k)	A Fugitive Dust and Odour Best Management Plan.	X				Operations Plan.	Addressed in Sections K of Operations Plan, referencing the Fugitive Dust and Odour Best Management Plan in Appendix C.
4.6.34 (l)	A runoff and industrial wastewater monitoring and management program.	X				Operations Plan.	Addressed in Sections L of Operations Plan.
4.6.34 (m)	A leachate monitoring and management program.	X				• Operations Plan. • SOPL002-003 Landfill Leachate System.	Addressed in Sections M of Operations Plan.
4.6.34 (n)	A leak detection liquid monitoring and management program.	X				• Operations Plan. • SOPL002-003 Landfill Leachate System.	Addressed in Sections M/N of Operations Plan.
4.6.34 (o)	A groundwater monitoring program.	X				Operations Plan.	Addressed in Sections O of Operations Plan.
4.6.34 (p)	A Remediation Plan to deal with groundwater quality deterioration.	X				Groundwater Remediation Plan.	Addressed in Sections P of Operations Plan.
4.6.34 (q)	A soil monitoring program.	X				Operations Plan.	Addressed in Sections Q of Operations Plan. Submitted in late 2019 and the first soil monitoring program report was submitted to AEP on January 31, 2020.
4.6.34 (r)	A soil management program.	X				Operations Plan.	Addressed in Sections R of Operations Plan. Confirmation of acceptance from AEP September 18, 2020.
4.6.34 (s)	A landfill cell cover system.	X				Operations Plan.	Addressed in Sections S of Operations Plan. Cell cover system is prepared by consultants and conforms to provincial regulations.
4.6.34 (t)	A monitoring and maintenance program for the scale house and heavy operational equipment.	X				• Operations Plan. • Maintenance Dashboard. • Scale maintenance records	Addressed in Sections T of Operations Plan. Scales calibrated twice per year, maintenance program in place.
4.6.34 (u)	A health and safety program.	X				Health and Safety Program.	Addressed in Sections U of Operations Plan. Health and Safety program in place, training records are kept accounted for, and notifications when training comes due. Employees sign-off on Health and Safety program.
4.6.34 (v)	An emergency response program, including SOP for handling fires, substance releases to the environment, and health concerns.	X				Contingency Plan in Appendix A of the Operations Plan.	Addressed in Sections V of Operations Plan, referencing the facility's Contingency Plan in Appendix A. A system exists to track each employees training and provides management with information such as: training expiring, which training each employee requires, etc.
4.6.34 (w)	An up-to-date plan of the landfill layout with survey records showing the location of all infrastructure components of the landfill including final cover elevations and contours.	X				Operations Plan.	Addressed in Section W of Operations Plan, referencing Appendix D.
4.6.35	The approval holder shall retain a copy of the most recent Landfill Operations Plan at the facility.	X				Operations Plan.	Hard copy of 2021 Operations Plan viewed
4.6.36	The approval holder shall submit to the Director the most recent Landfill Operations Plan when requested in writing by the Director within the timeline specified in writing by the Director.	X				Discussions with site staff.	Compliance confirmed; submitted annually.
4.6.37	The approval holder shall correct all deficiencies in the Landfill Operations Plan submitted pursuant to 4.6.36, as outlined in writing by the Director, within the timeline specified in writing by the Director.				X	Not applicable.	Not applicable. Information only.
4.6.38	The approval holder shall implement the latest Landfill Operations Plan, unless otherwise authorized in writing by the Director.	X				Operations Plan.	2021 Operations Plan observed.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Operations							
4.6.39	The approval holder shall classify all materials entering the landfill in accordance with the:				X	Not applicable.	Not applicable. Information only.
4.6.39 (a)	Waste Control Regulation (AR 192196).	X				Operations Plan, Section B.	Referenced in Landfill Operations Plan.
4.6.39 (b)	Industrial Waste Identification and Management Options, Alberta Environment, May 1996, as amended.			X		Operations Plan.	The document is not referenced specifically in Landfill Operations Plan, although review of documentation indicates adherence to this standard. Recommended that this be included in the Operations Plan as a specific reference.
4.6.39 (c)	Alberta User Guide for Waste Managers, May 1995, as amended.	X				Operations Plan, Section B.	Referenced in Landfill Operations Plan.
4.6.40	The approval holder shall obtain a detailed representative physical and chemical analysis of a waste prior to disposal of the waste into the landfill at the following times, at a minimum:				X	Not applicable.	Not applicable. Information only.
4.6.40 (a)	The first time a waste is received from a new generator.	X				• Operations Plan, Sections B-D • Waste Profile from WIN Web viewed.	Compliance confirmed: • Procedures and acceptance criteria in the Landfill Operations Plan are compliant with Approval. • All waste profiles renewed annually, either by customers or Clean Harbors on-site.
4.6.40 (b)	The first time a delivery is received from a different process associated with a known waste generator.	X					
4.6.40 (c)	The first time a waste is received from a different location associated with a known waste generator.	X					
4.6.40 (d)	When the nature or composition of the waste that was previously characterized by the generator changes.	X					
4.6.41	The approval holder shall not dispose of hazardous waste in any Class II landfill cell.				X	Not applicable.	Not applicable. The site is not a Class II landfill.
4.6.42	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.6.42 (a)	Only carry out waste stabilization or solidification or both within the waste stabilization area.	X				Site field observations.	Solidification and waste stabilization activities consistent with Approval requirements during field observations.
4.6.42 (b)	Not transfer waste from the waste stabilization area to the Class I landfill cell before the waste stabilization or solidification or both have completed.	X					
4.6.43	The approval holder shall only dispose of any liquid collected within the waste stabilization area by one or more of the following methods:				X	Not applicable.	Not applicable. Information only.
4.6.43 (a)	To facilities holding a current Act authorization to accept such waste.				X	Not applicable.	Not applicable. This option not used by the facility.
4.6.43 (b)	To facilities approved by a local environmental authority outside of Alberta to accept such waste.				X	Not applicable.	Not applicable. This option not used by the facility.
4.6.43 (c)	To a disposal well approved by AER.or	X				AER approval for deep well.	• Liquid waste is hauled to Class I deep well in Calmar. • AER approval for deep well (leased from Seller's Oilfield Services to CH) observed. Approval No. WM 077 A, dated July 25, 2011.
4.6.43 (d)	As otherwise authorized in writing by the Director.				X	Not applicable.	Option not used by the Facility.
4.6.44	The approval holder shall conduct:				X	Not applicable.	Not applicable. Information only.
4.6.44 (a)	Annually, in-house visual inspections for corrosion.	X				Discussion with site staff.	Confirmed that annual visual inspections performed.
4.6.44 (b)	Biennially, ultrasonic testing to monitor thickness of the steel plate liner of the stabilization pits in the waste stabilization area, unless otherwise authorized in writing by the Director.	X				Inspection report from Integrity Testing Services Inc., dated August 2021.	Performed yearly, tracked by compliance calendar.
4.6.45	The approval holder shall dispose of asbestos wastes in accordance with "Guidelines for the Disposal of Asbestos Waste": Environmental Protection Services, Alberta Environment, 1989, as amended.	X				Operations Plan, Section H.	Referenced in Landfill Operations Plan.
4.6.46	The approval holder shall dispose of sulphur waste in accordance with "Guidelines for Landfill Disposal of Sulphur Wastes and Remediation of Sulphur Containing Soils", Alberta Environment, 2011, as amended.	X				Operations Plan, Section G.	Referenced in Landfill Operations Plan.
4.6.47	The approval holder shall only dispose of wastes that the landfill is not authorized to dispose of:				X	Not applicable.	Not applicable. Information only.
4.6.47 (a)	To facilities holding a current Act authorization.	X				Discussion with site staff.	Compliance confirmed. All waste receipts are screened at the site entry scale and any non-authorized loads, as determined through manifest, are rejected.
4.6.47 (b)	To facilities approved by a local environmental authority outside of Alberta. Or:	X					
4.6.47 (c)	As otherwise authorized in writing by the Director.	X					
4.6.48	If an unauthorized waste is received at the landfill, the approval holder shall remove the waste from the landfill within seven (7) days of the receipt, unless otherwise authorized in writing by the Director.				X	Not applicable.	Not applicable. Not observed during the audit. Non authorized waste not received in the landfill.
4.6.49	The approval holder shall restrict the working face of each landfill cell to the smallest practical area.				X		
4.6.50	For any waste disposed of at the landfill that is subject to wind dispersal, the approval holder shall:				X		
4.6.50 (a)	Wet the waste to prevent dispersal of particulate matter.or	X				Operations Plan, Appendix C (Fugitive Dust and Odour Best Management Plan).	Documents reviewed have procedures for managing dust and particulate matter through waste placement in landfill and in waste stabilization.
4.6.50 (b)	Immediately apply cover on top of the waste to minimize entrainment of particulate matter.	X					

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.51	Notwithstanding 4.6.1 (v), the approval holder may place any of the following wastes over the surface of the active landfill area for the purpose of dust suppression, provided that placement of such wastes will not cause offensive odours:	X				Discussion with site staff.	Compliance confirmed. Pond water for dust suppression. Leachate is never used due to odour.
4.6.51 (a)	Specified runoff.				X		
4.6.51 (b)	Leachate.				X		
4.6.51 (c)	Leak detection liquid.				X		
4.6.51 (d)	Sump waste of car wash bays or similar operations.				X	Not applicable.	Not applicable. Pond water is used for dust suppression only.
4.6.51 (e)	Waste from hydrovac excavation operations.				X		
4.6.51 (f)	Any other waste authorized by the Alberta User Guide for Waste Managers, May 1995, as amended.				X		
4.6.52	The approval holder shall inspect the landfill, at a minimum:				X	Not applicable.	Not applicable. Information only.
4.6.52 (a)	Weekly.	X					
4.6.52 (b)	Immediately after each storm event to: - Detect evidence of deterioration of any infrastructure components, including the composite liner. - Detect any malfunction or improper operation of the run-on and runoff control systems, leachate collection system, or leak detection system. - Take corrective measures to repair any damage to infrastructure components, including the composite liner.	X				<ul style="list-style-type: none"> Discussion with site staff. September 1, 2021 daily inspection record. 	Compliance confirmed through review of inspection record.
4.6.53	The approval holder shall do the following, the Director in writing along with any corrective measures taken or proposed:				X	Not applicable.	Not applicable. Information only.
4.6.53 (a)	Keep a record of inspections conducted pursuant to 4.6.52.	X					
4.6.53 (b)	Have the record of inspections available for review upon written request from the Director.	X				Landfill inspection records.	Compliance confirmed through review of electronic records.
4.6.53 (c)	Immediately report any deficiencies detected by the inspection in 4.6.52 to the Director in writing along with any corrective measures taken or proposed	X				Landfill inspection records.	Reported if there is a contravention. If not, a work ticket is created and the issue is fixed.
4.6.54	The approval holder shall not stockpile waste exceeding the maximum designated waste elevation of the landfill for a period of more than two (2) weeks, unless otherwise authorized in writing by the Director.	X				Site survey, dated January 4, 2021.	The site is surveyed twice per year, and no contours exceed the maximum designated waste elevation.
4.6.55	The approval holder shall take all practical measures to prevent off-site tracking of waste from vehicles and equipment leaving the facility.	X				Discussion with site staff.	Mud and waste tracking from the haul trucks is addressed as needed.
Monitoring and Reporting							
4.6.56	The approval holder shall monitor the landfill operations as required in Table 4.6-D.	X				2020 Annual Report.	All criteria in Table 4.6-D is included.
4.6.57	The approval holder shall report to the Director the results of the landfill operations monitoring as required in Table 4.6-D.	X				2020 Annual Report.	Submitted to AEP.
4.6.58	The Annual Landfill Operations Report required in Table 4.6-D shall include, at a minimum, all of the following:				X	Not applicable.	Not applicable. Information only.
4.6.58 (a)	the name and contact information of the person responsible for the facility.	X				2020 Annual Report.	Addressed in Section 2.0 of Annual Report.
4.6.58 (b)	A summary of all information collected as required in Table 4.6-D.	X				2020 Annual Report.	Addressed in Section 3.0 of Annual Report.
4.6.58 (c)	A summary of the results of any audit conducted in accordance with 4.1.7.	X				2020 Annual Report.	2018 Triennial Compliance Audit included in Appendix D of Annual Report.
4.6.58 (d)	A summary of the operations of the waste stabilization area.	X				2020 Annual Report.	Addressed in Section 5.0 and Appendix I of Annual Report.
4.6.58 (e)	A summary of the performance of the run-on and runoff control systems, including a comparison to the limits in Tables 4.3-8 and 4.3-C.	X				2020 Annual Report.	Addressed in Section 6.0 of Annual Report.
4.6.58 (f)	A summary of the performance of the leachate collection system, including a comparison to the maximum acceptable leachate head.	X				2020 Annual Report.	Addressed in Section 7.0 of Annual Report.
4.6.58 (g)	A summary of the performance of the leak detection system, including a comparison to the action leakage rate limit.	X				2020 Annual Report.	Addressed in Section 8.0 of Annual Report.
4.6.58 (h)	The Response Action Plan for the leak detection system pursuant to 4.4.1 O.	X				2020 Annual Report.	Addressed in Section 9.0 and Appendix J of Annual Report.
4.6.58 (i)	The Annual Dugout and Water Well Sampling Program Report pursuant to 4.5.4.	X				2020 Annual Report.	Addressed in Section 10.0 Appendix K of Annual Report.
4.6.58 (j)	A summary of all revisions to the Landfill Operations Plan pursuant to 4.6.33(b).	X				2020 Annual Report.	Addressed in Section 11.0 and Appendix L of Annual Report.
4.6.58 (k)	Any groundwater remedial action taken pursuant to 4.6.34(p).	X				2020 Annual Report.	Addressed in Section 12.0 of Annual Report.
4.6.58 (l)	A summary of records of landfill inspections pursuant to 4.6.53.	X				2020 Annual Report.	Addressed in Section 13.0 and Appendix M of Annual Report.
4.6.58 (m)	A summary of: - Operational issues encountered. - Emergencies occurred. - Measures or actions taken.	X				2020 Annual Report.	Addressed in Section 14.0 of Annual Report.
4.6.58 (n)	A summary of records of: - Public complaints. - The approval holder's responses	X				2020 Annual Report.	Addressed in Section 15.0 and Appendix Q of Annual Report.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.58 (o)	An up-to-date financial security estimate pursuant to 5.1.2.	X				2020 Annual Report.	Addressed in Section 16.0 and Appendix N of Annual Report.
4.6.58 (p)	An updated site development plan showing the status of the landfill progression at the end of the operating year, including but not limited to: - Contour mapping. - The location of active and inactive disposal areas. - Areas where a final cover has been placed. - The location of new landfill cell(s) constructed.	X				2020 Annual Report.	Addressed in Section 17.0 and Appendix O of Annual Report.
4.6.58 (q)	The Annual Landfill Cell Closure Report pursuant to 7.1.7.	X				2020 Annual Report.	Addressed in Section 18.0 Appendix P of Annual Report.
4.6.58 (r)	A summary of contraventions reported pursuant to 2.1.1 related to landfill operations.	X				2020 Annual Report.	Addressed in Section 19.0 Appendix Q of Annual Report.
4.6.58 (s)	Any other information as required in writing by the Director.	X				2020 Annual Report.	Addressed in Section 20 of Annual Report. No additional information was required by the Director.
4.6.59	The approval holder shall submit the Annual Landfill Operations Report to the Director.	X				Discussion with site staff.	Confirmation of submission prior to deadline (March 24, 2021 for last items).
Operations							
4.7.1	The approval holder shall not release any substances from the domestic wastewater system to the surrounding watershed except as authorized by this approval.	X				Discussion with site staff.	Wastewater is directed to an isolated holding tank.
4.7.2	The approval holder shall direct all domestic wastewater to the domestic wastewater system.	X					
4.7.3	The approval holder shall only dispose of substances from the domestic wastewater system:				X	Not applicable.	Not applicable. Information only.
4.7.3 (a)	To facilities holding a current Act authorization.	X					
4.7.3 (b)	To facilities approved by a local environmental authority outside of Alberta or	X				Discussion with site staff.	Wastewater from holding tank taken across the street to authorized treatment lagoon (Contractor).
4.7.3 (c)	As otherwise authorized in writing by the Director.	X					
Not used at this time.							
Monitoring							
4.9.1	The approval holder shall continue to implement the existing Groundwater Monitoring Program as authorized in writing by the Director, unless and until otherwise authorized in writing by the Director pursuant to 4.9.4.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Groundwater reporting is being conducted in conformance with the Groundwater Monitoring Program.
4.9.2	The approval holder shall submit a revised Groundwater Monitoring Program to the Director on or before September 30, 2017, unless otherwise authorized in writing by the Director.	X				Discussion with site staff.	Submitted before the September 30th, 2017 deadline.
4.9.3	If the revised Groundwater Monitoring Program submitted pursuant to 4.9.2 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.	X				Discussion with site staff.	AEP did not identify any deficiencies with the program.
4.9.4	The approval holder shall implement the revised Groundwater Monitoring Program submitted pursuant to 4.9.2 as authorized in writing by the Director within the timeline specified in writing by the Director.	X				Discussion with site staff.	Implemented after submittal.
4.9.5	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.9.5 (a)	Collect a representative groundwater sample from each of the groundwater monitor wells specified in the Groundwater Monitoring Program, including the groundwater monitoring wells designated as points of compliance.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Compliance confirmed; all wells in monitoring program are sampled.
4.9.5 (b)	Analyze each sample for the parameters listed in Table 4.9-A.	X					Compliance confirmed; all parameters are sampled for.
4.9.6	The monitoring required in 4.9.5 shall be conducted at the following frequencies, unless otherwise authorized in writing by the Director:				X	Not applicable.	Not applicable. Information only.
4.9.6 (a)	A minimum of once per year during each of the active landfill life, landfill cell closure, final landfill closure, and post-closure periods.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Compliance confirmed; groundwater is monitored once per year.
4.9.6 (b)	A minimum of four times per year following detection of leachate constituents in groundwater at levels above those specified in 4.9.7, and until the levels specified in 4.9.7 have been met.	X				Discussion with site staff.	Compliance confirmed; no leachate constituents have ever been found.
4.9.7	The groundwater quality in the monitoring wells, designated as points of compliance in the Groundwater Monitoring Program, shall not exceed the higher of:				X	Not applicable.	Not applicable. Information only.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.9.7 (a)	The objectives established in the water quality objectives in the Canadian Environmental Quality Guidelines (CEQG) for drinking water published by the Canadian Council of Ministers of the Environment (CCME), as amended.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Several exceedances noted in GW report, however these are due to the natural composition of the groundwater in the area.
4.9.7 (b)	Background groundwater chemistry as determined through a statistical analysis, as a derived alternate groundwater performance standard.	X					
4.9.8	The approval holder shall implement the Remediation Plan as specified in the Landfill Operations Plan, when groundwater quality exceeds the groundwater performance criteria in 4.9.7.				X		Remediation Plan has not been required to be implemented. Exceedances are normal for the groundwater in the area.
4.9.9	The samples extracted from the groundwater monitor wells shall be collected using scientifically acceptable purging, sampling and preservation procedures so that a representative groundwater sample is obtained.	X				2020 GW Monitoring Report, dated March 2, 2021 from Tetra Tech	Compliance confirmed; acceptable procedures are being followed.
4.9.10	The approval holder shall for all groundwater monitoring wells:				X	Not applicable.	Not applicable. Information only.
4.9.10 (a)	Protect from damage.	X				Field observations.	Compliance confirmed; all wells were observed to be protected and locked.
4.9.10 (b)	Keep locked except when being sampled.	X					
4.9.11	If a representative groundwater sample cannot be collected because the groundwater monitoring well is damaged or is no longer capable of producing a representative groundwater sample, the approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.9.11 (a)	Clean, repair or replace the groundwater monitoring well.				X	Not applicable.	Not applicable. No damaged or non-functional wells.
4.9.11 (b)	Collect and analyse a representative groundwater sample prior to the next scheduled sampling event.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Compliance confirmed; groundwater monitoring consistent with schedule.
4.9.12	In addition to the sampling information recorded in 2.2.1, the approval holder shall record the following sampling information for all groundwater samples collected:				X	Not applicable.	Not applicable. Information only.
4.9.12 (a)	A description of purging and sampling procedures.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Refer to Section 5.2.
4.9.12 (b)	The static elevations above sea level, and depth below ground surface of fluid phases in the groundwater monitoring well prior to purging.	X					Compliance confirmed; groundwater levels were recorded.
4.9.12 (c)	The temperature of each sample at the time of sampling.	X					Compliance confirmed; temperature was recorded at the time of sampling.
4.9.12 (d)	The pH of each sample at the time of sampling.	X					Compliance confirmed; pH was recorded at the time of sampling.
4.9.12 (e)	The specific conductance of each sample at the time of sampling.	X					Compliance confirmed; recorded as mS at the time of sampling.
4.9.13	The approval holder shall carry out remediation of the groundwater in accordance with the following:				X	Not applicable.	Not applicable. Information only.
4.9.13 (a)	Alberta Tier 1 Soil and Groundwater Remediation Guidelines, Alberta Environment, February 2009, as amended.				X		Not applicable. Groundwater remediation has not been deemed necessary.
4.9.13 (b)	Alberta Tier 2 Soil and Groundwater Remediation Guidelines, Alberta Environment, February 2009, as amended.				X		
Reporting							
4.9.14	The approval holder shall compile an Annual Groundwater Monitoring Program Report which shall include, at a minimum, all of the following information:				X	Not applicable.	Not applicable. Information only.

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details		
		Compliant	Non-Compliant	OFI	Info, N/A				
Part 4 - Operations, Limits, Monitoring, and Reporting									
4.9.14 (a)	A completed Record of Site Condition Form, Alberta Environment, 2009, as amended.	X							
4.9.14 (b)	A legal land description of the facility and a map illustrating the facility boundaries.	X							
4.9.14 (c)	A topographic map of the facility.	X							
4.9.14 (d)	A description of the industrial activity and processes.	X							
4.9.14 (e)	A map showing the location of all surface and groundwater users, and a listing describing surface water and water well use details, within at least a 1.6 kilometre radius of the facility.	X							
4.9.14 (f)	A general hydrogeological characterization of the region within a five kilometre radius of the facility.	X							
4.9.14 (g)	A detailed hydrogeological characterization of the facility, including an interpretation of groundwater flow patterns.	X							
4.9.14 (h)	Cross-sections showing depth to water table, patterns of groundwater movement and hydraulic gradients at the facility.	X							
4.9.14 (i)	Borehole logs and completion details for groundwater monitoring wells.	X							
4.9.14 (j)	A map showing locations of all known buried channels within at least five kilometre of the facility.	X				<ul style="list-style-type: none"> • Tetra Tech 2019 Groundwater Monitoring Program, dated March 10, 2020. • Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020. 	Compliance confirmed through a review of the report. Submission to AEP confirmed through review of correspondence.		
4.9.14 (k)	A map of surface drainage within the facility and surrounding area to include nearby water bodies.	X							
4.9.14 (l)	A map of groundwater monitoring well locations and a table summarizing the existing groundwater monitoring program for the facility.	X							
4.9.14 (m)	A summary of any changes to the groundwater monitoring program made since the last groundwater monitoring report.	X							
4.9.14 (n)	Analytical data recorded as required in 4.9.5 and 4.9.11(b).	X							
4.9.14 (o)	A summary of fluid elevations recorded as required in 4.9.12(b) and an interpretation of changes in fluid elevations.	X							
4.9.14 (p)	An interpretation of QA/QC program results.	X							
4.9.14 (q)	An interpretation of all the data in this report, including the following: - Diagrams indicating the location and extent of any contamination. - A description of probable sources of contamination. - A site map showing the location and type of current and historical potential sources of groundwater contamination	X							
4.9.14 (v)	Recommendations for: - Changes to the groundwater monitoring program to make it more effective. - Remediation, risk assessment or risk management of contamination identified.	X							
4.9.15	The approval holder shall submit the Annual Groundwater Monitoring Program Report to the Director.	X							
4.9.16	If the Annual Groundwater Monitoring Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, within the timeline specified in writing by the Director.				X			Not applicable.	Not applicable. AEP did not identify any deficiencies.
4.10.1	In addition to any other requirements specified in this approval, the approval holder shall conduct all of the following activities related to soil monitoring and soil management required by this approval in accordance with the Soil Monitoring Directive, Alberta Environment, 2009, as amended:	X						Tetra Tech 2017 Soil Management Program Proposal, including Soil Monitoring Program.	Compliance confirmed: • March 21, 2017 - Soil Management Program Proposal (incl. monitoring program submitted to AEP). • September 11, 2017 - Supplemental Information to Soil Management Program Proposal (revisions), submitted to AEP. • September 13, 2017 - Approval letter from AEP regarding Soil Management Program Proposal.
4.10.1 (a)	Designing and developing proposals for the Soil Monitoring Program.	X							
4.10.1 (b)	Designing and developing proposals for the Soil Management Program.	X							
4.10.1 (c)	All other actions, including sampling, analysing, and reporting, associated with the Soil Monitoring Program.	X				Tetra Tech 2019 Soil Monitoring Program Report, dated January 31, 2020.	Actions in program reflect the 2019 Soil Monitoring Program Proposal and Deficiency Response Letter.		
4.10.1 (d)	All other actions, including sampling, analysing and reporting, associated with the Soil Management Program.	X				Tetra Tech 2019 Soil Monitoring Program Report, dated January 31, 2020.	Actions in program reflect the 2019 Soil Monitoring Program Proposal and Deficiency Response Letter.		

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Soil Monitoring and Reporting							
4.10.2	The approval holder shall submit the Soil Monitoring Program proposal to the Director according to the following schedule: - For the first soil monitoring event on or before January 31, 2019. - For the second soil monitoring event on or before January 31, 2024.	X				Tetra Tech 2017 Soil Management Program Proposal, including Soil Monitoring Program.	Compliance confirmed: • March 21, 2017 - Soil Management Program Proposal (incl. monitoring program submitted to AEP). • September 11, 2017 - Supplemental Information to Soil Management Program Proposal (revisions), submitted to AEP. • September 13, 2017 - Approval letter from AEP regarding Soil Management Program Proposal.
4.10.3	If any Soil Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.	X					
4.10.4	Subject to 4.10.3, the approval holder shall implement the Soil Monitoring Program as authorized in writing by the Director.	X				Tetra Tech 2019 Soil Monitoring Program.	Confirmed that this was completed in Fall 2019.
4.10.5	If an authorization or a deficiency letter is not issued within 120 days of the applicable date required by 4.10.2, the approval holder shall implement the Soil Monitoring Program in accordance with the program as set out in the proposal submitted by the approval holder and within 270 days after the applicable date required by 4.10.2	X				Tetra Tech 2019 Soil Monitoring Program.	Confirmed that this was completed in Fall 2019.
4.10.6	The approval holder shall submit to the Director each Soil Monitoring Program Report obtained from the soil monitoring referred to in 4.10.4 and 4.10.5 according to the following schedule:	X				Tetra Tech 2019 Soil Monitoring Program.	Confirmed that this was completed in Fall 2019.
4.10.6 (a)	For the first Soil Monitoring Program Report on or before January 31, 2020.	X				Tetra Tech 2019 Soil Monitoring Program Report, dated January 31, 2020.	Submit to the AEP on time, January 31, 2020
4.10.6 (b)	For the second Soil Monitoring Program Report on or before January 31, 2025.				X	Not applicable.	Not applicable. To be completed in the summer of 2024.
4.10.7	If any Soil Monitoring Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.	X				Tetra Tech 2019 Soil Monitoring Program Report, dated January 31, 2020.	Actions in program reflect the 2019 Soil Monitoring Program Proposal and Deficiency Response Letter.
Soil Management Program							
4.10.8	If the Soil Monitoring Program, or any other soil monitoring, reveals that there are substances present in the soil at concentrations greater than any of the applicable concentrations set out in the standards in the Soil Monitoring Directive, Alberta Environment, 2009, as amended, the approval holder shall develop a Soil Management Program Proposal.	X				• Tetra Tech 2017 Soil Management Program Proposal, including Soil Monitoring Program. • Tetra Tech Soil Management Program 2017 Cell 4 Soil Sampling, dated March 12, 2018.	Soil Management Program Proposal was developed and compliance was confirmed through a review.
4.10.9	If a Soil Management Program Proposal is required pursuant to 4.10.8, the approval holder shall submit a Soil Management Program Proposal to the Director according to the following schedule:				X	Not applicable.	Not applicable. Information only
4.10.9 (a)	For Soil Management Program Proposal that is triggered by the findings from the first soil monitoring event on or before the date in 4.10.6(a).	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.9 (b)	For Soil Management Program Proposal that is triggered by the findings from a second soil monitoring event on or before the date in 4.10.6(b).	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.9 (c)	For any other soil monitoring event not specified in this approval within six months of completion of the soil monitoring event.				X	Not applicable.	Not applicable. Information only
4.10.10	If any Soil Management Program Proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.11	The approval holder shall implement the Soil Management Program as authorized in writing by the Director.	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.12	If the approval holder is required to implement a Soil Management Program pursuant to 4.10.11, the approval holder shall submit a written Soil Management Program Report to the Director on or before March 31 of each year following the year in which the information was collected.	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.13	If any Soil Management Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified by the Director by the date specified in writing by the Director.				X	Not applicable.	Not applicable. No deficiencies identified by the Director.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.1.1	The geographic boundaries of the landfill has been maintained to that located within SE ¼ of Section 9, Township 50, Range 17, West of the 4 th Meridian.	X				<ul style="list-style-type: none"> 2020 Annual Report Field observations. 	Confirmed that landfill is within the approved boundary.
4.1.2	The waste elevation of the landfill has not exceeded the maximum designated waste elevation.	X				Cell 3B Landfill Capping Top of Final Cover Elevations, Figure No. 3 in Dillon Annual Landfill Cell Closure Report (Cell 3B), dated March 2021.	<ul style="list-style-type: none"> Maximum elevation, per Part 1 (ggg) (definitions) is 714 masl. Most recent closure was Cell 3B, which is also the highest. Maximum elevation observed in final cover was 713.15 masl.
4.1.3	Access to the facility has been restricted to only authorized personnel.	X				Field observations.	<ul style="list-style-type: none"> Visitor sign in sheet at front desk. Scale house reporting for all vehicles. Security cameras on-site. Gated access.
4.1.4	A 24 hour "HOTLINE" number has been maintained for prompt response during an emergency.			X		Field observations.	A hotline is maintained but not posted at gate or office entrance. Hotline is 780-690-0614.
4.1.5	The approval owner shall operate and maintain the integrity of the following waste management facilities at the facility:				X		Not applicable. Information only.
4.1.5 (i)	HWRSP Facility	X					Confirmed during field inspection.
4.1.5 (ii)	Class I and II landfill, including Class I and II cells and waste stabilization areas.			X			Observed ponding in roadways near potable water tanks, which can be managed on an ongoing basis.
4.1.5 (iii)	Waste storage areas.	X					Confirmed during field inspection.
4.1.6	The approval holder shall operate and maintain the integrity of the following infrastructure components at the facility:				X		Not applicable. Information only.
4.1.6 (i)	Composite liner	X				<ul style="list-style-type: none"> 2020 Annual Report. Field observations. 	Confirmed during field inspection.
4.1.6 (ii)	Leachate collection system	X					Confirmed during field inspection.
4.1.6 (iii)	Leak detection system	X					Confirmed during field inspection.
4.1.6 (iv)	Run-on control system	X					Confirmed during field inspection.
4.1.6 (v)	Run-off control system	X					Confirmed during field inspection.
4.1.6 (vi)	Groundwater monitoring wells	X					<ul style="list-style-type: none"> Confirmed well MW-10 (near waste storage and HWRSP Facility) has been repaired and locked. All other wells were observed to be protected and locked.
4.1.6 (vii)	Weigh scale	X					Weigh scale is operational.
4.1.6 (viii)	Site access control	X				Field observations.	Confirmed that sign-in procedures in place, doors locked, etc.
Facility Audit							
4.1.7	The approval holder shall cause the facility to be audited by an independent third-party environmental consultant to assess compliance with the terms and conditions of this approval, commencing on or before October 1, 2018.	X				<ul style="list-style-type: none"> 2018 Compliance Audit Report. 2021 Compliance Audit Report. 	Compliance confirmed.
4.1.8	The approval holder shall submit the audit report required in 4.1.7 in the Annual Landfill Operations Report.	X				2020 Annual Report.	Reviewed the 2020 Annual Landfill Operations Report and confirmed previous Audit was included.
4.1.9	The requirements in 4.1.7 and 4.1.8 do not relieve the approval holder of any duty under the Act, or its associated regulations, or this approval.				X	Not applicable.	Not applicable. Information only.

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Operations							
4.2.1	The approval holder shall not release any air effluent streams to the atmosphere except as authorized by this approval.				X	Not applicable.	Not applicable. Information only.
4.2.2	The approval holder shall only release air effluent streams to the atmosphere from the following sources: - Scrubber exhaust stack - Drum Processing Building exhaust vent - Staging Building exhaust vent - Administrative Building exhaust vents - Laboratory fume hood and exhaust vents - Maintenance Shop equipment and exhaust vents - Leachate Collection Tanks exhaust vents - Leachate transfer lines passive gas vents - Any other source authorized in writing by the Director	X				Field observations.	<ul style="list-style-type: none"> No other sources not listed in the approval. Requested in Approval Amendment (pending) to do quenching emulsions, only if non-toxic gases are emitted.
4.2.3	The approval holder shall not operate any process equipment unless and until the pollution abatement equipment associated with the corresponding process equipment is operational and operating.	X				<ul style="list-style-type: none"> Field observations. Verbal confirmation. Sept. 1, 2021 Transfer Station Daily Inspection (including scrubber inspection). 	All pollution abatement equipment is continuously operated.
4.2.4	The approval holder shall treat all air effluent streams from the exhaust vents of the Drum Processing or Staging or both Buildings with a caustic scrubber and an activated carbon filter before directing the air effluent streams to the scrubber exhaust stack for release to the atmosphere while: - Hazardous wastes/recyclables are being processed. - Hazardous wastes/recyclables are being transferred. - Containers of hazardous wastes/recyclables are open in the Drum Processing and/or Staging Buildings.	X				<ul style="list-style-type: none"> Field observations. Discussion with site staff. 	Monitored weekly and documented as per section below. All building air is treated through the pollution abatement equipment (scrubber and filter), including drum and tank vents.
4.2.5	The approval holder shall control fugitive emissions and any source not specified in 4.2.2 in accordance with 4.2.6 of this approval.	X				Field observations.	A carbon filter was added to the leachate tank.
4.2.6	With respect to fugitive emissions and any source not specified in 4.2.2, the approval holder shall not release a substance or cause to be released a substance that causes or may cause any of the following:				X	<ul style="list-style-type: none"> Operations Plan, Appendix C (Fugitive Dust and Odour Best Management Plan). Odour Complaint notification to Village and County, dated July 30, 2021. 	<ul style="list-style-type: none"> No fugitive emissions outside of what's permitted. Odour complaints are received and managed per BMPs (report reviewed and contained in Operations Plan). As part of the Amendment Application, AEP identified concerns regarding communications to the Village of Ryley and Beaver County. Clean Harbors now notifies the Village and County of all complaints and contraventions submitted to AEP.
4.2.6 (a)	Impairment, degradation or alteration of the quality of natural resources.	X					
4.2.6 (b)	Material discomfort, harm or adverse effect to the well being or health of a person.	X					
4.2.6 (c)	Harm to property or to vegetative or animal life.	X					
4.2.7	The approval holder shall not burn any debris by means of an open fire unless authorized in writing by the Director.	X				Correspondence with AEP	A fire occurred on property in January 2021, for which AEP was notified. No burning is conducted on site.
4.2.8	If the approval holder receives complaints of offensive odours, or fugitive dust, or both, beyond the facility boundaries, the approval holder shall:				X		
4.2.8 (a)	Conduct the following to reduce the release of those odours, or fugitive dust, or both by:	X				<ul style="list-style-type: none"> Operations Plan, Appendix C (Fugitive Dust and Odour Best Management Plan). Environmental Management Program SOP #90RY-410-00. Field observations. Discussion with site staff. 	<ul style="list-style-type: none"> Response is based on the type of complaint. Recently added a carbon filter on the leachate tank vent. Material receipt may be suspended during high wind days. Cover can be immediately placed for dust suppression and dispersion prevention. Receive typically 2-3 odour complaints per year.
4.2.8 (a, i)	Placing restrictions on types, or volumes, or both, of the wastes being handled or processed or deposited that are causing those odours, or fugitive dust, or both.	X					
4.2.8 (a, ii)	Increasing the frequency of cover placement, or modifying waste handling activities, or performing both, at the landfill.	X					
4.2.8 (a, iii)	Modifying waste handling activities at the HWRSP Facility.	X					
4.2.8 (a, iv)	Performing any combination of the above.	X					
4.2.8 (b)	Activate the Odour and Fugitive Dust Response Program as specified in the Landfill Operations Plan 4.6.34U).	X					

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Limits							
4.2.9	The approval holder shall maintain the pH of the scrubbing liquid of the caustic scrubber referred to in 4.2.4 at 8.0 or higher.	X				<ul style="list-style-type: none"> Field observations. Recorded daily (viewed Aug. 22, 2021 and Nov. 5, 2020 examples) and maintained in the WIN Web system. 	<ul style="list-style-type: none"> pH data logger contains daily readings. Available to AEP upon request, confirmed in report that recordings are compliant. "Keep pH above 8.0" sign posted.
4.2.10	The approval holder shall replace activated carbon in the activated carbon filter referred to in 4.2.4 immediately when the concentration of total petroleum hydrocarbons in the air effluent streams released from the scrubber exhaust stack to the atmosphere exceeds 25 ppm.	X				<ul style="list-style-type: none"> Field observations. WIN Web records. 	<ul style="list-style-type: none"> Weekly total petroleum hydrocarbon readings are taken and recorded in log book next to the scrubber and in WINWEB. Carbon is typically replaced every 4-5 years or less frequent. Last replacement occurred July 2015. No exceedances or replacement of media in the last three year period (2019-2021).
Monitoring and Reporting							
4.2.11	The approval holder shall monitor, daily at a minimum, the pH of the scrubbing liquid of the caustic scrubber referred to in 4.2.4.	X				<ul style="list-style-type: none"> Monitoring records for Aug. 22, 2021 and Nov. 5, 2020 in WIN Web. Field observations. 	<ul style="list-style-type: none"> Data logger contains daily readings. Available to AEP upon request, confirmed in report that recordings are compliant. If pH readings are close to 8.0 limit, a secondary laboratory reading is performed to verify in-line pH meter accuracy. Aug. 22, 2021 and Nov. 5, 2020 dates sampled.
4.2.12	The approval holder shall monitor, weekly at a minimum, the air effluent streams released from the scrubber exhaust stack, using a portable total petroleum hydrocarbon analyzer while: <ul style="list-style-type: none"> Hazardous wastes/recyclables are being processed. Hazardous wastes/recyclables are being transferred. Containers of hazardous wastes/recyclables are open in the Drum Processing and/or Staging Buildings. 	X				<ul style="list-style-type: none"> Field observations. WIN Web records. 	<ul style="list-style-type: none"> Weekly readings are taken and recorded in log book next to the scrubber. Carbon is replaced every 4-5 years or less frequency.
4.2.13	The portable total petroleum hydrocarbon analyzer referred to in 4.2.12 shall:				X	Not applicable.	Not applicable. Information only.
4.2.13 (a)	Have a detection limit of 1 ppm or lower for total petroleum hydrocarbons.	X				Field observations.	Confirmed that accuracy is to 0.1 ppm, as observed on calibration certificate.
4.2.13 (b)	Be located in a straight section of the scrubber exhaust stack, a minimum of one (1) metre downstream from the last flow disturbance.	X				Field observations.	Sampling location is on second story scaffolding within building, 1 m downstream from the last flow disturbance.
4.2.13 (c)	Be calibrated regularly in accordance with the analyzer manufacturer's specifications.	X				Calibration certificate from 2020.	Confirmed calibrated in 2020; expires in 2022.
4.2.14	The approval holder shall continue to implement the Ambient Air Monitoring Program as authorized in writing by the Director on June 24, 2009, unless and until otherwise authorized in writing by the Director pursuant to 4.2.18.	X					
4.2.15	The approval holder shall submit to the Director the results of the Ambient Air Monitoring Program in 4.2.14 with the following reports: <ul style="list-style-type: none"> Monthly Ambient Air Monitoring Report Annual Ambient Air Monitoring Report In accordance with the written authorization by the Director on June 24, 2009, unless and until otherwise authorized in writing by the Director pursuant to 4.2.18.	X				<ul style="list-style-type: none"> 2020 Operations Report. GHD Quality Assurance Plan - Air Monitoring Program Report, dated Dec. 31, 2016. "Ambient Air Monitoring Station Audit" letter from AEP, dated August 31, 2016. "Ambient Air Monitoring Station Audit" letter from AEP, dated Jan. 13, 2017 (closing out the audit findings). 	<ul style="list-style-type: none"> Clean Harbors was audited by AEP for adherence to the new Air Monitoring Directive released in 2016. Clean Harbors proposed dates and actions to address findings of the audit, which were accepted by AEP in letter December 2, 2016. Dec. 31, 2016 GHD report contains new Air Monitoring Program. AEP letter closing out the audit indicates that all findings addressed.
4.2.16	The approval holder shall submit a revised Ambient Air Monitoring Program, revised reporting requirements, or both, to the Director upon written request from the Director within the timeline specified in writing by the Director.	X					
4.2.17	If the revised Ambient Air Monitoring Program, reporting requirements, or both, submitted pursuant to 4.2.16 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.	X					

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.2.18	The approval holder shall implement the revised Ambient Air Monitoring Program, reporting requirements, or both, submitted pursuant to 4.2.16 as authorized in writing by the Director within the timeline specified in writing by the Director.	X					
Operations							
4.3.1	The approval holder shall not release any substances from the facility to the surrounding watershed except as authorized by this approval.	X				Field observations.	Compliance confirmed. 100% of the leachate is disposed of via deep well injection. Runon/runoff control systems in place and inspected during field observations.
4.3.2	The approval holder shall operate and maintain the integrity of:				X	Not applicable.	Not applicable. Information only.
4.3.2 (a)	The run-on control system to prevent flow onto the active landfill area from at least the peak discharge from a 1 in 25 year, 24 hour duration storm event at the facility.	X				Field observations.	Compliance confirmed. Run on/run off control systems were completed during Cell 4 construction. As built drawings reviewed.
4.3.2 (b)	The runoff control system for the facility to collect and control at least the runoff volume resulting from a 1 in 25 year, 24 hour duration storm event at the facility.	X				Field observations.	Compliance confirmed. Run on/run off control systems were completed during Cell 4 construction. As built drawings reviewed.
4.3.3	All runoff from the facility developed area shall be directed to the runoff control system as described in:				X	Not applicable.	Not applicable. Information only.
4.3.3 (a)	Application No. 012-10348, prior to decommissioning and reclamation of the old surface water detention pond.	X				Not applicable.	Confirmed. The old surface water detention pond was decommissioned in August 2018 prior to this audit.
4.3.3 (b)	The application, after decommissioning and reclamation of the old surface water detention pond.	X					
4.3.4	Prior to decommissioning and reclamation of the old surface water detention pond and subject to 4.3.7, the approval holder shall only make or permit a release from the old surface water detention pond:				X	Not applicable.	Not applicable. Information only.
4.3.4 (a)	At the release point as designated in application No. 012-10348, which is: • Located in the south east corner of the old surface water detention pond. • Referred to as sampling location A 1 in 4.3.11.	X				<ul style="list-style-type: none"> • 2020 Annual Report. • Field observations. • Operations Plan. • Discussions with site staff. 	Decommissioning of the old surface water detention pond was completed in August 2018. Observations were made of the new surface water detention pond, drainage ditch, and discharge point.
4.3.4 (b)	Through a pump and a release hose over the south berm into the drainage control ditch, east of the landfill access road, to the new surface water detention pond, under normal operating conditions.	X					
4.3.4 (c)	Through a pump and a release hose over the south berm directly to the culvert under Highway 854, during periods of high runoff exceeding the holding capacity of the old surface water detention pond.	X					
4.3.5	Subject to 4.3.7, the approval holder shall only make or permit a release from the new surface water detention pond:	X					
4.3.5 (a)	At the release point as designated in application No. 012-10348, which is: • Located in the north east corner of the new surface water detention pond. • Referred to as sampling location 81 in 4.3.11.	X					<ul style="list-style-type: none"> • Observed the discharge point at the new surface water detention pond. • Composite sampling is performed prior to any discharge consistent with the approval.
4.3.5 (b)	Through a pump and a release hose over the east berm into the culvert under Highway 854.	X					
4.3.6	The approval holder shall only dispose of industrial wastewaters, or specified runoff in Table 4.3-A, or both, by one or more of the following methods:				X	<ul style="list-style-type: none"> • 2020 Annual Report. • Field observations. • Operations Plan. • Discussions with site staff. 	<ul style="list-style-type: none"> • All stormwaters are discharged through pond with testing prior to discharge. • No non-compliant discharges have occurred. • When TSS exceeds limits, further settling time is done prior to re-testing and discharge, or flocculant is added. • No change to discharge.
4.3.6 (a)	To facilities holding a current Act authorization to accept such waste.	X					
4.3.6 (b)	To facilities approved by a local environmental authority outside of Alberta to accept such waste.	X					
4.3.6 (c)	To a disposal well approved by AER.	X					
4.3.6 (d)	As per 4.6.51.	X					
4.3.6 (e)	As otherwise authorized in writing by the Director.	X					

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Limits							
4.3.7	Releases of runoff from the following to the surrounding watershed shall comply with the limits specified in Table 4.3-B: - The old surface water detention pond. - The new surface water detention pond. - Or, both ponds.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	Compliance confirmed through a review of release analytical records.
4.3.8	Releases of runoff from within the tank farm bermed area to the old or new or both surface water detention ponds shall comply with the limits specified in Table 4.3-C.				X	Not applicable.	Not applicable: <ul style="list-style-type: none"> Tank farm bermed area water goes into landfill. This volume is pumped and solidified for disposal in the landfill.
Monitoring and Reporting							
4.3.9	The approval holder shall monitor the runoff control system as required in Table 4.3-D, subject to 4.3.12.			X		Surface Water Detention Pond B Summary of Batch Analysis, 2020 Annual Report.	Results for the runoff control system testing of 48 hour static acute lethality test using daphnia magna could be included in the Summary of Batch Analysis presented in the 2020 Annual Landfill Operations Report; along with the lethality of effluents to rainbow trout testing.
4.3.10	The approval holder shall report to the Director the results of the runoff control system monitoring as required in Table 4.3-D, subject to 4.3.12.	X				2020 Annual Report.	Monitoring findings reported to AEP.
4.3.11	For the purpose of Table 4.3-D:				X	Not applicable	Not applicable. Information only.
4.3.11 (a)	Sampling location A 1 is defined as the old surface water detention pond release point.				X	Field observations.	Not applicable. Old surface water detention pond has been decommissioned.
4.3.11 (b)	Sampling location A2 is defined as the old surface water detention pond.				X	Field observations.	Facility actively monitors releases.
4.3.11 (c)	Sampling location B1 is defined as the new surface water detention pond release point.	X				Field observations.	Facility actively monitors detention pond.
4.3.11 (d)	Sampling location B2 is defined as the new surface water detention pond.	X				Field observations.	Water collected in bermed area of tank farm is solidified for disposal in landfill as per 4.3.8
4.3.11 (e)	Sampling location C is defined as the tank farm bermed area.	X				Field observations.	Not applicable. The old surface water detention pond was decommissioned in August, 2018 prior to this audit.
4.3.12	The monitoring and reporting requirements in 4.3.9 and 4.3.10 for the old surface water detention pond (sampling locations A1 and A2) shall not apply after decommissioning and reclamation of the old surface water detention pond.				X	Not applicable.	Not applicable. Information only.
4.3.13	The monitoring and reporting required in Table 4.3-D for the acute lethality tests shall comply with:				X	Not applicable.	Summary of results all pass for the Surface Water Detention Pond B Summary of Batch Analyses.
4.3.13 (a)	The Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, Environment Canada, Environment Protection Series 1/RM/13, December 2000, as amended.	X				Surface Water Detention Pond B Summary of Batch Analysis - 2020 Annual Landfill Operations Report	<ul style="list-style-type: none"> Monthly Runoff and Industrial Wastewater Report. Surface Water Detention Pond B Summary of Batch Analysis - 2020 Annual Report. Results for the runoff control system testing of 48 hour static acute lethality test using daphnia magna could be included in the Summary of Batch Analysis presented in the 2020 Annual Landfill Operations Report; along with the lethality of effluents to rainbow trout testing.
4.3.13 (b)	The Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia Magna, Environment Canada, Environmental Protection Series 1/RM/14, December 2000, as amended.			X		Not applicable.	Not applicable. No deviation from corresponding test method has occurred.
4.3.14	The approval holder shall: - Treat any acute lethality test that deviates from the corresponding test method referred to in 4.3.13 as invalid. - Repeat the test as soon as logistically possible.				X	Not applicable.	Not applicable. All testing passed the criteria.
4.3.15	In the event that less than 50% of the rainbow trout survived in the 100% concentration sample, the approval holder shall: - Implement a program immediately to identify the source of the toxicity. - Submit to the Director within 90 days after the test result is available, a proposed program to reduce the toxicity of the runoff.				X	Not applicable.	Verbal confirmation from multiple parties confirming the reports are forwarded to AEP.
4.3.16	The approval holder shall submit the Monthly Runoff and Industrial Wastewater Report in Table 4.3-D to the Director.	X				Monthly Runoff and Industrial Wastewater Report.	Not applicable. Monthly reports contained in annual report, but only need to be submitted with discharges.
4.3.17	The Monthly Runoff and Industrial Wastewater Report shall include, at a minimum, all of the following information:				X	Not applicable.	

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.3.17 (a)	A monthly assessment of the monitoring results relative to the limits in Table 4.3-B.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (b)	A monthly assessment of the monitoring results relative to the limits in Table 4.3-C.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (c)	A monthly assessment of the performance of the: - Runoff control system. - Pollution abatement equipment. - Monitoring equipment.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (d)	A monthly summary of management and disposal of the industrial wastewaters and specified runoff, as per 4.3.6.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (e)	A monthly summary of management and disposal of runoff in general.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (f)	A monthly summary of runoff contraventions reported pursuant to 2. 1. 1.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.17 (g)	Any other information as required in writing by the Director.	X				Monthly Runoff and Industrial Wastewater Report.	Included in Report.
4.3.18	The approval holder shall submit the Annual Runoff and Industrial Wastewater Report in Table 4.3-D to the Director.	X				Annual Runoff and Industrial Wastewater Report.	Verbal confirmation and included with annual report.
4.3.19	The Annual Runoff and Industrial Wastewater Report shall include, at a minimum, all of the following information:			X		Not applicable.	Not applicable. Information only.
4.3.19 (a)	An annual summary assessment of the monitoring results relative to the limits in Table 4.3-B.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (b)	An annual summary assessment of the monitoring results relative to the limits in Table 4.3-C.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (c)	An annual summary assessment of the performance of the: - Runoff control system. - Pollution abatement equipment. - Monitoring equipment.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (d)	An annual summary of management and disposal of the industrial wastewaters and specified runoff, as per 4.3.6.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (e)	An annual summary and evaluation of management and disposal of runoff in general.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (f)	An annual summary of the results pursuant to 4.3.21.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.3.19 (g)	An annual summary of runoff contraventions reported pursuant to 2. 1. 1.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.19 (h)	Any other information as required in writing by the Director.	X				Annual Runoff and Industrial Wastewater Report.	Included in Report.
4.3.20	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.3.20 (a)	Collect a representative grab sample from the old surface water detention pond at least once per year, prior to decommissioning and reclamation of the pond.				X	Not applicable.	Not applicable. Old surface water detention pond has been decommissioned.
4.3.20 (b)	Collect a representative grab sample from the new surface water detention pond at least once per year.	X				Annual Runoff and Industrial Wastewater Report	Details included in Report.
4.3.20 (c)	Analyze the sample(s) for all of the parameters specified in Table 4.3-E.	X				Annual Runoff and Industrial Wastewater Report	Details included in Report.
4.3.21	The approval holder shall submit the results of the analyses in 4.3.20 to the Director in the Annual Runoff and Industrial Wastewater Report.	X				Annual Runoff and Industrial Wastewater Report	Details included in Report.
Operations							
4.4.1	The approval holder shall only dispose of leachate removed from the leachate collection system by one or more of the following methods:				X	Not applicable.	Not applicable. Information only.
4.4.1 (a)	To facilities holding a current Act authorization to accept such waste.				X	Not applicable.	Not applicable. Option not used by the facility.
4.4.1 (b)	To facilities approved by a local environmental authority outside of Alberta to accept such waste.				X	Not applicable.	Not applicable. Option not used by the facility.
4.4.1 (c)	To a disposal well approved by AER.	X				<ul style="list-style-type: none"> • Alberta Energy Regulator (AER) approval for deep well. • Appendix E of 2020 Annual Report. 	Leachate is hauled to Class I deep well in Calmar. Volume summary included in annual report.
4.4.1 (d)	As per 4.6.51.				X	Not applicable.	Not applicable. Information only.
4.4.2	The approval holder shall only dispose of liquid removed from the leak detection system by one or more of the following methods:				X	Not applicable.	Not applicable. Information only.
4.4.2 (a)	To facilities holding a current Act authorization to accept such waste.				X	Not applicable.	Not applicable. Option not used by the facility.
4.4.2 (b)	To facilities approved by a local environmental authority outside of Alberta to accept such waste.				X	Not applicable.	Not applicable. Option not used by the facility.
4.4.2 (c)	To a disposal well approved by AER.	X				<ul style="list-style-type: none"> • AER approval for deep well. • Appendix E of 2020 Annual Landfill Operations Report. 	Leachate is hauled to Class I deep well in Calmar. Volume summary included in annual report.
4.4.2 (d)	As per 4.6.51.				X	Not applicable.	Option not used by the facility.
Limits							
4.4.3	Subject to 4.4.4, the approval holder shall not exceed the maximum acceptable leachate head in any landfill cell.	X				Leachate Head Level Table.	Leachate levels recorded daily. Field logs for 2020 observed, contain following parameters: - Date, time, condition, level status, personnel initial
4.4.4	Subsequent to a storm event, the leachate head in any landfill cell shall not exceed the maximum acceptable leachate head for more than fourteen (14) days, unless otherwise authorized in writing by the Director.	X				Leachate Head Level Table.	Leachate pumping infrastructure on timers in most cells, (all but Cell 1). A fire January 12, 2020 caused a fire (AEP Reference No. 362650) which destroyed the Cell 2 Leachate building until pumping capacity was restored June 30, 2020. Infrastructure is capable of removing leachate generated from a storm event in fewer than 14 days.
4.4.5	The volume of liquid in the leak detection system, as monitored in Table 4.6-D, shall not exceed the action leakage rate in any landfill cell.		X			2020 Annual Report.	Action Leakage Rate (ALR) Exceedances were noted June 9, 2020, June 10, 2020, July 2, 2020, July 9, 2020. Section 14.6 of the Annual Landfill Operations Report detail several ALR exceedances that were not reported. No negative impacts were observed and clarification of the reporting requirements were made with the Facility Manager to ensure this is not repeated in the future. (AEP 376183)

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Monitoring and Reporting							
4.4.6	The approval holder shall monitor the leachate collection and leak detection systems as required in Table 4.6-D and for all parameters specified in Table 4.4-A, subject to 4.4.8 and 4.4.9.	X				Primary Leachate Analysis Results Appendix D of 2020 Annual Report.	Leachate levels recorded daily. Field logs for 2020 observed, contain following parameters: • Date, time, condition, level status, personnel initial.
4.4.7	The approval holder shall report to the Director the results of the leachate collection and leak detection systems monitoring as required in Table 4.6-D, including the results of the analyses for all parameters specified in Table 4.4-A, subject to 4.4.8 and 4.4.9.	X				Primary Leachate Analysis Results Appendix D of 2020 Annual Report.	Submitted to AEP.
4.4.8	The requirements in 4.4.6 and 4.4.7 for monitoring and reporting the parameters in Table 4.4-A for leachate shall not apply if insufficient leachate is available for conducting the analyses.				X	Not applicable.	Not applicable. Information only.
4.4.9	The requirements in 4.4.6 and 4.4.7 for monitoring and reporting the parameters in Table 4.4-A for leak detection liquid shall not apply if insufficient leak detection liquid is available for conducting the analyses.				X	Not applicable.	Not applicable. Information only.
4.4.10	If the volume of liquid removed from the leak detection system exceeds the action leakage rate, in addition to reporting pursuant to 2.1.1, the approval holder shall submit a Response Action Plan to the Director within 30 days of the exceedance.	X				2020 Annual Report.	(AEP 376183) links exceedances to excessive rainfall and details steps taken to solve infiltration.
Monitoring and Reporting							
4.5.1	The approval holder shall, unless the approval holder is not granted access by the landowner:				X	Not applicable.	Not applicable. Information only.
4.5.1 (a)	Collect a representative sample from each of the dugouts and each of the water wells, within an approximate 1.6 kilometre radius around the facility.	X				Tetra Tech 2020 Dugout Sampling Program Report, dated March 2, 2021.	Details included in Report.
4.5.1 (b)	Analyze the sample for the parameters listed in Table 4.5-A.	X					Details included in Report.
4.5.2	The monitoring required in 4.5.1 shall be conducted once each year in October unless otherwise authorized in writing by the Director.	X					Details included in Report.
4.5.3	The approval holder shall record the analytical results of the sampling information required in 4.5.1 in an Annual Dugout and Water Well Sampling Program Report.	X					Details included in Report.
4.5.4	The approval holder shall submit the Annual Dugout and Water Well Sampling Program Report to the Director pursuant to 4.6.58(i).	X					Details included in Report.
General							
4.6.1	The approval holder shall not receive, process, dispose of, or perform any combination of the above for any of the following wastes, individually or in any combination, at the places specified below respectively: - Explosives (Class 1 TDGR wastes), at the facility. - Radioactive wastes (Class 7 TDGR wastes), at the facility. - Radioactive wastes regulated under the Nuclear Safety and Control Act (Canada), at the facility. - Biomedical waste, at the facility. - Waste containing free liquids, at the landfill, excluding the waste stabilization area. - Material containing ozone depleting substances, at the landfill. - Municipal solid waste, at the facility. - NORM waste, at the facility.	X				• Field observations. • Discussions with site staff.	Site field observations and verbal confirmation were received regarding materials receipt. Cross checked against Facility Operations Plan and SOPs for individual waste materials. WINWEB system also performs checks on waste compatibility and will issue warnings of any non-conforming waste
4.6.2	Incompatible wastes and incompatible hazardous recyclables shall be prevented from mixing.	X				• Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Landfill Operations (SOPL001). • WIN Web (compatibility workbench).	Relevant Facility SOPs confirm procedures are appropriate to prevent incompatible wastes and recyclables from mixing.
4.6.3	The approval holder shall dispose of wastes generated at the facility only:				X	Not applicable	Information only.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.3 (a)	To facilities holding a current Act authorization.	X				Discussions with site staff.	Confirmed that regulations are being followed.
4.6.3 (b)	To facilities approved by a local environmental authority outside of Alberta.	X				Discussions with site staff.	Confirmed that regulations are being followed.
4.6.3 (c)	As otherwise authorized in writing by the Director.	X				Discussions with site staff.	Confirmed that regulations are being followed.
HWRSP Facility							
Operations Plan							
4.6.4	The approval holder shall develop, keep up-to-date, and implement an HWRSP Facility Operations Plan.	X				<ul style="list-style-type: none"> Facility Standard Operating Procedures (SOPs) Operations Plan. 	Most recently dated as February 2021, with annual updates required. In 2020, procedures for Cell 4 added.
4.6.5	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.6.5 (a)	Review the HWRSP Facility Operations Plan annually, at a minimum.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	This is performed in line with the annual reporting required under the Approval.
4.6.5 (b)	Update the HWRSP Facility Operations Plan if any of the following circumstances apply: - There are facility expansions or changes in site operations or equipment. - There is an applicable change to an applicable regulation. - An update is required in writing by the Director.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	Section 14 added to 2017 Annual Report, addressing HWRSP facility operations.
4.6.6	The approval holder shall retain a copy of the most recent HWRSP Facility Operations Plan at the facility.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	Held on-site electronically and in hard copy.
4.6.7	The approval holder shall submit a copy of the most recent HWRSP Facility Operations Plan to the Director upon written request from the Director within the timeline specified in writing by the Director.	X				<ul style="list-style-type: none"> 2020 Annual Report. Operations Plan. 	Submitted in the 2020 Annual Report.
4.6.8	If the HWRSP Facility Operations Plan submitted pursuant to 4.6.7 is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.				X	Not applicable.	Not applicable. No response received from AEP on 2020 Annual Report.
4.6.9	The approval holder shall implement the latest HWRSP Facility Operations Plan, unless otherwise authorized in writing by the Director.	X				Operations Plan.	Up to date plan available and utilized.
Operations							
4.6.10	The approval holder shall only transfer wastes and hazardous recyclables at designated transfer areas designed to contain spills and leaks.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Relevant Facility SOPs confirm procedures for transferring wastes in the HWRSP.
4.6.11	The approval holder shall use the following when transferring substances to, from, and between containers, tanks, and trucks:				X	Not applicable.	Not applicable. Information only.
4.6.11 (a)	Couplings equipped with seals that are compatible with the substance transferred.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.11 (b)	The necessary precautions to prevent spills when the couplings are disconnected.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.11 (c)	Emergency shut-off valves.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.11 (d)	Established transfer areas and associated curbing, paving and catchment areas.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.11 (e)	Drip trays to capture potential losses under coupling devices and other connections.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.11 (f)	Manual inspections of the transfer area for leaks and spills during and after waste transfer.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.12	All wastes and all hazardous recyclables that are unloaded shall be immediately transferred to the waste storage area.	X				Facility SOPs: Drum Staging and Storage (SOPOP002), Drum Sampling (SOPOP003), Container Management (SOPOP004), Spills on Site (SOPOP008).	Reviewed and compliance confirmed during site visit.
4.6.13	All containers and unrinsed empty containers shall be stored in the waste storage area.	X				Field observations.	Confirmed during Site visit.
4.6.14	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.6.14 (a)	Provide and maintain an adequate aisle space between containers in the waste storage area to allow inspection and unobstructed movement of personnel, fire protection equipment, spill control equipment and decontamination equipment to any area of the waste storage area.	X				Field observations.	Site field operations consistent with fire code for spacing between containers.
4.6.14 (b)	Arrange inspection aisles in the waste storage area such that the identification label on each container is readable.	X				Field observations.	Identification labels clear for all containers.
4.6.15	All tanks within the tank farm area shall be equipped, at a minimum, with all of the following:				X	Not applicable.	Not applicable. Information only.
4.6.15 (a)	Sensors for detecting the level in each tank.	X				Field observations.	Sensors, alarms, and shut-off devices observed and active for each tank. The aqueous tank within the building does not contain a high level alarm but is not considered part of the tank farm.
4.6.15 (b)	High level alarms that activate when a tank overflow is imminent.	X					
4.6.15 (c)	Automatic shut-off devices or sufficient free board space above the high level sensor to allow operators time to prevent overflow from occurring.	X					
4.6.15 (d)	Earthen dikes or equivalent secondary containment structures capable of containing 110% of the volume of the largest tank within the bermed area plus 10% of the aggregate capacity of all other tanks in the bermed area.	X				Field observations.	Entire waste storage area is the building floor, which is drained to holding tank in central manhole and can be pumped.
4.6.16	All tanks containing hazardous waste and all tanks containing hazardous recyclables in each building shall be equipped, at a minimum, with all of the following:				X	Not applicable.	Not applicable. Information only.
4.6.16 (a)	Sensors or gauges for detecting the level in each tank.	X				Field observations.	Sensors observed and active for tanks.
4.6.16 (b)	A written operating procedure to prevent tank overflow.		X			<ul style="list-style-type: none"> Field observation Bulk Flammable Liquid Transfer SOP 	Bulk Flammable Liquid Transfer SOP Document and Checklist is available (part of Facility SOPs) in office area but is not stored next to tanks.
4.6.16 (c)	Secondary containment structures capable of containing 110% of the volume of the largest tank within the building plus 10% of the aggregate capacity of all other tanks containing hazardous waste and hazardous recyclables in the same building.	X				Field observations.	Secondary containment structures observed in the field.
4.6.17	Hazardous waste and hazardous recyclables stored in containers and tanks shall be stored in accordance with the Hazardous Waste Storage Guidelines, June 1988, Alberta Environment, as amended.	X				<ul style="list-style-type: none"> Field observations. Bulk Flammable Liquid Transfer SOP. 	Facility observed to be following governing regulations.
4.6.18	The approval holder shall only carry out the following activities, individually or in any combination, at the HWRSF Facility in relation to hazardous waste or hazardous recyclables or both:	X				<ul style="list-style-type: none"> Field observations. 	Field observations reviewed the activities that occur on site; which was confirmed through review of the Facility and Landfill
4.6.18 (a)	Commingling of hazardous waste or hazardous recyclables to make maximum use of available container or tank capacity, only if the resultant mixture has the same TDGR hazard classification as any one of the individual components.	X					
4.6.18 (b)	Phase separation by gravity settling, only without the addition of any chemicals designed to accelerate settling.	X					
4.6.18 (c)	Dispersion of solids into liquids by natural or mechanical means, only if the resultant mixture has the same TDGR hazard classification as the original waste.	X					

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.18 (d)	Physical segregation of hazardous from non-hazardous articles or components from the same container, only if no process equipment is used.	X				<ul style="list-style-type: none"> • Operations Plan. • Facility SOPs. 	Operations Plan and Facility SOPs.
4.6.18 (e)	Washing of drums or other objects, only for the purpose of removing hazardous residue.	X					
4.6.18 (f)	Crushing or shredding of used filters, rags, absorbent materials, or empty containers, only for the purpose of volume reduction or liquid recovery, unless otherwise authorized in writing by the Director.	X					
4.6.18 (g)	Treatment of hazardous waste, only as authorized in writing by the Director.	X					
4.6.19	Notwithstanding 4.6.1 B(g), the approval holder shall not incinerate waste at the facility.	X					
Limits							
4.6.20	The approval holder shall not store a total of more than 752,500 litres of hazardous waste or hazardous recyclables or both at the HWRSP Facility at any time.	X				WIN Web inventory management software.	Maximum capacity not exceeded as of September 2, 2021, per the below volumes.
4.6.21	In addition to the storage limits in 4.6.20, the approval holder shall not exceed the waste storage limits as specified in TABLE 4.6-A.	X				WIN Web inventory management software.	Observations of inventory software made on September 2, 2021: <ul style="list-style-type: none"> • 254,681 L of all wastes (hazardous and non-hazardous) • 64,856 L of hazardous waste in containers (drums) • 15,340 L of bulk liquids
4.6.22	Containers other than 205 litre drums shall be prorated to 205 litre drum equivalents based on their nominal volumes, e.g., 10 X 20 litre pails= 1 X 205 litre drum.	X				WIN Web inventory management software.	Software automatically calculates drum equivalents.
4.6.23	The limits referred to in 4.6.20 and 4.6.21 shall be calculated based on the:				X	Not applicable.	Not applicable. Information only.
4.6.23 (a)	Total nominal volumes of all containers, treating all partially filled containers as if they were full.				X	Not applicable.	Not applicable. Information only.
4.6.23 (b)	Total filled capacities of all tanks.				X	Not applicable.	Not applicable. Information only.
Monitoring and Reporting							
4.6.24	The approval holder shall identify, characterize, and classify all waste streams and all hazardous recyclables, generated or received at the HWRSP Facility, not including runoff, industrial wastewater streams and air effluent streams in accordance with the:				X	Not applicable.	Not applicable. Information only.
4.6.24 (i)	Industrial Waste Identification and Management Options, Alberta Environment, May 1996, as amended.			X		Facility and Landfill Operations Report, Section B	The document is not referenced specifically in Landfill Operations Plan, although review of documentation indicates adherence to this standard. Recommended that this be included in the Operations Plan as a specific reference.
4.6.24 (ii)	Alberta User Guide for Waste Managers, Alberta Environment, August 1996, as amended.	X				Facility and Landfill Operations Report, Section B	Referenced in Landfill Operations Plan.
4.6.25	The approval holder shall measure or, when not feasible to measure, estimate, the quantity of each waste and hazardous recyclable identified in 4.6.24 each year.	X				Facility and Landfill Operations Report	Addressed in Appendix A of Operations Report.
4.6.26	The approval holder shall keep a daily total and inventory of all materials being stored at the HWRSP Facility.	X				<ul style="list-style-type: none"> • Field observations. • Various inventory logs (WIN Web). 	Observed documentation in the field.
4.6.27	The daily total and inventory records in 4.6.26 shall be available at the facility at all times for inspection by the Director or an inspector.	X				<ul style="list-style-type: none"> • Field observations. • Various inventory logs (WIN Web). 	Available at the time of the audit.
4.6.28	The approval holder shall submit a Monthly Waste Management Report to the Director.	X				<ul style="list-style-type: none"> • July 2021 Waste Inventory Report. • Discussion with site staff. 	Verbal confirmation that the monthly reports are submitted to AEP. Different documents for internal use and submission confirms submission.
4.6.29	The approval holder shall compile all of the information indicated in Table 4.6-B in the Monthly Waste Management Report which shall contain, at minimum, all of the following information:				X	Not applicable.	Not applicable. Information only.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OfI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.29 (a)	An opening waste and hazardous recyclables inventory balance in kilograms or litres by waste class or material type.			X		<ul style="list-style-type: none"> July 2021 Waste Inventory Report. Discussion with site staff. 	Compliance confirmed; included in report. The Facility is adhering to the information required in the Monthly Waste Management Report, viewed for July 2021. However the reports are currently referencing the 10348-02-00 Approval. Dillon would recommend that the referenced Approval be updated to 10348-03-00.
4.6.29 (b)	The amount and type of waste and hazardous recyclables received: - Within the province. - From outside of the province.			X			
4.6.29 (c)	The amount and type of waste and hazardous recyclables: - Shipped for recycling or product. - Shipped off-site for disposal. - Disposed on-site.			X			
4.6.29 (d)	Any adjustments, including but not limited to, consolidation, reclassification, losses to processing, spills, volume miscalculations, or any other circumstances, which would affect the mass balance of the monthly inventory report.			X			
4.6.29 (e)	Closing balance in kilograms or litres.			X			
4.6.29 (f)	A summary of contraventions reported pursuant to 2. 1. 1 related to waste and hazardous recyclables.	X				<ul style="list-style-type: none"> July 2021 Waste Inventory Report. Discussion with site staff. 	No contraventions identified in monthly report.
4.6.29 (g)	Any other information as required in writing by the Director.	X				<ul style="list-style-type: none"> July 2021 Waste Inventory Report. Discussion with site staff. 	No additional requirements by AEP.
4.6.30	The approval holder shall compile all the information required by 4.6.24 and 4.6.25 in an Annual Waste Management Summary Report:				X	Not applicable.	Not applicable. Information only.
4.6.30 (a)	As specified in Table 4.6-C.	X				2020 Annual Waste Management Summary - Table 4.6-D, Hazardous Waste Landfilled, included in the 2020 Annual Report.	In Appendix A of Operations Report.
4.6.30 (b)	In accordance with the: - Industrial Waste Identification and Management Options, Alberta Environment, May 1996, as amended. - Alberta User Guide for Waste Managers, Alberta Environment, August 1996, as amended.			X		2020 Annual Waste Management Summary - Table 4.6-D, Hazardous Waste Landfilled, included in the 2020 Annual Report.	The first document is not referenced specifically in Landfill Operations Plan, although review of documentation indicates adherence to this standard. Recommended that this be included in the Operations Plan as a specific reference.
4.6.31	The approval holder shall submit the Annual Waste Management Summary Report to the Director.	X				2020 Annual Waste Management Summary - Table 4.6-D, Hazardous Waste Landfilled, included in the 2020 Annual Report.	Submitted as part of the Annual Report for the Facility.
Landfill							
Operations Plan							
4.6.32	The approval holder shall develop, keep up-to-date, and implement a Landfill Operations Plan that does not contravene with the requirements of this approval.	X				Operations Plan.	Approval requirements are being examined in this checklist.
4.6.33	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.6.33 (a)	Review the Landfill Operations Plan annually, at a minimum.	X				Operations Plan.	Revision date on the 2021 Facility and Landfill Operations Plan is February, 2021.
4.6.33 (b)	Update the Landfill Operations Plan if any of the following circumstances apply: - There are facility expansions or changes in site operations or equipment. - There is an applicable change to the Standards for Landfills in Alberta, as amended. - An update is required in writing by the Director. - There is an update to an applicable regulation.	X				Operations Plan.	Updates to the operations plan reflect Cell 4 and Cell 3B changes.
4.6.34	The Landfill Operations Plan shall include, at a minimum, all of the following:				X	Not applicable.	Not applicable. Information only.
4.6.34 (a)	SOP for keeping and maintaining an Operating Record.	X				Operations Plan.	Addressed in section A of Operations Plan.
4.6.34 (b)	SOP for waste control, run-on and runoff controls, and nuisance controls.	X				Operations Plan.	Addressed in section B of Operations Plan.
4.6.34 (c)	SOP for the waste stabilization area operations.	X				Operations Plan.	Addressed in section C of Operations Plan.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.34 (d)	SOP for the acceptance, handling and disposal of wastes, including: - Waste characterization and classification at source. - Waste manifesting and tracking. - QA/QC waste acceptance procedures. - Waste sampling.	X				Operations Plan.	Addressed in Sections D of Operations Plan.
4.6.34 (e)	SOP for detecting, preventing and disposal of unauthorized wastes.	X				Operations Plan.	Addressed in Sections E of Operations Plan.
4.6.34 (f)	SOP for placing waste in a landfill cell including: - Working face width. - Lift depth. - Compaction. - Waste placement location using a grid system	X				Operations Plan.	Addressed in Sections F of Operations Plan.
4.6.34 (g)	SOP for managing contaminated sulphur and sulphur containing wastes.	X				Operations Plan.	Addressed in Sections G of Operations Plan.
4.6.34 (h)	SOP for managing asbestos wastes.	X				Operations Plan.	Addressed in Sections H of Operations Plan.
4.6.34 (i)	SOP for placing leachate, leak detection liquid, or other authorized wastes and liquids over the surface of the active landfill area for the purpose of evaporation or dust suppression.	X				Operations Plan.	Addressed in Sections I of Operations Plan.
4.6.34 (j)	An Odour and Fugitive Dust Response Program.	X				Operations Plan.	Addressed in Sections J of Operations Plan, referencing the Fugitive Dust and Odour Best Management Plan in Appendix C.
4.6.34 (k)	A Fugitive Dust and Odour Best Management Plan.	X				Operations Plan.	Addressed in Sections K of Operations Plan, referencing the Fugitive Dust and Odour Best Management Plan in Appendix C.
4.6.34 (l)	A runoff and industrial wastewater monitoring and management program.	X				Operations Plan.	Addressed in Sections L of Operations Plan.
4.6.34 (m)	A leachate monitoring and management program.	X				<ul style="list-style-type: none"> Operations Plan. SOPL002-003 Landfill Leachate System. 	Addressed in Sections M of Operations Plan.
4.6.34 (n)	A leak detection liquid monitoring and management program.	X				<ul style="list-style-type: none"> Operations Plan. SOPL002-003 Landfill Leachate System. 	Addressed in Sections M/N of Operations Plan.
4.6.34 (o)	A groundwater monitoring program.	X				Operations Plan.	Addressed in Sections O of Operations Plan.
4.6.34 (p)	A Remediation Plan to deal with groundwater quality deterioration.	X				Groundwater Remediation Plan.	Addressed in Sections P of Operations Plan.
4.6.34 (q)	A soil monitoring program.	X				Operations Plan.	Addressed in Sections Q of Operations Plan. Submitted in late 2019 and the first soil monitoring program report was submitted to AEP on January 31, 2020.
4.6.34 (r)	A soil management program.	X				Operations Plan.	Addressed in Sections R of Operations Plan. Confirmation of acceptance from AEP September 18, 2020.
4.6.34 (s)	A landfill cell cover system.	X				Operations Plan.	Addressed in Sections S of Operations Plan. Cell cover system is prepared by consultants and conforms to provincial regulations.
4.6.34 (t)	A monitoring and maintenance program for the scale house and heavy operational equipment.	X				<ul style="list-style-type: none"> Operations Plan. Maintenance Dashboard. Scale maintenance records 	Addressed in Sections T of Operations Plan. Scales calibrated twice per year, maintenance program in place.
4.6.34 (u)	A health and safety program.	X				Health and Safety Program.	Addressed in Sections U of Operations Plan. Health and Safety program in place, training records are kept accounted for, and notifications when training comes due. Employees sign-off on Health and Safety program.
4.6.34 (v)	An emergency response program, including SOP for handling fires, substance releases to the environment, and health concerns.	X				Contingency Plan in Appendix A of the Operations Plan.	Addressed in Sections V of Operations Plan, referencing the facility's Contingency Plan in Appendix A. A system exists to track each employees training and provides management with information such as: training expiring, which training each employee requires, etc.
4.6.34 (w)	An up-to-date plan of the landfill layout with survey records showing the location of all infrastructure components of the landfill including final cover elevations and contours.	X				Operations Plan.	Addressed in Section W of Operations Plan, referencing Appendix D.
4.6.35	The approval holder shall retain a copy of the most recent Landfill Operations Plan at the facility.	X				Operations Plan.	Hard copy of 2021 Operations Plan viewed
4.6.36	The approval holder shall submit to the Director the most recent Landfill Operations Plan when requested in writing by the Director within the timeline specified in writing by the Director.	X				Discussions with site staff.	Compliance confirmed; submitted annually.
4.6.37	The approval holder shall correct all deficiencies in the Landfill Operations Plan submitted pursuant to 4.6.36, as outlined in writing by the Director, within the timeline specified in writing by the Director.				X	Not applicable.	Not applicable. Information only.
4.6.38	The approval holder shall implement the latest Landfill Operations Plan, unless otherwise authorized in writing by the Director.	X				Operations Plan.	2021 Operations Plan observed.

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		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Operations							
4.6.39	The approval holder shall classify all materials entering the landfill in accordance with the:				X	Not applicable.	Not applicable. Information only.
4.6.39 (a)	Waste Control Regulation (AR 192196).	X				Operations Plan, Section B.	Referenced in Landfill Operations Plan.
4.6.39 (b)	Industrial Waste Identification and Management Options, Alberta Environment, May 1996, as amended.			X		Operations Plan.	The document is not referenced specifically in Landfill Operations Plan, although review of documentation indicates adherence to this standard. Recommended that this be included in the Operations Plan as a specific reference.
4.6.39 (c)	Alberta User Guide for Waste Managers, May 1995, as amended.	X				Operations Plan, Section B.	Referenced in Landfill Operations Plan.
4.6.40	The approval holder shall obtain a detailed representative physical and chemical analysis of a waste prior to disposal of the waste into the landfill at the following times, at a minimum:				X	Not applicable.	Not applicable. Information only.
4.6.40 (a)	The first time a waste is received from a new generator.	X				• Operations Plan, Sections B-D • Waste Profile from WIN Web viewed.	Compliance confirmed: • Procedures and acceptance criteria in the Landfill Operations Plan are compliant with Approval. • All waste profiles renewed annually, either by customers or Clean Harbors on-site.
4.6.40 (b)	The first time a delivery is received from a different process associated with a known waste generator.	X					
4.6.40 (c)	The first time a waste is received from a different location associated with a known waste generator.	X					
4.6.40 (d)	When the nature or composition of the waste that was previously characterized by the generator changes.	X					
4.6.41	The approval holder shall not dispose of hazardous waste in any Class II landfill cell.				X	Not applicable.	Not applicable. The site is not a Class II landfill.
4.6.42	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.6.42 (a)	Only carry out waste stabilization or solidification or both within the waste stabilization area.	X				Site field observations.	Solidification and waste stabilization activities consistent with Approval requirements during field observations.
4.6.42 (b)	Not transfer waste from the waste stabilization area to the Class I landfill cell before the waste stabilization or solidification or both have completed.	X					
4.6.43	The approval holder shall only dispose of any liquid collected within the waste stabilization area by one or more of the following methods:				X	Not applicable.	Not applicable. Information only.
4.6.43 (a)	To facilities holding a current Act authorization to accept such waste.				X	Not applicable.	Not applicable. This option not used by the facility.
4.6.43 (b)	To facilities approved by a local environmental authority outside of Alberta to accept such waste.				X	Not applicable.	Not applicable. This option not used by the facility.
4.6.43 (c)	To a disposal well approved by AER.or	X				AER approval for deep well.	• Liquid waste is hauled to Class I deep well in Calmar. • AER approval for deep well (leased from Seller's Oilfield Services to CH) observed. Approval No. WM 077 A, dated July 25, 2011.
4.6.43 (d)	As otherwise authorized in writing by the Director.				X	Not applicable.	Option not used by the Facility.
4.6.44	The approval holder shall conduct:				X	Not applicable.	Not applicable. Information only.
4.6.44 (a)	Annually, in-house visual inspections for corrosion.	X				Discussion with site staff.	Confirmed that annual visual inspections performed.
4.6.44 (b)	Biennially, ultrasonic testing to monitor thickness of the steel plate liner of the stabilization pits in the waste stabilization area, unless otherwise authorized in writing by the Director.	X				Inspection report from Integrity Testing Services Inc., dated August 2021.	Performed yearly, tracked by compliance calendar.
4.6.45	The approval holder shall dispose of asbestos wastes in accordance with "Guidelines for the Disposal of Asbestos Waste": Environmental Protection Services, Alberta Environment, 1989, as amended.	X				Operations Plan, Section H.	Referenced in Landfill Operations Plan.
4.6.46	The approval holder shall dispose of sulphur waste in accordance with "Guidelines for Landfill Disposal of Sulphur Wastes and Remediation of Sulphur Containing Soils", Alberta Environment, 2011, as amended.	X				Operations Plan, Section G.	Referenced in Landfill Operations Plan.
4.6.47	The approval holder shall only dispose of wastes that the landfill is not authorized to dispose of:				X	Not applicable.	Not applicable. Information only.
4.6.47 (a)	To facilities holding a current Act authorization.	X				Discussion with site staff.	Compliance confirmed. All waste receipts are screened at the site entry scale and any non-authorized loads, as determined through manifest, are rejected.
4.6.47 (b)	To facilities approved by a local environmental authority outside of Alberta. Or:	X					
4.6.47 (c)	As otherwise authorized in writing by the Director.	X					
4.6.48	If an unauthorized waste is received at the landfill, the approval holder shall remove the waste from the landfill within seven (7) days of the receipt, unless otherwise authorized in writing by the Director.				X	Not applicable.	Not applicable. Not observed during the audit. Non authorized waste not received in the landfill.
4.6.49	The approval holder shall restrict the working face of each landfill cell to the smallest practical area.				X		
4.6.50	For any waste disposed of at the landfill that is subject to wind dispersal, the approval holder shall:				X		
4.6.50 (a)	Wet the waste to prevent dispersal of particulate matter.or	X				Operations Plan, Appendix C (Fugitive Dust and Odour Best Management Plan).	Documents reviewed have procedures for managing dust and particulate matter through waste placement in landfill and in waste stabilization.
4.6.50 (b)	Immediately apply cover on top of the waste to minimize entrainment of particulate matter.	X					

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.51	Notwithstanding 4.6.1 (v), the approval holder may place any of the following wastes over the surface of the active landfill area for the purpose of dust suppression, provided that placement of such wastes will not cause offensive odours:	X				Discussion with site staff.	Compliance confirmed. Pond water for dust suppression. Leachate is never used due to odour.
4.6.51 (a)	Specified runoff.				X		
4.6.51 (b)	Leachate.				X		
4.6.51 (c)	Leak detection liquid.				X		
4.6.51 (d)	Sump waste of car wash bays or similar operations.				X	Not applicable.	Not applicable. Pond water is used for dust suppression only.
4.6.51 (e)	Waste from hydrovac excavation operations.				X		
4.6.51 (f)	Any other waste authorized by the Alberta User Guide for Waste Managers, May 1995, as amended.				X		
4.6.52	The approval holder shall inspect the landfill, at a minimum:				X	Not applicable.	Not applicable. Information only.
4.6.52 (a)	Weekly.	X					
4.6.52 (b)	Immediately after each storm event to: - Detect evidence of deterioration of any infrastructure components, including the composite liner. - Detect any malfunction or improper operation of the run-on and runoff control systems, leachate collection system, or leak detection system. - Take corrective measures to repair any damage to infrastructure components, including the composite liner.	X				<ul style="list-style-type: none"> Discussion with site staff. September 1, 2021 daily inspection record. 	Compliance confirmed through review of inspection record.
4.6.53	The approval holder shall do the following, the Director in writing along with any corrective measures taken or proposed:				X	Not applicable.	Not applicable. Information only.
4.6.53 (a)	Keep a record of inspections conducted pursuant to 4.6.52.	X					
4.6.53 (b)	Have the record of inspections available for review upon written request from the Director.	X				Landfill inspection records.	Compliance confirmed through review of electronic records.
4.6.53 (c)	Immediately report any deficiencies detected by the inspection in 4.6.52 to the Director in writing along with any corrective measures taken or proposed	X				Landfill inspection records.	Reported if there is a contravention. If not, a work ticket is created and the issue is fixed.
4.6.54	The approval holder shall not stockpile waste exceeding the maximum designated waste elevation of the landfill for a period of more than two (2) weeks, unless otherwise authorized in writing by the Director.	X				Site survey, dated January 4, 2021.	The site is surveyed twice per year, and no contours exceed the maximum designated waste elevation.
4.6.55	The approval holder shall take all practical measures to prevent off-site tracking of waste from vehicles and equipment leaving the facility.	X				Discussion with site staff.	Mud and waste tracking from the haul trucks is addressed as needed.
Monitoring and Reporting							
4.6.56	The approval holder shall monitor the landfill operations as required in Table 4.6-D.	X				2020 Annual Report.	All criteria in Table 4.6-D is included.
4.6.57	The approval holder shall report to the Director the results of the landfill operations monitoring as required in Table 4.6-D.	X				2020 Annual Report.	Submitted to AEP.
4.6.58	The Annual Landfill Operations Report required in Table 4.6-D shall include, at a minimum, all of the following:				X	Not applicable.	Not applicable. Information only.
4.6.58 (a)	the name and contact information of the person responsible for the facility.	X				2020 Annual Report.	Addressed in Section 2.0 of Annual Report.
4.6.58 (b)	A summary of all information collected as required in Table 4.6-D.	X				2020 Annual Report.	Addressed in Section 3.0 of Annual Report.
4.6.58 (c)	A summary of the results of any audit conducted in accordance with 4.1.7.	X				2020 Annual Report.	2018 Triennial Compliance Audit included in Appendix D of Annual Report.
4.6.58 (d)	A summary of the operations of the waste stabilization area.	X				2020 Annual Report.	Addressed in Section 5.0 and Appendix I of Annual Report.
4.6.58 (e)	A summary of the performance of the run-on and runoff control systems, including a comparison to the limits in Tables 4.3-8 and 4.3-C.	X				2020 Annual Report.	Addressed in Section 6.0 of Annual Report.
4.6.58 (f)	A summary of the performance of the leachate collection system, including a comparison to the maximum acceptable leachate head.	X				2020 Annual Report.	Addressed in Section 7.0 of Annual Report.
4.6.58 (g)	A summary of the performance of the leak detection system, including a comparison to the action leakage rate limit.	X				2020 Annual Report.	Addressed in Section 8.0 of Annual Report.
4.6.58 (h)	The Response Action Plan for the leak detection system pursuant to 4.4.1 O.	X				2020 Annual Report.	Addressed in Section 9.0 and Appendix J of Annual Report.
4.6.58 (i)	The Annual Dugout and Water Well Sampling Program Report pursuant to 4.5.4.	X				2020 Annual Report.	Addressed in Section 10.0 Appendix K of Annual Report.
4.6.58 (j)	A summary of all revisions to the Landfill Operations Plan pursuant to 4.6.33(b).	X				2020 Annual Report.	Addressed in Section 11.0 and Appendix L of Annual Report.
4.6.58 (k)	Any groundwater remedial action taken pursuant to 4.6.34(p).	X				2020 Annual Report.	Addressed in Section 12.0 of Annual Report.
4.6.58 (l)	A summary of records of landfill inspections pursuant to 4.6.53.	X				2020 Annual Report.	Addressed in Section 13.0 and Appendix M of Annual Report.
4.6.58 (m)	A summary of: - Operational issues encountered. - Emergencies occurred. - Measures or actions taken.	X				2020 Annual Report.	Addressed in Section 14.0 of Annual Report.
4.6.58 (n)	A summary of records of: - Public complaints. - The approval holder's responses	X				2020 Annual Report.	Addressed in Section 15.0 and Appendix Q of Annual Report.

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Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.6.58 (o)	An up-to-date financial security estimate pursuant to 5.1.2.	X				2020 Annual Report.	Addressed in Section 16.0 and Appendix N of Annual Report.
4.6.58 (p)	An updated site development plan showing the status of the landfill progression at the end of the operating year, including but not limited to: - Contour mapping. - The location of active and inactive disposal areas. - Areas where a final cover has been placed. - The location of new landfill cell(s) constructed.	X				2020 Annual Report.	Addressed in Section 17.0 and Appendix O of Annual Report.
4.6.58 (q)	The Annual Landfill Cell Closure Report pursuant to 7.1.7.	X				2020 Annual Report.	Addressed in Section 18.0 Appendix P of Annual Report.
4.6.58 (r)	A summary of contraventions reported pursuant to 2.1.1 related to landfill operations.	X				2020 Annual Report.	Addressed in Section 19.0 Appendix Q of Annual Report.
4.6.58 (s)	Any other information as required in writing by the Director.	X				2020 Annual Report.	Addressed in Section 20 of Annual Report. No additional information was required by the Director.
4.6.59	The approval holder shall submit the Annual Landfill Operations Report to the Director.	X				Discussion with site staff.	Confirmation of submission prior to deadline (March 24, 2021 for last items).
Operations							
4.7.1	The approval holder shall not release any substances from the domestic wastewater system to the surrounding watershed except as authorized by this approval.	X				Discussion with site staff.	Wastewater is directed to an isolated holding tank.
4.7.2	The approval holder shall direct all domestic wastewater to the domestic wastewater system.	X					
4.7.3	The approval holder shall only dispose of substances from the domestic wastewater system:				X	Not applicable.	Not applicable. Information only.
4.7.3 (a)	To facilities holding a current Act authorization.	X					
4.7.3 (b)	To facilities approved by a local environmental authority outside of Alberta or	X				Discussion with site staff.	Wastewater from holding tank taken across the street to authorized treatment lagoon (Contractor).
4.7.3 (c)	As otherwise authorized in writing by the Director.	X					
Not used at this time.							
Monitoring							
4.9.1	The approval holder shall continue to implement the existing Groundwater Monitoring Program as authorized in writing by the Director, unless and until otherwise authorized in writing by the Director pursuant to 4.9.4.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Groundwater reporting is being conducted in conformance with the Groundwater Monitoring Program.
4.9.2	The approval holder shall submit a revised Groundwater Monitoring Program to the Director on or before September 30, 2017, unless otherwise authorized in writing by the Director.	X				Discussion with site staff.	Submitted before the September 30th, 2017 deadline.
4.9.3	If the revised Groundwater Monitoring Program submitted pursuant to 4.9.2 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.	X				Discussion with site staff.	AEP did not identify any deficiencies with the program.
4.9.4	The approval holder shall implement the revised Groundwater Monitoring Program submitted pursuant to 4.9.2 as authorized in writing by the Director within the timeline specified in writing by the Director.	X				Discussion with site staff.	Implemented after submittal.
4.9.5	The approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.9.5 (a)	Collect a representative groundwater sample from each of the groundwater monitor wells specified in the Groundwater Monitoring Program, including the groundwater monitoring wells designated as points of compliance.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Compliance confirmed; all wells in monitoring program are sampled.
4.9.5 (b)	Analyze each sample for the parameters listed in Table 4.9-A.	X					Compliance confirmed; all parameters are sampled for.
4.9.6	The monitoring required in 4.9.5 shall be conducted at the following frequencies, unless otherwise authorized in writing by the Director:				X	Not applicable.	Not applicable. Information only.
4.9.6 (a)	A minimum of once per year during each of the active landfill life, landfill cell closure, final landfill closure, and post-closure periods.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Compliance confirmed; groundwater is monitored once per year.
4.9.6 (b)	A minimum of four times per year following detection of leachate constituents in groundwater at levels above those specified in 4.9.7, and until the levels specified in 4.9.7 have been met.	X				Discussion with site staff.	Compliance confirmed; no leachate constituents have ever been found.
4.9.7	The groundwater quality in the monitoring wells, designated as points of compliance in the Groundwater Monitoring Program, shall not exceed the higher of:				X	Not applicable.	Not applicable. Information only.

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
4.9.7 (a)	The objectives established in the water quality objectives in the Canadian Environmental Quality Guidelines (CEQG) for drinking water published by the Canadian Council of Ministers of the Environment (CCME), as amended.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Several exceedances noted in GW report, however these are due to the natural composition of the groundwater in the area.
4.9.7 (b)	Background groundwater chemistry as determined through a statistical analysis, as a derived alternate groundwater performance standard.	X					
4.9.8	The approval holder shall implement the Remediation Plan as specified in the Landfill Operations Plan, when groundwater quality exceeds the groundwater performance criteria in 4.9.7.				X		Remediation Plan has not been required to be implemented. Exceedances are normal for the groundwater in the area.
4.9.9	The samples extracted from the groundwater monitor wells shall be collected using scientifically acceptable purging, sampling and preservation procedures so that a representative groundwater sample is obtained.	X				2020 GW Monitoring Report, dated March 2, 2021 from Tetra Tech	Compliance confirmed; acceptable procedures are being followed.
4.9.10	The approval holder shall for all groundwater monitoring wells:				X	Not applicable.	Not applicable. Information only.
4.9.10 (a)	Protect from damage.	X				Field observations.	Compliance confirmed; all wells were observed to be protected and locked.
4.9.10 (b)	Keep locked except when being sampled.	X					
4.9.11	If a representative groundwater sample cannot be collected because the groundwater monitoring well is damaged or is no longer capable of producing a representative groundwater sample, the approval holder shall:				X	Not applicable.	Not applicable. Information only.
4.9.11 (a)	Clean, repair or replace the groundwater monitoring well.				X	Not applicable.	Not applicable. No damaged or non-functional wells.
4.9.11 (b)	Collect and analyse a representative groundwater sample prior to the next scheduled sampling event.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Compliance confirmed; groundwater monitoring consistent with schedule.
4.9.12	In addition to the sampling information recorded in 2.2.1, the approval holder shall record the following sampling information for all groundwater samples collected:				X	Not applicable.	Not applicable. Information only.
4.9.12 (a)	A description of purging and sampling procedures.	X				Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020.	Refer to Section 5.2.
4.9.12 (b)	The static elevations above sea level, and depth below ground surface of fluid phases in the groundwater monitoring well prior to purging.	X					Compliance confirmed; groundwater levels were recorded.
4.9.12 (c)	The temperature of each sample at the time of sampling.	X					Compliance confirmed; temperature was recorded at the time of sampling.
4.9.12 (d)	The pH of each sample at the time of sampling.	X					Compliance confirmed; pH was recorded at the time of sampling.
4.9.12 (e)	The specific conductance of each sample at the time of sampling.	X					Compliance confirmed; recorded as mS at the time of sampling.
4.9.13	The approval holder shall carry out remediation of the groundwater in accordance with the following:				X	Not applicable.	Not applicable. Information only.
4.9.13 (a)	Alberta Tier 1 Soil and Groundwater Remediation Guidelines, Alberta Environment, February 2009, as amended.				X		Not applicable. Groundwater remediation has not been deemed necessary.
4.9.13 (b)	Alberta Tier 2 Soil and Groundwater Remediation Guidelines, Alberta Environment, February 2009, as amended.				X		
Reporting							
4.9.14	The approval holder shall compile an Annual Groundwater Monitoring Program Report which shall include, at a minimum, all of the following information:				X	Not applicable.	Not applicable. Information only.

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details		
		Compliant	Non-Compliant	OFI	Info, N/A				
Part 4 - Operations, Limits, Monitoring, and Reporting									
4.9.14 (a)	A completed Record of Site Condition Form, Alberta Environment, 2009, as amended.	X							
4.9.14 (b)	A legal land description of the facility and a map illustrating the facility boundaries.	X							
4.9.14 (c)	A topographic map of the facility.	X							
4.9.14 (d)	A description of the industrial activity and processes.	X							
4.9.14 (e)	A map showing the location of all surface and groundwater users, and a listing describing surface water and water well use details, within at least a 1.6 kilometre radius of the facility.	X							
4.9.14 (f)	A general hydrogeological characterization of the region within a five kilometre radius of the facility.	X							
4.9.14 (g)	A detailed hydrogeological characterization of the facility, including an interpretation of groundwater flow patterns.	X							
4.9.14 (h)	Cross-sections showing depth to water table, patterns of groundwater movement and hydraulic gradients at the facility.	X							
4.9.14 (i)	Borehole logs and completion details for groundwater monitoring wells.	X							
4.9.14 (j)	A map showing locations of all known buried channels within at least five kilometre of the facility.	X				<ul style="list-style-type: none"> • Tetra Tech 2019 Groundwater Monitoring Program, dated March 10, 2020. • Tetra Tech 2020 Groundwater Monitoring Program, dated March 2, 2020. 	Compliance confirmed through a review of the report. Submission to AEP confirmed through review of correspondence.		
4.9.14 (k)	A map of surface drainage within the facility and surrounding area to include nearby water bodies.	X							
4.9.14 (l)	A map of groundwater monitoring well locations and a table summarizing the existing groundwater monitoring program for the facility.	X							
4.9.14 (m)	A summary of any changes to the groundwater monitoring program made since the last groundwater monitoring report.	X							
4.9.14 (n)	Analytical data recorded as required in 4.9.5 and 4.9.11(b).	X							
4.9.14 (o)	A summary of fluid elevations recorded as required in 4.9.12(b) and an interpretation of changes in fluid elevations.	X							
4.9.14 (p)	An interpretation of QA/QC program results.	X							
4.9.14 (q)	An interpretation of all the data in this report, including the following: - Diagrams indicating the location and extent of any contamination. - A description of probable sources of contamination. - A site map showing the location and type of current and historical potential sources of groundwater contamination	X							
4.9.14 (v)	Recommendations for: - Changes to the groundwater monitoring program to make it more effective. - Remediation, risk assessment or risk management of contamination identified.	X							
4.9.15	The approval holder shall submit the Annual Groundwater Monitoring Program Report to the Director.	X							
4.9.16	If the Annual Groundwater Monitoring Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, within the timeline specified in writing by the Director.				X			Not applicable.	Not applicable. AEP did not identify any deficiencies.
4.10.1	In addition to any other requirements specified in this approval, the approval holder shall conduct all of the following activities related to soil monitoring and soil management required by this approval in accordance with the Soil Monitoring Directive, Alberta Environment, 2009, as amended:	X						Tetra Tech 2017 Soil Management Program Proposal, including Soil Monitoring Program.	Compliance confirmed: • March 21, 2017 - Soil Management Program Proposal (incl. monitoring program submitted to AEP). • September 11, 2017 - Supplemental Information to Soil Management Program Proposal (revisions), submitted to AEP. • September 13, 2017 - Approval letter from AEP regarding Soil Management Program Proposal.
4.10.1 (a)	Designing and developing proposals for the Soil Monitoring Program.	X							
4.10.1 (b)	Designing and developing proposals for the Soil Management Program.	X							
4.10.1 (c)	All other actions, including sampling, analysing, and reporting, associated with the Soil Monitoring Program.	X				Tetra Tech 2019 Soil Monitoring Program Report, dated January 31, 2020.	Actions in program reflect the 2019 Soil Monitoring Program Proposal and Deficiency Response Letter.		
4.10.1 (d)	All other actions, including sampling, analysing and reporting, associated with the Soil Management Program.	X				Tetra Tech 2019 Soil Monitoring Program Report, dated January 31, 2020.	Actions in program reflect the 2019 Soil Monitoring Program Proposal and Deficiency Response Letter.		

Section 4 - Operations

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 4 - Operations, Limits, Monitoring, and Reporting							
Soil Monitoring and Reporting							
4.10.2	The approval holder shall submit the Soil Monitoring Program proposal to the Director according to the following schedule: - For the first soil monitoring event on or before January 31, 2019. - For the second soil monitoring event on or before January 31, 2024.	X				Tetra Tech 2017 Soil Management Program Proposal, including Soil Monitoring Program.	Compliance confirmed: • March 21, 2017 - Soil Management Program Proposal (incl. monitoring program submitted to AEP). • September 11, 2017 - Supplemental Information to Soil Management Program Proposal (revisions), submitted to AEP. • September 13, 2017 - Approval letter from AEP regarding Soil Management Program Proposal.
4.10.3	If any Soil Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.	X					
4.10.4	Subject to 4.10.3, the approval holder shall implement the Soil Monitoring Program as authorized in writing by the Director.	X				Tetra Tech 2019 Soil Monitoring Program.	Confirmed that this was completed in Fall 2019.
4.10.5	If an authorization or a deficiency letter is not issued within 120 days of the applicable date required by 4.10.2, the approval holder shall implement the Soil Monitoring Program in accordance with the program as set out in the proposal submitted by the approval holder and within 270 days after the applicable date required by 4.10.2	X				Tetra Tech 2019 Soil Monitoring Program.	Confirmed that this was completed in Fall 2019.
4.10.6	The approval holder shall submit to the Director each Soil Monitoring Program Report obtained from the soil monitoring referred to in 4.10.4 and 4.10.5 according to the following schedule:	X				Tetra Tech 2019 Soil Monitoring Program.	Confirmed that this was completed in Fall 2019.
4.10.6 (a)	For the first Soil Monitoring Program Report on or before January 31, 2020.	X				Tetra Tech 2019 Soil Monitoring Program Report, dated January 31, 2020.	Submit to the AEP on time, January 31, 2020
4.10.6 (b)	For the second Soil Monitoring Program Report on or before January 31, 2025.				X	Not applicable.	Not applicable. To be completed in the summer of 2024.
4.10.7	If any Soil Monitoring Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.	X				Tetra Tech 2019 Soil Monitoring Program Report, dated January 31, 2020.	Actions in program reflect the 2019 Soil Monitoring Program Proposal and Deficiency Response Letter.
Soil Management Program							
4.10.8	If the Soil Monitoring Program, or any other soil monitoring, reveals that there are substances present in the soil at concentrations greater than any of the applicable concentrations set out in the standards in the Soil Monitoring Directive, Alberta Environment, 2009, as amended, the approval holder shall develop a Soil Management Program Proposal.	X				• Tetra Tech 2017 Soil Management Program Proposal, including Soil Monitoring Program. • Tetra Tech Soil Management Program 2017 Cell 4 Soil Sampling, dated March 12, 2018.	Soil Management Program Proposal was developed and compliance was confirmed through a review.
4.10.9	If a Soil Management Program Proposal is required pursuant to 4.10.8, the approval holder shall submit a Soil Management Program Proposal to the Director according to the following schedule:				X	Not applicable.	Not applicable. Information only
4.10.9 (a)	For Soil Management Program Proposal that is triggered by the findings from the first soil monitoring event on or before the date in 4.10.6(a).	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.9 (b)	For Soil Management Program Proposal that is triggered by the findings from a second soil monitoring event on or before the date in 4.10.6(b).	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.9 (c)	For any other soil monitoring event not specified in this approval within six months of completion of the soil monitoring event.				X	Not applicable.	Not applicable. Information only
4.10.10	If any Soil Management Program Proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.11	The approval holder shall implement the Soil Management Program as authorized in writing by the Director.	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.12	If the approval holder is required to implement a Soil Management Program pursuant to 4.10.11, the approval holder shall submit a written Soil Management Program Report to the Director on or before March 31 of each year following the year in which the information was collected.	X				Soil Management Program - 2017 Cell 4 Soil Sampling	Updated Soil Management Plan and recommendations are being followed by consultant.
4.10.13	If any Soil Management Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified by the Director by the date specified in writing by the Director.				X	Not applicable.	Not applicable. No deficiencies identified by the Director.

Section 6 - Decommissioning

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFl	Info, N/A		
Part 6 - Decommissioning and Land Reclamation							
6.1.1	The approval holder shall apply for an amendment to this approval to reclaim the HWRSP Facility by submitting to the Director: - A Decommissioning Plan. - A Land Reclamation Plan.				X	Not applicable.	Not applicable. Facility is still operational and expanding.
6.1.2	The approval holder shall submit the Decommissioning Plan and Land Reclamation Plan referred to in 6.1.1 within six (6) months of the HWRSP Facility ceasing operation, except for repairs and maintenance, unless otherwise authorized in writing by the Director.				X		
6.2.1	The Decommissioning Plan referred to in 6.1.1 shall include, at a minimum, all of the following:				X	Not applicable.	Not applicable. Facility is still operational and expanding.
6.2.1 (a)	A plan for dismantling the HWRSP Facility.				X		
6.2.1 (b)	A comprehensive study to determine the nature, degree and extent of contamination at the HWRSP Facility and affected lands.				X		
6.2.1 (c)	A plan to manage all wastes at the HWRSP Facility.				X		
6.2.1 (d)	Evaluation of remediation technologies proposed to be used at the HWRSP Facility and affected lands.				X		
6.2.1 (e)	A plan for decontamination of the HWRSP Facility and affected lands in accordance with the following: - For soil or groundwater, Alberta Tier 1 Soil and Groundwater Remediation Guidelines, Alberta Environment, February 2009, as amended. - For soil or groundwater, Alberta Tier 2 Soil and Groundwater Remediation Guidelines, Alberta Environment, February 2009, as amended. - For drinking water, Canadian Environmental Quality Guidelines, Canadian Council of Ministers of the Environment, PN 1299, 1999, as amended. - For surface water, Surface Water Quality Guidelines for Use in Alberta, Alberta Environment, November 1999, as amended.				X		
6.2.1 (f)	Confirmatory testing to indicate compliance with the remediation objectives.				X		
6.2.1 (g)	A plan for maintaining and operating contaminant monitoring systems.				X		
6.2.1 (h)	A schedule for activities (a) through (g) above.				X		
6.2.1 (i)	Any other information as required in writing by the Director.				X		
6.2.2	If the Decommissioning Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.				X		

Section 6 - Decommissioning

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFl	Info, N/A		
6.3.1	The Land Reclamation Plan referred to in 6.1.1 shall include, at a minimum, all of the following:				X	Not applicable.	Not applicable. Facility is still operational and expanding.
6.3.1 (a)	The final use of the reclaimed area and how equivalent land capability will be achieved.				X		
6.3.1 (b)	Removal of infrastructure.				X		
6.3.1 (c)	Restoration of drainage.				X		
6.3.1 (d)	Soil replacement.				X		
6.3.1 (e)	Erosion control.				X		
6.3.1 (f)	Revegetation and conditioning of the HWRSP Facility including: - Species list, seed source and quality, seeding rates and methods. - Fertilization rates and methods. - Reclamation schedule.				X		
6.3.1 (g)	Reclamation schedule.				X		
6.3.1 (h)	Any other information as required in writing by the Director.				X		
6.3.2	If the Land Reclamation Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.				X		

Section 7 - Final Closure

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	O/I	Info. N/A		
Part 7 - Final Landfill Closure and Post-Closure							
7.1.1	The approval holder shall submit a Landfill Cell Closure Plan for individual landfill cell closure to the Director on or before September 30, 2017, unless otherwise authorized in writing by the Director.			X		Construction and record drawing packages for Cell 3B.	Based on further discussion with Clean Harbors, the Landfill Cell Closure Plan is formed by the stamped design work completed as part of the issued for construction and final record drawing packages and associated documents, and as such, we have considered this matter closed. Further monitoring of this requirement is recommended for future landfill cell closure activities.
7.1.2	The Landfill Cell Closure Plan submitted pursuant to 7.1.1 shall be signed and stamped by a professional registered with APEGA.			X			
7.1.3	If the Landfill Cell Closure Plan submitted pursuant to 7.1.1 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.				X	Not applicable.	Not applicable. Information only.
7.1.4	The approval holder shall implement the Landfill Cell Closure Plan submitted pursuant to 7.1.1 as authorized in writing by the Director.				X	Not applicable.	Not applicable. Information only.
7.1.5	The approval holder shall maintain the closed landfill cells to:				X	Not applicable.	Not applicable. Information only.
7.1.5 (a)	Protect and maintain the integrity of the final cover and surface water drainage systems.	X				Field observations.	<ul style="list-style-type: none"> • Surface run-off goes to perimeter ditch system. • Vegetated final caps. • Sloping and drainage per approved designs. • Leachate collection system and storage tanks. • No subsidence or settlement observed. Monitoring consistent with Operations Plan.
7.1.5 (b)	Prevent erosion.	X					
7.1.5 (c)	Prevent surface water ponding.	X					
7.1.5 (d)	Remediate areas affected by subsidence and differential settlement.	X					
7.1.5 (e)	Prevent leachate break out.	X					
7.1.6	If the approval holder completes landfill cell closure in a year, the approval holder shall prepare an Annual Landfill Cell Closure Report, and include, at a minimum, all of the following information in the Report:				X	Not applicable.	Not applicable. Information only.
7.1.6 (a)	As-built plans and details on the location of landfill cells that have been closed.	X				Annual Landfill Cell Closure Report - Cell 3B, report from Dillon Consulting dated March 2, 2021.	Confirmed that the Closure Report was submitted in the 2020 Annual Report.
7.1.6 (b)	Certified construction QA/QC procedures employed during cover construction and installation.	X					
7.1.6 (c)	Survey reports showing the final cover depths.	X					
7.1.7	The approval holder shall submit the Annual Landfill Cell Closure Report with the Annual Landfill Operations Report required in 4.6.58.	X					

Section 7 - Final Closure

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFl	Info. N/A		
7.2.1	The approval holder shall apply for an amendment to this approval for final landfill closure by submitting to the Director: - A Detailed Final Landfill Closure Plan. - A Landfill Post-Closure Plan.				X	Not applicable.	The landfill is still operational and expanding. Landfill Closure Plan and Post-Closure Plan is to be submitted 180 days prior to implementation.
7.2.2	The approval holder shall submit the Detailed Final Closure Plan and Landfill Post-Closure Plan referred to in 7.2.1 within six (6) months of the landfill ceasing operations, unless otherwise authorized in writing by the Director.				X	Not applicable.	The landfill is still operational and expanding.
Detailed Final Closure Plan							
7.2.3	The Detailed Final Landfill Closure Plan shall be developed in accordance with sections 6.1 (b) and 6.1 (c) of the Standards for Landfills in Alberta, as amended.				X	Not applicable.	The landfill is still operational and expanding.
7.2.4	In addition to 7.2.3, the Detailed Final Landfill Closure Plan shall include, at a minimum, all of the following:				X	Not applicable.	The landfill is still operational and expanding.
7.2.4 (a)	A plan for replacement of soil.				X	Not applicable.	The landfill is still operational and expanding.
7.2.4 (b)	A QA/QC Program.				X	Not applicable.	The landfill is still operational and expanding.
7.2.4 (c)	Any deviations from the most recently submitted closure plan.				X	Not applicable.	The landfill is still operational and expanding.
7.2.5	The Detailed Final Landfill Closure Plan shall be signed and stamped by a professional registered with APEGA.				X	Not applicable.	The landfill is still operational and expanding.
7.2.6	If the Detailed Final Landfill Closure Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.				X	Not applicable.	The landfill is still operational and expanding.
7.2.7	The approval holder shall implement the Detailed Final Landfill Closure Plan as authorized in writing by the Director.				X	Not applicable.	The landfill is still operational and expanding.
Landfill Post-Closure Plan							
7.2.8	The Landfill Post-Closure Plan shall be developed in accordance with sections 6.2 and 6.3 of the Standards for Landfills in Alberta, as amended.				X	Not applicable.	The landfill is still operational and expanding.
7.2.9	In addition to 7.2.8, the Landfill Post-Closure Plan shall include, at a minimum, all of the following:				X	Not applicable.	The landfill is still operational and expanding.
7.2.9 (a)	The groundwater monitoring program including performance standards and points of compliance.				X	Not applicable.	The landfill is still operational and expanding.
7.2.9 (b)	The subsurface landfill gas monitoring program and performance standards at points of compliance.				X	Not applicable.	The landfill is still operational and expanding.
7.2.9 (c)	A plan for erosion control.				X	Not applicable.	The landfill is still operational and expanding.
7.2.9 (d)	A plan for maintaining vegetative cover.				X	Not applicable.	The landfill is still operational and expanding.
7.2.9 (e)	Any other information requested in writing by the Director.				X	Not applicable.	The landfill is still operational and expanding.

Section 7 - Final Closure

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	O/I	Info, N/A		
7.2.10	The Landfill Post-Closure Plan shall be signed and stamped by a professional registered with APEGA.				X	Not applicable.	The landfill is still operational and expanding.
7.2.11	If the Landfill Post-Closure Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.				X	Not applicable.	The landfill is still operational and expanding.
7.2.12	The approval holder shall implement the Landfill Post-Closure Plan as authorized in writing by the Director.				X	Not applicable.	The landfill is still operational and expanding.

Section 8 - SWM Pond Closure

Approval Line Item	Action	Finding				Documents Reviewed	Details
		Compliant	Non-Compliant	OFI	Info, N/A		
Part 8 - Decommissioning and Land Reclamation of Old Surface Water Detention Pond							
8.1.1	The approval holder shall decommission and reclaim the old surface water detention pond prior to construction of Cell 4.	X				<ul style="list-style-type: none"> Soil Management Program - 2017 Cell 4 Soil Sampling, report dated March 12, 2018 from Tetra Tech. 	Confirmed that this was done concurrent with earthworks for Cell 4 construction.
8.1.2	The approval holder shall submit a Decommissioning and Land Reclamation Plan for the old surface water detention pond to the Director a minimum of six (6) months prior to decommissioning and land reclamation of the pond.	X				<ul style="list-style-type: none"> Soil Management Program - 2018 Cell 4 Remediation Report, May 31, 2019 from Tetra Tech. 	<ul style="list-style-type: none"> Soil Management Program (2017 Cell 4 Soil Sampling) submitted to AEP Industrial Reporting email address on March 23, 2018. Soil Management Program (2018 Cell 4 Remediation Report) submitted June 11, 2019. Report details pond draining and soil sampling following remediation to meet guidelines and approval.
8.1.3	If the Decommissioning and Land Reclamation Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.	X				Not applicable.	AEP did not comment on any deficiencies.

APPENDIX I
Stabilization Facility

TANK INTERNAL INSPECTION REPORT

Customer:	Clean Harbors	ITS Job No.:	1-5050
District:	Central	Date:	22-Aug-2023
Facility:	Ryley Facility	LSD:	04-09-050-17W4M
Tank Description:	South Sludge Pit	Serial No.:	Not Stated
Equip./OIP No.:	Not Stated		

Remedial Action	Access and Coverage	Internal Coating	Heating Coil
<input type="checkbox"/> Adequate Cleaning	<input checked="" type="checkbox"/> Internal Inspection	<input checked="" type="checkbox"/> Not Applicable	<input checked="" type="checkbox"/> Not Applicable
<input type="checkbox"/> No Action Required	<input type="checkbox"/> Part. Internal Inspection	<input type="checkbox"/> Good Condition	<input type="checkbox"/> Good Condition
<input type="checkbox"/> Paint/Coating Repairs	NDE Examination	<input type="checkbox"/> Coated <input type="checkbox"/> Full <input type="checkbox"/> Partial	<input type="checkbox"/> Corrosion
<input type="checkbox"/> Further Assessment Required	<input checked="" type="checkbox"/> UT	<input type="checkbox"/> Holidays/Cracking	<input type="checkbox"/> Pitting: <small>(max depth)</small>
	<input type="checkbox"/> MT	<input type="checkbox"/> Blisters/Bulges	<input type="checkbox"/> Cracked
<input type="checkbox"/> Condition Damage	<input type="checkbox"/> PT	<input type="checkbox"/> Flaking	<input type="checkbox"/> Scaled
<input type="checkbox"/> Does not comply with applicable code/safe operating requirement.	<input type="checkbox"/> RT	<input type="checkbox"/> See Comments	<input type="checkbox"/> Worn
	<input type="checkbox"/> BH	Internal Supports	<input type="checkbox"/> Loose
<input type="checkbox"/> Repairs Required	<input type="checkbox"/> MFL	<input checked="" type="checkbox"/> Not Applicable	<input type="checkbox"/> Poor Installation
	<input type="checkbox"/> Other	<input type="checkbox"/> Good Condition	<input type="checkbox"/> See Comments
<input checked="" type="checkbox"/> See Comments	<input type="checkbox"/> Double Walled	<input type="checkbox"/> Distorted	Bolted Tanks
Manway	<input type="checkbox"/> See Comments	<input type="checkbox"/> Cracked	<input checked="" type="checkbox"/> Not Applicable
<input checked="" type="checkbox"/> Not Applicable	Internal Components	<input type="checkbox"/> Broken	<input type="checkbox"/> Good Condition
<input type="checkbox"/> Good Condition	<input type="checkbox"/> Anodes Present	<input type="checkbox"/> Poor Installation	<input type="checkbox"/> Missing Bolts
<input type="checkbox"/> Coating Damage	<input type="checkbox"/> Level Gauge Float in Good Condition	<input type="checkbox"/> Bolts Missing/ Loose/ Damage	<input type="checkbox"/> Gasket in Good Condition
<input type="checkbox"/> Internal Corrosion	<input type="checkbox"/> Level Gauge Float or Lower Support Attachment Damaged	<input type="checkbox"/> See Comments	<input type="checkbox"/> Gasket Damaged
<input type="checkbox"/> Mechanical Damage			<input type="checkbox"/> Seepage at Seams
<input type="checkbox"/> Seal Face Corrosion			<input type="checkbox"/> Leakage at Seams
<input type="checkbox"/> Pitting: <small>(max depth)</small>	<input type="checkbox"/> Level Gauge Float Wires Damaged		<input type="checkbox"/> See Comments
<input type="checkbox"/> See Comments	<input checked="" type="checkbox"/> See Comments		

Shell Internal	Floor (Internal)	Nozzle Internal	Firetube(s)
<input checked="" type="checkbox"/> Good Condition	<input checked="" type="checkbox"/> Good Condition	<input type="checkbox"/> RF <input type="checkbox"/> NPT	<input checked="" type="checkbox"/> Not Applicable
<input type="checkbox"/> Internal Corrosion	<input type="checkbox"/> Internal Corrosion	<input type="checkbox"/> Good Condition	<input type="checkbox"/> Good Condition
<input type="checkbox"/> Pitting: <small>(max depth)</small>	<input type="checkbox"/> Pitting: <small>(max depth)</small>	<input type="checkbox"/> Nozzles are Gusseted	<input type="checkbox"/> Corrosion
<input type="checkbox"/> Scale	<input type="checkbox"/> Scale	<input type="checkbox"/> Nozzles Plugged	<input type="checkbox"/> Pitting: <small>(max depth)</small>
<input type="checkbox"/> Blistered	<input type="checkbox"/> Blistered	<input type="checkbox"/> Internal Corrosion	<input type="checkbox"/> Wear/Erosion
<input checked="" type="checkbox"/> Mechanical Damage	<input checked="" type="checkbox"/> Mechanical Damage	<input type="checkbox"/> Damaged/Cracked	<input type="checkbox"/> Cracked
<input type="checkbox"/> Deformation/Distortion	<input type="checkbox"/> Deformation/Distortion	<input type="checkbox"/> Deflection/Distortion	<input type="checkbox"/> Scaled
<input type="checkbox"/> Weld(s) in Good Condition	<input type="checkbox"/> Weld(s) in Good Condition	<input type="checkbox"/> Partial Internal Inspection	<input type="checkbox"/> Coated
<input type="checkbox"/> Weld(s) Corroded	<input type="checkbox"/> Weld(s) Corroded	<input type="checkbox"/> Weld(s) in Good Condition	<input type="checkbox"/> Heat Impinged
<input type="checkbox"/> Weld(s) Poor Quality	<input type="checkbox"/> Weld(s) Poor Quality	<input type="checkbox"/> Weld(s) Corroded	<input type="checkbox"/> Burner Misalignment
<input type="checkbox"/> Weld(s) Cracked	<input type="checkbox"/> Weld(s) Cracked	<input type="checkbox"/> Weld(s) Poor Quality	<input type="checkbox"/> Damaged Supports
<input type="checkbox"/> Previous Repairs	<input type="checkbox"/> Previous Repairs	<input type="checkbox"/> Weld(s) Cracked	<input type="checkbox"/> Damaged Guides/Tracks
<input checked="" type="checkbox"/> See Comments	<input checked="" type="checkbox"/> See Comments	<input checked="" type="checkbox"/> See Comments	<input type="checkbox"/> See Comments

Observations:

Tank is in **Good**, **Fair**, **Poor** Condition

Good: No concerns found (may still have recommendations)
Fair: Minor issues found that do not impair the "fitness for service" of the Tank, (internal coating deterioration, general internal surface corrosion - no measurable metal loss, etc.)
Poor: Equipment had moderate to major concerns found (Tank is damaged; moderate to severe corrosion noted, cracked or broken component(s), etc.)

Based on API 653 Visual Internal Inspection this Tank is fit for service
(This piece of equipment meets the Jurisdictional requirements based on the information available at the time of the inspection.)

Summary: Overall, this open-top sludge tank was found in good condition with no immediate items of concern that would require corrective action. Furthermore, it should be noted that in comparison to the previous visual and NDE data there has been no further deterioration and/or propagation of damage. Lastly, it should be noted that there was limited access to the North and South shell walls due to product build up.

Product side (topside): Overall, the associated shell and floor were found in good condition with no evidence of distortion, buckling, etc. The associated floor-to-shell joint and shell long seams were found in good condition, with no evidence of preferential weld corrosion, pitting, fabrication defects etc. As seen in previous years minor evidence of widely scattered mechanical damage was noted throughout the tank floor and shell with approximate depths of 0.070Inch to 0.100Inch. Overall, the mechanical damages profile has smooth edges (no-stress-risers) and no evidence of under-deposit / crevice corrosion. It is likely this mechanical damage was induced during the original fabrication process and/or during subsequent transportation / cleaning processes. Overall, no items of concern.

Soil side (bottom-side) - At the time of inspection an Ultrasonic thickness survey was performed on the floor, which revealed evidence of minor soil side corrosion/pitting, which was found to be consistent with the previous Ultrasonic thickness survey. See the associated UT data report for the remaining wall thickness, corrosion rates, etc. Overall, no items of concern.

Recommendations:

- 1) Recommend continuing to monitor on a 12-month maximum inspection interval.
- 2) For future reference, when installing these underground sludge tanks recommend the client installs, a secondary containment, external liner/barrier, suitably designed cathodic protection system etc. to help prevent soil-side corrosion and extend the service life.

Non-Conformance Conditions and Corrective Actions:

Note: Reference any and all Non-Conformance Report (NCR) numbers and Corrective Action Report (CAR) numbers.

- None.

Recommended Inspection Interval:

Recommended Maximum Inspection Interval: 12 Months

Pictures:



(Photo 1) Overview Facing North



(Photo 2) Overview Facing South



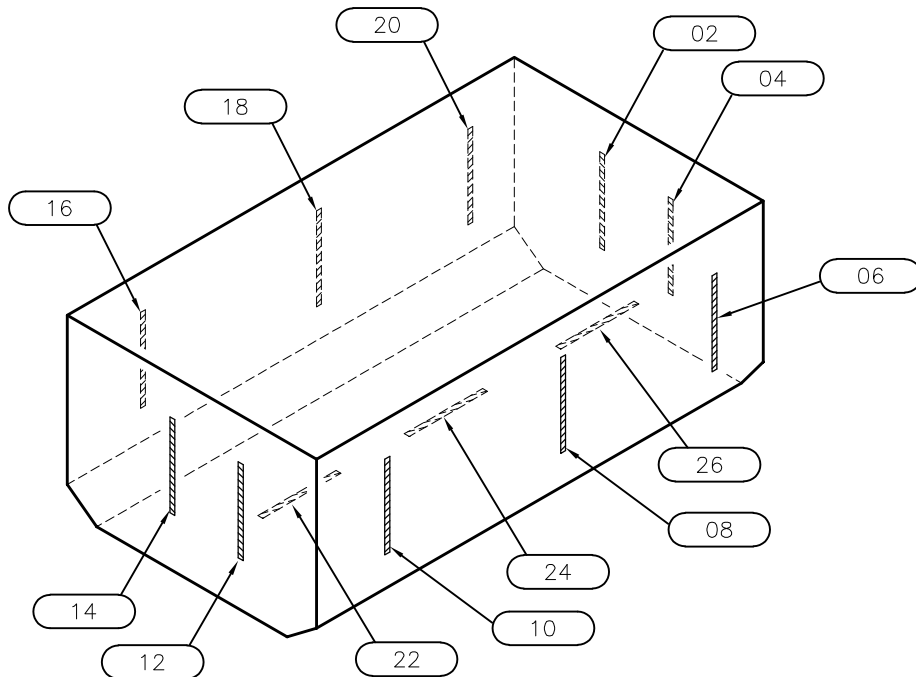
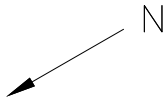
(Photo 3) Overview



(Photo 4) Overview 2

Internal Inspection Performed By:	ABSA IPV PESL: 000731
Print Name: _____	API 510: 94980
Justice Hryniw	API 570: 99735
Signature: _____	API 653: 104668
<i>Justice Hryniw</i>	Report Reviewed: _____
	Initial <i>J.E.</i>

Chief Inspector / Client Representative: _____	_____	_____
Name (Print)	Signature	Date:



Column Cooler Exchanger Furnace Heater Plate Exchanger Reboiler Vessel Other

Client:, District:, LSD:, Etc.:

Description:		SOUTH SLUDGE PIT			
P.R.N. No.:	N/S	Size:	24' X 14' X 8'		
Equipment No.	N/S	N.B. No.:	N/S		
Serial No.:	N/S				
HEAD Material:	N/S	Nominal:	N/S	C.A.:	N/S
HEAD Material:		Nominal:			
SHELL Material:	N/S	Nominal:	N/S	C.A.:	N/S
SHELL Material:		Nominal:			
MAWP S.Side @TEMP:	N/S	MAWP T.Side @TEMP:			

CLEAN HARBORS
RYLEY FACILITY

LSD 04-09-050-17W4M

Comments: NO NAMEPLATE.

Tech.: DWG Date: 2023/08

ITS Job No.: 1-5050 DWG No.: 006

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	South Sludge Pit		

EQUIPMENT INSPECTION SUMMARY:

NO DATA PLATE
2020/08 - ALL READINGS CONFIRMED.

Description: SOUTH WALL T-B

CML: 006-02

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **24.80 mm**
AVERAGE THICKNESS MEASURED: 25.01 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	25.50	24.90	24.90	25.20	25.20	25.20	25.20	0.0000	0.0232	100.00
2	25.48	25.00	25.00	25.30	25.30	25.20	25.10	0.0981	0.0294	100.00
3	25.48	25.00	25.00	25.10	25.10	25.20	25.20	0.0000	0.0217	100.00
4	25.27	25.10	25.10	25.10	25.10	25.10	25.10	0.0000	0.0132	100.00
5	25.68	24.90	24.90	24.70	25.00	25.10	25.00	0.0981	0.0527	100.00
6	25.40	24.10	24.10	24.80	24.90	25.00	24.80	0.1962	0.0465	100.00
7	25.83	25.00	25.00	25.00	25.00	25.00	24.90	0.0981	0.0721	100.00
8	25.55	25.00	25.00	24.90	24.90	25.00	24.80	0.1962	0.0581	100.00

Description: SOUTH WALL T-B

CML: 006-04

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **24.80 mm**
AVERAGE THICKNESS MEASURED: 24.89 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	25.50	24.80	24.80	25.00	25.00	25.00	24.80	0.1962	0.0542	100.00
2	25.76	24.70	24.70	25.00	25.00	25.00	24.80	0.1962	0.0744	100.00
3	25.48	24.90	24.80	25.00	25.00	25.00	24.90	0.0981	0.0449	100.00
4	25.58	24.50	24.50	25.00	24.90	25.00	24.80	0.1962	0.0604	100.00
5	25.50	24.50	24.50	25.00	25.00	25.00	24.90	0.0981	0.0465	100.00
6	25.71	24.50	24.50	25.00	25.00	25.00	25.00	0.0000	0.0550	100.00
7	25.68	24.10	24.10	25.00	24.80	25.00	25.00	0.0000	0.0527	100.00
8	25.68	24.10	24.10	25.00	24.80	25.00	24.90	0.0981	0.0604	100.00

Minimum Thickness is calculated.

Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

BLUE (Caution TML Point) - if Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	South Sludge Pit		

Description: WEST WALL T-B

CML: 006-06

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **24.60 mm**
AVERAGE THICKNESS MEASURED: 24.76 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY								Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23				
1	25.50	25.00	25.00	25.00	25.80	25.00	24.90		0.0981	0.0465	100.00
2	25.65	24.90	24.90	24.80	24.80	24.80	24.80		0.0000	0.0659	100.00
3	25.40	24.90	24.90	24.90	24.90	24.80	24.80		0.0000	0.0465	100.00
4	25.50	24.90	25.00	25.00	25.00	24.90	24.90		0.0000	0.0465	100.00
5	25.40	24.50	24.50	24.50	24.60	24.70	24.60		0.0981	0.0620	100.00
6	25.27	25.00	24.90	24.80	24.70	24.70	24.60		0.0981	0.0519	100.00
7	25.48	25.00	24.70	24.70	24.80	24.80	24.70		0.0981	0.0604	100.00
8	25.88	25.00	25.00	24.70	24.80	24.90	24.80		0.0981	0.0837	100.00

Description: WEST WALL T-B

CML: 006-08

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **24.60 mm**
AVERAGE THICKNESS MEASURED: 24.79 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY								Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23				
1	25.86	24.70	24.70	24.60	24.60	24.60	24.60		0.0000	0.0976	100.00
2	25.48	24.70	24.90	25.00	24.80	24.80	24.70		0.0981	0.0604	100.00
3	25.53	24.70	24.70	24.90	24.80	24.80	24.80		0.0000	0.0566	100.00
4	25.43	24.80	24.80	24.80	24.90	24.80	24.80		0.0000	0.0488	100.00
5	25.40	24.70	24.80	24.80	24.90	24.90	24.90		0.0000	0.0387	100.00
6	25.71	24.80	24.80	24.80	24.90	24.90	24.90		0.0000	0.0628	100.00
7	25.45	24.90	24.90	24.90	24.80	24.90	24.80		0.0981	0.0504	100.00
8	25.50	25.00	24.80	24.80	24.80	24.90	24.80		0.0981	0.0542	100.00

Minimum Thickness is calculated.

Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

BLUE (Caution TML Point) - if Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (Highlight and bolded if CR >= 0.250mm or 0.009in/yr.).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	South Sludge Pit		

Description: WEST WALL T-B

CML: 006-10

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **24.60 mm**
AVERAGE THICKNESS MEASURED: 24.75 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	25.45	24.90	24.90	24.90	24.80	24.80	24.80	0.0000	0.0504	100.00
2	25.32	24.70	24.80	24.80	24.80	24.80	24.70	0.0981	0.0480	100.00
3	25.45	24.70	24.70	24.90	24.90	24.80	24.70	0.0981	0.0581	100.00
4	25.78	24.70	24.70	24.90	24.90	24.80	24.80	0.0000	0.0759	100.00
5	25.38	24.70	24.70	24.70	24.80	24.80	24.80	0.0000	0.0449	100.00
6	25.68	24.80	24.70	24.90	24.80	24.80	24.80	0.0000	0.0682	100.00
7	25.40	24.60	24.60	24.90	24.80	24.80	24.80	0.0000	0.0465	100.00
8	25.53	24.50	24.50	24.50	24.60	24.60	24.60	0.0000	0.0721	100.00

Description: NORTH WALL T-B

CML: 006-12

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **25.10 mm**
AVERAGE THICKNESS MEASURED: 25.16 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	25.78	25.10	25.10	25.30	25.20	25.20	25.10	0.0981	0.0527	100.00
2	25.83	25.10	25.10	25.20	25.10	25.20	25.20	0.0000	0.0488	100.00
3	25.58	25.00	25.00	25.30	25.20	25.20	25.20	0.0000	0.0294	100.00
4	25.50	25.10	25.10	25.20	25.20	25.20	25.10	0.0981	0.0310	100.00
5	25.45	25.10	25.10	25.20	25.10	25.20	25.10	0.0981	0.0271	100.00
6	25.43	25.10	25.10	25.20	25.10	25.20	25.20	0.0000	0.0178	100.00
7	25.50	25.10	25.10	25.20	25.10	25.20	25.20	0.0000	0.0232	100.00
8	25.58	25.10	25.10	25.20	25.10	25.20	25.20	0.0000	0.0294	100.00

Minimum Thickness is calculated.

Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

BLUE (Caution TML Point) - if Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	South Sludge Pit		

Description: NORTH WALL T-B

CML: 006-14

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **25.10 mm**
AVERAGE THICKNESS MEASURED: 25.14 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	25.48	25.00	25.00	25.20	25.10	25.20	25.10	0.0981	0.0294	100.00
2	25.48	25.00	25.00	25.20	25.10	25.20	25.20	0.0000	0.0217	100.00
3	25.50	25.00	25.00	25.20	25.10	25.20	25.20	0.0000	0.0232	100.00
4	25.55	25.00	24.90	25.20	25.10	25.20	25.20	0.0000	0.0271	100.00
5	25.43	24.90	24.90	25.30	25.20	25.20	25.10	0.0981	0.0256	100.00
6	25.53	25.00	25.00	25.40	25.20	25.20	25.10	0.0981	0.0333	100.00
7	25.60	25.00	25.00	25.40	25.20	25.20	25.10	0.0981	0.0387	100.00
8	25.58	24.90	24.90	25.40	25.20	25.20	25.10	0.0981	0.0372	100.00

Description: EAST WALL T-B

CML: 006-16

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **24.40 mm**
AVERAGE THICKNESS MEASURED: 24.53 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	25.48	24.80	24.80	24.70	24.60	24.60	24.60	0.0000	0.0682	100.00
2	25.38	24.80	24.70	24.30	24.40	24.70	24.50	0.1962	0.0682	100.00
3	25.40	24.80	24.70	24.70	24.60	24.60	24.50	0.0981	0.0697	100.00
4	25.50	24.90	24.80	24.80	24.60	24.60	24.60	0.0000	0.0697	100.00
5	25.63	24.80	24.80	24.50	24.50	24.60	24.50	0.0981	0.0876	100.00
6	25.60	24.80	24.70	24.60	24.60	24.50	24.40	0.0981	0.0930	100.00
7	25.76	24.80	24.70	24.70	24.60	24.60	24.60	0.0000	0.0899	100.00
8	25.71	24.80	24.70	24.50	24.50	24.60	24.50	0.0981	0.0938	100.00

Minimum Thickness is calculated.

Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

BLUE (Caution TML Point) - if Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	South Sludge Pit		

Description: EAST WALL T-B
CML: 006-18

 NOM. THICK.: Not Stated
 MILL. TOL.: Not Stated
 CA: Not Stated
 MIN. NOM.: Not Stated

 MATERIAL: Not Stated
 MINIMUM THICKNESS MEASURED: **24.50 mm**
 AVERAGE THICKNESS MEASURED: 24.55 mm
 CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	25.53	24.70	24.70	24.70	24.60	24.60	24.50	0.0981	0.0798	100.00
2	25.43	24.70	24.70	24.50	24.60	24.60	24.50	0.0981	0.0721	100.00
3	25.48	24.60	24.60	24.50	24.50	24.60	24.60	0.0000	0.0682	100.00
4	25.71	24.50	24.50	24.60	24.60	24.60	24.60	0.0000	0.0860	100.00
5	25.40	24.60	24.60	24.30	24.50	24.60	24.50	0.0981	0.0697	100.00
6	25.40	24.60	24.60	24.70	24.60	24.70	24.60	0.0981	0.0620	100.00
7	25.71	24.60	24.70	24.80	24.70	24.50	24.50	0.0000	0.0938	100.00
8	26.01	24.60	24.70	24.60	24.60	24.60	24.60	0.0000	0.1093	100.00

Description: EAST WALL T-B
CML: 006-20

 NOM. THICK.: Not Stated
 MILL. TOL.: Not Stated
 CA: Not Stated
 MIN. NOM.: Not Stated

 MATERIAL: Not Stated
 MINIMUM THICKNESS MEASURED: **24.00 mm**
 AVERAGE THICKNESS MEASURED: 24.41 mm
 CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	25.55	24.70	24.70	24.80	24.60	24.50	24.50	0.0000	0.0814	100.00
2	25.55	24.70	24.80	24.70	24.60	24.50	24.50	0.0000	0.0814	100.00
3	25.50	24.50	24.50	24.50	24.50	24.50	24.50	0.0000	0.0775	100.00
4	25.53	24.40	24.40	24.40	23.90	24.20	24.00	0.1962	0.1186	100.00
5	25.50	24.40	24.40	24.50	24.50	24.50	24.40	0.0981	0.0852	100.00
6	25.73	24.50	24.70	24.80	24.70	24.50	24.50	0.0000	0.0953	100.00
7	25.86	24.50	24.30	24.50	24.50	24.60	24.50	0.0981	0.1054	100.00
8	25.58	24.50	24.10	24.50	24.50	24.50	24.40	0.0981	0.0914	100.00

Minimum Thickness is calculated.

Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

BLUE (Caution TML Point) - if Half Life is less than 15 years.
RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

 CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	South Sludge Pit		

Description: SOUTH FLOOR N-S

CML: 006-22

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **23.70 mm**
AVERAGE THICKNESS MEASURED: 23.88 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	25.40	24.50	24.50	24.00	24.00	24.00	24.00	0.0000	0.1085	100.00
2	25.38	24.40	24.30	24.00	24.00	24.00	24.00	0.0000	0.1069	100.00
3	25.76	24.30	24.30	23.90	24.00	24.00	23.90	0.0981	0.1441	100.00
4	25.48	24.20	24.30	23.60	23.80	23.90	23.80	0.0981	0.1302	100.00
5	25.60	24.20	24.40	23.80	23.90	23.90	23.80	0.0981	0.1395	100.00
6	25.38	24.20	24.30	24.00	23.90	23.90	23.90	0.0000	0.1147	100.00
7	25.40	24.50	24.30	24.00	23.90	23.90	23.90	0.0000	0.1162	100.00
8	25.50	24.50	24.30	23.50	23.70	23.80	23.70	0.0981	0.1395	100.00

Description: MIDDLE FLOOR N-S

CML: 006-24

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **23.80 mm**
AVERAGE THICKNESS MEASURED: 23.80 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	25.38	23.80	No Access	23.90	23.90	23.80	23.80	0.0000	0.1224	100.00
2	25.32	23.80		23.80	23.80	23.80	23.80	0.0000	0.1178	100.00
3	25.40	23.90		23.80	23.80	23.80	23.80	0.0000	0.1240	100.00
4	25.38	24.10		23.80	23.80	23.80	23.80	0.0000	0.1224	100.00
5	25.38	24.10		23.80	23.80	23.80	23.80	0.0000	0.1224	100.00
6	25.38	24.10		23.80	23.80	23.80	23.80	0.0000	0.1224	100.00
7	25.35	24.00		23.80	23.80	23.80	23.80	0.0000	0.1201	100.00
8	25.38	24.00		23.80	23.80	23.80	23.80	0.0000	0.1224	100.00

Minimum Thickness is calculated.

Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

BLUE (Caution TML Point) - if Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	South Sludge Pit		

Description: NORTH FLOOR N-S

CML: 006-26

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **23.90 mm**
AVERAGE THICKNESS MEASURED: 24.00 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/29/10	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	25.48	24.50	No Access	24.30	24.10	24.20	24.00	0.1962	0.1147	100.00
2	25.50	24.40		24.20	24.20	24.20	24.10	0.0981	0.1085	100.00
3	25.71	24.40		24.00	24.00	24.20	24.10	0.0981	0.1248	100.00
4	25.58	24.30		24.10	24.10	24.10	24.10	0.0000	0.1147	100.00
5	25.55	24.40		24.00	24.00	24.20	24.00	0.1962	0.1201	100.00
6	25.53	24.50		24.00	23.90	24.00	23.90	0.0981	0.1263	100.00
7	25.48	24.50		23.90	23.90	24.00	23.90	0.0981	0.1224	100.00
8	25.50	24.60		24.00	23.90	24.00	23.90	0.0981	0.1240	100.00

COMMENTS:

2020/2023 - PITTING/CORROSION NOTED.

Minimum Thickness is calculated.

Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

BLUE (Caution TML Point) - if Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (Highlight and bolded if CR >= 0.250mm or 0.009in/yr.).

TANK INTERNAL INSPECTION REPORT

Customer:	Clean Harbors	ITS Job No.:	1-5050
District:	Central	Date:	22-Aug-2023
Facility:	Ryley Facility	LSID:	04-09-050-17W4M
Tank Description:	East Sludge Pit	Serial No.:	Not Stated
Equip./OIP No.:	Not Stated		

Remedial Action	Access and Coverage	Internal Coating	Heating Coil
<input type="checkbox"/> Adequate Cleaning	<input checked="" type="checkbox"/> Internal Inspection	<input checked="" type="checkbox"/> Not Applicable	<input checked="" type="checkbox"/> Not Applicable
<input type="checkbox"/> No Action Required	<input type="checkbox"/> Part. Internal Inspection	<input type="checkbox"/> Good Condition	<input type="checkbox"/> Good Condition
<input type="checkbox"/> Paint/Coating Repairs	NDE Examination	<input type="checkbox"/> Coated <input type="checkbox"/> Full <input type="checkbox"/> Partial	<input type="checkbox"/> Corrosion
<input type="checkbox"/> Further Assessment Required	<input checked="" type="checkbox"/> UT	<input type="checkbox"/> Holidays/Cracking	<input type="checkbox"/> Pitting: (max depth)
	<input type="checkbox"/> MT	<input type="checkbox"/> Blisters/Bulges	<input type="checkbox"/> Cracked
<input type="checkbox"/> Condition Damage	<input type="checkbox"/> PT	<input type="checkbox"/> Flaking	<input type="checkbox"/> Scaled
<input type="checkbox"/> Does not comply with applicable code/safe operating requirement.	<input type="checkbox"/> RT	<input type="checkbox"/> See Comments	<input type="checkbox"/> Worn
	<input type="checkbox"/> BH	Internal Supports	<input type="checkbox"/> Loose
<input type="checkbox"/> Repairs Required	<input type="checkbox"/> MFL	<input checked="" type="checkbox"/> Not Applicable	<input type="checkbox"/> Poor Installation
	<input type="checkbox"/> Other	<input type="checkbox"/> Good Condition	<input type="checkbox"/> See Comments
<input checked="" type="checkbox"/> See Comments	<input type="checkbox"/> Double Walled	<input type="checkbox"/> Distorted	Bolted Tanks
Manway	<input type="checkbox"/> See Comments	<input type="checkbox"/> Cracked	<input checked="" type="checkbox"/> Not Applicable
<input checked="" type="checkbox"/> Not Applicable	Internal Components	<input type="checkbox"/> Broken	<input type="checkbox"/> Good Condition
<input type="checkbox"/> Good Condition	<input type="checkbox"/> Anodes Present	<input type="checkbox"/> Poor Installation	<input type="checkbox"/> Missing Bolts
<input type="checkbox"/> Coating Damage	<input type="checkbox"/> Level Gauge Float in Good Condition	<input type="checkbox"/> Bolts Missing/ Loose/ Damage	<input type="checkbox"/> Gasket in Good Condition
<input type="checkbox"/> Internal Corrosion	<input type="checkbox"/> Level Gauge Float or Lower Support Attachment Damaged	<input type="checkbox"/> See Comments	<input type="checkbox"/> Gasket Damaged
<input type="checkbox"/> Mechanical Damage			<input type="checkbox"/> Seepage at Seams
<input type="checkbox"/> Seal Face Corrosion			<input type="checkbox"/> Leakage at Seams
<input type="checkbox"/> Pitting: (max depth)	<input type="checkbox"/> Level Gauge Float Wires Damaged		<input type="checkbox"/> See Comments
<input type="checkbox"/> See Comments	<input checked="" type="checkbox"/> See Comments		

Shell Internal	Floor (Internal)	Nozzle Internal	Firetube(s)
<input checked="" type="checkbox"/> Good Condition	<input checked="" type="checkbox"/> Good Condition	<input type="checkbox"/> RF <input type="checkbox"/> NPT	<input checked="" type="checkbox"/> Not Applicable
<input checked="" type="checkbox"/> Internal Corrosion	<input type="checkbox"/> Internal Corrosion	<input type="checkbox"/> Good Condition	<input type="checkbox"/> Good Condition
<input checked="" type="checkbox"/> Pitting: 0.085 in (max depth)	<input type="checkbox"/> Pitting: (max depth)	<input type="checkbox"/> Nozzles are Gusseted	<input type="checkbox"/> Corrosion
<input type="checkbox"/> Scale	<input type="checkbox"/> Scale	<input type="checkbox"/> Nozzles Plugged	<input type="checkbox"/> Pitting: (max depth)
<input type="checkbox"/> Blistered	<input type="checkbox"/> Blistered	<input type="checkbox"/> Internal Corrosion	<input type="checkbox"/> Wear/Erosion
<input checked="" type="checkbox"/> Mechanical Damage	<input checked="" type="checkbox"/> Mechanical Damage	<input type="checkbox"/> Damaged/Cracked	<input type="checkbox"/> Cracked
<input type="checkbox"/> Deformation/Distortion	<input type="checkbox"/> Deformation/Distortion	<input type="checkbox"/> Deflection/Distortion	<input type="checkbox"/> Scaled
<input type="checkbox"/> Weld(s) in Good Condition	<input type="checkbox"/> Weld(s) in Good Condition	<input type="checkbox"/> Partial Internal Inspection	<input type="checkbox"/> Coated
<input type="checkbox"/> Weld(s) Corroded	<input type="checkbox"/> Weld(s) Corroded	<input type="checkbox"/> Weld(s) in Good Condition	<input type="checkbox"/> Heat Impinged
<input type="checkbox"/> Weld(s) Poor Quality	<input type="checkbox"/> Weld(s) Poor Quality	<input type="checkbox"/> Weld(s) Corroded	<input type="checkbox"/> Burner Misalignment
<input type="checkbox"/> Weld(s) Cracked	<input type="checkbox"/> Weld(s) Cracked	<input type="checkbox"/> Weld(s) Poor Quality	<input type="checkbox"/> Damaged Supports
<input type="checkbox"/> Previous Repairs	<input type="checkbox"/> Previous Repairs	<input type="checkbox"/> Weld(s) Cracked	<input type="checkbox"/> Damaged Guides/Tracks
<input checked="" type="checkbox"/> See Comments	<input checked="" type="checkbox"/> See Comments	<input checked="" type="checkbox"/> See Comments	<input type="checkbox"/> See Comments

Observations:

Tank is in **Good**, **Fair**, **Poor** Condition

Good: No concerns found (may still have recommendations)
Fair: Minor issues found that do not impair the "fitness for service" of the Tank, (internal coating deterioration, general internal surface corrosion - no measurable metal loss, etc.)
Poor: Equipment had moderate to major concerns found (Tank is damaged; moderate to severe corrosion noted, cracked or broken component(s), etc.)

Based on API 653 Visual Internal Inspection this Tank is fit for service
 (This piece of equipment meets the Jurisdictional requirements based on the information available at the time of the inspection.)

Summary: Overall, this open-top sludge tank was found in good condition with no immediate items of concern that would require corrective action. Furthermore, it should be noted that in comparison to the previous visual and NDE data there has been no further deterioration and/or propagation of corrosion/pitting. However, it should be noted there was limited access to the North and South shell walls due to product buildup.

Product side (topside): On the North side of the tank shell, evident inward mechanical distortion was noticed. It is essential to mention that the inward distortion, measuring approximately 1/2 inch to 3/4 inch, is not expected to pose a buckling concern and in comparison, to historical data has stayed stagnant with no further distortion. It is assumed this distortion was initially caused by uneven settlement/distribution during the loading/unloading phase, as there is no, base support, secondary containment/liner etc.

Furthermore, as seen in previous years there was evidence of isolated widely spread uniform corrosion/pitting on the tank internal shell surface near the lower shell approximately 2 to 4 Inches up from the bottom seam measuring approximately 0.070" to 0.085Inch in maximum depth. For reference, the corrosion/pitting profile gives the distinct appearance of typical under-deposit/Corrosion under insulation (CUI) induced damage, with smooth shallow uniform deterioration. It should be noted that these corrosion/pitting depths are consistent with previous inspection data, appearing to have completely arrested with no evidence of further deterioration/propagation. Overall, no warrant for concern, will continue to monitor on the current annual interval.

Soil side (bottom-side) - At the time of inspection an Ultrasonic thickness survey was performed on the floor and shell, which revealed evidence of moderate soil side corrosion/pitting, which was found to be consistent with the previous Ultrasonic thickness survey. See the associated UT data report for the remaining wall thickness, corrosion rates, etc. Overall, no items of immediate concern, However CML# 017-20 "East North Wall" and CML#017-06 "East South Wall" have experienced moderate soil-side corrosion. Which has resulted in a worst-case long-term corrosion rate of 0.7875 mm/yr, as this is essentially an atmospheric non-code storage tank with no means of leak detection or containment, recommend basing the t-min from API-653 using a t-min of 0.100Inch or 2.54mm.

Tmin= 0.100Inch (2.54mm)
 LTCR= 0.7875 mm/yr.
 Remaining thickness = 12.80mm
 Remaining life = 13 years.

Recommendations:

- 1) Recommend continuing to monitor and reassess on a 12-month maximum inspection interval.
- 2) For future reference, when installing these underground sludge tanks recommend the client installs, a secondary containment, external liner/barrier, suitably designed cathodic protection system etc. to help prevent soil-side corrosion and extend the service life.

Non-Conformance Conditions and Corrective Actions:

Note: Reference any and all Non-Conformance Report (NCR) numbers and Corrective Action Report (CAR) numbers.

- None.

Recommended Inspection Interval:

Recommended Maximum Inspection Interval: 12 Months

Pictures:



(Photo 1) Overview



(Photo 2) Overview Of East Wall



(Photo 3) Overview Of West Wall



(Photo 4) Overview Of Distortion



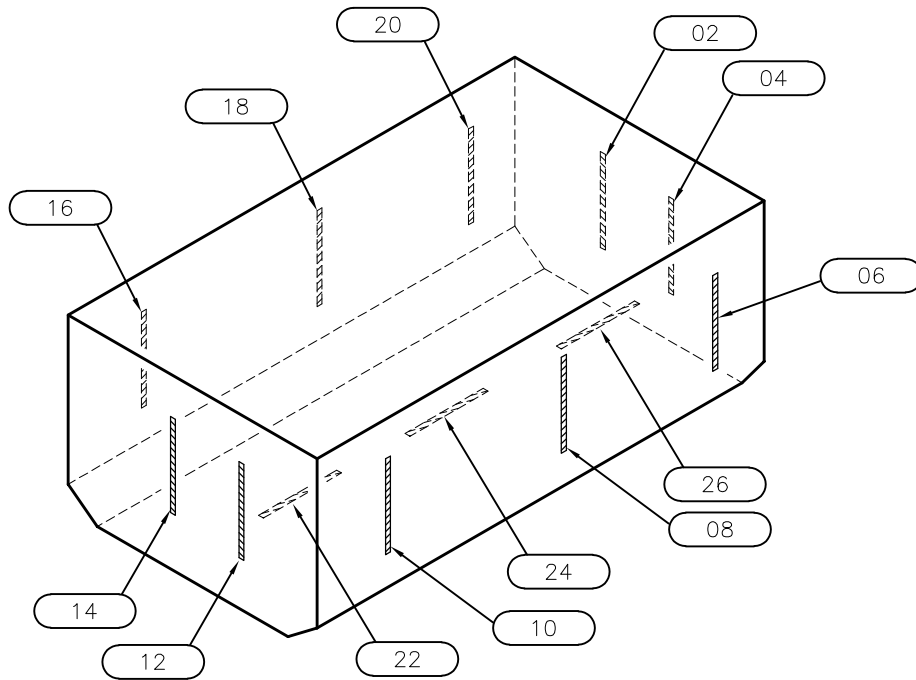
(Photo 5) Overview Of Distortion 2



(Photo 6) General Shell Condition

Internal Inspection Performed By:		ABSA IPV PESL: 000731	
Print Name: <u>Justice Hrynskiw</u>		API 510: 94980	
		API 570: 99735	
		API 653: 104668	
Signature: <u><i>Justice Hrynskiw</i></u>		Report Reviewed: <u><i>J.E.</i></u>	
		Initial	

Chief Inspector / Client Representative:			
Name (Print)		Signature	Date:



Column Cooler Exchanger Furnace Heater Plate Exchanger Reboiler Vessel Other

Client:, District:, LSD:, Etc.:

Description:	EAST SLUDGE PIT		
P.R.N. No.:	N/S	Size:	24' X 14' X 8'
Equipment No.:	N/S	N.B. No.:	N/S
Serial No.:	N/S		
HEAD Material:	N/S	Nominal:	N/S
HEAD Material:		Nominal:	
SHELL Material:	N/S	Nominal:	N/S
SHELL Material:		Nominal:	
MAWP S.Side @TEMP:	N/S	MAWP T.Side @TEMP:	

CLEAN HARBORS
RYLEY FACILITY

LSD 04-09-050-17W4M

Comments: NO NAMEPLATE.

Tech.: JTH

Date: 2023/08

ITS Job No.: 1-5050

DWG No.: 017

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	East Sludge Pit		

EQUIPMENT INSPECTION SUMMARY:

NO DATA PLATE

Description: EAST WALL (1) T-B

CML: 017-02

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **17.90 mm**
AVERAGE THICKNESS MEASURED: 18.32 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	19.30	18.80	18.80	18.60	18.60	18.70	18.60	0.0981	0.0886	100.00
2	19.30	18.80	18.80	18.30	18.30	18.60	18.60	0.0000	0.0886	100.00
3	19.40	18.60	18.60	18.40	18.40	18.60	18.50	0.0981	0.1139	100.00
4	19.40	18.30	18.30	18.20	18.20	18.30	18.30	0.0000	0.1392	100.00
5	19.30	17.40	17.40	18.00	18.00	18.00	18.00	0.0000	0.1645	100.00
6	19.40	17.40	17.30	18.00	18.00	18.00	17.90	0.0981	0.1898	100.00

Description: EAST WALL (2) T-B

CML: 017-04

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **17.40 mm**
AVERAGE THICKNESS MEASURED: 18.10 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	19.30	18.50	18.50	18.30	18.30	18.30	18.30	0.0000	0.1265	100.00
2	19.40	18.80	18.80	18.10	18.10	18.10	18.00	0.0981	0.1771	100.00
3	19.50	17.60	17.50	17.50	17.50	17.50	17.40	0.0981	0.2657	100.00
4	19.50	18.00	18.00	18.00	18.00	18.00	17.90	0.0981	0.2024	100.00
5	19.60	18.70	18.70	18.70	18.70	18.70	18.60	0.0981	0.1265	100.00
6	19.50	18.70	18.50	18.30	18.30	18.40	18.40	0.0000	0.1392	100.00

COMMENTS:

2020/08 - PITTING/CORROSION AT SOIL SIDE NOTED.

Minimum Thickness is calculated.

Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

BLUE (Caution TML Point) - if Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	East Sludge Pit		

Description: EAST SOUTH WALL T-B

CML: 017-06

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **16.40 mm**
AVERAGE THICKNESS MEASURED: 17.05 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	18.90	18.50	18.50	16.40	16.50	16.70	16.40	0.2944	0.3163	100.00
2	18.90	18.50	18.50	16.80	16.80	16.70	16.70	0.0000	0.2783	100.00
3	18.80	18.10	18.10	16.20	16.60	16.80	16.60	0.1962	0.2783	100.00
4	18.80	18.30	18.30	16.80	16.80	16.90	16.70	0.1962	0.2657	100.00
5	18.90	18.40	18.40	18.10	18.10	18.10	17.90	0.1962	0.1265	100.00
6	18.90	18.20	18.10	18.00	18.00	18.00	18.00	0.0000	0.1139	100.00

COMMENTS:
2020/2023 - PITTING/CORROSION AT SOIL SIDE NOTED.

Description: MIDDLE SOUTH WALL T-B

CML: 017-08

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **17.90 mm**
AVERAGE THICKNESS MEASURED: 18.00 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	18.90	18.60	18.60	17.80	17.80	17.90	17.90	0.0000	0.1265	100.00
2	18.90	18.70	18.50	18.20	18.20	18.10	17.90	0.1962	0.1265	100.00
3	18.80	18.60	18.50	18.10	18.10	18.10	18.00	0.0981	0.1012	100.00
4	18.70	18.40	18.20	18.10	18.10	18.10	18.10	0.0000	0.0759	100.00
5	18.80	18.60	18.20	18.00	18.00	18.00	18.00	0.0000	0.1012	100.00
6	18.90	18.60	18.40	18.40	18.40	18.40	18.10	0.2944	0.1012	100.00

COMMENTS:
2020/2023 - PITTING/CORROSION NOTED.

Minimum Thickness is calculated.
Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.
Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
BLUE (Caution TML Point) - if Half Life is less than 15 years.
RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.
CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	East Sludge Pit		

Description: WEST SOUTH WALL T-B

CML: 017-10

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **18.10 mm**
AVERAGE THICKNESS MEASURED: 18.25 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	18.80	18.50	18.50	18.10	18.10	18.10	18.10	0.0000	0.0886	100.00
2	18.80	18.50	18.30	18.30	18.30	18.30	18.20	0.0981	0.0759	100.00
3	18.90	18.50	18.40	17.90	18.10	18.20	18.20	0.0000	0.0886	100.00
4	18.90	18.60	18.40	18.30	18.30	18.30	18.30	0.0000	0.0759	100.00
5	18.90	18.30	18.50	18.50	18.50	18.40	18.40	0.0000	0.0633	100.00
6	18.90	18.40	18.30	18.30	18.30	18.30	18.30	0.0000	0.0759	100.00

COMMENTS:
2020/2023 - PITTING/CORROSION NOTED.

Description: WEST WALL (1) T-B

CML: 017-12

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **18.50 mm**
AVERAGE THICKNESS MEASURED: 18.65 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	19.10	19.30	19.30	18.70	18.70	18.70	18.70	0.0000	0.0506	100.00
2	19.20	19.30	19.30	18.60	18.60	18.70	18.60	0.0981	0.0759	100.00
3	19.40	19.20	19.20	18.80	18.80	18.70	18.70	0.0000	0.0886	100.00
4	19.30	18.60	18.60	18.80	18.80	18.90	18.70	0.1962	0.0759	100.00
5	19.30	18.70	18.50	18.50	18.50	18.50	18.50	0.0000	0.1012	100.00
6	19.20	18.80	18.70	18.70	18.70	18.70	18.70	0.0000	0.0633	100.00

Minimum Thickness is calculated.
Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.
Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
BLUE (Caution TML Point) - if Half Life is less than 15 years.
RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.
CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	East Sludge Pit		

Description: WEST WALL (2) T-B

CML: 017-14

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **18.70 mm**
AVERAGE THICKNESS MEASURED: 18.80 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	19.60	19.10	19.10	19.00	19.00	19.00	18.90	0.0981	0.0886	100.00
2	19.70	18.80	18.80	18.80	18.70	18.90	18.90	0.0000	0.1012	100.00
3	19.50	18.90	18.90	19.00	19.00	18.90	18.90	0.0000	0.0759	100.00
4	19.70	18.70	18.70	18.70	18.70	18.90	18.70	0.1962	0.1265	100.00
5	19.50	18.80	18.80	18.80	18.80	18.80	18.70	0.0981	0.1012	100.00
6	19.20	18.90	18.90	18.90	18.90	18.80	18.70	0.0981	0.0633	100.00

Description: WEST NORTH WALL T-B

CML: 017-16

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **17.30 mm**
AVERAGE THICKNESS MEASURED: 17.92 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	19.20	18.90	18.90	18.10	18.10	18.10	18.10	0.0000	0.1392	100.00
2	19.00	17.90	18.00	18.00	18.00	18.10	18.00	0.0981	0.1265	100.00
3	19.30	18.60	18.30	17.90	17.80	17.90	17.80	0.0981	0.1898	100.00
4	18.90	18.20	18.20	18.20	18.20	18.20	18.00	0.1962	0.1139	100.00
5	18.70	18.30	18.30	18.30	18.30	18.40	18.30	0.0981	0.0506	100.00
6	18.60	17.40	17.40	17.40	17.30	17.40	17.30	0.0981	0.1645	100.00

COMMENTS:
2020/2023 - PITTING/CORROSION NOTED.

Minimum Thickness is calculated.
Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.
Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
BLUE (Caution TML Point) - if Half Life is less than 15 years.
RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.
CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	East Sludge Pit		

Description: MIDDLE NORTH WALL T-B

CML: 017-18

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **17.00 mm**
AVERAGE THICKNESS MEASURED: 17.85 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	18.90	18.90	18.90	18.20	18.20	18.40	18.20	0.1962	0.0886	100.00
2	18.80	17.50	17.70	17.70	17.70	17.70	17.60	0.0981	0.1518	100.00
3	18.90	17.00	17.00	17.00	17.00	17.10	17.00	0.0981	0.2404	100.00
4	18.80	18.50	18.20	18.20	18.20	18.20	17.90	0.2944	0.1139	100.00
5	18.90	18.80	18.50	18.30	18.30	18.20	18.00	0.1962	0.1139	100.00
6	18.80	18.60	18.40	18.40	18.40	18.40	18.40	0.0000	0.0506	100.00

COMMENTS:
2020/2023 - PITTING/CORROSION NOTED.

Description: EAST NORTH WALL T-B

CML: 017-20

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **12.80 mm**
AVERAGE THICKNESS MEASURED: 16.58 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	19.10	18.20	18.20	13.40	12.20	12.80	12.80	0.0000	0.7971	100.00
2	19.10	18.00	18.00	17.80	17.80	17.90	17.80	0.0981	0.1645	100.00
3	19.00	15.90	15.90	16.50	16.40	16.50	16.50	0.0000	0.3163	100.00
4	19.00	18.00	17.50	17.50	17.50	17.60	17.40	0.1962	0.2024	100.00
5	18.90	17.80	17.30	17.50	17.50	17.60	17.40	0.1962	0.1898	100.00
6	18.90	18.20	17.80	17.50	17.50	17.60	17.60	0.0000	0.1645	100.00

COMMENTS:
2020/2023 - PITTING/CORROSION NOTED.

Minimum Thickness is calculated.
Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.
Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
BLUE (Caution TML Point) - if Half Life is less than 15 years.
RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.
CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	East Sludge Pit		

Description: WEST FLOOR E-W

CML: 017-22

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **17.70 mm**
AVERAGE THICKNESS MEASURED: 17.75 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	18.70	18.30	18.30	17.80	17.80	17.80	17.70	0.0981	0.1265	100.00
2	18.60	18.30	18.20	17.70	17.70	17.80	17.70	0.0981	0.1139	100.00
3	18.50	18.30	18.00	17.90	17.80	17.80	17.80	0.0000	0.0886	100.00
4	18.50	18.40	18.40	17.70	17.70	17.80	17.70	0.0981	0.1012	100.00
5	18.60	18.20	18.00	17.80	17.80	17.80	17.80	0.0000	0.1012	100.00
6	18.70	18.30	18.00	17.90	17.90	17.80	17.80	0.0000	0.1139	100.00

COMMENTS:
2020/2023 - PITTING/CORROSION NOTED.

Description: MIDDLE FLOOR E-W

CML: 017-24

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **17.60 mm**
AVERAGE THICKNESS MEASURED: 17.68 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22	08/22/23			
1	18.80	18.20	No Access	17.70	17.70	17.70	17.70	0.0000	0.1392	100.00
2	18.70	18.20		17.80	17.80	17.80	17.70	0.0981	0.1265	100.00
3	18.80	18.20		17.80	17.80	17.80	17.70	0.0981	0.1392	100.00
4	19.00	18.20		17.60	17.60	17.70	17.60	0.0981	0.1771	100.00
5	18.90	18.10		17.70	17.70	17.70	17.70	0.0000	0.1518	100.00
6	18.80	18.20		17.80	17.80	17.70	17.70	0.0000	0.1392	100.00

COMMENTS:
2020/2023 - PITTING/CORROSION NOTED.

Minimum Thickness is calculated.
Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.
Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
BLUE (Caution TML Point) - if Half Life is less than 15 years.
RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.
CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

CLIENT:	Clean Harbors	PROV. REG. #:	Not Stated
FACILITY:	Ryley Facility	SERIAL #:	Not Stated
UNIT/AREA:		EQUIP. NO.:	Not Stated
LSD:	04-09-050-17W4M		
DESCRIPTION:	East Sludge Pit		

Description: EAST FLOOR E-W

CML: 017-26

NOM. THICK.: Not Stated
MILL. TOL.: Not Stated
CA: Not Stated
MIN. NOM.: Not Stated

MATERIAL: Not Stated
MINIMUM THICKNESS MEASURED: **17.50 mm**
AVERAGE THICKNESS MEASURED: 17.62 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY							Short Term mm/yr	Long Term mm/yr	Rem. Half Life
		09/28/15	04/27/18	08/26/19	08/17/20	08/10/21	08/15/22			
1	18.60	18.30	No Access	17.70	17.70	17.70	17.60	0.0981	0.1265	100.00
2	18.60	18.20		17.80	17.70	17.70	17.60	0.0981	0.1265	100.00
3	18.70	18.30		17.60	17.60	17.70	17.60	0.0981	0.1392	100.00
4	18.90	18.20		17.70	17.60	17.70	17.70	0.0000	0.1518	100.00
5	18.80	18.30		17.70	17.70	17.70	17.70	0.0000	0.1392	100.00
6	18.70	18.30		17.50	17.50	17.60	17.50	0.0981	0.1518	100.00

COMMENTS:
2020/2023 - PITTING/CORROSION NOTED.

Minimum Thickness is calculated.
Design Minimum Thickness = Nom Thick. - CA - Manufacturing Steel Tolerance.
Manufacturing Tolerance of pipe and forged fittings is + or - 12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).
BLUE (Caution TML Point) - if Half Life is less than 15 years.
RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.
CA - Corrosion Allowance, CR - Corrosion Rate (**Highlight and bolded if CR >= 0.250mm or 0.009in/yr.**).

ULTRASONIC EXAMINATION REPORT

REPORT No.: UT-1-5050-00-JTH
Page: 1 of 1

Client: <u>Clean Harbors</u>	LSD: <u>04-09-050-17W4M</u>	ITS Job No.: <u>1-5050</u>
District: <u>Central</u>		Date: <u>August 22, 2023</u>
Facility: <u>Ryley Facility</u>		Time: <u>N/A</u>
Item(s) Examined: <u>East / South Sludge Pits</u>		W.O. No.: <u>N/S</u>
		P.O. No.: <u>N/S</u>
Acceptance Criteria: <u>For Client Review</u>	Rev./Date: <u>N/A</u>	Cost Code: <u>N/S</u>
Procedure No.: <u>ITS-UT01</u>	Rev./Date: <u>Rev.3 / Aug.2014</u>	AFE: <u>N/S</u>
Technique No.: <u>N/A</u>	Rev./Date: <u>N/A</u>	Other: <u>N/A</u>

Equipment Data:

PRN: N/S Serial No.: N/S Equip. No.: N/S CRN: N/S
Material: N/S Thickness: N/S Other: N/A

Surface Condition:

Base Metal Machined Shot Blasted Wire Wheeled As Ground As Welded Painted Coated Other: _____
 < 0°C(32°F) 0°C(32°F) to 54°C(130°F) 55°C(131°F) to 100°C(212°F) > 100°C(212°F)

Ultrasonic Equipment:

Instrument: Olympus Model: Epoch 600 Serial No.: 140615602 Cal. Due Date: 12-Mar-2024
 Cal. Block: 5 step wedge 2.5mm - 30mm Serial No.: 16-006 Couplant: UT-X
 Cal. Block: _____ Serial No.: _____
 Transducer Cable(s); Type: Co-axial Length: 4 ft

Transducer:

Serial No.:	Angle (X°):	Frequency (MHz):	Size (mm):	Type		Primary Reference (db)(% FSH):	Scanning Sensitivity (db):	Transfer Value (db):	Range (mm):
				Single	Dual				
13B01GDN	0	5	6.35	<input type="checkbox"/>	<input checked="" type="checkbox"/>	61.5dB @ 80% FSH	6dB	N/A	0-50
726428	0	5	6.35	<input type="checkbox"/>	<input checked="" type="checkbox"/>	64dB @ 80% FSH	6dB	N/A	0.50

Examination Details:



SCOPE: To perform UT corrosion survey on the East and South Sludge pits at the Ryley Facility.

RESULTS: See attached drawings and CML sheets for results.

CONCLUSION: The information will be reviewed and sent to the client for final analysis.

Client Representative: _____ Sign: _____ Date: _____

Technician(s):

Sign:  Print: <u>Justice Hryniuk</u>		Report Review:  Initial: _____	
1 st Technician CGSB ITS-WP01 ACCP/ASNT Level: <u>1</u> Certification No.: <u>20841</u>	2 nd Technician/Assistant CGSB ITS-WP01 ACCP/ASNT Level: _____ Certification No.: _____		

Scope of Services
The agreement of Integrity Testing Services Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested inspection of specific equipment provided for in writing and the preparation of reports or similar documents reflecting the inspection data obtained or the opinion formulated on the basis of such inspection. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinion or observations of the examiner and are not intended nor can they be construed as representations or warranties as to the actual circumstances. ITS is not assuming any responsibilities of the owner/operator, and the owner/operator retains complete responsibility for the engineering, repair and use decisions as a result of the inspection data or other information provided by ITS. In no event shall ITS's liability in respect of the services referred to herein exceed the amount paid for such services.
Standard of Care
In performing the services provided, Integrity Testing Services Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by ITS.

APPENDIX J

Response Action Plans

Response Action Plans

No Response Action Plans were required to be submitted in 2023.

APPENDIX K

Annual Dugout and Water Well

Sampling Program Report

2023 Dugout and Water Well Monitoring Program Clean Harbors Class 1 Waste Management Facility Ryley, Alberta



PRESENTED TO
Clean Harbors Canada Inc.

FEBRUARY 28, 2024
ISSUED FOR USE
FILE: 704-SWM.SWOP04810-01

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EXECUTIVE SUMMARY

Foreword

Tetra Tech Canada Inc. (Tetra Tech) was retained by Clean Harbors Canada Inc. (Clean Harbors) to sample all in-use dugouts and water wells located within a 1.6 km radius of the Ryley Class I Hazardous Waste Facility in Ryley, Alberta.

This sampling program is required by Alberta's *Environmental Protection and Enhancement Act* (EPEA). The facility operates under Alberta Environment and Protected Areas (EPA), in accordance with EPEA Approval No. 10348-03-01 (Appendix A). The program includes the surface water testing of all in-use dugouts and water wells, as identified during the October 1996 baseline sampling program and subsequent updates. The permit to operate defines "in-use" as stored water used for human consumption, cooking, washing, and gardening or livestock purposes. An additional two dugouts (9A, 23) were sampled in 2023 that are now within the 1.6 km radius due to the recent northward expansion of Clean Harbors Ryley Industrial Waste Management Facility. In addition, groundwater wells within a 1.6 km radius of the facility were reviewed and assessed for possible sampling as per the most recent Approval.

Twenty-one dugouts were inspected and sampled during the 2023 dugout sampling program, which is the 28th annual sampling event, including the baseline event in 1996. The baseline sampling program is detailed in the report titled *Water Sampling and Testing Program*. All annual dugout sampling has taken place in October.

Discussion and Recommendations

Analytical results of the dugout sampling program conducted in October 2023 indicate that the Ryley Class I Hazardous Waste Facility does not appear to be adversely impacting water quality in dugouts within the 1.6 km radius sampled. No water wells were accessible for sampling.

Some parameters analyzed in 2023 exhibited an upward trend in concentrations in one or more dugouts relative to historical baseline values, but the majority of concentrations were within the historical ranges for those parameters.

Select parameters had historically high values or concentrations for specific parameters during the 2023 sampling and should continue to be monitored and evaluated in future sampling events.

The following conclusions are based on the 2023 dugout and water well monitoring program:

- Analytical results of the dugout and water well monitoring program conducted in October 2023 indicate that the Ryley Class I Hazardous Waste Facility does not appear to be adversely impacting water quality in dugouts within a 1.6 km radius.
- Some parameters analyzed in 2023 exhibited new maximum observed values in one or more dugouts relative to historical baseline values, but the majority of concentrations were within the historical ranges for those parameters.
- Select parameters having historically high values or concentrations during the 2023 monitoring event should continue to be monitored and evaluated in future sampling events.
- No water wells were located within the 1.6 km radius of the site that could be included in the sampling program.
- A similar monitoring program is recommended for October 2024, as part of the ongoing site Approval compliance process.

- Each landowner should be forwarded a copy of the water chemistry analysis report pertaining to the dugout(s) sampled on their property once the 2023 report is finalized and submitted to AEPA.
- Area water wells should be reassessed every five years to confirm if any new wells have been established and should be included in the annual dugout and water well monitoring program.

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Table 1.1 to Table 1.23	Chemical Analytical Results
Table 2	Duplicate 1 Chemical Analytical Results
Table 3	Duplicate 2 Chemical Analytical Results
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Figure 1	Dugout Sampling Location Plan
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APPENDICES

Appendix A	Regulatory Approval - Alberta Environment And Parks EPEA Approval No.10348-03-01
Appendix B	Tetra Tech's Limitations on the Use of This Document
Appendix C	Laboratory Certificate of Analysis
Appendix D	Historical Dugout Chemical Analytical Results
Appendix E	Selected Site Photographs

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Clean Harbors Canada Inc. and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Clean Harbors Canada Inc. or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech Canada Inc.'s Services Agreement. Tetra Tech's Limitations on the Use of This Document are provided in Appendix B of this report.

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by Clean Harbors Canada Inc. (Clean Harbors) to sample all in-use groundwater wells and dugouts located within a 1.6 km radius of the Ryley Class I Hazardous Waste Facility in Ryley, Alberta. The sampling program is required by Alberta's *Environmental Protection and Enhancement Act* (EPEA). The facility operates under Alberta Environment and Protected Areas (EPA), in accordance with EPEA Approval No.10348-03-01 (Appendix A).

The program included the water testing of all in-use groundwater wells and dugouts, as identified during the baseline sampling program completed during the fall of 1996 and any additions or subtractions from subsequent annual sampling events. Based on an updated landowner survey in May 2023, there are no potable groundwater wells within the 1.6 km radius to be sampled as local groundwater quality is poor and most residents rely on EPCOR water supply piped to Ryley. The only exception is the Doyle Booth property which utilizes the on-site dugout as its domestic water supply source (Dugout 1 in Table B).

The definition of "in-use" is water used for human consumption, cooking, washing, gardening or livestock purposes. In 2023, the new Approval for developing lands north of the existing landfill extended the 1.6 km limit about 750 m to the north and required five additional dugouts to be included in the annual sampling program. However, three of the dugouts located on the Westmancoat property to the northwest of the site could not be sampled as Tetra Tech was not able to obtain permission from the landowner after multiple attempts to contact them. An additional two dugouts (9A, 23 on Figure 1) were sampled in 2023 that are within the new 1.6 km radius due to the recent northward expansion of Clean Harbors Ryley Industrial Waste Management Facility and these dugouts are defined as "in-use." Water wells within the 1.6 km radius of the site were reviewed in 2023 to update these potential receptors near the site. This exercise is described in Section 3.0.

Twenty-one (21) dugouts were inspected and sampled during the 2023 dugout and water well monitoring program, which is the 28th annual sampling event, including the baseline event in 1996. The baseline sampling program is detailed in the report titled *Water Sampling and Testing Program*¹. All annual dugout and water well monitoring has taken place in October since 1996.

This report presents the field observations and analytical water quality results of the 2023 sampling program with reference to recently collected data.

2.0 FIELD SAMPLING METHODS

2.1 Landowner Summary

The contact information for each landowner and their number of dugouts in the sampling program is presented in Table A. All landowners were contacted about two weeks prior to the sampling event, and each will be provided with a copy of the water chemistry of their dugout(s) once this report is finalized and sent to EPA. Landowners and contact information was updated as necessary in April and September 2023. The location of each sampled water source and residence, if found, is indicated on Figure 1.

¹Tetra Tech. 1996. *Water Sampling and Testing Program*.

Table A: Landowner Information

Landowner (October 2023)	Contact Name and (Number of Dugouts)	Mailing Address	Telephone Number
D. Booth	Doyle Booth (1)	Box 185, Ryley, Alberta T0B 4A0	780.999.4577
Ewert Farms Ltd.	Mark Ewert (4)	Box 355, Ryley, Alberta T0B 4A0	780.914.5766
B.L. Lyons (now Clean Harbors Canada Inc.)	Brian Lyons (5) *	Box 222, Ryley, Alberta T0B 4A0	780.984.5026
T. Magneson	Terry Magneson (5)	Box 374, Ryley, Alberta T0B 4A0	780.603.1537
County of Beaver	c/o Margaret Jones (1)	Box 140, Ryley, Alberta T0B 4A0	780.663.3730 (direct 825.385.0061)
W. Winsnes	William Winsnes (1)	Box 335, Ryley, Alberta T0B 4A0 SW8-50-17-W4M	780.699.4009
G. Balash	George and Rose Balash (3)	Box 291, St Paul, Alberta T0A 3A0 gsbfarm@gmail.com	780.646.2001
D. Lyons	Darryl Lyons (1)	Box 330, Ryley, Alberta T0A 3A0	780.405.1110

* Note: Brian Lyons' property (SW and SE 16) was purchased by Clean Harbors in July 2023. It is agreed that Brian Lyons will continue to receive water chemistry data for dugouts on these lands as long as he continues to farm the lands.

2.2 Sampling Procedure

The water samples were collected on October 16 and 17, 2023 by two Tetra Tech personnel. A Health and Safety Plan was completed and reviewed prior to initiating sampling. Twenty-one dugouts were sampled at eight properties, and 23 samples were collected: one from each dugout, plus two duplicate samples. Subsamples were collected from the four corners of each respective dugout at 0.20 m to 0.30 m below surface and about 2 metres from the dugout edge and submitted as an equal-weighted composite sample. Care was taken not to disturb bank or bed sediments in the sampling area.

All samples were obtained using standard procedures that minimized potential for contamination during collection, handling, preservation, and transportation to ensure representative samples were collected and tested. Table B contains a summary of the information gathered during the sampling program, including sample name, legal land description and relative dugout location with locations on Figure 1. The lands containing Dugout 12 (Magneson D.3) is incorporated into the Clean Harbor expansion area and therefore, no longer monitored. All dugouts were photographed with representative photos presented in Appendix E.

Table B: Sample Location Information

Sample	Sample Name	Legal Land Description (W4M)	Dugout Location
1	Booth D.1	NW ¼ 10-50-17	Dugout northwest of house
2	Ewert D.1	SW ¼ 15-50-17	Dugout south of centre barn
3	Ewert D.2	SW ¼ 15-50-17	Extreme west dugout
4	Ewert D.3	SW ¼ 15-50-17	Extreme east dugout
5	Ewert D.4	SW ¼ 15-50-17	Southeast corner of southwest quarter of Section 15
6	B. Lyons D.1*	SE ¼ 16-50-17	Northeast dugout on southeast quarter of Section 16
7	B. Lyons D.2*	SE ¼ 16-50-17	Northwest dugout on southeast quarter of Section 16
8	B. Lyons D.3*	SE ¼ 16-50-17	Southwest dugout on southeast quarter of Section 16
9	B. Lyons D.4*	SW ¼ 16-50-17	Southwest dugout on southwest quarter of Section 16
9A	B. Lyons D.5*	SW ¼ 16-50-17	Northwest dugout on southwest quarter Section of 16
10	Magneson D.1	SW ¼ 9-50-17	Dugout with windmill on northeast end of yard

Table B: Sample Location Information

Sample	Sample Name	Legal Land Description (W4M)	Dugout Location
11	Magneson D.2	SW ¼ 9-50-17	Southeast corner of northwest quarter of Section 9
13	Magneson D.4	SW ¼ 9-50-17	South end of southwest quarter of Section 9, east of main house
14	Magneson D.5	SW ¼ 9-50-17	East end of southwest quarter of Section 9, west of Clean Harbors
15	Magneson D.6	SW ¼ 9-50-17	South end of southwest quarter of Section 9, north of main house
16	Beaver County D.1	NW ¼ 3-50-17	Dugout south of house, northwest quarter of Section 3
19	Winsnes D.1	SW ¼ 4-50-17	Dugout on southwest corner of southwest quarter of Section 4
20	Balash D.1	NE ¼ 5-50-17	Dugout south of west approach, northeast quarter of Section 5
21	Balash D.2	SE ¼ 8-50-17	Dugout on southeast quarter of Section 8
22	Balash D.3	SE ¼ 8-50-17	Dugout is immediately west of Balash D.2
23	D. Lyons D.1	16-NE16-50-17-W4M	Middle of East half of Northeast Section 16

* Lands owned by Clean Harbors Canada Inc. since July 2023.

ALS Laboratory Group (ALS) of Edmonton was the laboratory selected to perform the sample analysis and is certified by the Canadian Association of Laboratory Accreditation (CALA) for the parameters tested. ALS prepared sampling sets beforehand with bottles for each dugout to be tested. These sets included the individual sample bottles and preservatives needed to perform the analysis required by the Permit to Operate.

The following analytical parameters were tested for all dugouts and duplicate samples, as required by Approval No. 10348-03-01, Section 4.5:

- Major ions: calcium, magnesium, sodium, potassium, chloride, carbonate, bicarbonate, and sulphate
- Dissolved metals: aluminum, antimony, arsenic, barium, boron, cadmium, chromium, hexavalent chromium (chromium VI), cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, tin, uranium, and zinc
- pH (field and laboratory)
- Electrical conductivity (EC) (field and laboratory)
- Benzene, toluene, ethylbenzene, xylenes (BTEX)
- Petroleum hydrocarbon (PHC) fractions F1 and F2
- Total dissolved solids (TDS)
- Total suspended solids (TSS)
- Chemical oxygen demand (COD)
- Dissolved organic carbon (DOC)
- Nutrients: ammonia (as N), Total Kjeldahl Nitrogen (TKN), nitrate (as NO₃-N), nitrite (as NO₂-N), and total phosphorus
- Phenols

Analytical request forms, including chain-of-custody data, were completed by Tetra Tech when the samples were submitted to the laboratory for analysis.

Hexavalent chromium (Chromium VI) was not analyzed in 2023 due to an oversight on the CoC. A multi-year laboratory quotation was obtained in 2021 for the 2021 through 2023 sampling events and was not updated to reflect the revised Approval in time for the 2023 sampling program. Hexavalent chromium analysis will be included in subsequent years.

In addition to lab testing, field parameter testing of the composite water sample was carried out at each dugout for the following:

- pH
- Electrical conductivity (EC)

Photographs were taken of each monitored dugout, and visual inspections were conducted to identify notable sheen, colour, odour, or other physical characteristics of the water in each dugout.

The analytical reports for each sample collected were forwarded to Tetra Tech once the analysis was completed. The 2023 laboratory Certificate of Analysis, as received from ALS, is presented in Appendix C. Table 1 summarizes the data collected in the last five years, including the 2023 monitoring program for each dugout. Appendix D contains the historical dugout chemical analytical results from 1996 up to 2023 data.

2.3 Quality Control and Quality Assurance

To evaluate field sampling reproducibility, duplicate water samples were collected during the 2023 sampling event at an approximate rate of 10% of total samples collected. In October 2023, the duplicates were taken from Dugout 11 (Duplicate 1) and Dugout 1 (Duplicate 2) and submitted as blinds for laboratory analysis for the same suite of parameters as the original samples (Tables 2 and 3).

To analyze the field sampling and laboratory testing reproducibility, the sample-duplicate pair was evaluated using the relative percentage difference (RPD) method, involving calculation of RPD when both sample and duplicate concentrations were greater than, or equal to, five times the laboratory reporting detection limit (RDL), as shown in Equation 1 below.

Equation 1:

$$\%RPD = (| \text{sample} - \text{duplicate concentrations} | \text{ divided by } \bar{X}) \text{ multiplied by } 100$$

Where \bar{X} is the average concentration of a sample and its duplicate.

Surface water quality parameters were considered as having passed the quality assurance (QA)/quality control (QC) reproducibility procedure if the RPD was less than or equal to 20%, indicating a close correlation between the sample-duplicate pair. RPD is usually used for objectively flagging data for further review, rather than for taking corrective action.

RPD values were not calculated if one or both of the sample-duplicate concentrations were less than five times the RDL. In these cases, water quality parameters were still considered as having passed the QA/QC reproducibility procedure if the other sample duplicate concentration difference was less than one RDL value.

The RPD calculations are summarized in Table 2 (Duplicate 1) and Table 3 (Duplicate 2). All but four RPD tests satisfied the requirements (Two failing tests from each Duplicate). The QA/QC reproducibility guidelines were not satisfied for the following parameters:

- Duplicate 1: COD (36% RPD)
- Duplicate 2: COD (62% RPD) and TSS (33% RPD)

Small variations due to variability in field sampling or laboratory analytical methods (i.e., residuals from previous analysis, etc.) can result in concentration differences that are two or three times greater than the concentration result, which results in higher RPDs which fail the requirements. However, the concentrations are similar in most cases and often have acceptable variability even though the RPD calculation may indicate otherwise. The Duplicate RPD failures are limited in number (one or two out of 60 tests conducted for each duplicate). Based on this fact, a limited number of failed results is within acceptable variability, and the duplicate analysis indicates the data are stable and considered reliable overall.

3.0 REVIEW OF WATER WELLS IN SEARCH RADIUS

Tetra Tech completed an audit to verify and review the information contained within the EPA Water Well Information Database (WWID) and other publicly available information sources to determine the existence and status of groundwater wells within a 1.6 km radius of the Ryley facility, and to determine if it is warranted to field verify the wells and sample them as part of the Dugout and Water Well Sampling Program (beginning in 2023). The required search radius was 1.6 km; however, to account for the distance from the centre of the facility and spatial inaccuracies within the water well database, an expanded 2.0 km radius was used. The search showed records of 50 water well records drilled for various purposes as of September 2023.

The accuracy of the WWID is limited, as described by EPA - *“Data provided through [WWID] are preliminary in nature. This data may not have been reviewed or edited for accuracy and may be subject to significant change when reviewed or corrected. Please exercise caution and carefully consider the provisional nature of the information provided.”* Further, EPA states that most well locations are not shown precisely enough to field verify. Where no GPS coordinates were provided in the driller submission forms (particularly for older wells), the well location is plotted in the centre of the LSD or quarter-section that was provided, and therefore, the WWID does not contain a high level of spatial accuracy.

Based on the available information, it appears that most wells are not suitable for regular sampling or are no longer present or available for use. Of 50 records returned, 44 are considered to not require field verification or are not suitable for sampling. Rationale for elimination is summarized in Table C below and encompasses 44 of the 50 wells. As a result, six (6) wells were included for site reconnaissance during the October 2023 field event.

Table C: Water Wells Eliminated from Search Radius

Type of Record or Use	Comments	Number of Wells
Decommissioned	WWID contains a record of well decommissioning.	4
Federal Well Survey	Non-domestic, assumed to be a test well, location unknown.	1
Transfer of land and removal of house	Well assumed to be abandoned/removed when land was sold, and house was removed.	3
Test hole, observation well, or monitoring well	Non-domestic observation well, assumed to be for compliance or other monitoring use based on owner name and/or proposed use.	21
Wells between 90 and 110 years old (pre-1933)	Well assumed to be decommissioned, abandoned, or not possible to locate in the field.	7
Distance Greater than 1.6 km	Wells were determined to be greater than 1.6 km from the edge of the landfill boundary (including the expansion area).	6
Municipal Use	The village of Ryley did not have any record of municipal water wells ² . All Village water is provided by water line from the City of Edmonton.	2

² Email communication from Village of Ryley to Tetra Tech dated September 25, 2023.

Tetra Tech also reviewed the status of the three “observation/investigation” wells (on SE 10-50-17-W4M) located immediately south of the active Claystone Landfill cells and to the east of Highway 854. These “test holes” were part of the 44 excluded wells and were excluded from further review in the September 2023 response to EPA from Clean Harbors Canada Inc. that summarized the area wells to consider in the Annual Dugouts and Water Wells monitoring program. The rationale for exclusion of these three wells is summarized as follows.

“Observation/investigation” wells (test holes) Nos. 1888429, 1888430 and 1888439 are located on lands owned by Claystone immediately south of the existing Claystone Class II Landfill cells and were installed by C. E. Moell as part of the landfill expansion and operation plan at that site. They would be part of the monitoring program at that site if functional, and even if data were available, it would be difficult to interpret due to the close proximity and potential influence of the Claystone Facility (about 200 m to the north). By comparison, the Clean Harbors facility is about 800 m to the southwest of these water wells. In addition, the lands where these wells are located is planned for future cell development and wells will be decommissioned. Our justification for excluding these three wells in the annual Clean Harbor’s Dugout and Water Well monitoring program is they are part of the Claystone operations and monitoring program (if functional), they are much closer to Claystone Landfill operations, and they will soon be decommissioned (if not already decommissioned). Just as Claystone does not monitor wells or dugouts on Clean Harbor’s lands, we do not monitor or sample water wells/dugouts on the Claystone Landfill property.

The remaining six records have the potential to correspond to water wells located on residential property, and therefore, may constitute active water wells. These wells were assumed to be in service until proven otherwise and therefore, field reconnaissance was conducted on October 17, 2023, during the dugout monitoring event. Table D below provides a summary of available information on the remaining six wells and Tetra Tech’s findings during reconnaissance.

Table D: Field Verification of Water Wells

GIC ID	Date Completed	Location	Use	Tetra Tech Findings
94701	1986	WH 4-50-17 W4M	Domestic & Industrial	Currently a closed diner nearby which is listed as being for sale. There are two well stickups at the back of the building. A letter was dropped off requesting for more information. No reply received.
94710	Not stated	4-9-50-17 W4M	Domestic & Stock	The landowner (Terry Magnuson) mentioned that there were three water wells surrounding his homestead and his family has decommissioned all three in the last 50 years. Currently, there are no water wells on his property.
94714	Not stated	SW 10-50-17 W4M	Domestic	The only potential residence in the vicinity is vacant/abandoned. GIC 94714 is likely an old record.
94748	Not stated	16-50-17 W4M	Domestic	The landowner stated that he has resided at the property for over 60 years and he doesn’t know of any water wells on the property.
286840	1997	4-10-50-17 W4M	Domestic	The only potential residence in the vicinity is vacant/abandoned. GIC ID 286840 is likely an old record.
94704	1986	4-50-17 W4M	Industrial	The building used to be occupied by “Highway 14 Regional Water Services Commission” and has since moved to a new location with the building currently appearing vacant. A well stickup was noted at an area adjacent to the west of the building. A letter requesting more information was dropped off at the vacant building and at the new office. No reply received.

None of the six outstanding water well records investigated resulted in monitoring or sampling as the well locations could not be confirmed/found or there was no response to either phone calls or letters dropped off at the locations.

4.0 FINDINGS

The chemical analysis results from the dugout monitoring program are reviewed for significant changes in parameters and compared to the range of results of previous sampling events, with particular focus on the past five years. The intent is not to compare results to provincial standards for acceptable water quality, but to pre-existing, baseline conditions in 1996 and successive years and identify potential or apparent trends, if any. High variability between years and between sites is possible and expected given only one sampling event per year and high variability in monthly and annual temperature and precipitation data. In addition, parameters at some locations have exceeded provincial water quality objectives since 1996 and are characteristic of natural conditions in the area or are related to pre-existing and ongoing agricultural land use. The objective of this work is to identify elevated levels and/or upward trends in parameters that might be sourced from the landfill through a groundwater, air or surface water pathway. Emphasis has been placed on reviewing sampling points down-gradient (generally east) of the landfill site, although the landfill site is near a local highpoint and groundwater and surface water flow may also be towards the north.

A summary of the 2023 data follows with data in Tables 1, 2 and 3. Table E below provides a summary of the evaluation of the parameters monitored for under the current approval.

Environment Canada's and Alberta Agriculture and Forestry's monthly and annual precipitation data from the Elk Island National Park meteorological station were reviewed and are summarized in Table 4. The total annual precipitation in 2023 was 396.7 mm which was 56.7 mm lower than the mean annual precipitation (or 87% of average) in the region (several different stations as available) since 1996. The months of January, February, March, September, October, November, and December 2023 were particularly low in 2023. The 2014, 2015, 2019, 2021, 2022, and 2023 annual precipitation data was from the Elk Island National Park meteorological station. Note that previous precipitation data (1996 to 2013) were obtained from the Tofield North Station when active. The Alberta Agriculture precipitation website³ was updated to include more station data, so during 2016-2018, the Holden Alberta Government Drought Monitoring (AGDM) meteorological station data was utilized as it was closer to the subject site than others available. These shifts in the local reporting stations over the years are not expected to have a material impact on annual averages but may affect monthly precipitation data. Overall, there was generally lower than average precipitation in 2023 for a third consecutive year.

The two duplicate samples (Duplicate 1 from Dugout 11 and Duplicate 2 from Dugout 1) were tested for the same parameters as all other dugouts. All data is presented as follows:

The maximum value of each analyzed parameter were reviewed for each dugout location. The 2023 values of most parameters appeared similar to historical values. Parameters with 2023 analytical results greater than the historical values for specific dugouts are summarized in Table E. Data from dugouts 9A and 23 was not assessed as each of these locations commenced monitoring in 2023.

³ <http://www.agriculture.alberta.ca/acis/alberta-weather-data-viewer.jsp>

Table E: Dugout and Water Well Monitoring Summary

Parameter	Locations where the 2023 value is the Maximum Value	Comments
pH (Field)	-	N/A
pH (Lab)	-	N/A
EC (Field)	-	N/A
EC (Lab)	Dugout 10	Lab EC at dugout 10 is the greatest to date, but similar to the 2022 value (2,810 µS/cm).
Chemical Oxygen Demand (COD)	Dugouts 3, 4, 10, and 20	COD results for dugouts 4 and 20 have exceeded historical values since 2022.
Dissolved Organic Carbon (DOC)	-	None
TDS	Dugout 10	TDS at dugout 10 appears to continue to increase year-over-year.
TSS	Dugouts 2, 3, 4, 10, 15, and 20	TSS monitoring commenced in 2021. While upward trends are apparent in several locations, the range of values observed may be within the typical range for the specified locations.
Dissolved Metals		
Aluminum	Dugout 11	No previous indication of elevated Aluminum at dugout 11.
Antimony	-	N/A
Arsenic	Dugout 10	Arsenic concentrations in dugout 10 appear to have increased slightly since 2019.
Barium	-	N/A
Boron	Dugout 9	Elevated but stable boron concentrations have been apparent since 2021.
Cadmium	Dugouts 4 and 11	Dugout 4 cadmium concentration is marginally greater than the laboratory detection limit. Dugout 11 cadmium concentration changed from the lowest observed value to the highest between 2022 and 2023.
Chromium, Total	-	N/A
Chromium, Hexavalent	No data available	No data available
Cobalt	-	N/A
Copper	Dugout 15	No previous trend in copper concentrations at dugout 15.
Lead	Dugouts 3 and 15	Lead concentration at dugout 3 is not appreciably greater than the 2020 value. Lead concentration at dugout 15 is marginally greater than the laboratory detection limit.
Manganese	-	N/A
Mercury	-	N/A
Molybdenum	-	N/A
Nickel	-	N/A
Selenium	-	N/A
Silver	Dugout 11	Silver concentration at dugout 11 is marginally greater than the laboratory detection limit.
Thallium	-	N/A
Tin	Dugouts 3, 4, 10, 11, 13, 14, 19, 21, and 22	Tin concentrations at the specified locations are historically less than the laboratory detection limit.

Table E: Dugout and Water Well Monitoring Summary

Parameter	Locations where the 2023 value is the Maximum Value	Comments
Uranium	Dugout 10	Uranium concentration at dugout 10 has increased steadily since 2019.
Zinc	Dugout 15	Zinc concentration at dugout 15 continues to increase since 2022.
Major Ions		
Calcium	Dugout 10	Calcium concentration at dugout 10 continues to increase.
Magnesium	Dugouts 2, 4, 7, 10, 13, and 14	Magnesium concentrations at the indicated dugouts are substantially greater than during historical monitoring.
Potassium	Dugouts 19 and 22	Potassium concentrations at dugouts 19 and 22 do not appear to represent a recent increasing trend.
Sodium	Dugout 10	Sodium concentrations at dugout 10 have slowly increased since 2019.
Carbonate	-	N/A
Bicarbonate	Dugout 10	Bicarbonate concentration at dugout 10 does not appear to represent a recent increasing trend.
Chloride	Dugout 10	Chloride concentrations at dugout 10 have slowly increased since 2019.
Sulfate	Dugout 22	Sulfate concentrations at dugout 22 have increased substantially since 2019.
Nutrients		
Ammonia (as N)	Dugout 10	Ammonia as N concentration at dugout 10 has increased substantially since 2019.
Total Kjeldahl Nitrogen	Dugouts 3 and 10	TKN concentrations in dugouts 3 and 10 do not appear to represent a recent increasing trend.
Nitrate (as NO ₃ -N)	Dugout 3	
Nitrite (as NO ₂ -N)	Dugouts 3, 10, 11, and 13	
Phosphorus, Total	Dugouts 2, 3, 4, 5, 6, 7, and 10	Phosphorus concentrations in dugouts 2, 3, and 4 continue to increase over their 2022 values and may represent a potential increasing trend in these locations.
BTEX		
Benzene	-	N/A
Toluene	-	N/A
Ethylbenzene	-	N/A
Xylenes, Total	-	N/A
Phenols	-	N/A
PHC Fraction F1	-	N/A
PHC Fraction F2	-	N/A

N/A – Not Applicable. No 2023 locations showed the maximum value for the specified parameter.

Data charts for parameters with locations where the 2023 results were the greatest results on record are presented on Figure 2.

5.0 DISCUSSION

5.1 Dugout Monitoring

The dugout water levels in 2023 were similar to those observed in 2022. Photos 1 and 2 show typical water levels at dugouts 13 and 19, respectively, and photographs of each dugout were taken at the time of monitoring. Sufficient water was available for sampling at all dugouts in 2023, however landowner authorization to monitor and sample dugouts 24, 25, and 26 had not been received prior to the 2023 monitoring event. These dugout locations were not monitored or sampled in 2023 and they are new due the expanded facility boundary. They will be included in 2024 if possible.

In general, the values of most parameters at most dugouts analyzed in 2023 were similar to historical values, except as described below and in Section 4.0. The following discussion focuses on parameters or parameter groups where observations at select dugouts were at their historical highest values in 2023.

The laboratory EC and total dissolved solids values at dugout 10 reached a new maximum value in 2023. As EC is affected by the total amount of anions and cations in solution, and dugout 10 has new maximum values for almost all the major ions (see below), an unusually high EC could be expected in response. Chemical oxygen demand in four dugouts (dugouts 3, 4, 10, and 20) was at its highest value in 2023, suggesting that the organic constituents of those dugouts may be substantially greater than in previous years. Changes in dugout use by livestock, use of the surrounding farmland, or changes in seasonal presence of decaying organic matter could affect the COD observed in these locations. Dugouts 4 and 20 have recorded elevated COD since 2022 and should be closely observed during future events.

Total suspended solids were recorded at new maximum values for six dugouts in 2023. As TSS analysis was added in 2020, it is likely that the full range of TSS values for some or all of the monitored dugouts have not yet been established. Future monitoring events may confirm if these values are typical or represent a potential increasing trend. Total suspended solids can be affected by livestock activity, bank erosion and wind activity on the dugouts.

Various dissolved metals parameters (aluminum, arsenic, boron, cadmium, copper, lead, silver, tin, uranium, and zinc) were observed at new maximum concentrations in one or more dugouts in 2023. Most of these occurrences appear isolated compared to historical values and not consistent with generally increasing concentrations of the specified parameters at the indicated wells. Tin concentrations have historically been below the laboratory reportable detection limit (RDL) at most dugout locations; however, reportable values were recorded at some locations in 2023 and should be confirmed during future monitoring events.

All major ions except carbonate (calcium, magnesium, sodium, potassium, bicarbonate, chloride, and sulfate) were observed at new maximum concentrations in one or more dugouts in 2023. Calcium, magnesium, sodium, chloride, and sulfate values for the locations noted in Table E may indicated increasing trends of these parameters and should continue to be observed closely during future monitoring events.

Nutrient parameters (ammonia, TKN, nitrate, nitrite, and phosphorus) were all observed at new maximum values at select locations in 2023. Nutrient load in surface water bodies can change with seasonal factors or changes to surrounding land use such as the presence of livestock or application of fertilizers and highly varied results year over year do not necessarily indicate undue influence from nearby landfill operations.

No dugout locations were identified with new maximum BTEX, phenols, or PHC fraction F1 or F2 values in 2023. These parameters are typically indicators of potential contamination sources and are generally not detected above the laboratory RDL.

The assessment of parameters analyzed does not appear to indicate off-site impacts from the Ryley Class I landfill site to these dugouts through groundwater, surface water or air pathways within a 1.6 km radius study area which includes the 21 dugouts sampled in 2023.

5.2 Surrounding Area Water Well Review Summary

Tetra Tech completed an audit to verify and review the information contained within the EPA Water Well Information Database (WWID) and other publicly available information sources to determine the status of water wells within a 1.6 km radius of the Ryley facility. Based on the available information, it appears that most wells are not suitable for regular sampling or are no longer present or available for use. Of 50 records returned in the database, 44 are considered to not require field verification (nor are suitable for sampling). Rationale for elimination of the 44 wells included available well record details, age of installation, distance from the Ryley Facility, intended purpose and owner name.

As noted in Section 3.0, none of the six outstanding water well records investigated in the field resulted in monitoring or sampling as the well locations could not be confirmed/found or there was no response to either telephone calls or letters dropped off at the locations.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are based on the 2023 dugout and water well monitoring program:

- Analytical results of the dugout and water well monitoring program conducted in October 2023 indicate that the Ryley Class I Hazardous Waste Facility does not appear to be adversely impacting water quality in dugouts within a 1.6 km radius.
- Some parameters analyzed in 2023 exhibited new maximum observed values in one or more dugouts relative to historical baseline values, but the majority of concentrations were within the historical ranges for those parameters.
- Select parameters having historically high values or concentrations during the 2023 monitoring event should continue to be monitored and evaluated in future sampling events.
- No water wells were located within the 1.6 km radius of the site that could be included in the sampling program.
- A similar monitoring program is recommended for October 2024, as part of the ongoing site Approval compliance process.
- Each landowner should be forwarded a copy of the water chemistry analysis report pertaining to the dugout(s) sampled on their property once the 2023 report is finalized and submitted to AEPA.
- Area water wells should be reassessed every five years to confirm if any new wells have been established and should be included in the annual dugout and water well monitoring program.

7.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

Respectfully submitted,
Tetra Tech Canada Inc.



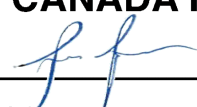
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DATE: <u>2024-02-29</u>
PERMIT NUMBER: P013774 The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

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TABLES

Table 1.1 to Table 1.23	Chemical Analytical Results
Table 2	Duplicate 1 Chemical Analytical Results
Table 3	Duplicate 2 Chemical Analytical Results
Table 4	Historical and 2023 Precipitation Data - Total Precipitation (mm)

Table 1.1: Chemical Analytical Results

Sample ID:		Booth D.1				
Site Number:		1				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	84	82	95	96	127
Ammonia-N	mg/L	<0.050	<0.050	0.051	0.117	0.128
Total Kjeldahl Nitrogen	mg/L	2.51	2.75	3.45	3.52	4.36
Dissolved Organic Carbon	mg/L	22.9	19.9	28.9	23.5	29.8
Phenols	mg/L	0.0075	0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	10.6	18.2	41.2	29
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0021	0.0036	0.0049	0.0041	0.0027
Antimony	mg/L	0.00020	0.00016	0.00034	<0.00010	0.00023
Arsenic	mg/L	0.00484	0.00583	0.00809	0.00297	0.00647
Barium	mg/L	0.0614	0.0612	0.0471	0.0992	0.0503
Boron	mg/L	0.047	0.025	0.037	0.023	0.048
Cadmium	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000052
Chromium	mg/L	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050
Cobalt	mg/L	0.00035	0.00030	0.00051	0.00029	0.00035
Copper	mg/L	0.00053	0.00040	0.00147	0.0002	0.00054
Lead	mg/L	0.000072	0.000055	0.000071	<0.000050	0.000098
Manganese	mg/L	0.00250	0.00783	0.00753	0.08	0.00556
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000113	<0.0000050
Molybdenum	mg/L	0.000853	0.000611	0.00117	0.000419	0.00106
Nickel	mg/L	0.00353	0.00304	0.00382	0.00277	0.00384
Selenium	mg/L	0.000115	0.000156	0.000096	0.00017	0.000132
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.0003
Uranium	mg/L	0.000578	0.000578	0.000824	0.000245	0.000525
Zinc	mg/L	<0.0010	<0.0010	0.0018	<0.0010	<0.0010
Routine Water						
Bicarbonate	mg/L	328	358	424	291	350
Chloride	mg/L	46.3	40.2	55.0	49.2	35
Carbonate	mg/L	<5.0	6.4	7.2	<1.0	5.3
Electrical Conductivity (EC)	uS/cm	714	712	808	651	689
Calcium	mg/L	21.5	20.4	13.9	45.5	22.6
Potassium	mg/L	12.5	13.2	16.4	14.2	10.2
Magnesium	mg/L	10.8	9.69	11.5	16.2	13.2
Sodium	mg/L	128	120	181	74.6	140
Sulfate	mg/L	43.4	26.6	28.0	42.4	51.6
Phosphorus	mg/L	0.211	0.466	0.148	0.525	0.607
pH in H ₂ O	pH	8.36	8.42	8.48	8.24	8.46
TDS (Calculated)	mg/L	428	413	522	423	460
Nitrate	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrite	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	8.4	8.27	9.57	8.23	8.75
Electrical Conductivity (EC)	uS/cm	80	758	507	803	575

Notes:

"-" Not required under previous permit

Table 1.2: Chemical Analytical Results

Sample ID:		Ewert D.1				
Site Number:		2				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	79	78	99	153	144
Ammonia-N	mg/L	<0.050	<0.050	0.122	0.0625	0.0547
Total Kjeldahl Nitrogen	mg/L	2.70	3.08	2.26	3.8	4.4
Dissolved Organic Carbon	mg/L	22.2	21.1	33.7	45.3	41.3
Phenols	mg/L	0.0101	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	10.6	8.0	35.8	91.4
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0349	0.0059	0.109	0.0179	0.0062
Antimony	mg/L	0.00025	0.00021	0.00052	0.00051	0.00042
Arsenic	mg/L	0.0137	0.00823	0.0103	0.0164	0.0128
Barium	mg/L	0.0449	0.0508	0.0812	0.0401	0.0501
Boron	mg/L	0.040	0.028	0.035	0.041	0.022
Cadmium	mg/L	0.0000070	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	<0.00010	<0.00010	0.00018	<0.00050	0.00054
Cobalt	mg/L	0.00062	0.00046	0.00117	0.00067	0.00049
Copper	mg/L	0.00271	0.00065	0.00389	0.00143	0.00113
Lead	mg/L	0.000076	<0.000050	0.000082	0.000097	0.000078
Manganese	mg/L	0.0138	0.00492	0.00745	0.0287	0.0259
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.00198	0.000868	0.00316	0.00196	0.00131
Nickel	mg/L	0.00321	0.00290	0.00698	0.00434	0.0032
Selenium	mg/L	0.000258	0.000172	0.000373	0.000435	0.00035
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	mg/L	0.00138	0.00101	0.00290	0.00253	0.00192
Zinc	mg/L	0.0011	<0.0010	0.0042	<0.0010	0.0028
Routine Water						
Bicarbonate	mg/L	304	367	551	375	501
Chloride	mg/L	32.9	34.5	56.7	60.1	55.8
Carbonate	mg/L	38.3	16.4	14.3	135	90.4
Electrical Conductivity (EC)	uS/cm	675	732	1110	1340	1,180
Calcium	mg/L	21.5	22.6	22.4	19	24
Potassium	mg/L	16.0	20.3	26.7	23.5	14.2
Magnesium	mg/L	10.2	12.0	14.9	16.1	21
Sodium	mg/L	124	121	255	295	271
Sulfate	mg/L	24.3	28.9	103	118	84.2
Phosphorus	mg/L	0.628	0.745	0.408	0.578	0.980
pH in H ₂ O	pH	9.16	8.69	8.59	9.75	9.45
TDS (Calculated)	mg/L	417	436	764	897	824
Nitrate	mg/L	0.047	<0.020	0.021	<0.020	<0.020
Nitrite	mg/L	0.013	<0.010	<0.010	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	EF	8.94	9.35	10.06	8.60
Electrical Conductivity (EC)	uS/cm	829	777	344.6	1388	947

Notes:

"-" Not required under previous permit

"EF" Equipment malfunction

Table 1.3: Chemical Analytical Results

Sample ID:		Ewert D.2				
Site Number:		3				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	92	119	133	124	226
Ammonia-N	mg/L	0.254	1.13	0.67	0.0393	0.341
Total Kjeldahl Nitrogen	mg/L	3.01	4.86	4.98	4.24	7.96
Dissolved Organic Carbon	mg/L	28.2	31.3	42.5	37.8	36.4
Phenols	mg/L	0.0068	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	13.6	93	53.8	152
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0334	0.0316	0.032	0.009	0.0036
Antimony	mg/L	0.00020	0.00025	0.00064	0.00022	0.00022
Arsenic	mg/L	0.00619	0.00841	0.0153	0.0113	0.00503
Barium	mg/L	0.0364	0.0509	0.0929	0.0252	0.023
Boron	mg/L	0.034	0.011	0.024	0.03	0.033
Cadmium	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000061
Chromium	mg/L	0.00013	0.00019	0.00013	<0.00050	<0.00050
Cobalt	mg/L	0.00061	0.00125	0.00153	0.00088	0.00077
Copper	mg/L	0.00127	0.00082	0.00197	0.00088	0.00168
Lead	mg/L	0.000164	0.000215	0.000102	0.000089	0.000229
Manganese	mg/L	0.00377	0.264	0.0538	0.0343	0.0429
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.000761	0.000587	0.00204	0.000878	0.00087
Nickel	mg/L	0.00630	0.00565	0.0086	0.00503	0.00485
Selenium	mg/L	0.000366	0.000326	0.000582	0.00038	0.000254
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00015
Uranium	mg/L	0.000775	0.000892	0.00274	0.000777	0.000728
Zinc	mg/L	<0.0010	<0.0010	0.0027	<0.0010	0.0016
Routine Water						
Bicarbonate	mg/L	407	498	662	393	385
Chloride	mg/L	33.3	45.9	62.2	40.2	32.6
Carbonate	mg/L	<5.0	12.6	19.9	23.8	<1.0
Electrical Conductivity (EC)	uS/cm	844	1220	1590	922	804
Calcium	mg/L	25.8	30.1	44.0	28.3	23.4
Potassium	mg/L	19.0	23.5	28.9	19.3	10.8
Magnesium	mg/L	13.4	16.6	23.8	13.6	16.4
Sodium	mg/L	157	222	317	180	155
Sulfate	mg/L	77.3	193	284	80.2	108
Phosphorus	mg/L	0.576	1.19	1.14	1.43	1.69
pH in H ₂ O	pH	8.29	8.49	8.61	8.92	8.23
TDS (Calculated)	mg/L	531	789	1110	617	566
Nitrate	mg/L	0.388	0.099	0.034	<0.020	0.392
Nitrite	mg/L	0.029	0.057	<0.010	<0.010	0.084
Field Data						
pH in H ₂ O	pH	6.49	8.17	8.94	9.19	8.93
Electrical Conductivity (EC)	uS/cm	104.3	1322	986	943	657

Notes:

"-" Not required under previous permit

Table 1.4: Chemical Analytical Results

Sample ID:		Ewert D.3				
Site Number:		4				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	106	116	115	164	166
Ammonia-N	mg/L	<0.050	<0.050	0.60	0.07	0.168
Total Kjeldahl Nitrogen	mg/L	3.22	3.45	4.27	4.87	4.55
Dissolved Organic Carbon	mg/L	28.3	29.0	38.2	45.9	47.2
Phenols	mg/L	0.0058	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	7.6	8.0	37.8	80
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0107	0.0155	0.0129	0.0111	0.0071
Antimony	mg/L	0.00016	0.00018	0.00025	0.00016	0.00018
Arsenic	mg/L	0.0031	0.00513	0.0077	0.00691	0.00447
Barium	mg/L	0.0418	0.0342	0.0468	0.0208	0.0247
Boron	mg/L	0.039	0.025	0.032	0.039	0.038
Cadmium	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000071
Chromium	mg/L	0.00017	0.00023	0.00011	<0.00050	<0.00050
Cobalt	mg/L	0.00036	0.00075	0.00080	0.00106	0.00059
Copper	mg/L	0.00163	0.0010	0.00255	0.00091	0.00159
Lead	mg/L	0.000211	0.000278	0.000189	0.000136	0.000081
Manganese	mg/L	0.00879	0.0441	0.114	0.146	0.0634
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.000489	0.000407	0.00143	0.000938	0.00104
Nickel	mg/L	0.00281	0.00314	0.00375	0.00468	0.00332
Selenium	mg/L	0.000188	0.000206	0.000252	0.000277	0.000262
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00011
Uranium	mg/L	0.000262	0.000262	0.000768	0.000332	0.000174
Zinc	mg/L	<0.0010	<0.0010	0.0017	0.0012	0.0033
Routine Water						
Bicarbonate	mg/L	290	338	426	291	308
Chloride	mg/L	56.2	73.5	99.8	68	49
Carbonate	mg/L	<5.0	5.3	<5.0	2.5	3
Electrical Conductivity (EC)	uS/cm	622	750	894	696	575
Calcium	mg/L	22.5	19.5	25.5	20.7	25.5
Potassium	mg/L	14.2	15.7	21.0	18.9	10.1
Magnesium	mg/L	10.7	10.2	11.5	10.9	16.1
Sodium	mg/L	103	126	173	124	101
Sulfate	mg/L	14.3	15.8	13.4	17.2	7.13
Phosphorus	mg/L	0.605	1.08	0.701	1.46	1.6
pH in H ₂ O	pH	7.98	8.39	8.40	8.38	8.38
TDS (Calculated)	mg/L	364	432	560	457	419
Nitrate	mg/L	0.027	<0.020	0.103	<0.020	<0.020
Nitrite	mg/L	0.010	<0.010	0.016	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	EF	8.34	8.60	8.53	8.39
Electrical Conductivity (EC)	uS/cm	803	793	275.9	716	500

Notes:

"-" Not required under previous permit

"EF" Equipment malfunction

Table 1.5: Chemical Analytical Results

Sample ID:		Ewert D.4				
Site Number:		5				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	92	75	124	114	109
Ammonia-N	mg/L	<0.050	0.235	0.51	0.0678	0.143
Total Kjeldahl Nitrogen	mg/L	3.61	3.64	5.41	4.27	3.5
Dissolved Organic Carbon	mg/L	22.7	23.0	35.9	28.3	28.3
Phenols	mg/L	0.0076	0.0012	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	33.8	69	40.2	38.8
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	0.77	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0015	0.0425	0.0782	0.0645	0.0025
Antimony	mg/L	0.00015	0.00035	0.00057	0.00031	0.00024
Arsenic	mg/L	0.00313	0.00692	0.00694	0.00625	0.00595
Barium	mg/L	0.0528	0.0823	0.102	0.0589	0.0338
Boron	mg/L	0.042	0.018	0.034	0.042	0.029
Cadmium	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	<0.00010	0.00013	0.00012	<0.00050	<0.00050
Cobalt	mg/L	0.00043	0.00113	0.00146	0.00093	0.00049
Copper	mg/L	0.00054	0.00123	0.00282	0.00078	0.00055
Lead	mg/L	<0.000050	0.000273	0.000078	0.000093	0.000067
Manganese	mg/L	0.00080	0.0246	0.00707	0.0131	0.0127
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.00118	0.00177	0.00312	0.00205	0.00108
Nickel	mg/L	0.00406	0.00732	0.00852	0.00442	0.00348
Selenium	mg/L	0.000217	0.00037	0.000469	0.000305	0.000256
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	mg/L	0.000602	0.00121	0.00245	0.0013	0.000551
Zinc	mg/L	<0.0010	<0.0010	0.0039	<0.0010	0.0015
Routine Water						
Bicarbonate	mg/L	356	312	494	364	339
Chloride	mg/L	18	12.9	20.5	15.2	10.6
Carbonate	mg/L	6.6	<5.0	9.8	14.9	5.4
Electrical Conductivity (EC)	uS/cm	624	796	878	718	589
Calcium	mg/L	23.9	28.5	29.5	22.2	24.4
Potassium	mg/L	14.5	15.3	19.6	16.7	11.6
Magnesium	mg/L	13.3	13.4	17.1	15.2	14.4
Sodium	mg/L	103	118	168	136	102
Sulfate	mg/L	20.2	136	80.9	42.3	46
Phosphorus	mg/L	0.225	0.591	0.105	0.301	0.988
pH in H ₂ O	pH	8.44	8.37	8.50	8.75	8.47
TDS (Calculated)	mg/L	375	482	583	472	388
Nitrate	mg/L	<0.020	<0.020	<0.020	0.032	<0.020
Nitrite	mg/L	<0.010	0.011	<0.010	0.013	<0.010
Field Data						
pH in H ₂ O	pH	EF	8.10	9.00	9.23	8.59
Electrical Conductivity (EC)	uS/cm	788	829	551	739	485

Notes:

"-" Not required under previous permit

"EF" Equipment malfunction

Table 1.6: Chemical Analytical Results

Sample ID:		Lyons D.1				
Site Number:		6				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	18-Oct-2022	17-Oct-2023
Chem. O ₂ Demand	mg/L	89	98	93	95	84
Ammonia-N	mg/L	0.575	0.191	0.054	0.021	0.241
Total Kjeldahl Nitrogen	mg/L	3.01	3.13	3.19	2.44	3.74
Dissolved Organic Carbon	mg/L	24.7	25.0	29.7	27.1	30.2
Phenols	mg/L	0.0087	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	5.2	23.6	16.6	17.8
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0306	0.0366	0.0034	0.0023	0.0067
Antimony	mg/L	0.00017	0.00017	0.00024	0.00015	0.00011
Arsenic	mg/L	0.00531	0.00537	0.00773	0.00591	0.00516
Barium	mg/L	0.0421	0.0372	0.0330	0.0286	0.0276
Boron	mg/L	0.029	<0.010	0.023	0.056	0.058
Cadmium	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	0.0002	0.00028	<0.00010	<0.00050	<0.00050
Cobalt	mg/L	0.00038	0.00065	0.00078	0.00057	0.00052
Copper	mg/L	0.00063	0.00060	0.00119	0.00044	0.00037
Lead	mg/L	0.000229	0.000149	<0.000050	<0.000050	0.00008
Manganese	mg/L	0.00866	0.223	0.00485	0.0169	0.119
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.00076	0.000751	0.00132	0.000992	0.00075
Nickel	mg/L	0.00361	0.00335	0.00336	0.00338	0.00274
Selenium	mg/L	0.000212	0.000251	0.000271	0.000256	0.000184
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	mg/L	0.000234	0.00025	0.000932	0.000393	0.000116
Zinc	mg/L	0.0016	<0.0010	0.0022	0.0014	<0.0010
Routine Water						
Bicarbonate	mg/L	217	210	325	228	185
Chloride	mg/L	12.9	13.1	18.3	24.2	11.2
Carbonate	mg/L	<5.0	<5.0	<5.0	9.7	<1.0
Electrical Conductivity (EC)	uS/cm	405	439	586	535	419
Calcium	mg/L	18.6	16.9	29.8	23.6	17.2
Potassium	mg/L	17.1	13.6	18.1	17.4	7.54
Magnesium	mg/L	8.46	7.41	10.8	9.12	16.2
Sodium	mg/L	51	59.0	84.7	76.7	53
Sulfate	mg/L	15	36.4	48.8	30.4	36
Phosphorus	mg/L	1.38	1.23	0.589	1.15	1.78
pH in H ₂ O	pH	7.91	8.06	8.30	8.72	7.95
TDS (Calculated)	mg/L	232	250	368	331	276
Nitrate	mg/L	0.429	<0.020	<0.020	<0.020	<0.020
Nitrite	mg/L	0.045	<0.010	<0.010	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	EF	7.69	9.13	8.62	8.72
Electrical Conductivity (EC)	uS/cm	496	953	355.1	535	374

Notes:
 "-" Not required under previous permit
 "EF" Equipment malfunction

Table 1.7: Chemical Analytical Results

Sample ID:		Lyons D.2				
Site Number:		7				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	18-Oct-2022	17-Oct-2023
Chem. O ₂ Demand	mg/L	83	76	182	87	90
Ammonia-N	mg/L	0.414	0.236	0.090	1.330	0.204
Total Kjeldahl Nitrogen	mg/L	2.58	2.67	9.30	3.66	4.45
Dissolved Organic Carbon	mg/L	23.4	20.8	46.8	33.5	29.6
Phenols	mg/L	0.0075	0.0017	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	3.4	43.5	8.6	25.2
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0613	0.0189	0.0176	0.0049	0.0043
Antimony	mg/L	0.00012	0.00014	0.00025	0.00014	0.00012
Arsenic	mg/L	0.00497	0.00461	0.00725	0.00513	0.00422
Barium	mg/L	0.0649	0.0240	0.0357	0.034	0.00746
Boron	mg/L	0.022	<0.010	0.032	0.05	0.046
Cadmium	mg/L	<0.0000050	<0.0000050	0.0000065	<0.0000050	<0.0000050
Chromium	mg/L	0.00018	0.00016	0.00011	<0.00050	<0.00050
Cobalt	mg/L	0.00049	0.00025	0.00081	0.00069	0.00027
Copper	mg/L	0.00083	0.00095	0.00233	0.00046	0.00038
Lead	mg/L	0.000281	0.000087	0.000056	<0.000050	<0.000050
Manganese	mg/L	0.0361	0.0155	0.0101	0.162	0.00983
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.00063	0.000745	0.00176	0.000826	0.0005
Nickel	mg/L	0.00341	0.00326	0.00415	0.00279	0.00201
Selenium	mg/L	0.000212	0.000249	0.000257	0.000192	0.000155
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	0.00012	<0.00010	<0.00010
Uranium	mg/L	0.000266	0.000275	0.00114	0.000342	0.000138
Zinc	mg/L	0.0018	<0.0010	0.0046	<0.0010	0.0031
Routine Water						
Bicarbonate	mg/L	232	202	289	270	233
Chloride	mg/L	15.6	13.0	17.9	21.6	15
Carbonate	mg/L	<5.0	<5.0	<5.0	<1.0	<1.0
Electrical Conductivity (EC)	uS/cm	435	409	515	549	455
Calcium	mg/L	17.4	16.9	26.2	22.5	18.5
Potassium	mg/L	18.5	15.5	21.3	19.7	6.99
Magnesium	mg/L	7.74	6.42	9.62	8.64	18
Sodium	mg/L	56.5	54.3	82.2	74.4	61
Sulfate	mg/L	14.5	24.9	32.8	22.6	19.5
Phosphorus	mg/L	1.13	1.09	0.865	1.2	1.68
pH in H ₂ O	pH	8.11	8.12	8.25	8.06	7.95
TDS (Calculated)	mg/L	246	230	333	346	291
Nitrate	mg/L	0.396	<0.020	0.047	0.045	0.024
Nitrite	mg/L	0.042	0.013	<0.010	0.02	<0.010
Field Data						
pH in H ₂ O	pH	10.73	7.81	9.07	7.93	8.50
Electrical Conductivity (EC)	uS/cm	529	923	173	541	377

Notes:

"-" Not required under previous permit

Table 1.8: Chemical Analytical Results

Sample ID:		Lyons D.3				
Site Number:		8				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	18-Oct-2022	17-Oct-2023
Chem. O ₂ Demand	mg/L	105	116	378	125	113
Ammonia-N	mg/L	<0.050	0.286	2.13	0.0994	0.0594
Total Kjeldahl Nitrogen	mg/L	3.66	4.93	18.0	4.0	3.15
Dissolved Organic Carbon	mg/L	30.9	30.8	108	45.7	27.6
Phenols	mg/L	0.0137	<0.0010	<0.003	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	52.8	1040	56.2	176
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0192	0.0175	1.28	0.0064	0.0046
Antimony	mg/L	0.0003	0.00046	0.00131	0.00052	0.00035
Arsenic	mg/L	0.00261	0.00407	0.00556	0.00575	0.0036
Barium	mg/L	0.0461	0.0697	0.185	0.0423	0.0418
Boron	mg/L	0.027	0.014	0.060	0.033	0.059
Cadmium	mg/L	0.0000068	<0.0000050	0.0000423	0.0000081	<0.0000050
Chromium	mg/L	0.00010	0.00011	0.00163	<0.00050	<0.00050
Cobalt	mg/L	0.00161	0.00247	0.00303	0.00136	0.00134
Copper	mg/L	0.00484	0.00425	0.00613	0.0028	0.00306
Lead	mg/L	0.000051	<0.000050	0.00289	<0.000050	0.000051
Manganese	mg/L	0.00279	0.0179	0.166	0.00573	0.0235
Mercury	mg/L	<0.0000050	<0.0000050	0.0000088	<0.0000050	<0.0000050
Molybdenum	mg/L	0.00452	0.00583	0.0316	0.0103	0.00625
Nickel	mg/L	0.0112	0.0125	0.0195	0.0136	0.00808
Selenium	mg/L	0.000684	0.000967	0.00153	0.001	0.000608
Silver	mg/L	<0.000010	<0.000010	0.000018	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	0.000016	<0.000010	<0.000010
Tin	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium	mg/L	0.00318	0.00422	0.0213	0.00628	0.00441
Zinc	mg/L	0.0017	<0.0010	0.0108	<0.0010	<0.0010
Routine Water						
Bicarbonate	mg/L	413	426	557	481	373
Chloride	mg/L	22.3	17.5	66.3	26.5	18
Carbonate	mg/L	14.5	15.7	<5.0	15.6	14.9
Electrical Conductivity (EC)	uS/cm	978	816	1470	1240	896
Calcium	mg/L	41.3	31.8	31.8	34.4	34.9
Potassium	mg/L	22.2	20.9	26.6	24.4	17.2
Magnesium	mg/L	24.6	17.1	14.5	23.4	17.7
Sodium	mg/L	149	126	262	216	128
Sulfate	mg/L	138	60.5	306	200	122
Phosphorus	mg/L	0.290	0.447	0.228	0.251	0.536
pH in H ₂ O	pH	8.60	8.60	8.31	8.61	8.61
TDS (Calculated)	mg/L	615	500	985	824	567
Nitrate	mg/L	<0.020	0.079	0.096	<0.020	<0.020
Nitrite	mg/L	<0.010	0.020	<0.010	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	7.24	8.54	8.58	8.53	8.08
Electrical Conductivity (EC)	uS/cm	1198	861	845	1238	668

Notes:

"-" Not required under previous permit

Table 1.9: Chemical Analytical Results

Sample ID:					
Lyons D.4					
Site Number:					
9					
Date Sampled:	29-Oct-2019	8-Oct-2020	21-Oct-2021	18-Oct-2022	17-Oct-2023
Chem. O ₂ Demand	137	137	258	236	111
Ammonia-N	0.397	0.888	0.43	0.134	0.105
Total Kjeldahl Nitrogen	4.26	4.02	9.10	6.67	3.9
Dissolved Organic Carbon	42.9	43.2	85.3	79.1	43.6
Phenols	0.0088	0.0013	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	-	61.0	96	40.4	44
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)					
Benzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals					
Aluminium	0.0764	0.125	0.221	0.0145	0.0467
Antimony	0.00024	0.00024	0.00117	0.00052	0.00029
Arsenic	0.00314	0.00702	0.00526	0.0122	0.00467
Barium	0.0406	0.0370	0.153	0.052	0.0348
Boron	0.024	0.011	0.053	0.045	0.056
Cadmium	0.0000099	<0.0000050	0.0000115	0.0000157	0.0000064
Chromium	0.00031	0.00035	0.00048	<0.00050	<0.00050
Cobalt	0.00060	0.00092	0.00232	0.00161	0.00101
Copper	0.00123	0.00083	0.00522	0.00299	0.00172
Lead	0.000283	0.000366	0.000096	0.000076	0.000111
Manganese	0.00266	0.0884	0.0828	<0.0050	0.0273
Mercury	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	0.00164	0.000964	0.0136	0.00296	0.00203
Nickel	0.00455	0.00468	0.0139	0.0105	0.00649
Selenium	0.000262	0.000408	0.000441	0.000688	0.000396
Silver	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	0.000924	0.000664	0.0113	0.00227	0.00124
Zinc	0.0024	<0.0010	0.0022	<0.0010	0.001
Routine Water					
Bicarbonate	442	375	734	633	385
Chloride	22.9	21.0	77.8	20.2	17.2
Carbonate	<5.0	<5.0	20.2	17.2	10.2
Electrical Conductivity (EC)	734	639	1430	1040	660
Calcium	22.2	23.5	36.5	37.8	25.2
Potassium	26.8	28.1	61.4	32.4	12.9
Magnesium	12.7	11.6	21.0	19.4	23.5
Sodium	121	94.5	264	188	93.6
Sulfate	5.32	3.99	81.2	3.8	4.85
Phosphorus	0.614	2.71	0.315	0.885	1.27
pH in H ₂ O	8.23	8.39	8.59	8.58	8.49
TDS (Calculated)	431	373	936	715	429
Nitrate	0.336	0.141	2.56	<0.020	0.112
Nitrite	0.030	0.058	0.050	<0.010	<0.010
Field Data					
pH in H ₂ O	6.14	8.08	8.60	8.20	8.37
Electrical Conductivity (EC)	897	666	68	1060	513

Notes:

"-" Not required under previous permit

Table 1.9A: Chemical Analytical Results

Sample ID:		Lyons D.5
Site Number:		9A
Date Sampled:	Units	17-Oct-2023
Chem. O ₂ Demand	mg/L	100
Ammonia-N	mg/L	0.1
Total Kjeldahl Nitrogen	mg/L	2.57
Dissolved Organic Carbon	mg/L	31.1
Phenols	mg/L	<0.0010
Total Suspended Solids (TSS)	mg/L	28.6
BTEX, F1 (C6-C10) and F2 (>C10-C16)		
Benzene	mg/L	<0.00050
Toluene	mg/L	<0.00050
Ethylbenzene	mg/L	<0.00050
Xylenes	mg/L	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10
Dissolved Metals		
Aluminium	mg/L	0.0068
Antimony	mg/L	0.0002
Arsenic	mg/L	0.00296
Barium	mg/L	0.0626
Boron	mg/L	0.029
Cadmium	mg/L	<0.0000050
Chromium	mg/L	<0.00050
Cobalt	mg/L	0.00043
Copper	mg/L	0.00088
Lead	mg/L	0.000177
Manganese	mg/L	0.0036
Mercury	mg/L	<0.0000050
Molybdenum	mg/L	0.00103
Nickel	mg/L	0.005
Selenium	mg/L	0.000225
Silver	mg/L	<0.000010
Thallium	mg/L	<0.000010
Tin	mg/L	0.00017
Uranium	mg/L	0.000756
Zinc	mg/L	0.0012
Routine Water		
Bicarbonate	mg/L	347
Chloride	mg/L	7.94
Carbonate	mg/L	8.5
Electrical Conductivity (EC)	uS/cm	602
Calcium	mg/L	24.3
Potassium	mg/L	11.9
Magnesium	mg/L	14.4
Sodium	mg/L	91.8
Sulfate	mg/L	23.9
Phosphorus, Total	mg/L	0.172
pH in H ₂ O	pH	8.47
TDS (Calculated)	mg/L	385
Nitrate	mg/L	0.021
Nitrite	mg/L	<0.010
Field Data		
pH in H ₂ O	pH	8.49
Electrical Conductivity (EC)	uS/cm	478

Notes:

"-" Not required under previous permit

Table 1.10: Chemical Analytical Results

Sample ID:		Magneson D.1				
Site Number:		10				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	339	280	272	245	578
Ammonia-N	mg/L	0.104	0.166	0.26	0.422	6.33
Total Kjeldahl Nitrogen	mg/L	11.0	9.55	8.70	8.71	23.7
Dissolved Organic Carbon	mg/L	102	85.6	84.0	80.6	204
Phenols	mg/L	0.0084	<0.0010	<0.0010	<0.0010	0.0014
Total Suspended Solids (TSS)	mg/L	-	4.4	10.6	22.8	192
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.039	0.187	0.583	0.0607	0.0166
Antimony	mg/L	0.0005	0.00054	0.00072	<0.0020	0.00062
Arsenic	mg/L	0.0175	0.0169	0.0225	0.0222	0.0249
Barium	mg/L	0.0701	0.0728	0.0553	0.0332	0.0254
Boron	mg/L	0.091	0.097	0.125	0.226	0.166
Cadmium	mg/L	0.00005	0.000024	0.000031	<0.00010	0.0000371
Chromium	mg/L	0.00092	0.00097	0.00109	<0.010	<0.00100
Cobalt	mg/L	0.0051	0.00494	0.00628	0.00545	0.00519
Copper	mg/L	0.0255	0.0184	0.0301	0.0318	0.00543
Lead	mg/L	0.00105	0.00131	0.00091	<0.0010	0.000583
Manganese	mg/L	0.587	0.621	0.521	0.359	0.3
Mercury	mg/L	0.0000086	<0.0000050	<0.0000050	<0.0000050	0.0000059
Molybdenum	mg/L	0.00327	0.00339	0.00439	0.00541	0.00278
Nickel	mg/L	0.0243	0.0200	0.0255	0.0244	0.0186
Selenium	mg/L	0.00080	0.00087	0.00105	0.00102	0.00083
Silver	mg/L	<0.000020	<0.000020	<0.000050	<0.00020	<0.000020
Thallium	mg/L	<0.000020	<0.000020	<0.000050	<0.00020	<0.000020
Tin	mg/L	<0.00020	<0.00020	<0.00050	<0.0020	0.00029
Uranium	mg/L	0.00185	0.00221	0.00292	0.0031	0.00436
Zinc	mg/L	0.0076	0.0063	0.0103	<0.020	0.0028
Routine Water						
Bicarbonate	mg/L	609	578	707	650	1,040
Chloride	mg/L	202	217	281	287	323
Carbonate	mg/L	16.1	22.7	24.1	34.6	39.6
Electrical Conductivity (EC)	uS/cm	2150	2230	2690	2810	2,890
Calcium	mg/L	51.7	56.8	74.9	75.5	81.3
Potassium	mg/L	135	116	152	146	49.1
Magnesium	mg/L	31.0	31.9	43.5	42.1	203
Sodium	mg/L	326	347	426	460	553
Sulfate	mg/L	284	363	480	512	388
Phosphorus	mg/L	8.91	7.55	7.01	6.31	12.4
pH in H ₂ O	pH	8.52	8.60	8.61	8.78	8.64
TDS (Calculated)	mg/L	1350	1440	1830	1980	2,400
Nitrate	mg/L	1.12	0.85	1.07	<0.10	<0.100
Nitrite	mg/L	<0.020	0.062	0.018	<0.050	0.235
Field Data						
pH in H ₂ O	pH	9.73	8.63	8.77	8.79	8.19
Electrical Conductivity (EC)	uS/cm	2660	2390	278	2850	2400

Notes:

"-" Not required under previous permit

Table 1.11: Chemical Analytical Results

Sample ID:		Magneson D.2				
Site Number:		11				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	114	196	Dry	224	192
Ammonia-N	mg/L	0.063	<0.050		0.1	0.902
Total Kjeldahl Nitrogen	mg/L	3.46	7.09		7.23	6.35
Dissolved Organic Carbon	mg/L	33.5	54.6		67.7	50.9
Phenols	mg/L	0.0142	0.0010		<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	345		56.8	86.4
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	Dry	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050		<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050		<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071		<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10		<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10		<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.168	0.0606	Dry	0.0338	0.356
Antimony	mg/L	0.00018	0.00026		0.00039	0.00023
Arsenic	mg/L	0.00332	0.00542		0.00544	0.00833
Barium	mg/L	0.0524	0.0423		0.045	0.0858
Boron	mg/L	0.024	0.031		0.03	0.05
Cadmium	mg/L	0.0000153	0.0000129		0.000007	0.0000334
Chromium	mg/L	0.00034	0.00035		<0.00050	0.00069
Cobalt	mg/L	0.00057	0.00124		0.00222	0.00198
Copper	mg/L	0.00211	0.00224		0.00314	0.00294
Lead	mg/L	0.000582	0.000394		0.000162	0.00204
Manganese	mg/L	0.00213	0.0308		0.00785	0.0885
Mercury	mg/L	0.000005	<0.0000050		<0.0000050	<0.0000050
Molybdenum	mg/L	0.00111	0.00138		0.00643	0.00272
Nickel	mg/L	0.00512	0.00635		0.0116	0.00893
Selenium	mg/L	0.000263	0.000417		0.000663	0.000392
Silver	mg/L	<0.000010	<0.000010		<0.000010	0.000013
Thallium	mg/L	<0.000010	<0.000010		<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010		<0.00010	0.00029
Uranium	mg/L	0.000954	0.00203	0.00497	0.00158	
Zinc	mg/L	0.0015	<0.0010	<0.0010	0.0066	
Routine Water						
Bicarbonate	mg/L	296	338	Dry	464	293
Chloride	mg/L	19.2	27.6		28.7	20.9
Carbonate	mg/L	<5.0	<5.0		13.2	2.9
Electrical Conductivity (EC)	uS/cm	516	625		837	500
Calcium	mg/L	20.8	21.0		34.2	22.1
Potassium	mg/L	32.9	33.5		48.4	8.98
Magnesium	mg/L	9.31	9.13		14	28.6
Sodium	mg/L	69.1	91.7		138	75.1
Sulfate	mg/L	5.44	14.5		9.38	4.18
Phosphorus	mg/L	1.21	2.61		0.836	2.72
pH in H ₂ O	pH	8.19	8.39		8.62	8.38
TDS (Calculated)	mg/L	303	369		584	383
Nitrate	mg/L	0.253	<0.020		<0.020	0.503
Nitrite	mg/L	<0.010	<0.010		<0.010	0.065
Field Data						
pH in H ₂ O	pH	10.3	8.42	Dry	8.78	8.67
Electrical Conductivity (EC)	uS/cm	650	662		858	434

Notes:

"-" Not required under previous permit

Table 1.12: Chemical Analytical Results

Sample ID:		Magneson D.3 (now on Clean Harbors' property)				
Site Number:		12				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	18-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	119	48	12	74	Not monitored
Ammonia-N	mg/L	<0.050	<0.050	<0.050	0.0335	
Total Kjeldahl Nitrogen	mg/L	3.49	2.02	0.57	2.37	
Dissolved Organic Carbon	mg/L	17.9	15.1	8.3	23.3	
Phenols	mg/L	0.0136	<0.0010	<0.0010	<0.0010	
Total Suspended Solids (TSS)	mg/L	-	19.2	7.4	39	
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	Not monitored
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	
Dissolved Metals						
Aluminium	mg/L	0.0033	0.0088	0.0125	0.0024	Not monitored
Antimony	mg/L	0.00029	0.00029	0.00028	0.00036	
Arsenic	mg/L	0.00194	0.00169	0.00105	0.00256	
Barium	mg/L	0.0773	0.053	0.0364	0.0954	
Boron	mg/L	0.060	0.062	0.05	0.084	
Cadmium	mg/L	0.0000188	<0.0000050	0.0000153	0.0000201	
Chromium	mg/L	0.00016	<0.00010	0.00029	<0.00050	
Cobalt	mg/L	0.00052	0.00022	<0.00010	0.00028	
Copper	mg/L	0.00242	0.0011	0.00276	0.00121	
Lead	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	
Manganese	mg/L	0.00123	0.00125	0.00067	<0.0050	
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum	mg/L	0.0254	0.0234	0.0364	0.0434	
Nickel	mg/L	0.0203	0.0146	0.00476	0.0171	
Selenium	mg/L	0.000304	0.000259	0.000246	0.000414	
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium	mg/L	0.00247	0.00265	0.00127	0.00322	
Zinc	mg/L	0.0028	<0.0010	0.0044	0.0012	
Routine Water						
Bicarbonate	mg/L	268	282	117	261	Not monitored
Chloride	mg/L	14.7	13.6	49.9	12.9	
Carbonate	mg/L	<5.0	5.0	<5.0	3.4	
Electrical Conductivity (EC)	uS/cm	960	947	772	992	
Calcium	mg/L	49.1	41.3	43.7	35.5	
Potassium	mg/L	13.6	12.2	3.22	14.6	
Magnesium	mg/L	17.4	16.1	13.5	16.8	
Sodium	mg/L	139	144	109	162	
Sulfate	mg/L	252	253	235	252	
Phosphorus	mg/L	0.185	0.081	<0.050	0.122	
pH in H ₂ O	pH	8.38	8.40	7.87	8.39	
TDS (Calculated)	mg/L	623	625	478	656	
Nitrate	mg/L	0.029	<0.020	<0.020	<0.020	
Nitrite	mg/L	<0.010	<0.010	<0.010	<0.010	
Field Data						
pH in H ₂ O	pH	11.68	8.36	8.48	8.28	Not monitored
Electrical Conductivity (EC)	uS/cm	1203	1017	483	1010	

Notes:

"-" Not required under previous permit

Table 1.13: Chemical Analytical Results

Sample ID:		Magneson D.4				
Site Number:		13				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	1370	1300	3420	1100	1,180
Ammonia-N	mg/L	2.85	2.02	<2.5	1.63	3.38
Total Kjeldahl Nitrogen	mg/L	43.7	42.6	122	42.1	41
Dissolved Organic Carbon	mg/L	415	295	1070	277	326
Phenols	mg/L	0.0116	0.0013	0.0054	0.0018	<0.0020
Total Suspended Solids (TSS)	mg/L	-	24.4	1660	12.6	48.7
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.080	0.0915	0.167	0.273	0.0529
Antimony	mg/L	0.00064	0.00074	0.0021	0.00091	0.0007
Arsenic	mg/L	0.0275	0.0310	0.0841	0.0347	0.0311
Barium	mg/L	0.166	0.195	0.436	0.15	0.132
Boron	mg/L	0.204	0.223	0.46	0.211	0.21
Cadmium	mg/L	0.000079	0.000036	0.000131	0.0000275	0.00007
Chromium	mg/L	0.00285	0.00373	0.0077	0.00337	0.00337
Cobalt	mg/L	0.00794	0.00817	0.0157	0.0113	0.0123
Copper	mg/L	0.0093	0.0103	0.0364	0.00685	0.00846
Lead	mg/L	0.00304	0.00391	0.00584	0.0031	0.00268
Manganese	mg/L	0.748	0.882	1.8	0.771	0.643
Mercury	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	0.0000132
Molybdenum	mg/L	0.00193	0.00371	0.0242	0.00656	0.00388
Nickel	mg/L	0.0350	0.0394	0.0967	0.0435	0.0522
Selenium	mg/L	0.00142	0.00184	0.00626	0.00155	0.00209
Silver	mg/L	<0.000050	<0.000050	0.00012	0.000059	0.00005
Thallium	mg/L	<0.000050	<0.000050	<0.00010	<0.000050	<0.000020
Tin	mg/L	<0.000050	<0.000050	<0.0010	<0.000050	0.0103
Uranium	mg/L	0.00214	0.00303	0.0119	0.00323	0.00263
Zinc	mg/L	0.032	0.0233	0.041	0.0165	0.0221
Routine Water						
Bicarbonate	mg/L	1310	1430	3440	1560	1,240
Chloride	mg/L	603	668	3040	831	461
Carbonate	mg/L	47.6	64.6	522	74.9	24.7
Electrical Conductivity (EC)	uS/cm	4570	4960	16400	5390	3,380
Calcium	mg/L	84.2	82.2	109	101	67.4
Potassium	mg/L	634	602	2420	696	47.6
Magnesium	mg/L	71.6	69.2	262	80	586
Sodium	mg/L	596	655	2840	596	420
Sulfate	mg/L	361	530	2940	715	213
Phosphorus	mg/L	26.9	26.8	34.8	26.2	20.3
pH in H ₂ O	pH	8.64	8.68	9.12	8.74	8.51
TDS (Calculated)	mg/L	3040	3380	11000	4190	2,800
Nitrate	mg/L	0.570	0.26	<0.20	0.15	0.102
Nitrite	mg/L	0.083	0.073	<0.10	1.73	1.9
Field Data						
pH in H ₂ O	pH	9.81	8.59	9.36	8.68	7.96
Electrical Conductivity (EC)	uS/cm	6.83	5430	5513	5580	2890

Notes:

"-" Not required under previous permit

Table 1.14: Chemical Analytical Results

Sample ID:		Magneson D.5				
Site Number:		14				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	370	380	670	282	202
Ammonia-N	mg/L	0.600	0.210	0.370	0.158	0.198
Total Kjeldahl Nitrogen	mg/L	13.9	14.6	23	9.63	4.93
Dissolved Organic Carbon	mg/L	100	100	171	84.6	68.3
Phenols	mg/L	0.0071	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	73.0	359.0	63.8	74.6
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0182	0.0145	1.21	0.0676	0.0041
Antimony	mg/L	0.00073	0.00059	0.00079	0.00104	0.00058
Arsenic	mg/L	0.0155	0.0168	0.0221	0.0242	0.0232
Barium	mg/L	0.0337	0.0317	0.0979	0.0817	0.0185
Boron	mg/L	0.048	0.059	0.079	0.031	0.071
Cadmium	mg/L	0.000012	<0.000010	0.000026	0.0000161	0.0000084
Chromium	mg/L	0.00055	0.00051	0.00153	<0.0010	<0.00050
Cobalt	mg/L	0.00428	0.00328	0.0032	0.00241	0.00362
Copper	mg/L	0.00527	0.00426	0.004	0.00187	0.00334
Lead	mg/L	0.00037	0.00017	0.00235	0.00014	<0.000050
Manganese	mg/L	0.220	0.218	0.342	0.0226	0.0996
Mercury	mg/L	0.0000063	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.00592	0.00596	0.016	0.0238	0.0106
Nickel	mg/L	0.0225	0.0181	0.0228	0.0205	0.018
Selenium	mg/L	0.00088	0.00096	0.00121	0.00074	0.000752
Silver	mg/L	<0.000020	<0.000020	<0.000050	<0.000020	<0.000010
Thallium	mg/L	<0.000020	<0.000020	<0.000050	<0.000020	<0.000010
Tin	mg/L	<0.00020	<0.00020	<0.00050	<0.00020	0.00013
Uranium	mg/L	0.0023	0.00191	0.00347	0.00441	0.00268
Zinc	mg/L	0.004	0.0039	0.0088	<0.0020	<0.0010
Routine Water						
Bicarbonate	mg/L	850	795	1440	769	705
Chloride	mg/L	175	207	476	230	114
Carbonate	mg/L	21.7	40.1	107	80.5	36.5
Electrical Conductivity (EC)	uS/cm	2120	2230	3780	2500	1,560
Calcium	mg/L	50.3	45.7	83.3	51	40.6
Potassium	mg/L	119	122	137	113	18.9
Magnesium	mg/L	35.9	30.6	41.6	29.2	69.6
Sodium	mg/L	353	370	572	461	305
Sulfate	mg/L	162	185	333	319	168
Phosphorus	mg/L	10.1	12.5	2.17	2.05	3.88
pH in H ₂ O	pH	8.53	8.78	8.89	9.11	8.84
TDS (Calculated)	mg/L	1340	1390	2460	1760	1,170
Nitrate	mg/L	0.557	0.19	<0.20	<0.10	0.243
Nitrite	mg/L	<0.020	0.065	<0.10	<0.050	0.011
Field Data						
pH in H ₂ O	pH	11.75	8.81	9.13	9.31	8.53
Electrical Conductivity (EC)	uS/cm	2.78	2300	2551	2520	1238

Notes:

"-" Not required under previous permit

Table 1.15: Chemical Analytical Results

Sample ID:		Magneson D.6				
Site Number:		15				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	125	88	148	127	89
Ammonia-N	mg/L	<0.050	<0.050	0.28	0.0747	0.0361
Total Kjeldahl Nitrogen	mg/L	4.16	3.27	2.55	4.17	2.95
Dissolved Organic Carbon	mg/L	33.1	26.6	39	39.7	29.7
Phenols	mg/L	0.013	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	11.2	14.2	32	62.4
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0051	0.0136	0.0211	0.0041	0.0035
Antimony	mg/L	0.00086	0.00067	0.00107	0.00088	0.00059
Arsenic	mg/L	0.0134	0.0139	0.0337	0.0209	0.00977
Barium	mg/L	0.0512	0.0370	0.0465	0.0212	0.0237
Boron	mg/L	0.237	0.230	0.302	0.239	0.082
Cadmium	mg/L	0.000012	<0.000010	<0.000025	<0.000010	<0.0000100
Chromium	mg/L	<0.00020	<0.00020	<0.00050	<0.0010	<0.00100
Cobalt	mg/L	0.00075	0.0011	0.00084	0.00069	0.00044
Copper	mg/L	0.00174	0.00085	0.0013	0.0008	0.00207
Lead	mg/L	<0.00010	<0.00010	<0.00025	<0.00010	0.000101
Manganese	mg/L	0.00599	0.172	0.505	0.0308	0.0442
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.00179	0.00128	0.00099	0.00151	0.0014
Nickel	mg/L	0.0082	0.0059	0.007	0.00495	0.00514
Selenium	mg/L	0.00029	0.00027	0.00029	0.000297	0.000334
Silver	mg/L	<0.000020	<0.000020	<0.000050	<0.000020	<0.000020
Thallium	mg/L	<0.000020	<0.000020	<0.000050	<0.000020	<0.000020
Tin	mg/L	<0.00020	<0.00020	<0.00050	<0.00020	<0.00020
Uranium	mg/L	0.00507	0.0040	0.0036	0.0044	0.00251
Zinc	mg/L	<0.0020	<0.0020	<0.0050	0.0021	0.0034
Routine Water						
Bicarbonate	mg/L	520	427	577	417	349
Chloride	mg/L	286	294	453	358	189
Carbonate	mg/L	16.6	11.2	12.7	28.1	5.8
Electrical Conductivity (EC)	uS/cm	3120	3050	4140	3760	2,190
Calcium	mg/L	97.9	91.4	83.6	67.4	54.7
Potassium	mg/L	34.1	26.6	40.2	33.1	37.7
Magnesium	mg/L	56.6	57.8	82.8	66.7	20.6
Sodium	mg/L	558	510	823	726	437
Sulfate	mg/L	818	772	1380	1210	686
Phosphorus	mg/L	0.745	0.582	1.25	0.625	0.335
pH in H ₂ O	pH	8.52	8.48	8.47	8.84	8.43
TDS (Calculated)	mg/L	2120	1970	2920	2730	1,630
Nitrate	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
Nitrite	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Field Data						
pH in H ₂ O	pH	9.48	8.37	8.55	9.02	8.55
Electrical Conductivity (EC)	uS/cm	3.82	3170	2705	3770	1784

Notes:

"-" Not required under previous permit

Table 1.16: Chemical Analytical Results

Sample ID:		Beaver D.1				
Site Number:		16				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	93	84	114	185	132
Ammonia-N	mg/L	0.071	0.200	2.200	0.490	0.0495
Total Kjeldahl Nitrogen	mg/L	2.46	3.01	2.38	8.06	3.54
Dissolved Organic Carbon	mg/L	28.1	26.2	36.8	42.7	33.2
Phenols	mg/L	0.0099	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	8.0	12.0	161.0	113
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0036	0.0039	0.0218	0.0046	0.0022
Antimony	mg/L	0.00022	0.00027	0.00057	0.00042	0.00022
Arsenic	mg/L	0.00586	0.00534	0.0131	0.0114	0.00557
Barium	mg/L	0.0489	0.0504	0.0955	0.0243	0.022
Boron	mg/L	0.039	0.020	0.041	0.058	0.05
Cadmium	mg/L	0.0000056	<0.0000050	0.0000066	<0.0000050	<0.0000050
Chromium	mg/L	0.00013	0.00014	0.00016	<0.00050	<0.00050
Cobalt	mg/L	0.00038	0.00050	0.00136	0.00111	0.00072
Copper	mg/L	0.00071	0.00037	0.00154	0.00077	0.00049
Lead	mg/L	<0.000050	<0.000050	0.000059	<0.000050	0.000052
Manganese	mg/L	0.00491	0.134	0.494	0.409	0.229
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.00067	0.00047	0.00268	0.00168	0.00113
Nickel	mg/L	0.00493	0.00347	0.00754	0.00695	0.00387
Selenium	mg/L	0.000205	0.000184	0.000491	0.000302	0.000167
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	mg/L	0.00115	0.000827	0.00362	0.0021	0.00126
Zinc	mg/L	<0.0010	<0.0010	0.0044	0.0011	0.0012
Routine Water						
Bicarbonate	mg/L	464	479	714	550	426
Chloride	mg/L	182	150	274	234	180
Carbonate	mg/L	6.7	7.4	22.8	13.3	3.8
Electrical Conductivity (EC)	uS/cm	1490	1400	2010	1830	1,280
Calcium	mg/L	53.7	45.5	75	73.8	56.6
Potassium	mg/L	19.1	15.3	25.4	20.9	22.7
Magnesium	mg/L	28.2	21.0	34.7	32.3	13
Sodium	mg/L	266	233	367	312	219
Sulfate	mg/L	131	116	173	170	140
Phosphorus	mg/L	1.41	1.68	1.3	2.21	1.98
pH in H ₂ O	pH	8.37	8.42	8.58	8.52	8.38
TDS (Calculated)	mg/L	915	824	1230	1180	848
Nitrate	mg/L	<0.020	<0.020	0.153	<0.020	<0.020
Nitrite	mg/L	<0.010	0.017	0.149	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	10.32	8.15	8.53	8.68	8.32
Electrical Conductivity (EC)	uS/cm	1940	1458	1307	1878	1022

Notes:

"-" Not required under previous permit

Table 1.18: Chemical Analytical Results

Sample ID:		Beaver D.2				
Site Number:		18				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	158	106	Not monitored	Not monitored	Not monitored
Ammonia-N	mg/L	<0.050	0.183			
Total Kjeldahl Nitrogen	mg/L	4.19	3.29			
Dissolved Organic Carbon	mg/L	39.2	27.5			
Phenols	mg/L	0.0081	0.0018			
Total Suspended Solids (TSS)	mg/L	-	12.4			
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	Not monitored	Not monitored	Not monitored
Toluene	mg/L	<0.00050	<0.00050			
Ethylbenzene	mg/L	<0.00050	<0.00050			
Xylenes	mg/L	<0.00071	<0.00071			
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10			
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10			
Dissolved Metals						
Aluminium	mg/L	0.0035	0.0195	Not monitored	Not monitored	Not monitored
Antimony	mg/L	0.00021	0.00015			
Arsenic	mg/L	0.00247	0.00172			
Barium	mg/L	0.0716	0.0934			
Boron	mg/L	0.053	0.017			
Cadmium	mg/L	<0.000010	<0.0000050			
Chromium	mg/L	<0.00020	0.00019			
Cobalt	mg/L	0.00040	0.00062			
Copper	mg/L	0.00049	0.00027			
Lead	mg/L	<0.00010	0.000172			
Manganese	mg/L	0.00533	0.713			
Mercury	mg/L	<0.0000050	<0.0000050			
Molybdenum	mg/L	0.00095	0.000111			
Nickel	mg/L	0.0042	0.00261			
Selenium	mg/L	0.00018	0.000429			
silver	mg/L	<0.000020	<0.000010			
Thallium	mg/L	<0.000020	<0.000010			
Tin	mg/L	<0.00020	<0.00010			
Uranium	mg/L	0.000974	0.000385			
Zinc	mg/L	<0.0020	0.0028			
Routine Water						
Bicarbonate	mg/L	784	598	Not monitored	Not monitored	Not monitored
Chloride	mg/L	285	235			
Carbonate	mg/L	<5.0	5.0			
Electrical Conductivity (EC)	uS/cm	2120	1690			
Calcium	mg/L	109	75.3			
Potassium	mg/L	26.1	15.2			
Magnesium	mg/L	43.8	25.2			
Sodium	mg/L	330	256			
Sulfate	mg/L	78.4	61.2			
Phosphorus	mg/L	1.02	0.732			
pH in H ₂ O	pH	8.10	8.33			
TDS (Calculated)	mg/L	1260	968			
Nitrate	mg/L	<0.040	<0.020			
Nitrite	mg/L	0.022	0.013			
Field Data						
pH in H ₂ O	pH	9.89	7.95	Not monitored	Not monitored	Not monitored
Electrical Conductivity (EC)	uS/cm	2.62	1801			

Notes:

"-" Not required under previous permit

Table 1.19: Chemical Analytical Results

Sample ID:		Winsnes D.1				
Site Number:		19				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	75	83	73	80	203
Ammonia-N	mg/L	<0.050	0.251	0.71	0.061	0.152
Total Kjeldahl Nitrogen	mg/L	2.52	3.99	1.4	3.03	2.04
Dissolved Organic Carbon	mg/L	24.2	21.7	24.9	24.1	26.7
Phenols	mg/L	0.0077	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	13.0	11.2	20.6	502
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0017	0.0022	0.0096	0.0037	0.0038
Antimony	mg/L	0.0002	0.00029	0.00037	0.00023	0.00023
Arsenic	mg/L	0.00471	0.00454	0.00579	0.00529	0.00438
Barium	mg/L	0.0412	0.0729	0.0779	0.0592	0.0644
Boron	mg/L	0.039	0.029	0.044	0.034	0.037
Cadmium	mg/L	<0.000050	<0.000050	0.0000071	<0.000050	<0.000050
Chromium	mg/L	<0.00010	<0.00010	0.00011	<0.00050	<0.00050
Cobalt	mg/L	0.00035	0.00062	0.00056	0.00051	0.00037
Copper	mg/L	0.00027	0.00026	0.00177	0.00042	0.00027
Lead	mg/L	<0.000050	<0.000050	0.000055	<0.000050	<0.000050
Manganese	mg/L	0.00135	0.0111	0.136	<0.0050	0.0994
Mercury	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum	mg/L	0.000602	0.000589	0.000873	0.000873	0.000545
Nickel	mg/L	0.00287	0.00304	0.00361	0.0029	0.00246
Selenium	mg/L	0.000204	0.000192	0.000263	0.000169	0.000195
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00024
Uranium	mg/L	0.00116	0.00136	0.00194	0.00143	0.000849
Zinc	mg/L	<0.0010	<0.0010	0.013	0.0011	<0.0010
Routine Water						
Bicarbonate	mg/L	416	359	370	305	312
Chloride	mg/L	71.6	76.8	103	89.1	75.8
Carbonate	mg/L	10.8	7.6	<5.0	18.4	2.9
Electrical Conductivity (EC)	uS/cm	1060	1020	1120	1070	872
Calcium	mg/L	39.2	44.7	33.1	35.9	28
Potassium	mg/L	15.7	12.7	16.5	15.8	18.9
Magnesium	mg/L	23.7	24.1	26.9	25.2	13.8
Sodium	mg/L	174	164	179	180	142
Sulfate	mg/L	106	123	166	160	131
Phosphorus	mg/L	0.263	0.425	0.306	0.249	0.77
pH in H ₂ O	pH	8.51	8.46	8.32	8.86	8.36
TDS (Calculated)	mg/L	646	630	709	698	582
Nitrate	mg/L	0.025	0.064	0.035	<0.020	<0.020
Nitrite	mg/L	0.014	0.025	<0.010	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	10.44	8.50	8.57	9.22	8.36
Electrical Conductivity (EC)	uS/cm	1306	1049	608	1098	706

Notes:

"-" Not required under previous permit

Table 1.20: Chemical Analytical Results

Sample ID:		Balash D.1				
Site Number:		20				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	79	75	65	96	116
Ammonia-N	mg/L	0.824	0.356	1.32	0.117	0.033
Total Kjeldahl Nitrogen	mg/L	3.35	3.20	1.46	3.52	3.21
Dissolved Organic Carbon	mg/L	25.3	24.1	25.1	23.5	23.3
Phenols	mg/L	0.0052	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	34.8	8.2	41.2	52.6
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0052	0.0128	0.0067	0.0041	0.0028
Antimony	mg/L	0.00013	0.00017	0.00011	<0.00010	0.00011
Arsenic	mg/L	0.00283	0.00274	0.00397	0.00297	0.00267
Barium	mg/L	0.0997	0.0979	0.116	0.0992	0.0529
Boron	mg/L	0.028	<0.010	<0.010	0.023	0.038
Cadmium	mg/L	0.0000063	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	0.00012	0.00016	0.00011	<0.00050	<0.00050
Cobalt	mg/L	0.00031	0.00027	0.00057	0.00029	0.00037
Copper	mg/L	0.00026	0.00023	0.0011	0.0002	0.00052
Lead	mg/L	0.000071	0.000138	0.0001	<0.000050	0.000058
Manganese	mg/L	0.00851	0.0070	0.6550	0.0800	0.105
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000113	<0.0000050
Molybdenum	mg/L	0.00039	0.000304	0.000301	0.000419	0.000683
Nickel	mg/L	0.00293	0.00282	0.00257	0.00277	0.00256
Selenium	mg/L	0.000188	0.000245	0.00019	0.00017	0.000225
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	mg/L	0.000199	0.000235	0.000194	0.000245	0.000122
Zinc	mg/L	<0.0010	<0.0010	0.0029	<0.0010	0.0017
Routine Water						
Bicarbonate	mg/L	277	259	322	291	190
Chloride	mg/L	43.9	55.5	63	49.2	25.5
Carbonate	mg/L	<5.0	<5.0	<5.0	<1.0	<1.0
Electrical Conductivity (EC)	uS/cm	574	654	696	651	388
Calcium	mg/L	43.6	45.2	49.8	45.5	27.8
Potassium	mg/L	14.8	10.6	13.7	14.2	9.62
Magnesium	mg/L	15.8	16.8	16.7	16.2	10.9
Sodium	mg/L	57.3	74.3	67.1	74.6	44.9
Sulfate	mg/L	12.1	47.5	36.6	42.4	21.2
Phosphorus	mg/L	0.463	0.552	0.454	0.463	0.482
pH in H ₂ O	pH	8.13	8.09	8.28	8.24	8.13
TDS (Calculated)	mg/L	324	378	406	423	266
Nitrate	mg/L	0.037	0.053	<0.020	<0.020	<0.020
Nitrite	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	9.26	7.73	7.81	8.23	8.71
Electrical Conductivity (EC)	uS/cm	714	681	450.9	673	344

Notes:

"-" Not required under previous permit

Table 1.21: Chemical Analytical Results

Sample ID:		Balash D.2				
Site Number:		21				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	21-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	93	130	175	148	90
Ammonia-N	mg/L	<0.050	0.072	0.26	0.0622	0.0363
Total Kjeldahl Nitrogen	mg/L	2.75	4.86	2.69	5.08	2.78
Dissolved Organic Carbon	mg/L	29.5	35.3	56.8	36.7	27.2
Phenols	mg/L	0.0093	<0.0010	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	29.6	53	55.8	31.4
BTEX, F1 (C₆-C₁₀) and F2(>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0071	0.0118	0.0035	0.0069	0.0014
Antimony	mg/L	0.00024	0.0003	0.00053	0.00039	0.00018
Arsenic	mg/L	0.00575	0.0064	0.0155	0.00898	0.00549
Barium	mg/L	0.0766	0.0595	0.103	0.114	0.0733
Boron	mg/L	0.05	<0.010	<0.010	0.048	0.022
Cadmium	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050
Chromium	mg/L	<0.00010	0.00014	<0.00010	<0.0010	<0.00050
Cobalt	mg/L	0.00056	0.00090	0.00198	0.00147	0.00053
Copper	mg/L	0.00071	0.00061	0.0025	0.00158	0.00056
Lead	mg/L	<0.000050	0.000061	<0.000050	<0.00010	<0.000050
Manganese	mg/L	0.00437	0.0204	0.0227	0.286	0.00433
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.000719	0.000283	0.00164	0.00129	0.000679
Nickel	mg/L	0.00398	0.00343	0.00751	0.00614	0.00316
Selenium	mg/L	0.000201	0.000239	0.000475	0.000267	0.000185
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00020	0.00105
Uranium	mg/L	0.0021	0.00127	0.00338	0.00362	0.0021
Zinc	mg/L	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010
Routine Water						
Bicarbonate	mg/L	435	472	671	494	338
Chloride	mg/L	244	311	537	393	256
Carbonate	mg/L	<5.0	8.3	25.7	30.1	20.2
Electrical Conductivity (EC)	uS/cm	1580	1800	2580	2410	1,910
Calcium	mg/L	69.8	61.4	86.6	105	76.7
Potassium	mg/L	22.6	37.7	47.2	39.3	50.5
Magnesium	mg/L	47.4	47.2	74.1	69.9	28.1
Sodium	mg/L	210	295	442	331	250
Sulfate	mg/L	104	57.2	92.7	300	284
Phosphorus	mg/L	0.755	1.50	0.72	0.93	0.658
pH in H ₂ O	pH	8.22	8.41	8.61	8.73	8.67
TDS (Calculated)	mg/L	912	1050	1430	1570	1,130
Nitrate	mg/L	<0.020	<0.020	0.031	<0.020	<0.020
Nitrite	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	9.22	8.07	8.86	8.8	8.38
Electrical Conductivity (EC)	uS/cm	1960	1869	799	2470	1333

Notes:

"-" Not required under previous permit

Table 1.22: Chemical Analytical Results

Sample ID:		Balash D.3				
Site Number:		22				
Date Sampled:	Units	29-Oct-2019	8-Oct-2020	22-Oct-2021	19-Oct-2022	16-Oct-2023
Chem. O ₂ Demand	mg/L	535	127	186	156	112
Ammonia-N	mg/L	0.075	0.059	1.32	0.109	0.0814
Total Kjeldahl Nitrogen	mg/L	17.0	4.78	3.25	5.13	3.74
Dissolved Organic Carbon	mg/L	31.2	44.0	55.4	48.0	41.4
Phenols	mg/L	0.0067	0.0014	<0.0010	<0.0010	<0.0010
Total Suspended Solids (TSS)	mg/L	-	27.4	434	32	49.2
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00050	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0165	0.0065	0.641	0.0111	0.0037
Antimony	mg/L	0.00019	0.00022	0.00037	<0.00020	<0.00020
Arsenic	mg/L	0.0057	0.00519	0.00704	0.00847	0.00588
Barium	mg/L	0.0437	0.0434	0.107	0.0503	0.0487
Boron	mg/L	0.033	<0.010	<0.010	<0.02	0.024
Cadmium	mg/L	<0.0000050	<0.0000050	0.0000152	<0.000010	<0.0000100
Chromium	mg/L	0.00014	0.00014	0.00078	<0.0010	<0.00100
Cobalt	mg/L	0.00101	0.00050	0.00166	0.00085	0.00047
Copper	mg/L	0.00101	<0.00020	0.00283	0.00074	0.00058
Lead	mg/L	0.000139	<0.000050	0.000967	<0.00010	<0.000100
Manganese	mg/L	0.410	0.00827	0.288	0.0551	0.077
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.000865	0.000193	0.00154	0.000922	0.000474
Nickel	mg/L	0.00233	0.00188	0.00503	0.00269	0.00199
Selenium	mg/L	0.000201	0.000168	0.000324	0.000208	0.000161
Silver	mg/L	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020
Thallium	mg/L	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020
Tin	mg/L	<0.00010	<0.00010	<0.00010	<0.00020	0.00182
Uranium	mg/L	0.000959	0.000561	0.00331	0.00175	0.000809
Zinc	mg/L	0.0012	<0.0010	0.0074	<0.0020	<0.0020
Routine Water						
Bicarbonate	mg/L	264	408	607	334	337
Chloride	mg/L	246	294	515	469	384
Carbonate	mg/L	<5.0	<5.0	15.7	37.8	6.7
Electrical Conductivity (EC)	uS/cm	1230	1640	2450	2350	2,250
Calcium	mg/L	45.1	53.5	81.9	70.7	68.3
Potassium	mg/L	26.0	37.1	45.5	39.4	50.8
Magnesium	mg/L	29.2	40.4	55.6	57.4	33.8
Sodium	mg/L	173	269	359	359	319
Sulfate	mg/L	37.4	43.3	93.9	244	262
Phosphorus	mg/L	2.55	1.28	0.334	0.84	1.58
pH in H ₂ O	pH	7.99	8.32	8.5	9.04	8.38
TDS (Calculated)	mg/L	687	941	1470	1490	1,340
Nitrate	mg/L	<0.020	<0.020	0.039	0.024	<0.020
Nitrite	mg/L	<0.010	<0.010	0.011	<0.010	<0.010
Field Data						
pH in H ₂ O	pH	9.67	8.01	7.84	9.33	8.46
Electrical Conductivity (EC)	uS/cm	1545	1687	849.1	2430	1573

Notes:

"-" Not required under previous permit

Table 1.23: Chemical Analytical Results

Sample ID:		Lyons D.1
Site Number:		23
Date Sampled:	Units	17-Oct-2023
Chem. O ₂ Demand	mg/L	101
Ammonia-N	mg/L	0.403
Total Kjeldahl Nitrogen	mg/L	3.43
Dissolved Organic Carbon	mg/L	32.8
Phenols	mg/L	<0.0010
Total Suspended Solids (TSS)	mg/L	24
BTEX, F1 (C6-C10) and F2(>C10-C16)		
Benzene	mg/L	<0.00050
Toluene	mg/L	<0.00050
Ethylbenzene	mg/L	<0.00050
Xylenes	mg/L	<0.00050
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.100
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10
Dissolved Metals		
Aluminium	mg/L	0.137
Antimony	mg/L	0.00014
Arsenic	mg/L	0.00469
Barium	mg/L	0.0473
Boron	mg/L	0.051
Cadmium	mg/L	<0.0000050
Chromium	mg/L	<0.00050
Cobalt	mg/L	0.00056
Copper	mg/L	0.00105
Lead	mg/L	0.000105
Manganese	mg/L	0.0372
Mercury	mg/L	<0.0000050
Molybdenum	mg/L	0.000758
Nickel	mg/L	0.00364
Selenium	mg/L	0.00023
Silver	mg/L	<0.000010
Thallium	mg/L	<0.000010
Tin	mg/L	0.00018
Uranium	mg/L	0.000569
Zinc	mg/L	0.0036
Routine Water		
Bicarbonate	mg/L	294
Chloride	mg/L	10.8
Carbonate	mg/L	4.9
Electrical Conductivity (EC)	uS/cm	541
Calcium	mg/L	15
Potassium	mg/L	7.02
Magnesium	mg/L	19.7
Sodium	mg/L	91.5
Sulfate	mg/L	21.3
Phosphorus	mg/L	0.44
pH in H ₂ O	pH	8.35
TDS (Calculated)	mg/L	354
Nitrate	mg/L	0.165
Nitrite	mg/L	0.021
Field Data		
pH in H ₂ O	pH	8.55
Electrical Conductivity (EC)	uS/cm	426

Notes:

"-" Not required under previous permit

Table 2: Duplicate 1 Chemical Analytical Results

Sample ID:			MAGNESON D.2			
Site Number:			MAGNESON D.2	DUPLICATE 1	% RPD	Pass/ Fail (>20%)
Date Sampled:			17-Oct-2023	17-Oct-2023		
Parameter	Units	RDL				
Chem. O ₂ Demand	mg/L	10	192	134	36%	Fail
Ammonia-N	mg/L	0.05	0.902	0.89	1%	Pass
Total Kjeldahl Nitrogen	mg/L	0.2	6.35	6.29	1%	Pass
Dissolved Organic Carbon	mg/L	1	50.9	52.8	4%	Pass
Phenols	mg/L	0.001	<0.0010	<0.0010	-	Pass
Total Suspended Solids (TSS)	mg/L	3	86.4	92.2	6%	Pass
BTEX, F1 (C6-C10) and F2 (>C10-C16)						
Benzene	mg/L	0.0005	<0.00050	<0.00050	-	Pass
Toluene	mg/L	0.0005	<0.00050	<0.00050	-	Pass
Ethylbenzene	mg/L	0.0005	<0.00050	<0.00050	-	Pass
Xylenes (m & p)	mg/L	0.0005	<0.00040	<0.00040	-	Pass
Xylene (o)	mg/L	0.0005	<0.00030	<0.00030	-	Pass
Xylenes	mg/L	0.00071	<0.00050	<0.00050	-	Pass
Styrene	mg/L	0.0005	<0.00050	<0.00050	-	Pass
F1 (C ₆ -C ₁₀)	mg/L	0.1	<0.10	<0.10	-	Pass
F1 (C ₆ -C ₁₀) - BTEX	mg/L	0.1	<0.100	<0.100	-	Pass
F2 - (C ₁₀ -C ₁₆)	mg/L	0.1	<0.10	<0.10	-	Pass
Dissolved Metals						
Aluminium	mg/L	0.001	0.356	0.418	16%	Pass
Antimony	mg/L	0.0001	0.00023	0.00021	-	Pass
Arsenic	mg/L	0.0001	0.00833	0.0085	2%	Pass
Barium	mg/L	0.0001	0.0858	0.0892	4%	Pass
Beryllium	mg/L	0.0001	0.000065	0.000065	-	Pass
Boron	mg/L	0.01	0.05	0.052	-	Pass
Cadmium	mg/L	0.000005	0.0000334	0.0000381	13%	Pass
Chromium	mg/L	0.0001	0.00069	0.00073	6%	Pass
Cobalt	mg/L	0.0001	0.00198	0.00201	2%	Pass
Copper	mg/L	0.0002	0.00294	0.00291	1%	Pass
Iron	mg/L	0.01	3.95	4.14	5%	Pass
Lead	mg/L	0.00005	0.00204	0.00206	1%	Pass
Lithium	mg/L	0.001	0.0115	0.0113	2%	Pass
Manganese	mg/L	0.0001	0.0885	0.089	1%	Pass
Mercury	mg/L	0.000005	<0.0000050	<0.0000050	-	Pass
Molybdenum	mg/L	0.00005	0.00272	0.00251	8%	Pass
Nickel	mg/L	0.0005	0.00893	0.00881	1%	Pass
Selenium	mg/L	0.00005	0.000392	0.000433	10%	Pass
Silver	mg/L	0.00001	0.000013	0.000011	-	Pass
Thallium	mg/L	0.00001	<0.000010	<0.000010	-	Pass
Tin	mg/L	0.0001	0.00029	<0.00010	-	Pass
Titanium	mg/L	0.0003	0.0116	0.0157	30%	Fail
Uranium	mg/L	0.00001	0.00158	0.00152	4%	Pass
Vanadium	mg/L	0.0005	0.00754	0.0078	3%	Pass
Zinc	mg/L	0.001	0.0066	0.0045	-	Pass
Routine Water						
Bicarbonate	mg/L	5	293	309	5%	Pass
Chloride	mg/L	0.5	20.9	20.9	0%	Pass
Carbonate	mg/L	5	2.9	<1.0	-	Pass
Conductivity (EC)	uS/cm	2	500	546	9%	Pass
Calcium	mg/L	0.5	22.1	21	5%	Pass
Potassium	mg/L	0.5	8.98	8.95	0%	Pass
Magnesium	mg/L	0.1	28.6	29.2	2%	Pass
Sodium	mg/L	1	75.1	73.9	2%	Pass
Sulfate	mg/L	0.3	4.18	4.23	1%	Pass
Phosphorus	mg/L	0.05	2.72	2.94	8%	Pass
pH in H ₂ O	pH	0.1	8.38	8.23	2%	Pass
TDS (Calculated)	mg/L	10	383	389	2%	Pass
Nitrate	mg/L	0.02	0.503	0.518	3%	Pass
Nitrite	mg/L	0.01	0.065	0.07	7%	Pass
Nitrate and Nitrite (as N)	mg/L	0.022	0.568	0.588	3%	Pass
Hardness as CaCO ₃	mg/L	N/A	92.2	89.3	-	Pass
Alkalinity (total as CaCO ₃)	mg/L	2	245	253	3%	Pass
Hydroxide	mg/L	5	<1.0	<1.0	-	Pass
Fluoride	mg/L	0.02	0.361	0.342	5%	Pass

Notes:

RDL - Reportable detection limit

RPD - Relative Percentage Difference calculated as $RPD(\%) = \frac{|V1-V2|}{(V1+V2)/2} * 100$ where V1, V2 = concentrations of parent and duplicate sample, respectively.

.* Indicates RPD not calculated. RPDs have only been calculated where a concentration is greater than 5 times the RDL

N/A - Not applicable

Shaded- RPD value greater than 20%

Table 3: Duplicate 2 Chemical Analytical Results

Sample ID:			BOOTH D.1			
Site Number:			BOOTH D.1	DUPLICATE 2	% RPD	Pass/ Fail (>20%)
Date Sampled:			16-Oct-2023	16-Oct-2023		
Parameter	Units	RDL				
Chem. O ₂ Demand	mg/L	10	127	67	62%	Fail
Ammonia-N	mg/L	0.005	0.128	0.127	1%	Pass
Total Kjeldahl Nitrogen	mg/L	0.2	4.36	4.06	7%	Pass
Dissolved Organic Carbon	mg/L	0.5	29.8	26.3	12%	Pass
Phenols	mg/L	0.001	<0.0010	<0.0010	-	Pass
Total Suspended Solids (TSS)	mg/L	3	29	20.8	33%	Fail
BTEX, F1 (C6-C10) and F2 (>C10-C16)						
Benzene	mg/L	0.0005	<0.00050	<0.00050	-	Pass
Toluene	mg/L	0.0005	<0.00050	<0.00050	-	Pass
Ethylbenzene	mg/L	0.0005	<0.00050	<0.00050	-	Pass
Xylenes (m & p)	mg/L	0.0003	<0.00040	<0.00040	-	Pass
Xylene (o)	mg/L	0.0004	<0.00030	<0.00030	-	Pass
Xylenes	mg/L	0.0005	<0.00050	<0.00050	-	Pass
Styrene	mg/L	0.0005	<0.00050	<0.00050	-	Pass
F1 (C ₆ -C ₁₀)	mg/L	0.1	<0.10	<0.10	-	Pass
F1 (C ₆ -C ₁₀) - BTEX	mg/L	0.1	<0.100	<0.100	-	Pass
F2 - (C ₁₀ -C ₁₆)	mg/L	0.1	<0.10	<0.10	-	Pass
Dissolved Metals						
Aluminium	mg/L	0.001	0.0027	0.0016	-	Pass
Antimony	mg/L	0.0001	0.00023	0.00018	-	Pass
Arsenic	mg/L	0.0001	0.00647	0.00656	1%	Pass
Barium	mg/L	0.0001	0.0503	0.0486	3%	Pass
Beryllium	mg/L	0.00002	<0.000020	<0.000020	-	Pass
Boron	mg/L	0.01	0.048	0.05	-	Pass
Cadmium	mg/L	0.000005	0.0000052	0.0000061	-	Pass
Chromium	mg/L	0.0005	<0.00050	<0.00050	-	Pass
Cobalt	mg/L	0.0001	0.00035	0.00032	-	Pass
Copper	mg/L	0.0002	0.00054	0.0004	-	Pass
Iron	mg/L	0.03	0.142	0.134	-	Pass
Lead	mg/L	0.00005	0.000098	0.000074	-	Pass
Lithium	mg/L	0.001	0.0384	0.0358	7%	Pass
Manganese	mg/L	0.005	0.00556	0.00528	-	Pass
Mercury	mg/L	0.000005	<0.0000050	<0.0000050	-	Pass
Molybdenum	mg/L	0.00005	0.00106	0.000969	9%	Pass
Nickel	mg/L	0.0005	0.00384	0.00345	11%	Pass
Selenium	mg/L	0.00005	0.000132	0.000155	-	Pass
Silver	mg/L	0.00001	<0.000010	<0.000010	-	Pass
Thallium	mg/L	0.00001	<0.000010	<0.000010	-	Pass
Tin	mg/L	0.0001	0.0003	<0.00010	-	Pass
Titanium	mg/L	0.0003	0.00065	0.00049	-	Pass
Uranium	mg/L	0.00001	0.000525	0.00047	11%	Pass
Vanadium	mg/L	0.0005	0.0012	0.00118	-	Pass
Zinc	mg/L	0.001	<0.0010	<0.0010	-	Pass
Routine Water						
Bicarbonate	mg/L	1	350	342	2%	Pass
Chloride	mg/L	0.5	35	34.6	1%	Pass
Carbonate	mg/L	1	5.3	6.1	14%	Pass
Conductivity (EC)	uS/cm	2	689	765	10%	Pass
Calcium	mg/L	0.05	22.6	20.4	10%	Pass
Potassium	mg/L	0.05	10.2	9.58	6%	Pass
Magnesium	mg/L	0.005	13.2	12.7	4%	Pass
Sodium	mg/L	0.05	140	129	8%	Pass
Sulfate	mg/L	0.3	51.6	50.8	2%	Pass
Phosphorus	mg/L	0.05	0.607	0.619	2%	Pass
pH in H ₂ O	pH	0.1	8.46	8.39	1%	Pass
TDS (Calculated)	mg/L	1	460	461	0%	Pass
Nitrate	mg/L	0.02	<0.020	<0.020	-	Pass
Nitrite	mg/L	0.01	<0.010	<0.010	-	Pass
Nitrate and Nitrite (as N)	mg/L	0.05	<0.0500	<0.0500	-	Pass
Hardness as CaCO ₃	mg/L	0.5	98.4	90.4	8%	Pass
Alkalinity (total as CaCO ₃)	mg/L	2	295	290	2%	Pass
Hydroxide	mg/L	1	<1.0	<1.0	-	Pass
Fluoride	mg/L	0.02	0.283	0.285	1%	Pass

Notes:

RDL - Reportable detection limit

RPD - Relative Percentage Difference calculated as $RPD(\%) = \frac{|V1 - V2|}{(V1 + V2) / 2} * 100$ where V1, V2 = concentrations of parent and duplicate sample, respectively.

“-” Indicates RPD not calculated. RPDs have only been calculated where a concentration is greater than 5 times the RDL

N/A - Not applicable

Shaded- RPD value greater than 20%

Table 4: Historical and 2023 Precipitation Data - Total Precipitation (mm)

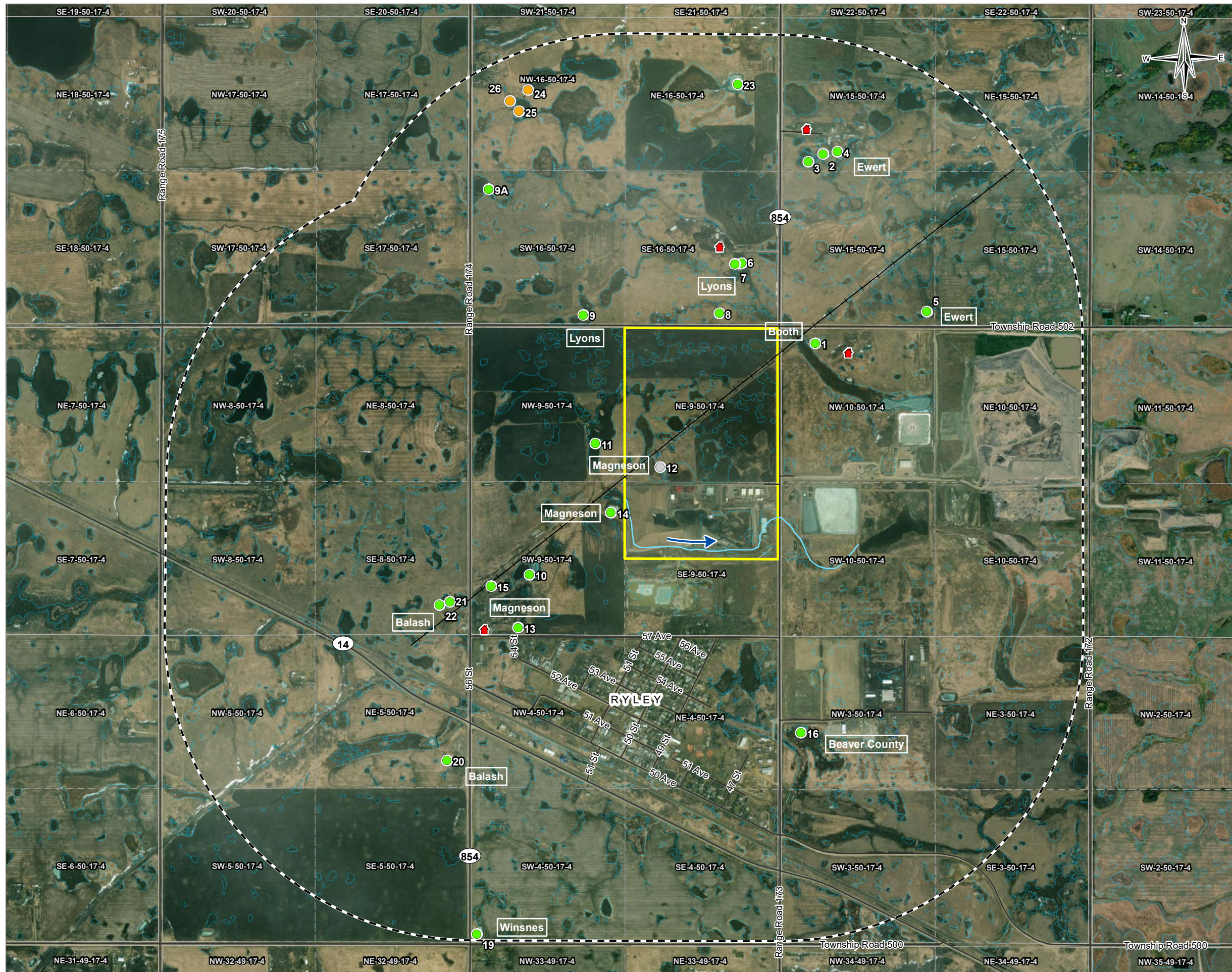
Year	January	February	March	April	May	June	July	August	September	October	November	December	Total Annual
1996	23	16	18	32.3	29.4	91.8	119.5	106.6	98.8	16.6	68.2	32.2	652.4
1997	11.1	12	24.5	27.7	50.7	143.3	52.3	71.4	96.6	31.6	7.2	4.5	532.9
1998	23	0	12.4	35.2	32.8	99.6	73	32.8	53.8	16.4	17.8	30	426.8
1999	64	4	19	19.6	64.8	21.6	123.8	60.8	11.4	9.4	14.6	12	425
2000	17.5	5	32	24	55.3	73.7	118	32.8	56.6	1	6.5	10	432.4
2001	1	5.8	6.5	0.8	55.2	94.2	260.2	8.4	37.4	23.4	34.5	6	533.4
2002	6	3.5	26	29.4	11.6	35.8	40	70	15.2	39.7	12	3	292.2
2003	39.7	19	20	46.9	64.3	110	80.8	40.8	27.2	23	19	8	498.7
2004	30.5	4	43	22.8	57.5	37.3	131.4	67.3	44.8	31.2	0	34.3	504.1
2005	10	5	35.5	18.6	43.6	95.3	82.8	59.3	24.4	18	3	14	409.5
2006	6	33	40	7.2	72.4	54.3	52.8	47.6	90.2	39.2	45	19.8	507.5
2007	7	23	5	46.9	51.5	78.8	59	59.1	9	5.8	9.6	27	381.7
2008	20.5	9	13.5	63.6	39	64.9	70.9	27.8	41.2	2.8	9	35	397.2
2009	22	9	24	32.7	7.6	20.6	67.6	19.2	5.8	31.1	8.6	41.5	289.7
2010	17	4	5	70.8	70	73.2	109	41.8	43.6	8.7	14	34	491.1
2011	69	20.5	8	14.4	6.8	146.6	113.4	61	12.4	14.8	19.2	16	502.1
2012	9	21.5	23	46.6	64.2	58.8	152.4	93.2	24.7	33.4	43	52	621.8
2013	39.5	10.5	31	17	23.9	96.6	101.4	71.6	4	9.8	61	41.5	507.8
2014	8.7	10.2	5.8	75.8	42.3	98.4	120.1	13.9	34.1	10.8	42.4	5.5	468
2015	19.8	24.9	31.3	16.5	37.3	59.7	108.6	10.3	71.1	22.7	17.4	3.5	423.1
2016	26.3	7.6	15.6	7.4	104	64.6	77.3	38.4	10.5	31.4	12.7	12	407.8
2017	10.2	1.9	5.9	45.9	56.5	32.4	44.5	41.3	27.1	25.2	2.4	5.7	299
2018	20.3	14.3	18.4	24.3	42.4	75.0	85.2	59.5	39.4	18.0	17.1	17.3	431.2
2019	26.8	18.6	7.1	29.6	49	155.8	153.7	31	43.7	27.3	25.3	11.1	579
2020	23.6	33	18.8	6	93.5	121.4	121.9	68.4	4.9	14.7	45.5	4.9	556.6
2021	10.8	12.2	7.3	13.2	65.5	38.9	25.3	63.5	22.4	9.1	21.1	39.2	328.5
2022	39.1	14.8	39.2	30	29	109.3	35	34.4	10.6	6.5	32.4	19.6	399.9
2023	3.3	6.1	3	23.8	40	128.8	110	56.3	11.8	4.8	2.6	6.2	396.7
Mean	21.6	12.4	19.2	29.8	48.6	81.5	96.1	49.6	36.6	18.8	21.8	19.5	453.4

1. Denotes - Based on Incomplete Data so annual total is not reliable.
2. Data collected from Elk Island National Park Station (2014-2015, 2019-2022), Holden AGDM Stations (2016-2018) and Tofield North (1996-2013)
3. Link to 1996-2013, 2014-2015, 2019-2023 Data: http://climate.weather.gc.ca/historical_data/search_historic_data_e.html
4. Link to 2016-2018 data: <http://agriculture.alberta.ca/acis/alberta-weather-data-viewer.jsp>
5. Blank - No data

FIGURES

- Figure 1 Dugout Sampling Location Plan
- Figure 2 Parameters with 2023 Maximum Value Trend Charts

G:\SOLID_WASTE\SWOP\SWOP04810-01\GIS\Maps\SWOP04810-01_Fig01_SamplingPlan.mxd modified 2/13/2024 by MEGAN BURNS



LEGEND

- Rural Residence
- Water Sample Location
- Westmancoat - Need Landowner Approval
- Removed
- Site Outline
- 1.6 km Buffer
- Road
- Abandoned Railway Bed (Approximate Centreline)
- ~ Bible Creek (Approximate Centreline)
- Bible Creek Flow Direction
- Potential Wetland

NOTES
 Base data source:
 CanVec 1:50,000 (2019)
 Imagery from ESRI; Maxar (2017/2021)

STATUS
ISSUED FOR USE

**2023 DUGOUT SAMPLING PROGRAM
 CLASS 1 WASTE MANAGEMENT FACILITY
 RYLEY, AB**

Dugout Sampling Location Plan

PROJECTION UTM Zone 12	DATUM NAD83	CLIENT
Scale: 1:20,000		
<div style="display: flex; justify-content: space-between; width: 100%;"> 400 200 0 400 </div> <hr style="width: 100%;"/> Metres		
FILE NO. SWOP04810-01_Fig01_SamplingPlan.mxd		
OFFICE TL-VANC	DWN SL	CKD BB
DATE February 13, 2024	APVD FN	REV 0
PROJECT NO. SWM.SWOP04810-01		Figure 1

Figure 2: Trend Charts

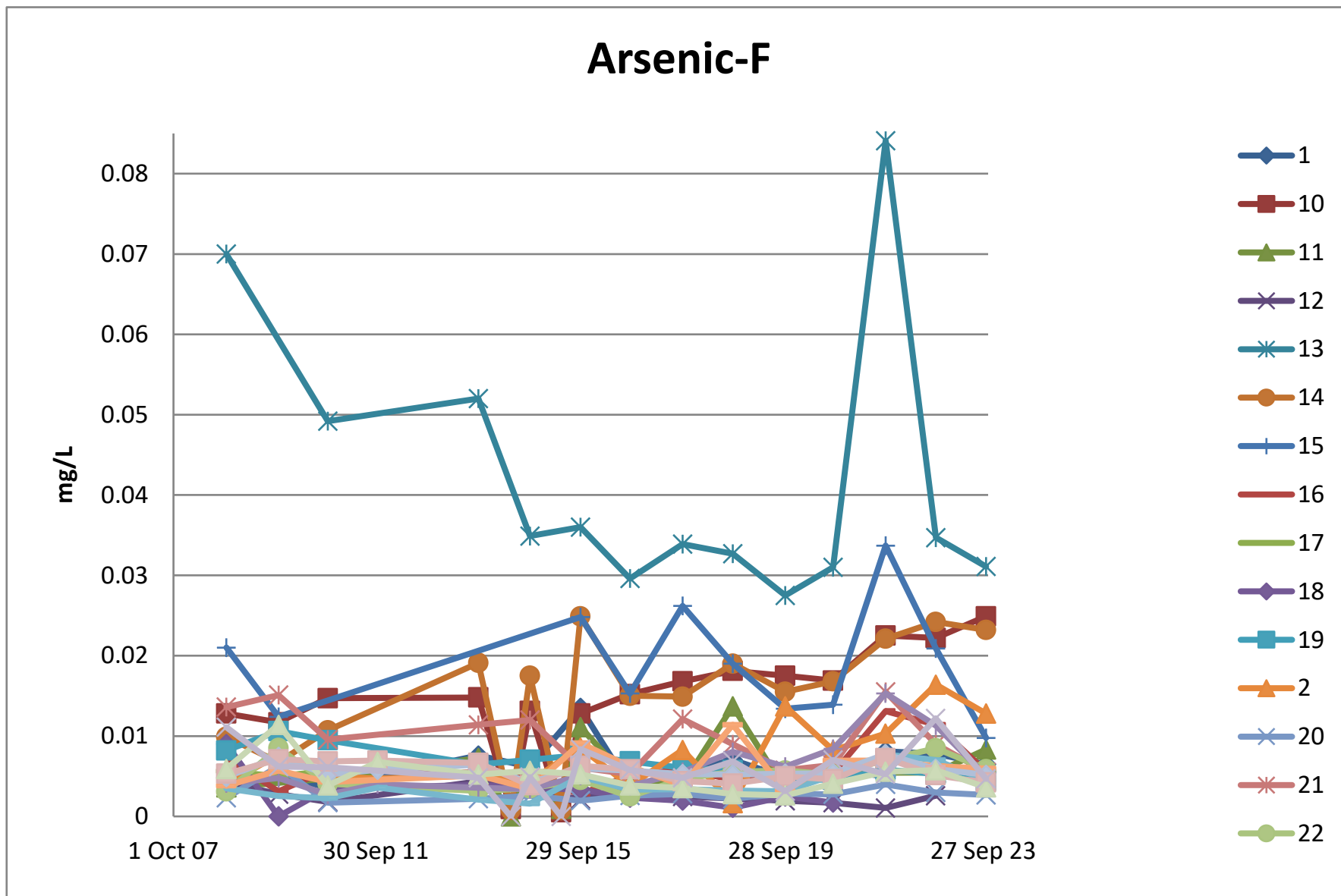


Figure 2: Trend Charts

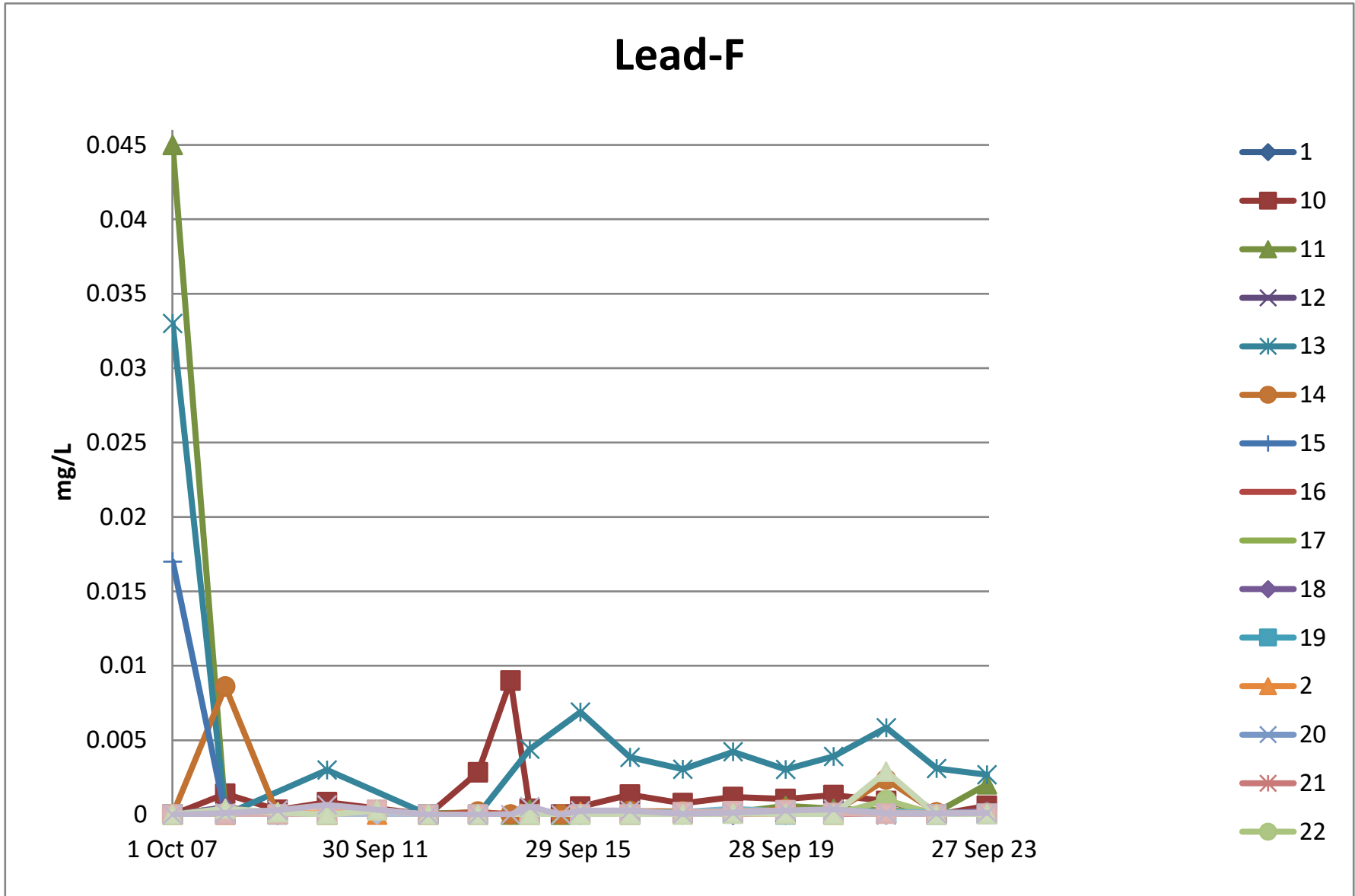


Figure 2: Trend Charts

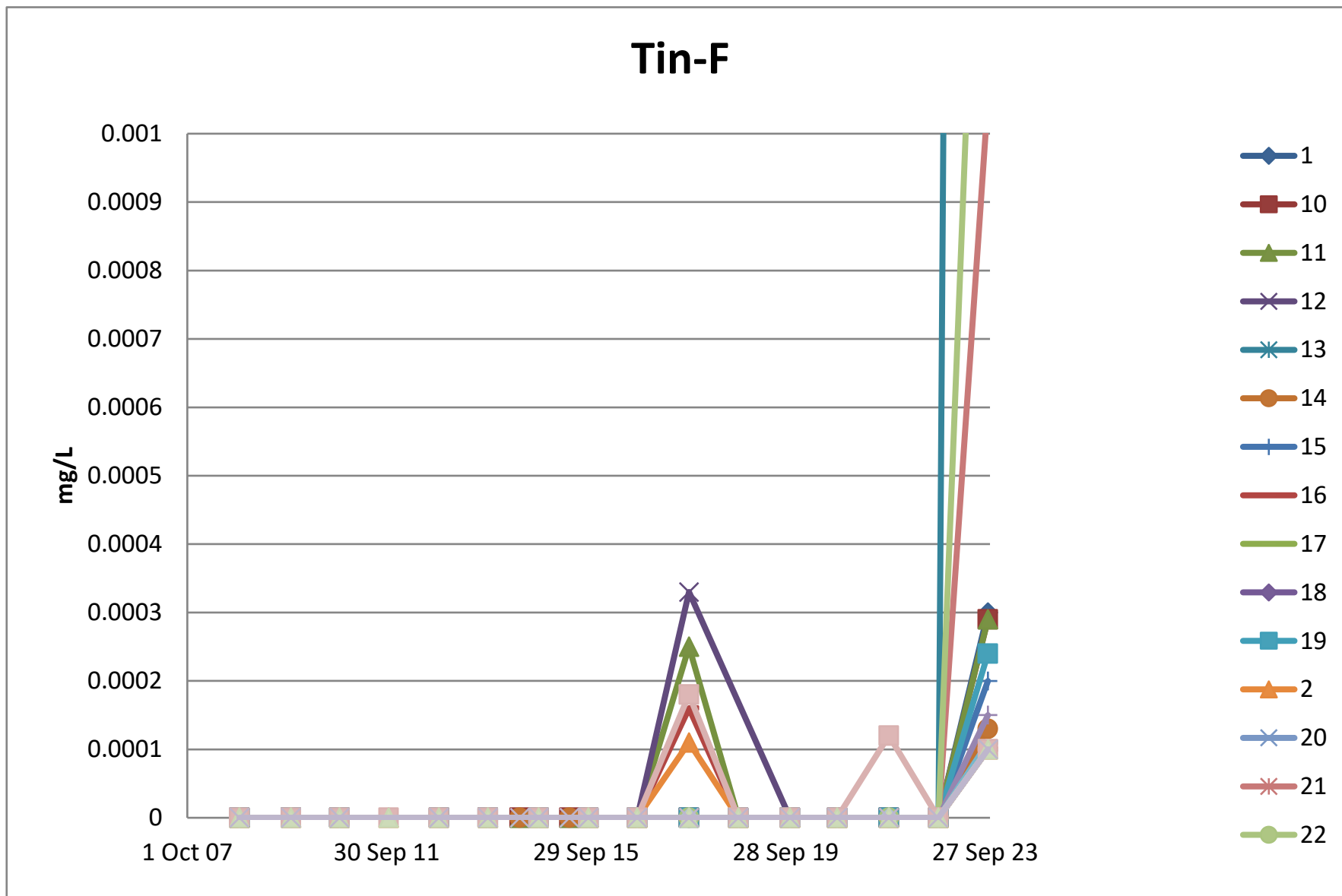


Figure 2: Trend Charts

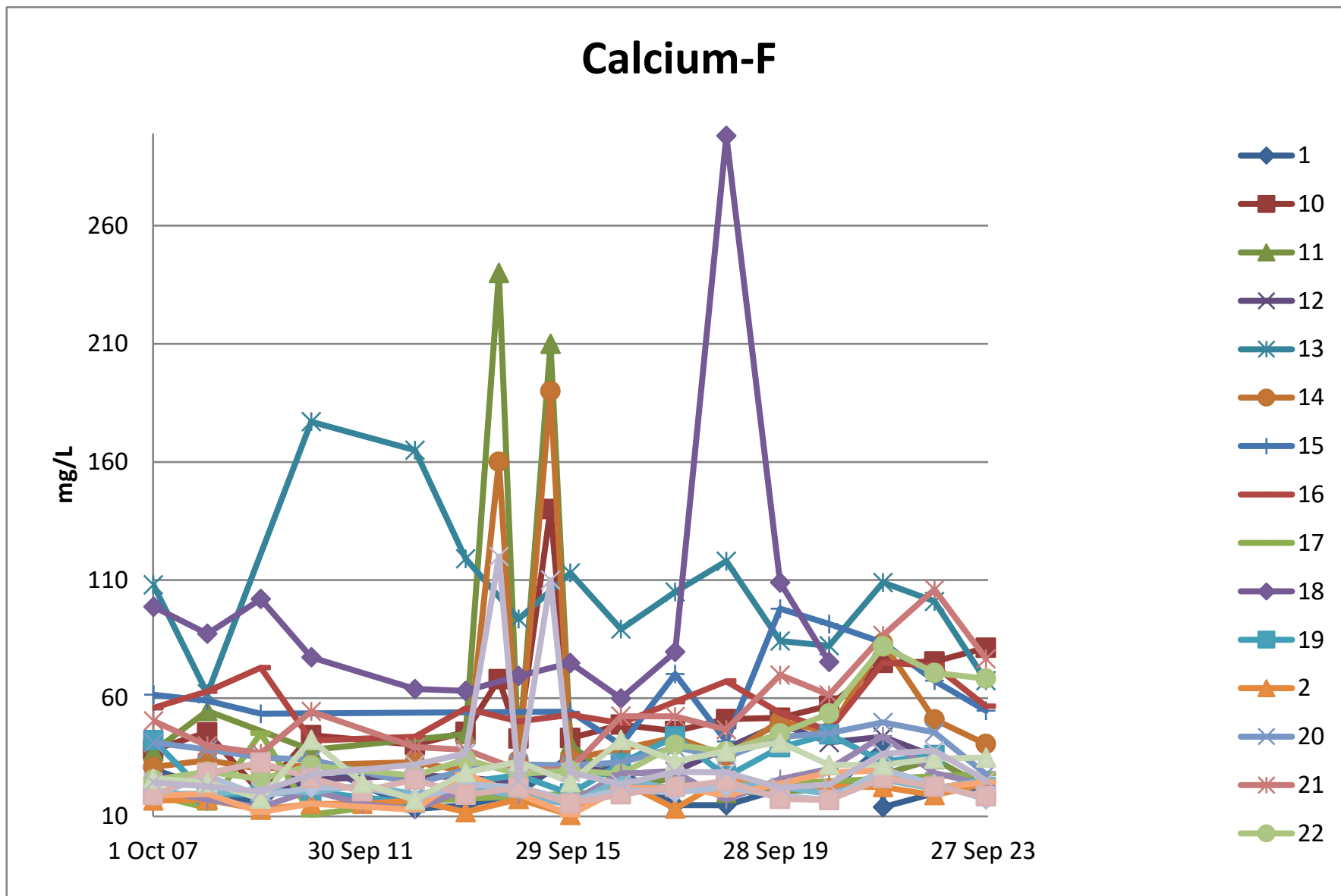


Figure 2: Trend Charts

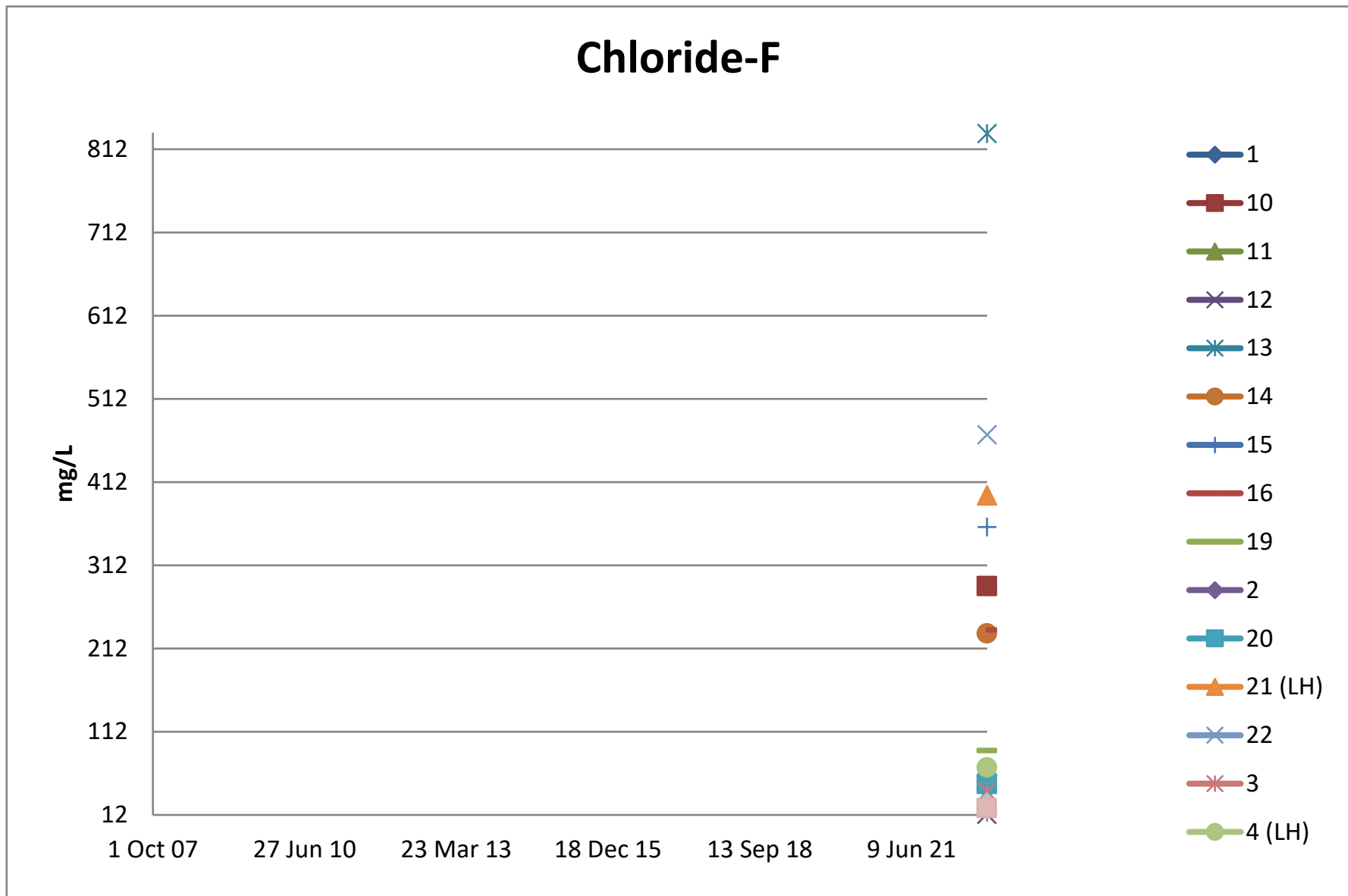
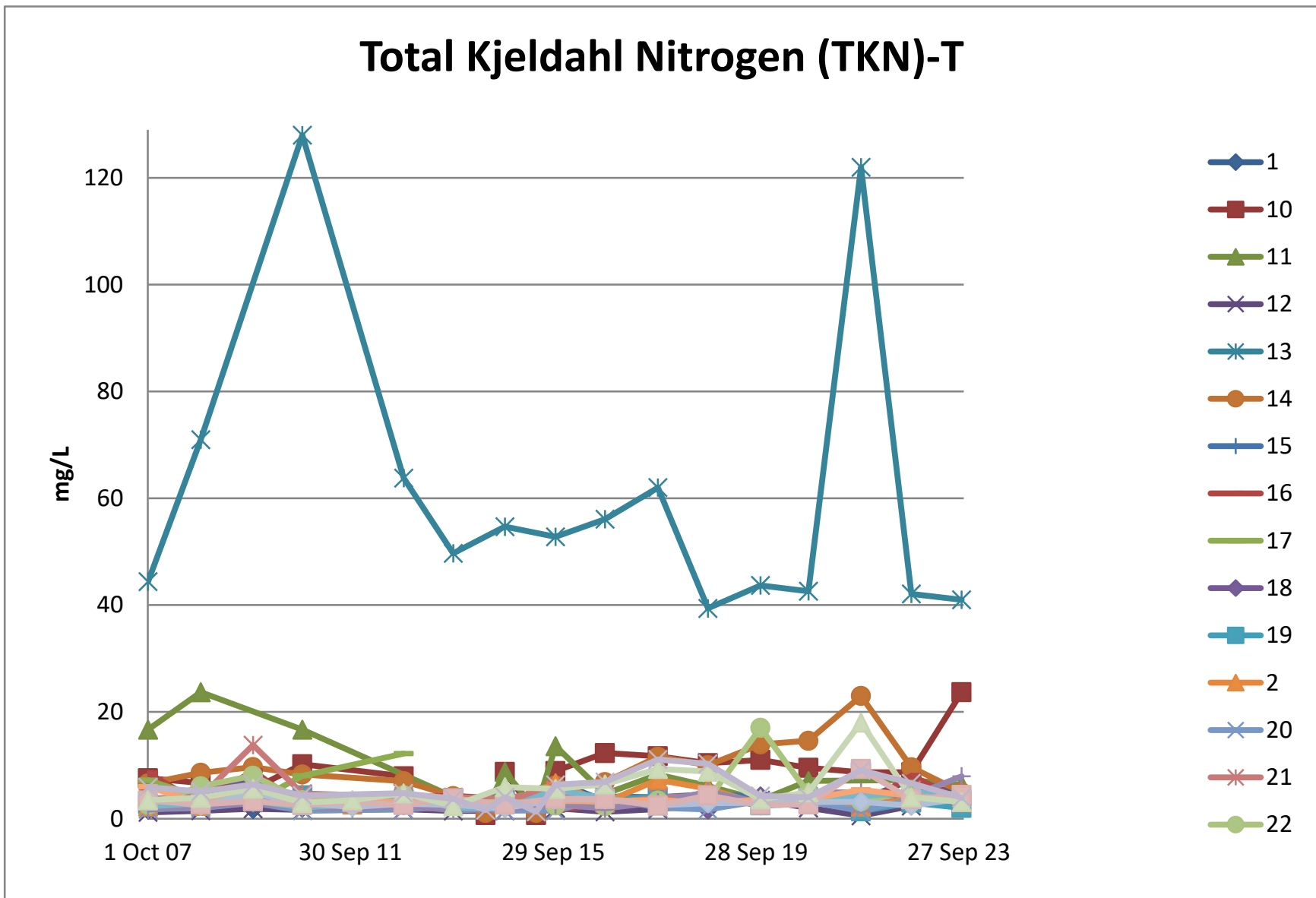


Figure 2: Trend Charts



APPENDIX A

REGULATORY APPROVAL - ALBERTA ENVIRONMENT AND PARKS EPEA APPROVAL NO.10348-03-01

AMENDING APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended.

APPROVAL NO. 10348-03-01

APPLICATION NO. 015-10348

EFFECTIVE DATE: June 21, 2022

EXPIRY DATE: March 31, 2027

APPROVAL HOLDER: Clean Harbors Canada, Inc.

Pursuant to Division 2, of Part 2, of the Environmental Protection and Enhancement Act, R.S.A.2000, c.E-12, as amended, the approval for the following activity:

construction, operation and reclamation of Ryley Industrial Waste Management Facility, consisting of a Class I and Class II Industrial Landfill and a Hazardous Waste/Recyclable Storage and Processing Facility

is amended as per the attached terms and conditions.

[Handwritten Signature]

Designated Director under the Act Mohammad Habib, P. Eng.

Date Signed June 21, 2022

TERMS AND CONDITIONS ATTACHED TO APPROVAL

1. *Environmental Protection and Enhancement Act* Approval No. 10348-03-00 is hereby amended by this Amending Approval.
2. Parts 1, 2, 3, 4, 5, 6, 7 and 8 are deleted, and the following are substituted:

PART 1: DEFINITIONS

SECTION 1.1: DEFINITIONS

- 1.1.1 All definitions from the Act and the regulations apply except where expressly defined in this approval.
- 1.1.2 In all PARTS of this approval:
 - (a) "Act" means the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c.E-12, as amended;
 - (b) "action leakage rate" means the leakage rate that would occur through the primary liner, based on two holes per hectare, each with a diameter of 2 mm and that is calculated to be 790L/ha/day;
 - (c) "active landfill area" means the portion of the landfill that has received or is receiving waste for disposal, where final cover has not been placed, and includes areas that are being used for interim management of waste prior to disposition;
 - (d) "active landfill life" means the period of landfill life during which waste is received for disposal at the landfill, beginning with the initial receipt of waste and ending with the start of final landfill closure activities;
 - (e) "AER" means Alberta Energy Regulator;
 - (f) "affected lands" means lands which have received substances released from the facility;
 - (g) "air effluent stream" means any substance in a gaseous medium released by or from a facility;
 - (h) "APEGA" means the Association of Professional Engineers and Geoscientists of Alberta;
 - (i) "application" means the written submissions from the approval holder to the Director in respect of application No. 014-10348 and any subsequent applications where amendments are issued for this approval;

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- (j) "application No. 005-10348" means the written submissions from the approval holder to the Director in respect of renewal application No. 005-10348;
- (k) "application No. 008-10348" means the written submissions from the approval holder to the Director in respect of amendment application No. 008-10348;
- (l) "application No. 012-10348" means the written submissions from the approval holder to the Director in respect of amendment application No. 012-10348;
- (m) "as-built plans" means survey plans, signed and stamped by a professional registered with APEGA, that document variances from design or construction plans that were either approved or authorized according to the terms and conditions of this approval;
- (n) "BTEX" means benzene, toluene, ethylbenzene and xylene;
- (o) "CAO" means Chief Administrative Officer;
- (p) "central waste receiving and stabilization area" means the central waste receiving and stabilization area as described in application No. 015-10348;
- (q) "COD" means Chemical Oxygen Demand;
- (r) "composite liner" means a liner that meets the specifications in 3.1.2(b) of this approval;
- (s) "container" means any portable device in which a substance is kept, including but not limited to the following:
 - (i) drums, barrels and pails which have a capacity greater than 18 litres but less than 210 litres,
 - (ii) 320 litre overpack drums, and
 - (iii) 1000 litre tote tanks or sacks;
- (t) "cover" means soil or other approved material that is used to cover compacted wastes in a landfill cell;
- (u) "day", when referring to sampling, means any sampling period of 24 consecutive hours;
- (v) "decommissioning" means the dismantling and decontamination of the facility undertaken subsequent to the termination or abandonment of any

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activity or any part of any activity regulated under the Act, excluding the landfill cells and those infrastructure components and facilities that are required for the landfill post-closure;

- (w) "decontamination" means the treatment or removal of substances from the facility and affected lands;
- (x) "Director" means an employee of the Government of Alberta designated as a Director under the Act;
- (y) "dismantling" means the removal of buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, railways, roadways, pipelines and any other installations that are being or have been used or held for or in connection with the facility;
- (z) "DOC" means Dissolved Organic Carbon;
- (aa) "domestic wastewater" means wastewater that is the composite of liquid and water-carried wastes associated with the use of water for drinking, cooking, cleaning, washing, hygiene, sanitation or other domestic purposes, together with any infiltration and inflow wastewater, that is released into a wastewater collection system;
- (bb) "domestic wastewater system" means the parts of the facility that collect, store, or treat domestic wastewater from the facility;
- (cc) "existing landfill cells" means Cell 1, Cell 2, Cell 3A, Cell 3B, and Cell 3C as described in application No. 005-10348;
- (dd) "facility" means all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, railways, pipelines and other installations, the Class I and Class II industrial landfill and the HWRSP Facility, and includes the land, located on the SE $\frac{1}{4}$ and NE $\frac{1}{4}$ of Section 9, Township 50, Range 17, West of the 4th Meridian, that is being or has been used or held for or in connection with the Ryley Industrial Waste Management Facility;
- (ee) "facility developed area" means the areas of the facility used for the storage, treatment, processing, transport, or handling of raw material, intermediate product, by-product, finished product, process chemicals, or waste material, and includes the active landfill area;
- (ff) "final cover" means a designed system, natural or man-made, that is placed on the surface of a landfill or landfill cell that has reached its maximum designated waste elevation to control transmission of moisture and landfill gas, and conforms to the end use plan;

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- (gg) “final landfill closure” means the period of time when waste is no longer placed in the defined portion of a landfill and activities are undertaken to complete the final cover system and decommission components and facilities that are no longer required, and includes the construction of any additional components or monitoring systems that are necessary for post-closure;
- (hh) “free liquids” means the liquids as determined by the US EPA SW-846 Test Method 9095B: Paint Filter Liquids Test, as specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, US EPA Publication No. SW-846, as amended;
- (ii) “fugitive emissions” means emissions of substances to the atmosphere other than ozone depleting substances, originating from a facility source other than a flue, vent, or stack but does not include sources which may occur due to breaks or ruptures in process equipment;
- (jj) “GCL” means geosynthetic clay liner that is made of a thin layer of bentonite either bonded to a geomembrane or fixed between two sheets of geotextile;
- (kk) “geomembrane” means a sheet of manufactured synthetic material designed to control migration of liquid and gas;
- (ll) “grab sample” means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;
- (mm) “groundwater” means groundwater as defined in the *Water Act*, R.S.A. 2000, c.W-3, as amended;
- (nn) “groundwater monitoring well” means a well drilled at a site to measure groundwater levels and collect groundwater samples for the purpose of physical, chemical, or biological analysis to determine the concentration of groundwater constituents;
- (oo) “H₂S” means hydrogen sulphide;
- (pp) “HDPE” means High Density Polyethylene;
- (qq) “HWRSP Facility” means the Hazardous Waste/Recyclable Storage and Processing Facility as described in the application for storage, processing and transfer of hazardous wastes and hazardous recyclables and which includes the Maintenance Shop, and is an integral part of the facility;
- (rr) “hydraulic conductivity” means the ease with which water can be transported through a material;

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- (ss) "hydrocarbon" means a chemical compound that consists entirely of hydrogen and carbon;
- (tt) "ISO/IEC 17025" means the international standard, developed and published by International Organization for Standardization (ISO), specifying management and technical requirements for laboratories;
- (uu) "incompatible waste" means waste materials which could cause dangerous reactions from direct contact with one another;
- (vv) "industrial wastewater" means the composite of liquid wastes and water-carried wastes, any portion of which results from any industrial process carried on at the HWRSP Facility;
- (ww) "landfill" means the Class I and Class II industrial landfill as described in the application and which includes the waste receiving area(s) and waste stabilization area(s), and is an integral part of the facility;
- (xx) "landfill cell" means a designed area of a landfill comprised of an excavation or earthen structure in which waste is enclosed;
- (yy) "landfill cell closure" means the construction of a final cover for landfill cell including placement of previously conserved top soil and upper subsoil and re-vegetation as required for the intended future use of the landfill;
- (zz) "landfill gas" means a mixture of gases generated by the microbial decomposition of and chemical reactions between wastes in a landfill;
- (aaa) "lateral expansion" means an expansion of landfill cell boundaries beyond the approved area;
- (bbb) "laydown area" means the laydown area as described in application No. 015-10348;
- (ccc) "leachate" means a liquid that has been in contact with waste in the landfill cell and has undergone chemical or physical changes;
- (ddd) "leachate collection system" means a system that gathers leachate so that it may be removed from a landfill, and includes a permeable drainage material, a network of perforated pipes and sumps or manholes from where leachate can be removed;
- (eee) "leak detection liquid" means any liquid collected within the leak detection system;
- (fff) "leak detection system" means a system that gathers liquid between a primary liner and a secondary liner system, and consists of a permeable

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drainage material, a network of perforated pipes and sumps or manholes from where the liquid can be removed;

(ggg) “liner” means a continuous layer of synthetic material or compacted natural clay placed beneath and at the sides of a landfill cell that is compatible with the waste and restricts the migration of leachate, or landfill gas, or both;

(hhh) “local environmental authority” means the Department of Environment and Parks, in the Province of Alberta, or the agency that has the equivalent responsibilities for any jurisdiction outside the Province;

(iii) “major ions” means the following:

Calcium	Carbonate
Magnesium	Bicarbonate
Sodium	Chloride
Potassium	Sulfate

(jjj) “maximum acceptable leachate head” means the maximum depth of leachate above the lowest part of the primary liner, not including the sumps or leachate collection pipe trenches, and is:

(i) 1.0 m in each of the existing landfill cells, and

(ii) 0.3 m in each of the new landfill cells

during active landfill life, landfill cell closure, final landfill closure, and post-closure;

(kkk) “maximum designated waste elevation” means the maximum elevation of waste in metres above sea level that can be disposed of at the landfill prior to construction of final cover, and is 714 metres;

(lll) “metals” means the following:

Aluminum, dissolved	Chromium, dissolved (hexavalent)	Nickel, dissolved
Antimony, dissolved	Cobalt, dissolved	Selenium, dissolved
Arsenic, dissolved	Copper, dissolved	Silver, dissolved
Barium, dissolved	Lead, dissolved	Thallium, dissolved
Boron, dissolved	Manganese, dissolved	Tin, dissolved
Cadmium, dissolved	Mercury, total	Uranium, dissolved
Chromium, total	Molybdenum, dissolved	Zinc, dissolved

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- (mmm) "monitoring system" means all equipment used for sampling, conditioning, analyzing or recording data in respect of any parameter listed or referred to in this approval, including equipment used for continuous monitoring;
- (nnn) "month" means calendar month;
- (ooo) "municipal solid waste" means solid waste resulting from or incidental to municipal, community, commercial, institutional and recreation activities, and includes garbage, rubbish, ashes, street cleanings, abandoned automobiles and all other solid wastes except hazardous waste, industrial solid waste, oilfield waste and biomedical wastes;
- (ppp) "NAPS" means the National Air Pollution Surveillance program;
- (qqq) "new landfill cells" means Cell 3D as described in application No. 005-10348, Cell 3E as described in application No. 012-10348, Cell 4 as described in application No. 014-10348, and Cell 5 as described in application No. 015-10348;
- (rrr) "new surface water detention pond" means the surface water detention pond(s) as described in application No. 012-10348 or No. 015-10348;
- (sss) "NORM" means Naturally Occurring Radioactive Materials;
- (ttt) "NORM waste" means any waste material with concentrations of NORM above the limits specified in Tables 5.1, 5.2, or 5.3 of the *Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM)*, Health Canada, 2011, as amended;
- (uuu) "nutrients" means the following:

Ammonia nitrogen	Nitrite nitrogen
Total Kjeldahl nitrogen	Total phosphorus
Nitrate nitrogen	Dissolved phosphorus

- (vvv) "old surface water detention pond" means the surface water detention pond as described in application No. 005-10348;
- (www) "Petroleum Hydrocarbons Fractions F1 and F2" means the specific hydrocarbon fraction measured by the analytical methods described in the *Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method*, published by the Canadian Council of Ministers of the Environment, 2001, as amended;
- (xxx) "PM" means particulate matter;

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- (yyy) "PM₁₀" means particulate matter less than 10 microns in diameter;
- (zzz) "points of compliance" means the location or locations of the groundwater monitoring wells where measurements of groundwater quality are taken to assess landfill and waste treatment performance;
- (aaaa) "post-closure" means the period of time after completion of the final landfill closure;
- (bbbb) "ppm" means concentration in parts per million;
- (cccc) "primary liner" means the uppermost geomembrane liner;
- (dddd) "QA/QC" means quality assurance and quality control;
- (eeee) "quarter year" means a time period of three consecutive months designated as January, February and March; or April, May and June; or July, August and September; or October, November and December;
- (ffff) "regulations" means the regulations enacted pursuant to the Act, as amended;
- (gggg) "representative grab" means a sample consisting of equal volume portions of water collected from at least four sites between 0.20 to 0.30 metres below the water surface within a pond;
- (hhhh) "runoff" means any rainwater or melt water that drains as surface flow from the facility developed areas, excluding leachate;
- (iiii) "runoff control system" means the parts of the facility that collect, store or treat runoff from the facility, and includes but is not limited to runoff collection ditches, surface water detention ponds and tank farm bermed area;
- (jjjj) "run-on" means any rainwater or melt water that drains as surface flow toward the active landfill area;
- (kkkk) "run-on control system" means the parts of the facility that divert run-on away from the active landfill area;
- (llll) "scrubber exhaust stack" means the exhaust stack through which the air effluent streams that are:
- (i) collected from the exhaust vents of the Drum Processing Building or Staging Building or both, and
 - (ii) treated with the caustic scrubber and activated carbon filter

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are released to the atmosphere as described in the application;

(mmmm) “secondary liner” means the lowermost geomembrane liner;

(nnnn) “soil” means mineral or organic earthen materials that can, have, or are being altered by weathering, biological processes, or human activity;

(oooo) “SOP” means Standard Operating Procedures;

(pppp) "storm event" means a 1 in 25 year, 24 hour duration rainfall event at Ryley, Alberta;

(qqqq) “tank” means a stationary device, designed to contain an accumulation of a substance, which is constructed primarily of non-earthen materials that provide structural support including wood, concrete, steel, and plastic;

(rrrr) “TDGR” means the *Transportation of Dangerous Goods Regulations* (SOR/2001-286) made under the *Transportation of Dangerous Goods Act, 1992* (Canada), as amended;

(ssss) “TDS” means Total Dissolved Solids;

(tttt) “TNMOCs” means total non-methane organic compounds;

(uuuu) “topsoil” means the uppermost layer of soil and consists of:

(i) the A-horizons and all organic horizons as defined in *The Canadian System of Soil Classification* (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended, and

(ii) the soil ordinarily moved during tillage;

(vvvv) “total metals” means the following:

Antimony	Cobalt	Selenium
Arsenic	Copper	Silver
Barium	Iron	Thallium
Beryllium	Lead	Tin
Boron	Manganese	Uranium
Cadmium	Mercury	Vanadium
Chromium	Nickel	Zinc

(wwww) “TSP” means total suspended particulate matter;

(xxxx) “TSS” means Total Suspended Solids;

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- (yyyy) "upper subsoil" means the layer of soil directly below the topsoil layer that consists of the B-horizons as defined in *The Canadian System of Soil Classification*, (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended;
- (zzzz) "VOCs" means volatile organic compounds;
- (aaaaa) "volume estimate" means a technical evaluation based on the sources contributing to the release including but not limited to pump capabilities, water meters, and batch release volumes;
- (bbbbb) "waste stabilization area" means the portion of the landfill that is used for waste stabilization or solidification or both, as described in application No. 008-10348 or No. 015-10348;
- (ccccc) "waste storage area" means the areas designated for storage of containers for waste or hazardous recyclable or both, or for storage of tanks for waste or hazardous recyclable or both, or for storage of both, as described in application No. 005-10348;
- (dddd) "week" means any consecutive 7-day period;
- (eeee) "working face" means that portion of the active landfill area where waste is currently being deposited, spread and compacted; and
- (ffff) "year" means calendar year.

PART 2: GENERAL

SECTION 2.1: REPORTING

- 2.1.1 The approval holder shall immediately report to the Director by telephone any contravention of the terms and conditions of this approval at 1-780-422-4505.
- 2.1.2 The approval holder shall submit a written report to the Director within 7 days of the reporting pursuant to 2.1.1.
- 2.1.3 The approval holder shall immediately notify the Director in writing if any of the following events occurs:
 - (a) the approval holder is served with a petition into bankruptcy;
 - (b) the approval holder files an assignment in bankruptcy or Notice of Intent to make a proposal;
 - (c) a receiver or receiver-manager is appointed;

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- (d) an application for protection from creditors is filed for the benefit of the approval holder under any creditor protection legislation; or
- (e) any of the assets which are the subject matter of this approval are seized for any reason.

2.1.4 If the approval holder monitors for any substances or parameters which are the subject of operational limits as set out in this approval more frequently than is required and uses procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the reports required by this approval.

2.1.5 The approval holder shall submit all monthly reports required by this approval to be compiled or submitted to the Director on or before the end of the month following the month in which the information was collected, unless otherwise specified in this approval.

2.1.6 The approval holder shall submit all annual reports required by this approval to be compiled or submitted to the Director on or before March 31 of the year following the year in which the information was collected, unless otherwise specified in this approval.

SECTION 2.2: RECORD KEEPING

2.2.1 The approval holder shall:

- (a) record; and
- (b) retain

all the following information in respect of any sampling conducted or analyses performed in accordance with this approval for a minimum of ten years, unless otherwise authorized in writing by the Director:

- (i) the place, date and time of sampling,
- (ii) sample type,
- (iii) the dates the analyses were performed,
- (iv) the analytical techniques, methods or procedures used in the analyses,
- (v) the names of the persons who collected and analysed each sample, and
- (vi) the results of the analyses.

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- 2.2.2 The approval holder shall keep and maintain an Operating Record of the landfill as per 4.6.34(a) until the end of the landfill post-closure.
- 2.2.3 The Operating Record referred to in 2.2.2 shall include, at a minimum, all of the following information:
- (a) the information required in section 7.3(c) of the *Standards for Landfills in Alberta*, as amended;
 - (b) the name and contact information of all persons who discover any contravention;
 - (c) the names and contact information of all persons who take any remedial actions arising from the contravention of the Act, the regulations, or this approval; and
 - (d) a description of the remedial measures taken in respect of a contravention of the Act, the regulations, or this approval.
- 2.2.4 The approval holder shall submit a copy of the most recent Operating Record to the Director upon written request from the Director within the timeline specified in writing by the Director.

SECTION 2.3: ANALYTICAL REQUIREMENTS

- 2.3.1 With respect to any sample required to be taken pursuant to this approval, the approval holder shall ensure that:

- (a) collection;
- (b) preservation;
- (c) storage;
- (d) handling; and
- (e) analysis

shall be conducted in accordance with the following unless otherwise authorized in writing by the Director:

- (i) for air:
 - (A) the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended,

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- (B) the *Methods Manual for Chemical Analysis of Atmospheric Pollutants*, Alberta Environment, 1993, as amended, and
 - (C) the *Air Monitoring Directive*, Alberta Environment, 1989, as amended;
- (ii) for industrial wastewater, industrial runoff, groundwater and domestic wastewater:
- (A) the *Standard Methods for the Examination of Water and Wastewater*, published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation, 1998, as amended;
- (iii) for whole effluent toxicity tests:
- (A) the *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout*, Environment Canada, Environmental Protection Series 1/RM/13, December 2000, as amended,
 - (B) the *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia Magna*, Environment Canada, Environmental Protection Series 1/RM/14, December 2000, as amended,
 - (C) the *Biological Test Method: Growth Inhibition Test Using the Freshwater Alga Selenastrum capricornutum*, Environment Canada, Environmental Protection Series, November 1992, as amended,
 - (D) the *Biological Test Method: Test of Reproduction and Survival Using the Cladoceran Ceriodaphnia dubia*, Environment Canada, Environmental Protection Series 1/RM/21, February 1992, as amended,
 - (E) the *Biological Test Method: Test of Larval Growth and Survival Using Fathead Minnows*, Environment Canada, Environmental Protection Series 1/RM/22, February 1992, as amended, and
 - (F) the *Biological Test Method: Toxicity Test Using Luminescent Bacteria (Photobacterium phosphoreum)*, Environment Canada, Environmental Protection Series, 1/RM/24, November 1992, as amended;
- (iv) for soil:

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- (A) the *Soil Monitoring Directive*, Alberta Environment, May 2009, as amended, and
 - (B) the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, March 1987, as amended; and
 - (v) for waste:
 - (A) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846, September 1986, as amended,
 - (B) the *Methods Manual for Chemical Analysis of Water and Wastes*, Alberta Environmental Centre, Vegreville, Alberta, 1996, AECV96-M1, as amended,
 - (C) the *Toxicity Characteristic Leaching Procedure (TCLP)* USEPA Regulation 40 CFR261, Appendix II, Method No. 1311, as amended, or
 - (D) the *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, and the Water Environment Federation, 2010, as amended.
- 2.3.2 The approval holder shall analyse all samples that are required to be obtained by this approval in a laboratory accredited pursuant to ISO/IEC 17025, as amended, for the specific parameter(s) to be analysed, unless otherwise authorized in writing by the Director.
- 2.3.3 The term sample used in 2.3.2 does not include samples directed to continuous monitoring equipment, unless specifically required in writing by the Director.
- 2.3.4 The approval holder shall comply with the terms and conditions of any written authorization issued by the Director under 2.3.2.

SECTION 2.4: OTHER

- 2.4.1 The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.
- 2.4.2 Any conflict between the *Standards for Landfills in Alberta*, as amended, and the terms and conditions of this approval shall be resolved in favour of this approval.

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- 2.4.3 *Environmental Protection and Enhancement Act* Approval No. 10348-02-00, as amended, is cancelled.
- 2.4.4 All tanks shall conform to the *Guidelines for Secondary Containment for Above Ground Storage Tanks*, Alberta Environmental Protection, 1997, as amended, unless otherwise authorized in writing by the Director.
- 2.4.5 All above ground storage tanks containing liquid hydrocarbons or organic compounds shall conform to the *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks*, Canadian Council of Ministers of the Environment, PN 1180, 1995, as amended.

PART 3: CONSTRUCTION**SECTION 3.1: LANDFILL**

- 3.1.1 The approval holder shall not commence construction of:
- (a) Cell 4, unless and until updated financial security of the facility has been provided to the Director to include Cell 4; and
 - (b) Cell 5, unless and until updated financial security of the facility has been provided to the Director to include Cell 5.
- 3.1.2 The approval holder shall construct each new Class I industrial landfill cell in such a way that each new Class I landfill cell shall consist of the following components, at a minimum, unless otherwise authorized in writing by the Director:
- (a) a minimum of 0.45 metre thick cover of clean sand or soil placed over top of the uppermost drainage layer;
 - (b) a composite liner that consists of, at a minimum:
 - (i) a geo-composite drainage layer placed in direct contact with an underlying 80 mil HDPE geomembrane liner as a primary liner;
 - (ii) a geo-composite drainage layer placed in direct contact with an underlying 80 mil HDPE geomembrane liner as a secondary liner; and
 - (iii) a GCL liner placed in direct contact with an underlying clay liner that has:
 - (A) a minimum thickness of 1.0 metre at all points, measured perpendicular to the slope, and
 - (B) been compacted to achieve an in-place hydraulic conductivity of 1×10^{-9} m/s or less;

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- (c) a leachate collection system that:
 - (i) is placed over the primary liner;
 - (ii) is capable of maintaining the maximum acceptable leachate head;
and
 - (iii) consists of:
 - (A) a geo-composite drainage layer with a transmissivity of at least $1 \times 10^{-4} \text{ m}^2/\text{s}$ placed over top of the primary liner,
 - (B) a network of perforated leachate collection pipes, and
 - (C) a leachate collection sump placed over the primary liner;
- (d) a leak detection system that:
 - (i) is installed over the secondary liner;
 - (ii) is capable of detecting the leakage through the primary liner; and
 - (iii) consists of:
 - (A) a geo-composite drainage layer with a transmissivity of at least $1 \times 10^{-4} \text{ m}^2/\text{s}$ placed over top of the secondary liner,
 - (B) a network of perforated leak detection liquid collection pipes,
and
 - (C) a leak detection liquid collection sump placed over the secondary liner;
- (e) a final cover:
 - (i) that meets the requirements in section 6.1(c) of the *Standards for Landfills in Alberta*, as amended; or
 - (ii) as specified in the Landfill Cell Closure Plan submitted by the approval holder and authorized in writing by the Director pursuant to 7.1.1 and 7.1.4;
- (f) a run-on control system capable of preventing flow onto the active landfill area from at least the peak discharge from a 1 in 25 year, 24 hour duration storm event at the facility; and

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- (g) a runoff control system capable of collecting and controlling at least the runoff volume resulting from a 1 in 25 year, 24 hour duration storm event at the facility.
- 3.1.3 For any new landfill cell(s) to be constructed below the native ground surface in the NE 09-050-17-W4M area of the facility, the approval holder shall construct the cell(s) in the following manner:
- (a) shallow groundwater shall be dewatered and managed to ensure that construction specifications for the composite liner system referred to in 3.1.2 shall not be compromised;
 - (b) measures of groundwater dewatering and management during construction shall be documented, and the document shall be maintained as part of the documentation for construction of the composite liner system;
 - (c) the integrity of the composite liner system shall be verified and maintained to function as designed, and the verification shall be documented; and
 - (d) the documentation referred to in (b) and (c) above shall be submitted as part of the summary report required in 3.1.9.
- 3.1.4 The composite liner for the landfill shall be constructed on a foundation or base such that there shall be no failure of the liners due to settlement, compression, or uplift.
- 3.1.5 The approval holder shall submit to the Director the following plans and specifications for the proposed construction of each of the items listed in 3.1.2, signed and stamped by a professional registered with APEGA at least three (3) months prior to construction:
- (a) a Detailed Construction Plan and Specifications prepared as per 3.1.2;
 - (b) a Construction Quality Assurance Plan; and
 - (c) a Construction Quality Control Plan.
- 3.1.6 If the Detailed Construction Plan and Specifications in 3.1.5 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.
- 3.1.7 The approval holder shall implement the Detailed Construction Plan and Specifications in 3.1.5 as authorized in writing by the Director.
- 3.1.8 During construction of any of the items listed in 3.1.2, the approval holder shall not deviate from the Detailed Construction Plan and Specifications as authorized in writing by the Director in 3.1.7, unless the following conditions are met:

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- (a) the deviation results in a minor adjustment to the Detailed Construction Plan and Specifications in order to suit field conditions encountered; and
- (b) the deviation will result in an equivalent or better design performance of the landfill.

3.1.9 The approval holder shall submit to the Director a summary report of the Construction Quality Assurance and Construction Quality Control results signed and stamped by a professional registered with APEGA.

3.1.10 The summary report in 3.1.9 shall contain the following information, at a minimum:

- (a) confirmation that the landfill has been constructed according to:
 - (i) the Construction Quality Assurance Plan,
 - (ii) the Construction Quality Control Plan, and
 - (iii) the Detailed Construction Plan and Specifications as authorized in writing by the Director in 3.1.7, subject to the deviations as per 3.1.8;
- (b) description of any minor deviations as per 3.1.8;
- (c) confirmation by the professional registered with APEGA, that deviations as per 3.1.8 will result in an equivalent or better design performance of the landfill;
- (d) “as-built” plans;
- (e) photo-documentation of important stages of construction including any repair work or remediation activities to establish or maintain liner integrity;
- (f) documentation required in 3.1.3; and
- (g) any other information as required in writing by the Director.

3.1.11 The approval holder shall notify the Director in writing at least fourteen (14) days prior to commencing operations of any new landfill cell.

3.1.12 The approval holder shall construct the new surface water detention pond(s) in the:

- (a) SE 09-050-17-W4M area of the facility as described in application No. 012-10348; and
- (b) NE 09-050-17-W4M area of the facility as described in application No. 015-10348 with a clay liner that has:

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- (i) a minimum thickness of 1.0 metre at all points, measured perpendicular to the slope, and
- (ii) been compacted to achieve an in-place hydraulic conductivity of 1×10^{-9} m/s or less;

unless otherwise authorized in writing by the Director.

- 3.1.13 The approval holder shall construct the laydown area in the NE 09-050-17-W4M area of the facility as described in application No. 015-10348, unless otherwise authorized in writing by the Director.
- 3.1.14 The approval holder shall manage landfill progression in such a manner as to minimize off-site visual impacts of the landfill, as described in the Landfill Cell Closure Plan submitted by the approval holder and authorized in writing by the Director pursuant to 7.1.1 and 7.1.4.

SECTION 3.2: WASTE RECEIVING AND STABILIZATION AREAS

- 3.2.1 The approval holder shall construct the waste receiving area(s) in the SE 09-050-17-W4M area of the facility as described in the application, unless otherwise authorized in writing by the Director.
- 3.2.2 The approval holder shall construct the waste stabilization area(s) in the SE 09-050-17-W4M area of the facility in accordance with the following:
 - (a) application No. 008-10348; and
 - (b) within a Class I landfill cell;unless otherwise authorized in writing by the Director.
- 3.2.3 The approval holder shall construct the central waste receiving and stabilization area in the NE 09-050-17-W4M area of the facility as described in application No. 015-10348, unless otherwise authorized in writing by the Director.
- 3.2.4 The approval holder shall decommission and reclaim the waste receiving and stabilization area(s) in the SE 09-050-17-W4M area of the facility upon completing:
 - (a) construction; and
 - (b) commissioning

of the central waste receiving and stabilization area in the NE 09-050-17-W4M area of the facility, unless otherwise authorized in writing by the Director.

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SECTION 3.3: SOIL CONSERVATION

3.3.1 The approval holder shall:

- (a) salvage; and
- (b) conserve

all topsoil for land reclamation of the landfill.

3.3.2 The approval holder shall:

- (a) salvage; and
- (b) conserve

all upper subsoil for land reclamation of the landfill.

3.3.3 The approval holder shall:

- (a) conserve; and
- (b) stockpile

all topsoil separately from the upper subsoil.

3.3.4 The approval holder shall place all:

- (a) topsoil stockpiles; and
- (b) upper subsoil stockpiles

at the landfill.

3.3.5 The approval holder shall stockpile all topsoil as follows:

- (a) on stable foundations; and
- (b) on undisturbed topsoil.

3.3.6 The approval holder shall stockpile all upper subsoil as follows:

- (a) on stable foundations; and
- (b) on areas where the topsoil has been removed.

3.3.7 The approval holder shall take all steps necessary to prevent any erosion (e.g., wind or water), including but not limited to, all of the following:

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- (a) revegetating the stockpiles; and
- (b) any other steps authorized in writing by the Director.

3.3.8 The approval holder shall immediately suspend conservation of:

- (a) topsoil; and
- (b) upper subsoil

when:

- (i) wet or frozen conditions will result in mixing, loss, degradation or compaction of topsoil or upper subsoil, or
- (ii) high wind velocities, any other field conditions or facility operations will result in mixing, loss, or degradation of topsoil or upper subsoil.

3.3.9 The approval holder shall recommence conservation of:

- (a) topsoil; and
- (b) upper subsoil

only when conditions in 3.3.8 no longer exist.

PART 4: OPERATIONS, LIMITS, MONITORING AND REPORTING

SECTION 4.1: GENERAL

4.1.1 The approval holder shall maintain the geographical boundaries of the facility to that located within SE ¼ and NE ¼ of Section 09, Township 050, Range 17, West of the 4th Meridian, as described in the application.

4.1.2 The approval holder shall limit the waste elevation of the landfill to no more than the maximum designated waste elevation.

4.1.3 The approval holder shall restrict access to the facility to only personnel authorized by the approval holder.

4.1.4 The approval holder shall maintain a publicly available 24 hour "HOTLINE" number for a prompt response during an emergency.

4.1.5 The approval holder shall:

- (a) operate; and

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(b) maintain the integrity of

the following waste management facilities at the facility:

- (i) the HWRSP Facility;
 - (ii) the Class I and Class II industrial landfill, including:
 - (A) Class I landfill cells,
 - (B) Class II landfill cell(s),
 - (C) waste receiving area(s), and
 - (D) waste stabilization area(s); and
 - (iii) waste storage area(s);
- as described in the application.

4.1.6 In addition to 4.1.5, the approval holder shall:

(a) operate; and

(b) maintain the integrity of

the following infrastructure components at the facility:

- (i) the composite liner;
 - (ii) the leachate collection system,
 - (iii) the leak detection system,
 - (iv) the run-on control system,
 - (v) the runoff control system,
 - (vi) the groundwater monitoring wells,
 - (vii) the weigh scale, and
 - (viii) the site access control;
- as described in the application.

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FACILITY AUDIT

- 4.1.7 The approval holder shall cause the facility to be audited by an independent third-party environmental consultant or organization to assess compliance with the terms and conditions of this approval:
 - (a) at least once every three years; and
 - (b) commencing on or before October 1, 2018 for the first audit.
- 4.1.8 The approval holder shall submit the audit report required in 4.1.7 in the Annual Landfill Operations Report as required in 4.6.60(c).
- 4.1.9 The requirements in 4.1.7 and 4.1.8 shall not relieve the approval holder of any duty under the Act, or its associated regulations, or this approval.

FACILITY WILDLIFE MANAGEMENT PLAN

- 4.1.10 The approval holder shall:
 - (a) develop; and
 - (b) implementa Facility Wildlife Management Plan at the facility to keep wildlife away from exposed waste areas within 120 days of the issuance of this approval, unless otherwise authorized in writing by the Director.
- 4.1.11 The approval holder shall:
 - (a) review the Facility Wildlife Management Plan annually; and
 - (b) update the Facility Wildlife Management Plan if any of the following circumstances apply:
 - (i) there are facility expansions or changes in site operations, or
 - (ii) an update is requested in writing by the Director.
- 4.1.12 The approval holder shall retain a copy of the most recent Facility Wildlife Management Plan at the facility.
- 4.1.13 The approval holder shall submit a copy of the most recent Facility Wildlife Management Plan to the Director upon written request from the Director within the timeline specified in writing by the Director.

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- 4.1.14 If the Facility Wildlife Management Plan submitted pursuant to 4.1.13 is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.
- 4.1.15 The approval hold shall implement the latest Facility Wildlife Management Plan, unless otherwise authorized in writing by the Director.

COMMUNITY COMPLAINT RESPONSE PLAN

- 4.1.16 The approval holder shall:
 - (a) develop; and
 - (b) implementa Community Complaint Response Plan at the facility within 90 days of the issuance of this approval, unless otherwise authorized in writing by the Director.
- 4.1.17 The approval holder shall include, at a minimum, all of the following in the Community Complaint Response Plan referred to in 4.1.16:
 - (a) procedures and methods to be taken to respond to the complaint, which shall include but not limited to the following:
 - (i) recording of the complaint,
 - (ii) reviewing of the complaint records and other relevant information,
 - (iii) investigation of the complaint, and
 - (iv) timeline and follow-up actions for responding to the complaint based on the findings of the complaint review and investigation;
 - (b) the recording of the complaint referred to in (a)(i) above shall include but not limited to the following:
 - (i) contact information of the complainant(s) (names, phone numbers, e-mails and addresses),
 - (ii) detailed description of the event for which the complaint is filed,
 - (iii) date and time of the event occurring,
 - (iv) location where the event is noticed, and direction and distance of the event location relative to the facility,
 - (v) wind direction and speed at the facility, and

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- (vi) other local meteorological information at the time of the event occurring;
- (c) the reviewing of the complaint referred to in (a)(ii) above shall include but not limited to the following:
 - (i) reviewing complaint records,
 - (ii) reviewing the facility operating records,
 - (iii) reviewing additional local meteorological data, and
 - (iv) timeline for reviewing the complaint;
- (d) the investigation of the complaint referred to in (a)(iii) above shall include but not limited to the following:
 - (i) meeting complainant(s) to obtain further information related to the complaint,
 - (ii) visiting other local residents to collect additional information,
 - (iii) assessing other activities in the vicinity of the facility that may have potential for causing the event, and
 - (iv) timeline for the complaint investigation;
- (e) the timeline and follow-up actions referred to in (a)(iv) above shall include but not limited to the following:
 - (i) timeline for responding to the complaint; and
 - (ii) follow-up actions:
 - (A) if the complaint is found to be related to the facility operations, the follow-up actions shall include:
 - (A.1) notifying the complainant(s) of the findings of the complaint review and investigation within the timeline specified in (i) above,
 - (A.2) taking immediate measures to correct the source(s) of the complaint,
 - (A.3) taking measures to prevent the issue from occurring again in future, and

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- (A.4) providing a summary of the complaint review and investigation in the Annual Landfill Operations Report pursuant to 4.6.60(n); or
 - (B) if the complaint is found not to be related to the facility operations, the follow-up actions shall include:
 - (B.1) notifying the complainant(s) of the findings of the complaint review and investigation within the timeline specified in (i) above, and
 - (B.2) providing a summary of the complaint review and investigation in the Annual Landfill Operations Report pursuant to 4.6.60(n).
- 4.1.18 The approval holder shall:
- (a) review the Community Complaint Response Plan annually; and
 - (b) update the Community Complaint Response Plan if any of the following circumstances apply:
 - (i) there are facility expansions or changes in site operations, or
 - (ii) an update is requested in writing by the Director.
- 4.1.19 The approval holder shall retain a copy of the most recent Community Complaint Response Plan at the facility.
- 4.1.20 The approval holder shall submit a copy of the most recent Community Complaint Response Plan to the Director upon written request from the Director within the timeline specified in writing by the Director.
- 4.1.21 If the Community Complaint Response Plan submitted pursuant to 4.1.20 is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.
- 4.1.22 The approval hold shall implement the latest Community Complaint Response Plan, unless otherwise authorized in writing by the Director.

PARTICIPATION IN DEVELOPMENT OF LOCAL EMERGENCY MANAGEMENT PLANS

- 4.1.23 The approval holder shall support the Village of Ryley and Beaver County in the development of Local Emergency Management Plans by providing assistance to the Village and County in, at a minimum, all of the following:
- (a) identifying hazards at the facility;

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- (b) assessing degree of risk of the hazards at the facility;
- (c) suggesting risk mitigation measures;
- (d) offering input to development of emergency notification and emergency evacuation procedures for local residents;
- (e) keeping the Village and County updated for any major new development at the facility; and
- (f) advising the Village and County of the need for updating the Local Emergency Management Plans following any major new development at the facility.

FACILITY EMERGENCY MANAGEMENT PLAN

4.1.24 The approval holder shall:

- (a) develop; and
- (b) implement

a Facility Emergency Management Plan at the facility within 90 days of the issuance of this approval, unless otherwise authorized in writing by the Director.

4.1.25 The Facility Emergency Management Plan referred to in 4.1.24 shall include, at a minimum, all of the following:

- (a) identification of hazards at the facility;
- (b) assessment of degree of risk and impact of hazards at the facility;
- (c) preventative measures for hazards at the facility;
- (d) mitigation measures for hazards at the facility;
- (e) emergency preparedness at the facility;
- (f) procedures for emergency management at the facility; and
- (g) emergency notification and emergency evacuation procedures for local residents.

4.1.26 The approval holder shall:

- (a) review the Facility Emergency Management Plan annually; and

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- (b) update the Facility Emergency Management Plan if any of the following circumstances apply:
 - (i) there are facility expansions or changes in site operations, or
 - (ii) an update is requested in writing by the Director.
- 4.1.27 The approval holder shall retain a copy of the most recent Facility Emergency Management Plan at the facility.
- 4.1.28 The approval holder shall submit a copy of the most recent Facility Emergency Management Plan to the Director upon written request from the Director within the timeline specified in writing by the Director.
- 4.1.29 If the Facility Emergency Management Plan submitted pursuant to 4.1.28 is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.
- 4.1.30 The approval hold shall implement the latest Facility Emergency Management Plan, unless otherwise authorized in writing by the Director.

COMMUNITY ACESIBLE WEBSITE

- 4.1.31 The approval shall:
 - (a) develop; and
 - (b) maintain

a community accessible website available to all local residents within 120 days of the issuance of this approval, unless otherwise authorized in writing by the Director.
- 4.1.32 The community accessible website referred to in 4.1.31 shall include, at a minimum, all of the following information:
 - (a) Annual Landfill Operations Reports (including the three-year compliance audit report, Annual Dugout and Water Well Sampling Program Report, and Annual Landfill Cell Closure Report, etc.);
 - (b) Monthly Waste Management Report, and Annual Waste Management Summary Report;
 - (c) Monthly Ambient Air Monitoring Report, and Annual Ambient Air Monitoring Report;
 - (d) Monthly Runoff and Industrial Wastewater Report, and Annual Runoff and Industrial Wastewater Report;

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- (e) Annual Groundwater Monitoring Program Report;
- (f) Soil Monitoring Program Report, and Soil Management Program Report;
- (g) Facility Wildlife Management Plan;
- (h) Community Complaint Response Plan;
- (i) regulatory correspondences for incidents and complaints;
- (j) correspondences made to Alberta Environment and Parks and copied CAOs at the Village of Ryley and Beaver County;
- (k) Facility Emergency Management Plan, including emergency notification and emergency evacuation procedures;
- (l) Village of Ryley Emergency Management Plan, including emergency notification and emergency evacuation procedures;
- (m) Beaver County Emergency Management Plan, including emergency notification and emergency evacuation procedures; and
- (n) any other information as requested in writing by the Director.

4.1.33 The approval holder shall:

- (a) review the community accessible website annually; and
- (b) update the website if any of the following circumstances apply:
 - (i) there are facility expansions or changes in site operations, or
 - (ii) an update is requested in writing by the Director.

SECTION 4.2: AIR

OPERATIONS

4.2.1 The approval holder shall not release any air effluent streams to the atmosphere except as authorized by this approval.

4.2.2 The approval holder shall only release air effluent streams to the atmosphere from the following sources:

- (a) the scrubber exhaust stack;

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- (b) the Drum Processing Building natural gas fired air make up unit exhaust vent;
- (c) the Staging Building natural gas fired air make up unit exhaust vent;
- (d) the Administration Building natural gas fired furnaces exhaust vents;
- (e) the Laboratory fume hood and natural gas fired air make up unit exhaust vents;
- (f) the Maintenance Shop equipment and natural gas fired Radiant Heater exhaust vents;
- (g) the Leachate Collection Tanks natural gas fired heaters exhaust vents;
- (h) the leachate transfer lines passive gas vents; and
- (i) any other source authorized in writing by the Director.

4.2.3 The approval holder shall not operate any process equipment unless and until the pollution abatement equipment associated with the corresponding process equipment is:

- (a) operational; and
- (b) operating.

4.2.4 The approval holder shall treat all air effluent streams from the exhaust vents of the Drum Processing or Staging or both Buildings with a caustic scrubber and an activated carbon filter before directing the air effluent streams to the scrubber exhaust stack for release to the atmosphere while:

- (a) hazardous waste or hazardous recyclables or both are being processed;
- (b) hazardous waste or hazardous recyclables or both are being transferred; or
- (c) containers of hazardous waste or hazardous recyclables or both are open

in the Drum Processing or Staging or both Buildings.

4.2.5 The approval holder shall control fugitive emissions and any source not specified in 4.2.2 in accordance with 4.2.6 of this approval unless otherwise authorized in writing by the Director.

4.2.6 With respect to fugitive emissions and any source not specified in 4.2.2, the approval holder shall not release a substance or cause to be released a substance that causes or may cause any of the following:

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- (a) impairment, degradation or alteration of the quality of natural resources;
- (b) material discomfort, harm or adverse effect to the well being or health of a person; or
- (c) harm to property or to vegetative or animal life.

4.2.7 The approval holder shall not burn any debris by means of an open fire unless authorized in writing by the Director.

4.2.8 If the approval holder receives complaints of offensive odours, or fugitive dust, or both, beyond the facility boundaries, the approval holder shall:

- (a) conduct the following to reduce the release of those odours, or fugitive dust, or both by:
 - (i) placing restrictions on types, or volumes, or both, of the wastes being handled or processed or deposited that are causing those odours, or fugitive dust, or both,
 - (ii) increasing the frequency of cover placement, or modifying waste handling activities, or performing both, at the landfill,
 - (iii) modifying waste handling activities at the HWRSP Facility, or
 - (iv) performing any combination of the above; and
- (b) activate the Odour and Fugitive Dust Response Program as specified in the Landfill Operations Plan in 4.6.34(I).

LIMITS

4.2.9 The approval holder shall maintain the pH of the scrubbing liquid of the caustic scrubber referred to in 4.2.4 at 8.0 or higher.

4.2.10 The approval holder shall replace activated carbon in the activated carbon filter referred to in 4.2.4 immediately when the concentration of total petroleum hydrocarbons in the air effluent streams released from the scrubber exhaust stack to the atmosphere exceeds 25 ppm.

SOURCE MONITORING AND REPORTING

4.2.11 The approval holder shall monitor, daily at a minimum, the pH of the scrubbing liquid of the caustic scrubber referred to in 4.2.4.

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- 4.2.12 The approval holder shall monitor, weekly at a minimum, the air effluent streams released from the scrubber exhaust stack, using a portable total petroleum hydrocarbon analyzer while:
- (a) hazardous waste or hazardous recyclables or both are being processed;
 - (b) hazardous waste or hazardous recyclables or both are being transferred; or
 - (c) containers of hazardous waste or hazardous recyclables or both are open in the Drum Processing or Staging or both Buildings.
- 4.2.13 The portable total petroleum hydrocarbon analyzer referred to in 4.2.12 shall:
- (a) have a detection limit of 1 ppm or lower for total petroleum hydrocarbons;
 - (b) be located in a straight section of the scrubber exhaust stack, a minimum of one (1) metre downstream from the last flow disturbance; and
 - (c) be calibrated regularly in accordance with the analyzer manufacturer's specifications.

AMBIENT AIR MONITORING AND REPORTING

- 4.2.14 The approval holder shall continue to implement the Ambient Air Monitoring Program as authorized in writing by the Director on June 24, 2009, unless and until otherwise authorized in writing by the Director pursuant to 4.2.21.
- 4.2.15 The approval holder shall submit to the Director the results of the Ambient Air Monitoring Program in 4.2.14 with the following reports:
- (a) a Monthly Ambient Air Monitoring Report; and
 - (b) an Annual Ambient Air Monitoring Report
- in accordance with the written authorization by the Director on June 24, 2009, unless and until otherwise authorized in writing by the Director pursuant to 4.2.21.
- 4.2.16 The approval holder shall submit:
- (a) a revised Ambient Air Monitoring Program;
 - (b) revised reporting requirements, or
 - (c) both of the above

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to the Director upon written request from the Director within the timeline specified in writing by the Director.

- 4.2.17 The approval holder shall submit an enhanced Ambient Air Quality Monitoring Program to the Director within 90 days of the issuance of this approval, unless otherwise authorized in writing by the Director.
- 4.2.18 The approval holder shall include, at a minimum, all of the following in the enhanced Ambient Air Quality Monitoring Program referred to in 4.2.17:
- (a) three (3) intermittent ambient air quality monitoring stations:
 - (i) the existing Highway 854 station,
 - (ii) the existing Ryley School station, and
 - (iii) the existing Facility Site station, to be relocated as authorized in writing by the Director;
 - (b) the following monitoring parameters for the existing Highway 854 station:
 - (i) TSP,
 - (ii) PM₁₀ (for 2 year transition from PM₁₀ to TSP, starting from authorization of the enhanced Ambient Air Quality Monitoring Program by the Director),
 - (iii) total metals in:
 - (A) TSP, and
 - (B) PM₁₀ (for 2 year transition from PM₁₀ to TSP, starting from authorization of the enhanced Ambient Air Quality Monitoring Program by the Director),if concentration of TSP or PM₁₀ exceeds 50 µg/m³,
 - (iv) VOCs, and
 - (v) TNMOCs;
 - (c) the following monitoring parameters for the Ryley School and Facility Site stations:
 - (i) TSP, and
 - (ii) total metals in TSP, if concentration of TSP exceeds 50 µg/m³; and

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- (d) the following monitoring frequencies for the three (3) stations referred to in (a) above:
 - (i) for the Highway 854 station, once every six (6) days in alignment with the NAPS sampling schedule, and
 - (ii) for the Ryley School and Facility Site stations, linking the two (2) stations in such a way that the two (2) stations will collect air samples whenever the wind direction is oriented in a northeast to southwest direction.

4.2.19 The approval holder shall include a minimum of one (1) meteorological station in each of the Ryley School and Facility Site intermittent ambient air quality monitoring stations referred to in 4.2.18(a) that measures and records, at a minimum, all of the following parameters:

- (a) wind speed; and
- (b) wind direction.

4.2.20 If the revised:

- (a) Ambient Air Monitoring Program;
- (b) reporting requirements; or
- (c) both of the above

submitted pursuant to 4.2.16 or 4.2.17 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.

4.2.21 The approval holder shall implement the revised:

- (a) Ambient Air Monitoring Program;
- (b) reporting requirements; or
- (c) both of the above

submitted pursuant to 4.2.16 or 4.2.17 as authorized in writing by the Director within the timeline specified in writing by the Director.

TERMS AND CONDITIONS ATTACHED TO APPROVAL**SECTION 4.3: RUNOFF AND INDUSTRIAL WASTEWATER****OPERATIONS**

- 4.3.1 The approval holder shall not release any substances from the facility to the surrounding watershed except as authorized by this approval.
- 4.3.2 The approval holder shall operate and maintain the integrity of:
- (a) the run-on control system to prevent flow onto the active landfill area from at least the peak discharge from a 1 in 25 year, 24 hour duration storm event at the facility; and
 - (b) the runoff control system for the facility to collect and control at least the runoff volume resulting from a 1 in 25 year, 24 hour duration storm event at the facility.
- 4.3.3 All runoff from the facility developed area shall be directed to the runoff control system as described in:
- (a) application No. 012-10348, for the SE 09-050-17-W4M area of the facility, prior to decommissioning and reclamation of the old surface water detention pond;
 - (b) application No. 014-10348, for the SE 09-050-17-W4M area of the facility, after decommissioning and reclamation of the old surface water detention pond; and
 - (c) application No. 015-10348, for the NE 09-050-17-W4M area of the facility;
- unless otherwise authorized in writing by the Director.
- 4.3.4 Prior to decommissioning and reclamation of the old surface water detention pond and subject to 4.3.8, the approval holder shall only make or permit a release from the old surface water detention pond:
- (a) at the release point as designated in application No. 012-10348, which is:
 - (i) located in the south east corner of the old surface water detention pond, and
 - (ii) referred to as sampling location A1 in 4.3.12; and
 - (b) through
 - (i) a pump and a release hose over the south berm into the drainage control ditch, east of the landfill access road, to the new surface water

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detention pond in the SE 09-050-17-W4M area of the facility, under normal operating conditions; or

- (ii) a pump and a release hose over the south berm directly to the culvert under Highway 854, during periods of high runoff exceeding the holding capacity of the new surface water detention pond in the SE 09-050-17-W4M area of the facility;

unless otherwise authorized in writing by the Director.

4.3.5 Subject to 4.3.8, the approval holder shall only make or permit a release from the new surface water detention pond in the SE 09-050-17-W4M area of the facility:

- (a) at the release point as designated in application No. 012-10348, which is:
 - (i) located in the north east corner of the new surface water detention pond in the SE 09-050-17-W4M area of the facility, and
 - (ii) referred to as sampling location B1 in 4.3.12; and
- (b) through a pump and a release hose over the east berm into the culvert under Highway 854;

unless otherwise authorized in writing by the Director.

4.3.6 Subject to 4.3.8, the approval holder shall only make or permit a release from each of the new surface water detention pond(s) in the NE 09-050-17-W4M area of the facility:

- (a) through a pump and a release hose into the drainage control ditch, east of the landfill access road, to the new surface water detention pond in the SE 09-050-17-W4M area of the facility, under normal operating conditions; or
- (b) through a pump and a release hose directly to the culvert under Highway 854, during periods of high runoff exceeding the holding capacity of the new surface water detention pond in the SE 09-050-17-W4M area of the facility;

unless otherwise authorized in writing by the Director.

4.3.7 The approval holder shall only dispose of industrial wastewaters, or specified runoff in TABLE 4.3-A, or both, by one or more of the following methods:

- (a) to facilities holding a current Act authorization to accept such waste;
- (b) to facilities approved by a local environmental authority outside of Alberta to accept such waste;

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- (c) to a disposal well approved by AER;
- (d) as per 4.6.52; or
- (e) as otherwise authorized in writing by the Director.

TABLE 4.3-A: SPECIFIED RUNOFF

SOURCES
Runoff that exceeds any of the limits for the parameters listed in TABLE 4.3-B.
Runoff for which the results of the parameters listed in TABLE 4.3-B are unavailable at the time that the runoff must be disposed of.
Runoff from within the tank farm bermed area.

LIMITS

4.3.8 Releases of runoff:

- (a) from the old surface water detention pond to the surrounding watershed;
- (b) from the new surface water detention pond in the SE 09-050-17-W4M area of the facility to the surrounding watershed;
- (c) from each of the new surface water detention pond(s) in the NE 09-050-17-W4M area of the facility to the surrounding watershed, or to the new surface water detention pond in the SE 09-050-17-W4M area of the facility; or
- (d) from any combination of the above

shall comply with the limits specified in TABLE 4.3-B.

TABLE 4.3-B: RUNOFF LIMITS FOR SURFACE WATER DETENTION PONDS

PARAMETER	LIMITS (Maximum unless otherwise indicated)
pH	6.0 – 9.5 pH units
COD	50 mg/L
TDS	2500 mg/L
TSS	25 mg/L
Ammonia (expressed as Nitrogen)	5 mg/L
Chloride	250 mg/L
Sodium	200 mg/L
Sulphate	500 mg/L
Oil or other substances	Not present in amounts sufficient to create a visible film or sheen
96-Hour Multiple Concentration Acute Lethality Test Using Rainbow Trout (<i>Oncorhynchus mykiss</i>)	50% or greater survival

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4.3.9 Releases of runoff from within the tank farm bermed area to the old or new or both surface water detention ponds shall comply with the limits specified in TABLE 4.3-C.

TABLE 4.3-C: RUNOFF LIMITS FOR TANK FARM BERMED AREA

PARAMETER	LIMITS Maximum unless otherwise indicated
pH	6.0 – 9.5 pH units
COD	50 mg/L
TSS	25 mg/L
Ammonia (expressed as Nitrogen)	5 mg/L
Oil or other substances	Not present in amounts sufficient to create a visible film or sheen

MONITORING AND REPORTING

- 4.3.10 The approval holder shall monitor the runoff control system as required in TABLE 4.3-D, subject to 4.3.13.
- 4.3.11 The approval holder shall report to the Director the results of the runoff control system monitoring as required in TABLE 4.3-D, subject to 4.3.13.
- 4.3.12 For the purpose of TABLE 4.3-D:
- (a) sampling location A1 is defined as the old surface water detention pond release point;
 - (b) sampling location A2 is defined as the old surface water detention pond;
 - (c) sampling location B1 is defined as the release point of the new surface water detention pond in the SE 09-050-17-W4M area of the facility;
 - (d) sampling location B2 is defined as the new surface water detention pond in the SE 09-050-17-W4M area of the facility;
 - (e) sampling location C1 is defined as the release point of each of the new surface water detention pond(s) in the NE 09-050-17-W4M area of the facility;
 - (f) sampling location C2 is defined as each of the new surface water detention pond(s) in the NE 09-050-17-W4M area of the facility; and
 - (g) sampling location D is defined as the tank farm bermed area.
- 4.3.13 The monitoring and reporting requirements in 4.3.10 and 4.3.11 for the old surface water detention pond (sampling locations A1 and A2) shall not apply after decommissioning and reclamation of the old surface water detention pond.

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TABLE 4.3-D: RUNOFF CONTROL SYSTEM MONITORING AND REPORTING

MONITORING				REPORTING	
Parameter	Frequency	Sample Type	Sampling Location	Monthly	Annually
Surface Water Detention Ponds				Monthly Runoff and Industrial Wastewater Report, for each month when release occurs	Annual Runoff and Industrial Wastewater Report
Flow (m ³ /day)	Daily during release	Estimate	A1, B1, C1		
pH	Once per batch release, prior to release	Representative Grab	A2, B2, C2		
COD					
TDS					
TSS					
Ammonia (expressed as nitrogen)					
Chloride					
Sodium					
Sulphate					
Oil or other substances	Daily during release	Visual			
96-hour multiple concentration acute lethality test using rainbow trout (<i>oncorhynchus mykiss</i>)	Each month when release occurs, prior to release, for the first batch release of the month	Representative Grab			
48-hour static acute lethality test using <i>daphnia magna</i>					
Tank Farm Bermed Area					
Volume (m ³)	Total batch volume released	Estimate	D		
pH	Once per batch release, prior to release to the surface water detention pond(s)	Representative Grab			
COD					
TSS					
Ammonia (expressed as nitrogen)					
Oil or other substances		Visual			

4.3.14 The monitoring and reporting required in TABLE 4.3-D for the acute lethality tests shall comply with:

- (a) the *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout*, Environment Canada, Environmental Protection Series 1/RM/13, December 2000, as amended; and
- (b) the *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia Magna*, Environment Canada, Environmental Protection Series 1/RM/14, December 2000, as amended.

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- 4.3.15 The approval holder shall:
- (a) treat any acute lethality test that deviates from the corresponding test method referred to in 4.3.14 as invalid; and
 - (b) repeat the test as soon as logistically possible.
- 4.3.16 In the event that less than 50% of the rainbow trout survived in the 100% concentration sample, the approval holder shall:
- (a) implement a program immediately to identify the source of the toxicity; and
 - (b) submit to the Director within 90 days after the test result is available, a proposed program to reduce the toxicity of the runoff.
- 4.3.17 The approval holder shall submit the Monthly Runoff and Industrial Wastewater Report in TABLE 4.3-D to the Director.
- 4.3.18 The Monthly Runoff and Industrial Wastewater Report shall include, at a minimum, all of the following information:
- (a) a monthly assessment of the monitoring results relative to the limits in TABLE 4.3-B;
 - (b) a monthly assessment of the monitoring results relative to the limits in TABLE 4.3-C;
 - (c) a monthly assessment of the performance of the:
 - (i) runoff control system,
 - (ii) pollution abatement equipment, and
 - (iii) monitoring equipment;
 - (d) a monthly summary of management and disposal of the:
 - (i) industrial wastewaters, and
 - (ii) specified runoffas per 4.3.7;
 - (e) a monthly summary of management and disposal of runoff in general;
 - (f) a monthly summary of runoff contraventions reported pursuant to 2.1.1; and

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- (g) any other information as required in writing by the Director.
- 4.3.19 The approval holder shall submit the Annual Runoff and Industrial Wastewater Report in TABLE 4.3-D to the Director.
- 4.3.20 The Annual Runoff and Industrial Wastewater Report shall include, at a minimum, all of the following information:
- (a) an annual summary assessment of the monitoring results relative to the limits in TABLE 4.3-B;
 - (b) an annual summary assessment of the monitoring results relative to the limits in TABLE 4.3-C;
 - (c) an annual summary assessment of the performance of the:
 - (i) runoff control system,
 - (ii) pollution abatement equipment, and
 - (iii) monitoring equipment;
 - (d) an annual summary of management and disposal of the:
 - (i) industrial wastewaters, and
 - (ii) specified runoffas per 4.3.7;
 - (e) an annual summary and evaluation of management and disposal of runoff in general;
 - (f) an annual summary of the results pursuant to 4.3.22;
 - (g) an annual summary of runoff contraventions reported pursuant to 2.1.1; and
 - (h) any other information as required in writing by the Director.
- 4.3.21 The approval holder shall:
- (a) collect a representative grab sample from the old surface water detention pond at least once per year, prior to decommissioning and reclamation of the pond;
 - (b) collect a representative grab sample from each of the new surface water detention ponds at least once per year; and

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(c) analyze the samples for all of the parameters specified in TABLE 4.3-E.

TABLE 4.3-E: ANNUAL MONITORING OF SURFACE WATER DETENTION POND

PARAMETERS			
pH	TDS; TSS	Fluoride, dissolved	Phenols
Electrical conductivity	Metals	Cyanide (weak acid dissociable)	Total chlorinated phenols
COD	Major ions	BTEX	Polychlorinated biphenyls, total
DOC	Nutrients	Petroleum Hydrocarbons Fractions F1 and F2	Total organic halogens

4.3.22 The approval holder shall submit the results of the analyses in 4.3.21 to the Director in the Annual Runoff and Industrial Wastewater Report.

SECTION 4.4: LEACHATE COLLECTION AND LEAK DETECTION

OPERATIONS

4.4.1 The approval holder shall only dispose of leachate removed from the leachate collection system by one or more of the following methods:

- (a) to facilities holding a current Act authorization to accept such waste;
- (b) to facilities approved by a local environmental authority outside of Alberta to accept such waste;
- (c) to a disposal well approved by AER; or
- (d) as per 4.6.52.

4.4.2 The approval holder shall only dispose of liquid removed from the leak detection system by one or more of the following methods:

- (a) to facilities holding a current Act authorization to accept such waste;
- (b) to facilities approved by a local environmental authority outside of Alberta to accept such waste;
- (c) to a disposal well approved by AER; or
- (d) as per 4.6.52.

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LIMITS

- 4.4.3 Subject to 4.4.4, the approval holder shall not exceed the maximum acceptable leachate head in any landfill cell.
- 4.4.4 Subsequent to a storm event, the leachate head in any landfill cell shall not exceed the maximum acceptable leachate head for more than fourteen (14) days, unless otherwise authorized in writing by the Director.
- 4.4.5 The volume of liquid in the leak detection system, as monitored in TABLE 4.6-D, shall not exceed the action leakage rate in any landfill cell.

MONITORING AND REPORTING

- 4.4.6 The approval holder shall monitor the leachate collection and leak detection systems as required in TABLE 4.6-D and for all parameters specified in TABLE 4.4-A, subject to 4.4.8 and 4.4.9.
- 4.4.7 The approval holder shall report to the Director the results of the leachate collection and leak detection systems monitoring as required in TABLE 4.6-D, including the results of the analyses for all parameters specified in TABLE 4.4-A, subject to 4.4.8 and 4.4.9.

TABLE 4.4-A: LEACHATE AND LEAK DETECTION LIQUID MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

- 4.4.8 The requirements in 4.4.6 and 4.4.7 for monitoring and reporting the parameters in TABLE 4.4-A for leachate shall not apply if insufficient leachate is available for conducting the analyses.
- 4.4.9 The requirements in 4.4.6 and 4.4.7 for monitoring and reporting the parameters in TABLE 4.4-A for leak detection liquid shall not apply if insufficient leak detection liquid is available for conducting the analyses.
- 4.4.10 If the volume of liquid removed from the leak detection system exceeds the action leakage rate, in addition to reporting pursuant to 2.1.1, the approval holder shall submit a Response Action Plan to the Director within 30 days of the exceedance.

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SECTION 4.5: DUGOUTS AND WATER WELLS IN SURROUNDING AREA

MONITORING AND REPORTING

4.5.1 The approval holder shall:

(a) collect a representative sample from:

(i) each of the dugouts, and

(ii) each of the water wells

within an approximate 1.6 kilometre radius around the facility; and

(b) analyze the sample for the parameters listed in TABLE 4.5-A;

unless the approval holder is not granted access by the landowner.

TABLE 4.5-A: DUGOUT AND WATER WELL MONITORING

PARAMETERS		
pH (field and laboratory)	TDS	Nutrients
Electrical conductivity (field and laboratory)	TSS	BTEX
COD	Metals	Phenols
DOC	Major Ions	Petroleum Hydrocarbons Fractions F1 and F2

4.5.2 The monitoring required in 4.5.1 shall be conducted once each year in October unless otherwise authorized in writing by the Director.

4.5.3 The approval holder shall record the analytical results of the sampling information required in 4.5.1 in an Annual Dugout and Water Well Sampling Program Report.

4.5.4 The approval holder shall submit the Annual Dugout and Water Well Sampling Program Report to the Director pursuant to 4.6.60(i).

SECTION 4.6: HWRSP FACILITY AND LANDFILL

GENERAL

4.6.1 The approval holder shall not:

(a) receive;

(b) process;

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- (c) dispose of; or
- (d) perform any combination of the above for

any of the following wastes, individually or in any combination, at the respective locations specified below:

- (i) explosives (Class 1 TDGR wastes), at the facility;
- (ii) radioactive wastes (Class 7 TDGR wastes), at the facility;
- (iii) radioactive wastes regulated under the *Nuclear Safety and Control Act* (Canada), at the facility;
- (iv) biomedical waste, at the facility;
- (v) waste containing free liquids, at the landfill, excluding the waste stabilization area;
- (vi) material containing ozone depleting substances, at the landfill;
- (vii) municipal solid waste, at the facility;
- (viii) NORM waste, at the facility;
- (ix) waste generating offensive odours, at the facility, unless and until effective control measures are provided to prevent releases of offensive odours to the outside of the facility fenceline.

4.6.2 Incompatible wastes and incompatible hazardous recyclables shall be prevented from mixing.

4.6.3 The approval holder shall dispose of wastes generated at the facility only:

- (a) to facilities holding a current Act authorization;
- (b) to facilities approved by a local environmental authority outside of Alberta; or
- (c) as otherwise authorized in writing by the Director.

HWRSP FACILITY

OPERATIONS PLAN

4.6.4 The approval holder shall:

- (a) develop;

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(b) keep up-to-date; and

(c) implement

an HWRSP Facility Operations Plan.

4.6.5 The approval holder shall:

(a) review the HWRSP Facility Operations Plan annually, at a minimum; and

(b) update the HWRSP Facility Operations Plan if any of the following circumstances apply:

(i) there are facility expansions or changes in site operations or equipment,

(ii) there is an applicable change to an applicable regulation, or

(iii) an update is required in writing by the Director.

4.6.6 The approval holder shall retain a copy of the most recent HWRSP Facility Operations Plan at the facility.

4.6.7 The approval holder shall submit a copy of the most recent HWRSP Facility Operations Plan to the Director upon written request from the Director within the timeline specified in writing by the Director.

4.6.8 If the HWRSP Facility Operations Plan submitted pursuant to 4.6.7 is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

4.6.9 The approval hold shall implement the latest HWRSP Facility Operations Plan, unless otherwise authorized in writing by the Director.

OPERATIONS

4.6.10 The approval holder shall only transfer wastes and hazardous recyclables at designated transfer areas designed to contain spills and leaks.

4.6.11 The approval holder shall use the following when transferring substances to, from, and between containers, tanks, and trucks:

(a) couplings equipped with seals that are compatible with the substance transferred;

(b) the necessary precautions to prevent spills when the couplings are disconnected;

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- (c) emergency shut-off valves;
 - (d) established transfer areas and associated curbing, paving and catchment areas;
 - (e) drip trays to capture potential losses under coupling devices and other connections; and
 - (f) manual inspections of the transfer area for leaks and spills during and after waste transfer.
- 4.6.12 All wastes and all hazardous recyclables that are unloaded shall be immediately transferred to the waste storage area.
- 4.6.13 All containers and unrinsed empty containers shall be stored in the waste storage area.
- 4.6.14 The approval holder shall:
- (a) provide and maintain an adequate aisle space between containers in the waste storage area to allow:
 - (i) inspection, and
 - (ii) unobstructed movement of personnel, fire protection equipment, spill control equipment and decontamination equipment to any area of the waste storage area; and
 - (b) arrange inspection aisles in the waste storage area such that the identification label on each container is readable.
- 4.6.15 All tanks within the tank farm area shall be equipped, at a minimum, with all of the following:
- (a) sensors for detecting the level in each tank;
 - (b) high level alarms that activate when a tank overfill is imminent;
 - (c) automatic shut-off devices or sufficient free board space above the high level sensor to allow operators time to prevent overfill from occurring; and
 - (d) earthen dikes or equivalent secondary containment structures capable of containing 110% of the volume of the largest tank within the bermed area plus 10% of the aggregate capacity of all other tanks in the bermed area.

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- 4.6.16 All tanks containing hazardous waste and all tanks containing hazardous recyclables in each building shall be equipped, at a minimum, with all of the following:
- (a) sensors or gauges for detecting the level in each tank;
 - (b) a written operating procedure to prevent tank overflow; and
 - (c) secondary containment structures capable of containing 110% of the volume of the largest tank within the building plus 10% of the aggregate capacity of all other tanks containing hazardous waste and hazardous recyclables in the same building.
- 4.6.17 Hazardous waste and hazardous recyclables stored in containers and tanks shall be stored in accordance with the *Hazardous Waste Storage Guidelines*, June 1988, Alberta Environment, as amended.
- 4.6.18 The approval holder shall only carry out the following activities, individually or in any combination, at the HWRSP Facility in relation to hazardous waste or hazardous recyclables or both:
- (a) commingling of hazardous waste or hazardous recyclables to make maximum use of available container or tank capacity, only if the resultant mixture has the same TDGR hazard classification as any one of the individual components;
 - (b) phase separation by gravity settling, only without the addition of any chemicals designed to accelerate settling;
 - (c) dispersion of solids into liquids by natural or mechanical means, only if the resultant mixture has the same TDGR hazard classification as the original waste;
 - (d) physical segregation of hazardous from non-hazardous articles or components from the same container, only if no process equipment is used;
 - (e) washing of drums or other objects, only for the purpose of removing hazardous residue;
 - (f) crushing or shredding of used filters, rags, absorbent materials, or empty containers, only for the purpose of volume reduction or liquid recovery, unless otherwise authorized in writing by the Director; or
 - (g) treatment of hazardous waste, only as authorized in writing by the Director.
- 4.6.19 Notwithstanding 4.6.18(g), the approval holder shall not incinerate waste at the facility.

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LIMITS

4.6.20 The approval holder shall not store a total of more than 752,500 litres of hazardous waste or hazardous recyclables or both at the HWRSP Facility at any time.

4.6.21 In addition to the storage limits in 4.6.20, the approval holder shall not exceed the waste storage limits as specified in TABLE 4.6-A.

TABLE 4.6-A: STORAGE LIMITS FOR HAZARDOUS WASTE OR HAZARDOUS RECYCLABLES OR BOTH AT HWRSP FACILITY

Waste/Recyclable Type	Material	Maximum Quantity
Containers: Hazardous waste or hazardous recyclables or both	TDGR Classification 2, 3, 4, 5, 6, 8 or 9 waste type only	512,500 litres (consisting of 2,500 drum equivalents, each 205 litre capacity)
Bulk Tanks: Hazardous waste or hazardous recyclables or both	Waste flammable liquids, used oil, or wastewaters; or TDGR Classification 3, 5, 6, 8 or 9 waste type only	240,000 litres (consisting of a total of 135 m ³ in the tank farm area, and a total of 105 m ³ inside the buildings)

4.6.22 Containers other than 205 litre drums shall be prorated to 205 litre drum equivalents based on their nominal volumes, e.g., 10 X 20 litre pails = 1 X 205 litre drum.

4.6.23 The limits referred to in 4.6.20 and 4.6.21 shall be calculated based on the:

- (a) total nominal volumes of all containers, treating all partially filled containers as if they were full; and
- (b) total filled capacities of all tanks.

MONITORING AND REPORTING

4.6.24 The approval holder shall:

- (a) identify;
- (b) characterize; and
- (c) classify

all waste streams and all hazardous recyclables, generated or received at the HWRSP Facility, not including runoff, industrial wastewater streams and air effluent streams in accordance with the:

- (i) *Industrial Waste Identification and Management Options*, Alberta Environment, May 1996, as amended, and

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- (ii) *Alberta User Guide for Waste Managers*, Alberta Environment, August 1996, as amended.

4.6.25 The approval holder shall measure or, when not feasible to measure, estimate, the quantity of each waste and hazardous recyclable identified in 4.6.24 each year.

4.6.26 The approval holder shall keep a daily:

- (a) total; and
- (b) inventory

of all materials being stored at the HWRSP Facility.

4.6.27 The daily total and inventory records in 4.6.26 shall be available at the facility at all times for inspection by the Director or an inspector.

4.6.28 The approval holder shall submit a Monthly Waste Management Report to the Director.

4.6.29 The approval holder shall compile all of the information indicated in TABLE 4.6-B in the Monthly Waste Management Report which shall contain, at minimum, all of the following information:

- (a) an opening waste and hazardous recyclables inventory balance in kilograms or litres by waste class or material type;
- (b) the amount and type of waste and hazardous recyclables received:
 - (i) within the province, and
 - (ii) from outside the province;
- (c) the amount and type of waste and hazardous recyclables:
 - (i) shipped for recycling or product,
 - (ii) shipped off-site for disposal, and
 - (iii) disposed on-site;
- (d) any adjustments, including but not limited to, consolidation, reclassification, losses to processing, spills, volume miscalculations, or any other

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TABLE 4.6-B: MONTHLY WASTE INVENTORY REPORT (BY WASTE CLASS)

COMPANY NAME: _____ APPROVAL NO.: _____
REPORT PERIOD: MONTH _____ YEAR _____

CLASS	UNIT (Kg or L)	OPENING BALANCE	+ RECEIVED IN PROVINCE	+ RECEIVED OUT OF PROVINCE	- SHIPPED *		- ON-SITE DISPOSAL	+ or - ADJUSTMENT **	CLOSING BALANCE	APPROVAL LIMIT
					RECYCLING / PRODUCT	OFF-SITE DISPOSAL				
2										
3										
4										
5										
6.1										
8										
9.1										
9.2										
9.3										
PCB										
NR										
TOTAL										XXXXX
							No. of Containers On site			XXXXX
							Total Litres in Bulk Tanks			XXXXX

Name of Company Official: _____ Title: _____ Signature: _____

Report Date: _____

* Provide a list of the recycling and disposal locations.

** Identify the amount and reason for each adjustment.
Adjustments include consolidation/reclassification, losses to processing, spills, volume miscalculations, or any other circumstances, which would affect the mass balance of the monthly inventory report.

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circumstances, which would affect the mass balance of the monthly inventory report;

- (e) closing balance in kilograms or litres;
- (f) a summary of contraventions reported pursuant to 2.1.1 related to waste and hazardous recyclables; and
- (g) any other information as required in writing by the Director.

4.6.30 The approval holder shall compile all the information required by 4.6.24 and 4.6.25 in an Annual Waste Management Summary Report:

- (a) as specified in TABLE 4.6-C; and
- (b) in accordance with the:
 - (i) *Industrial Waste Identification and Management Options*, Alberta Environment, May 1996, as amended, and
 - (ii) *Alberta User Guide for Waste Managers*, Alberta Environment, August 1996, as amended.

TABLE 4.6-C: ANNUAL WASTE MANAGEMENT SUMMARY

Waste or Hazardous Recyclable Name	Uniform Waste Code				Quantity (kg or L)		Stored	Recycled		Disposed	
	WC	PIN	Class	Mgmt	Hazardous	Non-hazardous	On-site	On-site	Off-site	On-site	Off-site
TOTAL											

4.6.31 The approval holder shall submit the Annual Waste Management Summary Report to the Director.

LANDFILL

OPERATIONS PLAN

4.6.32 The approval holder shall:

- (a) develop;
- (b) keep up-to-date; and

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- (c) implement

a Landfill Operations Plan that does not contravene with the requirements of this approval.

4.6.33 The approval holder shall:

- (a) review the Landfill Operations Plan annually, at a minimum; and
- (b) update the Landfill Operations Plan if any of the following circumstances apply:
- (i) there are facility expansions or changes in site operations or equipment,
 - (ii) there is an applicable change to the *Standards for Landfills in Alberta*, as amended,
 - (iii) an update is required in writing by the Director, or
 - (iv) there is an update to an applicable regulation.

4.6.34 The Landfill Operations Plan shall include, at a minimum, all of the following:

- (a) SOP for keeping and maintaining an Operating Record;
- (b) SOP for waste control, run-on and runoff controls, and nuisance controls;
- (c) SOP for the waste stabilization area operations;
- (d) SOP for the acceptance, handling and disposal of wastes, including;
- (i) waste characterization and classification at source,
 - (ii) waste manifesting and tracking,
 - (iii) QA/QC waste acceptance procedures, and
 - (iv) waste sampling;
- (e) SOP for detecting, preventing and disposal of unauthorized wastes;
- (f) SOP for placing waste in a landfill cell including;
- (i) working face width,
 - (ii) lift depth,

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- (iii) compaction, and
- (iv) waste placement location using a grid system;
- (g) SOP for managing contaminated sulphur and sulphur containing wastes;
- (h) SOP for managing asbestos wastes;
- (i) SOP for placing leachate, leak detection liquid, or other authorized wastes and liquids over the surface of the active landfill area for the purpose of evaporation or dust suppression;
- (j) SOP for lab screening of pyrophoric wastes for water quenching;
- (k) SOP for water quenching treatment of pyrophoric wastes;
- (l) an Odour and Fugitive Dust Response Program, including odour from the HWRSP Facility;
- (m) a Fugitive Dust and Odour Best Management Plan, including odour from the HWRSP Facility;
- (n) a runoff and industrial wastewater monitoring and management program;
- (o) a leachate monitoring and management program;
- (p) a leak detection liquid monitoring and management program;
- (q) a groundwater monitoring program;
- (r) a Remediation Plan to deal with groundwater quality deterioration;
- (s) a soil monitoring program;
- (t) a soil management program;
- (u) a landfill cell cover system;
- (v) a monitoring and maintenance program for the scale house and heavy operational equipment;
- (w) a health and safety program;
- (x) a Facility Wildlife Management Plan, pursuant to 4.1.15;
- (y) a Community Complaint Response Plan, pursuant to 4.1.22;

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- (z) a Facility Emergency Management Plan, pursuant to 4.1.30; and
 - (aa) an up-to-date plan of the landfill layout with survey records showing the location of all infrastructure components of the landfill including final cover elevations and contours.
- 4.6.35 The approval holder shall include, at a minimum, all of the following in the SOP referred to in 4.6.34(j) for lab screening of pyrophoric wastes to assess the suitability of using water quenching to neutralize the reactivity of the pyrophoric wastes:
- (a) procedures and methods for obtaining representative pyrophoric wastes sample for lab test;
 - (b) procedures and methods for conducting lab screening test using representative sample of pyrophoric wastes, including:
 - (i) setup of lab test equipment,
 - (ii) test procedures,
 - (iii) collection of samples of off-gases from lab water quenching test,
 - (iv) screening parameters, including, at a minimum, odour, ammonia, H₂S, PM, total metals, VOCs, TNMOCs, and total hydrocarbons, and
 - (v) analytical methods for testing the screening parameters;
 - (c) assessment of lab test results and passing criteria for screening; and
 - (d) documentation and record keeping of lab screening test results.
- 4.6.36 The approval holder shall retain a copy of the most recent Landfill Operations Plan at the facility.
- 4.6.37 The approval holder shall submit to the Director the most recent Landfill Operations Plan when requested in writing by the Director within the timeline specified in writing by the Director.
- 4.6.38 The approval holder shall correct all deficiencies in the Landfill Operations Plan submitted pursuant to 4.6.37, as outlined in writing by the Director, within the timeline specified in writing by the Director.
- 4.6.39 The approval holder shall implement the latest Landfill Operations Plan, unless otherwise authorized in writing by the Director.

TERMS AND CONDITIONS ATTACHED TO APPROVAL**OPERATIONS**

- 4.6.40 The approval holder shall classify all materials entering the landfill in accordance with the:
- (a) *Waste Control Regulation (AR 192/96)*;
 - (b) *Industrial Waste Identification and Management Options*, Alberta Environment, May 1996, as amended; and
 - (c) *Alberta User Guide for Waste Managers*, May 1995, as amended.
- 4.6.41 The approval holder shall obtain a detailed representative physical and chemical analysis of a waste prior to disposal of the waste into the landfill at the following times, at a minimum:
- (a) the first time a waste is received from a new generator;
 - (b) the first time a delivery is received from a different process associated with a known waste generator;
 - (c) the first time a waste is received from a different location associated with a known waste generator; and
 - (d) when the nature or composition of the waste that was previously characterized by the generator changes.
- 4.6.42 The approval holder shall not dispose of hazardous waste in any Class II landfill cell.
- 4.6.43 The approval holder:
- (a) shall only carry out waste stabilization or solidification or both within the waste stabilization area(s);
 - (b) shall only operate waste:
 - (i) receiving, and
 - (ii) stabilizationarea(s) as described in the application;
 - (c) shall not transfer waste from the waste stabilization area to the Class I landfill cell before the waste stabilization or solidification or both have been completed; and

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- (d) may treat pyrophoric wastes by water quenching only within the waste stabilization area, subject to passing lab screening criteria;

unless otherwise authorized in writing by the Director.

4.6.44 The approval holder shall only dispose of any liquid collected within the waste stabilization area by one or more of the following methods:

- (a) to facilities holding a current Act authorization to accept such waste;
- (b) to facilities approved by a local environmental authority outside of Alberta to accept such waste;
- (c) to a disposal well approved by AER; or
- (d) as otherwise authorized in writing by the Director.

4.6.45 The approval holder shall conduct:

- (a) annually, in-house visual inspections for corrosion; and
- (b) biennially, ultrasonic testing to monitor thickness

of the steel plate liner of the stabilization pits in the waste stabilization area, unless otherwise authorized in writing by the Director.

4.6.46 The approval holder shall dispose of asbestos wastes in accordance with "*Guidelines for the Disposal of Asbestos Waste*", Environmental Protection Services, Alberta Environment, 1989, as amended.

4.6.47 The approval holder shall dispose of sulphur waste in accordance with "*Guidelines for Landfill Disposal of Sulphur Wastes and Remediation of Sulphur Containing Soils*", Alberta Environment, 2011, as amended.

4.6.48 The approval holder shall only dispose of wastes that the landfill is not authorized to dispose of:

- (a) to facilities holding a current Act authorization;
- (b) to facilities approved by a local environmental authority outside of Alberta; or
- (c) as otherwise authorized in writing by the Director.

4.6.49 If an unauthorized waste is received at the landfill, the approval holder shall remove the waste from the landfill within seven (7) days of the receipt, unless otherwise authorized in writing by the Director.

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- 4.6.50 The approval holder shall restrict the working face of each landfill cell to the smallest practical area.
- 4.6.51 For any waste disposed of at the landfill that is subject to wind dispersal or release of offensive odours or both, the approval holder shall:
- (a) wet the waste to prevent dispersal of particulate matter; and
 - (b) immediately apply effective cover on top of the waste to control releases of:
 - (i) particulate matter, and
 - (ii) offensive odours.
- 4.6.52 Notwithstanding 4.6.1(v), the approval holder may place any of the following wastes over the surface of the active landfill area for the purpose of dust suppression:
- (a) specified runoff;
 - (b) leachate;
 - (c) leak detection liquid;
 - (d) sump waste of car wash bays or similar operations;
 - (e) waste from hydrovac excavation operations; or
 - (f) any other waste authorized by *the Alberta User Guide for Waste Managers*, May 1995, as amended;
- provided that placement of such wastes will not cause offensive odours.
- 4.6.53 The approval holder shall inspect the landfill, at a minimum:
- (a) weekly; and
 - (b) immediately after each storm event to:
 - (i) detect evidence of deterioration of any infrastructure components, including the composite liner,
 - (ii) detect any malfunction or improper operation of the run-on and runoff control systems, leachate collection system, or leak detection system, and
 - (iii) take corrective measures to repair any damage to infrastructure components, including the composite liner.

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- 4.6.54 The approval holder shall:
- (a) keep a record of inspections conducted pursuant to 4.6.53;
 - (b) have the record of inspections available for review upon written request from the Director; and
 - (c) immediately report any deficiencies detected by the inspection in 4.6.53 to the Director in writing along with any corrective measures taken or proposed.
- 4.6.55 The approval holder shall not stockpile waste exceeding the maximum designated waste elevation of the landfill for a period of more than two (2) weeks, unless otherwise authorized in writing by the Director.
- 4.6.56 The approval holder shall take all practical and effective measures to prevent off-site tracking of waste from vehicles and equipment leaving the facility.
- 4.6.57 The approval holder shall operate the laydown area in the NE 9-50-17 W4M area of the facility only as described in the application.

MONITORING AND REPORTING

- 4.6.58 The approval holder shall monitor the landfill operations as required in TABLE 4.6-D.
- 4.6.59 The approval holder shall report to the Director the results of the landfill operations monitoring as required in TABLE 4.6-D.

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TABLE 4.6-D: LANDFILL OPERATIONS MONITORING AND REPORTING REQUIREMENTS

MONITORING AND REPORTING				
Parameter	Frequency	Sample Type	Sampling Location	Reporting
Quantity and type of waste received	Continuously, When operating	Measured or estimated	At entrance to landfill	Annual Landfill Operations Report
Quantity and type of material removed	Continuously, when operating	Measured or estimated	At entrance to landfill	
General location of waste deposited	Continuously, when operating	As per survey, or using grid system	At active landfill area, or survey coordinates	
Leachate head	at least: - once every three working days; - after storm event; and - immediately prior to leachate removal	Calculated	At primary leachate collection system sumps for existing landfill Cell 1	
		Measured	At primary leachate collection system sumps for all other landfill cells	
Leachate analysis, as per TABLE 4.4-A	At least once every quarter year, unless insufficient sample volume is available	Grab sample	At each primary leachate collection system sump	
Volume of leachate removed from the leachate collection system	As removed	Measured or calculated	At leachate collection system sumps	
Leak detection liquid analysis, as per TABLE 4.4-A	At least once every quarter year, unless insufficient sample volume is available	Grab sample	At each leak detection system sump	
Volume of leak detection liquid removed from the leak detection system	At least once every working day, as removed	Measured or calculated	At leak detection system sumps	
Final cover	When final cover is applied	Final cover by survey cores or test pits or both	On each completed landfill cell	

4.6.60 The Annual Landfill Operations Report required in TABLE 4.6-D shall include, at a minimum, all of the following:

- (a) the name and contact information of the person responsible for the facility;
- (b) a summary of all information collected as required in TABLE 4.6-D;
- (c) a summary of the results of any audit conducted in accordance with 4.1.7;
- (d) a summary of the operations of the waste stabilization area;

.....

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- (e) a summary of the performance of the run-on and runoff control systems, including a comparison to the limits in TABLES 4.3-B and 4.3-C;
- (f) a summary of the performance of the leachate collection system, including a comparison to the maximum acceptable leachate head;
- (g) a summary of the performance of the leak detection system, including a comparison to the action leakage rate limit;
- (h) the Response Action Plan for the leak detection system pursuant to 4.4.10;
- (i) the Annual Dugout and Water Well Sampling Program Report pursuant to 4.5.4;
- (j) a summary of all revisions to the Landfill Operations Plan pursuant to 4.6.33(b);
- (k) any groundwater remedial action taken pursuant to 4.6.34(r);
- (l) a summary of records of landfill inspections pursuant to 4.6.53;
- (m) a summary of:
 - (i) operational issues encountered,
 - (ii) emergencies occurred, and
 - (iii) measures or actions taken;
- (n) a summary of records of:
 - (i) public complaints, and
 - (ii) the approval holder's responses;
- (o) an up-to-date financial security estimate pursuant to 5.1.2;
- (p) an updated site development plan showing the status of the landfill progression at the end of the operating year, including but not limited to:
 - (i) contour mapping,
 - (ii) the location of active and inactive disposal areas,
 - (iii) areas where a final cover has been placed, and
 - (iv) the location of new landfill cell(s) constructed;

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- (q) the Annual Landfill Cell Closure Report pursuant to 7.1.7;
- (r) a summary of contraventions reported pursuant to 2.1.1 related to landfill operations; and
- (s) any other information as required in writing by the Director.

4.6.61 The approval holder shall submit the Annual Landfill Operations Report to the Director.

SECTION 4.7: DOMESTIC WASTEWATER

OPERATIONS

4.7.1 The approval holder shall not release any substances from the domestic wastewater system to the surrounding watershed except as authorized by this approval.

4.7.2 The approval holder shall direct all domestic wastewater to the domestic wastewater system.

4.7.3 The approval holder shall only dispose of substances from the domestic wastewater system:

- (a) to facilities holding a current Act authorization;
- (b) to facilities approved by a local environmental authority outside of Alberta; or
- (c) as otherwise authorized in writing by the Director.

SECTION 4.8: WATERWORKS

Not used at this time.

SECTION 4.9: GROUNDWATER

BASELINE MONITORING AND REPORTING

4.9.1 The approval holder shall submit a proposal for a Baseline Groundwater Monitoring Program for the NE 9-50-17 W4M area of the facility on or before October 31, 2022, unless otherwise authorized in writing by the Director.

4.9.2 If the Baseline Groundwater Monitoring Program proposal submitted pursuant to 4.9.1 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.

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- 4.9.3 The approval holder shall implement the Baseline Groundwater Monitoring Program referred to in 4.9.1 as authorized in writing by the Director prior to commencing operation of any new landfill cell(s) in the NE 9-50-17 W4M area of the facility, unless otherwise authorized in writing by the Director.
- 4.9.4 The approval holder shall submit a Baseline Groundwater Monitoring Program Report to the Director within six (6) months of completing the Baseline Groundwater Monitoring Program, unless otherwise authorized in writing by the Director.

MONITORING

- 4.9.5 The approval holder shall continue to implement the existing Groundwater Monitoring Program as authorized in writing by the Director, unless and until otherwise authorized in writing by the Director pursuant to 4.9.8.
- 4.9.6 The approval holder shall submit a revised Groundwater Monitoring Program to the Director on or before December 31, 2022, unless otherwise authorized in writing by the Director.
- 4.9.7 If the revised Groundwater Monitoring Program submitted pursuant to 4.9.6 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.
- 4.9.8 The approval holder shall implement the revised Groundwater Monitoring Program submitted pursuant to 4.9.6 as authorized in writing by the Director within the timeline specified in writing by the Director.
- 4.9.9 The approval holder shall:
 - (a) collect a representative groundwater sample from each of the groundwater monitor wells specified in the Groundwater Monitoring Program, including the groundwater monitoring wells designated as points of compliance; and
 - (b) analyze each sample for the parameters listed in TABLE 4.9-A.

TABLE 4.9-A: GROUNDWATER MONITORING PROGRAM

PARAMETERS	
pH	Metals
Electrical conductivity	Major ions
COD	Nutrients
DOC	BTEX
TDS	Petroleum Hydrocarbons Fractions F1 and F2

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- 4.9.10 The monitoring required in 4.9.9 shall be conducted at the following frequencies, unless otherwise authorized in writing by the Director:
- (a) a minimum of once per year during each of the active landfill life, landfill cell closure, final landfill closure, and post-closure periods; and
 - (b) a minimum of four times per year following detection of leachate constituents in groundwater at levels above those specified in 4.9.11, and until the levels specified in 4.9.11 have been met.
- 4.9.11 The groundwater quality in the monitoring wells, designated as points of compliance in the Groundwater Monitoring Program, shall not exceed the higher of:
- (a) the objectives established in the water quality objectives in the *Canadian Environmental Quality Guidelines (CEQG)* for drinking water published by the Canadian Council of Ministers of the Environment (CCME), as amended; or
 - (b) background groundwater chemistry as determined through a statistical analysis, as a derived alternate groundwater performance standard.
- 4.9.12 The approval holder shall implement the Remediation Plan as specified in the Landfill Operations Plan, when groundwater quality exceeds the groundwater performance criteria in 4.9.11.
- 4.9.13 The samples extracted from the groundwater monitor wells shall be collected using scientifically acceptable purging, sampling and preservation procedures so that a representative groundwater sample is obtained.
- 4.9.14 The approval holder shall:
- (a) protect from damage; and
 - (b) keep locked except when being sampled
- all groundwater monitoring wells unless otherwise authorized in writing by the Director.
- 4.9.15 If a representative groundwater sample cannot be collected because the groundwater monitoring well is damaged or is no longer capable of producing a representative groundwater sample, the approval holder shall:
- (a) clean, repair or replace the groundwater monitoring well; and
 - (b) collect and analyse a representative groundwater sample prior to the next scheduled sampling event;

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unless otherwise authorized in writing by the Director.

- 4.9.16 In addition to the sampling information recorded in 2.2.1, the approval holder shall record the following sampling information for all groundwater samples collected:
- (a) a description of purging and sampling procedures;
 - (b) the static elevations above sea level, and depth below ground surface of fluid phases in the groundwater monitoring well prior to purging;
 - (c) the temperature of each sample at the time of sampling;
 - (d) the pH of each sample at the time of sampling; and
 - (e) the specific conductance of each sample at the time of sampling.
- 4.9.17 The approval holder shall carry out remediation of the groundwater in accordance with the following:
- (a) *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Environment, February 2009, as amended; and
 - (b) *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment, February 2009, as amended.

REPORTING

- 4.9.18 The approval holder shall compile an Annual Groundwater Monitoring Program Report which shall include, at a minimum, all of the following information:
- (a) a completed *Record of Site Condition Form*, Alberta Environment, 2009, as amended;
 - (b) a legal land description of the facility and a map illustrating the facility boundaries;
 - (c) a topographic map of the facility;
 - (d) a description of the industrial activity and processes;
 - (e) a map showing the location of all surface and groundwater users, and a listing describing surface water and water well use details, within at least a 1.6 kilometre radius of the facility;
 - (f) a general hydrogeological characterization of the region within a five kilometre radius of the facility;

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- (g) a detailed hydrogeological characterization of the facility, including an interpretation of groundwater flow patterns;
- (h) cross-sections showing depth to water table, patterns of groundwater movement and hydraulic gradients at the facility;
- (i) borehole logs and completion details for groundwater monitoring wells;
- (j) a map showing locations of all known buried channels within at least five kilometre of the facility;
- (k) a map of surface drainage within the facility and surrounding area to include nearby water bodies;
- (l) a map of groundwater monitoring well locations and a table summarizing the existing groundwater monitoring program for the facility;
- (m) a summary of any changes to the groundwater monitoring program made since the last groundwater monitoring report;
- (n) analytical data recorded as required in 4.9.9 and 4.9.15(b);
- (o) a summary of fluid elevations recorded as required in 4.9.16(b) and an interpretation of changes in fluid elevations;
- (p) an interpretation of QA/QC program results;
- (q) an interpretation of all the data in this report, including the following:
 - (i) diagrams indicating the location and extent of any contamination,
 - (ii) a description of probable sources of contamination, and
 - (iii) a site map showing the location and type of current and historical potential sources of groundwater contamination;
- (r) a summary and interpretation of the data collected since the groundwater monitoring program began including:
 - (i) control charts which indicate trends in concentrations of parameters, and
 - (ii) the migration of contaminants;
- (s) a description of the following:
 - (i) contaminated groundwater remediation techniques employed,

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- (ii) source elimination measures employed,
- (iii) risk assessment studies undertaken, and
- (iv) risk management studies undertaken;
- (t) a proposed sampling schedule for the following year(s);
- (u) a description of any contaminant remediation, risk assessment or risk management action conducted at the facility; and
- (v) recommendations for:
 - (i) changes to the groundwater monitoring program to make it more effective, and
 - (ii) remediation, risk assessment or risk management of contamination identified.

4.9.19 The approval holder shall submit the Annual Groundwater Monitoring Program Report to the Director.

4.9.20 If the Annual Groundwater Monitoring Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, within the timeline specified in writing by the Director.

SECTION 4.10: SOIL

4.10.1 In addition to any other requirements specified in this approval, the approval holder shall conduct all of the following activities related to soil monitoring and soil management required by this approval in accordance with the *Soil Monitoring Directive*, Alberta Environment, 2009, as amended:

- (a) designing and developing proposals for the Soil Monitoring Program;
- (b) designing and developing proposals for the Soil Management Program;
- (c) all other actions, including sampling, analysing, and reporting, associated with the Soil Monitoring Program; and
- (d) all other actions, including sampling, analysing and reporting, associated with the Soil Management Program.

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BASELINE MONITORING AND REPORTING

- 4.10.2 The approval holder shall submit a proposal for a Baseline Soil Monitoring Program for the NE 9-50-17 W4M area of the facility on or before October 31, 2022, unless otherwise authorized in writing by the Director.
- 4.10.3 If the Baseline Soil Monitoring Program proposal submitted pursuant to 4.10.2 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.
- 4.10.4 The approval holder shall implement the Baseline Soil Monitoring Program referred to in 4.10.2 as authorized in writing by the Director prior to commencing operation of any new landfill cell(s) in the NE 9-50-17 W4M area of the facility, unless otherwise authorized in writing by the Director.
- 4.10.5 The approval holder shall submit a Baseline Soil Monitoring Program Report to the Director within six (6) months of completing the Baseline Soil Monitoring Program, unless otherwise authorized in writing by the Director.

MONITORING AND REPORTING

- 4.10.6 The approval holder shall submit the Soil Monitoring Program proposal to the Director according to the following schedule:
 - (a) for the first soil monitoring event on or before January 31, 2019; and
 - (b) for the second soil monitoring event on or before January 31, 2024;unless otherwise authorized in writing by the Director.
- 4.10.7 If any Soil Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.
- 4.10.8 Subject to 4.10.7, the approval holder shall implement the Soil Monitoring Program as authorized in writing by the Director.
- 4.10.9 If an authorization or a deficiency letter is not issued within 120 days of the applicable date required by 4.10.6, the approval holder shall implement the Soil Monitoring Program:
 - (a) in accordance with the program as set out in the proposal submitted by the approval holder; and
 - (b) within 270 days after the applicable date required by 4.10.6.

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- 4.10.10 The approval holder shall submit to the Director each Soil Monitoring Program Report obtained from the soil monitoring referred to in 4.10.8 and 4.10.9 according to the following schedule:
- (a) for the first Soil Monitoring Program Report on or before January 31, 2020; and
 - (b) for the second Soil Monitoring Program Report on or before January 31, 2025;
- unless otherwise authorized in writing by the Director.
- 4.10.11 If any Soil Monitoring Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

SOIL MANAGEMENT PROGRAM

- 4.10.12 If the Soil Monitoring Program, or any other soil monitoring, reveals that there are substances present in the soil at concentrations greater than any of the applicable concentrations set out in the standards in the *Soil Monitoring Directive*, Alberta Environment, 2009, as amended, the approval holder shall develop a Soil Management Program Proposal.
- 4.10.13 If a Soil Management Program Proposal is required pursuant to 4.10.12, the approval holder shall submit a Soil Management Program Proposal to the Director according to the following schedule:
- (a) for Soil Management Program Proposal that is triggered by the findings from the first soil monitoring event on or before the date in 4.10.10(a);
 - (b) for Soil Management Program Proposal that is triggered by the findings from a second soil monitoring event on or before the date in 4.10.10(b); or
 - (c) for any other soil monitoring event not specified in this approval within six months of completion of the soil monitoring event.
- 4.10.14 If any Soil Management Program Proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.
- 4.10.15 The approval holder shall implement the Soil Management Program as authorized in writing by the Director.
- 4.10.16 If the approval holder is required to implement a Soil Management Program pursuant to 4.10.15, the approval holder shall submit a written Soil Management

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Program Report to the Director on or before March 31 of each year following the year in which the information was collected.

- 4.10.17 If any Soil Management Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified by the Director by the date specified in writing by the Director.

PART 5: FINANCIAL SECURITY REQUIREMENTS

- 5.1.1 The approval holder shall annually review and revise the cost estimate for reclamation of the facility including decommissioning and land reclamation.
- 5.1.2 The annual revised cost estimate for the facility shall be submitted to the Director by March 31 of each year.
- 5.1.3 The approval holder shall review and revise the cost estimate for reclamation of the facility when one or more of the following occurs:
- (a) the cost estimate of future conservation and reclamation of the facility changes;
 - (b) the extent of the operation of the facility is increased or reduced;
 - (c) the facility or any portion of it is conserved and reclaimed;
 - (d) the conservation and reclamation plan required by this approval is changed;
or
 - (e) the activities conducted at the facility for which security is required is increased or decreased.
- 5.1.4 The approval holder shall submit the revised cost estimate arising from 5.1.3 to the Director within 30 days after the occurrence of any of the circumstances described in 5.1.3.
- 5.1.5 The approval holder shall provide additional financial security as required in writing by the Director.
- 5.1.6 The approval holder shall renew the financial security for the facility at least 30 days prior to the date it expires.
- 5.1.7 The approval holder shall maintain the financial security for the facility until returned in accordance with the Act or the regulations.

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PART 6: DECOMMISSIONING AND LAND RECLAMATION OF HWRSP FACILITY

SECTION 6.1: GENERAL

6.1.1 The approval holder shall apply for an amendment to this approval to reclaim the HWRSP Facility by submitting to the Director:

- (a) a Decommissioning Plan; and
- (b) a Land Reclamation Plan.

6.1.2 The approval holder shall submit the:

- (a) Decommissioning Plan; and
- (b) Land Reclamation Plan

referred to in 6.1.1 within six (6) months of the HWRSP Facility ceasing operation, except for repairs and maintenance, unless otherwise authorized in writing by the Director.

SECTION 6.2: DECOMMISSIONING

6.2.1 The Decommissioning Plan referred to in 6.1.1 shall include, at a minimum, all of the following:

- (a) a plan for dismantling the HWRSP Facility;
- (b) a comprehensive study to determine the nature, degree and extent of contamination at the HWRSP Facility and affected lands;
- (c) a plan to manage all wastes at the HWRSP Facility;
- (d) evaluation of remediation technologies proposed to be used at the HWRSP Facility and affected lands;
- (e) a plan for decontamination of the HWRSP Facility and affected lands in accordance with the following:
 - (iii) for soil or groundwater, *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Environment, February 2009, as amended,
 - (iv) for soil or groundwater, *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment, February 2009, as amended,

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- (v) for drinking water, *Canadian Environmental Quality Guidelines*, Canadian Council of Ministers of the Environment, PN 1299, 1999, as amended, and
- (vi) for surface water, *Surface Water Quality Guidelines for Use in Alberta*, Alberta Environment, November 1999, as amended;
- (f) confirmatory testing to indicate compliance with the remediation objectives;
- (g) a plan for maintaining and operating contaminant monitoring systems;
- (h) a schedule for activities (a) through (g) above; and
- (i) any other information as required in writing by the Director.

6.2.2 If the Decommissioning Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

SECTION 6.3: LAND RECLAMATION

6.3.1 The Land Reclamation Plan referred to in 6.1.1 shall include, at a minimum, all of the following:

- (a) the final use of the reclaimed area and how equivalent land capability will be achieved;
- (b) removal of infrastructure;
- (c) restoration of drainage;
- (d) soil replacement;
- (e) erosion control;
- (f) revegetation and conditioning of the HWRSP Facility including:
 - (i) species list, seed source and quality, seeding rates and methods,
 - (ii) fertilization rates and methods, and
 - (iii) wildlife habitat plans where applicable;
- (g) reclamation schedule; and
- (h) any other information as required in writing by the Director.

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- 6.3.2 If the Land Reclamation Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

PART 7: FINAL LANDFILL CLOSURE AND POST-CLOSURE

SECTION 7.1: LANDFILL CELL CLOSURE AND MAINTENANCE

- 7.1.1 The approval holder shall submit a Landfill Cell Closure Plan for individual landfill cell closure to the Director on or before September 30, 2017, unless otherwise authorized in writing by the Director.
- 7.1.2 The Landfill Cell Closure Plan submitted pursuant to 7.1.1 shall be signed and stamped by a professional registered with APEGA.
- 7.1.3 If the Landfill Cell Closure Plan submitted pursuant to 7.1.1 is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within the timeline specified in writing by the Director.
- 7.1.4 The approval holder shall implement the Landfill Cell Closure Plan submitted pursuant to 7.1.1 as authorized in writing by the Director.
- 7.1.5 The approval holder shall maintain the closed landfill cells to:
- (a) protect and maintain the integrity of the final cover and surface water drainage systems;
 - (b) prevent erosion;
 - (c) prevent surface water ponding;
 - (d) remediate areas affected by subsidence and differential settlement; and
 - (e) prevent leachate break out.
- 7.1.6 If the approval holder completes landfill cell closure in a year, the approval holder shall prepare an Annual Landfill Cell Closure Report, and include, at a minimum, all of the following information in the Report:
- (a) as-built plans and details on the location of landfill cells that have been closed;
 - (b) certified construction QA/QC procedures employed during cover construction and installation; and
 - (c) survey reports showing the final cover depths.

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7.1.7 The approval holder shall submit the Annual Landfill Cell Closure Report with the Annual Landfill Operations Report required in 4.6.60.

SECTION 7.2: FINAL LANDFILL CLOSURE AND POST-CLOSURE

7.2.1 The approval holder shall apply for an amendment to this approval for final landfill closure by submitting to the Director:

- (a) a Detailed Final Landfill Closure Plan ; and
- (b) a Landfill Post-Closure Plan.

7.2.2 The approval holder shall submit the:

- (a) Detailed Final Landfill Closure Plan; and
- (b) Landfill Post-Closure Plan

referred to in 7.2.1 within six (6) months of the landfill ceasing operations, unless otherwise authorized in writing by the Director.

DETAILED FINAL LANDFILL CLOSURE PLAN

7.2.3 The Detailed Final Landfill Closure Plan shall be developed in accordance with sections 6.1(b) and 6.1(c) of the *Standards for Landfills in Alberta*, as amended.

7.2.4 In addition to 7.2.3, the Detailed Final Landfill Closure Plan shall include, at a minimum, all of the following:

- (a) a plan for replacement of soil;
- (b) a QA/QC Program; and
- (c) any deviations from the most recently submitted closure plan.

7.2.5 The Detailed Final Landfill Closure Plan shall be signed and stamped by a professional registered with APEGA.

7.2.6 If the Detailed Final Landfill Closure Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

7.2.7 The approval holder shall implement the Detailed Final Landfill Closure Plan as authorized in writing by the Director.

TERMS AND CONDITIONS ATTACHED TO APPROVAL**LANDFILL POST-CLOSURE PLAN**

- 7.2.8 The Landfill Post-Closure Plan shall be developed in accordance with sections 6.2 and 6.3 of the *Standards for Landfills in Alberta*, as amended.
- 7.2.9 In addition to 7.2.8, the Landfill Post-Closure Plan shall include, at a minimum, all of the following:
- (a) the groundwater monitoring program including performance standards and points of compliance;
 - (b) the subsurface landfill gas monitoring program and performance standards at points of compliance;
 - (c) a plan for erosion control;
 - (d) a plan for maintaining vegetative cover; and
 - (e) any other information requested in writing by the Director.
- 7.2.10 The Landfill Post-Closure Plan shall be signed and stamped by a professional registered with APEGA.
- 7.2.11 If the Landfill Post-Closure Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.
- 7.2.12 The approval holder shall implement the Landfill Post-Closure Plan as authorized in writing by the Director.

PART 8: DECOMMISSIONING AND LAND RECLAMATION OF OLD SURFACE WATER DETENTION POND

- 8.1.1 The approval holder shall:
- (a) decommission; and
 - (b) reclaim
- the old surface water detention pond prior to construction of Cell 4.
- 8.1.2 The approval holder shall submit a Decommissioning and Land Reclamation Plan for the old surface water detention pond to the Director a minimum of six (6) months prior to decommissioning and land reclamation of the pond.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

- 8.1.3 If the Decommissioning and Land Reclamation Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.



June 21, 2022

DATE SIGNED

DESIGNATED DIRECTOR UNDER THE ACT
Mohammad Habib, P. Eng.

APPENDIX B

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner

consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX C

LABORATORY CERTIFICATE OF ANALYSIS



CERTIFICATE OF ANALYSIS

<p>Work Order : EO2309502</p> <p>Amendment : 1</p> <p>Client : Tetra Tech Canada Inc.</p> <p>Contact : Brent Finnestad</p> <p>Address : North Building 14940 123 Ave NW Edmonton AB Canada T5V 1B4</p> <p>Telephone : 780-718-9317</p> <p>Project : 704-SWM.SWOP04810-01</p> <p>PO : 704-SWM.SWOP04810-01</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : EO23-EBAE100-006 (Q83988)</p> <p>No. of samples received : 23</p> <p>No. of samples analysed : 23</p>	<p>Page : 1 of 23</p> <p>Laboratory : ALS Environmental - Edmonton</p> <p>Account Manager : Kieran Tordoff</p> <p>Address : 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 17-Oct-2023 15:36</p> <p>Date Analysis Commenced : 18-Oct-2023</p> <p>Issue Date : 02-Nov-2023 14:51</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Brayden Ginther	Laboratory Analyst	Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Daniel Nguyen	Lab Assistant	Metals, Edmonton, Alberta
Elke Tabora		Inorganics, Calgary, Alberta
Fahad Husain	Analyst	Inorganics, Edmonton, Alberta
Garrett Nodin	Lab Analyst	Inorganics, Edmonton, Alberta
Jing Liu	Lab Assistant	Inorganics, Edmonton, Alberta
Kari Mulroy	Lab Supervisor - Environmental	Organics, Edmonton, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Logan Carroll	Laboratory Analyst	Inorganics, Edmonton, Alberta
Michelle Schroder	Laboratory Analyst	Inorganics, Edmonton, Alberta
Yan Zhang	Lab Analyst	Organics, Edmonton, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Water					Client sample ID	1Booth D.1	2 Ewert D.1	3 Ewert D.2	4 Ewert D.3	5 Ewert D.4
(Matrix: Water)					Client sampling date / time	16-Oct-2023 17:45	16-Oct-2023 16:20	16-Oct-2023 16:45	16-Oct-2023 16:00	16-Oct-2023 17:00
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-001	EO2309502-002	EO2309502-003	EO2309502-004	EO2309502-005	
					Result	Result	Result	Result	Result	
Physical Tests										
Hardness (as CaCO ₃), dissolved	----	EC100/EO	0.50	mg/L	98.4	118	103	105	109	
Solids, total dissolved [TDS]	----	E162/EO	10	mg/L	460	824	566	419	388	
Solids, total suspended [TSS]	----	E160/EO	3.0	mg/L	29.0	91.4	152	80.0	38.8	
Conductivity	----	E100/CG	2.0	µS/cm	689	1180	804	575	589	
pH	----	E108/CG	0.10	pH units	8.46	9.45	8.23	8.38	8.47	
Alkalinity, bicarbonate (as HCO ₃)	71-52-3	E290/CG	1.0	mg/L	350	501	385	308	339	
Alkalinity, carbonate (as CO ₃)	3812-32-6	E290/CG	1.0	mg/L	5.3	90.4	<1.0	3.0	5.4	
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Alkalinity, total (as CaCO ₃)	----	E290/CG	2.0	mg/L	295	561	316	257	287	
Solids, total dissolved [TDS], calculated	----	EC103/EO	1.0	mg/L	483	849	577	430	414	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/EO	0.0050	mg/L	0.128	0.0547	0.341	0.168	0.143	
Kjeldahl nitrogen, total [TKN]	----	E318/EO	0.050	mg/L	4.36	4.40	7.96	4.55	3.50	
Phosphorus, total	7723-14-0	E372-S/EO	0.0010	mg/L	0.607	0.980	1.69	1.60	0.988	
Chloride	16887-00-6	E235.Cl/EO	0.50	mg/L	35.0	55.8	32.6	49.0	10.6	
Fluoride	16984-48-8	E235.F/EO	0.020	mg/L	0.283	0.492	0.324	0.262	0.403	
Nitrate (as N)	14797-55-8	E235.NO3/EO	0.020	mg/L	<0.020	<0.020	0.392	<0.020	<0.020	
Nitrite (as N)	14797-65-0	E235.NO2/EO	0.010	mg/L	<0.010	<0.010	0.084	<0.010	<0.010	
Sulfate (as SO ₄)	14808-79-8	E235.SO4/EO	0.30	mg/L	51.6	84.2	108	7.13	46.0	
Nitrate + Nitrite (as N)	----	EC235.N+N/E O	0.0500	mg/L	<0.0500	<0.0500	0.476	<0.0500	<0.0500	
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/CG	0.50	mg/L	29.8	41.3	36.4	47.2	28.3	
Ion Balance										
Anion sum	----	EC101/EO	0.10	meq/L	7.97	14.6	9.53	6.68	7.01	
Cation sum	----	EC101/EO	0.10	meq/L	8.41	14.7	9.25	6.94	6.99	
Ion balance (APHA)	----	EC101/EO	0.01	%	2.69	0.34	-1.49	1.91	-0.14	
Ion balance (cations/anions)	----	EC101/EO	0.010	%	106	101	97.1	104	99.7	
Dissolved Metals										



Analytical Results

Sub-Matrix: Water					Client sample ID	1Booth D.1	2 Ewert D.1	3 Ewert D.2	4 Ewert D.3	5 Ewert D.4
(Matrix: Water)					Client sampling date / time	16-Oct-2023 17:45	16-Oct-2023 16:20	16-Oct-2023 16:45	16-Oct-2023 16:00	16-Oct-2023 17:00
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-001	EO2309502-002	EO2309502-003	EO2309502-004	EO2309502-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/EO	0.0010	mg/L	0.0027	0.0062	0.0036	0.0071	0.0025	
Antimony, dissolved	7440-36-0	E421/EO	0.00010	mg/L	0.00023	0.00042	0.00022	0.00018	0.00024	
Arsenic, dissolved	7440-38-2	E421/EO	0.00010	mg/L	0.00647	0.0128	0.00503	0.00447	0.00595	
Barium, dissolved	7440-39-3	E421/EO	0.00010	mg/L	0.0503	0.0501	0.0230	0.0247	0.0338	
Beryllium, dissolved	7440-41-7	E421/EO	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Bismuth, dissolved	7440-69-9	E421/EO	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Boron, dissolved	7440-42-8	E421/EO	0.010	mg/L	0.048	0.022	0.033	0.038	0.029	
Cadmium, dissolved	7440-43-9	E421/EO	0.0000050	mg/L	0.0000052	<0.0000050	0.0000061	0.0000071	<0.0000050	
Calcium, dissolved	7440-70-2	E421/EO	0.050	mg/L	22.6	24.0	23.4	25.5	24.4	
Cesium, dissolved	7440-46-2	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Chromium, dissolved	7440-47-3	E421/EO	0.00050	mg/L	<0.00050	0.00054	<0.00050	<0.00050	<0.00050	
Cobalt, dissolved	7440-48-4	E421/EO	0.00010	mg/L	0.00035	0.00049	0.00077	0.00059	0.00049	
Copper, dissolved	7440-50-8	E421/EO	0.00020	mg/L	0.00054	0.00113	0.00168	0.00159	0.00055	
Iron, dissolved	7439-89-6	E421/EO	0.010	mg/L	0.142	0.038	0.186	0.544	0.160	
Lead, dissolved	7439-92-1	E421/EO	0.000050	mg/L	0.000098	0.000078	0.000229	0.000081	0.000067	
Lithium, dissolved	7439-93-2	E421/EO	0.0010	mg/L	0.0384	0.0377	0.0238	0.0130	0.0146	
Magnesium, dissolved	7439-95-4	E421/EO	0.0050	mg/L	10.2	14.2	10.8	10.1	11.6	
Manganese, dissolved	7439-96-5	E421/EO	0.00010	mg/L	0.00556	0.0259	0.0429	0.0634	0.0127	
Mercury, dissolved	7439-97-6	E509/EO	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum, dissolved	7439-98-7	E421/EO	0.000050	mg/L	0.00106	0.00131	0.000870	0.00104	0.00108	
Nickel, dissolved	7440-02-0	E421/EO	0.00050	mg/L	0.00384	0.00320	0.00485	0.00332	0.00348	
Phosphorus, dissolved	7723-14-0	E421/EO	0.050	mg/L	0.344	0.657	0.332	0.716	0.429	
Potassium, dissolved	7440-09-7	E421/EO	0.050	mg/L	13.2	21.0	16.4	16.1	14.4	
Rubidium, dissolved	7440-17-7	E421/EO	0.00020	mg/L	0.00131	0.00097	0.00175	0.00154	0.00174	
Selenium, dissolved	7782-49-2	E421/EO	0.000050	mg/L	0.000132	0.000350	0.000254	0.000262	0.000256	
Silicon, dissolved	7440-21-3	E421/EO	0.050	mg/L	1.01	<0.050	0.541	7.09	1.26	
Silver, dissolved	7440-22-4	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium, dissolved	7440-23-5	E421/EO	0.050	mg/L	140	271	155	101	102	
Strontium, dissolved	7440-24-6	E421/EO	0.00020	mg/L	0.243	0.252	0.246	0.200	0.218	
Sulfur, dissolved	7704-34-9	E421/EO	0.50	mg/L	21.0	32.2	38.5	4.22	17.6	



Analytical Results

Sub-Matrix: Water					Client sample ID	1Booth D.1	2 Ewert D.1	3 Ewert D.2	4 Ewert D.3	5 Ewert D.4
(Matrix: Water)					Client sampling date / time	16-Oct-2023 17:45	16-Oct-2023 16:20	16-Oct-2023 16:45	16-Oct-2023 16:00	16-Oct-2023 17:00
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-001	EO2309502-002	EO2309502-003	EO2309502-004	EO2309502-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
Tellurium, dissolved	13494-80-9	E421/EO	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium, dissolved	7440-28-0	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium, dissolved	7440-29-1	E421/EO	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Tin, dissolved	7440-31-5	E421/EO	0.00010	mg/L	0.00030	<0.00010	0.00015	0.00011	<0.00010	
Titanium, dissolved	7440-32-6	E421/EO	0.00030	mg/L	0.00065	0.00040	0.00042	0.00065	<0.00030	
Tungsten, dissolved	7440-33-7	E421/EO	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium, dissolved	7440-61-1	E421/EO	0.000010	mg/L	0.000525	0.00192	0.000728	0.000174	0.000551	
Vanadium, dissolved	7440-62-2	E421/EO	0.00050	mg/L	0.00120	0.00280	0.00172	0.00161	0.00146	
Zinc, dissolved	7440-66-6	E421/EO	0.0010	mg/L	<0.0010	0.0028	0.0016	0.0033	0.0015	
Zirconium, dissolved	7440-67-7	E421/EO	0.00020	mg/L	0.00066	0.00065	0.00063	0.00084	0.00034	
Dissolved mercury filtration location	----	EP509/EO	-	-	Field	Field	Field	Field	Field	
Dissolved metals filtration location	----	EP421/EO	-	-	Field	Field	Field	Field	Field	
Aggregate Organics										
Chemical oxygen demand [COD]	----	E559-L/EO	10	mg/L	127 ^{RRV}	144	226	166	109	
Phenols, total (4AAP)	----	E562/EO	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Volatile Organic Compounds										
Benzene	71-43-2	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	100-41-4	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Styrene	100-42-5	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Toluene	108-88-3	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Xylene, m+p-	179601-23-1	E611A/EO	0.00040	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	
Xylene, o-	95-47-6	E611A/EO	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
Xylenes, total	1330-20-7	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Hydrocarbons										
F1 (C6-C10)	----	E581.F1/EO	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
F2 (C10-C16)	----	E601/EO	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
F1-BTEX	----	EC580/EO	0.100	mg/L	<0.100	<0.100	<0.100	<0.100	<0.100	
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/EO	1.0	%	105	102	99.2	98.9	102	
Dichlorotoluene, 3,4-	95-75-0	E581.F1/EO	1.0	%	85.5	81.2	81.2	71.1	71.9	



Analytical Results

Sub-Matrix: Water					Client sample ID	1Booth D.1	2 Ewert D.1	3 Ewert D.2	4 Ewert D.3	5 Ewert D.4
(Matrix: Water)					Client sampling date / time	16-Oct-2023 17:45	16-Oct-2023 16:20	16-Oct-2023 16:45	16-Oct-2023 16:00	16-Oct-2023 17:00
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-001	EO2309502-002	EO2309502-003	EO2309502-004	EO2309502-005	
Volatile Organic Compounds Surrogates					Result	Result	Result	Result	Result	
Bromofluorobenzene, 4-	460-00-4	E611A/EO	1.0	%	77.3	80.7	77.6	81.4	82.0	
Difluorobenzene, 1,4-	540-36-3	E611A/EO	1.0	%	101	100	101	102	98.7	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	10 Magneson D.1	11 Magneson D.2	13 Magneson D.4	14 Magneson D.5	15 Magneson D.6
Client sampling date / time					16-Oct-2023 12:30	16-Oct-2023 13:30	16-Oct-2023 11:00	16-Oct-2023 13:00	16-Oct-2023 11:50	
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-006	EO2309502-007	EO2309502-008	EO2309502-009	EO2309502-010	
					Result	Result	Result	Result	Result	
Physical Tests										
Hardness (as CaCO3), dissolved	---	EC100/EO	0.50	mg/L	405	92.2	364	179	292	
Solids, total dissolved [TDS]	---	E162/EO	10	mg/L	2620	428	3140	1170	1630	
Solids, total suspended [TSS]	---	E160/EO	3.0	mg/L	192	86.4	48.7	74.6	62.4	
Conductivity	---	E100/CG	2.0	µS/cm	2890	500	3380	1560	2190	
pH	---	E108/CG	0.10	pH units	8.64	8.38	8.51	8.84	8.43	
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L	1040	293	1240	705	349	
Alkalinity, carbonate (as CO3)	3812-32-6	E290/CG	1.0	mg/L	39.6	2.9	24.7	36.5	5.8	
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Alkalinity, total (as CaCO3)	---	E290/CG	2.0	mg/L	923	245	1060	639	296	
Solids, total dissolved [TDS], calculated	---	EC103/EO	1.0	mg/L	2400	383	2800	1180	1630	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/EO	0.0050	mg/L	6.33	0.902	3.38	0.198	0.0361	
Kjeldahl nitrogen, total [TKN]	---	E318/EO	0.050	mg/L	23.7	6.35	41.0	4.93	2.95	
Phosphorus, total	7723-14-0	E372-S/EO	0.0010	mg/L	12.4	2.72	20.3	3.88	0.335	
Chloride	16887-00-6	E235.Cl/EO	0.50	mg/L	323 ^{DLDS}	20.9	461 ^{DLDS}	114	189 ^{DLDS}	
Fluoride	16984-48-8	E235.F/EO	0.020	mg/L	<0.100 ^{DLDS}	0.361	<0.100 ^{DLDS}	0.685	0.278 ^{DLDS}	
Nitrate (as N)	14797-55-8	E235.NO3/EO	0.020	mg/L	<0.100 ^{DLDS}	0.503	0.102 ^{DLDS}	0.243	<0.100 ^{DLDS}	
Nitrite (as N)	14797-65-0	E235.NO2/EO	0.010	mg/L	0.235 ^{DLDS}	0.065	1.90 ^{DLDS}	0.011	<0.050 ^{DLDS}	
Sulfate (as SO4)	14808-79-8	E235.SO4/EO	0.30	mg/L	388 ^{DLDS}	4.18	213 ^{DLDS}	168	686 ^{DLDS}	
Nitrate + Nitrite (as N)	---	EC235.N+N/E O	0.0500	mg/L	0.235	0.568	2.00	0.254	<0.112	
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	---	E358-L/CG	0.50	mg/L	204	50.9	326	68.3	29.7	
Ion Balance										
Anion sum	---	EC101/EO	0.10	meq/L	35.6	5.63	38.8	19.5	25.5	
Cation sum	---	EC101/EO	0.10	meq/L	37.8	6.09	40.9	18.6	25.4	
Ion balance (APHA)	---	EC101/EO	0.01	%	3.00	3.92	2.63	-2.36	-0.20	
Ion balance (cations/anions)	---	EC101/EO	0.010	%	106	108	105	95.4	99.6	
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/EO	0.0010	mg/L	0.0166	0.356	0.0529	0.0041	0.0035	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	10 Magneson D.1	11 Magneson D.2	13 Magneson D.4	14 Magneson D.5	15 Magneson D.6
Client sampling date / time					16-Oct-2023 12:30	16-Oct-2023 13:30	16-Oct-2023 11:00	16-Oct-2023 13:00	16-Oct-2023 11:50	
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-006	EO2309502-007	EO2309502-008	EO2309502-009	EO2309502-010	
					Result	Result	Result	Result	Result	
Dissolved Metals										
Antimony, dissolved	7440-36-0	E421/EO	0.00010	mg/L	0.00062	0.00023	0.00070	0.00058	0.00059	
Arsenic, dissolved	7440-38-2	E421/EO	0.00010	mg/L	0.0249	0.00833	0.0311	0.0232	0.00977	
Barium, dissolved	7440-39-3	E421/EO	0.00010	mg/L	0.0254	0.0858	0.132	0.0185	0.0237	
Beryllium, dissolved	7440-41-7	E421/EO	0.000020	mg/L	<0.000040 DLDS	0.000065	0.000113	<0.000020	<0.000040 DLDS	
Bismuth, dissolved	7440-69-9	E421/EO	0.000050	mg/L	<0.000100 DLDS	<0.000050	<0.000100 DLDS	<0.000050	<0.000100 DLDS	
Boron, dissolved	7440-42-8	E421/EO	0.010	mg/L	0.166	0.050	0.210	0.071	0.082	
Cadmium, dissolved	7440-43-9	E421/EO	0.0000050	mg/L	0.0000371	0.0000334	0.0000700	0.0000084	<0.0000100 DLDS	
Calcium, dissolved	7440-70-2	E421/EO	0.050	mg/L	81.3	22.1	67.4	40.6	54.7	
Cesium, dissolved	7440-46-2	E421/EO	0.000010	mg/L	<0.000020 DLDS	0.000020	<0.000020 DLDS	<0.000010	<0.000020 DLDS	
Chromium, dissolved	7440-47-3	E421/EO	0.00050	mg/L	<0.00100 DLDS	0.00069	0.00337	<0.00050	<0.00100 DLDS	
Cobalt, dissolved	7440-48-4	E421/EO	0.00010	mg/L	0.00519	0.00198	0.0123	0.00362	0.00044	
Copper, dissolved	7440-50-8	E421/EO	0.00020	mg/L	0.00543	0.00294	0.00846	0.00334	0.00207	
Iron, dissolved	7439-89-6	E421/EO	0.010	mg/L	0.741	3.95	2.76	0.044	0.065	
Lead, dissolved	7439-92-1	E421/EO	0.000050	mg/L	0.000583	0.00204	0.00268	<0.000050	0.000101	
Lithium, dissolved	7439-93-2	E421/EO	0.0010	mg/L	0.0712	0.0115	0.109	0.0491	0.0852	
Magnesium, dissolved	7439-95-4	E421/EO	0.0050	mg/L	49.1	8.98	47.6	18.9	37.7	
Manganese, dissolved	7439-96-5	E421/EO	0.00010	mg/L	0.300	0.0885	0.643	0.0996	0.0442	
Mercury, dissolved	7439-97-6	E509/EO	0.0000050	mg/L	0.0000059	<0.0000050	0.0000132	<0.0000050	<0.0000050	
Molybdenum, dissolved	7439-98-7	E421/EO	0.000050	mg/L	0.00278	0.00272	0.00388	0.0106	0.00140	
Nickel, dissolved	7440-02-0	E421/EO	0.00050	mg/L	0.0186	0.00893	0.0522	0.0180	0.00514	
Phosphorus, dissolved	7723-14-0	E421/EO	0.050	mg/L	6.73	1.60	17.4	3.28	0.127	
Potassium, dissolved	7440-09-7	E421/EO	0.050	mg/L	203	28.6	586	69.6	20.6	
Rubidium, dissolved	7440-17-7	E421/EO	0.00020	mg/L	0.0200	0.00219	0.0804	0.00419	0.00249	
Selenium, dissolved	7782-49-2	E421/EO	0.000050	mg/L	0.000830	0.000392	0.00209	0.000752	0.000334	
Silicon, dissolved	7440-21-3	E421/EO	0.050	mg/L	13.6	6.31	11.8	3.27	0.487	
Silver, dissolved	7440-22-4	E421/EO	0.000010	mg/L	<0.000020 DLDS	0.000013	0.000050	<0.000010	<0.000020 DLDS	
Sodium, dissolved	7440-23-5	E421/EO	0.050	mg/L	553	75.1	420	305	437	
Strontium, dissolved	7440-24-6	E421/EO	0.00020	mg/L	0.527	0.145	0.572	0.402	0.690	
Sulfur, dissolved	7704-34-9	E421/EO	0.50	mg/L	158	3.02	88.2	62.2	258	
Tellurium, dissolved	13494-80-9	E421/EO	0.00020	mg/L	<0.00040 DLDS	<0.00020	<0.00040 DLDS	<0.00020	<0.00040 DLDS	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	10 Magneson D.1	11 Magneson D.2	13 Magneson D.4	14 Magneson D.5	15 Magneson D.6
Client sampling date / time					16-Oct-2023 12:30	16-Oct-2023 13:30	16-Oct-2023 11:00	16-Oct-2023 13:00	16-Oct-2023 11:50	
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-006	EO2309502-007	EO2309502-008	EO2309502-009	EO2309502-010	
					Result	Result	Result	Result	Result	
Dissolved Metals										
Thallium, dissolved	7440-28-0	E421/EO	0.000010	mg/L	<0.000020 ^{DLDS}	<0.000010	<0.000020 ^{DLDS}	<0.000010	<0.000020 ^{DLDS}	
Thorium, dissolved	7440-29-1	E421/EO	0.00010	mg/L	<0.00020 ^{DLDS}	0.00016	0.00091	<0.00010	<0.00020 ^{DLDS}	
Tin, dissolved	7440-31-5	E421/EO	0.00010	mg/L	0.00029	0.00029	0.0103	0.00013	<0.00020 ^{DLDS}	
Titanium, dissolved	7440-32-6	E421/EO	0.00030	mg/L	0.00434	0.0116	0.0396	0.00055	<0.00060 ^{DLDS}	
Tungsten, dissolved	7440-33-7	E421/EO	0.00010	mg/L	<0.00020 ^{DLDS}	<0.00010	<0.00020 ^{DLDS}	0.00047	<0.00020 ^{DLDS}	
Uranium, dissolved	7440-61-1	E421/EO	0.000010	mg/L	0.00436	0.00158	0.00263	0.00268	0.00251	
Vanadium, dissolved	7440-62-2	E421/EO	0.00050	mg/L	0.0161	0.00754	0.0315	0.0149	0.00156	
Zinc, dissolved	7440-66-6	E421/EO	0.0010	mg/L	0.0028	0.0066	0.0221	<0.0010	0.0034	
Zirconium, dissolved	7440-67-7	E421/EO	0.00020	mg/L	0.00623	0.00241	0.0262	0.00218	0.00068	
Dissolved mercury filtration location	----	EP509/EO	-	-	Field	Field	Field	Field	Field	
Dissolved metals filtration location	----	EP421/EO	-	-	Field	Field	Field	Field	Field	
Aggregate Organics										
Chemical oxygen demand [COD]	----	E559-L/EO	10	mg/L	578	192 ^{RRV}	1180 ^{DLM}	202	89	
Phenols, total (4AAP)	----	E562/EO	0.0010	mg/L	0.0014	<0.0010	<0.0020 ^{DLM}	<0.0010	<0.0010	
Volatile Organic Compounds										
Benzene	71-43-2	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	100-41-4	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Styrene	100-42-5	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Toluene	108-88-3	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Xylene, m+p-	179601-23-1	E611A/EO	0.00040	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	
Xylene, o-	95-47-6	E611A/EO	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
Xylenes, total	1330-20-7	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Hydrocarbons										
F1 (C6-C10)	----	E581.F1/EO	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
F2 (C10-C16)	----	E601/EO	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
F1-BTEX	----	EC580/EO	0.100	mg/L	<0.100	<0.100	<0.100	<0.100	<0.100	
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/EO	1.0	%	100	102	97.2	95.6	102	
Dichlorotoluene, 3,4-	95-75-0	E581.F1/EO	1.0	%	73.4	85.6	75.5	76.9	72.8	
Volatile Organic Compounds Surrogates										



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	10 Magneson D.1	11 Magneson D.2	13 Magneson D.4	14 Magneson D.5	15 Magneson D.6
					Client sampling date / time	16-Oct-2023 12:30	16-Oct-2023 13:30	16-Oct-2023 11:00	16-Oct-2023 13:00	16-Oct-2023 11:50
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-006	EO2309502-007	EO2309502-008	EO2309502-009	EO2309502-010	
					Result	Result	Result	Result	Result	
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/EO	1.0	%	79.9	79.1	81.0	75.6	79.7	
Difluorobenzene, 1,4-	540-36-3	E611A/EO	1.0	%	100	97.8	98.5	100	99.8	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					16 Beaver County D.1	19 Winsnes D.1	20 Balash D.1	21 Balash D.2	22 Balash D.3
Client sampling date / time					16-Oct-2023 15:30	16-Oct-2023 18:15	16-Oct-2023 15:00	16-Oct-2023 14:15	16-Oct-2023 14:30
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-011	EO2309502-012	EO2309502-013	EO2309502-014	EO2309502-015
					Result	Result	Result	Result	Result
Physical Tests									
Hardness (as CaCO3), dissolved	----	EC100/EO	0.50	mg/L	235	148	109	399	380
Solids, total dissolved [TDS]	----	E162/EO	10	mg/L	848	582	266	1130	1350
Solids, total suspended [TSS]	----	E160/EO	3.0	mg/L	113	502	52.6	31.4	49.2
Conductivity	----	E100/CG	2.0	µS/cm	1280	872	388	1910	2250
pH	----	E108/CG	0.10	pH units	8.38	8.36	8.13	8.67	8.38
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L	426	312	190	338	337
Alkalinity, carbonate (as CO3)	3812-32-6	E290/CG	1.0	mg/L	3.8	2.9	<1.0	20.2	6.7
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/CG	2.0	mg/L	355	261	156	310	288
Solids, total dissolved [TDS], calculated	----	EC103/EO	1.0	mg/L	883	594	276	1170	1340
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/EO	0.0050	mg/L	0.0495	0.152	0.0330	0.0363	0.0814
Kjeldahl nitrogen, total [TKN]	----	E318/EO	0.050	mg/L	3.54	2.04	3.21	2.78	3.74
Phosphorus, total	7723-14-0	E372-S/EO	0.0010	mg/L	1.98	0.770	0.482	0.658	1.58
Chloride	16887-00-6	E235.Cl/EO	0.50	mg/L	180	75.8	25.5	256	384
Fluoride	16984-48-8	E235.F/EO	0.020	mg/L	0.246	0.270	0.179	0.185	0.133
Nitrate (as N)	14797-55-8	E235.NO3/EO	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrite (as N)	14797-65-0	E235.NO2/EO	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Sulfate (as SO4)	14808-79-8	E235.SO4/EO	0.30	mg/L	140	131	21.2	284	262
Nitrate + Nitrite (as N)	----	EC235.N+N/E O	0.0500	mg/L	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	E358-L/CG	0.50	mg/L	33.2	26.7	23.3	27.2	41.4
Ion Balance									
Anion sum	----	EC101/EO	0.10	meq/L	15.1	10.1	4.29	19.3	22.0
Cation sum	----	EC101/EO	0.10	meq/L	14.6	9.50	4.42	19.6	22.3
Ion balance (APHA)	----	EC101/EO	0.01	%	-1.68	-3.06	1.49	0.77	0.68
Ion balance (cations/anions)	----	EC101/EO	0.010	%	96.7	94.0	103	102	101
Dissolved Metals									
Aluminum, dissolved	7429-90-5	E421/EO	0.0010	mg/L	0.0022	0.0038	0.0028	0.0014	0.0037



Analytical Results

Sub-Matrix: Water					Client sample ID	16 Beaver County D.1	19 Winsnes D.1	20 Balash D.1	21 Balash D.2	22 Balash D.3
(Matrix: Water)					Client sampling date / time	16-Oct-2023 15:30	16-Oct-2023 18:15	16-Oct-2023 15:00	16-Oct-2023 14:15	16-Oct-2023 14:30
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-011	EO2309502-012	EO2309502-013	EO2309502-014	EO2309502-015	
					Result	Result	Result	Result	Result	
Dissolved Metals										
Antimony, dissolved	7440-36-0	E421/EO	0.00010	mg/L	0.00022	0.00023	0.00011	0.00018	<0.00020	DLDS
Arsenic, dissolved	7440-38-2	E421/EO	0.00010	mg/L	0.00557	0.00438	0.00267	0.00549	0.00588	
Barium, dissolved	7440-39-3	E421/EO	0.00010	mg/L	0.0220	0.0644	0.0529	0.0733	0.0487	
Beryllium, dissolved	7440-41-7	E421/EO	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000040	DLDS
Bismuth, dissolved	7440-69-9	E421/EO	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000100	DLDS
Boron, dissolved	7440-42-8	E421/EO	0.010	mg/L	0.050	0.037	0.038	0.022	0.024	
Cadmium, dissolved	7440-43-9	E421/EO	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000100	DLDS
Calcium, dissolved	7440-70-2	E421/EO	0.050	mg/L	56.6	28.0	27.8	76.7	68.3	
Cesium, dissolved	7440-46-2	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	DLDS
Chromium, dissolved	7440-47-3	E421/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00100	DLDS
Cobalt, dissolved	7440-48-4	E421/EO	0.00010	mg/L	0.00072	0.00037	0.00037	0.00053	0.00047	
Copper, dissolved	7440-50-8	E421/EO	0.00020	mg/L	0.00049	0.00027	0.00052	0.00056	0.00058	
Iron, dissolved	7439-89-6	E421/EO	0.010	mg/L	0.087	0.048	0.202	0.010	0.086	
Lead, dissolved	7439-92-1	E421/EO	0.000050	mg/L	0.000052	<0.000050	0.000058	<0.000050	<0.000100	DLDS
Lithium, dissolved	7439-93-2	E421/EO	0.0010	mg/L	0.0278	0.0200	0.0134	0.0487	0.0238	
Magnesium, dissolved	7439-95-4	E421/EO	0.0050	mg/L	22.7	18.9	9.62	50.5	50.8	
Manganese, dissolved	7439-96-5	E421/EO	0.00010	mg/L	0.229	0.0994	0.105	0.00433	0.0770	
Mercury, dissolved	7439-97-6	E509/EO	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum, dissolved	7439-98-7	E421/EO	0.000050	mg/L	0.00113	0.000545	0.000683	0.000679	0.000474	
Nickel, dissolved	7440-02-0	E421/EO	0.00050	mg/L	0.00387	0.00246	0.00256	0.00316	0.00199	
Phosphorus, dissolved	7723-14-0	E421/EO	0.050	mg/L	1.27	0.195	0.204	0.399	1.28	
Potassium, dissolved	7440-09-7	E421/EO	0.050	mg/L	13.0	13.8	10.9	28.1	33.8	
Rubidium, dissolved	7440-17-7	E421/EO	0.00020	mg/L	0.00152	0.00136	0.00225	0.00222	0.00397	
Selenium, dissolved	7782-49-2	E421/EO	0.000050	mg/L	0.000167	0.000195	0.000225	0.000185	0.000161	
Silicon, dissolved	7440-21-3	E421/EO	0.050	mg/L	1.84	0.195	6.77	3.05	4.00	
Silver, dissolved	7440-22-4	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	DLDS
Sodium, dissolved	7440-23-5	E421/EO	0.050	mg/L	219	142	44.9	250	319	
Strontium, dissolved	7440-24-6	E421/EO	0.00020	mg/L	0.460	0.354	0.171	0.640	0.517	
Sulfur, dissolved	7704-34-9	E421/EO	0.50	mg/L	52.3	44.1	8.18	107	102	
Tellurium, dissolved	13494-80-9	E421/EO	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00040	DLDS



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	16 Beaver County D.1	19 Winsnes D.1	20 Balash D.1	21 Balash D.2	22 Balash D.3
Client sampling date / time					16-Oct-2023 15:30	16-Oct-2023 18:15	16-Oct-2023 15:00	16-Oct-2023 14:15	16-Oct-2023 14:30	
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-011	EO2309502-012	EO2309502-013	EO2309502-014	EO2309502-015	
					Result	Result	Result	Result	Result	
Dissolved Metals										
Thallium, dissolved	7440-28-0	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020 ^{DLDS}	
Thorium, dissolved	7440-29-1	E421/EO	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020 ^{DLDS}	
Tin, dissolved	7440-31-5	E421/EO	0.00010	mg/L	<0.00010	0.00024	<0.00010	0.00105	0.00182	
Titanium, dissolved	7440-32-6	E421/EO	0.00030	mg/L	<0.00030	<0.00030	0.00060	<0.00030	<0.00060 ^{DLDS}	
Tungsten, dissolved	7440-33-7	E421/EO	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020 ^{DLDS}	
Uranium, dissolved	7440-61-1	E421/EO	0.000010	mg/L	0.00126	0.000849	0.000122	0.00210	0.000809	
Vanadium, dissolved	7440-62-2	E421/EO	0.00050	mg/L	0.00317	0.00155	0.00096	0.00132	0.00138	
Zinc, dissolved	7440-66-6	E421/EO	0.0010	mg/L	0.0012	<0.0010	0.0017	<0.0010	<0.0020 ^{DLDS}	
Zirconium, dissolved	7440-67-7	E421/EO	0.00020	mg/L	0.00055	0.00035	0.00058	0.00022	<0.00040 ^{DLDS}	
Dissolved mercury filtration location	----	EP509/EO	-	-	Field	Field	Field	Field	Field	
Dissolved metals filtration location	----	EP421/EO	-	-	Field	Field	Field	Field	Field	
Aggregate Organics										
Chemical oxygen demand [COD]	----	E559-L/EO	10	mg/L	132	203	116	90 ^{DLM}	112 ^{DLM}	
Phenols, total (4AAP)	----	E562/EO	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Volatile Organic Compounds										
Benzene	71-43-2	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	100-41-4	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Styrene	100-42-5	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Toluene	108-88-3	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Xylene, m+p-	179601-23-1	E611A/EO	0.00040	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	
Xylene, o-	95-47-6	E611A/EO	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
Xylenes, total	1330-20-7	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Hydrocarbons										
F1 (C6-C10)	----	E581.F1/EO	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
F2 (C10-C16)	----	E601/EO	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
F1-BTEX	----	EC580/EO	0.100	mg/L	<0.100	<0.100	<0.100	<0.100	<0.100	
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/EO	1.0	%	95.0	99.9	95.1	107	96.2	
Dichlorotoluene, 3,4-	95-75-0	E581.F1/EO	1.0	%	76.4	81.2	91.3	93.0	95.8	
Volatile Organic Compounds Surrogates										



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	16 Beaver County D.1	19 Winsnes D.1	20 Balash D.1	21 Balash D.2	22 Balash D.3
Client sampling date / time					16-Oct-2023 15:30	16-Oct-2023 18:15	16-Oct-2023 15:00	16-Oct-2023 14:15	16-Oct-2023 14:30	
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-011	EO2309502-012	EO2309502-013	EO2309502-014	EO2309502-015	
Volatile Organic Compounds Surrogates					Result	Result	Result	Result	Result	
Bromofluorobenzene, 4-	460-00-4	E611A/EO	1.0	%	79.9	72.1	77.6	82.1	78.2	
Difluorobenzene, 1,4-	540-36-3	E611A/EO	1.0	%	99.4	103	102	101	106	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					21 D.Lyons D.1	6 B.Lyons D.1	7 B.Lyons D.2	8 B.Lyons D.3	9 B.Lyons D.4
Client sampling date / time					17-Oct-2023 12:45	17-Oct-2023 10:30	17-Oct-2023 10:45	17-Oct-2023 11:15	17-Oct-2023 11:40
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-016	EO2309502-017	EO2309502-018	EO2309502-019	EO2309502-020
					Result	Result	Result	Result	Result
Physical Tests									
Hardness (as CaCO3), dissolved	----	EC100/EO	0.50	mg/L	66.4	74.0	75.0	158	116
Solids, total dissolved [TDS]	----	E162/EO	10	mg/L	358	286	308	571	468
Solids, total suspended [TSS]	----	E160/EO	3.0	mg/L	24.0	17.8	25.2	176	44.0
Conductivity	----	E100/CG	2.0	µS/cm	541	419	455	896	660
pH	----	E108/CG	0.10	pH units	8.35	7.95	7.95	8.61	8.49
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L	294	185	233	373	385
Alkalinity, carbonate (as CO3)	3812-32-6	E290/CG	1.0	mg/L	4.9	<1.0	<1.0	14.9	10.2
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/CG	2.0	mg/L	250	152	191	331	332
Solids, total dissolved [TDS], calculated	----	EC103/EO	1.0	mg/L	354	276	291	567	429
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/EO	0.0050	mg/L	0.403	0.241	0.204	0.0594	0.105
Kjeldahl nitrogen, total [TKN]	----	E318/EO	0.050	mg/L	3.43	3.74	4.45	3.15	3.90
Phosphorus, total	7723-14-0	E372-S/EO	0.0010	mg/L	0.440	1.78	1.68	0.536	1.27
Chloride	16887-00-6	E235.Cl/EO	0.50	mg/L	10.8	11.2	15.0	18.0	17.2
Fluoride	16984-48-8	E235.F/EO	0.020	mg/L	0.277	0.161	0.180	0.591	0.388
Nitrate (as N)	14797-55-8	E235.NO3/EO	0.020	mg/L	0.165	<0.020	0.024	<0.020	0.112
Nitrite (as N)	14797-65-0	E235.NO2/EO	0.010	mg/L	0.021	<0.010	<0.010	<0.010	<0.010
Sulfate (as SO4)	14808-79-8	E235.SO4/EO	0.30	mg/L	21.3	36.0	19.5	122	4.85
Nitrate + Nitrite (as N)	----	EC235.N+N/E O	0.0500	mg/L	0.186	<0.0500	<0.0500	<0.0500	0.112
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	E358-L/CG	0.50	mg/L	32.8	30.2	29.6	27.6	43.6
Ion Balance									
Anion sum	----	EC101/EO	0.10	meq/L	5.77	4.11	4.66	9.69	7.25
Cation sum	----	EC101/EO	0.10	meq/L	5.86	4.24	4.63	9.18	7.01
Ion balance (APHA)	----	EC101/EO	0.01	%	0.77	1.56	-0.32	-2.70	-1.68
Ion balance (cations/anions)	----	EC101/EO	0.010	%	102	103	99.4	94.7	96.7
Dissolved Metals									
Aluminum, dissolved	7429-90-5	E421/EO	0.0010	mg/L	0.137	0.0067	0.0043	0.0046	0.0467



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					21 D.Lyons D.1	6 B.Lyons D.1	7 B.Lyons D.2	8 B.Lyons D.3	9 B.Lyons D.4
Client sampling date / time					17-Oct-2023 12:45	17-Oct-2023 10:30	17-Oct-2023 10:45	17-Oct-2023 11:15	17-Oct-2023 11:40
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-016	EO2309502-017	EO2309502-018	EO2309502-019	EO2309502-020
					Result	Result	Result	Result	Result
Dissolved Metals									
Antimony, dissolved	7440-36-0	E421/EO	0.00010	mg/L	0.00014	0.00011	0.00012	0.00035	0.00029
Arsenic, dissolved	7440-38-2	E421/EO	0.00010	mg/L	0.00469	0.00516	0.00422	0.00360	0.00467
Barium, dissolved	7440-39-3	E421/EO	0.00010	mg/L	0.0473	0.0276	0.00746	0.0418	0.0348
Beryllium, dissolved	7440-41-7	E421/EO	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/EO	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/EO	0.010	mg/L	0.051	0.058	0.046	0.059	0.056
Cadmium, dissolved	7440-43-9	E421/EO	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000064
Calcium, dissolved	7440-70-2	E421/EO	0.050	mg/L	15.0	17.2	18.5	34.9	25.2
Cesium, dissolved	7440-46-2	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, dissolved	7440-47-3	E421/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	7440-48-4	E421/EO	0.00010	mg/L	0.00056	0.00052	0.00027	0.00134	0.00101
Copper, dissolved	7440-50-8	E421/EO	0.00020	mg/L	0.00105	0.00037	0.00038	0.00306	0.00172
Iron, dissolved	7439-89-6	E421/EO	0.010	mg/L	0.241	0.467	0.131	0.022	0.278
Lead, dissolved	7439-92-1	E421/EO	0.000050	mg/L	0.000105	0.000080	<0.000050	0.000051	0.000111
Lithium, dissolved	7439-93-2	E421/EO	0.0010	mg/L	0.0249	0.0099	0.0097	0.0160	0.0192
Magnesium, dissolved	7439-95-4	E421/EO	0.0050	mg/L	7.02	7.54	6.99	17.2	12.9
Manganese, dissolved	7439-96-5	E421/EO	0.00010	mg/L	0.0372	0.119	0.00983	0.0235	0.0273
Mercury, dissolved	7439-97-6	E509/EO	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/EO	0.000050	mg/L	0.000758	0.000750	0.000500	0.00625	0.00203
Nickel, dissolved	7440-02-0	E421/EO	0.00050	mg/L	0.00364	0.00274	0.00201	0.00808	0.00649
Phosphorus, dissolved	7723-14-0	E421/EO	0.050	mg/L	0.345	1.37	1.19	0.054	0.397
Potassium, dissolved	7440-09-7	E421/EO	0.050	mg/L	19.7	16.2	18.0	17.7	23.5
Rubidium, dissolved	7440-17-7	E421/EO	0.00020	mg/L	0.00183	0.00186	0.00179	0.00090	0.00109
Selenium, dissolved	7782-49-2	E421/EO	0.000050	mg/L	0.000230	0.000184	0.000155	0.000608	0.000396
Silicon, dissolved	7440-21-3	E421/EO	0.050	mg/L	1.44	4.73	2.79	0.759	2.82
Silver, dissolved	7440-22-4	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/EO	0.050	mg/L	91.5	53.0	61.0	128	93.6
Strontium, dissolved	7440-24-6	E421/EO	0.00020	mg/L	0.156	0.138	0.145	0.374	0.187
Sulfur, dissolved	7704-34-9	E421/EO	0.50	mg/L	9.23	14.5	8.52	44.5	3.32
Tellurium, dissolved	13494-80-9	E421/EO	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					21 D.Lyons D.1	6 B.Lyons D.1	7 B.Lyons D.2	8 B.Lyons D.3	9 B.Lyons D.4
Client sampling date / time					17-Oct-2023 12:45	17-Oct-2023 10:30	17-Oct-2023 10:45	17-Oct-2023 11:15	17-Oct-2023 11:40
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-016	EO2309502-017	EO2309502-018	EO2309502-019	EO2309502-020
					Result	Result	Result	Result	Result
Dissolved Metals									
Thallium, dissolved	7440-28-0	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, dissolved	7440-29-1	E421/EO	0.00010	mg/L	<0.00010	<0.00010	0.00010	<0.00010	<0.00010
Tin, dissolved	7440-31-5	E421/EO	0.00010	mg/L	0.00018	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/EO	0.00030	mg/L	0.00634	0.00110	0.00040	<0.00030	0.00242
Tungsten, dissolved	7440-33-7	E421/EO	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, dissolved	7440-61-1	E421/EO	0.000010	mg/L	0.000569	0.000116	0.000138	0.00441	0.00124
Vanadium, dissolved	7440-62-2	E421/EO	0.00050	mg/L	0.00179	0.00176	0.00126	0.00183	0.00302
Zinc, dissolved	7440-66-6	E421/EO	0.0010	mg/L	0.0036	<0.0010	0.0031	<0.0010	0.0010
Zirconium, dissolved	7440-67-7	E421/EO	0.00020	mg/L	0.00069	0.00064	0.00038	0.00074	0.00092
Dissolved mercury filtration location	----	EP509/EO	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/EO	-	-	Field	Field	Field	Field	Field
Aggregate Organics									
Chemical oxygen demand [COD]	----	E559-L/EO	10	mg/L	101	84	90	113	111
Phenols, total (4AAP)	----	E562/EO	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Volatile Organic Compounds									
Benzene	71-43-2	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	100-41-4	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	100-42-5	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	108-88-3	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylene, m+p-	179601-23-1	E611A/EO	0.00040	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Xylene, o-	95-47-6	E611A/EO	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Xylenes, total	1330-20-7	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Hydrocarbons									
F1 (C6-C10)	----	E581.F1/EO	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
F2 (C10-C16)	----	E601/EO	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
F1-BTEX	----	EC580/EO	0.100	mg/L	<0.100	<0.100	<0.100	<0.100	<0.100
Hydrocarbons Surrogates									
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/EO	1.0	%	96.4	96.8	97.2	97.1	98.6
Dichlorotoluene, 3,4-	95-75-0	E581.F1/EO	1.0	%	79.5	81.9	70.6	83.6	82.6
Volatile Organic Compounds Surrogates									



Analytical Results

Sub-Matrix: Water					Client sample ID	21 D.Lyons D.1	6 B.Lyons D.1	7 B.Lyons D.2	8 B.Lyons D.3	9 B.Lyons D.4
(Matrix: Water)					Client sampling date / time	17-Oct-2023 12:45	17-Oct-2023 10:30	17-Oct-2023 10:45	17-Oct-2023 11:15	17-Oct-2023 11:40
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-016	EO2309502-017	EO2309502-018	EO2309502-019	EO2309502-020	
Volatile Organic Compounds Surrogates					Result	Result	Result	Result	Result	
Bromofluorobenzene, 4-	460-00-4	E611A/EO	1.0	%	81.4	76.2	77.7	79.0	110	
Difluorobenzene, 1,4-	540-36-3	E611A/EO	1.0	%	102	104	99.8	102	111	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Analytical Results

Sub-Matrix: Water					Client sample ID	9A B.Lyons D.5	DUP 01	Dup 02	----	----
(Matrix: Water)					Client sampling date / time	17-Oct-2023 12:00	17-Oct-2023 00:00	17-Oct-2023 00:00	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-021	EO2309502-022	EO2309502-023	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
Hardness (as CaCO3), dissolved	---	EC100/EO	0.50	mg/L	110	89.3	90.4	----	----	
Solids, total dissolved [TDS]	---	E162/EO	10	mg/L	398	442	490	----	----	
Solids, total suspended [TSS]	---	E160/EO	3.0	mg/L	28.6	92.2	20.8	----	----	
Conductivity	---	E100/CG	2.0	µS/cm	602	546	765	----	----	
pH	---	E108/CG	0.10	pH units	8.47	8.23	8.39	----	----	
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L	347	309	342	----	----	
Alkalinity, carbonate (as CO3)	3812-32-6	E290/CG	1.0	mg/L	8.5	<1.0	6.1	----	----	
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L	<1.0	<1.0	<1.0	----	----	
Alkalinity, total (as CaCO3)	----	E290/CG	2.0	mg/L	298	253	290	----	----	
Solids, total dissolved [TDS], calculated	----	EC103/EO	1.0	mg/L	385	389	461	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/EO	0.0050	mg/L	0.100	0.890	0.127	----	----	
Kjeldahl nitrogen, total [TKN]	---	E318/EO	0.050	mg/L	2.57	6.29	4.06	----	----	
Phosphorus, total	7723-14-0	E372-S/EO	0.0010	mg/L	0.172	2.94	0.619	----	----	
Chloride	16887-00-6	E235.Cl/EO	0.50	mg/L	7.94	20.9	34.6	----	----	
Fluoride	16984-48-8	E235.F/EO	0.020	mg/L	0.280	0.342	0.285	----	----	
Nitrate (as N)	14797-55-8	E235.NO3/EO	0.020	mg/L	0.021	0.518	<0.020	----	----	
Nitrite (as N)	14797-65-0	E235.NO2/EO	0.010	mg/L	<0.010	0.070	<0.010	----	----	
Sulfate (as SO4)	14808-79-8	E235.SO4/EO	0.30	mg/L	23.9	4.23	50.8	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/E O	0.0500	mg/L	<0.0500	0.588	<0.0500	----	----	
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	---	E358-L/CG	0.50	mg/L	31.1	52.8	26.3	----	----	
Ion Balance										
Anion sum	---	EC101/EO	0.10	meq/L	6.69	5.79	7.84	----	----	
Cation sum	---	EC101/EO	0.10	meq/L	6.57	6.01	7.76	----	----	
Ion balance (APHA)	---	EC101/EO	0.01	%	-0.90	1.86	-0.51	----	----	
Ion balance (cations/anions)	---	EC101/EO	0.010	%	98.2	104	99.0	----	----	
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/EO	0.0010	mg/L	0.0068	0.418	0.0016	----	----	



Analytical Results

Sub-Matrix: Water					Client sample ID	9A B.Lyons D.5	DUP 01	Dup 02	----	----
(Matrix: Water)					Client sampling date / time	17-Oct-2023 12:00	17-Oct-2023 00:00	17-Oct-2023 00:00	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-021	EO2309502-022	EO2309502-023	-----	-----	
					Result	Result	Result	----	----	
Dissolved Metals										
Antimony, dissolved	7440-36-0	E421/EO	0.00010	mg/L	0.00020	0.00021	0.00018	----	----	
Arsenic, dissolved	7440-38-2	E421/EO	0.00010	mg/L	0.00296	0.00850	0.00656	----	----	
Barium, dissolved	7440-39-3	E421/EO	0.00010	mg/L	0.0626	0.0892	0.0486	----	----	
Beryllium, dissolved	7440-41-7	E421/EO	0.000020	mg/L	<0.000020	0.000065	<0.000020	----	----	
Bismuth, dissolved	7440-69-9	E421/EO	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Boron, dissolved	7440-42-8	E421/EO	0.010	mg/L	0.029	0.052	0.050	----	----	
Cadmium, dissolved	7440-43-9	E421/EO	0.0000050	mg/L	<0.0000050	0.0000381	0.0000061	----	----	
Calcium, dissolved	7440-70-2	E421/EO	0.050	mg/L	24.3	21.0	20.4	----	----	
Cesium, dissolved	7440-46-2	E421/EO	0.000010	mg/L	<0.000010	0.000022	<0.000010	----	----	
Chromium, dissolved	7440-47-3	E421/EO	0.00050	mg/L	<0.00050	0.00073	<0.00050	----	----	
Cobalt, dissolved	7440-48-4	E421/EO	0.00010	mg/L	0.00043	0.00201	0.00032	----	----	
Copper, dissolved	7440-50-8	E421/EO	0.00020	mg/L	0.00088	0.00291	0.00040	----	----	
Iron, dissolved	7439-89-6	E421/EO	0.010	mg/L	0.241	4.14	0.134	----	----	
Lead, dissolved	7439-92-1	E421/EO	0.000050	mg/L	0.000177	0.00206	0.000074	----	----	
Lithium, dissolved	7439-93-2	E421/EO	0.0010	mg/L	0.0133	0.0113	0.0358	----	----	
Magnesium, dissolved	7439-95-4	E421/EO	0.0050	mg/L	11.9	8.95	9.58	----	----	
Manganese, dissolved	7439-96-5	E421/EO	0.00010	mg/L	0.00360	0.0890	0.00528	----	----	
Mercury, dissolved	7439-97-6	E509/EO	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
Molybdenum, dissolved	7439-98-7	E421/EO	0.000050	mg/L	0.00103	0.00251	0.000969	----	----	
Nickel, dissolved	7440-02-0	E421/EO	0.00050	mg/L	0.00500	0.00881	0.00345	----	----	
Phosphorus, dissolved	7723-14-0	E421/EO	0.050	mg/L	0.058	1.69	0.319	----	----	
Potassium, dissolved	7440-09-7	E421/EO	0.050	mg/L	14.4	29.2	12.7	----	----	
Rubidium, dissolved	7440-17-7	E421/EO	0.00020	mg/L	0.00153	0.00226	0.00132	----	----	
Selenium, dissolved	7782-49-2	E421/EO	0.000050	mg/L	0.000225	0.000433	0.000155	----	----	
Silicon, dissolved	7440-21-3	E421/EO	0.050	mg/L	0.192	6.33	0.996	----	----	
Silver, dissolved	7440-22-4	E421/EO	0.000010	mg/L	<0.000010	0.000011	<0.000010	----	----	
Sodium, dissolved	7440-23-5	E421/EO	0.050	mg/L	91.8	73.9	129	----	----	
Strontium, dissolved	7440-24-6	E421/EO	0.00020	mg/L	0.185	0.148	0.214	----	----	
Sulfur, dissolved	7704-34-9	E421/EO	0.50	mg/L	10.0	2.85	20.8	----	----	
Tellurium, dissolved	13494-80-9	E421/EO	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	



Analytical Results

Sub-Matrix: Water					Client sample ID	9A B.Lyons D.5	DUP 01	Dup 02	----	----
(Matrix: Water)					Client sampling date / time	17-Oct-2023 12:00	17-Oct-2023 00:00	17-Oct-2023 00:00	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-021	EO2309502-022	EO2309502-023	-----	-----	
					Result	Result	Result	----	----	
Dissolved Metals										
Thallium, dissolved	7440-28-0	E421/EO	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Thorium, dissolved	7440-29-1	E421/EO	0.00010	mg/L	<0.00010	0.00021	<0.00010	----	----	
Tin, dissolved	7440-31-5	E421/EO	0.00010	mg/L	0.00017	<0.00010	<0.00010	----	----	
Titanium, dissolved	7440-32-6	E421/EO	0.00030	mg/L	0.00109	0.0157	0.00049	----	----	
Tungsten, dissolved	7440-33-7	E421/EO	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Uranium, dissolved	7440-61-1	E421/EO	0.000010	mg/L	0.000756	0.00152	0.000470	----	----	
Vanadium, dissolved	7440-62-2	E421/EO	0.00050	mg/L	0.00070	0.00780	0.00118	----	----	
Zinc, dissolved	7440-66-6	E421/EO	0.0010	mg/L	0.0012	0.0045	<0.0010	----	----	
Zirconium, dissolved	7440-67-7	E421/EO	0.00020	mg/L	0.00086	0.00256	0.00056	----	----	
Dissolved mercury filtration location	----	EP509/EO	-	-	Field	Field	Field	----	----	
Dissolved metals filtration location	----	EP421/EO	-	-	Field	Field	Field	----	----	
Aggregate Organics										
Chemical oxygen demand [COD]	----	E559-L/EO	10	mg/L	100	134 ^{RRV}	67	----	----	
Phenols, total (4AAP)	----	E562/EO	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
Volatile Organic Compounds										
Benzene	71-43-2	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
Ethylbenzene	100-41-4	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
Styrene	100-42-5	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
Toluene	108-88-3	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
Xylene, m+p-	179601-23-1	E611A/EO	0.00040	mg/L	<0.00040	<0.00040	<0.00040	----	----	
Xylene, o-	95-47-6	E611A/EO	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	----	
Xylenes, total	1330-20-7	E611A/EO	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
Hydrocarbons										
F1 (C6-C10)	----	E581.F1/EO	0.10	mg/L	<0.10	<0.10	<0.10	----	----	
F2 (C10-C16)	----	E601/EO	0.10	mg/L	<0.10	<0.10	<0.10	----	----	
F1-BTEX	----	EC580/EO	0.100	mg/L	<0.100	<0.100	<0.100	----	----	
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/EO	1.0	%	99.7	98.0	99.9	----	----	
Dichlorotoluene, 3,4-	95-75-0	E581.F1/EO	1.0	%	91.6	84.2	84.5	----	----	
Volatile Organic Compounds Surrogates										



Analytical Results

Sub-Matrix: Water					Client sample ID	9A B.Lyons D.5	DUP 01	Dup 02	----	----
(Matrix: Water)					Client sampling date / time	17-Oct-2023 12:00	17-Oct-2023 00:00	17-Oct-2023 00:00	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	EO2309502-021	EO2309502-022	EO2309502-023	-----	-----	
Volatile Organic Compounds Surrogates					Result	Result	Result	----	----	
Bromofluorobenzene, 4-	460-00-4	E611A/EO	1.0	%	107	106	101	----	----	
Difluorobenzene, 1,4-	540-36-3	E611A/EO	1.0	%	109	111	110	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2309502</p> <p>Amendment : 1</p> <p>Client : Tetra Tech Canada Inc.</p> <p>Contact : Brent Finnestad</p> <p>Address : North Building 14940 123 Ave NW Edmonton AB Canada T5V 1B4</p> <p>Telephone : 780-718-9317</p> <p>Project : 704-SWM.SWOP04810-01</p> <p>PO : 704-SWM.SWOP04810-01</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : EO23-EBAE100-006 (Q83988)</p> <p>No. of samples received : 23</p> <p>No. of samples analysed : 23</p>	<p>Page : 1 of 64</p> <p>Laboratory : ALS Environmental - Edmonton</p> <p>Account Manager : Kieran Tordoff</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 17-Oct-2023 15:36</p> <p>Issue Date : 02-Nov-2023 14:52</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Anions and Nutrients	Anonymous	Anonymous	Chloride	16887-00-6	E235.Cl	54.2 %	20%	Duplicate RPD does not meet the DQO for this test.
Laboratory Control Sample (LCS) Recoveries								
Dissolved Metals	QC-1197253-002	----	Iron, dissolved	7439-89-6	E421	121 % ^{MES}	80.0-120%	Recovery greater than upper control limit
Dissolved Metals	QC-1197253-002	----	Potassium, dissolved	7440-09-7	E421	121 % ^{MES}	80.0-120%	Recovery greater than upper control limit
Dissolved Metals	QC-1197253-002	----	Selenium, dissolved	7782-49-2	E421	129 % ^{MES}	80.0-120%	Recovery greater than upper control limit
Dissolved Metals	QC-1197254-002	----	Selenium, dissolved	7782-49-2	E421	130 % ^{MES}	80.0-120%	Recovery greater than upper control limit
Dissolved Metals	QC-1197253-002	----	Sodium, dissolved	7440-23-5	E421	122 % ^{MES}	80.0-120%	Recovery greater than upper control limit
Dissolved Metals	QC-1197254-002	----	Sulfur, dissolved	7704-34-9	E421	122 % ^{MES}	80.0-120%	Recovery greater than upper control limit
Dissolved Metals	QC-1197254-002	----	Zinc, dissolved	7440-66-6	E421	124 % ^{MES}	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 21 D.Lyons D.1	E559-L	17-Oct-2023	---	---	---		19-Oct-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 6 B.Lyons D.1	E559-L	17-Oct-2023	---	---	---		19-Oct-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 7 B.Lyons D.2	E559-L	17-Oct-2023	---	---	---		19-Oct-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 8 B.Lyons D.3	E559-L	17-Oct-2023	---	---	---		19-Oct-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 9 B.Lyons D.4	E559-L	17-Oct-2023	---	---	---		19-Oct-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 9A B.Lyons D.5	E559-L	17-Oct-2023	---	---	---		19-Oct-2023	28 days	2 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 10 Magneson D.1	E559-L	16-Oct-2023	---	---	---		19-Oct-2023	28 days	3 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 11 Magneson D.2	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 13 Magneson D.4	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 14 Magneson D.5	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 15 Magneson D.6	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 16 Beaver County D.1	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 19 Winsnes D.1	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 1Booth D.1	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 2 Ewert D.1	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 20 Balash D.1	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 21 Balash D.2	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 22 Balash D.3	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 3 Ewert D.2	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 4 Ewert D.3	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) 5 Ewert D.4	E559-L	16-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) DUP 01	E559-L	17-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Dup 02	E559-L	17-Oct-2023	----	----	----		19-Oct-2023	28 days	3 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 21 D.Lyons D.1	E562	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 6 B.Lyons D.1	E562	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 7 B.Lyons D.2	E562	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 8 B.Lyons D.3	E562	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 9 B.Lyons D.4	E562	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 9A B.Lyons D.5	E562	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 10 Magneson D.1	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 11 Magneson D.2	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 13 Magneson D.4	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 14 Magneson D.5	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 15 Magneson D.6	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 16 Beaver County D.1	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 19 Winsnes D.1	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 1Booth D.1	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 2 Ewert D.1	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 20 Balash D.1	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 21 Balash D.2	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 22 Balash D.3	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 3 Ewert D.2	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 4 Ewert D.3	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 5 Ewert D.4	E562	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) DUP 01	E562	17-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) Dup 02	E562	17-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 21 D.Lyons D.1	E298	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 6 B.Lyons D.1	E298	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 7 B.Lyons D.2	E298	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 8 B.Lyons D.3	E298	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 9 B.Lyons D.4	E298	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 9A B.Lyons D.5	E298	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 10 Magneson D.1	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 11 Magneson D.2	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 13 Magneson D.4	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 14 Magneson D.5	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 15 Magneson D.6	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 16 Beaver County D.1	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 19 Winsnes D.1	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 1Booth D.1	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 2 Ewert D.1	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 20 Balash D.1	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 21 Balash D.2	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 22 Balash D.3	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 3 Ewert D.2	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 4 Ewert D.3	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) 5 Ewert D.4	E298	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP 01	E298	17-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Dup 02	E298	17-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 21 D.Lyons D.1	E235.Cl	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE 6 B.Lyons D.1	E235.Cl	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE 7 B.Lyons D.2	E235.Cl	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE 8 B.Lyons D.3	E235.Cl	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE 9 B.Lyons D.4	E235.Cl	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE 9A B.Lyons D.5	E235.Cl	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE 10 Magneson D.1	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE 11 Magneson D.2	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE 13 Magneson D.4	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE 14 Magneson D.5	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE 15 Magneson D.6	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 16 Beaver County D.1	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 19 Winsnes D.1	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 1Booth D.1	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 2 Ewert D.1	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 20 Balash D.1	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 21 Balash D.2	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 22 Balash D.3	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 3 Ewert D.2	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE 4 Ewert D.3	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE 5 Ewert D.4	E235.Cl	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE DUP 01	E235.Cl	17-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Dup 02	E235.Cl	17-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE 21 D.Lyons D.1	E235.F	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE 6 B.Lyons D.1	E235.F	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE 7 B.Lyons D.2	E235.F	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE 8 B.Lyons D.3	E235.F	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE 9 B.Lyons D.4	E235.F	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE 9A B.Lyons D.5	E235.F	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 10 Magneson D.1	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 11 Magneson D.2	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 13 Magneson D.4	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 14 Magneson D.5	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 15 Magneson D.6	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 16 Beaver County D.1	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 19 Winsnes D.1	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 1Booth D.1	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE 2 Ewert D.1	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 20 Balash D.1	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 21 Balash D.2	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 22 Balash D.3	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 3 Ewert D.2	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 4 Ewert D.3	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE 5 Ewert D.4	E235.F	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE DUP 01	E235.F	17-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Dup 02	E235.F	17-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE 21 D.Lyons D.1	E235.NO3	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 6 B.Lyons D.1	E235.NO3	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 7 B.Lyons D.2	E235.NO3	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 8 B.Lyons D.3	E235.NO3	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 9 B.Lyons D.4	E235.NO3	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 9A B.Lyons D.5	E235.NO3	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 10 Magneson D.1	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 11 Magneson D.2	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 13 Magneson D.4	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE 14 Magneson D.5	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 15 Magneson D.6	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 16 Beaver County D.1	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 19 Winsnes D.1	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 1Booth D.1	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 2 Ewert D.1	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 20 Balash D.1	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 21 Balash D.2	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 22 Balash D.3	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC											
HDPE 3 Ewert D.2	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 4 Ewert D.3	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE 5 Ewert D.4	E235.NO3	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE DUP 01	E235.NO3	17-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC											
HDPE Dup 02	E235.NO3	17-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 21 D.Lyons D.1	E235.NO2	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 6 B.Lyons D.1	E235.NO2	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 7 B.Lyons D.2	E235.NO2	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 8 B.Lyons D.3	E235.NO2	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE 9 B.Lyons D.4	E235.NO2	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 9A B.Lyons D.5	E235.NO2	17-Oct-2023	19-Oct-2023	3 days	2 days	✔	19-Oct-2023	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 10 Magneson D.1	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 11 Magneson D.2	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 13 Magneson D.4	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 14 Magneson D.5	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 15 Magneson D.6	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 16 Beaver County D.1	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 19 Winsnes D.1	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE 1Booth D.1	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 2 Ewert D.1	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 20 Balash D.1	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 21 Balash D.2	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 22 Balash D.3	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 3 Ewert D.2	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 4 Ewert D.3	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE 5 Ewert D.4	E235.NO2	16-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC											
HDPE DUP 01	E235.NO2	17-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC											
HDPE Dup 02	E235.NO2	17-Oct-2023	19-Oct-2023	3 days	3 days	✔	19-Oct-2023	3 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 21 D.Lyons D.1	E235.SO4	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 6 B.Lyons D.1	E235.SO4	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 7 B.Lyons D.2	E235.SO4	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 8 B.Lyons D.3	E235.SO4	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 9 B.Lyons D.4	E235.SO4	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 9A B.Lyons D.5	E235.SO4	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 10 Magneson D.1	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 11 Magneson D.2	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Sulfate in Water by IC											
HDPE 13 Magneson D.4	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 14 Magneson D.5	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 15 Magneson D.6	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 16 Beaver County D.1	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 19 Winsnes D.1	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 1Booth D.1	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 2 Ewert D.1	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 20 Balash D.1	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 21 Balash D.2	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Sulfate in Water by IC											
HDPE 22 Balash D.3	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 3 Ewert D.2	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 4 Ewert D.3	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 5 Ewert D.4	E235.SO4	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE DUP 01	E235.SO4	17-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Dup 02	E235.SO4	17-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 21 D.Lyons D.1	E318	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 6 B.Lyons D.1	E318	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 7 B.Lyons D.2	E318	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) 8 B.Lyons D.3	E318	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) 9 B.Lyons D.4	E318	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) 9A B.Lyons D.5	E318	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	2 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) DUP 01	E318	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Dup 02	E318	17-Oct-2023	19-Oct-2023	28 days	2 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) 10 Magneson D.1	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) 11 Magneson D.2	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) 13 Magneson D.4	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) 14 Magneson D.5	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 15 Magneson D.6	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 16 Beaver County D.1	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 19 Winsnes D.1	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 1Booth D.1	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 2 Ewert D.1	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 20 Balash D.1	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 21 Balash D.2	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 22 Balash D.3	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 3 Ewert D.2	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 4 Ewert D.3	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 5 Ewert D.4	E318	16-Oct-2023	19-Oct-2023	28 days	3 days	✔	19-Oct-2023	28 days	3 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) 21 D.Lyons D.1	E372-S	17-Oct-2023	01-Nov-2023	28 days	15 days	✔	01-Nov-2023	28 days	15 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) 6 B.Lyons D.1	E372-S	17-Oct-2023	01-Nov-2023	28 days	15 days	✔	01-Nov-2023	28 days	15 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) 7 B.Lyons D.2	E372-S	17-Oct-2023	01-Nov-2023	28 days	15 days	✔	01-Nov-2023	28 days	15 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) 8 B.Lyons D.3	E372-S	17-Oct-2023	01-Nov-2023	28 days	15 days	✔	01-Nov-2023	28 days	15 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) 9 B.Lyons D.4	E372-S	17-Oct-2023	01-Nov-2023	28 days	15 days	✔	01-Nov-2023	28 days	15 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) 9A B.Lyons D.5	E372-S	17-Oct-2023	01-Nov-2023	28 days	15 days	✔	01-Nov-2023	28 days	15 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)											
Amber glass total (sulfuric acid) DUP 01	E372-S	17-Oct-2023	01-Nov-2023	28 days	15 days	✔	01-Nov-2023	28 days	16 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) Dup 02	E372-S	17-Oct-2023	01-Nov-2023	28 days	15 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 10 Magneson D.1	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 11 Magneson D.2	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 13 Magneson D.4	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 14 Magneson D.5	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 15 Magneson D.6	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 16 Beaver County D.1	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 19 Winsnes D.1	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 1Booth D.1	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 2 Ewert D.1	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 20 Balash D.1	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 21 Balash D.2	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 22 Balash D.3	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 3 Ewert D.2	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 4 Ewert D.3	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.001 mg/L)										
Amber glass total (sulfuric acid) 5 Ewert D.4	E372-S	16-Oct-2023	01-Nov-2023	28 days	16 days	✔	01-Nov-2023	28 days	16 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 21 D.Lyons D.1	E509	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 6 B.Lyons D.1	E509	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) 7 B.Lyons D.2	E509	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) 8 B.Lyons D.3	E509	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) 9 B.Lyons D.4	E509	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) 9A B.Lyons D.5	E509	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) DUP 01	E509	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Dup 02	E509	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) 10 Magneson D.1	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) 11 Magneson D.2	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) 13 Magneson D.4	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 14 Magneson D.5	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 15 Magneson D.6	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 16 Beaver County D.1	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 19 Winsnes D.1	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 1Booth D.1	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 2 Ewert D.1	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 20 Balash D.1	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 21 Balash D.2	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 22 Balash D.3	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 3 Ewert D.2	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 4 Ewert D.3	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) 5 Ewert D.4	E509	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) 21 D.Lyons D.1	E421	17-Oct-2023	21-Oct-2023	180 days	4 days	✔	21-Oct-2023	180 days	4 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) 6 B.Lyons D.1	E421	17-Oct-2023	21-Oct-2023	180 days	4 days	✔	21-Oct-2023	180 days	4 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) 7 B.Lyons D.2	E421	17-Oct-2023	21-Oct-2023	180 days	4 days	✔	21-Oct-2023	180 days	4 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) 8 B.Lyons D.3	E421	17-Oct-2023	21-Oct-2023	180 days	4 days	✔	21-Oct-2023	180 days	4 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) 9 B.Lyons D.4	E421	17-Oct-2023	21-Oct-2023	180 days	4 days	✔	21-Oct-2023	180 days	4 days	✔
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) 9A B.Lyons D.5	E421	17-Oct-2023	21-Oct-2023	180 days	4 days	✔	21-Oct-2023	180 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 10 Magneson D.1	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 11 Magneson D.2	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 13 Magneson D.4	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 14 Magneson D.5	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 15 Magneson D.6	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 16 Beaver County D.1	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 19 Winsnes D.1	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 1Booth D.1	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 2 Ewert D.1	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 20 Balash D.1	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 21 Balash D.2	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 22 Balash D.3	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 3 Ewert D.2	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 4 Ewert D.3	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 5 Ewert D.4	E421	16-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) DUP 01	E421	17-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Dup 02	E421	17-Oct-2023	21-Oct-2023	180 days	5 days	✔	21-Oct-2023	180 days	5 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 21 D.Lyons D.1	E581.F1	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 6 B.Lyons D.1	E581.F1	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 7 B.Lyons D.2	E581.F1	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 8 B.Lyons D.3	E581.F1	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 9 B.Lyons D.4	E581.F1	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 9A B.Lyons D.5	E581.F1	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 10 Magneson D.1	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 11 Magneson D.2	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 13 Magneson D.4	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 14 Magneson D.5	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 15 Magneson D.6	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 16 Beaver County D.1	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 19 Winsnes D.1	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 1Booth D.1	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 2 Ewert D.1	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 20 Balash D.1	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 21 Balash D.2	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 22 Balash D.3	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 3 Ewert D.2	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 4 Ewert D.3	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) 5 Ewert D.4	E581.F1	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) DUP 01	E581.F1	17-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Dup 02	E581.F1	17-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 21 D.Lyons D.1	E601	17-Oct-2023	18-Oct-2023	14 days	1 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 6 B.Lyons D.1	E601	17-Oct-2023	18-Oct-2023	14 days	1 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 7 B.Lyons D.2	E601	17-Oct-2023	18-Oct-2023	14 days	1 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 8 B.Lyons D.3	E601	17-Oct-2023	18-Oct-2023	14 days	1 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 9 B.Lyons D.4	E601	17-Oct-2023	18-Oct-2023	14 days	1 days	✔	18-Oct-2023	40 days	0 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 9A B.Lyons D.5	E601	17-Oct-2023	18-Oct-2023	14 days	1 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) DUP 01	E601	17-Oct-2023	18-Oct-2023	14 days	1 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Dup 02	E601	17-Oct-2023	18-Oct-2023	14 days	1 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 10 Magneson D.1	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 11 Magneson D.2	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 13 Magneson D.4	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 14 Magneson D.5	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 15 Magneson D.6	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 16 Beaver County D.1	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 19 Winsnes D.1	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 1Booth D.1	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 2 Ewert D.1	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 20 Balash D.1	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 21 Balash D.2	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 22 Balash D.3	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 3 Ewert D.2	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 4 Ewert D.3	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) 5 Ewert D.4	E601	16-Oct-2023	18-Oct-2023	14 days	2 days	✔	18-Oct-2023	40 days	0 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 21 D.Lyons D.1	E358-L	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 6 B.Lyons D.1	E358-L	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 7 B.Lyons D.2	E358-L	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 8 B.Lyons D.3	E358-L	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 9 B.Lyons D.4	E358-L	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 9A B.Lyons D.5	E358-L	17-Oct-2023	18-Oct-2023	28 days	1 days	✔	18-Oct-2023	28 days	1 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 10 Magneson D.1	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 11 Magneson D.2	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 13 Magneson D.4	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) 14 Magneson D.5	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) 15 Magneson D.6	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) 16 Beaver County D.1	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) 19 Winsnes D.1	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) 1Booth D.1	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) 2 Ewert D.1	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) 20 Balash D.1	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) 21 Balash D.2	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) 22 Balash D.3	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 3 Ewert D.2	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 4 Ewert D.3	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 5 Ewert D.4	E358-L	16-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) DUP 01	E358-L	17-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Dup 02	E358-L	17-Oct-2023	18-Oct-2023	28 days	2 days	✔	18-Oct-2023	28 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE 21 D.Lyons D.1	E290	17-Oct-2023	20-Oct-2023	14 days	3 days	✔	20-Oct-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE 6 B.Lyons D.1	E290	17-Oct-2023	20-Oct-2023	14 days	3 days	✔	20-Oct-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE 7 B.Lyons D.2	E290	17-Oct-2023	20-Oct-2023	14 days	3 days	✔	20-Oct-2023	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE 8 B.Lyons D.3	E290	17-Oct-2023	20-Oct-2023	14 days	3 days	✔	20-Oct-2023	14 days	3 days	✔



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Alkalinity Species by Titration											
HDPE 9 B.Lyons D.4	E290	17-Oct-2023	20-Oct-2023	14 days	3 days	✔	20-Oct-2023	14 days	3 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 9A B.Lyons D.5	E290	17-Oct-2023	20-Oct-2023	14 days	3 days	✔	20-Oct-2023	14 days	3 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 10 Magneson D.1	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 11 Magneson D.2	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 13 Magneson D.4	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 14 Magneson D.5	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 15 Magneson D.6	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 16 Beaver County D.1	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 19 Winsnes D.1	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Alkalinity Species by Titration											
HDPE 1Booth D.1	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 2 Ewert D.1	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 20 Balash D.1	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 21 Balash D.2	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 22 Balash D.3	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 3 Ewert D.2	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 4 Ewert D.3	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE 5 Ewert D.4	E290	16-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE DUP 01	E290	17-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔	



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Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE Dup 02	E290	17-Oct-2023	20-Oct-2023	14 days	4 days	✔	20-Oct-2023	14 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 21 D.Lyons D.1	E100	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE 6 B.Lyons D.1	E100	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE 7 B.Lyons D.2	E100	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE 8 B.Lyons D.3	E100	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE 9 B.Lyons D.4	E100	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE 9A B.Lyons D.5	E100	17-Oct-2023	20-Oct-2023	28 days	3 days	✔	20-Oct-2023	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE 10 Magneson D.1	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 11 Magneson D.2	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Conductivity in Water										
HDPE 13 Magneson D.4	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 14 Magneson D.5	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 15 Magneson D.6	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 16 Beaver County D.1	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 19 Winsnes D.1	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 1Booth D.1	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 2 Ewert D.1	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 20 Balash D.1	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE 21 Balash D.2	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✔	20-Oct-2023	28 days	4 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE 22 Balash D.3	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✓	20-Oct-2023	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE 3 Ewert D.2	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✓	20-Oct-2023	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE 4 Ewert D.3	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✓	20-Oct-2023	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE 5 Ewert D.4	E100	16-Oct-2023	20-Oct-2023	28 days	4 days	✓	20-Oct-2023	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE DUP 01	E100	17-Oct-2023	20-Oct-2023	28 days	4 days	✓	20-Oct-2023	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE Dup 02	E100	17-Oct-2023	20-Oct-2023	28 days	4 days	✓	20-Oct-2023	28 days	4 days	✓	
Physical Tests : pH by Meter											
HDPE 21 D.Lyons D.1	E108	17-Oct-2023	20-Oct-2023	0.25 hrs	72 hrs	* EHTR-FM	20-Oct-2023	0.25 hrs	72 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE 9 B.Lyons D.4	E108	17-Oct-2023	20-Oct-2023	0.25 hrs	73 hrs	* EHTR-FM	20-Oct-2023	0.25 hrs	73 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE 9A B.Lyons D.5	E108	17-Oct-2023	20-Oct-2023	0.25 hrs	73 hrs	* EHTR-FM	20-Oct-2023	0.25 hrs	73 hrs	* EHTR-FM	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis					
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval		
				Rec	Actual			Rec	Actual			
Physical Tests : pH by Meter												
HDPE 7 B.Lyons D.2	E108	17-Oct-2023	20-Oct-2023	0.25 hrs	74 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	74 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 8 B.Lyons D.3	E108	17-Oct-2023	20-Oct-2023	0.25 hrs	74 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	74 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 6 B.Lyons D.1	E108	17-Oct-2023	20-Oct-2023	0.25 hrs	75 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	75 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE DUP 01	E108	17-Oct-2023	20-Oct-2023	0.25 hrs	85 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	85 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE Dup 02	E108	17-Oct-2023	20-Oct-2023	0.25 hrs	85 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	85 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 1Booth D.1	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	88 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	88 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 3 Ewert D.2	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	89 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	89 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 2 Ewert D.1	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	90 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	90 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 19 Winsnes D.1	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	91 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	91 hrs	*	EHTR-FM



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis					
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval		
				Rec	Actual			Rec	Actual			
Physical Tests : pH by Meter												
HDPE 5 Ewert D.4	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	92 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	92 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 4 Ewert D.3	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	93 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	93 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 16 Beaver County D.1	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	94 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	94 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 20 Balash D.1	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	94 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	94 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 21 Balash D.2	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	95 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	95 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 22 Balash D.3	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	95 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	95 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 11 Magneson D.2	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	96 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	96 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 14 Magneson D.5	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	96 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	96 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 10 Magneson D.1	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	97 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	97 hrs	*	EHTR-FM



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis					
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval		
				Rec	Actual			Rec	Actual			
Physical Tests : pH by Meter												
HDPE 15 Magneson D.6	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	97 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	97 hrs	*	EHTR-FM
Physical Tests : pH by Meter												
HDPE 13 Magneson D.4	E108	16-Oct-2023	20-Oct-2023	0.25 hrs	98 hrs	*	EHTR-FM	20-Oct-2023	0.25 hrs	98 hrs	*	EHTR-FM
Physical Tests : TDS by Gravimetry												
HDPE 10 Magneson D.1	E162	16-Oct-2023	---	---	---			20-Oct-2023	7 days	4 days	✓	
Physical Tests : TDS by Gravimetry												
HDPE 11 Magneson D.2	E162	16-Oct-2023	---	---	---			20-Oct-2023	7 days	4 days	✓	
Physical Tests : TDS by Gravimetry												
HDPE 13 Magneson D.4	E162	16-Oct-2023	---	---	---			20-Oct-2023	7 days	4 days	✓	
Physical Tests : TDS by Gravimetry												
HDPE 14 Magneson D.5	E162	16-Oct-2023	---	---	---			20-Oct-2023	7 days	4 days	✓	
Physical Tests : TDS by Gravimetry												
HDPE 1Booth D.1	E162	16-Oct-2023	---	---	---			20-Oct-2023	7 days	4 days	✓	
Physical Tests : TDS by Gravimetry												
HDPE 2 Ewert D.1	E162	16-Oct-2023	---	---	---			20-Oct-2023	7 days	4 days	✓	
Physical Tests : TDS by Gravimetry												
HDPE 3 Ewert D.2	E162	16-Oct-2023	---	---	---			20-Oct-2023	7 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TDS by Gravimetry										
HDPE 4 Ewert D.3	E162	16-Oct-2023	----	----	----		20-Oct-2023	7 days	4 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 5 Ewert D.4	E162	16-Oct-2023	----	----	----		20-Oct-2023	7 days	4 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 21 D.Lyons D.1	E162	17-Oct-2023	----	----	----		22-Oct-2023	7 days	5 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 6 B.Lyons D.1	E162	17-Oct-2023	----	----	----		22-Oct-2023	7 days	5 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 7 B.Lyons D.2	E162	17-Oct-2023	----	----	----		22-Oct-2023	7 days	5 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 8 B.Lyons D.3	E162	17-Oct-2023	----	----	----		22-Oct-2023	7 days	5 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 9 B.Lyons D.4	E162	17-Oct-2023	----	----	----		22-Oct-2023	7 days	5 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 9A B.Lyons D.5	E162	17-Oct-2023	----	----	----		22-Oct-2023	7 days	5 days	✔
Physical Tests : TDS by Gravimetry										
HDPE DUP 01	E162	17-Oct-2023	----	----	----		22-Oct-2023	7 days	5 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TDS by Gravimetry										
HDPE Dup 02	E162	17-Oct-2023	----	----	----		22-Oct-2023	7 days	5 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 15 Magneson D.6	E162	16-Oct-2023	----	----	----		22-Oct-2023	7 days	6 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 16 Beaver County D.1	E162	16-Oct-2023	----	----	----		22-Oct-2023	7 days	6 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 19 Winsnes D.1	E162	16-Oct-2023	----	----	----		22-Oct-2023	7 days	6 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 20 Balash D.1	E162	16-Oct-2023	----	----	----		22-Oct-2023	7 days	6 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 21 Balash D.2	E162	16-Oct-2023	----	----	----		22-Oct-2023	7 days	6 days	✔
Physical Tests : TDS by Gravimetry										
HDPE 22 Balash D.3	E162	16-Oct-2023	----	----	----		22-Oct-2023	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 10 Magneson D.1	E160	16-Oct-2023	----	----	----		23-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 11 Magneson D.2	E160	16-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE 14 Magneson D.5	E160	16-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 15 Magneson D.6	E160	16-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 16 Beaver County D.1	E160	16-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 1Booth D.1	E160	16-Oct-2023	----	----	----		23-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 2 Ewert D.1	E160	16-Oct-2023	----	----	----		23-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 20 Balash D.1	E160	16-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 21 Balash D.2	E160	16-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 21 D.Lyons D.1	E160	17-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 22 Balash D.3	E160	16-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE 3 Ewert D.2	E160	16-Oct-2023	----	----	----		23-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 4 Ewert D.3	E160	16-Oct-2023	----	----	----		23-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 5 Ewert D.4	E160	16-Oct-2023	----	----	----		23-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 6 B.Lyons D.1	E160	17-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 7 B.Lyons D.2	E160	17-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 8 B.Lyons D.3	E160	17-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 9 B.Lyons D.4	E160	17-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 9A B.Lyons D.5	E160	17-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE DUP 01	E160	17-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE Dup 02	E160	17-Oct-2023	----	----	----		24-Oct-2023	7 days	7 days	✔
Physical Tests : TSS by Gravimetry										
HDPE 13 Magneson D.4	E160	16-Oct-2023	----	----	----		24-Oct-2023	7 days	8 days	✖ EHT
Physical Tests : TSS by Gravimetry										
HDPE 19 Winsnes D.1	E160	16-Oct-2023	----	----	----		24-Oct-2023	7 days	8 days	✔
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) 21 D.Lyons D.1	E611A	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) 6 B.Lyons D.1	E611A	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) 7 B.Lyons D.2	E611A	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) 8 B.Lyons D.3	E611A	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) 9 B.Lyons D.4	E611A	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) 9A B.Lyons D.5	E611A	17-Oct-2023	19-Oct-2023	14 days	2 days	✔	19-Oct-2023	14 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 10 Magneson D.1	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 11 Magneson D.2	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 13 Magneson D.4	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 14 Magneson D.5	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 15 Magneson D.6	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 16 Beaver County D.1	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 19 Winsnes D.1	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 1Booth D.1	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 2 Ewert D.1	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 20 Balash D.1	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 21 Balash D.2	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 22 Balash D.3	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 3 Ewert D.2	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 4 Ewert D.3	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) 5 Ewert D.4	E611A	16-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) DUP 01	E611A	17-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	
Volatile Organic Compounds : BTEX by Headspace GC-MS											
Glass vial (sodium bisulfate) Dup 02	E611A	17-Oct-2023	19-Oct-2023	14 days	3 days	✔	19-Oct-2023	14 days	3 days	✔	

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 EHT: Exceeded ALS recommended hold time prior to analysis.
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1196651	3	58	5.1	5.0	✔
Ammonia by Fluorescence	E298	1197454	2	40	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1193705	2	40	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1193706	2	40	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1193619	3	60	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1194703	2	36	5.5	5.0	✔
Conductivity in Water	E100	1196650	3	60	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1191479	2	27	7.4	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1197253	2	34	5.8	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1192634	2	33	6.0	5.0	✔
Fluoride in Water by IC	E235.F	1194700	2	36	5.5	5.0	✔
Nitrate in Water by IC	E235.NO3	1194701	2	40	5.0	5.0	✔
Nitrite in Water by IC	E235.NO2	1194702	2	40	5.0	5.0	✔
pH by Meter	E108	1196649	3	60	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1197246	2	40	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1194704	2	36	5.5	5.0	✔
TDS by Gravimetry	E162	1194732	2	37	5.4	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1191618	2	30	6.6	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1216788	2	40	5.0	5.0	✔
TSS by Gravimetry	E160	1199775	2	40	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1196651	3	58	5.1	5.0	✔
Ammonia by Fluorescence	E298	1197454	2	40	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1193705	2	40	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1193706	2	40	5.0	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1191084	2	40	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1193619	3	60	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1194703	2	36	5.5	5.0	✔
Conductivity in Water	E100	1196650	3	60	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1191479	2	27	7.4	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1197253	2	34	5.8	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1192634	2	33	6.0	5.0	✔
Fluoride in Water by IC	E235.F	1194700	2	36	5.5	5.0	✔
Nitrate in Water by IC	E235.NO3	1194701	2	40	5.0	5.0	✔
Nitrite in Water by IC	E235.NO2	1194702	2	40	5.0	5.0	✔
pH by Meter	E108	1196649	3	60	5.0	5.0	✔



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Phenols (4AAP) in Water by Colorimetry	E562	1197246	2	40	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1194704	2	36	5.5	5.0	✔
TDS by Gravimetry	E162	1194732	2	37	5.4	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1191618	2	30	6.6	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1216788	2	40	5.0	5.0	✔
TSS by Gravimetry	E160	1199775	2	40	5.0	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1196651	3	58	5.1	5.0	✔
Ammonia by Fluorescence	E298	1197454	2	40	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1193705	2	40	5.0	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1193706	2	40	5.0	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1191084	2	40	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1193619	3	60	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1194703	2	36	5.5	5.0	✔
Conductivity in Water	E100	1196650	3	60	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1191479	2	27	7.4	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1197253	2	34	5.8	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1192634	2	33	6.0	5.0	✔
Fluoride in Water by IC	E235.F	1194700	2	36	5.5	5.0	✔
Nitrate in Water by IC	E235.NO3	1194701	2	40	5.0	5.0	✔
Nitrite in Water by IC	E235.NO2	1194702	2	40	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1197246	2	40	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1194704	2	36	5.5	5.0	✔
TDS by Gravimetry	E162	1194732	2	37	5.4	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1191618	2	30	6.6	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1216788	2	40	5.0	5.0	✔
TSS by Gravimetry	E160	1199775	2	40	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1197454	2	40	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1193705	2	40	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1193619	3	60	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1194703	2	36	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1191479	2	27	7.4	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1197253	2	34	5.8	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1192634	2	33	6.0	5.0	✔
Fluoride in Water by IC	E235.F	1194700	2	36	5.5	5.0	✔
Nitrate in Water by IC	E235.NO3	1194701	2	40	5.0	5.0	✔
Nitrite in Water by IC	E235.NO2	1194702	2	40	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1197246	2	40	5.0	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Sulfate in Water by IC	E235.SO4	1194704	2	36	5.5	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1191618	2	30	6.6	5.0	✔
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S	1216788	2	40	5.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Calgary	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Edmonton	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 ALS Environmental - Edmonton	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Calgary	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Edmonton	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.001 mg/L)	E372-S ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically after heated persulfate digestion of the sample.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L ALS Environmental - Edmonton	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Phenols (4AAP) in Water by Colorimetry	E562 ALS Environmental - Edmonton	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K ₃ Fe(CN) ₆) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
CCME PHC - F1 by Headspace GC-FID	E581.F1 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Edmonton	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Edmonton	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Edmonton	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Edmonton	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Edmonton	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 ALS Environmental - Edmonton	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 ALS Environmental - Edmonton	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Edmonton	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Edmonton	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Edmonton	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 ALS Environmental - Edmonton	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: EO2309502	Page	: 1 of 26
Amendment	: 1		
Client	: Tetra Tech Canada Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Brent Finnestad	Account Manager	: Kieran Tordoff
Address	: North Building 14940 123 Ave NW Edmonton AB Canada T5V 1B4	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: 704-SWM.SWOP04810-01	Date Samples Received	: 17-Oct-2023 15:36
PO	: 704-SWM.SWOP04810-01	Date Analysis Commenced	: 18-Oct-2023
C-O-C number	: ----	Issue Date	: 02-Nov-2023 14:52
Sampler	: ---- 780-718-9317		
Site	: ----		
Quote number	: EO23-EBAE100-006 (Q83988)		
No. of samples received	: 23		
No. of samples analysed	: 23		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Brayden Ginther	Laboratory Analyst	Edmonton Metals, Edmonton, Alberta
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Michelle Schroder
Yan Zhang

Laboratory Analyst
Lab Analyst

Edmonton Inorganics, Edmonton, Alberta
Edmonton Organics, Edmonton, Alberta



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "--" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1194732)											
EO2309472-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	854	852	0.235%	20%	----
Physical Tests (QC Lot: 1196649)											
EO2309464-004	Anonymous	pH	----	E108	0.10	pH units	8.96	8.96	0.00%	4%	----
Physical Tests (QC Lot: 1196650)											
EO2309464-004	Anonymous	Conductivity	----	E100	2.0	µS/cm	538	539	0.186%	10%	----
Physical Tests (QC Lot: 1196651)											
EO2309480-001	Anonymous	Alkalinity, total (as CaCO ₃)	----	E290	2.0	mg/L	583	582	0.154%	20%	----
Physical Tests (QC Lot: 1197230)											
CG2314802-001	Anonymous	pH	----	E108	0.10	pH units	8.28	8.58	3.56%	4%	----
Physical Tests (QC Lot: 1197231)											
CG2314802-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	1540	1570	1.80%	10%	----
Physical Tests (QC Lot: 1197232)											
CG2314802-001	Anonymous	Alkalinity, total (as CaCO ₃)	----	E290	2.0	mg/L	382	386	1.09%	20%	----
Physical Tests (QC Lot: 1197234)											
EO2309502-014	21 Balash D.2	Alkalinity, total (as CaCO ₃)	----	E290	2.0	mg/L	310	323	4.04%	20%	----
Physical Tests (QC Lot: 1197235)											
EO2309502-014	21 Balash D.2	pH	----	E108	0.10	pH units	8.67	8.68	0.115%	4%	----
Physical Tests (QC Lot: 1197236)											
EO2309502-014	21 Balash D.2	Conductivity	----	E100	2.0	µS/cm	1910	1910	0.00%	10%	----
Physical Tests (QC Lot: 1197463)											
EO2309502-010	15 Magneson D.6	Solids, total dissolved [TDS]	----	E162	20	mg/L	1630	1650	1.31%	20%	----
Physical Tests (QC Lot: 1199775)											
EO2309444-004	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	15.0	16.2	1.2	Diff <2x LOR	----
Physical Tests (QC Lot: 1200569)											
EO2309502-007	11 Magneson D.2	Solids, total suspended [TSS]	----	E160	3.0	mg/L	86.4	85.0	1.63%	20%	----
Anions and Nutrients (QC Lot: 1191618)											
EO2309439-060	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.200	mg/L	1.19	1.11	0.080	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1191619)											
EO2309502-019	8 B.Lyons D.3	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	3.15	3.40	7.64%	20%	----
Anions and Nutrients (QC Lot: 1194700)											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 1194700) - continued											
EO2309502-016	21 D.Lyons D.1	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.277	0.279	0.719%	20%	----
Anions and Nutrients (QC Lot: 1194701)											
EO2309502-016	21 D.Lyons D.1	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.165	0.161	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1194702)											
EO2309502-016	21 D.Lyons D.1	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	0.021	0.022	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1194703)											
EO2309502-016	21 D.Lyons D.1	Chloride	16887-00-6	E235.Cl	0.50	mg/L	10.8	10.6	1.33%	20%	----
Anions and Nutrients (QC Lot: 1194704)											
EO2309502-016	21 D.Lyons D.1	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	21.3	21.1	0.835%	20%	----
Anions and Nutrients (QC Lot: 1195018)											
EO2309506-008	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	889	761	15.5%	20%	----
Anions and Nutrients (QC Lot: 1195019)											
EO2309506-008	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1195020)											
EO2309506-008	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1195021)											
EO2309506-008	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1195022)											
EO2309506-008	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	39.1	22.4	54.2%	20%	----
Anions and Nutrients (QC Lot: 1197454)											
EO2309480-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0500	mg/L	1.85	1.86	0.270%	20%	----
Anions and Nutrients (QC Lot: 1197657)											
FC2303044-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0467	0.0477	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1216788)											
EO2309502-001	1Booth D.1	Phosphorus, total	7723-14-0	E372-S	0.0010	mg/L	0.607	0.605	0.403%	20%	----
Anions and Nutrients (QC Lot: 1216789)											
EO2309502-021	9A B.Lyons D.5	Phosphorus, total	7723-14-0	E372-S	0.0010	mg/L	0.172	0.174	0.964%	20%	----
Organic / Inorganic Carbon (QC Lot: 1192634)											
EO2309502-001	1Booth D.1	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	29.8	32.3	8.15%	20%	----
Organic / Inorganic Carbon (QC Lot: 1192635)											
EO2309502-021	9A B.Lyons D.5	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	31.1	31.3	0.545%	20%	----
Dissolved Metals (QC Lot: 1191479)											
EO2309493-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1191480)											
EO2309502-013	20 Balash D.1	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1197253)											
EO2309502-001	1Booth D.1	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0027	0.0032	0.0005	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00023	0.00022	0.000007	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00647	0.00641	0.938%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0503	0.0500	0.553%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.048	0.050	0.001	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000052	<0.0000050	0.0000002	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	22.6	22.3	1.34%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00035	0.00034	0.000006	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00054	0.00059	0.00005	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.142	0.143	0.555%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000098	0.000092	0.000006	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0384	0.0383	0.137%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	10.2	10.1	0.878%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00556	0.00551	0.910%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00106	0.00108	1.62%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00384	0.00358	0.00026	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.344	0.319	0.025	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	13.2	13.2	0.197%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00131	0.00131	0.000004	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000132	0.000139	0.000007	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.01	1.01	0.118%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	140	133	4.91%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.243	0.237	2.38%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	21.0	20.8	0.651%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1197253) - continued											
EO2309502-001	1Booth D.1	Tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00030	0.00021	0.00010	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00065	0.00089	0.00024	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000525	0.000522	0.655%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00120	0.00118	0.00002	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	0.00066	0.00071	0.00005	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1197254)											
EO2309502-021	9A B.Lyons D.5	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0068	0.0073	0.0004	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00020	0.00021	0.000007	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00296	0.00284	4.27%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0626	0.0632	1.07%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.029	0.028	0.0006	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	0.0000060	0.0000010	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	24.3	24.4	0.0706%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00043	0.00040	0.00002	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00088	0.00086	0.00002	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.241	0.234	3.09%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000177	0.000180	0.000002	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0133	0.0132	0.966%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	11.9	12.2	2.50%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00360	0.00341	5.39%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00103	0.00104	1.19%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00500	0.00461	0.00039	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.058	<0.050	0.008	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	14.4	14.4	0.596%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00153	0.00172	0.00018	Diff <2x LOR	----
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000225	0.000247	0.000022	Diff <2x LOR	----		
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.192	0.190	0.002	Diff <2x LOR	----		
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----		



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1197254) - continued											
EO2309502-021	9A B.Lyons D.5	Sodium, dissolved	7440-23-5	E421	0.050	mg/L	91.8	92.1	0.227%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.185	0.182	1.78%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10.0	10.1	0.151%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00017	<0.00010	0.00007	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00109	0.00113	0.00004	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.00010	mg/L	0.000756	0.000758	0.326%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00070	0.00066	0.00004	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0012	0.0010	0.0002	Diff <2x LOR	----
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	0.00086	0.00082	0.00004	Diff <2x LOR	----		
Aggregate Organics (QC Lot: 1193619)											
EO2309455-019	Anonymous	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	27	30	3	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1193858)											
EO2309434-012	Anonymous	Chemical oxygen demand [COD]	----	E559-L	100	mg/L	409	514	105	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1195266)											
EO2309502-022	DUP 01	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	134	126	6.17%	20%	----
Aggregate Organics (QC Lot: 1197246)											
EO2309440-072	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1197247)											
EO2309502-009	14 Magneson D.5	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1193705)											
EO2309460-035	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1194589)											
EO2309502-020	9 B.Lyons D.4	Benzene	71-43-2	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 1194589) - continued											
EO2309502-020	9 B.Lyons D.4	Styrene	100-42-5	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.00040 mg/L	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.00030 mg/L	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1193706)											
EO2309460-035	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<100	<100	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1194590)											
EO2309502-020	9 B.Lyons D.4	F1 (C6-C10)	----	E581.F1	100	µg/L	<0.10 mg/L	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1194732)						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
Physical Tests (QCLot: 1196650)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1196651)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1197231)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1197232)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1197234)						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1197236)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1197463)						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
Physical Tests (QCLot: 1199775)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Physical Tests (QCLot: 1200569)						
Solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 1191618)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1191619)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 1194700)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1194701)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1194702)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1194703)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1194704)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1194704) - continued						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1195018)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1195019)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1195020)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1195021)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1195022)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1197454)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1197657)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1216788)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1216789)						
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	<0.0010	----
Organic / Inorganic Carbon (QCLot: 1192634)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1192635)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 1191479)						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 1191480)						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 1197253)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1197253) - continued						
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1197254)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1197254) - continued						
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1197254) - continued						
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
Aggregate Organics (QCLot: 1193619)						
Chemical oxygen demand [COD]	---	E559-L	10	mg/L	<10	---
Aggregate Organics (QCLot: 1193858)						
Chemical oxygen demand [COD]	---	E559-L	10	mg/L	<10	---
Aggregate Organics (QCLot: 1195266)						
Chemical oxygen demand [COD]	---	E559-L	10	mg/L	<10	---
Aggregate Organics (QCLot: 1197246)						
Phenols, total (4AAP)	---	E562	0.001	mg/L	<0.0010	---
Aggregate Organics (QCLot: 1197247)						
Phenols, total (4AAP)	---	E562	0.001	mg/L	<0.0010	---
Volatile Organic Compounds (QCLot: 1193705)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
Styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	---
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	---
Volatile Organic Compounds (QCLot: 1194589)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
Styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	---
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	---
Hydrocarbons (QCLot: 1191084)						
F2 (C10-C16)	---	E601	100	µg/L	<100	---
Hydrocarbons (QCLot: 1191215)						
F2 (C10-C16)	---	E601	100	µg/L	<100	---
Hydrocarbons (QCLot: 1193706)						
F1 (C6-C10)	---	E581.F1	100	µg/L	<100	---
Hydrocarbons (QCLot: 1194590)						
F1 (C6-C10)	---	E581.F1	100	µg/L	<100	---





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				Qualifier
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 1194732)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Physical Tests (QCLot: 1196649)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1196650)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	106	90.0	110	----
Physical Tests (QCLot: 1196651)									
Alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
Physical Tests (QCLot: 1197230)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1197231)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	107	90.0	110	----
Physical Tests (QCLot: 1197232)									
Alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
Physical Tests (QCLot: 1197234)									
Alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
Physical Tests (QCLot: 1197235)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1197236)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	95.2	90.0	110	----
Physical Tests (QCLot: 1197463)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	96.2	85.0	115	----
Physical Tests (QCLot: 1199775)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	102	85.0	115	----
Physical Tests (QCLot: 1200569)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	97.5	85.0	115	----
Anions and Nutrients (QCLot: 1191618)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1191619)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 1194700)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1194701)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1194702)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	96.1	90.0	110	----
Anions and Nutrients (QCLot: 1194703)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 1194704)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	98.3	90.0	110	----
Anions and Nutrients (QCLot: 1195018)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1195019)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 1195020)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	96.3	90.0	110	----
Anions and Nutrients (QCLot: 1195021)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1195022)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 1197454)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 1197657)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 1216788)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	110	80.0	120	----
Anions and Nutrients (QCLot: 1216789)									
Phosphorus, total	7723-14-0	E372-S	0.001	mg/L	0.05 mg/L	111	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1192634)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	94.0	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1192635)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	85.6	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	107	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	103	80.0	120	----
Dissolved Metals (QCLot: 1197253)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	113	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1197253) - continued									
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	95.6	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	100	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.8	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.2	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.5	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	120	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	118	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	119	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	# 121	80.0	120	MES
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	100	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	113	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	119	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	118	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	# 121	80.0	120	MES
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	# 129	80.0	120	MES
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	97.6	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	98.3	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	# 122	80.0	120	MES
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.3	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	110	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	103	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	93.9	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.0	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	111	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	108	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1197253) - continued									
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	115	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.6	80.0	120	----
Dissolved Metals (QCLot: 1197254)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	111	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	105	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.6	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	95.7	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.0	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	119	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	117	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	117	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	119	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	101	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	113	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	118	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	117	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	96.3	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	119	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	# 130	80.0	120	MES
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	94.5	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	99.6	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	120	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.9	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	# 122	80.0	120	MES
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	105	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	99.8	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.8	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1197254) - continued									
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	114	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	# 124	80.0	120	MES
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	99.5	80.0	120	----
Aggregate Organics (QCLot: 1193619)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	104	85.0	115	----
Aggregate Organics (QCLot: 1193858)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	108	85.0	115	----
Aggregate Organics (QCLot: 1195266)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	108	85.0	115	----
Aggregate Organics (QCLot: 1197246)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	97.4	85.0	115	----
Aggregate Organics (QCLot: 1197247)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	97.6	85.0	115	----
Volatile Organic Compounds (QCLot: 1193705)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	80.2	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	88.3	70.0	130	----
Styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	91.6	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	86.6	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	94.7	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	98.1	70.0	130	----
Volatile Organic Compounds (QCLot: 1194589)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	81.4	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	85.4	70.0	130	----
Styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	97.1	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	84.1	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	84.7	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	81.3	70.0	130	----
Hydrocarbons (QCLot: 1191084)									
F2 (C10-C16)	----	E601	100	µg/L	3820 µg/L	108	70.0	130	----
Hydrocarbons (QCLot: 1191215)									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Hydrocarbons (QCLot: 1191215) - continued									
F2 (C10-C16)	----	E601	100	µg/L	3820 µg/L	104	70.0	130	----
Hydrocarbons (QCLot: 1193706)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	93.1	70.0	130	----
Hydrocarbons (QCLot: 1194590)									
F1 (C6-C10)	----	E581.F1	100	µg/L	2750 µg/L	77.8	70.0	130	----

Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1191618)										
EO2309480-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.20 mg/L	2.5 mg/L	87.9	70.0	130	----
Anions and Nutrients (QCLot: 1191619)										
EO2309502-020	9 B.Lyons D.4	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1194700)										
EO2309502-016	21 D.Lyons D.1	Fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1194701)										
EO2309502-016	21 D.Lyons D.1	Nitrate (as N)	14797-55-8	E235.NO3	2.50 mg/L	2.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1194702)										
EO2309502-016	21 D.Lyons D.1	Nitrite (as N)	14797-65-0	E235.NO2	0.447 mg/L	0.5 mg/L	89.4	75.0	125	----
Anions and Nutrients (QCLot: 1194703)										
EO2309502-016	21 D.Lyons D.1	Chloride	16887-00-6	E235.Cl	94.4 mg/L	100 mg/L	94.4	75.0	125	----
Anions and Nutrients (QCLot: 1194704)										
EO2309502-016	21 D.Lyons D.1	Sulfate (as SO4)	14808-79-8	E235.SO4	94.5 mg/L	100 mg/L	94.5	75.0	125	----
Anions and Nutrients (QCLot: 1195018)										
EO2309506-008	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1195019)										
EO2309506-008	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1195020)										
EO2309506-008	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.463 mg/L	0.5 mg/L	92.6	75.0	125	----
Anions and Nutrients (QCLot: 1195021)										
EO2309506-008	Anonymous	Fluoride	16984-48-8	E235.F	0.958 mg/L	1 mg/L	95.8	75.0	125	----
Anions and Nutrients (QCLot: 1195022)										
EO2309506-008	Anonymous	Chloride	16887-00-6	E235.Cl	78.9 mg/L	100 mg/L	78.9	75.0	125	----
Anions and Nutrients (QCLot: 1197454)										
EO2309480-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1197657)										
FC2303044-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.106 mg/L	0.1 mg/L	106	75.0	125	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1216788)										
EO2309502-002	2 Ewert D.1	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1216789)										
EO2309502-022	DUP 01	Phosphorus, total	7723-14-0	E372-S	ND mg/L	0.067 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1192634)										
EO2309502-001	1Booth D.1	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1192635)										
EO2309502-021	9A B.Lyons D.5	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 1191479)										
EO2309493-002	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000108 mg/L	0.0001 mg/L	108	70.0	130	----
Dissolved Metals (QCLot: 1191480)										
EO2309502-014	21 Balash D.2	Mercury, dissolved	7439-97-6	E509	0.000107 mg/L	0.0001 mg/L	107	70.0	130	----
Dissolved Metals (QCLot: 1197253)										
EO2309502-002	2 Ewert D.1	Aluminum, dissolved	7429-90-5	E421	0.184 mg/L	0.2 mg/L	91.9	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0445 mg/L	0.04 mg/L	111	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00912 mg/L	0.01 mg/L	91.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00380 mg/L	0.004 mg/L	94.9	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0186 mg/L	0.02 mg/L	93.2	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.99 mg/L	2 mg/L	99.5	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0200 mg/L	0.02 mg/L	99.9	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0377 mg/L	0.04 mg/L	94.4	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.0 mg/L	10 mg/L	100	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1197253) - continued										
EO2309502-002	2 Ewert D.1	Potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0420 mg/L	0.04 mg/L	105	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.46 mg/L	10 mg/L	94.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00300 mg/L	0.004 mg/L	74.9	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0434 mg/L	0.04 mg/L	108	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00389 mg/L	0.004 mg/L	97.2	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0199 mg/L	0.02 mg/L	99.5	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0393 mg/L	0.04 mg/L	98.3	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00403 mg/L	0.004 mg/L	101	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.370 mg/L	0.4 mg/L	92.6	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 1197254)										
EO2309502-022	DUP 01	Aluminum, dissolved	7429-90-5	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00902 mg/L	0.01 mg/L	90.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00391 mg/L	0.004 mg/L	97.7	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00993 mg/L	0.01 mg/L	99.3	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0388 mg/L	0.04 mg/L	97.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0186 mg/L	0.02 mg/L	93.2	70.0	130	----
		Iron, dissolved	7439-89-6	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0190 mg/L	0.02 mg/L	94.8	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0980 mg/L	0.1 mg/L	98.0	70.0	130	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1197254) - continued										
EO2309502-022	DUP 01	Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.2 mg/L	10 mg/L	102	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	10.1 mg/L	10 mg/L	101	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00388 mg/L	0.004 mg/L	96.9	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	20.4 mg/L	20 mg/L	102	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00381 mg/L	0.004 mg/L	95.4	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0211 mg/L	0.02 mg/L	106	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0485 mg/L	0.04 mg/L	121	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0187 mg/L	0.02 mg/L	93.7	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00391 mg/L	0.004 mg/L	97.7	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.378 mg/L	0.4 mg/L	94.6	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
Aggregate Organics (QCLot: 1193619)										
EO2309455-020	Anonymous	Chemical oxygen demand [COD]	----	E559-L	112 mg/L	100 mg/L	112	75.0	125	----
Aggregate Organics (QCLot: 1193858)										
EO2309434-013	Anonymous	Chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----
Aggregate Organics (QCLot: 1195266)										
EO2309502-023	Dup 02	Chemical oxygen demand [COD]	----	E559-L	98 mg/L	100 mg/L	97.6	75.0	125	----
Aggregate Organics (QCLot: 1197246)										
EO2309440-073	Anonymous	Phenols, total (4AAP)	----	E562	0.0196 mg/L	0.02 mg/L	97.8	75.0	125	----
Aggregate Organics (QCLot: 1197247)										
EO2309502-010	15 Magneson D.6	Phenols, total (4AAP)	----	E562	0.0195 mg/L	0.02 mg/L	97.6	75.0	125	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	
Volatile Organic Compounds (QCLot: 1193705)										
EO2309502-001	1Booth D.1	Benzene	71-43-2	E611A	83.6 µg/L	100 µg/L	83.6	50.0	140	----
		Ethylbenzene	100-41-4	E611A	92.3 µg/L	100 µg/L	92.3	50.0	140	----
		Styrene	100-42-5	E611A	94.6 µg/L	100 µg/L	94.6	50.0	140	----
		Toluene	108-88-3	E611A	85.0 µg/L	100 µg/L	85.0	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	181 µg/L	200 µg/L	90.5	50.0	140	----
		Xylene, o-	95-47-6	E611A	95.8 µg/L	100 µg/L	95.8	50.0	140	----
Volatile Organic Compounds (QCLot: 1194589)										
EO2309502-021	9A B.Lyons D.5	Benzene	71-43-2	E611A	83.7 µg/L	100 µg/L	83.7	50.0	140	----
		Ethylbenzene	100-41-4	E611A	84.0 µg/L	100 µg/L	84.0	50.0	140	----
		Styrene	100-42-5	E611A	89.8 µg/L	100 µg/L	89.8	50.0	140	----
		Toluene	108-88-3	E611A	80.8 µg/L	100 µg/L	80.8	50.0	140	----
		Xylene, m+p-	179601-23-1	E611A	161 µg/L	200 µg/L	80.6	50.0	140	----
		Xylene, o-	95-47-6	E611A	84.4 µg/L	100 µg/L	84.4	50.0	140	----

Report To Contact and company name below will appear on the final report Company: Tetra Tech Contact: Brent Finnestad Phone: 780-718-9317 Company address below will appear on the final report Street: 14940 123 ave City/Province: Edmonton Alberta Postal Code:		Reports / Recipients Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL) ESDA Merge QC/QCI Reports with COA <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax Brent.Finnestad@TetraTech.com Email 2 Fahim.Nazari@TetraTech.com Email 3 Eba.Labdata@TetraTech.com		Turnaround Time (TAT) Requested <input checked="" type="checkbox"/> Routine [R] if received by 3pm M-F - no surcharges apply <input type="checkbox"/> 4 day [P4] if received by 3pm M-F - 20% rush surcharge n <input type="checkbox"/> 3 day [P3] if received by 3pm M-F - 25% rush surcharge n <input type="checkbox"/> 2 day [P2] if received by 3pm M-F - 50% rush surcharge n <input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge n <input type="checkbox"/> Same day [E2] if received by 10am M-S - 200% rush surch Additional fees may apply to rush requests on week Date and Time Required for all E&P TATs:																																																																																																																																																																																																																												
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SHIPMENT RELEASE (client use) Released by: Fahim Nazari Date: Oct-17-2023 Time: 15h		INITIAL SHIPMENT RECEPTION (ALS use only) Received by: Date: 17-Oct-2023 Time: 3:36pm		FINAL SHIPMENT RECEPTION (ALS use only) Received by: Date: Time:																																																																																																																																																																																																																												

Environmental Division
 Edmonton
 Work Order Reference
E02309502



Telephone: +1 780 413 5227

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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ALS Sample # (ALS use only)</th> <th>Sample Identification and/or Coordinates (This description will appear on the report)</th> <th>Date (dd-mmm-yy)</th> <th>Time (hh:mm)</th> <th>Sample Type</th> <th>NUMBER OF CONTAINERS</th> <th>Routine</th> <th>BTEX F1 - F2</th> <th>Dissolved Metals (including Mercury)</th> <th>Total Dissolved Solids</th> <th>Total Suspended Solids</th> <th>Dissolved Organic Carbon</th> <th>Nutrients</th> <th>Chemical Oxygen Demand</th> <th>Phenols</th> <th>SAMPLES ON HOLD</th> <th>EXTENDED STORAGE REQUIRED</th> <th>SUSPECTED HAZARD (see notes)</th> </tr> </thead> <tbody> <tr> <td></td> <td>20 Balash D.1</td> <td>16-oct-23</td> <td>1500</td> <td>Surface</td> <td>10</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>21 Balash D.2</td> <td>↓</td> <td>1415</td> <td>water</td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>22 Balash D.3</td> <td>↓</td> <td>1430</td> <td></td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>23 D. Lyons D.1</td> <td>17-oct-23</td> <td>1245</td> <td></td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>6 B. Lyons D.1</td> <td>↓</td> <td>1030</td> <td></td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>7 B. Lyons D.2</td> <td>↓</td> <td>1045</td> <td></td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>8 B. Lyons D.3</td> <td>↓</td> <td>1115</td> <td></td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>9 B. Lyons D.4</td> <td>↓</td> <td>1140</td> <td></td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>9A B. Lyons D.5</td> <td>↓</td> <td>1200</td> <td></td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>DUP 01</td> <td></td> <td></td> <td></td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>DUP 02</td> <td></td> <td></td> <td></td> <td></td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td>↓</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>												ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Routine	BTEX F1 - F2	Dissolved Metals (including Mercury)	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Nutrients	Chemical Oxygen Demand	Phenols	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)		20 Balash D.1	16-oct-23	1500	Surface	10	✓	✓	✓	✓	✓	✓	✓	✓	✓					21 Balash D.2	↓	1415	water		↓	↓	↓	↓	↓	↓	↓	↓	↓					22 Balash D.3	↓	1430			↓	↓	↓	↓	↓	↓	↓	↓	↓					23 D. Lyons D.1	17-oct-23	1245			↓	↓	↓	↓	↓	↓	↓	↓	↓					6 B. Lyons D.1	↓	1030			↓	↓	↓	↓	↓	↓	↓	↓	↓					7 B. Lyons D.2	↓	1045			↓	↓	↓	↓	↓	↓	↓	↓	↓					8 B. Lyons D.3	↓	1115			↓	↓	↓	↓	↓	↓	↓	↓	↓					9 B. Lyons D.4	↓	1140			↓	↓	↓	↓	↓	↓	↓	↓	↓					9A B. Lyons D.5	↓	1200			↓	↓	↓	↓	↓	↓	↓	↓	↓					DUP 01					↓	↓	↓	↓	↓	↓	↓	↓	↓					DUP 02					↓	↓	↓	↓	↓	↓	↓	↓	↓			
ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Routine	BTEX F1 - F2	Dissolved Metals (including Mercury)	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Nutrients	Chemical Oxygen Demand	Phenols	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)																																																																																																																																																																																																																		
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Drinking Water (DW) Samples¹ (client use)				Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)				SAMPLE RECEIPT DETAILS (ALS use only)																																																																																																																																																																																																																											
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO				* Dissolved Metals is filtered but <u>Not</u> Preserved. Mercury → Filtered and preserved.				Cooling Method: <input type="checkbox"/> NONE <input type="checkbox"/> ICE <input type="checkbox"/> ICE PACKS <input type="checkbox"/> FROZEN <input type="checkbox"/> COOLING INITIATED																																																																																																																																																																																																																											
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO								Submission Comments identified on Sample Receipt Notification: <input type="checkbox"/> YES <input type="checkbox"/> NO																																																																																																																																																																																																																											
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SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (ALS use only)				FINAL SHIPMENT RECEPTION (ALS use only)																																																																																																																																																																																																																											
Released by: Fahim Nazari		Date: Oct-17-2023		Time: 1510		Received by: LA		Date:		Time:		Received by:		Date:		Time:																																																																																																																																																																																																																			

APPENDIX D

HISTORICAL DUGOUT CHEMICAL ANALYTICAL RESULTS

Table D.1: Chemical Analytical Results

Sample ID:		Booth D.1																										
Site Number:		1																										
Date Sampled:	Units	15-Oct-1996	3-Oct-1997	8-Oct-1998	20-Oct-1999	11-Oct-2000	24-Oct-2001	8-Oct-2002	15-Oct-2003	14-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	16-Oct-2008	28-Oct-2009	18-Oct-2010	12-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019			
Chem. O ₂ Demand	mg/L	70	40	50	70	50	40	60	50	40	55	61	50	69	65.5	59.4	75	92	78	71	219	68	77	98	84			
Ammonia-N	mg/L	<0.05	<0.05	<0.05	0.06	0.58	0.16	<0.05	<0.05	<0.05	<0.05	0.12	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.79	1.08	1.21	<0.050	<0.050			
Total Kjeldahl Nitrogen	mg/L	<0.2	0.6	1.6	1.8	1.5	2.4	1.8	1.7	1.8	1.8	1.8	1.7	2.5	1.84	2.1	2.89	2.55	2.76	2.76	7.02	3.09	2.58	4.70	2.51			
Total Organic Carbon	mg/L	16	15	19	17	17	16	22	17	21	21	21	19	-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit												18	22.5	22.2	29.4	26.8	29.0	22.7	59.9	21.4	77	29.9	22.9			
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	0.0019	0.0075		
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050		
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050		
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071		
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050		
F1 (C ₆ -C ₁₀)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F2 (>C ₁₀ -C ₁₆)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10	<0.10		
Dissolved Metals																												
Aluminium	mg/L	Not required under previous permit												<0.01	0.01	<0.010	<0.010	<0.010	0.013	<0.01	0.0035	0.0016	0.0031	0.0056	0.0021			
Antimony	mg/L	0.0007	0.0005	0.0009	0.0005	0.0007	0.0006	0.0009	0.0012	0.0024	0.0007	0.0009	0.0019	0.0005	<0.00040	<0.00040	<0.00040	<0.00040	0.00043	<0.0004	0.00077	0.0002	0.00024	0.00029	0.00020			
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.00703	0.00484	
Barium	mg/L	0.033	0.025	0.03	0.032	0.051	0.049	0.025	0.039	0.018	0.033	0.079	0.075	0.073	0.0655	0.0731	0.0674	0.0518	0.0600	0.0673	0.0421	0.0883	0.0594	0.0714	0.0614			
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		
Boron	mg/L	Not required under previous permit												<0.05	<0.050	0.054	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.064	0.045	0.049	0.047	
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050			
Cobalt	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020			
Copper	mg/L	0.022	0.007	0.011	0.012	0.014	0.025	0.016	0.016	0.005	<0.001	0.001	<0.001	<0.001	<0.0010	0.0046	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00045	0.00054	0.00049	0.00053			
Iron	mg/L	0.120	0.328	0.445	0.572	0.403	0.126	0.181	0.577	0.081	0.077	0.212	0.175	0.022	0.02	0.018	0.029	<0.010	0.025	0.07	0.021	0.021	0.033	0.028	0.121			
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.000050	0.000077	<0.000050	0.000072			
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0446	0.0327	
Manganese	mg/L	Not required under previous permit												0.003	0.005	<0.0020	<0.0020	<0.0020	0.0025	0.0024	0.154	0.00071	0.00744	0.00864	0.00250			
Mercury	mg/L	0.0007	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000095	<0.000050	<0.000050	<0.000050			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00244	0.00125	0.00111	0.000989	0.000853			
Nickel	mg/L	<0.002	<0.002	0.003	0.005	0.005	0.003	0.004	0.006	<0.002	<0.002	0.004	0.003	0.003	0.0035	0.0038	0.0047	0.0036	0.0035	0.0041	0.0060	0.0043	0.0034	0.00279	0.00353			
Selenium	mg/L	Not required under previous permit												<0.0004	<0.00080	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00045	0.000114	0.000115	0.000143	0.000115
Silver	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Thallium	mg/L	Not required under previous permit												0.0002	<0.00010	<0.00010	<0.00010	<0.050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0020	<0.0010	<0.0010	<0.0010	
Titanium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.001	<0.001	<0.001	<0.001	<0.00060	<0.00030	<0.00032	<0.00049	0.00059
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.000784	0.000578
Vanadium	mg/L	Not required under previous permit												0.001	<0.0010	<0.0010	<0.0010	0.0017	0.0026	0.0015	0.0053	0.00087	0.00112	0.00135	0.00076	0.00135	0.00076	
Zinc	mg/L	0.293	0.256	0.106	0.055	0.117	0.099	0.011	0.026	0.054	0.002	0.005	0.011	0.008	<0.0020	<0.0020	<0.0020	<0.0020	0.0035	<0.0020	0.0119	0.0021	<0.0010	0.0021	<0.0010			
Routine Water																												
Ion Balance	%	100	108	101	101	102	102	98.5	104	102	104	101	99.2	98.8	95	109	88	91.9	104	110	96.7	107	95.5	107	103			
Bicarbonate	mg/L	299	283	324	302	330	345	210	164	215	299	311	342	340	291	334	425	383	333	342	552	357	396	345	328			
Chloride	mg/L	15.8	16.1	18.1	20.0	31.0	54.0	62	43	55	52	72	65	73	76	83.2	85.6	96.9	97.1	78.4	80.3	61.7	59.7	54.6	46.3			
Carbonate	mg/L	<5	<5	<5	<5	<5	<5	76	37	45	<5	<5	<5	12	29.3	15	11.7	28.7	36.1	11.2	24.6	<5.0	10.7	7.6	<5.0			
Conductivity (EC)	uS/cm	1080	986	903	956	1070	1260	1500	998	1150	898	951	944	987	1010	1100	1130	1180	1100	989	1560	885	893	845	714			
Calcium	mg/L	25.5	20.5	18.1	15.5	26.2	28.6	13.2	14.2	14.6	23	31.2	30.1	21.7	14.8	33.3	28	13.1	14.7	19.6	33.6	29	14.8	14.7	21.5			
Potassium	mg/L	7.6	7.2	7.8	7.8	11	10.5	12.3	9.6	9.3	9.7	12.3	10.6	10.9	12.2	11.7	9.26	11.8	12.9	12.2	17.9	13.9	12.3	15.1	12.5			
Magnesium	mg/L	14.0	10.8	11.3	10.4	14.3	17.1	18	11.7	12.7	11.4	12.9	12.3	14	12.2	16.9	13	13.4	15.0	13.6	20.8	13.9	12.5	11.7	10.8			
Sodium	mg/L	211	198	194	175	204	250	333	194	219	178	163	153	171	182	202	178	210	217	186	254	154	167	156	128			
Sulfate	mg/L	307	231	216	185	223	332	382	233	228	159	136	100	98.3	125	135	101	106	90.2	67.7	157	70.6	59.6	43.0	43.4			
Phosphorus	mg/L	Not required under previous permit												0.057	0.087	0.324	0.16	0.166	0.245	1.09	0.155	0.128	0.276	0.211				
pH in H ₂ O	pH	8.4	8.4	8.0	8.3	8.0	8.1	9.5	9.4																			

Table D.2: Chemical Analytical Results

Sample ID:	Ewert D.1																											
Site Number:	2																											
Date Sampled:	Units	16-Oct-1996	7-Oct-1997	9-Oct-1998	20-Oct-1999	11-Oct-2000	4-Oct-2001	8-Oct-2002	15-Oct-2003	14-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	16-Oct-2008	28-Oct-2009	18-Oct-2010	13-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019			
Chem. O ₂ Demand	mg/L	40	50	100	90	50	90	90	80	40	85	55	68	70	103	67	81	81	80	79	131	83	122	53	79			
Ammonia-N	mg/L	1.65	0.36	0.8	<0.05	<0.05	0.28	<0.05	<0.05	<0.05	<0.05	1.64	<0.05	<0.05	0.207	<0.050	<0.050	0.198	<0.050	0.082	0.304	0.052	1.11	3.79	<0.050			
Total Kjeldahl Nitrogen	mg/L	3.3	2.7	3	2.5	1.7	0.9	3.9	4.8	2.7	2.2	3.9	2.3	2.4	5.8	3.52	2.66	3.15	3.13	2.95	6.65	3.06	7.29	5.64	2.70			
Total Organic Carbon	mg/L	17	24	23	19	19	31	37	29	23	31	20	24	-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit												18	29.1	31.7	20	24.8	24.9	23.4	37.2	24.3	122	21.6	22.2			
Phenols	mg/L	-																										
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Toluene	mg/L	-												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Ethylbenzene	mg/L	-												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Xylenes (m & p)	mg/L	-												-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Xylenes	mg/L	-												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071		
Styrene	mg/L	-												-	-	-	-	-	-	-	-	-	-	-	-	-	-	
F1 (C ₇ -C ₁₀)	mg/L	-												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F1 (C ₇ -C ₁₀) - BTEX	mg/L	-												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F2 - (C ₁₀ -C ₁₆)	mg/L	-												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10	<0.13	<0.10	<0.10		
Dissolved Metals																												
Aluminium	mg/L	Not required under previous permit												<0.01	0.026	0.022	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0167	0.0025	0.0151	0.0303	0.0349	
Antimony	mg/L	<0.0004	<0.0002	0.0005	<0.0004	0.0005	0.0009	0.0015	0.0015	0.0016	0.0015	0.0012	0.002	0.0005	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00043	0.00013	0.0003	0.0003	0.00010	0.00025		
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	0.051	0.075	0.064	0.111	0.078	0.075	0.131	0.155	0.155	0.041	0.088	0.071	0.057	0.048	0.0581	0.044	0.0789	0.0584	0.0826	0.0506	0.0699	0.0642	0.118	0.0449			
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron	mg/L	-												0.05	0.052	0.057	0.058	0.057	0.052	0.061	0.059	0.073	0.053	0.046	0.040			
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0000099	0.0000059	0.0000083	<0.000050	0.0000070			
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00013	<0.00010	<0.00010	<0.00011	<0.00010			
Cobalt	mg/L	<0.002	0.005	0.018	<0.002	<0.002	0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00060	0.00025	0.00064	0.00065	0.00062			
Copper	mg/L	0.132	0.008	0.014	0.016	0.011	0.028	0.021	0.027	0.007	0.004	0.003	0.005	0.001	0.0019	0.0037	<0.0010	<0.0010	<0.0010	<0.0010	0.00180	0.00360	0.00193	0.00081	0.00271			
Iron	mg/L	0.277	0.754	0.595	1.400	0.770	2.920	4.33	7.07	0.616	0.454	1.67	1.19	0.032	0.087	0.055	<0.030	0.027	0.098	0.031	0.062	0.012	0.052	0.166	0.077			
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000176	<0.000050	0.000098	0.000113	0.000076			
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-		
Manganese	mg/L	-												0.002	0.0075	0.0096	<0.0050	<0.0020	0.0046	<0.002	0.00448	0.0161	0.0116	0.0192	0.138			
Mercury	mg/L	<0.0002	<0.0004	0.0005	<0.0002	<0.0002	0.0009	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0000052	0.0000081	<0.000050	<0.000050	<0.000050			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.007	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00252	0.00142	0.000884	0.00136	0.00198			
Nickel	mg/L	<0.002	<0.002	0.018	0.01	0.004	0.004	0.01	0.013	<0.002	0.004	0.006	0.006	0.005	0.0047	0.0043	0.0026	0.0046	0.0027	0.0037	0.00581	0.00424	0.00243	0.00389	0.00321			
Selenium	mg/L	-												0.0005	0.00058	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	0.000347	0.000248	0.00025	0.000169	0.000258			
Silver	mg/L	-												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Thallium	mg/L	-												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Titanium	mg/L	-												<0.001	0.0026	0.0027	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00118	<0.00030	0.00044	0.0029	0.00517		
Uranium	mg/L	-												-	-	-	-	-	-	-	-	-	-	-	-	-		
Vanadium	mg/L	-												<0.001	0.002	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	0.00286	<0.00050	0.00228	0.00067	0.00299			
Zinc	mg/L	<0.051	0.038	0.078	0.018	0.009	0.085	0.02	0.043	0.037	0.003	0.006	0.007	0.009	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0074	0.0026	<0.0010	0.0057	<0.0010	0.0011			
Routine Water																												
Ion Balance	%	93	108	99	99	101	92.3	101	103	99.5	103	103	98.9	103	106	108	95.5	92.4	107	109	102	111	88.7	102	100			
Bicarbonate	mg/L	401	368	422	421	349	282	499	280	315	211	554	297	307	277	298	350	392	272	310	285	354	456	319	304			
Chloride	mg/L	11.5	12.7	10.7	15.0	13.0	18.0	27	26	13	12	13	13	16	14.8	13	20.8	20.4	32.0	23.7	27.2	31.5	31.3	30.8	32.9			
Carbonate	mg/L	<5	13	<5	<5	<5	41	41	111	<5	36	<5	12	20	32.6	18	21.2	10.3	18.6	14.3	15.8	6.6	12.7	8.2	38.3			
Conductivity (EC)	uS/cm	718	889	828	1050	1140	1170	1680	1410	656	519	554	653	734	662	662	692	727	597	648	622	759	851	758	675			
Calcium	mg/L	15.6	27.6	32.2	32.5	27.5	17.1	23.3	17.5	17.4	16	18.8	16.7	17.1	12.8	15.3	15.3	16.8	11.8	17.3	10.6	24.8	13.3	26.0	21.5			
Potassium	mg/L	15	17.4	17.6	17	19.5	13.8	22.5	14.8	13.9	9.6	14.1	12.2	13.4	13.8	13.6	14.6	15.5	17.7	17.8	14.4	19.2	18.5	19.9	16.0			
Magnesium	mg/L	8.5	14.4	12.9	14.8	14.5	9.7	18.1	11	8.7	7.0	9.4	8	9.9	7.34	8.72	10.6	9.01	10.8	10.3	5.81	12.9	12	12.8	10.2			
Sodium	mg/L	122	175	145	172	203	214	388	310	110	99	88	114	135	138	129	118	124	109	111	115	134	144	109	124			

Table D.3: Chemical Analytical Results

Sample ID:		Ewert D.2																										
Site Number:		3																										
Date Sampled:	Units	16-Oct-1996	7-Oct-1997	9-Oct-1998	20-Oct-1999	11-Oct-2000	4-Oct-2001	8-Oct-2002	15-Oct-2003	14-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	16-Oct-2008	28-Oct-2009	18-Oct-2010	13-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019			
Chem. O ₂ Demand	mg/L	40	50	70	90	50	60	70	30	30	49	53	67	65	54.7	55.2	62	77	53	61	158	61	88	127	92			
Ammonia-N	mg/L	0.69	<0.05	0.06	0.05	0.05	0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.613	<0.050	<0.050	0.174	<0.050	<0.05	0.127	<0.05	<0.05	0.113	0.254			
Total Kjeldahl Nitrogen	mg/L	3.1	2.1	2.7	2.8	1.8	3.6	3.5	1.3	1.9	1.6	1.8	1.7	2.3	2.95	2.12	1.9	2.44	1.60	1.8	2.62	1.94	3.09	5.07	3.01			
Total Organic Carbon	mg/L	19	27	31	22	21	21	32	11	21	16	23	19	-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit												18	19.2	22.4	18	22.9	31.7	18.2	23.4	21	88	44.0	28.2	-		
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0018	0.0068	
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F1 (C6-C10)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F1 (C6-C10) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 - (C10-C16)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10	<0.13	<0.10	<0.10	
Dissolved Metals																												
Aluminum	mg/L	Not required under previous permit												0.01	0.02	<0.010	0.01	0.055	<0.010	<0.01	0.0055	0.0011	0.0045	0.0317	0.0334	-		
Antimony	mg/L	0.0004	<0.0002	0.0008	<0.0004	0.0005	0.0007	0.002	0.0011	0.0013	0.001	0.0010	0.0025	0.0004	<0.00040	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.00021	0.00015	0.00017	0.00038	0.00020			
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.00803	0.00619
Barium	mg/L	0.106	0.065	0.056	0.083	0.059	0.093	0.046	0.077	0.018	0.034	0.069	0.052	0.042	0.0452	0.0454	0.0361	0.0532	0.0540	0.0482	0.0511	0.041	0.0501	0.0439	0.0364			
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Cadmium	mg/L	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
Chromium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050			
Cobalt	mg/L	0.003	0.005	0.022	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00036	0.00014	0.00053	0.00063	0.00061			
Copper	mg/L	0.008	<0.001	0.01	0.004	0.006	0.011	0.012	0.009	0.004	0.001	0.003	0.001	0.001	0.0014	0.0036	<0.0010	0.0016	<0.0010	<0.0010	0.00063	0.000797	0.00111	0.00234	0.00127			
Iron	mg/L	7.200	1.060	1.510	1.980	1.280	4.770	1.28	3.04	0.216	0.452	1.13	0.734	0.046	0.043	0.085	0.073	0.098	0.046	0.032	0.083	0.045	0.056	0.054	0.256			
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000072	<0.00050	<0.00050	0.00010	0.000164			
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.0323	0.0261
Manganese	mg/L	Not required under previous permit												0.003	<0.0020	<0.0020	<0.0050	0.0021	0.0067	<0.002	0.00205	0.00125	0.107	0.0131	0.00377	-	-	
Mercury	mg/L	<0.0002	<0.0004	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0000066	<0.0000050	<0.0000050	<0.0000050			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00108	0.000744	0.000491	0.0010	0.000761			
Nickel	mg/L	0.009	0.004	0.019	0.009	0.008	0.004	0.008	0.009	<0.002	0.004	0.007	0.006	0.005	0.0047	0.0065	0.0048	0.0053	0.0048	0.0034	0.0042	0.00457	0.00417	0.00423	0.00630			
Selenium	mg/L	Not required under previous permit												0.0005	0.00052	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.000243	0.000245	0.000184	0.000319	0.000366	-		
Silver	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Thallium	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Titanium	mg/L	Not required under previous permit												0.001	0.0013	<0.0010	<0.0010	0.003	<0.0010	<0.0010	<0.0010	0.00034	<0.0003	0.00062	0.000375	0.00694	-	
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.00159	0.000775
Vanadium	mg/L	Not required under previous permit												0.001	0.0019	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	0.00096	0.00072	0.00136	0.00513	0.00218	-	
Zinc	mg/L	0.028	0.025	0.027	0.019	0.014	0.039	0.011	0.016	0.066	0.002	0.006	0.008	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.006	0.0010	0.0020	0.0085	<0.0010	<0.0010			
Routine Water																												
Ion Balance	%	103	109	103	100	103	92.9	101	102	99.9	103	105	99.4	103	104	109	88.3	97.3	105	109	97.5	100	96.1	107	105			
Bicarbonate	mg/L	380	369	394	338	327	341	445	261	130	175	242	255	251	260	238	272	341	306	281	312	355	496	433	407			
Chloride	mg/L	12.5	14.3	11.8	13.0	10.0	14.0	22	9	15	10	12	13	16	21.4	10.5	10.3	13.7	15.5	13.2	18.0	31.3	36.3	35.7	33.3			
Carbonate	mg/L	<5	25	13	17	<5	14	51	17	111	15	<5	<5	19	9.4	7.9	8.7	7.5	8.8	11	8.2	5	15.8	11.9	<5.0			
Conductivity (EC)	uS/cm	845	926	869	900	941	1080	1610	852	1170	430	529	639	702	602	546	571	661	580	568	614	723	964	885	844			
Calcium	mg/L	15.9	19.2	29.8	16.6	29.8	27.9	16.2	17.4	13.9	17.7	22.5	17.1	17.1	13.8	20.9	15.3	12.9	21.5	19.1	16.0	28.2	28.6	17.1	25.8			
Potassium	mg/L	15.1	15.5	15.8	13.4	17	16.5	23.4	13.5	12	9.8	14.1	13.9	13.2	13	12.8	10.4	12.9	15.3	14.5	15.7	15.5	21.4	20.5	19.0			
Magnesium	mg/L																											

Table D.4: Chemical Analytical Results

Sample ID:		Ewert D.3																									
Site Number:		4																									
Date Sampled:	Units	16-Oct-1996	7-Oct-1997	9-Oct-1998	20-Oct-1999	11-Oct-2000	4-Oct-2001	8-Oct-2002	15-Oct-2003	14-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	16-Oct-2008	28-Oct-2009	18-Oct-2010	13-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019		
Chem. O ₂ Demand	mg/L	50	60	50	70	60	80	70	50	40	43	48	82	83	77	62.5	81	72	53	30	117	74	51	78	106		
Ammonia-N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.845	<0.050	<0.050	2.15	<0.050	<0.05	0.785	0.641	<0.050	0.655	<0.050		
Total Kjeldahl Nitrogen	mg/L	2.7	1.8	2.1	2	1.8	3.9	4.6	3.9	3.1	1.5	1.5	2.3	2.9	3.38	2.08	2.66	4.3	2.04	1.88	5.40	3.84	2.55	3.31	3.22		
Total Organic Carbon	mg/L	19	21	21	18	23	26	29	17	24	15	19	25	-	-	-	-	-	-	-	-	-	-	-	-		
Dissolved Organic Carbon	mg/L	Not required under previous permit												20	26.6	22.9	21	27.8	23.5	19.3	28.4	27.2	51	38.0	28.3		
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	0.0018	0.0058	
BTEX, F1 (C6-C10) and F2 (>C10-C16)																											
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	
F1 (C ₇ -C ₁₀)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F2 - (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	
Dissolved Metals																											
Aluminum	mg/L	Not required under previous permit												<0.01	0.069	<0.010	<0.010	0.113	<0.010	<0.01	0.0024	0.0473	0.0052	0.0673	0.0107		
Antimony	mg/L	<0.0004	<0.0002	0.0007	<0.0004	0.0005	0.0005	0.001	0.0009	0.0014	0.0006	0.0014	0.0018	<0.0004	<0.00040	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.0018	0.0001	0.0001	0.00016	0.00016		
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0032	0.0031
Barium	mg/L	0.059	0.057	0.046	0.064	0.05	0.064	0.076	0.046	0.024	0.026	0.045	0.052	0.028	0.0629	0.0431	0.0261	0.0631	0.0330	0.0302	0.0300	0.0433	0.0288	0.0656	0.0418		
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	0.029	0.044	0.018	0.035	0.039		
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050		
Chromium	mg/L	<0.005	<0.005	n/a	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		
Cobalt	mg/L	<0.002	0.004	0.025	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00039	0.00024	0.00046	0.00095	0.00036		
Copper	mg/L	0.002	<0.001	0.011	0.003	0.002	0.006	0.009	0.004	0.002	<0.001	<0.001	0.002	<0.001	<0.0010	0.0023	<0.0010	0.0012	<0.0010	<0.001	<0.00020	0.00661	0.0013	0.00163	0.00163		
Iron	mg/L	0.951	0.987	0.462	1.770	0.671	1.870	3.11	0.793	0.666	0.328	0.561	1.82	0.181	0.455	0.05	0.194	0.236	0.037	0.247	0.089	1.79	0.659	0.848	1.01		
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	0.00019	<0.00010	<0.00010	<0.00050	<0.00010	<0.0001	<0.000050	0.000132	0.000168	0.000389	0.000211		
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0153	0.0125
Manganese	mg/L	Not required under previous permit												0.008	0.0812	<0.0020	<0.0050	0.082	0.0027	<0.002	0.0025	0.00451	0.0477	0.194	0.00879		
Mercury	mg/L	<0.0002	0.0012	0.0007	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.000050	0.000069	<0.000050	<0.000050	<0.000050		
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.000746	0.000389	0.00046	0.000956	0.000489		
Nickel	mg/L	<0.002	0.003	0.016	0.006	0.004	<0.002	0.006	0.005	<0.002	0.003	0.003	0.004	0.002	0.0039	0.0043	0.0025	0.0047	0.0024	<0.002	0.00122	0.00222	0.00281	0.00396	0.00281		
Selenium	mg/L	Not required under previous permit												<0.0004	<0.00080	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.000135	0.000153	0.000151	0.000192	0.000188		
Silver	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Thallium	mg/L	Not required under previous permit												0.0001	<0.00010	<0.00010	<0.00010	<0.050	<0.00010	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium	mg/L	Not required under previous permit												<0.001	0.0031	<0.0010	<0.0010	0.004	<0.0010	<0.001	<0.00030	0.00264	0.00083	0.00499	0.00168		
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.000531	0.000262
Vanadium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.001	0.00099	0.00102	0.00102	0.00193	0.00144		
Zinc	mg/L	0.011	0.02	0.019	0.007	0.002	0.043	0.017	0.007	0.036	0.002	0.004	0.007	0.015	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0089	<0.0010	0.0024	0.0151	<0.0010		
Routine Water																											
Ion Balance	%	106	108	107	98	102	96.1	101	103	99.6	103	104	99	96.9	114	104	93.9	94.1	104	106	98.3	106	95.1	105	103		
Bicarbonate	mg/L	250	232	244	232	255	265	381	234	272	153	179	207	232	289	241	259	298	245	200	205	247	326	308	290		
Chloride	mg/L	9.7	15.2	9.8	13.0	12.0	13.0	20	7	11	14	21	25	30	33.3	25.4	52.2	63.1	51.5	32.9	65.3	51	55.8	64.6	56.2		
Carbonate	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	12	<5.0	7.2	<5.0	<5.0	<5.0	<5	<5.0	<5.0	<5.0	<5.0			
Conductivity (EC)	uS/cm	462	480	476	488	523	543	860	403	545	277	363	460	488	577	506	608	682	547	448	568	549	679	708	622		
Calcium	mg/L	17.3	19.4	19.9	15.8	20.7	17.3	18.5	21.4	16.6	16.9	17.8	19.4	19.6	20.9	20.2	23.2	19.4	22.2	18.8	15.0	25.7	21.5	23.4	22.5		
Potassium	mg/L	16.2	13.4	15	12.9	16.3	15	18.6	13.1	12.9	9.8	13.0	12.9	13.1	14.9	14	12.7	15.7	16.4	15.8	17.1	15	14.9	22.0	14.2		
Magnesium	mg/L	6.8	8.1	8.6	7.7	8.9	9.5	10.7	7.6	6.9	5.8	7.2	7.8	8.7	9.31	7.88	9.81	9.67	10.3	7.96	8.28	10.5	9.48	10.9	10.7		
Sodium	mg/L	70	77	75	69	74	7																				

Table D.5: Chemical Analytical Results

Sample ID:	Ewert D.4																																		
Site Number:	5																																		
Date Sampled:	Units	16-Oct-1996	7-Oct-1997	9-Oct-1998	20-Oct-1999	11-Oct-2000	4-Oct-2001	8-Oct-2002	15-Oct-2003	14-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	16-Oct-2008	28-Oct-2009	18-Oct-2010	12-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019										
Chem. O ₂ Demand	mg/L	30	40	50	80	60	60	60	50	40	103	123	82	78	98.5	69.6	66	95	67	79	109	30	102	86	92										
Ammonia-N	mg/L	<0.05	<0.05	0.042	<0.05	<0.05	0.06	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	0.124	<0.050	0.055	0.103	0.098	<0.05	0.059	<0.050	<0.050	0.120	<0.050										
Total Kjeldahl Nitrogen	mg/L	1.5	1.2	2.7	2.3	1.7	3.1	3.4	2.1	3.1	4	5	6	2.9	4.74	3.2	2.8	3.17	2.82	2.25	3.33	2.88	3.48	2.91	3.61										
Total Organic Carbon	mg/L	16	17	21	19	18	23	31	20	23	35	48	26	-	-	-	-	-	-	-	-	-	-	-	-										
Dissolved Organic Carbon	mg/L	Not required under previous permit												22	31.2	28	27.2	30.6	26.6	23	31.9	29.4	102	38.0	22.7										
Phenols	mg/L	-												-	-	-	-	-	-	-	-	-	-	-	0.0015	0.0076									
BTEX, F1 (C6-C10) and F2 (>C10-C16)																																			
Benzene	mg/L	-												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050					
Toluene	mg/L	-												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050					
Ethylbenzene	mg/L	-												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050				
Xylenes (m & p)	mg/L	-												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050			
Xylene (o)	mg/L	-												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylenes	mg/L	-												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071
Styrene	mg/L	-												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
F1 (C ₆ -C ₁₀)	mg/L	-												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F1 (C ₆ -C ₁₀) - BTEX	mg/L	-												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 - (C ₁₀ -C ₁₆)	mg/L	-												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.13	<0.10	<0.10	<0.10	0.77
Dissolved Metals																																			
Aluminum	mg/L	-												0.02	0.033	0.053	0.011	<0.010	<0.010	<0.01	0.0238	0.0013	0.0062	0.0194	0.0015	0.0015									
Antimony	mg/L	<0.0004	<0.0002	0.0009	0.0004	0.0005	0.0006	0.0011	0.0011	0.0019	0.0011	0.002	0.003	0.0005	<0.00040	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.00031	0.00018	0.00022	0.00025	0.00015	0.0015									
Arsenic	mg/L	-												0.127	0.0772	0.0843	0.0335	0.0722	0.148	0.0639	0.0651	0.0524	0.0903	0.0588	0.0528	0.0013	0.0015								
Barium	mg/L	0.054	0.058	0.058	0.135	0.083	0.056	0.203	0.069	0.054	0.126	0.1	0.1	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010									
Beryllium	mg/L	-												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050			
Boron	mg/L	-												<0.001	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050									
Chromium	mg/L	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050									
Cobalt	mg/L	<0.002	0.003	0.021	0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020									
Copper	mg/L	0.003	<0.001	0.01	0.005	0.004	0.006	0.011	0.005	0.002	0.004	0.002	0.002	0.001	0.0017	0.0042	<0.0010	0.0017	0.0011	<0.001	0.00139	0.00084	0.00095	0.00102	0.00054	0.00054									
Iron	mg/L	1.310	1.180	1.100	4.150	2.190	0.964	9.66	1.32	0.463	2.31	3.8	1.92	0.058	0.083	0.171	0.044	0.152	0.044	0.043	0.111	0.04	0.12	0.087	0.026	0.026									
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00010	0.00019	<0.00010	<0.00050	<0.00010	<0.0001	0.000119	<0.00050	0.000096	0.00010	<0.00050										
Lithium	mg/L	-												0.004	0.0021	0.007	<0.0020	0.0024	<0.0020	<0.002	0.0038	0.00066	0.00532	0.00626	0.00080	0.00080									
Manganese	mg/L	-												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Mercury	mg/L	<0.0002	0.0009	0.0009	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	0.0000108	<0.000050	<0.000050	<0.000050									
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00329	0.00216	0.00196	0.0019	0.00118										
Nickel	mg/L	0.003	<0.002	0.014	0.01	0.008	0.004	0.013	0.009	0.003	0.011	0.01	0.008	0.009	0.0066	0.0063	0.0056	0.0066	0.0079	0.0052	0.00487	0.00606	0.00687	0.00569	0.00406										
Selenium	mg/L	-												0.0006	0.00056	0.00046	<0.00040	<0.00080	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040		
Silver	mg/L	-												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Thallium	mg/L	-												<0.0001	<0.00010	<0.00010	<0.00010	<0.050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Tin	mg/L	-												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Titanium	mg/L	0.001	0.002	0.0037	<0.0010	0.0025	<0.0010	0.00345	<0.0010	0.00345	<0.0010	0.00345	<0.0010	0.001	0.002	0.0037	<0.0010	0.0025	<0.0010	<0.0010	0.00345	<0.0010	0.00345	<0.0010	0.00345	<0.0010									
Uranium	mg/L	-												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium	mg/L	-												<0.001	0.001	0.0013	<0.0010	0.0014	<0.0010	0.0014	<0.0010	<0.001	0.00294	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	0.007	0.018	0.023	0.012	0.007	0.052	0.023	0.004	0.05	0.02	0.005	0.009	0.003	<0.0020	<0.0020	<0.0020	<0.0020	0.002	<0.0020	0.0087	<0.0010	0.001	<0.0010	<0.0010	<0.0010									
Routine Water																																			
Ion Balance	%	109	109	100	99	103	93.5	99.1	97	97	102	102	97.4	99.2	99.1	106	92	93.1	106	108	96.2	114	92.9	115	102										
Bicarbonate	mg/L	286	294	338	360	352	342	485	289	274	317	407	348	357	337	313	336	369	357	303	280	324	442	398	356										
Chloride	mg/L	4.2	4.3	3.4	6.0	6.0	9.0	14	12	16	18	28	20	23	21.7	19.7	15.2	19.4	21.4	15.2	18.5	17.5	19.4	21.7	18										
Carbonate	mg/L	25	17	<5	24	7	42	46	56	65	30	<5	<5	10	21.8	14.9	7	13.9	10.0	12.2	38.0	<5.0	7.2	<5.0	6.6										
Conductivity (EC)	uS/cm	645	601	565	682	658	735	974	735	711	598	700	602	637	627	606	613	666	668	587	627	599	742	713	624										
Calcium	mg/L	14	12.8	14.3	18.1	16.4	10.7	13.7	14.5	10																									

Table D.6: Chemical Analytical Results

Sample ID:	Lyons D.1																											
Site Number:	6																											
Date Sampled:	Units	15-Oct-1996	3-Oct-1997	8-Oct-1998	20-Oct-1999	10-Oct-2000	5-Oct-2001	8-Oct-2002	15-Oct-2003	14-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	16-Oct-2008	28-Oct-2009	18-Oct-2010	13-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019			
Chem. O ₂ Demand	mg/L	50	50	80	90	80	80	160	60	60	56	61	84	71	91.1	59.8	63	83	75	71	101	71	70	78	89			
Ammonia-N	mg/L	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0021	<0.05	<0.05	<0.050	0.155	0.202	0.252	<0.050	<0.05	0.053	1.35	<0.050	0.063	0.575			
Total Kjeldahl Nitrogen	mg/L	1.2	2	3.7	2.9	2.9	3.5	5.8	1.7	3.2	2	1.7	3.8	2.4	4.73	2.91	2.19	2.81	2.59	1.95	3.63	3.62	2.55	2.89	3.01			
Total Organic Carbon	mg/L	19	20	26	24	27	31	40	22	26	21	20	36	-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit												21	27.4	22.9	28.6	28.8	27.1	19.8	26.8	25	70	28.0	24.7			
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0013	0.0087	
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
F1 (C ₆ -C ₁₀)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F2 (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10	<0.13	<0.10	<0.10	
Dissolved Metals																												
Aluminium	mg/L	Not required under previous permit												<0.01	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0040	0.0962	0.0097	0.015	0.0306
Antimony	mg/L	<0.0004	0.0006	0.0006	<0.0004	0.0006	0.0006	0.0008	0.001	0.0012	0.0012	0.0021	0.0012	<0.0004	<0.00040	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.00025	0.00013	0.00014	0.00022	0.00017			
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.00522	0.00531
Barium	mg/L	0.052	0.058	0.066	0.085	0.078	0.082	0.105	0.015	0.046	0.023	0.044	0.075	0.053	0.0369	0.0554	0.0296	0.033	0.0623	0.0417	0.0472	0.0448	0.032	0.0495	0.0421			
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Boron	mg/L	Not required under previous permit												0.05	0.056	<0.050	<0.050	0.078	0.065	0.055	0.052	0.042	0.04	0.050	0.029			
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.000050	<0.000050	<0.000050	<0.0010	<0.000050	<0.00005	<0.000050	<0.000050	<0.000050	0.0000172	<0.000050			
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0010	0.0002	<0.0010	0.00011	0.0002			
Cobalt	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.002	0.00050	0.0003	0.0004	0.00063	0.00038			
Copper	mg/L	0.002	<0.001	<0.001	0.003	0.002	0.004	0.009	0.023	0.002	0.002	0.001	0.003	<0.001	<0.0010	0.0073	0.0011	0.0013	<0.0010	<0.001	0.00065	0.00066	0.0006	0.00071	0.00063			
Iron	mg/L	<0.005	0.377	0.854	1.910	1.640	1.020	2.28	0.642	0.418	0.145	0.141	2.57	0.026	0.071	0.015	0.089	0.03	0.094	0.024	0.040	0.629	0.121	0.136	0.958			
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000189	0.000056	0.000112	0.000229		
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0136	0.0074	
Manganese	mg/L	Not required under previous permit												0.002	0.033	<0.0020	<0.0050	0.0023	0.0127	<0.002	0.00338	0.00586	0.0135	0.00866				
Mercury	mg/L	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	0.000878	0.000596	0.000817	0.00112	0.00076			
Nickel	mg/L	0.002	<0.002	0.01	0.009	0.012	0.007	0.007	0.005	<0.002	0.003	0.005	0.009	0.006	0.004	0.0035	0.0035	0.0035	0.0038	0.0029	0.00278	0.00337	0.00397	0.00414	0.00361			
Selenium	mg/L	Not required under previous permit												0.0004	0.00042	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.000202	0.000194	0.000194	0.000273	0.000212
Silver	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Thallium	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0010	<0.0010	<0.0010	<0.0010	
Titanium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.001	0.00047	0.00568	0.00088	0.00113	0.00329		
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.000909	0.00234
Vanadium	mg/L	Not required under previous permit												0.001	0.0018	<0.0010	0.0016	0.0026	0.0023	0.0011	0.00334	0.00241	0.0021	0.00256	0.0025	0.0025		
Zinc	mg/L	0.007	0.038	0.028	0.01	0.017	0.038	0.008	0.006	0.053	0.001	0.005	0.012	0.002	<0.0020	<0.0020	0.0027	<0.0020	<0.0020	0.0052	<0.0010	0.0012	0.0021	<0.0010	0.0016			
Routine Water																												
Ion Balance	%	98	106	108	100	109	106	99.9	106	103	105	103	104	104	91.6	103	96.2	94.4	97.3	106	96.3	104	94.3	110	101			
Bicarbonate	mg/L	334	314	361	359	338	427	510	281	452	211	259	207	271	287	257	304	291	311	224	213	277	281	270	217			
Chloride	mg/L	7.5	8.3	11.5	12.0	12.0	17.0	24	14	35	23	15	19	19	25.1	21.3	19.9	18.4	29.2	22.1	20.9	19.4	17.7	20.6	12.9			
Carbonate	mg/L	<5	<5	<5	5	5	17	25	48	8	<5	<5	<5	<5	5.4	5.7	5.1	5.4	7.9	6.7	22.2	<5.0	<5.0	<5.0	<5.0			
Conductivity (EC)	uS/cm	844	734	735	900	887	1110	1980	1450	1680	504	612	455	594	612	591	649	605	595	490	526	523	510	519	405			
Calcium	mg/L	33.8	29.3	30.1	29	29.8	47.8	33.3	44.6	44.9	28.3	29	18.8	27.1	18.6	22.1	22.5	17.5	23.4	22.4	16.7	21.2	20.1	22.3	18.6			
Potassium	mg/L	11.6	12.5	16.1	14.6	17.8	20.9	24.1	19.3	23.6	15.5	17.1	18	17.3	16.3	15.5	16.2	16	17.3	14.6	15.3	19.3	17.5	21.7				

Table D.7: Chemical Analytical Results

Sample ID:		Lyons D.2																										
Site Number:		7																										
Date Sampled:	Units	15-Oct-1996	3-Oct-1997	8-Oct-1998	20-Oct-1999	10-Oct-2000	5-Oct-2001	8-Oct-2002	15-Oct-2003	14-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	16-Oct-2008	28-Oct-2009	18-Oct-2010	13-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019			
Chem. O ₂ Demand	mg/L	60	70	80	110	70	90	100	60	60	56	95	80	72	75	55.6	77	71	71	84	103	80	64	70	83			
Ammonia-N	mg/L	<0.05	0.48	0.16	0.15	<0.05	<0.05	<0.05	0.51	0.24	<0.05	<0.05	<0.05	<0.05	0.267	<0.050	0.663	<0.050	<0.050	<0.05	0.051	0.685	<0.050	1.17	0.414			
Total Kjeldahl Nitrogen	mg/L	2.5	2.8	2.8	3.8	2.7	4.9	5.2	3.5	4.2	2	2.9	3.4	2.7	3.27	2.53	3.15	2.66	3.83	2.62	3.75	3.69	2.45	4.37	2.58			
Total Organic Carbon	mg/L	24	23	25	24	23	26	30	25	35	23	29	30	-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit												20	25.9	20.5	30.4	25	25.2	21.5	27.4	26.9	64	25.0	23.4			
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0018	0.0075	
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
Xylenes (m & p)	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
Slyrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
F1 (C6-C10)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F1 (C6-C10) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 (C10-C16)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10	<0.13	<0.10	<0.10	<0.10
Dissolved Metals																												
Aluminium	mg/L	Not required under previous permit												<0.01	<0.010	<0.010	0.027	<0.010	0.015	<0.01	0.0070	0.0058	0.0096	0.0643	0.0613			
Antimony	mg/L	<0.0004	<0.0004	0.0037	<0.0004	0.0005	0.0005	0.0013	0.0013	0.0014	0.0017	0.0013	0.002	<0.0004	<0.00040	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.00023	0.00013	0.00015	0.00021	0.00012			
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.00407	0.00497	
Barium	mg/L	0.057	0.073	0.049	0.095	0.071	0.08	0.068	0.069	0.047	0.031	0.039	0.045	0.044	0.0588	0.041	0.0504	0.0469	0.0291	0.0503	0.0403	0.0263	0.0364	0.0655	0.0649			
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	0.056	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.053	0.026	0.037	0.044	0.022
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.000050	<0.000050	<0.000050	<0.0010	<0.000050	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
Chromium	mg/L	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00010	0.00017	<0.00010	0.00028	0.00018			
Cobalt	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00026	0.00029	0.00048	0.00079	0.00049			
Copper	mg/L	0.004	0.004	0.003	0.009	0.004	0.008	0.013	0.035	0.004	0.003	0.002	0.001	0.001	0.0018	0.0034	<0.0010	0.0013	0.0012	<0.001	0.00071	0.00073	0.00091	0.00116	0.00083			
Iron	mg/L	<0.005	0.837	0.680	2.430	0.680	1.480	1.64	0.601	0.113	0.122	0.215	0.547	0.056	0.044	0.023	0.839	0.016	0.028	0.036	0.013	0.268	0.083	0.275	1.51			
Lead	mg/L	<0.005	<0.005	<0.005	0.95	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00010	<0.00010	0.00032	<0.0050	<0.00010	<0.0001	<0.000050	<0.000050	0.00015	0.000218	0.000281			
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0137	0.0071	
Manganese	mg/L	Not required under previous permit												0.02	0.0318	<0.0020	0.0075	0.0055	0.0028	0.0026	0.0031	0.00297	0.0198	0.122	0.0361			
Mercury	mg/L	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	0.000007	<0.000050	<0.000050	<0.000050			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.000755	0.000696	0.000893	0.00102	0.00063				
Nickel	mg/L	0.003	<0.002	0.007	0.007	0.005	0.005	0.006	0.006	<0.002	0.004	0.005	0.004	0.004	0.0042	0.0038	0.0043	0.0034	0.0030	0.0027	0.00433	0.00483	0.00453	0.00341				
Selenium	mg/L	Not required under previous permit												0.0005	0.00041	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	0.000175	0.000252	0.000205	0.00023	0.00023	0.00022	0.00012	
Silver	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.0050	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Thallium	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.050	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	0.000018	<0.000010		
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.00010	<0.0001	0.00018	<0.00010	<0.00010	<0.00010		
Titanium	mg/L	Not required under previous permit												0.001	<0.0010	<0.0010	0.0028	<0.0010	<0.0010	<0.0010	<0.001	<0.00030	0.0013	0.00052	0.00545	0.00488		
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.000787	0.000266	
Vanadium	mg/L	Not required under previous permit												0.002	0.0027	0.0022	0.0022	0.002	0.002	0.0022	0.001	0.00394	0.00253	0.00196	0.0023	0.00206		
Zinc	mg/L	0.012	0.033	0.03	0.007	0.009	0.068	0.009	0.017	0.046	0.002	0.007	0.006	0.014	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0054	<0.0010	0.0026	0.0122	<0.0010	0.0018			
Routine Water																												
Ion Balance	%	107	104	107	99	104	96.7	99.9	106	101	103	103	95.9	102	104	106	96.6	98.5	108	106	96.6	101	94.1	109	97.4			
Bicarbonate	mg/L	300	318	351	326	348	372	406	386	346	308	288	250	289	318	257	254	354	300	270	279	222	296	278	232			
Chloride	mg/L	9.9	11.7	15.3	15.0	15.0	20.0	23	24	30	27	28	19	24	23.7	25	14.1	24.3	32.8	26.9	28.6	11.8	20	21.4	15.6			
Carbonate	mg/L	<5	<5	<5	7	7	35	48	38	58	5	13	<5	13	21.5	33.7	<5.0	12.3	10.9	13.8	14.6	<5.0	<5.0	<5.0	<5.0			
Conductivity (EC)	uS/cm	600	650	643	721	791	963	1120	1120	1300	772	738	478	657	759	799	505	737	653	590	604	408	525	536	435			
Calcium	mg/L	25.6	25.7	25.6	23.8	30.5	43.6	25.4	30.4	28.6	29	25.9	19	28.4	32.7	26.1	20.6	25.6	28.1	19.1	22.2	15.5	19.3	22.5	17.4			
Potassium	mg/L	20	18.5	23.1	20.5	23.1	26.3	29.9	28.2	26	22.1	22.3	19.7	20.7	23.4	22.7	14.1	21.5	18.6	17	19.0	15.2	18.9	21.8	18.5			
Magnesium	mg/L	8.3																										

Table D.8: Chemical Analytical Results

Sample ID:		Lyons D.3																											
Site Number:		8																											
Date Sampled:	Units	15-Oct-1996	3-Oct-1997	8-Oct-1998	20-Oct-1999	10-Oct-2000	5-Oct-2001	8-Oct-2002	15-Oct-2003	14-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	16-Oct-2008	28-Oct-2009	18-Oct-2010	13-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019				
Chem. O ₂ Demand	mg/L	40	100	70	100	90	110	230	80	60	66	92	78	105	110	64.1	86	108	67	127	150	149	232	171	105				
Ammonia-N	mg/L	0.05	0.74	<0.05	<0.05	0.31	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	0.14	<0.05	<0.050	0.133	0.264	0.434	<0.050	0.08	0.256	0.099	0.082	0.186	<0.050				
Total Kjeldahl Nitrogen	mg/L	2.7	4.7	2.7	3	3.2	6.5	22.2	2.8	2.7	2.4	2.9	3.5	3.9	5.64	2.98	3.48	4.78	2.39	5.93	5.61	6.45	9.34	8.83	3.66				
Total Organic Carbon	mg/L	19	36	27	30	34	42	151	27	29	26	32	33	-	-	-	-	-	-	-	-	-	-	-	-				
Dissolved Organic Carbon	mg/L	Not required under previous permit													31	41.8	24.5	30.4	34.9	29.5	27.6	47.3	35.8	232	41.4	30.9			
Phenols	mg/L	Not required under previous permit													-	-	-	-	-	-	-	-	-	-	-	-	0.0021	0.0137	
BTEX, F1 (C6-C10) and F2 (>C10-C16)																													
Benzene	mg/L	Not required under previous permit													<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Toluene	mg/L	Not required under previous permit													<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Ethylbenzene	mg/L	Not required under previous permit													<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Xylenes (m & p)	mg/L	Not required under previous permit													-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylene (o)	mg/L	Not required under previous permit													-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
Xylenes	mg/L	Not required under previous permit													<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
Styrene	mg/L	Not required under previous permit													-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
F1 (C ₉ -C ₁₀)	mg/L	Not required under previous permit													<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F1 (C ₉ -C ₁₀) - BTEX	mg/L	Not required under previous permit													<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F2 - (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit													<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10	<0.13	<0.10	<0.10	<0.10	
Dissolved Metals																													
Aluminium	mg/L	Not required under previous permit													0.82	0.104	<0.010	0.471	0.095	0.036	0.014	0.0507	0.0166	0.0196	0.0563	0.0192			
Antimony	mg/L	0.0006	0.0006	0.0008	<0.0004	0.0006	0.0006	0.0021	0.0011	0.0014	0.001	0.0014	0.0033	0.0007	0.00046	<0.00040	<0.00040	<0.00080	<0.00040	0.00052	0.00076	0.00043	0.00054	0.00096	0.0003				
Arsenic	mg/L	Not required under previous permit													-	-	-	-	-	-	-	-	-	-	-	-	0.00277	0.00261	
Barium	mg/L	0.117	0.136	<0.003	0.095	0.116	0.159	0.26	0.091	0.077	0.085	0.111	0.146	0.058	0.0835	0.0733	0.0607	0.105	0.0416	0.0408	0.119	0.0567	0.0797	0.108	0.0461				
Beryllium	mg/L	Not required under previous permit													<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Boron	mg/L	Not required under previous permit													<0.05	<0.050	0.055	<0.050	<0.050	<0.050	0.061	0.052	0.068	0.079	0.035	0.027			
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050	<0.00005	0.000062	0.0000078	0.0000064	0.000031	0.000068				
Chromium	mg/L	0.012	0.006	<0.005	<0.005	<0.005	0.017	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.00010	0.00015	<0.00010	0.00058	0.00010				
Cobalt	mg/L	0.003	<0.002	<0.002	<0.002	0.003	0.003	0.01	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0023	0.00100	0.00123	0.00182	0.00183	0.00161				
Copper	mg/L	0.008	0.004	0.001	0.004	0.004	0.009	0.032	0.016	0.004	0.004	0.004	0.01	0.003	0.0031	0.0062	0.0033	0.0033	0.0028	0.0031	0.00334	0.0046	0.00427	0.00582	0.00484				
Iron	mg/L	8.390	8.430	0.006	1.530	3.600	4.340	15.9	1.56	1.46	2.32	1.6	9.23	0.653	0.194	0.057	0.537	0.114	0.032	0.039	0.030	0.025	0.021	0.046	0.064				
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	0.0004	0.00015	<0.00010	0.00029	<0.00050	<0.00010	<0.0001	<0.000050	<0.00005	<0.000050	0.000076	0.000051				
Lithium	mg/L	Not required under previous permit													-	-	-	-	-	-	-	-	-	-	-	-	0.028	0.0166	
Manganese	mg/L	Not required under previous permit													0.035	0.0062	0.0089	0.0088	0.0195	0.0021	0.0174	0.00259	0.00127	0.00254	0.00185	0.00279			
Mercury	mg/L	0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0000050	0.0000051	<0.0000050	<0.0000050	<0.0000050				
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.023	<0.005	<0.005	<0.005	<0.005	0.006	0.006	<0.0050	<0.0050	<0.0050	0.0087	0.0062	0.007	0.0116	0.00669	0.00966	0.0144	0.00452				
Nickel	mg/L	0.01	0.012	<0.002	0.01	0.015	0.017	0.04	0.013	0.004	0.008	0.011	0.021	0.012	0.0093	0.0106	0.0093	0.0128	0.0089	0.0128	0.0135	0.0135	0.0133	0.0151	0.0112				
Selenium	mg/L	Not required under previous permit													0.0012	0.00117	0.00072	0.00067	0.00085	0.00067	0.00084	0.000916	0.00106	0.00113	0.000684				
Silver	mg/L	Not required under previous permit													<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Thallium	mg/L	Not required under previous permit													<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Tin	mg/L	Not required under previous permit													<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Titanium	mg/L	Not required under previous permit													0.032	0.0065	<0.0010	0.0168	0.0057	0.0022	0.0019	0.00143	0.00098	0.00045	0.0040	0.00244			
Uranium	mg/L	Not required under previous permit													-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.00318	
Vanadium	mg/L	Not required under previous permit													0.003	0.0035	<0.0010	0.0034	<0.0010	0.0018	0.0028	0.00110	0.0016	0.00149	0.00126	0.00110			
Zinc	mg/L	0.037	0.036	0.005	0.006	0.034	0.098	0.049	0.013	0.061	0.007	0.007	0.032	0.017	<0.0020	<0.0020	0.0024	<0.0020	<0.0020	0.0069	<0.0010	<0.0010	<0.0010	<0.0010	0.0017				
Routine Water																													
Ion Balance	%	99	106	110	101	104	109	101	103	98.4	106	103	102	94.6	98.4	108	95	96.9	102	110	95.3	112	95.2	113	103				
Bicarbonate	mg/L	335	383	391	405	446	503	872	387	329	339	314	357	393	386	329	380	389	376	339	474	353	516	409	413				
Chloride	mg/L	11.7	22.5	14.0	16.0	19.0	32.0	120	29	21	17	23	23	29	25.1	27.4	20.8	37.8	21.5	20.4	34.0	25.7	34.7	48.4	22.3				
Carbonate	mg/L	<5	<5	<5	19	<5	27	196	13	17	<5	<5	<5	13	32.3	17.2	7.4	7.8	20.4	25.8	13.5	7.7	24.6	12.7	14.5				
Conductivity (EC)	uS/cm	810	689	717	897	998	1440	2980	913	760	628	693	673	781	782	807	733	948	815	937	1210	855	1230	1420	978				
Calcium	mg/L	17.7	22.5	20.8	19.6	30.1	30.6	12.8	32.3	18.3	20.8	25.4	26	24.4	17.6	42.4	24.2	17	28.6	33.2	24.4	42.4	33.3	37.6	41.3				
Potassium	mg/L	7.3	20.6	11	10.8	16.1	18.9	21.1	19.1	18	15.3	17.9	18.8	16.8	17.5	22.7	15.8	17	21.2	22	20.9	27.6	30.2	29.2	22.2				
Magnesium	mg/L	8.9	10.9	10.0	11.2	15.4	22.8	30.2	16.8	13.1	13.8	14	15.7	15.7	14.5	18.3	13.6	12.4	18.2	18.5	14.6	21.2	25.8	23.1	24.6				
Sodium	mg/L	146	122	166	169	180																							

Table D.9: Chemical Analytical Results

Sample ID:		Lyons D.4																													
Site Number:		9																													
Date Sampled:	Units	15-Oct-1996	3-Oct-1997	8-Oct-1998	20-Oct-1999	10-Oct-2000	5-Oct-2001	8-Oct-2002	15-Oct-2003	15-Oct-2004	20-Oct-2005	13-Oct-2007	3-Oct-2007	16-Oct-2008	28-Oct-2009	18-Oct-2010	12-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019						
Chem. O ₂ Demand	mg/L	60	50	190	730	250	290	E M P T Y	90	90	126	112	130	132	131	84.4	165	149	95	132	155	120	202	221	137						
Ammonia-N	mg/L	<0.05	<0.05	0.06	1.59	0.89	5.69		0.16	0.73	0.42	0.68	<0.05	<0.05	0.065	<0.050	0.143	0.491	<0.050	0.055	0.137	0.111	3.04	1.82	0.397						
Total Kjeldahl Nitrogen	mg/L	3.9	2.5	5	19.6	2.6	20.2		3.8	3.8	5.1	7.3	5.9	5.1	6.39	4.36	6.18	4.78	3.71	4.04	6.38	6.87	11.1	10.3	4.26						
Total Organic Carbon	mg/L	33	20	47	184	156	26		33	33	47	48	51	-	-	-	-	-	-	-	-	-	-	-	-						
Dissolved Organic Carbon	mg/L	Not required by previous permit							Not required by previous permit							35	54	33.6	69.2	56.5	37.8	42	47.7	49.2	202	74.0	42.9				
Phenols	mg/L	Not required by previous permit							Not required by previous permit							-	-	-	-	-	-	-	-	-	-	-	0.0019	0.0088			
BTEX, F1 (C6-C10) and F2 (>C10-C16)																															
Benzene	mg/L	Not required by previous permit							Not required by previous permit							<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Toluene	mg/L	Not required by previous permit							Not required by previous permit							<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	mg/L	Not required by previous permit							Not required by previous permit							<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Xylenes (m & p)	mg/L	Not required by previous permit							Not required by previous permit							-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylene (o)	mg/L	Not required by previous permit							Not required by previous permit							-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylenes	mg/L	Not required by previous permit							Not required by previous permit							<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
Styrene	mg/L	Not required by previous permit							Not required by previous permit							-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
F1 (C ₆ -C ₁₀)	mg/L	Not required by previous permit							Not required by previous permit							<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required by previous permit							Not required by previous permit							<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 (C ₁₀ -C ₁₆)	mg/L	Not required by previous permit							Not required by previous permit							<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.13	<0.10	<0.10	<0.10	<0.10	
Dissolved Metals																															
Aluminum	mg/L	Not required by previous permit							Not required by previous permit							0.23	0.129	0.069	0.03	0.045	0.066	0.032	0.0313	0.0755	0.0785	0.0911	0.0764				
Antimony	mg/L	0.0009	0.0009	0.003	<0.0004	0.0021	0.0011	E M P T Y	0.0014	0.0021	0.0012	0.0016	0.0012	0.0006	<0.00040	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.00069	0.00024	0.00047	0.00058	0.00024						
Arsenic	mg/L	Not required by previous permit							Not required by previous permit							-	-	-	-	-	-	-	-	-	-	0.00685	0.00314				
Barium	mg/L	0.097	0.106	0.143	0.677	0.388	0.399		0.181	0.245	0.136	0.297	0.133	0.057	0.0671	0.0785	0.0171	0.0556	0.0851	0.0658	0.124	0.0338	0.0643	0.0935	0.0406						
Beryllium	mg/L	Not required by previous permit							Not required by previous permit							<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			
Boron	mg/L	Not required by previous permit							Not required by previous permit							<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	0.0000103	0.0000097	0.0000079	0.0000297	0.0000099					
Chromium	mg/L	0.008	<0.005	0.007	0.032	0.028	0.017	0.01	0.016	0.008	0.025	0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00011	0.00042	0.00025	0.00033	0.00031							
Cobalt	mg/L	<0.002	<0.002	<0.002	0.011	0.011	0.011	0.005	0.006	0.004	0.010	0.003	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00133	0.00063	0.00197	0.0022	0.00060							
Copper	mg/L	0.004	0.004	0.007	0.024	0.027	0.02	0.055	0.015	0.008	0.02	0.006	0.004	0.002	0.004	<0.0010	0.0013	0.0012	0.0015	0.00181	0.00152	0.00243	0.00383	0.00123							
Iron	mg/L	1.830	4.620	7.320	27.800	15.300	27.400	8.99	13.9	7.47	20.6	4.71	0.142	0.3	2.12	0.998	0.268	0.067	1.18	0.216	0.995	0.108	0.168	0.922							
Lead	mg/L	<0.005	<0.005	<0.005	0.016	0.016	0.01	0.006	0.008	<0.005	0.012	<0.005	0.0001	0.0003	0.00065	<0.00010	<0.00050	<0.00010	0.00054	0.000267	0.00028	0.00059	0.000125	0.000283							
Lithium	mg/L	Not required by previous permit							Not required by previous permit							-	-	-	-	-	-	-	-	-	-	0.0339	0.016				
Manganese	mg/L	Not required by previous permit							Not required by previous permit							0.001	0.004	0.03	0.0484	0.0031	0.0022	0.0062	0.00197	0.00355	0.147	0.0927	0.00266				
Mercury	mg/L	0.0004	<0.0002	<0.0002	<0.0002	0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050						
Molybdenum	mg/L	<0.005	<0.005	0.007	<0.005	0.008	0.01	0.007	0.008	<0.005	0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00953	0.00113	0.00311	0.00662	0.00184							
Nickel	mg/L	0.003	0.003	0.014	0.039	0.056	0.039	0.021	0.023	0.013	0.030	0.013	0.008	0.0079	0.0057	<0.0020	0.0092	0.0072	0.0062	0.0126	0.00526	0.00965	0.0132	0.00455							
Selenium	mg/L	Not required by previous permit							Not required by previous permit							0.0007	0.00095	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	0.000626	0.000393	0.000497	0.000795	0.000262				
Silver	mg/L	Not required by previous permit							Not required by previous permit							<0.0001	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010			
Thallium	mg/L	Not required by previous permit							Not required by previous permit							<0.0001	<0.00010	<0.00010	<0.00010	<0.050	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010			
Tin	mg/L	Not required by previous permit							Not required by previous permit							<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010			
Titanium	mg/L	Not required by previous permit							Not required by previous permit							0.01	0.008	0.0092	0.0024	0.0083	0.0026	0.0109	0.00518	0.00061	0.00269	0.0104	0.00661				
Uranium	mg/L	Not required by previous permit							Not required by previous permit							-	-	-	-	-	-	-	-	-	-	-	0.00446	0.00924			
Vanadium	mg/L	Not required by previous permit							Not required by previous permit							0.006	0.0025	0.003	0.0014	0.0051	0.0018	0.0022	0.00199	0.00334	0.00415	0.00393	0.00222				
Zinc	mg/L	0.038	0.025	0.058	0.029	0.605	0.088	0.032	0.143	0.063	0.079	0.021	0.012	<0.0020	<0.0020	<0.0020	<0.0020	0.0035	<0.0020	0.0066	<0.0010	0.0027	0.0017	<0.0010	0.0024						
Routine Water																															
Ion Balance	%	98	108	100	99	114	105	E M P T Y	104	103	105	102	98.1	98.6	99.9	109	92.8	94.8	110	104	98.9	110	97.7	112	101						
Bicarbonate	mg/L	385	331	459	705	650	636		402	411	429	459	428	343	405	318	470	599	425	297	413	356	619	564	442						
Chloride	mg/L	18.2	10.2	21.9	181.0	120.0	173.0		40	41	37	45	38	38	31.2	13.6	33.7	48.4	19.1	16.1	32.3	29.8	47.5	48.6	22.9						
Carbonate	mg/L	<5	<5	<5	<5	<5	<5		9	<5	<5	<5	<5	42	17.4	6.4	<5.0	17.3	7.5	9.8	10.6	<5	<5.0	<5.0	<5.0						
Conductivity (EC)	uS/cm	742	713	745	1740	1390	1840		887	891	730	879	760	774	758	553	921	1090	730	559	834	675	1050	1050	734						
Calcium	mg/L	23.1	20.5	21.9	39.5	45.9	56.6		39.1	29.5	27	28.2	24.4	22.7	20.5	27.7	29.4	31.9	36.6	25.3	28.7	23.5	28.8	28.6	22.2						
Potassium	mg/L	12.5	9.2	20.9	93.4	75.8	54.1	28.9	28.9	32.8	34.9	32.8	23.5	25.6	21.5	38.7	39.3	35.4	28.5	36.0	35.6	45.2									

Table D.10: Chemical Analytical Results

Sample ID:		Magneson D.1																										
Site Number:		10																										
Date Sampled:	Units	17-Oct-1996	3-Oct-1997	8-Oct-1998	19-Oct-1999	10-Oct-2000	5-Oct-2001	8-Oct-2002	21-Oct-2003	15-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	18-Oct-2010	12-Oct-2011	16-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019			
Chem. O ₂ Demand	mg/L	50	70	110	90	130	80	140	120	120	88	126	244	186	96.3	134	280	211	149	257	197	320	323	268	339			
Ammonia-N	mg/L	<0.05	0.27	0.85	1.6	1.42	0.36	0.53	0.21	0.79	0.13	0.13	0.13	<0.05	<0.050	0.167	0.134	0.138	0.086	0.157	0.215	0.571	0.200	0.123	0.104			
Total Kjeldahl Nitrogen	mg/L	2.5	2.8	4.7	5.2	5.5	8.6	6.2	4.2	4.8	3.7	4.5	7.6	6.7	5.59	10.2	9.14	7.93	3.88	8.78	8.94	12.3	11.7	10.4	11.0			
Total Organic Carbon	mg/L	20	24	38	32	44	53	55	43	43	37	45	54	-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit												55	34.7	72.3	85.5	64	77.4	58.1	93.9	106	323	91.0	102			
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.0017	0.0084
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
Xylenes (o)	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
F1 (C ₇ -C ₁₀)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	
F1 (C ₇ -C ₁₀) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	
F2 - (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit												<0.2	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.20	<0.13	<0.10	<0.10	
Dissolved Metals																												
Aluminium	mg/L	Not required under previous permit												2.43	0.075	0.866	0.59	1.63	1.84	<0.01	0.326	0.168	0.0146	0.302	0.039			
Antimony	mg/L	0.0005	0.001	0.0012	<0.0004	0.0008	0.0008	0.0012	0.0013	0.0013	0.001	0.0010	0.002	0.0009	<0.00040	0.00067	<0.00040	<0.00080	0.00049	<0.0004	0.00044	0.00045	0.00057	0.00059	0.0005			
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.0181	0.0175
Barium	mg/L	0.03	0.036	0.042	0.052	0.06	0.055	0.041	0.038	0.045	0.058	0.06	0.104	0.062	0.0618	0.0474	0.031	0.0645	0.0712	0.0308	0.0376	0.0623	0.0562	0.0720	0.0701			
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron	mg/L	Not required under previous permit												0.11	<0.050	0.115	0.072	0.086	0.085	0.087	0.087	0.107	0.091	0.091	0.091	0.091		
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0003	<0.000050	0.000055	0.000055	<0.0010	0.000074	<0.00005	0.000043	0.00005	0.000038	0.000056	0.00005			
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	0.00104	0.00114	0.00096	0.00115	0.00092			
Cobalt	mg/L	<0.002	<0.002	0.021	0.002	0.003	0.002	<0.002	<0.002	<0.002	0.002	0.002	0.005	<0.002	<0.0020	0.0026	0.0033	0.0044	0.0042	<0.002	0.00336	0.00442	0.00637	0.00608	0.0051			
Copper	mg/L	0.004	0.002	0.011	0.006	0.014	0.009	0.012	0.005	0.005	0.096	0.226	0.162	0.139	0.0014	0.0922	0.169	0.198	0.107	0.484	0.309	0.094	0.0532	0.0521	0.0255			
Iron	mg/L	<0.005	0.549	1.100	1.680	1.560	1.500	0.37	0.455	0.53	3.65	3.4	6.6	1.93	0.309	0.861	0.864	1.37	2.09	0.42	0.784	1.41	0.822	1.41	1.08			
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0014	0.00032	0.00083	0.0006	<0.0050	0.00284	0.00039	0.00053	0.00134	0.00076	0.00118	0.00105			
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0639	0.0537	
Manganese	mg/L	Not required under previous permit												0.029	0.0223	0.079	0.0699	0.232	0.440	0.0279	0.280	0.179	0.451	0.333	0.587			
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0000205	<0.0000050	<0.0000050	<0.0000050	0.000086			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0054	<0.0050	0.005	<0.0050	<0.005	0.00595	0.00523	0.00447	0.00457	0.00327			
Nickel	mg/L	0.007	0.01	0.016	0.012	0.014	0.011	0.013	0.013	0.01	0.015	0.02	0.022	0.022	0.0058	0.0239	0.0214	0.0316	0.0283	0.0226	0.0261	0.0287	0.0288	0.0293	0.0243			
Selenium	mg/L	Not required under previous permit												0.0021	<0.00040	<0.0020	0.00069	0.00084	0.00067	0.00051	0.00076	0.00077	0.00096	0.00099	0.00099	0.00080		
Silver	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Thallium	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Titanium	mg/L	0.119	0.006	0.0546	0.0342	0.0754	0.0836	0.0031	0.0226	0.0135	0.00819	0.0552	0.00886															
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.00196	0.00185
Vanadium	mg/L	Not required under previous permit												0.016	0.0034	0.0121	0.0106	0.0246	0.0201	0.0108	0.0139	0.0152	0.0155	0.0154	0.0131			
Zinc	mg/L	0.023	0.017	0.014	0.01	0.021	0.062	0.008	0.008	0.049	0.08	0.021	0.051	0.015	<0.0020	0.0065	0.0103	0.0143	0.0174	0.0304	0.0055	0.0123	0.0091	0.0071	0.0076			
Routine Water																												
Ion Balance	%	102	102	94	103	108	105	103	106	102	105	96.5	100	101	105	94.5	91.6	97.4	106	109	102	108	91.7	103	102			
Bicarbonate	mg/L	346	328	465	360	646	590	675	746	717	434	483	471	516	251	481	440	482	453	434	474	540	688	617	609			
Chloride	mg/L	73.1	70.5	96.1	97.0	110.0	159.0	161	149	158	94	101	123	157	12.2	149	126	142	136	151	147	174	200	197	202			
Carbonate	mg/L	19	16	<5	48	<5	64	86	60	90	16	30	10	19	53.6	28.4	7.9	15.5	14.0	19.7	12.5	15	<5.0	17.9	16.1			
Conductivity (EC)	uS/cm	1490	1150	1200	1420	1900	2160	2370	2500	2430	1410	1580	1430	1850	569	1930	1590	1750	1680	1830	1870	2030	2190	2150	2150			
Calcium	mg/L	28.4	27	28.6	28.3	40.7	40.3	40.6	44.4	48.9	32.3	35.0	38.2	45.5	19.8	44.3	32.8	40.3	45.7	42.9	43.1	48.8	46.1	51.1	51.7			
Potassium	mg/L	22.9	33.4	46.2	45.7	49.1	55.8	88	61.8	62.7	48.5	62.6	76.7	79.4	15.7	80.2	82.7	99.4	96.0	113	111	131	132	127	135			
Magnesium	mg/L	13.0	11.5	11.2	12.3	20.5	22.0	26.1	24.7	25.5	16.0	17.5	18.9	23.2	7.6	20.2	14.3	19.7	19.9	19.3	18.9	25.1						

Table D.12: Chemical Analytical Results

Sample ID:		Magneson D.3																													
Site Number:		12																													
Date Sampled:	Units	17-Oct-1996	Oct. 3, 97	8-Oct-1998	19-Oct-1999	10-Oct-2000	5-Oct-2001	8-Oct-2002	15-Oct-2003	15-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	19-Oct-2010	12-Oct-2011	15-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019						
Chem. O ₂ Demand	mg/L	10	30	30	50	40	40	30	30	30	40	39	49	53	57.2	45.1	42	49	37	59	49	37	57		119						
Ammonia-N	mg/L	0.06	<0.05	0.05	<0.05	<0.05	<0.05	0.12	<0.05	0.38	<0.05	<0.05	0.1	<0.05	<0.050	<0.050	<0.050	0.116	<0.050	<0.05	0.252	<0.050	<0.050		<0.050						
Total Kjeldahl Nitrogen	mg/L	1.3	<0.2	1.1	1	0.9	2.9	1.1	1.3	1.5	1	0.9	1.2	1.5	1.86	1.65	1.22	1.77	1.44	1.48	1.97	1.29	1.79		3.49						
Total Organic Carbon	mg/L	9	12	13	13	12	13	14	12	16	14	14	17	-	-	-	-	-	-	-	-	-	-		-						
Dissolved Organic Carbon	mg/L	Not required under previous permit														18	20.1	15.1	17.8	19.1	19.5	15.5	17.6	17.3	57		17.9				
Phenols	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		0.0136						
BTEX, F1 (C6-C10) and F2 (>C10-C16)																															
Benzene	mg/L	Not required under previous permit														<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Toluene	mg/L	Not required under previous permit														<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Ethylbenzene	mg/L	Not required under previous permit														<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Xylenes (m & p)	mg/L	Not required under previous permit														-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050
Xylene (o)	mg/L	Not required under previous permit														-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050
Xylenes	mg/L	Not required under previous permit														<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
Styrene	mg/L	Not required under previous permit														-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050
F1 (C6-C10)	mg/L	Not required under previous permit														<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F1 - BTEX	mg/L	Not required under previous permit														<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 - (>C10-C16)	mg/L	Not required under previous permit														<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10
Dissolved Metals																															
Antimony	mg/L	0.0004	0.0008	0.0012	<0.0004	0.0006	0.0005	0.0011	0.0011	0.0012	0.0014	0.0011	0.0018	0.0005	<0.00040	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.00054	0.00031	0.00027		0.00029						
Arsenic	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		0.00194					
Barium	mg/L	0.039	0.041	0.039	0.069	0.053	0.058	0.082	0.058	0.079	0.047	0.047	0.071	0.066	0.0646	0.0455	0.0687	0.0798	0.0262	0.0425	0.0968	0.0264	0.0913		0.0773						
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.000050	<0.000050	<0.000050	<0.0010	<0.000050	<0.00005	0.000084	0.0000249	0.0000585		0.0000188						
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.00010	<0.00010	<0.00010		0.00016						
Cobalt	mg/L	0.002	0.002	0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.002	0.00024	0.00018	0.00039		0.00052						
Copper	mg/L	0.006	0.002	0.009	0.002	0.004	0.004	0.007	0.005	0.007	0.003	0.003	0.002	0.002	0.0022	0.0087	0.0011	0.0015	0.0016	0.0014	0.00136	0.0013	0.00283		0.00242						
Iron	mg/L	<0.005	0.982	0.603	0.977	0.266	0.810	2.36	1.48	3.32	0.437	1.07	0.872	0.032	0.071	0.014	0.102	0.047	0.036	<0.01	0.018	<0.010	0.019		0.015						
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.0001	<0.000050	<0.000050	0.000087		<0.000050						
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		0.0409					
Molybdenum	mg/L	0.008	<0.005	0.007	0.006	<0.005	0.006	0.007	0.008	0.007	0.006	0.006	<0.005	0.007	0.0072	0.0217	0.0146	0.0169	0.0225	0.0212	0.0302	0.0302	0.0206		0.0254						
Nickel	mg/L	0.013	0.009	0.015	0.008	0.01	0.008	0.011	0.009	0.012	0.007	0.007	0.007	0.007	0.0081	0.0105	0.0113	0.0116	0.0127	0.013	0.0191	0.0172	0.0121		0.0203						
Zinc	mg/L	0.016	0.015	0.031	0.009	<0.001	0.032	0.01	0.009	0.066	0.004	0.009	0.009	0.009	<0.0020	<0.0020	0.0021	<0.0020	<0.0020	0.0079	0.0021	0.0015	0.0057		0.0028						
Mercury	mg/L	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.000050	<0.000050	<0.000050		<0.000050						
Aluminum	mg/L	Not required under previous permit														0.02	0.082	0.011	0.012	0.031	0.039	<0.01	0.0233	0.0023	0.0149		0.0033				
Beryllium	mg/L	Not required under previous permit														<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	<0.0010	<0.0010		<0.00010			
Boron	mg/L	Not required under previous permit														<0.05	<0.050	<0.050	0.058	0.055	0.055	0.053	0.065	0.061	0.071		0.060				
Manganese	mg/L	Not required under previous permit														0.002	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	<0.002	0.0009	0.00027	0.0211		0.00123				
Silver	mg/L	Not required under previous permit														<0.0001	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010		<0.000010				
Tin	mg/L	Not required under previous permit														<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.00010	<0.00010	0.00033		<0.00010				
Selenium	mg/L	Not required under previous permit														0.0007	0.00054	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.000412	0.000322	0.000233		0.000304				
Titanium	mg/L	Not required under previous permit														0.001	0.0037	<0.0010	<0.0010	0.0023	<0.0010	0.0025	<0.001	0.00114	<0.00030	0.00144		<0.00030			
Thallium	mg/L	Not required under previous permit														0.0002	<0.00010	<0.00010	<0.00010	<0.050	<0.00010	<0.0001	<0.000010	<0.000010	<0.000010		<0.000010				
Uranium	mg/L	Not required under previous permit														-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00247	
Vanadium	mg/L	Not required under previous permit														0.001	<0.0010	0.0015	0.0034	0.005	0.0127	0.0096	0.00866	0.0164	0.00285		0.00262				
Routine Water																															
Ion Balance	%	103	106	109	103	105	108	97.6	104	102	109	104	103	99.5	92.3	95.7	93.6	94.2	104	104	94.5	99.8	94.8		102						
Bicarbonate	mg/L	237	198	227	222	222	246	247	200	261	225	224	256	268	228	189	267	290	253	230	251	256	334		268						
Chloride	mg/L	4.4	3.9	4.4	5.0	4.0	6.0	7	6	8	6	7	6	12	10.6	24	19.2	24.5	24.4	21.3	20.9	18.2	18.3		14.7						
Carbonate	mg/L	<5	<5	<5	5	<5	<5	13	9	<5	<5	<5	<5	14	7.1	<5.0	7.1	6	6.7	8.4	<5.0	<5.0	6.4		<5.0						
Conductivity (EC)	uS/cm	876	603	632	745	789	918	1050	909	1110	779	790	683	831	918	989	928	1060	993	957	987	943	1020		960						
Calcium	mg/L	21.8	24.9	21.1	23	24.3	28.7	22.8	21.6	35.6	37.5	26.3	27.5	25.7	19	25.5	34.4	27.4	26.4	24.4	31.3	27.9	29.1		49.1						
Potassium	mg/L	6.9	6.6	7.3	7.3	7.8	8.4	9.5	7.1	7.7	7.1	8.4	8.5	8.6	8.39	8.8	8.06	10.9	11.6	10.7	11.5	10.4	11.1		13.6						
Magnesium	mg/L	8.0	6.4	7.9	8.8	10.2	12.0	13	10	11.0	10.6	10.4	9.9	12.4	12.4	13.1	13.5	14.2	16.0	14.7	11.8	15.5	15.3		17.4						
Sodium	mg/L	168	100	130	129	139	181	213	174	201	14																				

Table D.13: Chemical Analytical Results

Sample ID:	Magneson D.4																												
Site Number:	13																												
Date Sampled:	Units	7-Oct-1997	8-Oct-1998	19-Oct-1999	10-Oct-2000	5-Oct-2001	8-Oct-2002	15-Oct-2003	14-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	18-Oct-2010	12-Oct-2011	16-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019					
Chem. O ₂ Demand	mg/L	350	1430	680	1450	5260	E M P T Y	1270	E M P T Y	259	1120	1070	1440	E M P T Y	4810	1220	1550	1560	1580	1190	1300	1930	960	1370					
Ammonia-N	mg/L	9.72	2.35	2.41	14.6	1.73		0.77		0.26	1.48	1.37	0.67		5.11	4.39	2.04	2.24	0.828	1.37	3.13	1.37	0.409	2.85					
Total Kjeldahl Nitrogen	mg/L	27.8	86.2	30.7	<3	91.2		58.2		11.9	45.1	44.4	71		128	44.6	63.8	49.7	54.7	52.8	56.1	62	39.4	43.7					
Total Organic Carbon	mg/L	168	714	187	813	1690		356		105	271	251	-		-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit					E M P T Y	ired under previo	Not required under previous permit					527	E M P T Y	1430	554	392	756	609	531	507	1930	329	415				
Phenols	mg/L	Not required under previous permit						ired under previo	Not required under previous permit					-		1430	554	392	756	609	531	507	1930	329	415				
BTEX, F1 (C6-C10) and F2 (>C10-C16)																													
Benzene	mg/L	Not required under previous permit					E M P T Y	ired under previo	E M P T Y	Not required under previous permit					<0.0005	E M P T Y	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Toluene	mg/L	Not required under previous permit						ired under previo		<0.0005	0.00318	<0.00050	<0.00050	<0.00050	<0.00050		<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	Not required under previous permit						ired under previo		<0.0005	0.00107	<0.00050	<0.00050	<0.00050	<0.00050		<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes (m & p)	mg/L	Not required under previous permit						ired under previo		-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene (o)	mg/L	Not required under previous permit						ired under previo		-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes	mg/L	Not required under previous permit						ired under previo		<0.0005	0.00825	<0.00071	<0.00071	<0.00071	<0.00071		<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
Styrene	mg/L	Not required under previous permit						ired under previo		-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
F1 (C ₆ -C ₁₀)	mg/L	Not required under previous permit					E M P T Y	ired under previo	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required under previous permit						ired under previo	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
F2 - (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit						ired under previo	<0.2	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25				
Dissolved Metals																													
Aluminium	mg/L	Not required under previous permit					E M P T Y	ired under previo	Not required under previous permit					<0.2	E M P T Y	0.23	0.617	1.09	0.45	0.075	5.79	0.273	0.149	0.145	0.080				
Antimony	mg/L	<0.0002	0.003	<0.0004	0.0034	0.0021		0.0007	0.0019	<0.0004	0.0012	<0.008	0.0019	<0.0004		0.0012	<0.008	0.0019	<0.0004	0.0012	<0.008	0.0019	<0.0004	0.0012	<0.008	0.0019	<0.0004	0.0012	
Arsenic	mg/L	Not required under previous permit						ired under previo	Not required under previous permit					-		-	-	-	-	-	-	-	-	-	-	-	-		
Barium	mg/L	0.383	1.09	0.208	1.29	0.998		0.137	0.083	0.03	0.736	<0.06	0.317	0.0722		0.305	0.113	0.137	0.330	0.188	0.236	0.383	0.166						
Beryllium	mg/L	Not required under previous permit						ired under previo	Not required under previous permit					<0.02		<0.010	<0.0020	<0.0010	<0.050	<0.001	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
Boron	mg/L	Not required under previous permit						ired under previo	Not required under previous permit					<1		0.48	<0.10	0.318	<1.0	0.28	0.270	0.289	0.302	0.267	0.204				
Cadmium	mg/L	<0.001	<0.001	<0.001	0.002	<0.001		<0.001	<0.001	<0.001	<0.001	<0.002	<0.0010	<0.0010		<0.0010	<0.0010	0.00017	0.000114	0.000094	0.000061	0.000064	0.000079						
Chromium	mg/L	0.039	0.079	0.026	0.114	0.055		0.018	0.005	<0.005	0.07	<0.1	<0.0080	<0.010		0.0057	<0.010	<0.005	0.0119	0.00483	0.00492	0.00482	0.00285						
Cobalt	mg/L	0.024	0.063	0.011	0.069	0.061		0.008	0.006	0.003	0.036	<0.04	0.0218	<0.0040		0.013	0.014	0.0144	0.0154	0.0128	0.0108	0.00594	0.00794						
Copper	mg/L	0.017	0.084	0.017	0.136	0.188		0.018	0.0011	0.008	0.078	0.02	0.016	0.0031		0.0283	0.024	0.0335	0.0263	0.0138	0.0093	0.0069	0.0093						
Iron	mg/L	29.100	80.000	14.900	93.800	98.300		113	5.19	5.76	62.7	0.43	4.93	5.83		6.3	2.3	3.64	9.88	3.92	2.86	3.26	1.99						
Lead	mg/L	0.011	0.009	0.005	0.048	0.043		0.007	<0.005	<0.005	0.033	<0.002	0.003	0.00103		<0.0050	<0.0050	0.0044	0.00689	0.00385	0.00305	0.00422	0.00304						
Lithium	mg/L	Not required under previous permit						ired under previo	Not required under previous permit					-		-	-	-	-	-	-	-	-	-	-	-			
Manganese	mg/L	Not required under previous permit						ired under previo	0.3	1.83	1.18	1.18	0.649	0.615		1.15	0.945	1.06	1.39	0.748									
Mercury	mg/L	0.0009	<0.0002	<0.0002	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	0.0000184	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050								
Molybdenum	mg/L	0.006	0.019	0.006	0.036	0.017	0.005	0.021	<0.005	0.005	0.03	<0.0050	<0.010	0.0189	0.0409	0.0078	0.0179	0.00911	0.00492	0.00333	0.00193								
Nickel	mg/L	0.059	0.18	0.047	0.212	0.201	0.029	0.024	0.011	0.099	0.07	0.0998	0.0122	0.0658	0.085	0.0507	0.0553	0.0497	0.045	0.0350	0.0350								
Selenium	mg/L	Not required under previous permit					E M P T Y	ired under previo	0.014	<0.002	<0.0020	<0.0050	<0.010	<0.001	0.00014	0.000092	0.000075	0.00009	<0.000050	<0.000050	<0.000050	<0.000050							
Silver	mg/L	Not required under previous permit						ired under previo	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020							
Thallium	mg/L	Not required under previous permit						ired under previo	<0.002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010							
Tin	mg/L	Not required under previous permit					E M P T Y	ired under previo	<1	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050							
Titanium	mg/L	Not required under previous permit						ired under previo	<0.02	0.128	0.0338	0.0989	0.083	0.0437	0.334	0.0677	0.0592	0.0716	0.0444										
Uranium	mg/L	Not required under previous permit						ired under previo	-	-	-	-	-	-	-	-	-	-	-	-	-								
Vanadium	mg/L	Not required under previous permit					E M P T Y	ired under previo	0.06	0.0793	0.0072	0.0345	0.055	0.033	0.0481	0.0336	0.0351	0.0277	0.0286										
Zinc	mg/L	0.149	0.424	0.027	0.505	1.92		0.067	0.073	0.015	0.261	<0.04	0.094	0.0106	0.0284	<0.10	0.053	0.047	0.0421	0.0297	0.0247	0.032							
Routine Water																													
Ion Balance	%	104	102	105	107	107	E M P T Y	103	E M P T Y	102	111	98.1	95	E M P T Y	115	91.8	96.1	96.8	101	97.9	114	98.6	101	110					
Bicarbonate	mg/L	1240	1650	1450	2200	2500		1890		883	1570	1470	2830		2220	1320	2350	3210	1490	1540	1080	1830	1580	1310					
Chloride	mg/L	505	868	674	1420	2530		1640		424	921	605	2040		1190	480	1030	1930	807	744	615	932	894	603					
Carbonate	mg/L	29	70	95	<5	189		81		53	57	75	359		73	49.9	140	341	138	88.6	65.1	94.1	87.5	47.6					
Conductivity (EC)	uS/cm	3620	4920	4510	7690	11700		8430		3000	6190	3980	11500		7840	4020	7490	11,800	5830	5640	4620	6910	6470	4570					
Calcium	mg/L	86.3	113	74.1	205	212		244		113	144	108	61.9		177	86.6	165	119	93.5	113	89.2	105	118	84.2					
Potassium	mg/L	322	492	359	1090	1310		1120		329	678	545	1260		1290	481	976	1550	788	728	610	870	717	634					
Magnesium	mg/L	61.4	95.8	84.0	142.0	198.0		246		67.0	112	56	177		112	44.9	90.6	148	60.8	59.2	60.3	90	84.4	71.6					
Sodium	mg/L	517	870	709	1220	2450		1540		432	838	515	1760		915	365	898	1700	680	591	560	881	844	596					
Sulfate	mg/L	140	418	126	555	713		2150		448	75																		

Table D.14: Chemical Analytical Results

Sample ID:	Magneson D.5																											
Site Number:	14																											
Date Sampled:	Units	7-Oct-1997	8-Oct-1998	19-Oct-1999	10-Oct-2000	5-Oct-2001	8-Oct-2002	15-Oct-2003	15-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	18-Oct-2010	12-Oct-2011	16-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019				
Chem. O ₂ Demand	mg/L	90	120	130	120	280	440	240	130	156	117	153	191	181	98.2	156	178	146	100	146	184	268	243	370				
Ammonia-N	mg/L	0.05	0.32	0.1	0.08	<0.05	0.13	0.05	1.15	<0.05	1.04	0.52	0.95	0.432	0.087	0.135	0.084	<0.050	0.704	1.38	0.138	2.42	0.455	0.600				
Total Kjeldahl Nitrogen	mg/L	3.7	5.1	5.2	4.6	14.2	21.5	8.2	7	5.9	7.5	6.6	8.6	9.67	8.29	5.73	7.03	4.24	4.16	6.24	6.84	11.6	10.0	13.9				
Total Organic Carbon	mg/L	34	45	49	47	76	201	49	52	63	46	56	-	-	-	-	-	-	-	-	-	-	-	-				
Dissolved Organic Carbon	mg/L	Not required under previous permit												60	68.7	61.6	57.5	60.5	49.1	36.8	55.1	62.4	268	88.0	100			
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	0.0025	0.0071		
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050			
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050			
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071			
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050			
F1 (C ₆ -C ₁₀)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10		
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10		
F2 - (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit												<0.2	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10	<0.13	<0.10	<0.10		
Dissolved Metals																												
Aluminium	mg/L	Not required under previous permit												1.16	0.057	0.031	0.035	0.106	0.203	<0.01	0.0288	0.0636	0.297	0.0245	0.0182			
Antimony	mg/L	<0.0002	0.001	0.0009	0.0009	0.001	0.0022	0.0023	0.0021	0.0012	0.0022	0.0015	0.003	0.00138	0.00082	0.00072	0.00099	0.00104	0.00047	0.00055	0.00049	0.00045	0.00101	0.00073				
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.019	0.0155
Barium	mg/L	0.068	0.081	0.092	0.063	0.121	0.188	0.191	0.197	0.057	0.327	0.083	0.09	0.0835	0.0459	0.0428	0.0737	0.0697	0.0402	0.0616	0.0324	0.0255	0.0764	0.0337				
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020		
Boron	mg/L	Not required under previous permit												<0.05	<0.050	0.056	<0.050	<0.050	<0.050	<0.050	0.032	0.038	<0.020	<0.020	<0.020	0.048		
Cadmium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	0.00005	<0.000050	<0.000050	<0.0010	<0.000050	<0.00005	<0.00010	<0.00010	<0.00010	0.000019	0.000012				
Chromium	mg/L	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.024	0.019	<0.005	0.047	0.008	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.00020	0.00043	0.00068	0.00025	0.00025	0.00055				
Cobalt	mg/L	0.005	0.022	0.004	0.003	0.003	0.008	0.014	0.01	0.004	0.015	0.005	0.004	0.0034	0.0035	0.0034	<0.0020	<0.0020	0.003	0.00218	0.00169	0.00234	0.00364	0.00428				
Copper	mg/L	<0.001	0.014	0.009	0.007	0.008	0.032	0.028	0.016	0.005	0.031	0.008	0.008	0.0055	0.0118	0.0063	0.0035	0.0031	0.0023	0.00201	0.00214	0.00112	0.0052	0.00527				
Iron	mg/L	2.770	3.470	3.220	1.510	4.460	6.480	15.2	13.1	0.725	32.2	3.34	0.726	0.059	0.064	0.05	0.098	0.143	<0.01	<0.020	0.322	0.223	0.070	0.277				
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.01	0.009	<0.005	0.025	<0.005	0.0086	<0.00010	<0.00010	<0.00010	<0.0050	0.00020	<0.0001	<0.00010	0.00024	0.00021	0.00011	0.00037				
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0576	0.0533	
Manganese	mg/L	Not required under previous permit												0.066	<0.0020	0.0384	0.0024	0.0033	0.0047	0.0375	0.00208	0.0381	0.633	0.00515	0.220			
Mercury	mg/L	<0.0004	<0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.000050	0.0000118	<0.000050	<0.000050	0.0000063				
Molybdenum	mg/L	<0.005	0.005	0.007	0.007	0.012	0.065	0.014	0.019	0.016	0.015	0.008	0.04	0.0326	0.0122	0.0191	0.0458	0.0444	0.0131	0.0218	0.00595	0.00653	0.0110	0.00592				
Nickel	mg/L	0.011	0.024	0.02	0.019	0.019	0.071	0.056	0.042	0.025	0.055	0.025	0.033	0.0319	0.0283	0.0314	0.0408	0.0253	0.0204	0.0236	0.0165	0.0168	0.0232	0.0225				
Selenium	mg/L	Not required under previous permit												0.0018	0.002	<0.0020	0.00121	0.00091	0.00072	0.00063	0.00087	0.00067	0.00062	0.00078	0.00062	0.00088		
Silver	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.0050	<0.00010	<0.0001	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020		
Thallium	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.0050	<0.00010	<0.0001	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020		
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020		
Titanium	mg/L	Not required under previous permit												0.05	0.0037	0.0041	0.0015	0.0037	0.0164	<0.001	0.00148	0.00805	0.0116	0.00511	0.00459			
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	0.00351	0.0023		
Vanadium	mg/L	Not required under previous permit												0.009	0.0044	0.0074	0.0294	0.0365	0.0286	0.0162	0.0138	0.0178	0.018	0.0188	0.0269			
Zinc	mg/L	0.032	0.052	0.013	0.064	0.246	0.031	0.098	0.168	0.01	0.210	0.036	0.006	0.0108	0.003	0.0021	<0.0020	<0.0020	0.0071	<0.0020	0.0028	0.0033	<0.0020	0.004				
Routine Water																												
Ion Balance	%	109	100	108	105	107	102	98.2	107	104	102	98.7	100	104	105	91.5	95.3	103	111	94.5	107	94.4	99.5	104				
Bicarbonate	mg/L	360	529	455	408	571	1370	482	622	408	658	533	687	664	491	537	709	549	521	713	589	1100	932	850				
Chloride	mg/L	40.9	51.6	57.0	60.0	109.0	323.0	104	103	106	99	95	140	126	76.7	82.1	114	89.3	54.9	81.4	71.4	143	145	175				
Carbonate	mg/L	26	<5	60	45	69	89	20	19	19	<5	22	29	67.1	19.8	73	46.7	68.9	42.9	40.3	22.4	18.7	37.6	21.7				
Conductivity (EC)	uS/cm	1020	976	1200	1030	1460	3320	1410	1700	1530	1460	1500	1830	1810	1280	1610	1950	1480	1370	1640	1520	2080	2030	2120				
Calcium	mg/L	30.4	31.1	32	23.7	33.1	36.3	43	48.5	46.2	23.7	30.9	33.8	30	31.8	39.7	32.9	29.2	33.7	34.3	38.5	43.4	35.6	50.3				
Potassium	mg/L	40.4	43.2	42.2	32.6	35.1	43.1	57.1	52.5	48.1	35.7	52.6	42.9	40.6	57	52.1	45	40.3	42	44.9	54.5	83.8	67.2	119				
Magnesium	mg/L	11.8	12.2	13.5	10.5	12.3	23.2	15.1	18.7	17.2	9.7	15.3	14.2	15.3	13.2	16.9	14.6	11.3	15.6	13.5	20.4	26.1	18.2	35.9				
Sodium	mg/L	194	184	238	205	367	802	253	307	323	299	235	359	388	227	252	363	296	261	274	263	375	391	353				
Sulfate	mg/L	146	75.2	101	70.2	55	152	221	250	179	97.6	117	162	157	114	172	210	99.7	117	74.4	144	45.4	71.6	162				
Phosphorus	mg/L	Not required under previous permit												-	0.77	3.05	2.74	1.27										

Table D.15: Chemical Analytical Results

Sample ID:		Magneson D.6				
Site Number:		15				
Date Sampled:	Units	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019
Chem. O ₂ Demand	mg/L	121	106	127	125	125
Ammonia-N	mg/L	0.088	0.056	0.27	<0.050	<0.050
Total Kjeldahl Nitrogen	mg/L	4.06	4.16	4.05	4.58	4.16
Total Organic Carbon	mg/L	-	-	-	-	-
Dissolved Organic Carbon	mg/L	43.1	33	127	43.0	33.1
Phenols	mg/L	-	-	-	0.0021	0.013
BTEX, F1 (C₆-C₁₀) and F2 (>C₁₀-C₁₆)						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes (m & p)	mg/L	-	-	-	<0.0005	<0.00050
Xylene (o)	mg/L	-	-	-	<0.0005	<0.00050
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071
Styrene	mg/L	-	-	-	<0.0005	<0.00050
F1 (C ₆ -C ₁₀)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
F1 (C ₆ -C ₁₀) - BTEX	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
F2 - (C ₁₀ -C ₁₆)	mg/L	<0.10	<0.13	<0.10	<0.10	<0.10
Dissolved Metals						
Aluminium	mg/L	0.0224	0.0167	<0.0050	0.0151	0.0051
Antimony	mg/L	0.00080	0.0007	0.00103	0.00113	0.00086
Arsenic	mg/L	-	-	-	0.019	0.0134
Barium	mg/L	0.0342	0.0266	0.0375	0.0302	0.0512
Beryllium	mg/L	<0.0005	<0.00050	<0.00050	<0.00020	<0.00020
Boron	mg/L	0.306	0.279	0.337	0.301	0.237
Cadmium	mg/L	<0.000025	<0.000025	<0.000025	0.000018	0.000012
Chromium	mg/L	<0.00050	<0.0005	<0.00050	<0.00020	<0.00020
Cobalt	mg/L	0.00061	0.00086	0.00133	0.00089	0.00075
Copper	mg/L	<0.0010	0.0016	<0.0010	0.00103	0.00174
Iron	mg/L	<0.050	<0.050	0.063	0.037	0.023
Lead	mg/L	<0.00025	<0.00025	<0.00025	<0.00010	<0.00010
Lithium	mg/L	-	-	-	0.13	0.0978
Manganese	mg/L	0.00404	0.00561	0.532	0.00962	0.00599
Mercury	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.00327	0.00254	0.0016	0.00211	0.00179
Nickel	mg/L	0.0072	0.0069	0.0086	0.0067	0.0082
Selenium	mg/L	0.00033	0.00037	<0.00025	0.00032	0.00029
Silver	mg/L	<0.000050	<0.000050	<0.000050	<0.000020	<0.000020
Thallium	mg/L	<0.000050	<0.000050	<0.000050	<0.00002	<0.000020
Tin	mg/L	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020
Titanium	mg/L	0.0016	<0.0015	<0.0015	0.00146	0.00134
Uranium	mg/L	-	-	-	0.00442	0.00507
Vanadium	mg/L	0.00450	0.0052	0.0044	0.0042	0.0063
Zinc	mg/L	<0.0050	<0.0050	<0.0050	0.0020	<0.0020
Routine Water						
Ion Balance	%	104	106	94.3	98.7	101
Bicarbonate	mg/L	593	343	694	538	520
Chloride	mg/L	334	235	340	359	286
Carbonate	mg/L	30.9	13.1	20	14.5	16.6
Conductivity (EC)	uS/cm	4080	2790	4020	4070	3120
Calcium	mg/L	54.3	40.2	70.2	41.7	97.9
Potassium	mg/L	31.3	27.1	29.6	29.8	34.1
Magnesium	mg/L	55.5	42.5	56.4	58.5	56.6
Sodium	mg/L	785	528	729	794	558
Sulfate	mg/L	990	711	1030	1120	818
Phosphorus	mg/L	0.707	0.385	0.963	0.486	0.745
pH in H ₂ O	pH	8.61	8.56	8.52	8.47	8.52
TDS (Calculated)	mg/L	2570	1770	2620	2680	2120
Nitrate	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrite	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrate and Nitrite (as N)	mg/L	-	-	-	<0.11	<0.101
Hardness as CaCO ₃	mg/L	-	-	-	345	478
Alkalinity (total as CaCO ₃)	mg/L	-	-	-	465	454
Hydroxide	mg/L	-	-	-	<5	<5.0
Fluoride	mg/L	-	-	-	0.22	0.35
Field Data						
pH in H ₂ O	pH	8.68	9.5	8.5	10.9	9.48
Conductivity (EC)	uS/cm	4120	2730	4300	4140	3.82

Table D.16: Chemical Analytical Results

Sample ID:		Beaver D.1																											
Site Number:		16																											
Date Sampled:	Units	18-Oct-1996	3-Oct-1997	8-Oct-1998	20-Oct-1999	11-Oct-2000	4-Oct-2001	9-Oct-2002	16-Oct-2003	14-Oct-2004	21-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	19-Oct-2010	12-Oct-2011	16-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019				
Chem. O ₂ Demand	mg/L	60	70	90	90	80	100	80	50	70	59	65	78	85	140	66.4	89	302	73	105	60	74	56	66	93				
Ammonia-N	mg/L	0.1	<0.05	0.07	<0.05	<0.05	1.24	<0.05	<0.05	0.05	0.22	<0.05	2.11	0.46	5.66	<0.050	<0.050	<0.050	2.57	<0.05	0.188	<0.05	1.00	1.10	0.071				
Total Kjeldahl Nitrogen	mg/L	4.9	2.2	2.9	2.5	2	5.9	2.3	<0.2	2	1.8	2.1	8.5	2.8	9	2.21	2.62	3.98	4.30	3.69	1.61	2.67	2.78	4.27	2.46				
Total Organic Carbon	mg/L	25	28	30	25	26	30	32	26	24	22	22	27	-	-	-	-	-	-	-	-	-	-	-	-				
Dissolved Organic Carbon	mg/L	Not required under previous permit												27	63.2	24.9	29	29.9	29.5	25.6	22.7	22.5	56.0	25.6	28.1				
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	0.0023	0.0099			
BTEX, F1 (C6-C10) and F2 (>C10-C16)																													
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050		
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071		
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
F1 (C ₆ -C ₁₀)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F2 - (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.13	<0.10	<0.10	<0.10		
Dissolved Metals																													
Aluminium	mg/L	Not required under previous permit												<0.01	0.074	0.022	<0.010	<0.010	0.059	<0.01	0.0119	0.0011	0.008	0.0064	0.0036				
Antimony	mg/L	<0.0004	0.0006	0.0011	<0.0004	0.0005	0.0007	<0.0004	0.0009	0.0018	0.001	0.0014	0.0009	0.0008	<0.0016	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.00025	0.00024	0.00023	0.00024	0.00022				
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00455	0.00586
Barium	mg/L	0.15	0.049	0.029	0.084	0.074	0.123	0.15	0.051	0.040	0.047	0.061	0.092	0.039	0.115	0.037	0.0521	0.0799	0.0952	0.0558	0.0756	0.0581	0.0707	0.0833	0.0489				
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		
Boron	mg/L	Not required under previous permit												0.07	<0.050	0.071	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.00020	<0.000050	<0.000050	<0.0010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050				
Chromium	mg/L	0.015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.010	0.01	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050				
Cobalt	mg/L	0.005	<0.002	0.019	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020				
Copper	mg/L	0.01	<0.001	0.006	<0.001	0.001	0.007	0.022	0.005	0.001	<0.001	0.002	0.001	0.001	<0.0024	0.0019	<0.0010	<0.0010	<0.0010	<0.0010	0.00043	0.00034	0.00101	0.00057	0.00071				
Iron	mg/L	6.880	0.376	0.201	0.581	0.127	1.220	0.339	1.17	0.09	0.316	0.311	0.74	0.008	0.089	0.013	0.016	0.04	0.212	0.078	0.038	0.011	0.033	0.026	0.049				
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0002	<0.00040	<0.00010	<0.00010	<0.00050	0.00013	<0.0001	<0.000050	<0.000050	0.000075	<0.000050	<0.000050				
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.0329	0.0308	
Manganese	mg/L	Not required under previous permit												0.025	0.137	<0.0020	0.0025	<0.0020	0.248	0.0073	<0.00078	0.00062	0.182	0.387	0.00491				
Mercury	mg/L	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	0.000005	<0.0000050	<0.0000050	<0.0000050				
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00199	0.000986	0.00105	0.00153	0.00067				
Nickel	mg/L	0.011	<0.002	0.015	0.005	0.003	<0.002	0.005	0.005	<0.005	<0.005	<0.005	0.006	0.007	0.004	0.0049	0.0036	0.0049	0.0047	0.0043	0.00725	0.00521	0.00592	0.00697	0.00493				
Selenium	mg/L	Not required under previous permit												0.0015	0.0038	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040		
Silver	mg/L	Not required under previous permit												<0.0001	<0.00040	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Thallium	mg/L	Not required under previous permit												<0.0001	<0.00020	<0.00010	<0.00010	<0.050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Titanium	mg/L	Not required under previous permit												0.002	<0.0012	<0.0010	<0.0010	<0.0010	<0.0010	0.0037	<0.001	<0.00081	<0.00030	0.00044	0.00086	0.00069	0.00069		
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.00225	0.00115	
Vanadium	mg/L	Not required under previous permit												0.01	0.0052	0.0024	0.0031	0.0072	0.0038	0.0036	0.00484	0.00328	0.00439	0.00363	0.00324	0.00324	0.00324		
Zinc	mg/L	0.046	0.017	0.031	0.005	0.009	0.036	0.011	0.006	0.022	0.002	0.006	0.006	0.009	<0.0040	<0.0020	<0.0020	<0.0020	0.0051	0.0088	<0.0010	<0.0010	0.0098	<0.0010	<0.0010				
Routine Water																													
Ion Balance	%	97	103	103	94	103	91.7	102	102	96.7	103	103	97.4	95.5	92.5	93.9	93.5	95.8	101	109	98.6	100	104	103	109				
Bicarbonate	mg/L	338	315	271	315	310	423	520	193	361	335	270	386	408	348	327	357	345	429	306	307	396	566	451	464				
Chloride	mg/L	138.0	125.0	146.0	203.0	175.0	267.0	436	192	245	182	166	153	233	384	160	117	205	218	145	149	137	203	237	182				
Carbonate	mg/L	<5	7	27	15	16	<5	<5	15	<5	<5	<5	<5	9	6.1	11.1	12.8	9.3	11.6	25.2	<5.0	8.4	<5.0	7.9	6.7				
Conductivity (EC)	uS/cm	1200	1210	1020	1530	1380	1640	2860	1210	1520	1130	1120	1410	1620	1980	1280	1150	1420	1500	1130	1330	1230	1660	1780	1490				
Calcium	mg/L	43.9	43.1	36.1	48.7	47.2	55.8	70.9	63.6	53.2	48.9	46.8	55.9	62.9	72.9	42.1	46.3	43.7	55.7	50.2	53.0	49.4	58.5	67.2	53.7				
Potassium	mg/L	12.5	14.5	15.5	14.7	14.6	16.3	31.5	14.4	14.3	10	11.7	13.9	16.4	19.2	13.8	13.4	20.2	21.8	14.9	16.3	16.8	20.6	19.6	19.1				
Magnesium	mg/L	19.3	18.4	18.3	21.9	19.0	22.3	55.5	21.7	19.7	17.7	16.0	19.9	24	23.2	18.3	17.2	22.2	24.7	17.9	18.5	20.4	26.6	28.5	28.2				
Sodium	mg/L	186	200	204	223	219	228	498	185	234	194	171	206	238	283	185	156	207	234	179	166	185	279	275	266				
Sulfate	mg/L	149	165	134	182	135	113	436	195	131	75.3	92.7	174	149	170	122	97.7	114	98.6	55.4	127	93.7	98	163	131				
Phosphorus	mg/L	Not required under previous permit												-	0.258	0.568	0.876	0.615	1.45	1.42	0.160	0.612	0.82	0.464	1.41				
pH in H ₂ O	pH	8.4	8.6	8.7	8.7	8.7	8.1	7.1	8.8	8.3	8.4	8.3	8.2	8.4	8.38	8.51	8.54	8.52	8.46	8.85	8.23	8.44	8.08	8.39	8.37				
TDS (Calculated)	mg/L	717	728	714	864	777	918	1780	782	878	698	637	812	933	1130	713	636	791	875	638	687								

Table D.18: Chemical Analytical Results

Sample ID:		Norgaard D.1																										
Site Number:		18																										
Date Sampled:	Units	17-Oct-1996	3-Oct-1997	8-Oct-1998	20-Oct-1999	11-Oct-2000	5-Oct-2001	9-Oct-2002	16-Oct-2003	14-Oct-2004	21-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	19-Oct-2010	12-Oct-2011	16-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019			
Chem. O ₂ Demand	mg/L	60	90	100	120	90	110	180	200	110	120	99	<5	109	131	82.8	119	109	106	155	81	80	78	35	158			
Ammonia-N	mg/L	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	0.06	<0.05	3.85	<0.050	<0.050	<0.050	<0.050	0.062	1.31	0.553	<0.050	<0.050	<0.050			
Total Kjeldahl Nitrogen	mg/L	4	1.8	3.8	3.6	2.4	4.7	4.9	3.2	3	3.4	2.7	3.1	3.5	7.86	2.52	4.03	3.42	2.57	2.98	3.14	2.67	2.74	1.71	4.19			
Total Organic Carbon	mg/L	24	32	35	45	32	37	62	45	66	47	35	54	-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit												38	54.4	31.3	34.5	37	34.5	29.5	29.9	27.7	78	21.6	39.2			
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-		
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-		
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-		
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071		
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-		
F1 (C6-C10)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F1 (C6-C10) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F2 - (C10-C16)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10	<0.13	<0.10	<0.10		
Dissolved Metals																												
Aluminum	mg/L	Not required under previous permit												<0.04	0.14	<0.010	<0.010	<0.010	0.022	<0.01	0.0056	0.0086	0.0025	0.0034	0.0035			
Antimony	mg/L	<0.0004	0.0006	0.0006	<0.0004	0.0005	0.0004	0.0007	0.0011	0.0015	0.001	0.0010	0.0021	<0.002	<0.0080	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	<0.00020	0.00012	0.00011	0.00027	0.00021			
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-		
Barium	mg/L	0.111	0.087	0.084	0.101	0.1	0.133	0.217	0.038	0.048	0.056	0.105	0.145	0.1	0.168	0.0779	0.086	0.0961	<0.0030	0.0947	0.096	0.0642	0.0801	0.0924	0.0716			
Beryllium	mg/L	Not required under previous permit												<0.004	<0.010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		
Boron	mg/L	Not required under previous permit												<0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.027	0.032	0.024	0.053	
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0004	<0.0010	<0.000050	<0.000050	<0.0010	<0.000050	<0.000050	<0.000010	<0.000050	<0.000050	0.000018	<0.000010			
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	<0.005	0.013	0.012	<0.02	<0.0080	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00020	0.00015	0.00013	<0.0002	<0.00020			
Cobalt	mg/L	<0.002	<0.002	0.019	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.008	0.0049	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00045	0.00033	0.00048	0.0101	0.00040			
Copper	mg/L	0.003	0.04	0.005	<0.001	0.001	0.004	0.017	0.005	0.002	<0.001	0.001	0.002	<0.004	<0.012	0.0037	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00022	0.00031	0.00127	0.00049			
Iron	mg/L	<0.005	0.265	0.243	0.469	0.063	0.377	4.04	0.372	0.098	0.067	0.136	0.646	0.011	<0.010	0.025	0.034	0.024	0.022	0.073	0.033	0.129	0.081	0.064	0.111			
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0005	<0.0020	<0.00010	<0.00010	<0.0050	<0.00010	<0.00010	<0.00010	<0.000050	<0.000050	<0.00010	<0.00010			
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-		
Manganese	mg/L	Not required under previous permit												0.165	0.378	0.0021	0.01	<0.0020	0.411	0.0039	0.0758	0.00168	0.229	5.26	0.00533			
Mercury	mg/L	0.0002	<0.0002	<0.0002	0.0002	0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00088	0.000341	0.000524	0.00304	0.00095			
Nickel	mg/L	0.003	<0.002	<0.002	0.004	0.003	<0.002	0.011	0.003	<0.002	0.011	0.003	<0.002	0.003	0.06	0.0034	0.0025	0.0039	0.0043	0.0035	0.0057	0.00333	0.00448	0.0113	0.0042			
Selenium	mg/L	Not required under previous permit												0.003	0.0093	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00092	0.000118	0.000092	0.00013	0.00018
silver	mg/L	Not required under previous permit												<0.0004	<0.0020	<0.00010	<0.00010	<0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	
Thallium	mg/L	Not required under previous permit												<0.0004	<0.0010	<0.00010	<0.00010	<0.050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	
Tin	mg/L	Not required under previous permit												<0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.00020	<0.00010	<0.00020	<0.00020	
Titanium	mg/L	Not required under previous permit												<0.004	<0.0060	<0.0010	<0.0010	<0.0010	0.0019	<0.001	<0.00060	<0.00072	0.00033	<0.00060	<0.00060	<0.00060		
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium	mg/L	Not required under previous permit												0.009	<0.0020	0.0014	0.0012	0.0038	0.0032	0.0011	0.0032	0.0016	0.00151	<0.0010	0.0013	0.0012	0.0013	
Zinc	mg/L	0.021	0.051	0.025	0.002	0.001	0.041	0.026	0.006	0.037	0.002	0.01	0.034	<0.008	<0.020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0085	<0.0020	0.0013	0.0012	0.0064	<0.0020		
Routine Water																												
Ion Balance	%	101	103	99	95	102	103	100	104	98.7	98.2	99.9	95.3	99.5	95.2	94.5	95.6	98	99.0	108	99.2	104	97.9	109	107			
Bicarbonate	mg/L	537	639	420	598	551	607	567	228	480	747	602	778	820	718	603	537	532	522	414	455	417	573	558	784			
Chloride	mg/L	268.0	375.0	339.0	465.0	343.0	544.0	881	579	586	520	443	514	595	756	296	181	283	242	155	228	156	265	688	285			
Carbonate	mg/L	<5	<5	<5	18	<5	<5	44	21	<5	10	<5	6	32	<5.0	<5.0	26.3	12.5	32.7	21.1	6.4	11.2	10.3	<5.0	<5.0			
Conductivity (EC)	uS/cm	2250	2510	2140	2770	2410	2890	4120	2890	3080	2790	2350	3030	3230	3820	1800	1560	1790	1600	1250	1740	1180	1800	3810	2120			
Calcium	mg/L	93.2	91.1	60.6	64.6	96.8	109	57.7	113	83.7	96.8	90.8	98.7	87.3	102	77.3	64.9	63.9	63.1	69.4	79.9	59.9	79.6	298	109			
Potassium	mg/L	21.3	26.1	23.9	23.9	24.9	31.5	36.9	38.1	30.3	31.5	25.7	32	32.6	40	21.5	22.1	28.8	22.5	19.4	22.9	19.2	20	26.1	26.1			
Magnesium	mg/L	49.7	57.5	39.5	48.2	49.0	62.4	66.5	91.7	57.9	58.9	48.4	59.5	63.4	67.3	35.5	25.9	29.1	29.4	20.9	26.7	21.8	31	87.2	43.8			
Sodium	mg/L	348	380	348	443	344	556	816	556	498	452	360	449	540	613	258	213	266	255	181	216	171	267	498	330			
Sulfate	mg/L	378	220	282	245	273	315	342	771	407	153	120	202	133	357	67.6	53.6	54.8	45.1	32.1	96.2	28.8	76.1	592	78.4			
Phosphorus	mg/L	Not required under previous permit												-	<0.020	1.03	1.43	0.704	1.04	1.76	0.674	1.02	0.527	0.243	1.02			
pH in H ₂ O	pH	8.0	8.3	8.1	8.5	8.2	8.2	8.4	8.8	8.3	8.3	8.3	8.3	8.5	8.31	8.18	8.57	8.49	8.69	8.65	8.37	8.47	8.41	8.18	8.10			
TDS (Calculated)																												

Table D.19: Chemical Analytical Results

Sample ID:	Winsnes D.1																												
Site Number:	19																												
Date Sampled:	Units	16-Oct-1996	7-Oct-1997	9-Oct-1998	19-Oct-1999	10-Oct-2000	4-Oct-2001	9-Oct-2002	16-Oct-2003	14-Oct-2004	21-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	19-Oct-2010	12-Oct-2011	16-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019				
Chem. O ₂ Demand	mg/L	60	70	70	90	100	110	100	80	80	54	65	68	65	101	85.8	68	420	79	94	92	69	83	92	75				
Ammonia-N	mg/L	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.105	0.09	<0.050	<0.050	0.084	0.059	0.069	<0.05	1.08	0.058	<0.050				
Total Kjeldahl Nitrogen	mg/L	3.1	2.5	2.6	2.5	3.4	6.2	4.1	3.6	2.1	1.7	2.4	2.7	3.8	4.48	4.36	2.79	3.66	3.62	3.48	3.76	3.52	4.11	4.01	2.52				
Total Organic Carbon	mg/L	25	28	28	27	31	36	40	37	30	23	24	24	-	-	-	-	-	-	-	-	-	-	-	-				
Dissolved Organic Carbon	mg/L	Not required under previous permit												23	31.9	29.7	25	33.6	28.2	26.4	28.2	27	83	27.3	24.2	-			
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0026	0.0077		
BTEX, F1 (C6-C10) and F2 (>C10-C16)																													
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	<0.00050	
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	<0.00050	
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	<0.00050	
F1 (C ₆ -C ₁₀)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F2 - (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.12	<0.13	<0.10	<0.10		
Dissolved Metals																													
Aluminium	mg/L	Not required under previous permit												<0.01	<0.010	0.025	<0.010	<0.010	<0.010	<0.01	0.0013	<0.0010	0.0038	0.0085	0.0017	-	-		
Antimony	mg/L	<0.0004	0.0002	0.0009	<0.0004	0.0006	0.0008	0.0006	0.0014	0.0014	0.0015	0.0021	0.0011	0.0007	0.00045	0.0004	<0.00040	<0.00080	<0.00040	<0.0004	0.00029	0.00021	0.00023	0.00030	0.0002				
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.00574	0.00471		
Barium	mg/L	0.036	0.055	0.049	0.051	0.053	0.042	0.105	0.04	0.011	0.022	0.043	0.081	0.04	0.0418	0.0425	0.0238	0.0149	0.0257	0.0589	0.0508	0.0633	0.0359	0.0623	0.0412				
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Boron	mg/L	Not required under previous permit												<0.05	0.051	0.051	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.037	0.034	0.037	0.039		
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000168	<0.000050				
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00011	<0.00010				
Cobalt	mg/L	<0.002	0.002	0.021	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00033	0.00065	0.00055	0.00035				
Copper	mg/L	0.002	<0.001	0.009	0.002	0.003	0.006	0.009	0.006	0.003	0.001	0.002	0.002	<0.001	<0.0010	0.0059	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00021	0.00033	0.00043	0.00027				
Iron	mg/L	<0.005	0.291	0.200	0.460	0.342	0.081	0.991	0.369	0.203	0.101	0.211	0.76	0.005	0.022	<0.010	0.032	0.011	0.014	0.024	0.014	0.019	0.054	0.038	0.011				
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.000050	<0.000050	0.000055	0.000061	<0.000050				
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0279	0.0235		
Manganese	mg/L	Not required under previous permit												0.006	0.0341	0.0022	0.0025	0.0037	0.0029	0.0053	0.00179	0.00088	0.276	0.0371	0.00135	-	-		
Mercury	mg/L	0.0003	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	0.000006	0.000058	<0.000050	<0.000050			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00036	0.000688	0.00054	0.00052	0.000602				
Nickel	mg/L	<0.002	<0.002	0.012	0.003	0.004	<0.002	0.006	0.004	<0.002	0.002	0.005	0.006	<0.002	0.0026	<0.0020	0.002	<0.0020	<0.0020	0.0025	0.00178	0.00214	0.0035	0.00316	0.00287				
Selenium	mg/L	Not required under previous permit												0.0007	0.00049	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	0.000194	0.000232	0.00021	0.000206	0.000204	-	-		
Silver	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Thallium	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010			
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Titanium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.00159	0.00116	
Vanadium	mg/L	Not required under previous permit												0.004	0.0041	0.0018	<0.0010	0.001	<0.0010	0.0015	0.00172	0.00107	0.00167	0.00163	0.00094	-	-		
Zinc	mg/L	0.006	0.025	0.057	0.003	0.017	0.048	0.008	0.008	0.074	0.002	0.008	0.008	0.03	<0.0020	<0.0020	<0.0020	0.0024	<0.0020	0.0058	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010				
Routine Water																													
Ion Balance	%	98	110	108	103	109	90.3	101	106	105	107	106	97.7	98	100	106	97.1	92.7	103	104	93.2	100	96.3	107	104				
Bicarbonate	mg/L	483	445	475	485	464	457	635	361	276	285	315	366	319	366	362	370	348	450	420	408	446	563	469	416				
Chloride	mg/L	20.7	20.0	17.0	21.0	21.0	25.0	32	29	29	17	18	15	19	17.9	19.4	15	17.7	19.8	23.5	27.2	38.3	59.3	58.7	71.6				
Carbonate	mg/L	<5	<5	<5	17	25	60	44	49	75	13	7	12	46	52.4	32	11	46	11.3	30.9	18.2	9.3	<5.0	<5.0	10.8				
Conductivity (EC)	uS/cm	1270	1230	1100	1270	1320	1520	1850	1950	2400	1530	1280	1030	1080	1150	1180	914	1000	1020	1040	971	997	1190	1070	1060				
Calcium	mg/L	31.5	32.4	32.3	27.8	26.3	20.8	23.4	32.9	31.9	40.2	39.3	42.2	19.1	19.5	20.4	24.5	15.7	24.4	27.5	19.6	32.4	43.8	26.8	39.2				
Potassium	mg/L	8.8	10.6	10.3	11.1	10.8	11	13.4</																					

Table D.20: Chemical Analytical Results

Sample ID:		Winsnes D.2																										
Site Number:		20																										
Date Sampled:	Units	16-Oct-1996	7-Oct-1997	9-Oct-1998	26-Nov-1999	10-Oct-2000	4-Oct-2001	9-Oct-2002	16-Oct-2003	14-Oct-2004	21-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	19-Oct-2010	12-Oct-2011	16-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019			
Chem. O ₂ Demand	mg/L	40	50	50	60	70	70	70	50	60	45	56	65	62	80.7	49.6	56	61	65	49	54	81	77	61	79			
Ammonia-N	mg/L	<0.05	0.06	<0.05	0.14	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	0.06	<0.050	<0.050	0.056	<0.05	0.139	0.618	0.67	<0.050	0.824			
Total Kjeldahl Nitrogen	mg/L	0.9	0.9	1.5	1.6	1.9	2.8	1.5	1.6	1.3	1.6	1.7	1.8	2	2.99	1.5	1.32	1.74	2.29	1.54	1.51	3.93	2.06	1.73	3.35			
Total Organic Carbon	mg/L	17	18	21	17	22	24	26	28	18	19	22	25	-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit												20	27.8	18.7	22	21.5	20.2	17.9	20.0	20.9	77	21.5	25.3			
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0018	0.0052	
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071		
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
F1 (C6-C10)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F1 (C6-C10) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F2 - (C10-C16)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.13	<0.10	<0.10		
Dissolved Metals																												
Aluminium	mg/L	Not required under previous permit												<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.010	0.0018	0.004	0.0046	0.0052			
Antimony	mg/L	<0.0004	<0.0002	0.0005	<0.0004	<0.0004	0.0005	<0.0004	0.0009	0.0011	0.0006	0.0012	0.0015	<0.0004	<0.00040	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.00013	<0.00010	0.00013	0.00016	0.00013			
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.00218	0.00283	
Barium	mg/L	0.086	0.179	0.112	0.17	0.118	0.087	0.06	0.128	0.096	0.095	0.132	0.136	0.116	0.189	0.134	0.134	0.107	0.115	0.103	0.119	0.104	0.0911	0.104	0.0997			
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		
Boron	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.050	0.04	0.039	0.04	0.023	0.033	0.028	
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.000050	0.000861	<0.000050	<0.0010	<0.000050	<0.00005	<0.000050	<0.000050	<0.000050	0.0000237	0.0000063			
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.00010	<0.00010	<0.00010	0.00013	0.00012			
Cobalt	mg/L	<0.002	0.002	0.023	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.002	0.00025	0.00012	0.0004	0.00053	0.00031			
Copper	mg/L	0.002	<0.001	0.007	0.001	0.003	0.002	0.003	0.002	<0.001	0.001	<0.001	<0.001	<0.001	<0.0010	0.00033	<0.0010	<0.0010	<0.0010	<0.001	0.00022	0.00027	0.00037	0.00027	0.00026			
Iron	mg/L	<0.005	0.771	1.490	0.065	0.765	0.748	0.308	0.818	0.983	1.29	0.927	1.96	0.057	0.095	0.416	0.152	0.013	0.444	0.047	<0.010	0.878	0.526	0.185	0.815			
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.0001	<0.000050	0.000111	0.000067	0.000071				
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	0.0237	0.0178		
Manganese	mg/L	Not required under previous permit												<0.001	0.0306	0.003	<0.0020	<0.0020	<0.0020	<0.002	0.00053	0.00173	0.104	0.0629	0.00851			
Mercury	mg/L	0.0002	0.0006	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.005	0.0015	0.000584	0.00068	0.00061	0.00039			
Nickel	mg/L	<0.002	0.002	0.013	0.007	0.007	<0.002	0.004	0.005	<0.002	0.002	0.005	0.005	0.005	0.0093	0.0045	0.0032	0.0031	0.0030	0.0031	0.00341	0.00267	0.00373	0.00305	0.00293			
Selenium	mg/L	Not required under previous permit												<0.0004	<0.00040	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.000186	0.000212	0.00019	0.00018	0.000188			
Silver	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010			
Thallium	mg/L	Not required under previous permit												<0.0001	<0.00010	<0.00010	<0.00010	<0.050	<0.00010	<0.0001	<0.000010	<0.000010	<0.000010	0.000024	<0.000010			
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010			
Titanium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.00030	<0.00030	<0.00030	0.00074	0.00053	0.00095		
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	0.000372	0.000199		
Vanadium	mg/L	Not required under previous permit												<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.00050	<0.00050	<0.00050	0.00059	0.00071	0.00095		
Zinc	mg/L	0.005	0.022	0.135	0.021	0.028	0.038	0.007	0.003	0.044	0.007	0.004	0.01	0.003	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0073	<0.0010	<0.0010	0.0027	<0.0010	<0.0010			
Routine Water																												
Ion Balance	%	99	106	104	101	99.5	101	103	103	98.5	105	109	98.7	97.5	96.3	97.6	105	93.9	107	103	102	109	91.1	108	106			
Bicarbonate	mg/L	262	273	273	307	272	286	173	293	310	277	299	315	323	340	303	319	295	266	245	255	227	294	269	277			
Chloride	mg/L	15.4	15.1	9.3	17.0	15.0	19.0	21	14	13	10	12	13	17	15.8	12.4	12.7	23.4	14.4	13.7	15.6	19.8	38.5	37.6	43.9			
Carbonate	mg/L	<5	<5	<5	<5	<5	<5	56	<5	<5	<5	<5	<5	<5	<5.0	<5.0	5.4	6.5	6.3	7.6	<5.0	<5.0	<5.0	<5.0				
Conductivity (EC)	uS/cm	514	557	511	591	479	523	514	482	518	501	529	542	552	567	538	567	515	484	465	490	431	634	569	574			
Calcium	mg/L	27.3	34.5	36.2	34.1	34.2	26.7	11.7	34.6	32.2	37.6	38.3	41.2	38.3	34.9	34	40.3	23.7	29.8	32	31.6	32.7	39.1	35.2	43.6			
Potassium	mg/L	11.5	11.5	11.2	13.3	12.2	13	15.2	14.5	14.4	12.9	14.2	13.8	14.4	16.6	15.6	17.1	15.7	15.4	14.3	16.7	13.6	15.8	17.8	14.8			
Magnesium	mg/L	11.2	14.4	13.7	14.7	12.1	13.6	14.7	14.1	12.8	13.4	15.2	14.1	14.3	15.5	13.7	15.8	15.2	14.5	11.9	12.3	12.5	15.8	16.3	15.			

Table D.21: Chemical Analytical Results

Sample ID:		Winsnes D.3																																					
Site Number:		21																																					
Date Sampled:	Units	16-Oct-1996	7-Oct-1997	9-Oct-1998	19-Oct-1999	10-Oct-2000	4-Oct-2001	9-Oct-2002	16-Oct-2003	15-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	18-Oct-2010	12-Oct-2011	16-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019														
Chem. O ₂ Demand	mg/L	60	80	160	110	110	260	Empty	90	110	54	85	64	106	251	97	96	128	116	108	108	81	97	112	93														
Ammonia-N	mg/L	0.06	<0.05	1.45	0.3	<0.05	2.78		<0.05	<0.05	<0.05	0.15	1.47	0.34	1.02	0.083	<0.050	0.225	<0.050	<0.05	0.639	<0.05	0.059	0.090	<0.050														
Total Kjeldahl Nitrogen	mg/L	5.5	3.2	10.5	5.2	4	15.8		2.9	3.4	1.7	3.1	3.8	4.1	13.8	4.71	3.08	4.2	4.03	3.81	5.34	2.92	3.91	4.39	2.75														
Total Organic Carbon	mg/L	26	32	44	28	39	71		49	38	20	29	29	29	-	-	-	-	-	-	-	-	-	-	-														
Dissolved Organic Carbon	mg/L	Not required under previous permit							Empty	Not required under previous permit							33	82.1	36.9	31	39	33.1	32.1	37.9	26.8	97	32.4	29.5											
Phenols	mg/L	Not required under previous permit								Not required under previous permit							-	-	-	-	-	-	-	-	-	-	-	-	-										
BTEX, F1 (C6-C10) and F2(>C10-C16)		Not required under previous permit								Not required under previous permit							-	-	-	-	-	-	-	-	-	-	-	-	-										
Benzene	mg/L	Not required under previous permit								Not required under previous permit							<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050										
Toluene	mg/L	Not required under previous permit							Not required under previous permit							<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050											
Ethylbenzene	mg/L	Not required under previous permit							Not required under previous permit							<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050											
Xylenes (m & p)	mg/L	Not required under previous permit							Not required under previous permit							-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050											
Xylene (o)	mg/L	Not required under previous permit							Not required under previous permit							-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050										
Xylenes	mg/L	Not required under previous permit							Not required under previous permit							<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071										
Styrene	mg/L	Not required under previous permit							Not required under previous permit							-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050										
F1 (C ₆ -C ₁₀)	mg/L	Not required under previous permit							Not required under previous permit							<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10										
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required under previous permit							Not required under previous permit							<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10										
F2 - (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit							Not required under previous permit							<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.13	<0.10	<0.10	<0.10										
Dissolved Metals		Not required under previous permit							Not required under previous permit							<0.01	0.034	<0.010	<0.010	<0.010	<0.010	<0.01	0.0405	0.002	0.003	0.0177	0.0071												
Aluminum	mg/L	Not required under previous permit							Not required under previous permit							0.0017	0.0013	0.0014	0.0013	0.001	0.0008	<0.0016	<0.0040	<0.0040	<0.0080	0.00044	0.00054	0.00093	0.00031	0.00044	0.00061	0.00024							
Antimony	mg/L	0.0008	<0.0002	0.0014	<0.0004	0.001	0.001	Not required under previous permit							Not required under previous permit							-	-	-	-	-	-	-	-	-	0.00898	0.00575							
Arsenic	mg/L	Not required under previous permit							Not required under previous permit							Not required under previous permit							0.006	0.008	0.013	0.12	0.094	0.091	0.109	0.103	0.0553	0.111	0.101	0.0732	0.134	0.101	0.107	0.114	0.0766
Barium	mg/L	0.109	0.011	0.155	0.159	0.105	0.175	Not required under previous permit							Not required under previous permit							<0.001	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010			
Beryllium	mg/L	Not required under previous permit							Not required under previous permit							Not required under previous permit							<0.05	<0.050	<0.050	0.067	0.077	0.073	0.079	0.077	0.094	<0.020	0.021	0.05					
Boron	mg/L	Not required under previous permit							Not required under previous permit							Not required under previous permit							<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.00020	<0.00050	<0.00050	<0.0010	<0.00050	<0.000050	0.000074	<0.000050	<0.00010	0.000199	<0.000050
Cadmium	mg/L	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.00020	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050							
Chromium	mg/L	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050								
Cobalt	mg/L	0.003	0.003	0.022	<0.002	0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020								
Copper	mg/L	0.006	<0.001	0.008	0.001	0.006	0.01	0.005	0.002	<0.001	<0.001	<0.001	<0.001	0.001	<0.0024	0.0031	<0.0010	0.0016	<0.0010	0.0012	0.00236	0.00132	0.00141	0.00202	0.00071														
Iron	mg/L	1.320	1.090	2.500	1.110	0.628	3.690	0.146	0.163	0.051	0.083	0.508	0.015	0.062	0.011	0.02	0.025	0.022	0.047	0.022	0.011	0.03	0.037	0.038															
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0001	<0.00040	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00050	<0.00050	<0.00010	0.0006	<0.00050														
Lithium	mg/L	Not required under previous permit							Not required under previous permit							-	-	-	-	-	-	-	-	-	-	-	0.0595	0.0419											
Manganese	mg/L	Not required under previous permit							Not required under previous permit							0.003	0.0538	<0.0020	<0.0020	<0.0020	<0.0020	0.0593	0.0142	0.00143	0.00076	0.0129	0.00528	0.00437											
Mercury	mg/L	0.0003	<0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010									
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050									
Nickel	mg/L	0.007	<0.002	0.027	0.008	0.014	0.008	0.007	<0.002	<0.002	0.004	0.004	0.006	0.0063	0.0058	0.0043	0.0074	0.0041	0.0053	0.0117	0.00722	0.0057	0.0072	0.00398															
Selenium	mg/L	Not required under previous permit							Not required under previous permit							0.0014	0.003	<0.00040	<0.00040	<0.00080	<0.00040	<0.0004	0.000359	0.000239	0.00027	0.000366	0.000201												
Silver	mg/L	Not required under previous permit							Not required under previous permit							<0.0001	<0.00040	0.00032	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010									
Thallium	mg/L	Not required under previous permit							Not required under previous permit							<0.0001	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010								
Tin	mg/L	Not required under previous permit							Not required under previous permit							<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010										
Titanium	mg/L	Not required under previous permit							Not required under previous permit							0.003	<0.0012	<0.0010	<0.0010	0.0012	<0.0010	0.002	0.00198	<0.00030	0.00132	0.00333	0.00134												
Uranium	mg/L	Not required under previous permit							Not required under previous permit							-	-	-	-	-	-	-	-	-	-	-	0.00437	0.0021											
Vanadium	mg/L	Not required under previous permit							Not required under previous permit							0.006	0.007	0.002	0.0025	0.0098	0.0019	0.0052	0.00154	0.0016	0.0048	0.00433	0.0018												
Zinc	mg/L	0.016	0.022	0.049	0.004	0.063	0.047	0.009	0.06	0.006	0.003	0.017	0.016	0.006	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0053	<0.0010	0.0014	<0.0020	<0.0010	<0.0010														
Routine Water		Not required under previous permit							Not required under previous permit							107	103	104	103	101	96.5	106	107	101	97.4	106	107	105	98.9	105	98.9	106							
Ion Balance	%	109	109	109	97	107	92.2	107	103	104	103	101	96.5	106	107	101	97.4	106	107	105	98.9	105	98.9	106															
Bicarbonate	mg/L	219	285	336	357	428	623	72	693	381	450	352	386	353	446	419	375	292	375	292	375	396	504	429	435														
Chloride	mg/L	81.9	112.0	156.0	158.0	152.0	248.0	318	294	76	101	213	266	2																									

Table D.22: Chemical Analytical Results

Sample ID:	Winsnes D.4																											
Site Number:	22																											
Date Sampled:	Units	16-Oct-1996	7-Oct-1997	9-Oct-1998	19-Oct-1999	10-Oct-2000	4-Oct-2001	9-Oct-2002	16-Oct-2003	15-Oct-2004	20-Oct-2005	13-Oct-2006	3-Oct-2007	17-Oct-2008	28-Oct-2009	18-Oct-2010	12-Oct-2011	16-Oct-2012	8-Oct-2013	15-Oct-2014	14-Oct-2015	5-Oct-2016	20-Oct-2017	16-Oct-2018	29-Oct-2019			
Chem. O ₂ Demand	mg/L	70	70	100	90	130	150	180	140	150	83	97	86	95	138	88.6	115	116	78	102	96	70	112	101	535			
Ammonia-N	mg/L	0.06	<0.05	1.58	<0.05	<0.05	0.52	<0.05	<0.05	0.75	<0.05	<0.05	0.06	3.11	0.917	0.399	<0.050	0.052	<0.050	<0.05	0.070	<0.050	0.120	0.055	0.075			
Total Kjeldahl Nitrogen	mg/L	4.5	3	5.5	3.4	3.7	8.2	5.4	5.9	9.3	2.9	2.9	2.6	6.1	8.08	3.47	-	4.36	2.65	3.27	2.48	2.33	3.4	3.57	17.0			
Total Organic Carbon	mg/L	29	25	34	28	46	61	68	59	55	32	33	33	-	-	-	-	-	-	-	-	-	-	-	-			
Dissolved Organic Carbon	mg/L	Not required under previous permit												32	47	34.8	32	38.9	32.3	30.4	33.2	25.3	112	34.2	31.2			
Phenols	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0012	0.0067	
BTEX, F1 (C6-C10) and F2 (>C10-C16)																												
Benzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Toluene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		
Ethylbenzene	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
Xylenes (m & p)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
Xylene (o)	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
Xylenes	mg/L	Not required under previous permit												<0.0005	<0.00050	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071		
Styrene	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050	
F1 (C ₆ -C ₁₀)	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F1 (C ₆ -C ₁₀) - BTEX	mg/L	Not required under previous permit												<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
F2 - (C ₁₀ -C ₁₆)	mg/L	Not required under previous permit												<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.13	<0.10	<0.10		
Dissolved Metals																												
Aluminium	mg/L	Not required under previous permit												0.02	0.062	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0017	0.0114	0.0455	0.0165
Antimony	mg/L	<0.0004	<0.0004	0.0009	<0.0004	0.0006	0.0009	<0.0004	0.0015	0.0015	0.0016	0.0016	0.0022	<0.0004	<0.0016	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	0.00033	0.00017	0.00026	0.00029	0.00019			
Arsenic	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.00555	0.0057
Barium	mg/L	0.058	0.044	0.063	0.083	0.058	0.052	<0.003	0.089	0.061	0.01	0.022	0.014	0.084	0.0693	0.0728	0.0302	0.0782	0.129	0.0722	0.115	0.0559	0.0462	0.0659	0.0437			
Beryllium	mg/L	Not required under previous permit												<0.001	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Boron	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.041	0.036	0.031	0.033	
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.00020	<0.000050	<0.000050	<0.0010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050			
Cobalt	mg/L	<0.002	0.005	0.019	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00027	0.00085	0.00099	0.00101			
Copper	mg/L	0.002	<0.001	0.007	0.002	0.007	0.009	<0.001	0.006	0.003	<0.001	<0.001	<0.001	<0.001	<0.0024	0.0038	<0.0010	<0.0010	<0.0010	<0.0010	0.00043	0.00052	0.0008	0.00118	0.00101			
Iron	mg/L	0.612	0.807	1.140	1.810	0.373	0.639	0.065	3.48	0.815	0.3	0.602	0.581	0.041	0.053	0.033	0.018	0.06	<0.010	0.027	0.011	0.021	0.088	0.130	0.898			
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0001	<0.00040	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00068	0.00012	0.00139			
Lithium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	0.0158	0.013	
Manganese	mg/L	Not required under previous permit												0.404	0.0068	0.0143	0.0326	0.0046	<0.0020	0.003	0.0099	0.00054	0.0158	0.0104	0.410			
Mercury	mg/L	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00197	0.00135	0.00183	0.000865				
Nickel	mg/L	0.002	0.003	0.018	0.006	0.015	<0.002	<0.002	0.011	0.006	0.002	0.005	0.003	0.006	0.0051	0.0051	0.0029	0.004	0.0058	0.0049	0.00578	0.00391	0.00359	0.00364	0.00233			
Selenium	mg/L	Not required under previous permit												0.0011	0.0021	<0.00040	<0.00040	<0.00080	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.000227	0.000222	0.000252	0.000201	
Silver	mg/L	Not required under previous permit												<0.0001	<0.00040	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Thallium	mg/L	Not required under previous permit												<0.0001	<0.00020	<0.00010	<0.00010	<0.050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000017	<0.00010	
Tin	mg/L	Not required under previous permit												<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium	mg/L	Not required under previous permit												0.001	<0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00030	<0.00030	0.00067	0.000854	0.00139
Uranium	mg/L	Not required under previous permit												-	-	-	-	-	-	-	-	-	-	-	-	-	0.00247	0.000959
Vanadium	mg/L	Not required under previous permit												0.003	0.0049	0.0011	<0.0010	0.0026	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00050	<0.00050	0.00144	0.00229	0.0018
Zinc	mg/L	0.11	0.016	0.05	0.015	0.246	0.045	0.007	0.014	0.243	0.003	0.005	0.012	0.004	<0.0040	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0086	<0.0010	0.0015	<0.0010	0.0012			
Routine Water																												
Ion Balance	%	109	107	103	105	109	92	102	104	102	101	103	99.6	95.6	105	104	96.5	98.1	110	107	100	107	101	110	107			
Bicarbonate	mg/L	253	287	284	223	591	526	536	387	509	347	336	322	384	288	313	341	311	300	261	248	216	350	290	264			
Chloride	mg/L	135.0	105.0	183.0	181.0	134.0	189.0	235	200	207	98	101	83	146	156	242	173	241	240	246	204	170	238	222	246			
Carbonate	mg/L	17	41	<5	16	<5	64	124	90	47	<5	13	<5	<5	38.2	11.9	<5.0	14.4	8.8	8.3	<5.0	<5.0	<5.0	<5.0				
Conductivity (EC)	uS/cm	884	934	1000	1050	1490	1660	1990	1520	1550	773	905	787	1050	1070	1350	1130	1310	1280	1270	1190	889	1330	1190	1230			
Calcium	mg/L	28.1	34	34	29.9	32.4	22.2	25.7	34.2	26.4	21.9	22.5	25.5	28.9	25.8	31.5	29.8	27.2	34.1	27.9	29.4	27.9	40.2	37.5	45.1			
Potassium	mg/L	24.4	19.7	25.6	22.8	26	24.6	27.7	29.9	27.7	18.8	24.1	21.2	23.1	25.7	29.7	25.8	28.1	30.6	28.1	25.9	22.9	32.3	32.8	26			
Magnesium	mg/L	16.8																										

APPENDIX E

SELECTED SITE PHOTOGRAPHS



Photo 1: Dugout 13, a typical dugout in the monitoring program. Taken October 16, 2023.



Photo 2: Dugout 19, a typical dugout in the monitoring program. Taken October 19, 2022.

APPENDIX L
Summary of Revisions
to the
Landfill Operations Plan



Landfill Operations Plan

Approval 10348-03-01

Sec. 4.6.34

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OPERATING RECORD
Standard Operating
Procedure
Ryley, AB

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TITLE: OPERATING REECORD			
Facility: Ryley	Prepared by: Stan Yuha	SOP Number: 90RY4.6.34(a)	Page 3 of 6
Reviewed By:	Title: Operations Manager	Issue Date: MAY 2023	
Reviewed By:	Title: Director of Compliance	Next Review Date: MAY 2026	
Reviewed By:	Title: Health and Safety Manager		
Approved By:	Title:		

1.0 Objective

This SOP is to provide the information required through an Operating Record that will keep the facility compliant as per its Approval.

2.0 Site Specific Terms

None

3.0 Responsibilities

3.1 General Manager

The General Manager will ensure that all employees are trained and knowledgeable regarding the Operating Record.

3.2 Supervisors

The Operations Manager and/or Lead Foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.

3.3 Employees

3.3.1 Employees are responsible for adhering to safe work practices and all provisions found in this procedure. 3.3.2 Employees must inspect equipment and report any failures or deficiencies to the appropriate Supervisor.

4.0 Prerequisites

4.1 Health and Safety

- Any incidents, including near misses, are to be reported immediately to the supervisor.
- A Job Hazard Analysis will be made available if required for any part of the Operating Record (Appendix 1)
- Consult the PPE Hazard Assessments (Appendix 2) to be worn for this job task that may require PPE.

4.2 Environmental

- Ensure all applicable monitoring equipment is available.
- If an incident occurs, report it immediately to your supervisor.
- Incidental releases are to be cleaned up immediately in the process designated PPE.

- If the incident requires additional assistance or equipment, the Contingency Plan may need to be implemented.

4.3 Documented Training

- TDG training
- SOP training
- WINWEB training

5.0 Procedure

The landfill Operating Record shall contain:

- (i) a copy of the facility's Operating Approval or Registration number;
- (ii) as-built records for each constructed landfill cell showing the location and development of excavations, fill areas, final grades and structural components;
- (iii) annual topographic survey records and plans showing the areas where waste has been disposed in the previous year of operation;
- (iv) the most recent version of the design and operating plan for the landfill;
- (v) records of handling of any wastes accepted at the landfill including the amounts accepted and the disposed locations within the landfill;
- (vi) all Annual Reports for the landfill as described in Section 7.5 in the Standards for Landfills in Alberta Guide;
- (vii) nuisance records;
- (viii) The Final Landfill Closure Report as described in section 7.6 in the Standards for Landfills in Alberta Guide;
- (ix) All Post-Closure Annual Reports for the landfill as described in section 7.7 of the Standards for Landfills in Alberta Guide;
- (x) The name and contact information of all persons who discover ant contravention;
- (xi) The names and contact information of all persons who take any remedial actions arising from the contravention of the Act, the regulations, or the approval;
- (xii) A description of the remedial measures taken in respect of a contravention of the Act, the regulations or the approval;

The Landfill Operating Record has many components and is a compilation of many separate documents. All required components are stored electronically, hard copy or both at the facility and are available for review at any time as requested. Clean Harbors operates an electronic waste tracking and recording system called WINWEB. Almost every aspect of the business is tracked, recorded or tied to the WINWEB system in some way or another. This computer program tracks and records not only all the waste that is accepted at the facility but many other items as well such as contraventions and incidents. This system also holds scanned images of all shipping and receiving documents of all the waste accepted and shipped from the facility. It provides cradle to grave tracking along with Certificates of Disposal as requested.

6.0 Consequences of Deviations

In addition to the process interruptions which can occur, the following additional consequences of deviations could result:

- Injuries and/or fatalities
- Property damage
- Regulatory violations and/or fines
- Damaged public relations and/or customer relations
- Disciplinary actions up to and including termination

Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



Waste Control, Run On & Run Off Controls and Nuisance Controls

**Ryley
Alberta**

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TITLE: WASTE CONTROL, RUN ON & RUN OFF CONTROLS AND NUISANCE CONTROLS		
Facility: Rley	Prepared by: Stan Yuha	SOP Number: 90RY 4.6.34(b)
Reviewed By:	Title: Operations Manager	Issue Date: MAY 2023
Reviewed By:	Title: Director of Compliance	Next Review Date: MAY 2026
Reviewed By:	Title: Health and Safety Manager	
Approved By:	Title:	

1. Objective

This SOP is to provide guidance and the information required for waste controls, run on and run off controls and nuisance controls as to remain compliant with it's current approval.

2. Site Specific Terms

None

3. Responsibilities

3.1. General Manager

The General Manager will ensure that all employees are trained and knowledgeable regarding these controls.

3.2. Supervisors

The Operations Manager and/or Lead Foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.

3.3. Employees

- Employees are responsible for adhering to safe work practices and all provisions found in this procedure.
- Employees must inspect equipment and report any failures or deficiencies to the appropriate Supervisor.

4. Prerequisites

4.1. Health and Safety

- Any incidents, including near misses, are to be reported immediately to the supervisor.
- A Job Hazard Analysis will be made available if required (Appendix 1)
- Consult the PPE Hazard Assessments (Appendix 2) to be worn when required.

4.2. Environmental

- Ensure all applicable monitoring equipment is available.
- If an incident occurs, report it immediately to your supervisor.
- Incidental releases are to be cleaned up immediately in the process designated PPE.
- If the incident requires additional assistance or equipment, the Contingency Plan may need to be implemented.

4.3. Documented Training

- SOP training
- WINWEB training

5. Procedure for Waste Control, run-on and run-off controls and nuisance controls

5.1. Waste Control

Clean Harbors Canada, Inc. Ryley Facility can accept all categories of waste except those listed in section 4.6.1 of Approval 10348-0-00. The secure landfill can receive solid non-hazardous and hazardous wastes that meet the criteria outlined in Section 13(2) of the *Alberta Waste Control Regulations* and *The Alberta User Guide for Waste Managers*. The regulatory and facility specific criteria are summarized as follows:

5.2. Ryley Landfill Acceptance Criteria (Approval No. 10348-03-00)

- Waste must have no Free Liquids as defined by the Paint Filter Test (SW 846 - 9095).
- Waste must have a Flash Point greater than 40oC. Waste streams with a flash point less than 40°C may be accepted. All waste will be evaluated on a case-by-case basis.
- Waste must contain less than 1000 mg/kg of halogenated organic compounds as determined using the TCLP extract.
- Waste must have a pH greater than 2 (pH of 1:1 solid: deionized water mixture).
- TCLP Extract of the waste must contain the following metals at less than the concentrations shown:
 - Arsenic 500 mg/L
 - Beryllium 100 mg/L

- Nickel 500 mg/L
- Selenium 200 mg/L
- Cadmium 100 mg/L
- Silver 100 mg/L
- Chromium (Cr+6) 500 mg/L
- Thallium 200 mg/L
- Lead 500/mg/L
- Mercury 20 mg/L
- Uranium 100 mg/L
- Solids must contain less than 1000 mg/kg each of benzene, ethyl benzene, methyl ethyl ketone, nitrobenzene, pyridine, toluene, or xylene in TCLP extract.
- Solids contaminated with acetone, n-butyl alcohol, cyclohexanone, ethyl acetate, ethyl ether, isobutanol, and 2-nitropropane can be landfilled when these solvents are present at levels greater than 1000 mg/kg in TCLP extract only if the waste is nonflammable.
- Solids contaminated with cresols, or cresylic acid can be landfilled when these solvents are present at levels greater than 1000 mg/kg in TCLP extract only if the waste is non-toxic.
- Solids contaminated with carbon disulfide or methanol can be landfilled if they are present at levels greater than 1000 mg/kg in TCLP extract only if the waste is nonflammable or non-toxic.
- Waste must contain less than 50 mg/kg PCBs.

5.3. Operational Criteria

- Wastes reacting with water to give a temperature rise >15oC- accepted case by case,
- Resistance to penetration must be >3 psi, < 3 psi should go into solidification pit,
- Total cyanide must be <590 mg/kg, Reactive cyanide must be <250 mg/kg,
- Elemental Sulfur concentration must be less than 500 mg/kg,
- Waste must be non-odourous, and
- Waste control is also talked about in section D.

5.4. Surface Water Run-On and Run-Off Control

Water management inside and outside the landfill is important to minimize cost and operational impacts to the landfill operation. The Ryley landfills are built above the surface elevation of the surrounding area and therefore the landfills themselves are not subject to surface run-on problems. The facility itself is built up above the surrounding area to the north and water does not flow on to the site from that direction. Water moving from west to east is directed around the operational areas by means of a drainage ditch that conveys the water to the area southeast of the landfill cells from where it is pumped to follow the natural eastward drainage pattern in the vicinity.

Surface run-off from the roadways, the paved plant site areas, and areas south of the landfills is collected in a surface water detention pond B, which has two collection ditches flowing into it

from the north and from the south. Surface run-off from the lugger pad, container lay-down area and bone yard is collected in surface detention pond A.

Water from the detention ponds are sampled, tested and then compared to the discharge criteria in Table 4.3-B of the Operating Approval 10348-03-00. If the analytical results meet the discharge criteria, discharge can commence. In the event that the analytical data does not meet the surface discharge criteria, the Operations Manager and laboratory personnel will evaluate the feasibility of treating the water to achieve the discharge criteria, sending the water for deep-well disposal or other alternative disposal options.

Run-off collected in the landfill or leachate is collected via the leachate collection systems and disposed in Class 1a deepwell. It is important to maintain perimeter trenches for landfill run-off collection that are deep enough to collect the water that may accumulate from severe or prolonged rainfall events.

5.5. Nuisance Management

The following sections are summaries of the more detailed procedures described in Appendix C “Fugitive Dust and Odour Best Management Plan.”

5.5.1. Litter

Litter will be controlled by the use of cover and compaction and by avoiding the dumping of dispersible materials on windy days. Litter that accumulates on the landfill site and/or adjacent properties will be retrieved.

5.5.2. Dust

Water will be applied frequently to control dust. Dispersible hazardous wastes will not be landfilled when wind speeds exceed 30 kilometers per hour. The usual source of water for dust control is the surface water detention pond. Other possible sources identified in the Operating Approval include sump waste from car wash bays, waste from hydro-vac operations, leachate and leak detection liquids. Leachate and leak detection liquids are not generally applied since leachate from older cells typically has odour issues.

5.5.3. Odour

Highly odorous wastes such as mercaptan or sulphur-treating wastes will **not** be accepted for disposal at the facility. Cover material will be used to control odours from the waste. Odour suppressant chemicals and fans to disperse these chemicals may be used as an additional means of controlling odours. Should an odour complaint be received at the facility, the name of the caller, date and time of the complaint and contact information of the caller will be recorded on the form included as part of Appendix C Fugitive Dust and Odour Best Management Plan.

The nature of the complaint and the address or location that the complaint originates from will be recorded. The Operations or Facility Manager will be notified, and the complaint will be

investigated by sending someone to the area as necessary. The weather conditions, wind speed and direction at the time of the complaint will be recorded. The caller will be contacted by the Operations or Facility Manager to inform them of remedial action taken. The date and time of the return contact will be recorded.

6. Consequences of Deviations

In addition to the process interruptions which can occur, the following additional consequences of deviations could result:

- Injuries and/or fatalities
- Property damage
- Regulatory violations and/or fines
- Damaged public relations and/or customer relations
- Disciplinary actions up to and including termination.

7. Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



Stabilization Standard Operating Procedure

**Ryley,
AB**

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TITLE: Stabilization			
Facility: Ryley	Prepared by: Stan Yuha	SOP Number: 90RY 4.6.34(c)	Page 3 of 7
Reviewed By:	Title: Health and Safety Manager Environmental Compliance Manager Engineering / Maintenance Manager	Issue Date: Nov. 2017	
Approved By: Stan Yuha	Title: Stan Yuha General Manager	Next Review Date: Sept. 2024	

1.0 Objective

This SOP is to provide the guidance and necessary steps for workers to chemically treat waste materials to meet the regulatory requirements to safely dispose of it in a landfill. The procedure below will provide the steps to meet this objective.

2.0 Site Specific Terms

Sludge Pit – stabilization pit; large steel box that is placed in the landfill where stabilization takes place

Delta T (ΔT) – the change in temperature over a specific amount of time

EAF dust – Electric Arc Furnace dust; alkaline waste material that is received as a waste from the generation of the production of steel.

Micro-encapsulation – process which completely nullifies the hazardous characteristics of a material by coating and containing the material in an inert substance that cannot be penetrated.

3.0 Responsibilities

General Manager

The General Manager or designee will ensure that all employees are trained and knowledgeable regarding the proper operating procedures used during Stabilization.

Supervisors

The supervisor and/or lead foreman or designee for this process is responsible for training, monitoring, and enforcing this procedure with the employees.

Employees

Employees are responsible for following and adhering to safe work practices and all provisions found in this procedure. Employees must inspect equipment and report any failures or deficiencies to the appropriate Supervisor.

4.0 Prerequisites

The following prerequisites must be completed prior to performing this procedure.

Health and Safety

- Any incidents, including near misses, are to be reported immediately to the supervisor.
- Review the Job Hazard Analysis (Appendix 1) to become familiar with the hazards associated with this process.
- Consult the PPE Hazard Assessments (Appendix 2) to be worn for this job task.
- The buddy system (e.g., visual, audio contact, etc.) must be maintained when this process is being conducted.
- Ensure all personal air monitoring devices are available, calibrated, and in good working order.

Environmental

- Employees operating the stabilization pit must operate the unit in accordance with all local, provincial, and/or federal permits and operating plans specified within those permits and/or the permit application.
- Ensure all applicable environmental monitoring equipment or pollution is available and in good working order.
- Do not exceed permitted tank capacities, equipment process rates, and/or daily, weekly, monthly, or annual throughputs, if applicable.
- If an incident occurs (e.g., fire, explosion, spill, release of waste or gas to water, soil or air), report it immediately to your supervisor, and follow the Contingency Plan requirements, if applicable.
- Incidental releases or spills are to be cleaned up immediately in the process designated PPE. If the PPE must be upgraded, the release is deemed to be an Emergency Response activity.
- .

Documented Training

- HazWoper training
- Hazard Communication for treatment chemicals
- OSHA regulated substances, as required (e.g., asbestos, arsenic, lead, etc.)
- SOP training
- Equipment training (e.g., rock truck, excavator, forklift, front end loader, etc.)

Operations

- Material restrictions: the following wastes shall **NOT** be bulked into the sludge pit unless reviewed and authorized by the General Manager, Compliance Manager, and Health and Safety Manager or designee: reactive materials, oil or solvent-based paint filters, pesticides, oxidizers, grinding swarf, metal powders, poisons (Hazard Class 6.1), dyes, inks in dry powder form, cyanides, and acid sludges.
- Ensure that all material to be transferred is compatible with the equipment construction, other material to be processed (e.g. in a batch/job) as well as any residue through the use of bucket testing or other compatibility testing, as appropriate
- Ensure that all preventative maintenance on equipment has been conducted.
- Ensure that all equipment is appropriately clean to prevent incompatible chemical reactions, ready for the next treatment, and operational.
- Ensure that all waste material to be stabilized has been sampled, analyzed, and final coded.
- Ensure that the material is noted on the pick list (e.g., batch list, job sheet) or laboratory treatment recipe.
- Recommended equipment:
 - Trackhoe or Backhoe
 - Rock Truck
 - Forklift
 - Front end loader
- Staffing – the following functions are to be completed by assigned personnel. The number of personnel assigned to complete Stabilization is dependent on the facility process.
 - Lead Operator
 - Trackhoe Operator
 - Haul Truck Operator

5.0 Procedure

5.1 Receiving

All waste entering the facility must be properly identified before any processing can begin. The facility's receiving personnel must ensure that all proper documentation arrives with the load or is otherwise readily available. This will include, at a minimum:

- Manifests for solid or liquid hazardous waste or Bill of Lading for liquid or solid non-hazardous waste **and**
- Waste Data Sheet or Waste Profile

Customer Service or appropriate personnel will provide the most up-to- date waste data sheet or profile to the receiving Operator the day the load is scheduled for delivery.

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For WinWeb data entry, the load must be Received and Final Coded prior to beginning these steps. Once the load has been treated, the load will be final disposed within WinWeb by entering the container weight in the Lab Results. If the load is a CHES internal load, the WinWeb Solid Bulking must be completed. If the load is disposed on-site, Landfill Tracking screen will be completed. If the load is transferred off-site, the Solid Bulking screen is completed and then Outboard Shipping.

5.2 Waste Tracking

Waste tracking for the waste managed through the Stabilization process will be provided by the following documents:

- Hazardous Waste Manifest or Bill of Lading
- Waste Profile
- Off-load Order
- On-site tracking documents (e.g., Landfill Disposal Stabilization Form, etc.)

5.3 Material Processing Operation

5.3.1 Pre-Operational Inspections

- Each piece of equipment to be used during Stabilization must be inspected prior to use.
- Ensure compatibility testing has been conducted, as appropriate, by the Laboratory.
- Inspect the following process control equipment (e.g., fire suppression, ventilation, etc.) to ensure it is ready for use for the day or per the facility's Inspection Schedule:
 - Portable fire extinguishes
 - Eye wash stations
 - Safety showers
 - SARs
 - First Aid kits
 - Bloodborne pathogen kits
 - Appropriate calibration and/or bump tests are conducted for the personal air monitors required for various types of treatment (e.g., hydrogen cyanide, hydrogen sulfide, ammonia, etc.) for the daily operations.

5.3.2 Procedure

There are three types of stabilization that are currently done at the Ryley Facility. These procedures will explain each one of them separately.

(a) Delta T Quenching

Most materials that require delta T quenching are catalysts and or mole sieves which are usually dusty.

1. Don proper PPE.
2. Check wind conditions; if they are not favorable check with supervisor before proceeding. A spray fog of water may be needed to control dust while waste is being dumped into the sludge pit. Dump the waste that's needs treatment into the sludge pit. Leave sufficient room for the addition of water, wood chips and/or peat moss and to allow for proper mixing.
3. Staying upwind, use the fire truck or equivalent to add water into the sludge pit at a 1:1 ratio of waste to water. The generation of steam and heat are expected. Temperatures could rise in excess of 100 degrees Celsius. Extreme caution is needed while doing this step. The usage of pond water is preferred.
4. If the heat generated steams off excessive water, additional water may need to be added. Allow contents of sludge pit to cool below 40 degrees. This may take several hours and possibly even over-night. Process is completed once there is no more rise in temperature after water is added and the over-all temperature is below 40 degrees Celsius.

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5. Materials must pass the Paint Filter Test prior to landfilling. The addition peat moss and/or wood chips shall be added to ensure this. Mix the load with the track-hoe until the waste material has the same consistency throughout its entirety.
6. Using the excavator, load the waste into the rock truck to be placed into the landfill. When removing a load from the sludge pit, it is very important to remove all the material from the pit as much as possible before placing another load into the same sludge pit. This is to prevent cross contamination and/or an incompatible chemical reaction between waste streams.
7. Document final disposal location and the fact that this waste was treated on a Landfill Disposal Stabilization Form. Hand in form to the Receiving Clerk who will enter comments in the Lab Results Entry screen that reflect that this waste was treated prior to being landfilled. This form will be attached to the rest of the pertaining paperwork.

(b) pH Adjustment

The pH of wastes allowed to be landfilled at the Ryley Landfill must be above 2.0. There is no upper pH limit therefore pH adjustments will usually only be done on materials that have a low pH. (<2.0)

8. Don proper PPE.
9. Check wind conditions; if they are not favorable check with supervisor before proceeding. A spray fog of water may be needed to control the corrosive dust while waste is being dumped into the sludge pit. Dump the waste that's needs treatment into the sludge pit. Leave sufficient room for the addition of reagent, water, wood chips and/or peat moss and to allow for proper mixing.
10. Add the alkaline reagent such as cement, lime, or EAF dust as determined by Management or Lab personnel. Add sufficient water and ensure good mixing with track-hoe. The generation of heat and steam is expected. Temperatures could rise significantly, extreme caution is needed.
11. If the heat generated steams off excessive water, additional water may need to be added. Allow contents of sludge pit to cool below 40 degrees. This may take several hours and possibly even over-night.
12. Once contents have cooled obtain a sample and check pH. If it's acceptable then proceed to next step. If not then repeat step 10.
13. Repeat steps 5 through 7.

(c) Micro-Encapsulation

Usually done on materials the exhibit self-heating properties such as activated carbon.

14. Don proper PPE.
15. Check wind conditions; if they are not favorable check with supervisor before proceeding. A spray fog of water may be needed to control the corrosive dust while waste is being dumped into the sludge pit. Dump the waste that's needs treatment into the sludge pit. Leave sufficient room for the addition of reagent, water, wood chips and/or peat moss and to allow for proper mixing.
16. Add sufficient Portland cement or equivalent as pre-determined by Management or Lab Personnel. Add sufficient water to ensure good mixing. Ensure not too much water is added so that one can maintain a thick consistency.
17. Thoroughly mix using excavator. Ensure all surfaces of waste being treated are covered in the cement mixture.
18. Using the track-hoe place the treated waste into scrap lugger bins or equivalent to allow contents to cure. This may

take several days.

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19. After curing is determined to be complete, obtain a sample and submit to the lab to determine self heating properties have been treated successfully. If not, contents must be dumped back into the sludge pit and process must be repeated by adding more cement.

20. If test is successful, dump the lugger bin and repeat step 7 above.

5.3.4 Process Interruptions

The following process interruptions may occur with the Stabilization of waste materials:

- Fire
- Excessive odor or irritation
- Popping
- Fuming or off gassing
- Spill
- Personnel contamination

Should any of the reactions noted above, personnel are to:

1. Contact the Primary Emergency Coordinator.
2. Cease all waste mixing.
3. All equipment is to be turned off and secured (i.e., emergency brakes set).
4. Report to designated evacuation point for the area.

If mechanical difficulties are encountered during Stabilization treatment, the operators are to notify their immediate supervisor for resolution.

5.3.5 Shut Down

At the end of last operating shift for the day, the following shut down procedures are to be followed.

Sludge Pit

The Sludge Pit is to be emptied of all residual material left remaining in it.

Excavator

The excavator bucket is to be rinsed off after and encapsulation processing is done. This is to ensure the cement mixture doesn't cure or set on or in the bucket or any hoses, etc.

Equipment

- All equipment is to be shut off during all breaks and at the end of each shift.
- All doors and windows are to be placed in the closed position at all times.

6.0 **Consequences of Deviations**

In addition to the process interruptions which can occur, the following additional consequences of deviations could result:

- Injuries and/or fatalities
- Property damage
- Regulatory violations and/or fines
- Damaged public relations and/or customer relations
- Disciplinary actions up to and including termination

7.0 **Appendices**

- Appendix 1: Job Hazard Analysis
- Appendix 2: PPE Hazard Assessment

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- Appendix 3: SOP Checklist
- Appendix 4: SOP Performance Evaluation Checklist
- Appendix 5: SOP Quiz
- Appendix 6: Landfill Disposal Stabilization Form

Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



**Appendix 1
JOB HAZARD ANALYSIS**

<u>Job Being Analyzed:</u> Stabilization	Job Analysis No.	<u>Job Analysis By:</u>	Page 1 of 2
<u>Facility Location:</u> Ryley	<u>Operator's Job Title:</u>	<u>Original Analysis Date:</u>	<u>General Manager Approval:</u>
<u>Department:</u>	<u>Supervisor:</u>	<u>Last Revision Date:</u>	<u>H&S Manager Approval</u>
Required and/or Recommended Personal Protective Equipment:		Hard hat, safety glasses, minimum of half-face respirator with OV/AG/Ammonia/P100 cartridges, tyvek suit, inner and outer nitrile gloves, and CP steel-toe boots.	

Step #	Sequence of Job Steps	Potential Hazards	Recommended Procedures or Controls
1,8,14	Don PPE	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • none
2,9,15	Check wind. Dumping of waste into sludge pit	<ul style="list-style-type: none"> • dust 	<ul style="list-style-type: none"> • water fog application • respirator
3,4,10,11,16	Addition of water	<ul style="list-style-type: none"> • Walking surfaces may be slick. • Chemical splash, contact • Gas, vapor, or fumes • Dust particle • increase in temperature, steam • Kick back from pressure of fire hose. • Increase in temperature 	<ul style="list-style-type: none"> • Watch walking surfaces as Operator moves about area. • Ensure designated PPE is worn by all personnel who are within Exclusion Zone. • Hold hose firmly with feet planted to prevent losing balance.
5,10,17	Mix the waste material with the Trackhoe/Backhoe bucket until the waste has a solid consistency.	<ul style="list-style-type: none"> • Chemical splash, contact • Gas, vapor, or fumes • Dust particle 	<ul style="list-style-type: none"> • Ensure designated PPE is worn by all personnel who are within Exclusion Zone.
6,13	Loading of waste into rock truck & placement of waste	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
7,20	documentation	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • none
12,19	Obtain sample	<ul style="list-style-type: none"> • contact 	<ul style="list-style-type: none"> • Proper PPE

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Step #	Sequence of Job Steps	Potential Hazards	Recommended Procedures or Controls
12,18	The treated waste material is then to be placed into the transport vehicle. Ensure that the waste material is removed from the Stabilization Tank.	<ul style="list-style-type: none"> • Chemical splash, contact • Gas, vapor, or fumes • Dust particle 	<ul style="list-style-type: none"> • Ensure designated PPE is worn by all personnel who are within Exclusion Zone.

I certify that I performed a hazard assessment of the above task. This document constitutes the certification of that hazard assessment. I understand that this document facilitates compliance to the hazard assessment requirements of the Canada Labour Code (CLC, Part II, Part XIX Hazard Prevention Program).

Signature of Evaluator: _____

Date _____

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Appendix 2 PPE HAZARD ASSESSMENT

Task/Operation Evaluated: Stabilization of Hazardous Waste **Location:** _____

Name of Evaluator: _____ **Position/Title:** _____ **Date of Assessment:** _____

	Mechanical/Physical Hazards	Chemical Hazards	Biological/Environmental Hazards	Minimum PPE Required
	<input type="checkbox"/> Cutting <input type="checkbox"/> Sawing <input type="checkbox"/> Drilling <input type="checkbox"/> Sanding <input type="checkbox"/> Grinding <input type="checkbox"/> Hammering <input type="checkbox"/> Chopping <input type="checkbox"/> Puncture <input type="checkbox"/> Welding <input type="checkbox"/> Flying particles <input type="checkbox"/> Intense Rays <input type="checkbox"/> Compressed Air	<input checked="" type="checkbox"/> Chemical Splash, contact Gas, vapors, & fumes Dust particles <input checked="" type="checkbox"/> Objects under pressure <input type="checkbox"/> Cryogenic Burn <input type="checkbox"/>	<input type="checkbox"/> Blood <input type="checkbox"/> Other Infectious Substance <input type="checkbox"/> Harmful bacteria, virus <input type="checkbox"/>	<input checked="" type="checkbox"/> Safety Glasses <input type="checkbox"/> Safety Goggles <input type="checkbox"/> Faceshield <input type="checkbox"/> Welding Goggles <input type="checkbox"/> Welding Helmet w/tinted lens <input type="checkbox"/> Refer to Respirator PPE <input checked="" type="checkbox"/> None
	<input type="checkbox"/> Mechanical/Physical Hazards <input type="checkbox"/> Falling objects <input type="checkbox"/> Electrical shock <input type="checkbox"/> Impact	<input type="checkbox"/> Chemical Hazards Dust particles, debris	<input type="checkbox"/> Biological/Environmental Hazards <input type="checkbox"/> Heat Stress <input checked="" type="checkbox"/> Cold Stress	<input checked="" type="checkbox"/> Minimum PPE Required <input type="checkbox"/> Hard Hat <input type="checkbox"/> Spray-head sock
	<input type="checkbox"/> Mechanical/Physical Hazards <input checked="" type="checkbox"/> Impact / Falling objects <input type="checkbox"/> Electrical <input type="checkbox"/> Puncture <input type="checkbox"/> Slippery/Wet surface <input type="checkbox"/> Sharp objects Power tool(s) <input type="checkbox"/> Crushing/Compression objects <input type="checkbox"/> Welding/Sparks	<input checked="" type="checkbox"/> Chemical Hazards <input type="checkbox"/> Chemical Splash, contact <input type="checkbox"/> Objects under pressure <input type="checkbox"/> Cryogenic Burn	<input checked="" type="checkbox"/> Biological/Environmental Hazards <input checked="" type="checkbox"/> Heat Stress <input type="checkbox"/> Cold Stress <input type="checkbox"/> Dirt, Debris	<input type="checkbox"/> Minimum PPE Required <input type="checkbox"/> Steel-toe Safety Shoe <input type="checkbox"/> Steel-shank Shoe <input type="checkbox"/> PVC Overboot (Chicken boot) <input type="checkbox"/> PVC Steel-toe Boot <input type="checkbox"/> Boot/shoe Cover <input type="checkbox"/> CPC Steel-toe boot
	<input type="checkbox"/> Mechanical/Physical Hazards <input type="checkbox"/> Cuts, abrasions <input type="checkbox"/> Electrical shock <input type="checkbox"/> Puncture <input type="checkbox"/> Thermal burn <input type="checkbox"/> Pinch/crush <input type="checkbox"/> Impact/bruise <input type="checkbox"/> Tools <input type="checkbox"/> Welding/Sparks	<input checked="" type="checkbox"/> Chemical Hazards <input type="checkbox"/> Chemical Splash, contact <input type="checkbox"/> Cryogenic Burn <input type="checkbox"/> Objects under pressure	<input type="checkbox"/> Biological/Environmental Hazards <input checked="" type="checkbox"/> Heat Stress <input checked="" type="checkbox"/> Cold Stress <input type="checkbox"/> Dirt, Debris <input type="checkbox"/> Blood <input type="checkbox"/> Other Infectious Substance	<input type="checkbox"/> Minimum PPE Required <input type="checkbox"/> Cotton, inner <input type="checkbox"/> Cotton, outer <input checked="" type="checkbox"/> Nitrile, inner <input checked="" type="checkbox"/> Nitrile, outer <input type="checkbox"/> Canvas <input type="checkbox"/> Leather <input type="checkbox"/> Polar, insulated <input type="checkbox"/> Kevlar <input type="checkbox"/> Neoprene <input type="checkbox"/> NitroSafe <input type="checkbox"/> Rubber <input type="checkbox"/> Latex <input type="checkbox"/> SilverShields <input type="checkbox"/> Other _____

	<input type="checkbox"/> Mechanical/Physical Hazards <input type="checkbox"/> Cuts, abrasions <input type="checkbox"/> Puncture <input type="checkbox"/> Impact/bruise <input type="checkbox"/> Tools	<input checked="" type="checkbox"/> Chemical Hazards <input type="checkbox"/> Electrical shock <input type="checkbox"/> Thermal burn <input type="checkbox"/> Chemical Splash, contact <input type="checkbox"/> Cryogenic Burn <input type="checkbox"/> Objects under pressure	<input checked="" type="checkbox"/> Biological/Environmental Hazards <input checked="" type="checkbox"/> Heat Stress <input type="checkbox"/> Cold Stress <input type="checkbox"/> Dirt, Debris <input type="checkbox"/> Blood <input type="checkbox"/> Other Infectious Substance	<input checked="" type="checkbox"/> Minimum PPE Required <input checked="" type="checkbox"/> Work Uniform <input type="checkbox"/> Tyvek, suit <input type="checkbox"/> Tyvek, apron <input type="checkbox"/> Tyvek QC, suit <input type="checkbox"/> Tyvek QC, apron <input type="checkbox"/> Saranex, suit <input type="checkbox"/> Saranex, apron <input type="checkbox"/> CPF I, suit <input type="checkbox"/> CPF I, apron Other: _____
	Mechanical/Physical Hazards Noise	Chemical Hazards	Biological/Environmental Hazards	<input checked="" type="checkbox"/> Minimum PPE Required <input type="checkbox"/> Ear plugs <input type="checkbox"/> Ear muffs
	<input type="checkbox"/> Mechanical/Physical Hazards Welding	<input checked="" type="checkbox"/> Chemical Hazards <input type="checkbox"/> Chemical Splash, contact <input type="checkbox"/> Gas, vapors, & fumes <input type="checkbox"/> Dust particles	<input type="checkbox"/> Biological/Environmental Hazards <input type="checkbox"/> Blood <input type="checkbox"/> Other Infectious Substance <input type="checkbox"/> Harmful bacteria, virus	<input checked="" type="checkbox"/> Minimum PPE Required <input checked="" type="checkbox"/> Half-face respirator <input type="checkbox"/> Full-face respirator <input type="checkbox"/> SCBA <input checked="" type="checkbox"/> Supplied Airline Respirator <input checked="" type="checkbox"/> OV/AG P100 Cartridge <input type="checkbox"/> Amonia/Amine P100 Cartridge <input type="checkbox"/> Particulate mask
	<input type="checkbox"/> Mechanical/Physical Hazards <input type="checkbox"/> Fall Hazard	Chemical Hazards	Biological/Environmental Hazards	<input type="checkbox"/> Minimum PPE Required <input type="checkbox"/> Full-body Harness with Lanyard

Comments:

I certify that I performed a hazard assessment of the above task. This document constitutes the certification of that hazard assessment. I understand that this document facilitates compliance to the hazard assessment requirements of OSHA 29 CFR 1910.132(d)(2), only.

Signature of Evaluator: _____

Date _____

Reviewed and Approved: _____
 (signature)

Date: _____



Appendix 3 SOP Checklist

Name of Procedure: Stabilization

Location/Facility: _____

	Step #	Procedure	Recommended Action(s)
<input type="checkbox"/>		Ensure the appropriate documentation has been received prior to processing the waste material in the Stabilization Tank.	Contact Customer Service, Receiving, or the Laboratory personnel if correct documents are received or if there are any questions about the processing of the waste material.
<input type="checkbox"/>		Inspect all safety equipment and operational equipment prior to its use to ensure it is ready for use.	If equipment is malfunctioning or not ready for use, it must be placed out-of-service and an appropriate replacement be obtained prior to the processing of any waste material.
<input type="checkbox"/>	1,8,14	Don PPE	As to comply with facility regulations
<input type="checkbox"/>	2	Check wind	Stay upwind at all times
<input type="checkbox"/>	3,4,9,15	Place the waste material in the sludge pit and add water	
<input type="checkbox"/>	5	solidification	Material must pass Paint Filter Test
<input type="checkbox"/>	6,18	Removal of waste from sludge pit into rock truck or luggers	Ensure all waste is removed
<input type="checkbox"/>	7	documentation	Ensure paperwork and forms are submitted to Receiving Clerk for processing

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	Step #	Procedure	Recommended Action(s)
<input type="checkbox"/>	10,16,17	Addition of reagent/stabilization and mixing	Ensure pH adjustment is correct and all surfaces of stabilized material are completely coated
<input type="checkbox"/>	12,19	Obtain sample	Ensure treatment is complete & satisfactory

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**Appendix 5
Standard Operating Procedure Quiz**

Riley Facility	
TITLE:	Stabilization
REFERENCE NUMBER:	90RY-218-00
ORIGINAL DATE OF STANDARD WORK PRACTICE:	
REVISION NUMBER:	
DATE OF REVISION:	

SOP PROFICIENCY REVIEW: WRITTEN	
EMPLOYEE:	_____
DATE OF REVIEW:	_____
SCORE:	_____

Complete the following:

1. Name the four (4) types of information that must be received prior to waste being stabilized.

- | | |
|----------|----------|
| a. _____ | c. _____ |
| b. _____ | d. _____ |

2. Name four (4) types of equipment which must be inspected prior to waste being stabilized.

- | | |
|----------|----------|
| a. _____ | c. _____ |
| b. _____ | d. _____ |

3. Describe the process of micro-encapsulation.

FACILITY NAME _____

SOP Quiz
Stabilization
SOP #
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-
4. Why must water be added when doing any type of treatment process?

5. What is the consistency of the waste to be when it has done being treated?

6. Why should the pit be as empty as possible before placing another material into it?

7. Name four (2) types of incompatible chemical reactions.
a. _____ c. _____

8. Name the four (4) actions to be taken if an incompatible reaction occurs.
a. _____
b. _____
c. _____
d. _____
9. Name at least 2 consequences should personnel deviate from the procedures in this SOP.
a. _____
b. _____

SOP PROFICIENCY SIGN-OFF	
SOP TITLE:	Stabilization
SOP REFERENCE #:	
I certify that I have read the procedures required for the successful completion of the Standard Operating Procedure identified above. I also had the opportunity to discuss with the Training Department or my immediate Supervisor any questions concerning this Standard Operating Procedure prior to completing this quiz. I also understand that this SOP is a tool to be used during my on-the-job training and subsequently while performing my work job tasks:	
Trainee Signature _____	Date _____
The Standard Operating Procedure identified above has been discussed with the employee named herein. As evidenced by attaining satisfactory task knowledge, he/she is approved, pending satisfactory completion of the SOP task evaluation, to perform the named operation.	
Trainer Signature _____	Date _____

LANDFILL SOLIDIFICATION/STABILIZATION FORM

Date: _____

Customer:

Manifest: _____

Waste Shipping Name:

TDG Class: _____

pH Initial: _____

pH Final: _____

Paint Filter Test: Pass _____ Fail _____

Comments:

Reagents Used: (one bucket = 3 m3)

Peat Moss	Wood Chips	EAF Dust (AltaSteel)	Lime	Other (specify)

Landfill Location: _____ Operator: _____

PAINT FILTER LIQUIDS TEST

PROCEDURE NO.: _____

Approved By: **Stan Yuha, Facility Manager** _____

Signature

Wayne Codd, Operations Manager _____

Signature

1.0 PURPOSE:

This method is used to determine the presence of free liquids in a representative sample of waste. This is required to determine compliance with Section 6.1.1(b) of Approval 10348-01-00 (landfilling of liquid waste prohibited).

2.0 SUMMARY OF METHOD:

A predetermined amount of material is placed in a paint filter. If any portion of the material passes through and drops from the filter within the 5-min test period, the material is deemed to contain free liquids.

3.0 INTERFERENCES:

Filter media were observed to separate from the filter cone on exposure to alkaline materials. This causes no problem if the sample is not disturbed.

4.0 APPARATUS AND MATERIALS:

4.1 Conical paint filter: Mesh number 60 (fine meshed size).
 Available from paint suppliers.

4.2 Funnel: If the paint filter, with the waste cannot sustain its weight on the ring stand, then a fluted funnel or a funnel with a mouth large enough to allow at least 1 inch of the filter mesh to protrude should be used to support the filter. The funnel is to be fluted or have a large open mouth in order to support the paint filter but not interfere with the movement of liquid that passes through the filter mesh to the graduated cylinder.

4.3 Ring stand and ring or a tripod

4.4 Graduated cylinder or beaker: 100 mL.

5.0 REAGENTS:

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None.

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6.0 SAMPLE COLLECTION AND HANDLING:

- 6.1 Samples must be collected such that they are representative of the material being tested. It will be adequate for the purposes of this procedure to fill a beaker to the 100-mL mark for analysis.
- 6.2 A 100-mL or 100-g representative sample is required for the test. If it is not possible to obtain a sample of 100-mL or 100-g that is sufficiently representative of the waste, the operator may use larger size samples in multiples of 100-mL or 100-g, i.e., 200, 300, 400 mL/g. However, when larger samples are used, operators shall divide the sample into 100 mL or 100-g portions and test each portion separately. If any portion contains free liquids, the entire sample is considered to have free liquids.

7.0 PROCEDURE:

- 7.1 Assemble the test apparatus as shown in Figure 1.
- 7.2 Place the sample in the filter. A funnel may be used to provide support for the paint filter.
- 7.3 Allow the sample to drain for **5min.** into the graduated cylinder.
- 7.4 If any portion of the test material collects in the graduated cylinder in the 5-min period, then the material contains free liquids and **CANNOT BE LANDFILLED.**

8.0 REPORTING:

The results of the Paint Filter Test will be recorded in a logbook at the landfill kiosk and on the landfill receiving form. The logbook will contain the following information: date and time the test was performed, service work order number, size of the batch being sorbed, results of testing, initials of the analyst or operator.

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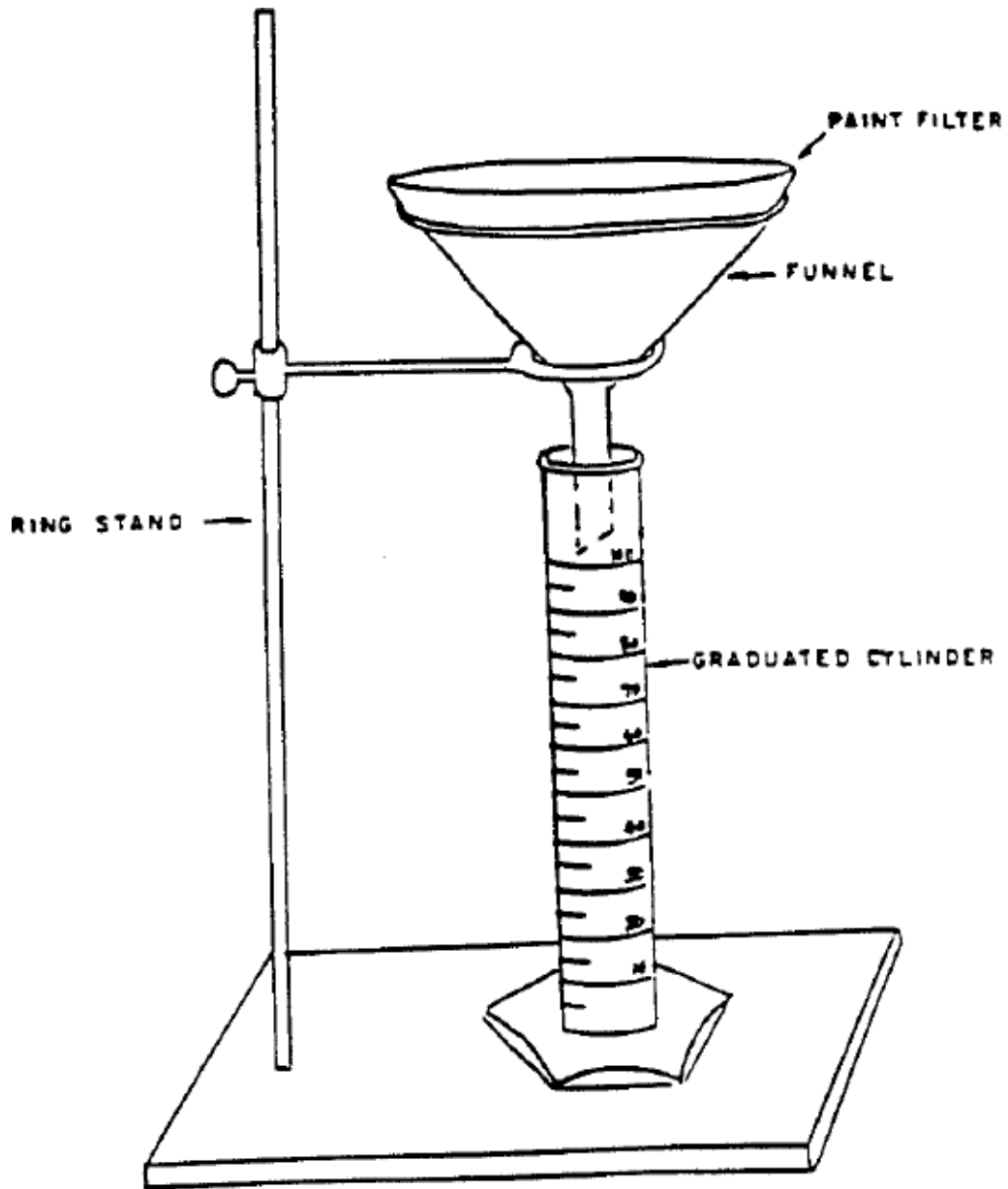


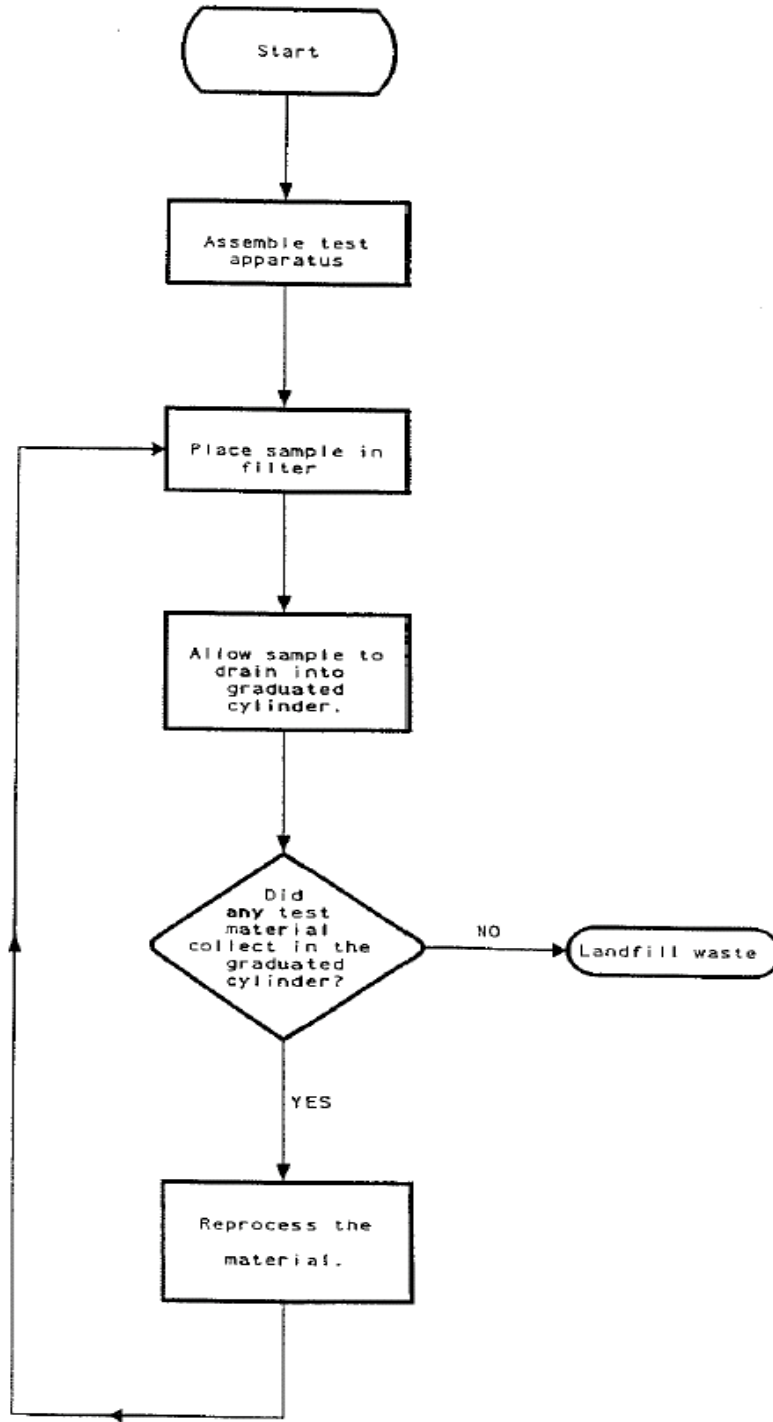
Figure 1. Paint filter test apparatus.

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PAINT FILTER LIQUIDS TEST



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**Waste Acceptance, Handling and
Disposal of Waste & Detecting,
Preventing any Disposal of
Unauthorized Waste**

**Ryley
Alberta**

Contents

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TITLE: PLACING OF WASTE IN THE LANDFILL		
Facility: Ryley	Prepared by: Stan Yuha	SOP Number: 90RY 4.6.34(d&e)
Reviewed By:	Title: Operations Manager	Issue Date: MAY 2023
Reviewed By:	Title: Director of Compliance	Next Review Date: MAY 2026
Reviewed By:	Title: Health and Safety Manager	
Approved By:	Title:	

1. Objective

This SOP is to provide guidance and the information required for waste acceptance, handling, and disposal of waste as to remain compliant with its current approval.

2. Site Specific Terms

None

3. Responsibilities

3.1. General Manager

- The General Manager will ensure that all employees are trained and knowledgeable regarding these controls.

3.2. Supervisors

- The Operations Manager and/or Lead Foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.

3.3. Employees

- Employees are responsible for adhering to safe work practices and all provisions found in this procedure.
- Employees must inspect equipment and report any failures or deficiencies to the appropriate Supervisor.

4. Prerequisites

4.1. Health and Safety

- Any incidents, including near misses, are to be reported immediately to the supervisor.
- A Job Hazard Analysis will be made available if required (Appendix 1)
- Consult the PPE Hazard Assessments (Appendix 2) to be worn when required.

4.2. Environmental

- Ensure all applicable monitoring equipment is available.
- If an incident occurs, report it immediately to your supervisor.
- Incidental releases are to be cleaned up immediately in the process designated PPE.
- If the incident requires additional assistance or equipment, the Contingency Plan may need to be implemented.

4.3. Documented Training

- SOP training
- WINWEB training

5. Approval Requirements

Clean Harbors Canada, Inc. Ryley Facility can accept all categories of waste except those listed in section 4.6.1 of Approval 10348-0-00. The secure landfill can receive solid non-hazardous and hazardous wastes that meet the criteria outlined in Section 13(2) of the Alberta Waste Control Regulations and The Alberta User Guide for Waste Managers. The regulatory and facility specific criteria are summarized as follows:

5.1. RYLEY LANDFILL ACCEPTANCE CRITERIA (APPROVAL 10348-03-00)

- Waste must have no Free Liquids as defined by the Paint Filter Test (SW 846 - 9095).
- Waste must have a Flash Point greater than 40°C. Waste streams with a flash point less than 40°C may be accepted. All waste will be evaluated on a case-by-case basis.
- Waste must contain less than 1000 mg/kg of halogenated organic compounds as determined using the TCLP extract.
- Waste must have a pH greater than 2 (pH of 1:1 solid: deionized water mixture).
- TCLP Extract of the waste must contain the following metals at less than the concentrations shown:
 - Arsenic 500 mg/L
 - Beryllium 100 mg/L
 - Cadmium 100 mg/L
 - Chromium (Cr+6) 500 mg/L
 - Lead 500 mg/L

- Mercury 20 mg/L
 - Nickel 500 mg/L
 - Selenium 200 mg/L
 - Silver 100 mg/L
 - Thallium 200 mg/L
 - Uranium 100 mg/L
-
- Solids must contain less than 1000 mg/kg each of benzene, ethyl benzene, methyl ethyl ketone, nitrobenzene, pyridine, toluene, or xylene in TCLP extract.
 - Solids contaminated with acetone, n-butyl alcohol, cyclohexanone, ethyl acetate, ethyl ether, isobutanol, and 2-nitropropane can be landfilled when these solvents are present at levels greater than 1000 mg/kg in TCLP extract only if the waste is non- flammable.
 - Solids contaminated with cresols, or cresylic acid can be landfilled when these solvents are present at levels greater than 1000 mg/kg in TCLP extract only if the waste is non-toxic.
 - Solids contaminated with carbon disulfide or methanol can be landfilled if they are present at levels greater than 1000 mg/kg in TCLP extract only if the waste is non- flammable or non-toxic.
 - Waste must contain less than 50 mg/kg PCBs.

5.1 Operational Criteria

- Wastes reacting with water to give a temperature rise $>15^{\circ}\text{C}$ - accepted case by case,
- Resistance to penetration must be >3 psi, < 3 psi should go into solidification pit,
- Total cyanide must be <590 mg/kg, Reactive cyanide must be <250 mg/kg,
- Elemental Sulfur concentration must be less than 500 mg/kg, AND
- Waste must be non-odorous.

6 Procedure

6.1 Waste Acceptance, handling, and disposal of wastes SOP

The following section includes procedures for:

6.1.1 Waste characterization and classification at source

Each waste stream to be accepted at the Ryley facility must be subjected to a pre-acceptance review prior to onsite receipt or disposal. The pre-acceptance review must include the collection of information about the waste stream from the generator and may include sample analysis. The purpose of the pre-acceptance review is to determine if the waste is acceptable for receipt at the Ryley facility. Each waste stream will have a waste profile completed prior to receipt of the waste at the facility.

Incoming shipments of waste arriving at the facility must be reviewed to determine acceptability for disposal. As part of this review, shipments must be subjected to visual inspection. This is particularly important for waste that are not sampled. Visual inspection should be used to ensure

that facilities manage only acceptable waste. Waste must be deemed acceptable prior to disposal at the facility. Visual inspection must verify that each waste conforms to the information on the profile and shipping documentation.

The number and type of containers in the shipment must be consistent with the information on the manifest. The physical state, absence of free liquids, and color of the waste must also be consistent with the documentation. Each container should be checked for proper and accurate safety marks and checked against the documentation including the manifest.

All incoming bulk loads in luggers, roll-offs, or dump units should be visually inspected to ensure consistency with the documentation. The material should specifically be examined for foreign matter and free liquids. Any discrepancies shall be reported to management.

6.1.2 QA/QC waste acceptance procedures

The laboratory should complete the information on the Quality Assurance form (paper or electronic) pertaining to the laboratory analysis and coding; no waste processing should commence prior to completion of this information. The lab must sign in with the receipt date and sign out with approval, code and date. Facility approval beyond laboratory recommendation may be required for off-spec and non-routine wastes.

Waste, such as asbestos and monolithic materials need not be sampled; visual inspection is sufficient. Acceptance of asbestos may be limited to certain times depending upon the condition of the landfill due to weather events.

Samples from multiple containers may be composited only if they are from the same generator, have the same waste code, and are similar in physical appearance. If the composite sample is found to be "off-spec", each container comprising the composite must be individually sampled. On-going waste streams that have not exhibited variability can be off-loaded without sampling but should be re-evaluated annually to confirm their composition. In these cases, careful visual inspection will be sufficient to confirm acceptability.

If the waste does not conform to the assigned profile and it cannot be accepted due to permit limitations, health and safety concerns, or operational limitations, the generator must be notified promptly of the rejection. The waste must be rejected back to the generator, rerouted or brokered to another disposal facility with the consent of the generator. **Waste that is not acceptable for landfill disposal and has been placed in the landfill MUST be removed within 7 days of receipt and reported to AEP in the monthly contravention report and included in the Annual Report on Landfill Operations.**

Other provincial governments may need to be notified of rejected waste shipments if they originated outside the province of Alberta. Paperwork review and documentation of waste starts when the waste arrives at the site. The driver is directed to stop on the weigh scale and to bring his paperwork into the entry beside the scale office. The paperwork (bill of lading, manifest) is reviewed for completeness and to ensure that the waste is intended for the Clean Harbors' facility. If the paperwork is determined to be in order, the truck is scaled in.

The generator's name, sales order number, manifest, bill of lading or receiving docket number is written on the scale ticket. Each scale ticket has a unique number that can be associated with a particular load and shipping document.

The wind speed and direction are recorded on the shipment receipt log for loads being offloaded immediately. The receiving personnel radio the landfill operators to find out where the driver should proceed to offload.

New drivers or drivers who have not been to the site in the past six months are given a brief safety orientation and shown a map of the site before they are sent back to the landfill. Following this they are directed to proceed to the unloading area.

Visual inspections of the load may be performed by personnel in the scale area or by landfill personnel. Samples of waste may be taken at the sampling station or by the landfill operators. When the driver returns to the scale after unloading, the scale ticket is punched in to get the net weight of the waste disposed. This weight is entered on the driver's paperwork and any discrepancies noted. Most shipping sites do not have scales and the shipping weights are usually estimates that can be **out significantly**.

6.1.3 Waste manifest & tracking

Hazardous wastes and Dangerous Oilfield Wastes must be accompanied by a shipping document completed by the waste generator that includes proper shipping name of the waste, the UN shipping number and packing group as well as the quantity of waste being shipped for disposal. The transporter of these wastes must have a carrier number issued by Alberta Environment and Parks.

The shipping document is to be signed by both the Generator (Part A) and the Carrier (Part B) of the waste before the load leaves the generator's facility. Copy 1 of the manifest is sent to AEP and the receiving jurisdiction if leaving Alberta. The Generator keeps Copy 2 for their records. The Carrier takes the remaining 4 copies with him to be given to the receiving facility.

Upon delivery of the waste to the Receiving facility, the receiving personnel review the shipping document. They will complete Section C of the manifest. One copy will be sent to Alberta Environment, the carrier will be given a copy of the completed manifest or shipping document for his records, copy will be retained by the receiving facility and a copy will be returned to the generator.

A copy of the manifest, the weigh ticket and the sales order will be given to the receiving coordinator. The coordinator will enter the sales order number into the Bulk Receiving Screen of the WINWEB system and then proceed to complete the entry of the manifest number and the weight into the system. The manifest will be scanned into the system as part of the electronic record of the load. The landfill location for the load is also entered into the system. Each load is assigned a unique tracking which is associated with the Sales Order and the manifest. Through the use of this tracking number the location or disposition of the waste can be found at any time.

6.1.4 Waste Sampling

Sampling of incoming loads should be conducted to verify that the characteristics of the shipment are as expected according to the pre-acceptance review information and the information on the shipment's accompanying documentation. Additional testing may be required because of a discrepancy between containers and their documentation or safety marks. Sampling procedures should be determined based on both the nature of the material and the type of containment.

Landfill solids may be checked for pH, BTEX, metals, delta T and flash point. Appropriate documentation must accompany all samples throughout the analysis process. Waste Profile code or identification should accompany the load for acceptance verification. Receiving personnel will complete the following information prior forwarding samples to the lab:

Sample information including work order number and data,

- Generator information including name,
- Waste description including waste name, specified information on physical state, and
- Container identification, including container number and any other information to identify the container.

7 Unauthorized Wastes

Through the Profile Approval System, unauthorized waste are not approved to be accepted into the facility. Individual loads are, at a minimum, visually inspected for quality assurance. As per Approval 10348-03-01 and the approval holder shall not:

- Receive,
- Process,
- Dispose of, or
- Perform any combination of the above for any of the following wastes, individually or in any combination, at the respective locations specified below:
 - Explosives (Class 1 TDGR wastes), at the facility,
 - Radioactive wastes (Class 7 TDGR wastes), at the facility,
 - Radioactive wastes regulated under the *Nuclear Safety and Control Act* (Canada), at the facility,
 - Biomedical waste, at the facility,
 - Waste containing free liquids, at the landfill, excluding the waste stabilization area,
 - Material containing ozone depleting substances, at the landfill,
 - Municipal solid waste, at the facility,
 - NORM waste, at the facility,
 - Waste generating offensive odours, at the facility, unless and until effective control measures are provided to prevent releases of offensive odours to the outside of the facility fence line.
 - Incompatible wastes and incompatible hazardous recyclables shall be prevented from mixing.

8 Consequences of Deviations

In addition to the process interruptions which can occur, the following additional consequences of deviations could result:

- Injuries and/or fatalities
- Property damage
- Regulatory violations and/or fines
- Damaged public relations and/or customer relations
- Disciplinary actions up to and including termination.

Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



Placing of Waste in the Landfill

**Ryley
Alberta**

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TITLE: PLACING OF WASTE IN THE LANDFILL		
Facility: Ryley	Prepared by: Stan Yuha	SOP Number: 90RY 4.6.34(f)
Reviewed By:	Title: Operations Manager	Issue Date: MAY 2023
Reviewed By:	Title: Director of Compliance	Next Review Date: MAY 2026
Reviewed By:	Title: Health and Safety Manager	
Approved By:	Title:	

1. Objective

This SOP is to provide guidance and the information required for the placing of waste in the landfill to remain compliant with its current approval.

2. Site Specific Terms

None

3. Responsibilities

3.1. General Manager

The General Manager will ensure that all employees are trained and knowledgeable regarding the placement of waste in the landfill.

3.2. Supervisors

The Operations Manager and/or Lead Foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.

3.3. Employees

- Employees are responsible for adhering to safe work practices and all provisions found in this procedure.
- Employees must inspect equipment and report any failures or deficiencies to the appropriate Supervisor.

4. Prerequisites

4.1. Health and Safety

- Any incidents, including near misses, are to be reported immediately to the supervisor.

- A Job Hazard Analysis will be made available if required (Appendix 1)
- Consult the PPE Hazard Assessments (Appendix 2) to be worn when required.

4.2. Environmental

- Ensure all applicable monitoring equipment is available.
- If an incident occurs, report it immediately to your supervisor.
- Incidental releases are to be cleaned up immediately in the process designated PPE.
- If the incident requires additional assistance or equipment, the Contingency Plan may need to be implemented.

4.3. Documented Training

- SOP training

5. Procedure for Placement of Waste in the Landfill

5.1 Working Face Width

Typically, the facility runs two operating faces simultaneously – one for debris waste streams and the other for soil and loose fill wastes. Each operating face is kept to as small an area as is practical and appropriately sloped. The minimum width of the working face should be at least wide enough to accommodate as many trucks as are expected to be at the landfill. It should be maintained to be narrow enough so the waste can be compacted and covered rapidly.

The facility receives a wide variety of waste types of varying compositions and consistencies. Operationally this means that the working face areas can vary depending upon the waste mix being received on any given day in order that the waste can be properly managed.

Wastes with little structural integrity require a wider, shallower operating area than soil or debris waste streams. Each working face shall be identified to the scale office and clerical staff as well as landfill personnel using a grid system that enables the location of waste streams within the landfill.

The following points are considered with respect to aesthetics:

- Minimize the height of the landfill area.
- Minimize the open working face of the site.
- Ensure cover is put in place as soon as possible.

5.2 Lift Depth

A lift is composed of adjoining working faces that form one layer of the landfill. Each lift should be between 1 – 2 metres high so as not to cause severe settlement and slope stability problems. Operators should check each day that they are building the cell to the correct levels.

5.3 Compaction

The wastes should be placed in the landfill in lifts of approximately 1 metre in depth. Each lift should be compacted or crushed as much as possible during placement depending upon the type and volume of the waste stream. This is done by making multiple passes over the waste with the compactor. If the waste is dumped in the cell and is not carefully compacted, it can take up to two or three times the airspace volume of well compacted waste. To get better compaction have waste tipped at the bottom of the face. Push it up and across the face.

5.4 Grid System

The landfills are divided into imaginary grids. The grids are marked using a combination of letters and numbers that mark each grid height and its east/west and north/south location in the landfill. The markers are placed on the landfill berm around the outside two edges of the landfill having letters on one side and numbers on the other side. Each individual grid is 10 meters x 10 meters. For example, if a load is placed in L3B5R, it would be in landfill 3, in layer B from the bottom (2 meters) and in the grid section where 5 and R intersect.

5.5 Liner Protection

Prior to the disposal of waste in a landfill cell, a minimum of 18 inches (0.45 metre) of protective cover material will be placed over the primary synthetic liner at the base of the cell. This material will include 18 inches (0.45 metre) of thickness over the granular material typically used as part of the primary leachate collection system. A minimum of 18 inches (0.45 metre) of protective cover material will be placed on all landfill side slopes before waste is placed near the side slopes. As an additional measure to protect the liner, rigid debris such as pipe, pieces of wood and metal will not be placed in the bottom lift of the landfill or near the side slopes of the landfill cells.

6 Consequences of Deviations

In addition to the process interruptions which can occur, the following additional consequences of deviations could result:

- Injuries and/or fatalities
- Property damage
- Regulatory violations and/or fines
- Damaged public relations and/or customer relations
- Disciplinary actions up to and including termination.

7 Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



Waste Sulphur Management Plan

Ryley, AB

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1. Objective

Clean Harbors has developed the following procedure for management of waste sulphur or waste containing sulphur into the Ryley landfill Facility.

Incoming shipments of waste arriving at the facility must be reviewed to determine acceptability for disposal. Waste containing sulphur must be appropriately handled and managed.

Extreme caution must be taken when handling any material(s) that may contain sulphur. Sulphur waste is to be stabilized and/or placed in a designated landfill location, often segregated other waste streams. Failure to do so could cause the sulphur to negatively react with other materials, resulting in a possible vapor release or fire.

2. Responsibilities

2.1. General Manager

The General Manager will ensure that all employees are trained and knowledgeable regarding the proper operating procedures.

2.2. Supervisors

The supervisor and/or lead foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.

The supervisor and/or lead foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.

2.3. Employees

Employees are responsible for adhering to safe work practices and all provisions found in this procedure. Employees must inspect all equipment prior to use. If deficiencies are found, the equipment must be locked out/ tagged out and reported to the supervisor immediately.

3. Prerequisites

The following prerequisites must be completed prior to performing this procedure.

4. Health and Safety

- 4.1. Any incidents, including near misses, are to be reported immediately to the supervisor.
- 4.2. Review the Job Hazard Analysis to become familiar with the hazards associated with this process.
- 4.3. Consult the PPE Hazard Assessments for proper PPE to be worn for this job task.
- 4.4. In the event the employees' personal gas detection instrument goes into alarm mode, the employee is to leave the area immediately and report the condition to their supervisor.

5. Environmental

- 5.1. If an incident occurs, report it to your supervisor immediately, and implement the facility's Contingency Plan, if applicable.
- 5.2. Incidental releases are to be cleaned up immediately in the process designated PPE.

6. Documented Training

- 6.1. For new employees, these rules will be reviewed during the facility orientation. A member of supervision, to ensure that a clear understanding and agreement to follow is achieved, should do this review in a two-way discussion. Simply having an employee read these rules is not adequate or acceptable.
- 6.2. A periodic review with all employees is to be conducted to help ensure continuing awareness.
- 6.3. HAZWOPER training
- 6.4. Monthly HAZWOPER Update Modules
- 6.5. TDG training as applicable
- 6.6. SOP training
- 6.7. Equipment training

7. Waste Sulphur Management Procedures

7.1. Scope and Application

This procedure is intended to guide personnel on how to safely handle and dispose of waste containing sulphur. Sulphur may be stabilized with alkaline material or placed on a bed of limestone in a segregated area of the working landfill. A stabilization method is to be determined by the Facility manager or lab manager prior

to any handling. Limited quantities are approved for disposal, making communication with management crucial prior to landfill placement.

References to the Guideline for Landfill of Sulphur Waste September 12, 2011, are made in this SOP.

7.2. Materials and Apparatus

- Heavy Equipment (ie. Rock Truck, Bulldozer, etc.)
- Limestone and/or other alkaline material(s) for stabilization.

7.3. Landfill Procedure for Small Quantities of S-Waste

The following applies to landfill disposal of small and larger quantities of solid S-waste:

- a. An area within the active landfill cell should be designated for the disposal of S-waste where incompatible wastes (other wastes prone to generate acidic leachates) must not be co-disposed of with the S-waste.
- b. The designated area shall be at least 1.5 m above the base of the landfill,
- c. The bottom and sides of the designated area should be lined with a 0.30 m thick layer of finely ground alkaline product applied in consecutive compacted lifts 0.10-0.15 m (4-5 inches) thick,
- d. Immediately upon arrival at the landfill, the S-waste should be mixed with alkaline product prior to or after placement in the designated area at the ratios ($\text{CaCO}_3/\text{S} = 3.2$ or $\text{Ca}(\text{OH})_2/\text{S} = 2.4$) as described in section 4.1 of the Guidelines for S Disposal-September 2011,
- e. After mixing and/or layering, the S-waste should be immediately covered with a uniform layer of alkaline material in an amount and thickness equal to 10-15 % of the amount used to line the cell; and
- f. An intermediate or final cover, as applicable, shall be applied over the S waste plus alkaline material to prevent water percolation.

7.4. Landfill Procedures for Large Quantities of S-Waste

Basically, large quantities of S-waste resulting from train derailments, off-spec S, contaminated S, and S-containing soil with unrecoverable S should be disposed of into dedicated cells/trenches within the active landfill cell:

- a) An area within the active landfill cell should be designated for the disposal of S-waste where incompatible wastes (other wastes prone to generate acidic leachates) must not be co-disposed of with the S-waste,
- b) The S-waste cell/trench shall be large enough to allow for expansion as required, but it should minimize:
 - a. the active S disposal area, and
 - b. airborne particulate matter by adopting dust control and synthetic/alkaline product intermediate covers,
- c) Upon delivery to the site, the S-waste shall be immediately deposited into the previously prepared designated area or cell for disposal,

- d) Within the designated area or cell/trench, the S-waste should be totally encapsulated (i.e. the base, sides and top) with alkaline material to:
 - a. neutralize potential acidic leachate,
 - b. minimize waste volume, and
 - c. facilitate mining of the S-waste if that becomes a future option,
- e) The bottom and sides of the cell/trench should be lined with a 0.60 m thick layer of fine-grained alkaline product (for example, 3/8ths minus limestone, lime, or equivalent alkaline product) applied in consecutive compacted lifts 0.10-0.15 m thick:
- f) The S-waste should be:
 - a. delivered to the designated area or dedicated cell in bulk with no mixing of the S-waste with alkaline product,
 - b. placed directly on the bed of alkaline product,
 - c. compacted as needed to minimize voids,
 - d. developed until the final design height is reached, and
 - e. covered in the following order with:
 - i. a 0.15 m layer of alkaline product,
 - ii. a low permeability cap sloped to avoid percolation of infiltration water,
 - iii. a sloped drainage layer of coarse material; and
 - iv. a final cover of sufficient thickness to avoid erosion, water accumulation, and support vegetation,
- g) Any leachate, passing through the S-waste should be collected and controlled in the leachate collection system,
- h) The operation of a cell dedicated to S-waste should not allow for:
 - a. oxidation of S present in the waste,
 - b. water accumulation on and/or infiltration into the S-waste during operation or post-closure to minimize aerobic/anaerobic activity,
 - c. co-disposal of the S-waste with municipal solid waste,
 - d. leachate recirculation to reduce formation of acidic leachate, mobilization of heavy metals, and waste destabilization; and
 - e. capture of landfill gas.

Regardless of the degree of the landfill cell/trench design (bottom liners, leachate collection systems, etc...) the disposal of large quantities of S-waste at approved landfills with dedicated S-cells should respect the encapsulation process described in these Guidelines.

8. Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved

APPENDIX – Sulphur Waste Guidelines

**Guidelines for
Landfill Disposal of Sulphur Waste
and
Remediation of Sulphur Containing Soils**

September 12, 2011

TITLE:
Waste Sulphur Management Plan

SOP No.:
90RY- - 10 -

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Preface

These *Guidelines for the Disposal of Sulphur Waste and the Remediation of Sulphur Containing Soils* (the *Guidelines*) amend, consolidate, and replace the *Guidelines for the Disposal of Sulphur Containing Solid Waste* (1983) and the *Guidelines for the Remediation and Disposal of Sulphur Contaminated Wastes* (1996) published by Alberta Environment. Significant parts of these two documents have been incorporated with changes into these *Guidelines* which are to be effective September 12, 2011.

These *Guidelines* do not apply to the production, recovery, processing or storage of sulphur as a product. Instead, they are restricted to and provide information on acceptable industry practices regarding the management of sulphur waste and sulphur containing soils incidental to those activities.

If there is a conflict between these *Guidelines* and the *Environmental Protection and Enhancement Act*, the *Oil and Gas Conservation Act*, the *Oil Sands Conservation Act* or their *Regulations*, specific approvals or authorizations, which may contain more stringent requirements, then the legislation or the AENV or ERCB approvals take precedence over the *Guidelines*. For a comprehensive review of Alberta's waste legislation review the documents identified in section 2.

AENV and ERCB staff are available to clarify policy and legislation in case of doubt, but it is the responsibility of the persons responsible to satisfy themselves as to the proper interpretation of these *Guidelines* if they are uncertain. Responsibility for proper sulphur waste disposal and the remediation of sulphur containing soils rests with the person responsible, despite anything written in these *Guidelines*.

Abbreviations

AENV	Alberta Environment
CCE	Calcium carbonate equivalent
<i>EPEA</i>	<i>Environmental Protection and Enhancement Act</i>
ERCB	Energy Resources Conservation Board
<i>Guidelines</i>	<i>Guidelines for the Landfill Disposal of Sulphur Waste and the Remediation of Sulphur Containing Soils</i>
ID	Interim Directive
IL	Information Letter
<i>MSDS</i>	Material Safety Data Sheet
<i>MOU</i>	Memorandum of Understanding
<i>OGCA</i>	<i>Oil and Gas Conservation Act</i>
<i>OSCA</i>	<i>Oil Sands Conservation Act</i>
S	Symbol for sulphur
<i>User Guide</i>	<i>Alberta User Guide for Waste Managers, 1995</i>
<i>WCR</i>	<i>Waste Control Regulation</i>

Definitions

All definitions in the *EPEA*, *OGCA* and their *Regulations* apply to these *Guidelines*. The following additional definitions are included here for comprehensiveness, interpretation or clarification of the meaning of the terms used in this document.

- (a) **“3/8ths minus”** means lime, limestone or equivalent product for which a sieve analysis shows that 20% of the product passes a 60 mesh sieve, 60% passes a 10 mesh sieve, and 100% passes a 3/8" sieve.
- (b) **“Acid neutralizing capacity”** or “ANC” means the ability of a substance to neutralize an acidic material. It is measured by a titration method such as AOAC 955.01. Although the results are often expressed as the calcium carbonate equivalent, the titration method measures all acid neutralizing compounds, not just carbonate.
- (c) **“Alkaline product”** means limestone, lime or an alternative alkaline product derived from waste with a MSDS that identifies the waste as a suitable neutralizing or buffer alkaline material when remediating S-containing soils or mixing with and/or encapsulating S-waste at landfills.
- (d) **“ERCB facility”** means an upstream oil and gas facility approved by the ERCB and as defined in the *Oil and Gas Conservation Act*. The OGCA is found at <http://www.gp.alberta.ca/>.
- (e) **“Landfill”** means a waste management facility at which waste is disposed of by placing it on or in land, but does not include a land treatment facility, a surface impoundment pond, a salt cavern or a disposal well.
- (f) **“Large quantity”** means, for the purpose of this document, a quantity of S- waste that exceeds a truck load or 10 cubic meters or 20 tonnes per calendar month or landfill disposal event. (*Note: Multiple loads of small quantities of S- waste produced by the same generator are considered for landfill disposal purposes a large quantity when disposed of at the same dedicated landfill cell and may follow the alternating method of disposal described in section 6.2.*)
- (g) **“Lime”** means ‘quicklime’ or ‘hydrated lime’ which are products derived from limestone.
- (h) **“Limestone”** means a naturally occurring sedimentary rock consisting primarily of calcium carbonate.
- (i) **“MSDS”** means a Material Safety Data Sheet prepared as required by the *Hazardous Products Act* (Canada). The MSDS identifies the product, origin, uses, physical/chemical properties, precautions and procedures when used, and disposal methods for when it becomes a waste.
- (j) **“Off-specification”** or **“off-spec”** product or material means that the product or material does not meet the quality standards required to satisfy its designed

purpose or its Material Safety Data Sheet (MSDS).

- (k) **“Oilfield waste”** means an unwanted substance or mixture of substances that results from the construction, operation, abandonment or reclamation of a facility, well site or pipeline as defined in the *OGCA* and its Regulations, but does not include an unwanted substance or mixture of substances from such a source that is received for storage, treatment, disposal or recycling at a facility authorized for that activity under *EPEA*.
- (l) **“Oilfield waste management facility”** means a facility approved by the ERCB under the *OGCA* and its Regulations to process, treat, store, dispose or recycle oilfield waste.
- (m) **“S”** is the chemical symbol for elemental sulphur. Is often used throughout the Guidelines as an abbreviation for “sulphur”.
- (n) **“SO₄”** stands for sulphate(s) in wastes, soils, or products.
- (o) **“Small quantity”** means, for the purpose of this document, a quantity of waste that does not exceed a truck load or 10 cubic meters or 20 tonnes per month or landfill disposal event.
- (p) **“Sulphur containing soil”** means in-situ or excavated soil that contains sulphur (in an elemental and/or reduced form).
- (q) **“Sulphur manufacturing or processing plant”**¹ means a facility that manufactures or processes compounds containing elemental sulphur in a quantity greater than 1.0 tonne per day.
- (r) **“Sulphur storage facility”**¹ means a facility that has a storage capacity for S of greater than 100 tonnes of S.
- (s) **“Sulphur waste”** or **“S-waste”** means waste that contains S in a reduced and/or elemental form in excess of 500 milligrams of sulphur per kilogram of waste or soil and that is intended to be disposed of.

¹ *Sulphur manufacturing or processing* and *sulphur storage* are activities mostly associated with hydrocarbon processing and sulphur recovery plants and that require an *EPEA* and/or *OGCA* approval. ERCB ID 2001-3 *Sulphur Recovery Guidelines for the Province of Alberta* available at <http://www.ercb.ca/> also apply to these activities.

1. Introduction

Canada, with a production of about 9 million tonnes per year, is the world's second largest producer of sulphur (S), a valuable by-product of Alberta's oil and gas industry. Because the generation of S-waste is incidental to the production, recovery, processing or storage of S as a resource or product, regional plans, policies or strategies affecting those activities may influence the management of S-waste. Regardless, these *Guidelines* are not applicable to S as a product. Instead, their objective is to describe procedures and recommendations required for the proper management of S-waste and the remediation of S containing soil.

Small quantities of S-waste are produced when S is removed from natural gas, crude oil, and hydrocarbon products and includes, without limitation, spent sweetening agents, used catalysts, and S-contaminated debris, soil or industrial equipment. Large quantities of S-waste result from railway car accidents, the reclamation of S-block storage areas, and off-specification S or residues from S production, storage, and recovery processes.

These *Guidelines* do not apply to the management of wastes containing S in an oxidized form such as gypsum from fertilizer manufacturing plants or from scrubbing SO_x from gas stacks. This includes wastes with sulphates (SO²⁻) or sulphites (SO²⁻)⁴ because the S present in those wastes can not be further oxidized to produce sulphuric acid.³

Though S recovery is the primary driver in dealing with S-waste and S-containing soils, *in situ* land treatment and land application to S-deficient soils as a fertilizer should be used whenever possible with landfill disposal of S-waste being the last resort and used only when other options are inappropriate.

The landfill disposal of S-waste and the remediation of S-containing soil must be done in compliance with the *Waste Control Regulation* and/or *Directive 58*, as applicable, and the recommendation and procedures outlined in these *Guidelines*

The *Guidelines* emphasize the addition of suitable alkaline buffer products to the affected soil or waste in order to minimize adverse environmental impacts, and their ultimate objective is to eliminate the environmental liability that may result from the improper landfill disposal of S-waste or the deficient remediation of S-contaminated land. Specific objectives of the *Guidelines* are to ensure that the person responsible adopts sound procedures that result in:

- controlling the rate of sulphur oxidation;
- neutralizing any free sulphuric acid eventually formed; and
- preventing the formation of acidic leachate from sulphur cell/trenches.

2. Legislation

Persons responsible for the management of S-waste and/or S contaminated land should be familiar with Alberta's waste related legislation. The most relevant regulatory documents are identified below. All Alberta's legislation is available at <http://www.qp.alberta.ca>.

S-waste including excavated S-containing soil is an oilfield waste when it results from the processing of hydrocarbons or recovery of S at upstream oil and gas facilities approved by the ERCB pursuant to the OGCA. Oilfield wastes directed to facilities authorized by AENV are, upon acceptance at these facilities, regulated under EPEA and associated regulations, namely the WCR and the ADR.

- **Environmental Protection and Enhancement Act (EPEA)** – RSA 2000, Chapter E-12, Current as of November 1, 2010
 - Section 176 of the Act requires disposal of waste at approved waste management facilities or as authorized in writing by the Director.
- **Activities Designation Regulation (ADR)** – AR 276/2003 with amendments up to and including AR 97/2011
 - Sections 2 and 3 on definitions for *landfill, land treatment, oilfield waste, waste, sulphur manufacturing or processing plant, and sulphur storage facility*.
 - Section 5 on the designation of activities and approvals required.
 - Section 6 empowers the Director to issue combined or individual approvals or registrations where more than one activity takes place at one particular site, as appropriate.
 - Schedule 1, Division 1, clause (i) identifies a landfill as a facility that requires approval under the EPEA.
 - Schedule 2, Division 1, clauses (a) and (c) identify land treatment and landfill disposal as activities that require EPEA registration.
- **Waste Control Regulation (WCR)** – AR 192/1996 with amendments up to and including AR 68/2008
 - Section 1 on definitions such as *recyclable, oilfield waste, waste*.
 - Sections 13(2)(c) and 23(1) on landfill disposal prohibitions.
- **Alberta User Guide for Waste Managers, 1995 (User Guide)**
 - Part 1A, pgs 21-23, things that are not hazardous waste
- **Release Reporting Regulation (RRR)** – AR 117/1993 with amendments up to and including AR 386/2003

- **Substance Release Regulation (SRR)** – AR 124/1993 with amendments up to and including AR 114/2006
- **Oil and Gas Conservation Act (OGCA) and Regulations** – RSA 2000, Chapter O-6, as of December 2, 2010. Waste produced by a *facility* as defined in the OGCA and its Regulations is defined as *oilfield waste* and regulated by the ERCB.

Management requirements for *oilfield waste* are set out in Directive 58: *Oilfield Waste Management Requirements for the Upstream Petroleum Industry*, as amended. Further guidance is in ID 2000-3: *Harmonization of Waste Management*, ID 2000-4: *An Update to the Requirements for the Appropriate Management of Oilfield Wastes*, and ID 99-4: *Deposition of Oilfield Waste into Landfills*.

Provided that the management of *oilfield waste* meets the ERCB requirements, further guidance specific to the management of S-waste is found in these *Guidelines*.

- ERCB directives, information letters (IL), interim directives (ID), and directives are available at URL <http://www.ercb.ca/portal/server.pt>.
 - **Directive 58**, *Oilfield Waste Management Requirements for the Upstream Petroleum Industry*. (November 1996, addendum added December 23, 2008)
 - **Directive 47**, *Waste Reporting Requirements for Oilfield Waste Management Facilities* (February 13, 2009 - effective April 1, 2009)
 - **ID 2000-4**, *An Update to the Requirements for the Appropriate Management of Oilfield Wastes* (ERCB). Prohibits most oilfield wastes, including S-wastes, from disposal at EPEA registered Class II landfills.
 - **ID 2003-3**, MOU on the *Harmonization of Waste Management* clarifies ERCB and AENV jurisdictional roles.
 - **ID 99-4**, MOU on the *Deposition of Oilfield Waste into Class II Landfills* identifies waste quality and landfill design requirements for specific oilfield wastes disposal at Class II landfills.
 - **IL 84-11**, *Approval, Monitoring, and Control of Sulphur Storage Sites*. Summarizes the responsibilities of the ERCB and AENV and guidelines for S production and handling facilities.
- **Oil Sands Conservation Act** provides authority for the approval of oil sands processing plants and associated S recovery facilities.

- ***Transportation of Dangerous Goods Regulations (TDGR).***

TDGR identifies solid and molten sulphur as Class 4.1 dangerous goods when transported as a solid or a liquid with the product identification number UN 1350 or UN 2448, respectively, packing Group III. Depending on the transportation, some exemptions apply. Spent iron sponge, which contains iron oxide, a substance prone to spontaneous combustion, is a Class 4.2 dangerous good with a PIN UN 1376, Packing Group III. Additional information on TDGR rules is available at (780) 422 9600 or 1 800 272 9600.

- ***Occupational Health and Safety Act.***

Due to the presence of high percentages of S, some S-wastes are flammable and as such also regulated as a *controlled product* under the *Hazardous Products Act* (Canada) as it relates to workers' occupational health and safety. Employers must ensure proper labeling of controlled products, and provide workers who handle flammable S and S-waste with adequate education and training to ensure that their health and safety are protected. Detail on applicable requirements at http://employment.alberta.ca/documents/WHS/WHS-PUB_ch044.pdf.

3. Approvals Required

The ERCB and AENV encourage persons responsible for the management of S-waste to consider waste prevention or recovery before disposal. S as a by-product of the oil and gas industry sector should always be managed as a resource. In that regard, the approvals required for the production, processing, and storage of S are identified in the ADR and ERCB information Letter 84-11 pursuant to EPEA and the OGCA, respectively.

The landfill disposal of S-waste and the remediation of S-containing soils are activities that per se do not require additional specific approvals under *EPEA* or the *OGCA*. Generally, the ERCB or AENV regulations, approvals, authorizations and guidance documents include provisions applicable to the management of S-waste and the remediation of S-containing soils. If not, those regulatory documents are complemented by what is described in these *Guidelines* to ensure accountability in dealing with these wastes or soils.

3.1 Landfill Disposal of S-waste

Landfill disposal of S-waste is limited to AENV or ERCB approved Class I or Class II landfills. These facilities may be located at S production or recovery plants, within mined out areas at coal and oil sands plants or off-site as stand alone or components of specific waste management facilities.

Prior to receiving S-waste for disposal, the existing approval must contain provisions relevant to the landfill handling and disposal of S-waste (see Appendix 2). Otherwise, the approval holder must contact the AENV regional office to determine if specific authorizations are required.

AENV registered Class II landfills operating under the Code of Practice for Landfills are restricted to disposal of small quantities of *non-oilfield* S-waste provided that the S-waste is not co-disposed with MSW; the disposal meets section 6.1(a) to (f) of these *Guidelines*. Acceptance of large quantities or multiple loads of small quantities will require prior written authorization from AENV. A Class II registered landfill is a landfill where not more than 10 000 tonnes per year of waste is disposed of.

Regardless of the approval, the class and design of the landfill, and the quantity of S-waste disposed of, the applicable disposal procedures must be described in the landfill operations plan, specifically, or by reference to the appropriate sections of these *Guidelines*. In all cases, the person responsible for the S-waste must obtain prior permission from the landfill operator before shipping the S-waste off-site for landfill disposal.

3.2 Remediation of S-containing soils

The *in-situ remediation* of S-containing soil or the *land application* of S products derived from waste to S-deficient soils must be conducted in compliance with the technical procedures identified in section 7 of these *Guidelines*.

The person responsible for the application to land of any *oilfield waste* (including S- waste or alkaline wastes) generated as a result of oil and gas activity must meet the requirements set out in Directive 58.

4. Effects of Sulphur on Soil

Under aerobic conditions, specific micro-organisms may oxidize the S in wastes, water or soil through the reaction:



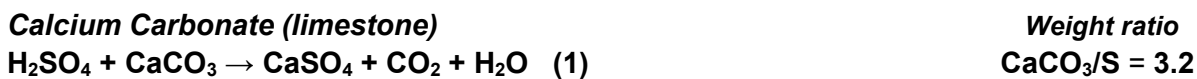
Sulphuric acid increases soil acidity, solubilizes sulphates, mobilizes trace metals from soil, reduces the concentration of basic ions, decreases soil availability of nutrients, and ultimately reduces microbial activity. Acid neutralizing agents such as limestone (a mixture of calcium and magnesium carbonates), hydrated lime (calcium hydroxide), quick lime (calcium oxide) or equivalent alkaline products are suitable to buffer or mitigate these effects and should be used when remediating S-containing soils or landfilling S-wastes.

Limestone is recommended for *in situ* land remediation and land application of S impacted soils and landfill disposal of S-wastes. Hydrated lime or quicklime (commonly known as 'lime') is suitable for treatment of S-affected soils or disposal with S-waste but its use in land application or *in situ* treatment requires planning of frequency and application rates because it can raise soil pH above the levels that are optimum for agricultural and forestry production.

Strong bases must not be used in S-waste land management programs because they contain soluble salts which may have adverse effects on the structure of soils and clay landfill liners. Alternative alkaline materials derived from wastes might be suitable but only upon assessment on a case-by-case basis to evaluate the suitability of the candidate alternative material including without limitation the acid neutralizing capacity (often expressed as the calcium carbonate equivalent) of the material, its constituents, contaminants present and concentrations, and the potential impacts.

4.1 Neutralization with Alkaline Products

The neutralization of sulphuric acid with limestone or hydrated lime involves the following reactions:



Gypsum (calcium sulfate dihydrate or $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) is only slightly soluble in water and soil salinity problems are unlikely to occur. However, limestone often contains magnesium carbonate (MgCO_3) which within an acidic environment produces soluble magnesium sulphate that can adversely affect soil and water quality because of increased salinity. Consequently, when limestone is used to remediate S-containing soils, the MgCO_3 content shall not exceed 2%.

More generally, the weight ratios identified above apply to pure limestone or pure lime, e.g. when 100% calcium carbonate or 100% lime are used to remediate S-containing soil or when are mixed with S-waste. In summary, both the quantity in kilograms and the thickness in metres of the layers of the alkaline products identified in 6.1 and 6.2 should be adjusted to reflect:

- (a) the actual acid neutralizing capacity (ANC), often expressed as the calcium carbonate equivalent of the alkaline product; and
- (b) the buffer capacity (again the ANC), if any, of the S-waste or S-containing soil being disposed or remediated, respectively.

4.2 Alternative Alkaline Products

The use of alkaline products other than the pure products indicated in 4.1 to neutralize S-waste requires the person responsible for the alternative alkaline product to carefully evaluate the product including without limitation the following:

- (a) the ANC (often expressed as calcium carbonate equivalent) of the candidate alkaline product;
- (b) information on the product necessary to prepare a MSDS;
- (c) identification of the weight and volume and/or thickness needed to neutralize or buffer the S-waste or S containing soil, as applicable;
- (d) identification of any constituent, contaminant, moisture and conditions that may limit its use; and
- (e) any mitigative measures as required by (d).

Alternative products may include quick lime, by-product or spent lime, cement kiln dust, crushed concrete, fly and bottom ashes, etc. Each candidate product should be assessed on its own merits. For instance, quick lime (CaO) should not be used for safety reasons unless it is previously reacted with water under controlled conditions. This reaction is highly exothermic and the heat released together with the pyrophoric nature of some S-wastes makes it highly incompatible.

The generator of alkaline products derived from waste shall develop an MSDS and provide a copy to the receiver/user of the alkaline product

The intent of this case-by-case evaluation is to ensure that the alternative alkaline product is suitable and equivalent in effectiveness to the stoichiometric quantities of the pure products indicated in 4.1. For instance, specific fossil fuel ashes might not be appropriate due to the high content of certain heavy metals and thus the likelihood of these being leached out and pollute the environment.

5. What Is Sulphur Waste?

Sulphur waste includes without limitation the following:

- (a) spent sweetening agents containing elemental S and sulphides;
- (b) spent catalysts from S production, recovery or desulphurization plants;
- (c) industrial equipment or materials impregnated or covered with S scaling or incrustations;
- (e) S contaminated with hydrocarbons, methanol, glycol, amines, etc.;
- (f) S contaminated soil from S spills;
- (g) S contaminated materials or debris;
- (h) off-specification S, unrecoverable S, or contaminated S from S production, processing, recovery or storage;
- (i) contaminated S soil or material removed from S production, processing, recovery plants, S-block base pads, and/or storage areas;
- (j) S-containing soil or material from the remediation of S contaminated sites;
or
- (k) contaminated S from transport accidents.

Spent sweetening agents such as iron sponge [which contains pyrite (FeS_2), troilite (FeS) and elemental S] are easily oxidized with the release of heat. To dissipate the heat from this exothermic reaction and prevent fire during and upon removal of the spent material from absorption towers, S pyrophoric wastes should be kept moist when handled and within an oxygen-starved environment.

If a waste including contaminated soil is not included in the list above and is not known or suspected of containing elemental or reduced forms of S, then these *Guidelines* do not apply to that waste and thus no testing for S is required when characterizing the waste/soil.

5.1 Classification of Sulphur Waste

Despite the *TDGR* classification described in section 2 for solid or molten S and spent iron sponge, S-waste including S-contaminated soils is not classified as hazardous waste in Alberta regardless of the S content, provided that:

- (a) the management of the S-waste and S-containing soil is in compliance with these *Guidelines*; and
- (b) S is the only contaminant of concern (*Alberta User Guide for Waste Managers*, 1995, Part 1A, pg 21), or
- (c) the S-waste is not liable to spontaneous combustion when it is being handled or disposed of.

These conditions imply that: (1) the S-waste is conditioned with alkaline products prior

to and/or during disposal as described in section 4.1; (2) the presence of possible contaminants such as hydrocarbons, other organics, salts, heavy metals, or naturally occurring radioactive material (NORM), common in some S-wastes, is not at hazardous levels; and (3) potential pyrophoric S-waste is kept moist at all times and/or bagged/contained to prevent exposure to air and flammability upon removal from the absorption tower and subsequent handling as a waste.

The presence of substances other than S may trigger, depending on the concentration, the presence of hazardous characteristics and/or the need to adopt additional precautions to ensure the safe and environmentally management of the S-waste or S- containing soils.

5.2 Neutralization of Sulphur Waste (or Sulphur Containing Soil)

When managing S-waste including S-containing soil (excavated or *in-situ*) it is important to know when and how much alkaline material needs to be added to the S- waste or the S-containing soil in order to properly neutralize the S present. To determine the correct amounts information from the following questions should be used together with what is described in section 4.1:

- (a) What is the concentration of S in the waste or soil? Does it exceed 0.05% or 500 milligrams per kilogram?
- (b) Does the 500 mg/kg referred in (a) represent S in a combined total concentration of elemental (S^0) and reduced (S^{2-}) forms, only?
- (c) Do we know the acid neutralizing capacity (ANC) of the S-waste or S-containing soil to accurately calculate the amount and/or thickness layers, as applicable, of the alkaline product needed?
- (d) What type of waste are we dealing with? Is it homogeneous soil or waste constituted by heterogeneous industrial equipment or debris with visible S as incrustations or scaling?
- (e) Does the waste result from specific chemical processes? Is it known for its S content (elemental or in reduced form)?

In S-containing soil, the S present is typically elemental S, but in some S-wastes such as spent sweetening agents or used catalysts it might be present as a mixture of free S, sulphides, etc. Wastes with S as a sulphate are not subject to these *Guidelines* as the S cannot be further oxidized to produce an acid.

When S is present in wastes or soils it is important to know, in addition to the concentration of S and any other contaminants present, what is the calcium carbonate equivalent (or the ANC) of that waste or soil. Some wastes and soils have a significant alkaline buffer capacity that may be taken into account when calculating the actual quantity of alkaline material needed in each particular case. This knowledge is particularly important when dealing with large quantities of homogeneous wastes/soils with low S content.

5.3 Beneficial Use of Sulphur Waste

The person responsible for S-waste intended for beneficial use must characterize the waste, process it as required into a product, and develop a MSDS for the product derived from the S-waste which identifies at a minimum:

- the product, origin, and intended use,
- physical/chemical/biological properties,
- precautions and procedures for use,
- potential adverse health and environmental impacts, and
- disposal methods if it becomes a waste.

The MSDS must accompany the S-waste from producer to user to ensure that workers occupational health and safety and the environment are protected.

6 Landfill Disposal of Sulphur Waste

The ultimate objective when disposing S-waste with alkaline material is to prevent S oxidation, neutralize the sulphuric acid eventually formed, prevent migration of acidic leachate from the landfill cell/trench, and ensure that the landfill operator has adopted proper cell/trench landfill designs that optimize landfill space, minimize liability, and protect the environment.

These *Guidelines* address separately the landfill disposal of small and large quantities of S-waste. This approach has been adopted based on operational, economic and environmental reasons. Overall, the most suitable disposal method should be decided on a case-by-case basis depending on the assessment without limitation of the following factors:

- type and quantity of S-waste,
- access to recovery technologies,
- availability of alkaline products, and
- landfill space.

Regardless of the disposal method, in all cases when handling S-waste at landfills, emergency S-fire fighting equipment must be available and S-dust control measures implemented as required.

The main objective in landfill disposal of S-waste is to ensure that the cell/trench design and operational procedures prevent the formation of acidic leachate.

Approved Class I or II landfills may accept S-waste for disposal along with the appropriate alkaline product for neutralization of the waste (by mixing or encapsulation) as described in these *Guidelines* provided that that:

- (a) appropriate approvals/authorizations as per section 3 have been obtained by the appropriate regulatory authority; and
- (b) the landfill operations plan reflects applicable handling and disposal practices consistent with the approval and/or these *Guidelines*,

S-waste with non-recoverable S, such as S-containing soil, non-usable equipment with S incrustations or scaling, spent sweetening agents, or used catalysts should be conditioned and disposed of with alkaline products as described in this section of the *Guidelines*. When contaminants other than S are present, they have to be characterized and taken onto account for waste classification, facility design, recovery, treatment, or disposal options. Common contaminants include heavy metals, hydrocarbons, glycols, amines, other organics, or naturally occurring radioactive material.

When disposing of S-containing soil, the ANC of the S-containing soil may be taken into account when calculating the quantities and/or layer thickness of the alkaline product required. However, in no case should the layer of alkaline material be reduced from the values indicated in section 6.1 and 6.2 when the total S content in the soil or waste exceeds 4%.

6.1 Small Quantities of Sulphur Waste

When disposing of small quantities of S-waste at approved Class I or Class II landfills, the person responsible for the S-waste and the person responsible for the landfill receiving the S-waste must jointly ensure that the S-waste is mixed stoichiometrically with alkaline product prior to or upon disposal. This is critical when the small quantity of S-waste is disposed of into a cell/trench that has not been specifically designed to receive industrial waste or S-waste only.

Exceptions to mixing may apply when the small quantities of S-waste is

- pyrophoric S-waste such as spent iron sponge being disposed of at Class I landfills; or
- industrial equipment such as containers, vessels, heat exchangers, piping, or similar units not suitable for mixing with alkaline products; or
- disposed of into a cell or trench dedicated to S-wastes only.

In these cases, the S-waste must be disposed of as per the encapsulation *alternating method* described in 6.2.2. Persons responsible for pyrophoric S-waste should take special precautions when handling, transporting, storing and disposing of this waste by keeping it moist to prevent the fire hazard. Pyrophoric waste can not be disposed of into approved Class II landfills unless the waste is previously treated to a non-hazardous condition.

Co-disposal of S-waste with municipal solid waste is not an acceptable waste management practice.

Certain S-waste spent slurries or sludges from gas sweetening processes must be dewatered to a solid condition prior to landfill disposal of the solids. The liquid phase has to be further treated and/or disposed of at approved facilities.

The following applies to landfill disposal of small quantities of solid S-waste:

- (a) an area should be designated for the disposal of S-waste within a landfill cell/trench where incompatible wastes (municipal solid organic wastes and other wastes prone to generate acidic leachates) must not be co-disposed of with the S-waste.
- (b) the designated area shall be at least 1.5 m above the water table;

- (c) the bottom and sides of the designated area should be lined with a 0.30 m thick layer of finely ground alkaline product applied in consecutive compacted lifts 0.10-0.15 m (4-5 inches) thick;
- (d) at the generating site or immediately upon arrival at the landfill, the S-waste should be mixed with alkaline product prior to or after placement in the cell/trench at the ratios described in section 4.1. (Note the exceptions mentioned above for pyrophoric S-waste, industrial heterogeneous equipment, or multi-loads of small quantities of S-waste going to the same dedicated cell/trench described in section 6.2.2.)
- (e) after mixing and/or layering, the S-waste should be immediately covered with a uniform layer of alkaline material in an amount and thickness equal to 10-15 % of the amount used to line the cell; and
- (f) an intermediate or final cover, as applicable, shall be applied over the S-waste plus alkaline material to prevent water percolation.

Limestone, lime or other alkaline products used as neutralizing agents in landfills should be no coarser than the commercially available product known as "3/8th minus". A laboratory investigation which involved leaching a solution of sulphuric acid through columns of this limestone product indicated a considerable margin of safety is provided as long as a significant content of fine particles is present. Removing the particles which pass a 60 mesh sieve significantly increased the percolation rate and jeopardized pH control. The limestone grain size has to be balanced with site stability, erosion and dust formation.

Alkaline materials, other than those identified in section 4.2, have to be assessed on a case by case basis with respect to their ANC (expressed as calcium carbonate equivalent) and other constituents/contaminants that might be present.

The objective in lining the disposal cell with alkaline material is to provide additional safety against the formation of acidic leachate. When disposing of small quantities of S-waste into cells/trenches that are not dedicated to S-wastes only, a layer of limestone/lime about 0.3 m thick should provide such a margin of safety. Between active disposal periods, an intermediate cover, preferably an alkaline product or buffer should be placed on top of the S-waste to minimize dust, erosion and leachate.

6.2 Large Quantities of Sulphur Waste

The landfill disposal of large quantities of S-waste discussed here follows methods that are not based on the stoichiometry of the reaction referred to in section 4.1. Instead, the S-waste is encapsulated within layers of suitable alkaline material.

Mixing large quantities of S-waste with alkaline material at the rates indicated in section 4.1 would multiply the waste volume by a factor of at least 3 or 4 depending on the alkaline material used. This is neither economical nor environmentally sound since both landfill space and alkaline materials are often scarce. Consequently, the encapsulation of a large quantity of S-waste within a layer of suitable alkaline material acting as a buffer barrier is preferred over the stoichiometric mixing when disposing of large quantities of S-waste into a dedicated landfill cell/trench.

When disposing of S-waste by encapsulation into a dedicated landfill cell/trench no mixing of the S-waste with alkaline material is required. Consequently, the ratios indicated in section 4.1 do not apply.

Those large quantities can occur as one time event or result from multiple loads of small or large quantities of S-waste produced over a short period of time that should not exceed a maximum of two continuous calendar months. In summary, a homogeneous large quantity of S-waste or a large quantity constituted by the accumulation of multiple alternating layers of small or large quantities of S-waste and alkaline material or intermediate cover must not be mixed with additional alkaline material but rather encapsulated as described in 6.2.1 and 6.2.2.

6.2.1 Encapsulating Large Quantities of S-Waste

Basically, large quantities of S-waste resulting from train derailments, off-spec S, contaminated S, and S-containing soil with unrecoverable S should be preferably disposed of into dedicated cells/trenches at approved Class I or Class II landfills that respect the following design and operational requirements:

- (a) a location within the industrial disposal area or a dedicated cell/trench (it is assumed that the overall site is hydrogeologically suitable) shall be designated for the disposal of large quantities of S-waste;
- (b) the S-waste cell/trench shall be large enough to allow for expansion as required, but it should minimize
 - (i) the active S disposal area, and
 - (ii) airborne particulate matter by adopting dust control and synthetic/alkaline product intermediate covers;
- (c) upon delivery to the site, the S-waste shall be immediately deposited into the previously prepared designated area or cell for disposal;
- (d) within the designated area or cell/trench, the S-waste should be totally encapsulated (i.e. the base, sides and top) with alkaline material to:
 - (i) neutralize potential acidic leachate;
 - (ii) minimize waste volume; and
 - (iii) facilitate mining of the S-waste if that becomes a future option;
- (e) the bottom and sides of the cell/trench should be lined with a 0.60 m thick layer of fine-grained alkaline product (for example, 3/8th minus limestone, lime, or equivalent alkaline product) applied in consecutive compacted lifts 0.10-0.15 m thick;
- (f) the S-waste should be:
 - (i) delivered to the designated area or dedicated cell in bulk with no

mixing of the S-waste with alkaline product,

- (ii) placed directly on the bed of alkaline product,
- (iii) compacted as needed to minimize voids;
- (iv) developed until the final design height is reached, and
- (v) covered in the following order with:
 - A. a 0.15 m layer of alkaline product;
 - B. a low permeability cap sloped to avoid percolation of infiltration water;
 - C. a sloped drainage layer of coarse material; and
 - D. a final cover of sufficient thickness to avoid erosion, water accumulation, and support vegetation;
- (g) any leachate, passing through the S-waste should be collected and controlled in the leachate collection system;
- (h) the operation of a cell dedicated to S-waste should not allow for:
 - (i) oxidation of S present in the waste;
 - (ii) water accumulation on and/or infiltration into the S-waste during operation or post-closure to minimize aerobic/anaerobic activity;
 - (iii) co-disposal of the S-waste with municipal solid waste;
 - (iv) leachate recirculation to reduce formation of acidic leachate, mobilization of heavy metals, and waste destabilization; and
 - (v) capture of landfill gas;

Regardless of the degree of the landfill cell/trench design (bottom liners, leachate collection systems, etc...) the disposal of large quantities of S-waste at approved landfills with dedicated S-cells should respect the encapsulation process described in these *Guidelines*.

6.2.2 The Alternating Method

The encapsulation method can be modified as necessary to accommodate the disposal of multiple small or large loads of similar S-wastes received and disposed into the same dedicated landfill cell/trench provided that:

- (a) the individual shipments are received within a limited period that should not exceed two continuous calendar months; and
- (b) the multiple loads of S-waste are disposed into a dedicated landfill cell/trench in sequential alternating layers of alkaline material or intermediate cover and S-waste.

In the *alternating method*, the layer of alkaline product functions simultaneously as buffer and as intermediate cover. This method is particularly suitable when small quantities of S-waste are produced over a limited time, the potential for recovery of the S-waste is low, and/or it is difficult to obtain alkaline products. Most importantly, there is

no need to mix the S-waste with alkaline products.

The intermediate cover may take the form of temporary or removable tarps, plastic liners, synthetic geotextiles, clay or other suitable material that minimize airborne S particulate matter and preclude percolation of water through the S-waste.

6.3 Monitoring

The presence of large quantities of S-waste in dedicated landfills cells or trenches may trigger additional monitoring to assess performance of the cell or trench and the landfill in containing these wastes. The extent of these monitoring provisions, if not part of the existing approval, is described next and must be added as part of an amendment of the landfill approval.

For further guidance on comprehensive landfill monitoring consult the *Standards for Landfills in Alberta* at <http://environment.alberta.ca/02956.html>. The monitoring provisions, triggered by the presence of large quantities of S-waste, include, without limitation the following:

- (a) measuring the quantity, type, and chemistry of the S-waste received and disposed of;
- (b) measuring the quantity, type, and chemistry of the alkaline product admixed and/or used as encapsulating buffer;
- (c) recording and mapping the exact disposal location of the S-waste;
- (d) recording the design, construction, operation, and reclamation of the S-waste cell/trench;
- (e) the leachate from each cell containing S-waste should be tested bi- annually for pH, sulphates, and heavy metals including vanadium; (3)
- (f) water accumulation and infiltration within areas containing S-waste;
- (g) controlling S dust, as needed; and
- (h) additional groundwater well(s) installed up-gradient and immediately down-gradient, adjacent to the S-waste cell/trench, as part of the landfill groundwater monitoring system.

This landfill monitoring information should be collected during operation, closure and post-closure periods. Record keeping and reporting should be maintained as per the *WCR* or specific approval requirements.

7 Remediation of Sulphur Containing Soil

Remediation and land application applies only to S-containing soil. Contaminated S, unrecoverable S, and off-specification S may be candidates to land application provided that these materials do not contain constituents detrimental to the soil systems or cause odours and are in compliance with section 7.2.

Upon removal of the most free and visible S from S-block storage areas, the concentration of total S left in the soil should not exceed 4% [elemental S plus sulphate (SO_4)]. This soil with low S content may be left in place provided that *in situ* land surface remediation with limestone or lime is done as described in section 7.1. Though suitable alternative alkaline products may be used, limestone is preferred to other products because of its longer term ANC. When residual S in the base soil is less than 0.05% (or 500 parts per million on a weight basis) no liming is required.

The materials removed during S storage block area clean-up activities, including excavated contaminated soil, base aggregates and/or liners, contaminated S, unrecoverable S, and off-specification S, must be sent to a S recovery facility or managed as described in section 6 or 7.2 of these *Guidelines*. Some of these materials may be suitable for land application to S-deficient soils provided that S recovery is not feasible, do not contain constituents that could be detrimental to the soil system, and do not create odours. On-site dilution of contaminated material to reduce S content to below 4% total S is not allowed. Soils containing more than 4% total S are not suitable for *in situ* liming and should be removed from the contaminated site for S-recovery or disposal.

When transferring S-waste or alkaline products derived from waste to a third party for land application, the person responsible (generator/producer/owner) for the S-waste and/or alkaline product shall develop applicable MSDS sheets and provide a copy to the receiving party.

S materials should not be applied to soils with an initial pH less than 6.5. To ensure effective oxidation of the S within the top layer of soil and crop benefit, S particle size should not exceed 2 mm (0.08 in).

7.1 In Situ Land Remediation

In situ land remediation (1) refers to the treatment with alkaline product of

- (a) the top layer of S-containing soil that remains on former S storage block areas after removal of all the S, and S-wastes; or
- (b) S-contaminated soil due to dusting in the vicinity of S-block storage areas;
or
- (c) the land area where an accidental spill of S has occurred;

and the total residual concentration of S is between 0.05% elemental S and 4% total S (or 500 mg elemental S/kg and 40 000 mg total S/kg, respectively).

This means that most free and visible S, S-containing soil/material, or S-waste with an excess of 4% total S have been removed from the former S-storage block or otherwise S-affected areas prior to *in situ* liming. Then, alkaline product must be applied to the affected land in accordance with the following:

- (d) the application rates reflect the chemical reactions depicted in section 4 of these *Guidelines*;
- (e) the magnesium carbonate content of the limestone does not exceed 2% by weight;
- (f) the alkaline product is finely ground so that 90% passes a 60 mesh sieve; and
- (g) airborne particulate matter is minimized.

In situ land treatment with limestone is not required when the residual elemental S soil content is less than 0.05% (500 mg S/kg) and the soil pH is higher than 6.5 (measured in 0.01 M CaCl₂). A balance has to be reached in each case in terms of the soil S- content versus limestone requirements as limestone generally decreases the availability of sulphates for plants (2).

7.2 **Land Application**

Land application (3) of suitable S-waste to agricultural soils refers to the occasional application of S to soils that are S-deficient, high in carbonates, or required to grow specific crops. When S is finely ground and mixed with soils with high oxidizing capacity it is usually just as effective as alternative SO₄ sources (4). Time of application of S-waste is also critical as it should be worked into the soil as far ahead of planting as possible.

Prior to or immediately after the application of S-waste to land, ground limestone may have to be spread over the S treated area for pH control. Both, the S-waste and the limestone, have to be incorporated homogeneously into the surface 15 cm (6 in) of the soil using suitable tillage equipment. The following should be respected when applying S-waste to soils:

- (a) the application rate of S to the land should be based on a fertilizer recommendation prepared by a Professional Agrologist and should not exceed a maximum rate of 250 kilograms elemental S per hectare (or about 223 pounds per acre);
- (b) S particle size should not exceed 2 mm (0.08 in);
- (c) no S application should take place on soils that
 - (i) have a pH of less than 6.5,
 - (ii) are saturated with water,
 - (iii) is covered with ice or snow,
 - (iv) is frozen, or

- (v) at any time where conditions preclude effective application and incorporation;
- (d) the targeted agricultural land should not be used for S application more than once every 3 or 4-year cycle, or as determined by a fertilizer recommendation;
- (e) additional application of S to the same area should not occur until the previously applied S has been oxidized;
- (f) when needed, the application of limestone should
 - (i) accompany each application of S-waste, and
 - (ii) comply with section 7.1(d) - (f);
- (g) between consecutive applications of S, the land should be sown to a grass mixture or cropped (i.e., it must support vegetation); and
- (h) land management must ensure the wastes applied are retained on the top soil where they are spread.

A Professional Agrologist may recommend application rates for sulphur and/or limestone that may differ from those indicated in section 4 and 7.

When S-waste or alkaline product derived from waste are to be used, detailed chemistry including the soil oxidizing capacity, the alkaline product ANC (often expressed as calcium carbonate equivalent), and the concentration of non-oxidized forms of S (elemental and sulphides) is required. The application rates to land for S or lime/limestone indicated in sections 4.1 or 7.2 may vary subject to the assessment of a Professional Agrologist.

7.3 Soil and Water Monitoring

Soil, surface water, and when needed, groundwater monitoring of the land area receiving S and alkaline buffer products should be conducted to:

- (a) assess the impact of these substances on the targeted land;
- (b) confirm that S oxidation has been achieved; and
- (c) assess soil and water pH, especially when the land receives more than one application of S.

Documentation to be collected and submitted must address the elements identified in Sections 3 to 7 of these *Guidelines*, and should include data which demonstrate effective *in situ* remediation in the case of cleaning up former S block storage areas or spills, or effective use of S as a soil fertilizer in the case of application of suitable S- waste to S-deficient soils.

7.3.1. Soil Monitoring

Representative soil samples shall be taken and tested from at least four locations within each land treated area (1) prior to land application, (2) at least once within two months after land treatment, and (3) quarterly thereafter until soil pH stabilizes within

6.5 and the background value. In doing so, the following factors should be taken into account:

- (a) at each location the soil samples shall be representative of the soil horizons at 0 to 0.15 and 0.15 to 0.30 m depths; and
- (b) the soil analyses should include at a minimum
 - (i) pH (in 0.01 M CaCl₂),
 - (ii) elemental S,
 - (iii) total S (elemental and sulphate)
 - (iv) ANC (often expressed as CaCO₃ equivalent), and
 - (v) electrical conductivity.

Soils with low pH (i.e. with a pH below 6.5) would trigger further testing including heavy metals. The results obtained should be compared with similar data obtained from adjacent unaffected soil locations. If needed, soil samples should also be collected from the 0.30 to 0.45, 0.45 to 0.60, 0.60 to 0.90, 0.90 to 1.20, 1.20 to 1.50 m depths and every 0.50 m thereafter throughout the depth of contamination to assess further impact and tested for the parameters in 7.3.1 (b).

7.3.2. Groundwater Monitoring

Groundwater monitoring hydraulically up-gradient, immediately down-gradient of the S- affected land, and within the land application area is required on an annual basis when acidification of the subsoil above the water table has been detected. This is more likely to occur upon multiple applications of S to the same area. Groundwater monitoring, if needed, should take into account the following:

- (a) the location of acidification (with one sample per each of the acidified sampling area with a maximum of 2500 square metres);
- (b) areal and depth extent of the acidification and/or contamination;
- (c) soil testing results and trends;
- (d) depth of local water table;
- (e) be conducted for as long as soil acidification persists; and
- (f) sample parameters to be tested include pH, SO₄, vanadium and other heavy metals.

8 Test Methods, Record Keeping, and Reporting

Often S-wastes and S-containing soils are rather heterogeneous materials. Thus, the collection and preparation of homogeneous and representative samples for analytical testing is a significant challenge. This is well illustrated with elemental S for which current test methods require a 0.2 milligram size sample and/or different solvents. Another recurrent issue is inconsistency of results due to the different methodologies used when testing elemental S, total S, sulphates, and other S-soil related parameters referred to in these *Guidelines*.

There is a need for further identification and standardization of reliable and cost effective tests methods for testing S and S-soil related parameters. In the interim, and to minimize sample variability and increase consistency, it is recommended that large enough samples be obtained and homogenized for representativeness prior to collection of the required aliquot for testing using:

- (a) standard test methods when available,
- (b) the test methods identified in Table 1 of AENV draft *Directive for Monitoring the Impact of Sulphur Dust on Soils* available on-line at <http://environment.gov.ab.ca/info/library/8368.pdf>; or
- (c) alternative test methods adopted by a laboratory accredited pursuant to ISO 17025, as amended, unless otherwise authorized in writing by the regulatory agency.

The test methods recommended for better established water and wastewater (leachate), soil and solid waste analysis mentioned in these *Guidelines* and in AENV approvals are also identified in Appendix 1.

All information collected in compliance with the monitoring requirements of these *Guidelines* (e.g. in sections 6.3 and 7.3) shall be recorded, kept by the person responsible for the activity, and reported as required in the approval to operate the facility, if one is required, or upon written request of the Director. In addition, the type and quantity of S-waste produced and disposed of should be recorded and reported in the facility's *annual summary of waste management data* to the regulatory agency, if required by the applicable approval, or recorded in the landfill operational plan and kept on site.

Any environmental releases involving contaminated elemental S not addressed in the facility approval to operate shall be reported by the person responsible immediately upon discovery. Reports shall be made by phoning the toll free 24-hour Alberta Environment hotline at 1-800-222-6514. More information on reporting spills/releases is available at <http://environment.alberta.ca/01521.html>.

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APPENDIX 1: RECOMMENDED TEST METHODS

1. **For S and S-Soil or S-Waste Related Parameters**
 - (a) the methods identified in Table 1 of AENV *Directive for Monitoring the Impact of Sulphur Dust on Soils* at <http://environment.gov.ab.ca/info/library/8368.pdf>.
2. **For wastewater, runoff, and groundwater**
 - (a) the *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, and the Water Environment Federation, as amended;
 - (b) the *Methods Manual for Chemical Analysis of Water and Wastes*, Alberta Innovates, Vegreville, Alberta, 1996, as amended;
 - (c) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846; September 1986, as amended;
3. **For soil samples**
 - (a) *Soil Sampling and Methods of Analysis*, Lewis Publishers, 1993, as amended;
 - (b) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846; September 1986, as amended;
 - (c) the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, March 1987, as amended;
 - (d) the *Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volume I: Main Report*, CCME EPCNCS62E, 1993, as amended;
 - (e) the *Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volume II: Analytical Method Summaries*, CCME EPC-NCS66E, as amended;
4. **For waste**
 - (a) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846, Revision 6, 2007 available on-line at <http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm>;
 - (b) the *Methods Manual for Chemical Analysis of Water and Wastes*, Alberta Environmental Centre, Vegreville, Alberta, 1996, AECV96-M1 as amended; or
 - (c) the *Toxicity Characteristic Leaching Procedure (TCLP)* USEPA Regulation 40 CFR261, Appendix II, Method No. 1311, as amended; or
 - (d) the *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, and the Water Environment Federation, as amended; or
 - (e) the *Alberta User Guide for Waste Managers*, AENV, 1995, as amended;
 - (f) with respect to coal sampling and analytical methods, the applicable requirements in the most recent version of ASTM, as amended.

APPENDIX 2: FREQUENTLY ASKED QUESTIONS

1. *When do these Guidelines apply to me?*

When you are the person responsible for the generation and/or management of S-waste including excavated S-contaminated soils, the *in-situ* remediation of S-contaminated land, and/or the reclamation of S-storage block base pads and use land-based technologies such as landfills or land application for S-waste management.

2. *Does my EPEA landfill approval require an amendment if I want to accept S-waste including off-spec S or S-containing soil for disposal?*

An EPEA approval amendment is not required if S-waste disposal related provisions are clearly identified in the landfill approval. The landfill approval should

- (a) contain specific S disposal provisions; or
- (b) specifically require S disposal procedures be part of the operations plan; or
- (c) make reference to the 1983 “*Guideline for the Disposal of Sulphur Containing Solid Wastes*” as amended, or
- (d) make reference to these *Guidelines*.

If the above are not met, the person responsible must contact AENV regional office, prior to acceptance of the S waste, to determine if an approval amendment or site specific authorization is required.

In any case, the operator of an approved landfill should document the disposal procedures applicable to any particular waste (including S-waste) received at the site that requires special handling procedures and those procedures should be documented in the facility operational plan kept at the site.

3. *Can a registered Class II landfill accept large quantities or oilfield S-waste for disposal?*

No. If the S-waste is an oilfield waste, ERCB *ID 2000-4* takes precedence. ERCB *ID 2000-4* prohibits oilfield wastes other than demolition debris, garbage, and scrap metal from accessing EPEA registered Class II landfills. However, large quantities of S-waste that is not an oilfield waste may access Class II registered landfills provided the registration holder has previously obtained the written authorization of the Director and the activity is documented in the landfill’s operational plan.

4. *Can I dispose of S-waste, off-spec S or contaminated S at my landfill for possible future mining of S?*

A landfill is not a “sulphur storage facility” as defined in the *ADR*. Hence, the storage of S at a landfill can only be accommodated under an approval for a S-storage facility (or an amendment of the current approval). The *ADR* and *IL 84-11* define the production, processing, and storage of S as activities that require EPEA and/or OGCA approvals.

However, the disposal of large quantities of S-waste by encapsulation with limestone, lime or suitable alternative alkaline product at approved landfills is acceptable provided that it is conducted in compliance with section 6.2 of these *Guidelines* and the activity is addressed in:

- (a) the existing approval for the landfill, or
- (b) an amendment of the current approval.

Regardless, any landfill should be designed and operated in anticipation of foreseeable wastes and activities planned for the facility and for what may happen later when reclaiming these sites. Among other, landfill reclamation activities may include landfill gas collection and mining of specific wastes.

5. If my landfill approval references the 1983 guideline, as amended, should I follow these Guidelines?

Yes, you should follow these *Guidelines* because they amend and replace the *Guidelines for the Disposal of Sulphur Containing Solid Waste* (1983) as well as the *Guidelines for the Remediation and Disposal of Sulphur Contaminated Wastes* (1996), published by Alberta Environment effective September 12, 2011.

6. Can I store S at my approved landfill?

No, unless an *EPEA* or an *OGCA* approval for a S storage facility has been issued by AENV or the ERCB, as applicable. A landfill is not a "sulphur storage facility" as defined in the *ADR* and the ERCB *IL 84-11*.

7. Can a S-waste dedicated landfill cell or trench accept other wastes?

Yes, under well defined conditions and subject to case-by-case assessment, wastes other than S-waste are suitable for treating other wastes being simultaneously treated in the process and eventually be disposed in the same cell/trench. Examples include alkaline and elemental mercury (Hg^0) wastes. Cases with alkaline wastes are profusely illustrated in these *Guidelines*. As for Hg^0 waste, treatment options have to be assessed individually. One acceptable method is the treatment by the generator of the Hg^0 waste by mixing and reacting the Hg^0 waste with S^0 followed by encapsulation with alkaline material. The S^0 needed could come from suitable S-waste that otherwise would have to be disposed of as such. In any case, treatment of Hg^0 waste with S^0 has to be properly designed and evaluated to ensure its technical, economic and environmental feasibility. (Example 3 in Appendix 3)

8. Can I co-dispose of S-waste with MSW at my landfill?

No. S-waste should never be mixed and/or co-disposed with MSW at any landfill. However, small quantities of S-waste may be disposed in a MSW landfill cell/trench provided that the S-waste is layered, confined, and physically separated from the MSW by appropriate barriers of alkaline product and/or other suitable waste. Alternatively, small quantities of S-waste or S-containing soil, properly mixed or layered with intermediate alkaline material may be placed preferably at the bottom of the trench or within a designated part of the trench and then totally encapsulated with buffer alkaline material as described in section 6. In this case, the alkaline material also functions as intermediate cover.

9. Do debris with minor dusting of S on the surface, but no visible solid or scaled S, require the addition of alkaline material when landfilled?

Assuming that the S dusting was not from direct exposure to S manufacturing, processing, or

recovery operations and was caused presumably by the deposits of air borne S particulate matter from S handling or storage, then the debris with minor dusting is not considered an S- waste. However, this debris would not be considered an inert waste and should not be disposed of in a Class III landfill. Check also the criteria in section 5.

10. Does a landfill operator have to develop specific landfill procedures including S-waste management protocols when receiving S-waste?

Yes. The person responsible for the operation of a landfill must include in the landfill operations plan all the procedures and protocols required to properly handle S-waste received at the site.

11. Does a landfill with an engineered liner and leachate collection and removal systems still require the co-disposal or encapsulation of the S-waste with suitable alkaline materials?

Yes. The addition of alkaline products as a buffer or neutralizing agent to S-wastes – either by mixing or encapsulation – constitutes a mandatory precautionary measure to account for potential operational mismanagement of the landfill, the neutralization of potential acid leachate, liner protection, and the landfill post-closure period when the maintenance, leachate control and monitoring systems are no longer in place.

12. Can I receive spent iron sponge (i.e. a pyrophoric waste, TDGR class 4.2) for disposal at my Class I landfill?

Yes, provided that the spent iron sponge is conditioned so that it does not ignite under the conditions of disposal [s 13(2)(c), WCR]. This is done by keeping the waste wet and contained upon removal from the absorption tower up to disposal with lime or limestone as indicated in section 6.1.

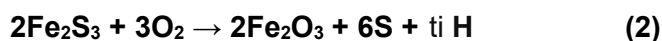
Iron sponge consists of wood chips impregnated with iron oxide (Fe_2O_3) and it is used to remove hydrogen sulphide and other S compounds from slightly sour natural gas. During this sweetening process the following reaction occur:

- (a) Ferric oxide (impregnating wood chips) reacts with H_2S to sweeten slightly sour natural gas producing water and ferric sulfide:



The spent iron sponge is a hazardous pyrophoric waste, class 4.2, that can be regenerated a number of times but eventually has to be disposed of.

- (b) Regeneration (or **treatment to a non-hazardous condition**) is achieved by allowing the ferric sulfide to react with air:



This is a spontaneous exothermic reaction controlled by keeping the iron sponge wet to prevent spontaneous combustion. This reaction may take a few days and is complete when the black spent iron sponge turns red.

- (c) In the presence of enough heat, the S is burned producing sulphur dioxide:



Of course, in the absence of air, reactions (2) and (3) do not occur and the waste

must be co-disposed with limestone/lime at approved Class I landfills as described in section 4.1 of the *Guidelines*.

13. Can I receive spent iron sponge at my approved Class II landfill?

Not as produced since spent iron sponge is a hazardous pyrophoric waste. See FAQ 12.

However, this waste can be easily treated by the generator as illustrated by the process described in FAQ 12. To confirm treatment performance, representative samples have to pass the test for *spontaneously combustible substances* (15) and (16)

14. May these Guidelines be used as guidance when preparing an application for an approval to store S by entombment?

Yes, as applicable. In particular, sections 6.2 to 6.3 of these *Guidelines* may assist in the development of the application for an approval, particularly with respect to the design and monitoring of the S-storage cell or trench.

15. Where can I find information regarding the approvals required for the production, processing, and storage of S?

ERCB Information Letter 84-11 and the ADR pursuant to OGCA/OSCA or EPEA, respectively provide information on the approvals required for these activities.

16. How do I measure the pH of soils with sulphur?

The soil pH is measured in a 1:2 (w/v basis) equilibrated slurry of soil to 0.01 mole solution of CaCl₂ or by using laboratories accredited pursuant to ISO/IEC 17025 (for more information on test methods see Alberta Environment's 2009 *Directive Soil Monitoring* at <http://environment.gov.ab.ca/info/library/8159.pdf>).

17. What is the level that renders soil containing sulphur, as sulphate, contaminated soil? Is a soil with 5 000 mg/kg of S (as sulphate) considered contaminated? At what levels do sulphates become a contaminant of concern?

Oxidized S in soils as sulphate (SO²⁻) is not generally considered a soil contaminant and sulphates maximum levels in soils are not regulated in Alberta. Soil with 5 000 mg/kg of S as sulphate is not considered contaminated if the soil pH exceeds 6.5 units. (*Guidelines*, sections 4.2, 7.1 and 7.2).

The total combined concentration of reduced S plus elemental S in soils that triggers remediation or application of suitable alkaline compounds to soils is soil with S in excess of 0.05% or 500 mg/kg on a dry weight basis.

Regarding acceptable levels of soluble sulfate (SO₄²⁻) in soils the following thresholds may be used as a reference:

- *Not a concern*: below 0.3% or 3,000 mg /kg;
- *Moderate risk*: between 0.3% (3,000 mg/kg) and 0.5% (5,000 mg/kg)
- *Moderate to high risk*: between 0.5% (5,000 mg/kg) and 0.8% (8,000 mg/kg)
- *Unacceptable risk*: greater than 0.8% (8,000 mg/kg soils with total soluble sulphate

contents greater than 1.0% (10,000 ppm) generally are not suitable for lime stabilization because of the high risk of sulphate-induced disruption and failure.

More detail on soluble sulphate in soils at http://www.griffinsoil.com/sulfate_study.

18. Is an MSDS required for S-waste applied to agricultural land?

Yes. MSDS are required for both “alkaline products” and “S-waste” identified in Sections 4 and 5, respectively, when used as described in sections 6 and 7 of these *Guidelines* (i.e. *in situ* treatment, land application, and disposal of S-waste) or other beneficial uses.

19. What is a fine-grained soil?

Fine-grained soil means soil that has a median grain size less than or equal to seventy-five (75) micrometers, determined in accordance with the *Standard Test Method for Particle-Size Analysis of Soils*, published by the American Society for Testing and Materials, Test Method D422-63, 1998, as amended. Fine-grained soil generally includes clay, silty clay, and sandy clay.

20. Why should dolomitic limestone not be used?

Because the oxidation of limestone with more than 2% magnesium carbonate will generate significant amounts of highly soluble magnesium sulfate that may migrate from the site and adversely affect local soil quality.

21. When do I have to test limestone, lime or alternative alkaline material for the ANC?

Pure grade commercial available lime or limestone should not require routine testing and the specifications of the product should respond to the purity of the material. However, when alternative products are used the ANC should be determined to ensure that the ratios S- waste/alkaline material and the thickness of the required alkaline material are adequate. See section 4.2.

22. What is the oxidizing capacity of a soil?

The oxidizing capacity of a soil reflects its redox potential. It shows the potential of that the soil to add or remove electrons from a particular element or compound added or present in that soil. From measuring the soil redox potential we can estimate whether the soil is aerobic, anaerobic, and whether chemicals such as S or S compounds will be chemically reduced or oxidized.

23. Can alternative alkaline products derived from waste be used in co-disposal or neutralization of S-waste?

Yes. Alkaline products derived from wastes may be used as substitute products to buffer S- waste. However, when used for this purpose, these alternative products must be supported by a case-by-case assessment which must identify the following:

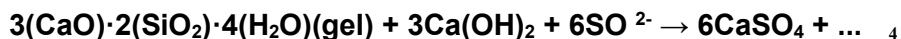
- (a) the ANC (often expressed as calcium carbonate equivalent),
- (b) the moisture content,
- (c) any constituent or contaminants present , and
- (d) an applicable Material Safety Data Sheet

Subject to assessment, candidate wastes may include wood ash, fossil fuel, fly and bottom ash, lime sludges, cement kiln dust, crushed concrete, excess/junk cement, or other alkaline

product derived from waste that are free of soluble ions or hazardous constituents/contaminants.

24. Can I use crushed concrete as an alternative alkaline product to mix with or encapsulate S-waste?

Yes, if the material has a suitable ANC. The use of alkaline products alternative to limestone or lime, discussed in section 4, is acceptable and recommended provided that the person responsible determines the potentially reactive alkaline content of the candidate product. For crushed concrete, the rationale to determine the amount of concrete equivalent to the stoichiometric quantities indicated in Section 4 is illustrated next. The basic reaction when concrete reacts with oxidized S is:



Taking an average mass increase of about five times due to the addition of sand and aggregate to Portland cement to produce concrete, the resulting weight ratio concrete/S is about 6.5 (i.e., about 6.5 kg of crushed concrete are needed to potentially neutralize one kilogram of S present in the S-waste or S-contaminated soil). Because concrete shows about half the buffering capacity of pure limestone, the thickness of the bottom and side layers of the crushed concrete should be double the thickness indicated in section 6.2(e) for limestone.

25. What gaseous emissions should be monitored when disposing of large quantities of S-waste?

S-dust and associated particulate matter (PM) should always be controlled at a landfill site and in particular the PM created when handling S-waste. On the other end, the disposal of large quantities of S-waste is not expected to generate significant S gaseous emissions.

Even though the occurrence of fires at S facilities is a rare event, emergency S fire fighting equipment should be always available at landfills handling large quantities of S. S fires are hard to put out and when they occur large quantities of SO₂ are released. Other gas releases are not relevant and the important thing is to put out the fire.

26. Where can I find information on specific test methods for S when managing S-wastes and remediating S-containing soils?

Information on analytical methods for soil S parameters and S related test methods is available in the AENV draft *Directive for Monitoring the Impact of Sulphur Deposition on Soils* available at <http://environment.gov.ab.ca/info/library/8368.pdf>.

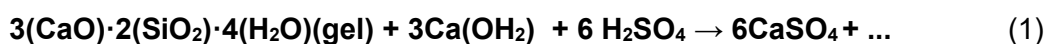
Questions on sulphur-soil parameters and test methods identified in this Directive can be directed to

Air, Land and Waste Policy Branch Alberta
Environment
10th Floor, Oxbridge Place 9820-106 Street
Edmonton, Alberta T5K 2J6 phone: (780) 427-5125
fax: (780) 422-4192
email: AENV.AMD@gov.ab.ca

APPENDIX 3: EXAMPLES

Example 1: Calculation of the Calcium Carbonate Equivalent (CaCO₃) in Cement and Drilling Mud Mixtures

One method of calculating the ANC (expressed as CaCO₃ equivalent) in mixtures of cement/drilling mud (CDM) mixtures (or in concrete) is to react a representative sample of the CDM mixture with excess acid and then titrate the excess acid with a strong base. In the case of sulphuric acid and sodium hydroxide the basic reactions involved are:



Once the quantity of acid unused is known it is easy to calculate the weight of the acid neutralizing compounds present in the CDM mixture and from that, the weight of CDM mixture required to neutralize a given weight of S present in the S-waste.

Example 2: Reclamation of a Sulphur Base Pad

This option is advisable when cleaning up S base pad material or S spills. The remaining material or soil should not contain more than 4% total S (or 40 000 mg total S/kg). The affected area should then be treated with alkaline product as outlined in section 7.1 of these *Guidelines*.

Options available to deal with the free S present in the material removed from the S base pad and containing over 4% total S, soil or gravel include:

- further recovery of S by using for instance froth flotation,
- use as fertilizer in S-deficient agricultural soils as outlined in section 7.2, or
- disposed of in an approved landfill or, with the appropriate authorization, buried in a registered landfill as described in section 6.

Example 3: Disposal of Mercury Waste with Sulphur

A simple method of safely disposing of small quantities of mercury waste is by first stabilizing the waste mercury by mixing and encapsulating the waste with sulphur or calcium sulphide. The mercury will react slowly with the sulphur or calcium sulphide to form the extremely insoluble mercury (II) sulphide (HgS) similar to the naturally occurring mercury ore known as cinnabar.

Illustrations on the treatment of elemental Hg with elemental S are found at (8), <http://digital.csic.es/bitstream/10261/7692/1/DISPOSAL%20ELEMENTALHg.pdf>; & www.clu-in.org/download/contaminantfocus/mercury/sulfur-polymer-22164.pdf.

Example 4: Landfill Disposal of S-waste

(a) Small Quantities

STOICHIOMETRIC MIXING and encapsulation with alkaline products apply to the disposal of small quantities of S-waste. The weight of alkaline product in the mixture per each kilogram of sulphur is (detail in section 4.1)

- 3.2 kg for limestone (calcium carbonate)
- 2.4 kg for hydrated lime (calcium hydroxide)
- 1.8 kg for quick lime (calcium oxide)

Specific spent sweetening agents such as spent iron sponge are pyrophoric and should be kept moist and/or prevented from contacting air (under uncontrolled conditions all the time) once they are removed from the absorption tower beds.

When the alkaline product used is not a pure substance i.e. 100% lime Ca(OH) or 100% CaCO₃ (limestone) then the ANC (or the calcium carbonate equivalent) of the product has to be determined and the quantities and/or thickness of the actual alkaline product adjusted accordingly.

To illustrate, suppose that we have only limestone that has a calcium carbonate equivalent of only 50%. In this case we would need for each kilogram of S

- 6.4 kg for limestone (calcium carbonate)
- 4.8 kg for hydrated lime (calcium hydroxide)
- 3.6 kg for quick lime (calcium oxide)

The layers of alkaline material referred to in section 6.1 and 6.2 would have to be doubled as well.

NOTE: The quantities of alkaline product used may be also adjusted to take into account the ANC inherent to the S-waste or S-containing soil, if any. However, the thickness of the layers of alkaline product should not be reduced when the total S content of the soil or waste exceeds 4%.

(b) Large Quantities of Unrecoverable Sulphur or S-Containing Soil

ENCAPSULATE THE S-WASTE within a casing of alkaline product as described in section 6.2. Dispose of S-waste in consecutive alternating layers of S-waste and alkaline product and in end encapsulated the overall mass as described in section 6.2. This approach is suitable when disposing of large quantities of S-waste constituted by S-containing soil, S block base pad material, or any other S-waste with unrecoverable S.



Waste Asbestos Management SOP

**Ryley
Alberta**

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TITLE: OPERATING REECORD		
Facility: Ryley	Prepared by: Stan Yuha	SOP Number: 90RY 4.6.34(h)
Reviewed By:	Title: Operations Manager	Issue Date: MAY 2023
Reviewed By:	Title: Compliance Manager	Next Review Date: MAY 2026
Reviewed By:	Title: Health and Safety Manager	
Approved By:	Title:	

1. Objective

Clean Harbors has developed the following procedure for management of asbestos or waste containing asbestos into the Ryley landfill Facility.

Incoming shipments of waste arriving at the facility must be reviewed to determine acceptability for disposal. Waste containing asbestos must be appropriately handled and managed.

Extreme caution must be taken when handling any material(s) that may contain asbestos. Asbestos is to be placed in a designated landfill location, often segregated within a bunker. Failure to do so could cause the asbestos to be disturbed, and become dispersible through the air, and can be very harmful to personnel.

2. Waste Asbestos Management

2.1. Scope and Application

This procedure is intended to guide personnel on how to safely handle and dispose of waste containing asbestos. Asbestos waste must be contained in marked bags – often yellow in colour. Asbestos cannot be disturbed, and therefore cannot be offloaded into a receiving pit. Large loads of asbestos are to be offloaded directly into the landfill. Smaller loads can be manually placed into a placarded bin, to be placed in the bunkered area by landfill personnel.

2.2. Materials and Apparatus

- Not Applicable.

2.3. Procedure Disposal

The disposal of asbestos waste should be carried out in accordance with the following recommendations:

- 2.3.1.** Containers with asbestos waste which is non-friable need not be packaged for disposal.
- 2.3.2.** Additional requirements for friable asbestos waste are as follows:
 - 2.3.2.1.** No person should allow friable asbestos waste to leave the location at which it is generated unless:
 - i. The friable asbestos waste is in a rigid, impermeable, sealed container of sufficient strength to accommodate the weight of the friable asbestos waste; or
 - ii. The friable asbestos waste is double bagged within two six-mil polyethylene bags; or
 - iii. The friable asbestos waste is packaged in accordance with a method approved in writing by the Director of Standards and Approvals of Alberta Environment.

Every container referred to above must be free from punctures, tears or leaks, and should be clearly labelled to indicate the nature of the contents and the presence of a carcinogenic hazard, with a warning that the dust not be breathed.

Friable asbestos waste which is readily bagged or boxed should not be transported or disposed of in bulk. However, if it cannot be readily packaged then the portion of the vehicle containing it should be lined with six mil polyethylene and covered in such a way as to prevent asbestos fibers and particulates from escaping. Bulk friable asbestos waste may be moistened to prevent the escape of asbestos fibres.

Polyethylene liners used in the transportation of bulk friable asbestos waste should be disposed of along with the associated asbestos waste.

- 2.3.3.** Where containers of friable asbestos waste are being unloaded, the unloading shall be carried out so that no loose friable asbestos waste or punctured, broken or leaking containers of friable asbestos waste are landfilled. Any friable asbestos waste that is in a container that is punctured, broken or leaking shall be double bagged, immediately on discovery, in two six-mil polyethylene bags.
- 2.3.4.** If an incoming asbestos load is small enough to be manually placed in the designated bin or directly dumped into the landfills bunker.
- 2.3.5.** Prior offloading asbestos waste into the landfill a bunker is excavated as close to the active landfill face as possible.

- 2.3.6.** Inform all landfill crew at morning meeting that asbestos waste is going to be landfilled and go over everyone's duties that are to be performed.
- 2.3.7.** The asbestos needs to be landfilled without the containers breaking open.
- 2.3.8.** A suitable bunker or depression needs to be created by piling waste in a window to create a pocket of sufficient size to contain asbestos waste being dumped. The window can be pushed over the asbestos in such a manner that the equipment does not come in contact with asbestos.
- 2.3.9.** After asbestos is dumped into the landfill it shall be covered with a minimum of 60 cm (2 feet) of waste or other fill material as soon as possible to cover the waste. The operator of the dozer must ensure that the machine does not come in contact with the asbestos.
- 2.3.10.** All personnel directly involved are to wear respirators with rated cartridges and disposable coveralls. Unnecessary personnel will be removed from the area during dumping operation. This information will be relayed to other areas of the facility at the morning operational meeting. The surfaces of vehicles and reusable containers which have been in direct contact with friable asbestos waste must be thoroughly cleaned prior to leaving the disposal site. Only the minimum amount of water necessary to wet the asbestos fibres should be used during cleaning. Any waste produced during vehicle or container cleaning should also be covered immediately.
- 2.3.11.** Every person directly or indirectly involved in the transportation, handling or management of asbestos waste should take all precautions necessary to prevent asbestos fibres from becoming airborne.
- 2.3.12.** In the event containers are broken open or containers are not shipped in the correct manner to prevent exposure, the supervisor must be notified and any machine or container used to deposit asbestos must be decontaminated at the landfill before returning to the plant.

3. Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



Irrigation of Leachate Water and Leak Detection Liquid

**Ryley
Alberta**

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TITLE: Irrigation of leachate water and leak detection liquid		
Facility: Ryley	Prepared by: Stan Yuha	SOP Number: 90RY 4.6.34(i)
Reviewed By:	Title: Operations Manager	Issue Date: MAY 2023
Reviewed By:	Title: Director of Compliance	Next Review Date: MAY 2026
Reviewed By:	Title: Health and Safety Manager	
Approved By:	Title:	

1. Objective

This SOP is to provide guidance and the information required for waste acceptance, handling, and disposal of waste as to remain compliant with its current approval.

2. Site Specific Terms

None

3. Responsibilities

3.1. General Manager

The General Manager will ensure that all employees are trained and knowledgeable regarding these controls.

3.2. Supervisors

The Operations Manager and/or Lead Foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.

3.3. Employees

- Employees are responsible for adhering to safe work practices and all provisions found in this procedure.
- Employees must inspect equipment and report any failures or deficiencies to the appropriate Supervisor.

4. Prerequisites

4.1. Health and Safety

- Any incidents, including near misses, are to be reported immediately to the supervisor.
- A Job Hazard Analysis will be made available if required (Appendix 1)
- Consult the PPE Hazard Assessments (Appendix 2) to be worn when required.

4.2. Environmental

- Ensure all applicable monitoring equipment is available.
- If an incident occurs, report it immediately to your supervisor.
- Incidental releases are to be cleaned up immediately in the process designated PPE.
- If the incident requires additional assistance or equipment, the Contingency Plan may need to be implemented.

4.3. Documented Training

- SOP training

5. Plan

Irrigation of leachate water and/or leak detection liquids could be a positive aspect of landfill operation that could be advantageous to the facility.

- Reduces cost of shipping water off-site to a deepwell (shipping water to a deepwell carries with it the liability of incidents or accidents to and from the deepwell),
- Effectively controls dust, and
- Greatly increases the compaction of waste.

However, due to the organic content of leachate water, if left sitting over a period of time decomposition starts to occur. The decomposition of organic material creates an awful odour similar to the smell of silage. Therefore, due to our close proximity to the Village of Ryley, leachate water and leak detection liquids are not used in the landfill for dust suppression. The exception to this policy would be if the leachate water is from a new landfill and the water does not contain any odours.

If non-odorous leachate liquids are to be used, a vacuum truck is the preferred piece of equipment for this practice. See SOP on Vacuum Truck operation.

6. Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



**Lab Screening and
Treatment of Pyrophoric
Wastes and Water
Quenching of Pyrophoric
Wastes (Wastes with Delta T)**

**Riley
Alberta**

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6. Revision Summary	Error! Bookmark not defined.

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TITLE: Irrigation of leachate water and leak detection liquid		
Facility: Ryley	Prepared by: Stan Yuha	SOP Number: 90RY 4.6.34(j&k)
Reviewed By:	Title: Operations Manager	Issue Date: MAY 2023
Reviewed By:	Title: Director of Compliance	Next Review Date: MAY 2026
Reviewed By:	Title: Health and Safety Manager	
Approved By:	Title:	

1. Objective

This SOP is to provide guidance and the information required for screening and determination of pyrophoric wastes and treatment and quenching of wastes with a delta T.

2. Site Specific Terms

None

3. Responsibilities

3.1. General Manager

The General Manager will ensure that all employees are trained and knowledgeable regarding these controls.

3.2. Supervisors

The Operations Manager and/or Lead Foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.

3.3. Employees

- Employees are responsible for adhering to safe work practices and all provisions found in this procedure.
- Employees must inspect equipment and report any failures or deficiencies to the appropriate Supervisor.

4. Prerequisites

4.1. Health and Safety

- Any incidents, including near misses, are to be reported immediately to the supervisor.
- Consult the PPE Hazard Assessments (Appendix 2) to be worn when required.

4.2. Environmental

- Ensure all applicable monitoring equipment is available.
- If an incident occurs, report it immediately to your supervisor.
- Incidental releases are to be cleaned up immediately in the process designated PPE.
- If the incident requires additional assistance or equipment, the Contingency Plan may need to be implemented.

4.3. Documented Training

- SOP training

Clean Harbors has developed the following procedure for conducting water quenching treatment activities to neutralize waste streams that exhibit heat when they come in contact with water.

Procedure for Lab Screening of Pyrophoric Wastes for Water Quenching

1.0 Scope and Application

This procedure is intended to test the suitability of waste for the quenching treatment process before the waste profile is approved to Clean Harbors Ryley. Waste is subjected to this procedure (Lab screening of pyrophoric wastes for water quenching), if the waste meets the following properties:

1. It is water reactive, *i.e.* $\Delta T > 15$ °C. (see Method MTD041 - ΔT Differential Temperature).
2. Passes the Division 4.3 quick screen procedure, *i.e.* a match will not ignite vapours when water is added (see MTD050 Screens - Water Reactive Div. 4.3). Any waste that fails the Division 4.3 screen procedure will not be suitable for quenching.

This test is not quantitative and is intended as a simulation of quenching in the sludge pit. The results are qualitative and indicate whether any VOCs, hydrocarbons, H₂S, PM, and/or Ammonia are likely to be released as a result of quenching.

2.0 Materials and Apparatus

- 360 mL glass jars
- ppBRAE 3000 gas detector set to “as isobutyl reference” with hydrophobic probe filter
- RKI Eagle gas detector set to “as Hexane reference” with hydrophobic probe filter
- Temtop 6746 Handheld PM Dust Monitor
- pH paper (Alkacid test paper Fisher Scientific Cat #A980)
- Nanopure water

- Fumehood
- Quench Assessment Lab Form
- Lab Stand

3.0 Procedure

Samples for lab screening of pyrophoric waste are obtained following the procedure: MTD004 Rev 2 Sampling methodology.

3.1 Screens of PM and Released HCs, TNMOC, VOCs, H₂S (see Figure 1)

- 3.1.1 In 360 mL glass jar, add 100 mL of waste to be tested
- 3.1.2 Measure out 100 mL of nanopure water
- 3.1.3 In a fumehood, insert Temtop Dust Monitor, ppbRAE , and RKI Eagle sampling hoses into headspace above the jar.
- 3.1.4 Ensure the logged maximum values on each meter is cleared
- 3.1.5 Pour the measured 100 mL of water over the waste quickly
- 3.1.6 Wait until all meter readings reach a maximum and are declining for at least 2 minutes.
- 3.1.7 Note odour and document peak values on the “Quench Assessment Lab Form” for;
 - Released H₂S, HCs, and TNMOC from RKI Eagle
 - Released VOCs from ppbRAE
 - PM from Temtop 6746 Dust Monitor

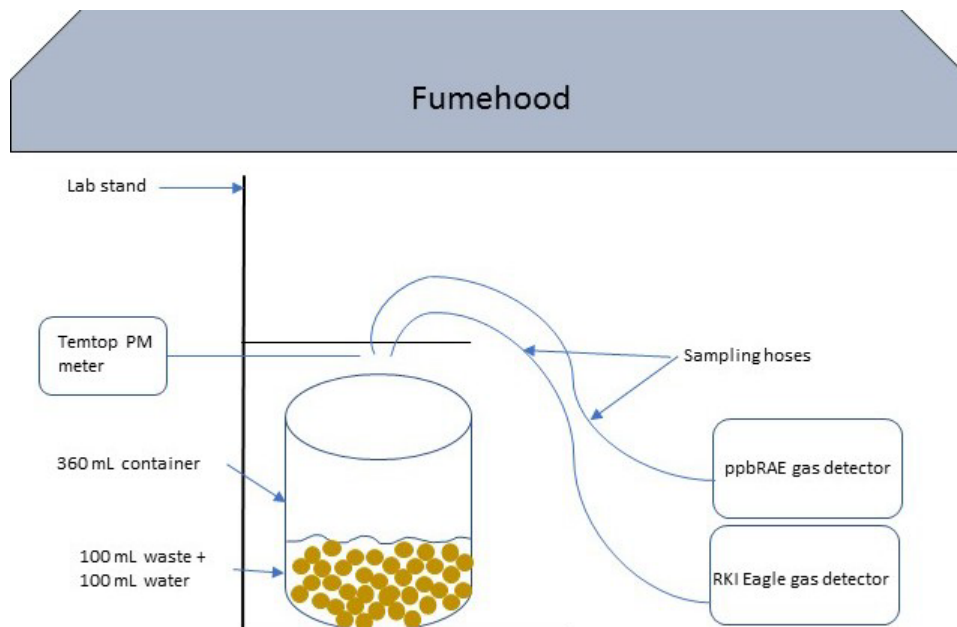


Figure 1: diagram depicting layout for quench test

3.2 Ammonia Screen

- 3.2.1 Using a 50 mL vial, add 10 mL of nanopure water to 10 mL of waste with wetted pH paper in the headspace
- 3.2.2 Interpretation:

- Blue color = Alkaline gas released (record as Ammonia– Positive)
- No change = No Ammonia released (record as Ammonia– Negative)

3.2.3 If positive, determine releasable Ammonia concentration via Draeger tube

3.3 Further Identification of off-gases from quenching test

A GC-MS headspace screen of a wetted sample can be used to identify gases released when the sample is wetted. The collection of off-gases occurs directly in the headspace vial prior to GC-MS analysis.

3.3.1 In a 20 mL vial add 1 mL of nanopure water to 1 g of waste

3.3.2 Immediately cap the vial and wait 2 minutes (or until temperature has peaked) before drawing a headspace sample for GC-MS injection

3.3.3 After the sample has been processed, a database search can be used to identify volatiles released when waste comes into contact with water

3.4 Total Metals Analysis

If PM is released during the screen procedure, the sample can be digested and analyzed to determine the total metals present in the waste.

3.4.1 Sample is prepared as per EPA METHOD 3050B Acid Digestion of Sediments, Sludges, and Soils.

3.4.2 Sample is analyzed on ICP as per MTD013 Rev 2 ICP Operations - Varian 725-ES.

3.5 Assessment of Results

Report pass/fail based on pass criteria (see Table 1). If any parameter exceeds the recommended limit, the waste fails to meet quenching criteria.

Table 1: Pass Criteria for Quenching

Parameter	Pass Criteria
ΔT (°C)	-
Flammability (Flash with water)	Must not flash
Released VOCs (ppm as isobutyl)	<100
Released HCs (ppm as Hexane)	<1000
Released TNMOC (ppm as Hexane)	<1000
Particulate Matter (Positive/Negative)	-
Total Metals (Dependent on PM presence)	-
Released Ammonia (ppm)	<100
Released H ₂ S (ppm)	<10
Odour (None/Mild/Medium/Strong)	-

3.6 Documentation and Record keeping of Lab screening results

Lab screen results will be recorded on the Quenching Assessment Lab form (see figure 2) and filed electronically by Lab log number. Results will be scanned into the specific profile attachments for that waste stream on Winweb.

Quenching Assessment Lab Form

See Clean Harbors Ryley Facility Water Quenching SOP (SOPL001-016) for procedure

Date:	Profile:
Customer:	Manifest/BOL:
QAS/Log #:	Bin #:

Parameter	Pass Criteria	Result
ΔT (°C)	-	
Flammability (Flash with water)	Must not flash	
Released VOCs (ppm as isobutyl)	<100	
Released HCs (ppm as Hexane)	<1000	
Released TNMOC (ppm as Hexane)	<1000	
Particulate Matter (Positive/Negative)		
Total Metals		
Released Ammonia (ppm)	<100	
Released H ₂ S (ppm)	<10	
Odour (None/Mild/Medium/Strong)		

Assessment (Pass/Fail)	
-------------------------------	--

Comments:

Figure 2: Quenching Assessment Lab Form Example

Quenching Treatment Process:

The proposed method below describes the process of cooling waste that exhibits heat when in contact with water:

1. Adding water to sludge pit to allow any heat that is generated during material off-loading process to be dissipated by the water.
2. Off-loading the prescribe material into sludge pits and immersing the waste rapidly in water, the heat of reaction is safely dissipated into a large, inert heat sink and without any observable temperature increase.
3. If necessary adding additional water during or after the off-loading process in order to further prevent temperature increases;
4. Once the quenching activity has been completed it may be necessary to manage waste in the prescribe pits by applying solidification/pH reagents or other treatment and or inspection to ensure the waste is suitable for landfill disposal.
5. The Company will, if necessary, utilize odour and dust control techniques such as application of odor control reagent. The Company actively ensures that employees maintain these control measures.
6. Once the materials are treated with water and cooling process is completed, the material will not react with water again. They are deemed inert from that point forward and suitable for disposal.

The facility is currently approved to solidify sludge waste. Water will be taken from the surface water ponds and introduced into the pits on an as needed basis to assist with the cooling process. Excess water will be solidified using reagents available on site. Treatment of waste will be conducted in accordance with site standard operating procedures.

Waste Requiring Water Quenching in Sludge Pits

The facility current Approval 10348-03-01 allows for many different treatment activities, including solidification, stabilization and neutralization. These treatments currently take place in one of the two sludge pits that are located adjacent to the tipping pad which is currently located in Cell 3D. Once the new waste receiving pad is constructed and operational they will take place in the sludge pits that will be located on the new receiving area located NE 9 – 50 – 17 W4.

The company routinely accepts wastes (non-hazardous and hazardous) such as spent catalyst material that is within its acceptance criteria but on occasion, exhibits heat or heat increases when exposed to water or moisture. Although the material may evolve heat upon contact with water, the properly classified material has no reactive tendencies that neither produces immediate danger for life or environment nor is the material classified as reactive waste. Waste streams proposed for water quenching would not be classified as substances and mixtures which, in contact with water emit flammable gases and or vapors of concern.

Although the waste does not to meet the definition of reactive waste, from an operational perspective the evolution of heat is a condition that requires proper management. In the past the company has experienced the occasional fire at some of our landfill facilities while managing these materials. The company has evaluated the root cause of each incident and implemented operational and engineering controls to prevent these situations from reoccurring.

TITLE: Lab Screening and Treatment of Pyrophoric Wastes and Water Quenching of Pyrophoric Wastes (Wastes with Delta T)	SOP No.: 90RY 4.6.34(j&k)	Page 9 of 12
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Prior to initiating cooling activities the Company may contact the Generator and request additional information on the material in this container. Based upon the information discussed with the generator; the information on the profile and manifest sheets; pre-test lab results; and internal discussions on handling methods the company will determine the appropriate measures

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to process the waste. If testing indicates cooling is required, the loaded containers will then be transported to one of the prescribed sludge pits for water quenching activities.

The company intends to use the two sludge pits for hydrating loads where necessary. The waste class types intended for neutralization and/or stabilization are typically as follows:

- Catalyst
- Mole Sieves
- Pyrophoric Wastes
- Other waste streams as identified through lab testing

Prior to treatment each profile will be tested in the lab to ensure there are no contaminants of concern being released. To simulate landfill quenching conditions, a sample will be placed into a jar/container and water will be added. The released gases will be screened for the presence of; flammability, volatile organic compounds (VOCs), total hydrocarbons (HCs), total non-methane organic compounds (TNMOC), particulate matter (PM), Ammonia, H₂S and odour. Positive results would trigger further testing to identify constituents of concern via GC-MS or ICP (total metals). Once a profile passes the above testing it will then be approved for water quenching treatment.

Monitoring Program:

The following data will be recorded in WINWEB:

1. Date: the date quenching activities was conducted;
2. Waste Description:
 - a. Waste Type: the type waste that quenching was treated (i.e., catalyst)
 - b. Profile Number: the Clean Harbors profile number. The Waste Profile provides all analytical details on waste;
 - c. Tonnage treated

Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved

“People and Technology Creating a Safer, Cleaner Environment”

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APPENDICES

APPENDIX A SDS'S

MATERIAL SAFETY DATA SHEETS

Dust Lynx H56
Ecosorb 606
Calcium Chloride
Portland Cement

1.0 INTRODUCTION

The following report details the Fugitive Dust and Odour Best Management Plan (BMP) prepared for Clean Harbors Canada, Inc. Ryley Facility, located 2 km north of Highway 14 on the west side of Secondary Road 854, Alberta. The purpose of this BMP is to identify the sources of fugitive dust & odour emissions within the Facility, and to provide details about the management programs that are used to control these emissions.

The objectives of this BMP are to:

- Provide an overview of the processes at the Facility and identify potential sources of fugitive dust;
- Assess the human health risks posed by the fugitive dust through a review of the size range and composition of the dust particles;
- Discuss dust control measures and implementation frequency for each of the identified sources;
- Discuss odour control measures and implementation frequency for each of the identified sources;
- Outline maintenance and inspection procedures;
- Illustrate how ongoing compliance is ensured through the use of a monitoring and record-keeping program; and
- Detail the employee training program for fugitive dust control procedures.

2.0 FACILITY & PROCESS DESCRIPTION

Clean Harbors Ryley facility is a hazardous waste transfer station as well as a secure landfill located 2 km north of Highway 14 on the west side of Secondary Road 854, in east central Alberta. A Site Location Plan is provided on Figure 1.

This facility is permitted to accept all hazardous wastes with the exception of explosives, radioactive wastes and infectious wastes. Although the Ryley facility is permitted to solidify and stabilize hazardous waste on its site, it cannot import hazardous waste for landfill disposal. It can import non-hazardous waste for landfill disposal.

Ryley Facility consists of vehicle maintenance building, drum staging and processing buildings, air emissions control building and the secure landfills. The apron around the buildings and the main roadway to the landfill is paved. Truck traffic to the landfill occurs on paved road up to the graveled landfill access road into the landfill and onto a tipping pad constructed of rig mats.

3.0 **SOURCE OF FUGITIVE DUST & ODOUR**

The sources of fugitive dust and odour that have been identified for the facility activities are included in the following table, recognizing that some of these areas contribute to both dust and odour:

DUST	ODOUR
Paved Roads	Landfill
Unpaved Roads	Mixing pits
Storage Piles	Leachate
Container lay-down areas	Transfer operations

3.1 **PAVED ROADS**

The paved roads used by the Facility are indicated on the site plan as Figure 2. The roads are used by heavy transport vehicles (transport trucks and landfill vehicles) to transport solid hazardous waste to the landfill; by operations personnel in pick-up trucks, back-hoes, forklifts, yard trucks and vans.

The paved roads may be a source of Particulate Matter (PM) and PM₁₀ emissions, from the accumulation of dust on the road surface deposited by vehicular traffic. Vehicle speed, vehicle weight, moisture content, and silt content are all critical factors in the amount of fugitive dust emitted from paved roads. The particle distribution of the dust tends to have a greater percentage of fines than unpaved roads, but there is significantly less dust on paved roads. PM₁₀ is the respirable fraction of particulate and can have an impact on human health. The metals content of this dust is negligible. The emissions of PM₁₀ from the paved roads are controlled and the off-site concentrations are expected to be below levels of human health concern.

3.2 **UNPAVED ROADS**

The unpaved roads used by the Facility are indicated on Figure 2. The roads in the landfill area are used by landfill vehicles as part of solid waste disposal activities and by excavation vehicles for earth moving activities. The unpaved yards in the staging/laydown areas are used by vehicles laying down luggers and roll-offs for temporary storage and for staging trailers and containers for transportation activities.

Chapter 11.19 of the USEPA AP-42 document identifies unpaved haul roads as a source of PM and PM₁₀ emissions, in the form of fugitive dust. Vehicle speed, vehicle weight, moisture content, and silt content are all critical factors in the amount of fugitive dust emitted from unpaved roads. Particle sizing and composition will vary at the Facility, but emissions of trace metals will be negligible. PM₁₀ is the respirable fraction of

particulate and can have an impact on human health. The emissions of PM₁₀ from the unpaved roads are controlled and the off- site concentrations are expected to be below levels of human health concern.

3.3 STORAGE PILES

The site may stockpile clay materials, sub-soil and top soil that is removed in the course of cell construction and removed from open areas on-site. Material is stored in piles in the area south of landfill Cells 3A and 3B. The consistency of this product is clay and soil.

The fugitive dust emissions from this area are therefore generally not respirable and do not pose any human health risks.

3.4 CONTAINER LAYDOWN AREAS

Container lay-down areas are used by the various operations at the facility for temporary storage of luggers and roll-off containers prior to and after processing or landfill activity. These areas are monitored by supervisory staff on a daily basis. They are west of the surface water pond and north of Landfill Cells 3C and 3D shown on Figure 2. A small portion of this area is paved but most of it is unpaved. The contours of the surface are sloped to provide storm water run-off control to contained areas on the site.

3.5 LEACHATE

All precipitation that enters any working landfill cell and comes into contact with waste is handled as landfill leachate. The leachate is collected using pumps and pipes and transferred to the leachate storage tanks. The landfill leachate can contain dissolved salts, dissolved organics, and trace concentrations of heavy metals and ammonia. The leachate storage tanks have a total storage capacity of 570,000 liters. The leachate is pumped from the leachate storage tanks to tanker trucks and shipped off-site for deep well disposal.

3.6 LANDFILL

A portion of the solid waste received for landfill disposal contains volatile organic compounds (VOCs) that depending upon environmental factors such as wind speed and temperature will volatilize from the exposed surface of the waste. A key factor that affects the rate of volatilization is the size of the exposed waste face. These emissions could lead to off-site odours or unacceptable ambient air quality.

The release of VOC to the atmosphere from the waste is not a constant phenomenon. A freshly placed load of waste will have the highest rate of VOC release when initially placed. As the surface of the waste becomes depleted in VOC (due to the volatilization loss) the overall rates of VOC release decreases markedly. This is because the remaining VOC contained within the waste mass must diffuse out to the surface from within the solid matrix. Thus the rate of diffusion within the solid waste mass becomes the rate- limiting factor to the VOC emission rate.

3.7 SOLIDIFICATION AND STABILIZATION PIT

The facility has two solidification and stabilization pits located in landfill Cell 3D. The facility receives wet waste that requires solidification to pass the paint filter test and/or operational requirements and wet or dry wastes that require stabilization to meet landfill disposal criteria. Many of these waste streams are received from interceptor sumps and tank cleanout operations. These types of wastes have the potential to contain organic chemicals/hydrocarbons that may have some odour. The facility will process these wastes and to transport them promptly to the disposal area where they will be covered to minimize their exposure to the atmosphere.

The most common drying agents are peat moss and wood chips. Fugitive emissions from these stockpiles do not pose any human health risks. They also act as odour mitigation reagents by acting as a bio-filter.

Stabilization is generally accomplished using Portland cement. Portland cement is a fine particulate. This process is only conducted when the wind speed is low to minimize any airborne particulate creation. To further control dust emissions the cement is added in super sacs to a mixture of the waste being stabilized and water. The super sacs are opened with the bucket of the excavator when in contact with the water-waste mixture. The waste, water and reagent are mixed slowly with the excavator to minimize any dust emission.

When mixing is complete, the damp stabilized material is transferred to lugger bins to cure before testing to ensure that the material is suitable for landfill disposal. There are no fugitive dust emissions from the operation at this point.

4.0 CONTROL METHODOLOGY AND FREQUENCY

Reducing the potential for fugitive dust generation is an ongoing commitment, especially during the hot and dry summer months. This section provides an overview of the procedures in place at the Facility to limit emissions of fugitive dust from potential sources.

4.1 PAVED ROADS

Treatment measures include washing the road with water, spraying water to reduce dust emissions and sweeping the roadways with a sweeper attachment for the facility's skidsteer. If fugitive dust emissions become a concern during cold, dry winter conditions, sweeping may be employed instead of washing in order to avoid safety concerns as a result of ice formation on the roadways. Sweeping can be contracted on a situational basis with the Town of Tofield.

- 4.1.1 Paved roads, aprons, and the area from front gate to Secondary 854 line is watered during dry periods to keep down road dust.

- 4.1.2 A sweeper operates regularly in the same areas to remove as much dust as possible from paved roads throughout the facility with special emphasis on the paved landfill access areas.
- 4.1.3 All facility roads have a speed limit of 20 km/hr, intended to keep down dust as well as for safety reasons. Drivers, including yard drivers, found to be exceeding the speed limit will be disciplined.

42 UNPAVED ROADS

The majority of unpaved roads at the Facility are treated with a commercial dust suppressant that renders the road close to paved quality. The MSDS for this product is included in Appendix A. The product is applied as needed from the early spring to late fall. The treated roads are maintained through the application of water once the coating has initially cured.

The unpaved roads that are not eligible for treatment with the commercial dust suppressant are watered to control the emissions of fugitive dust on a daily basis, as needed, using a watering truck. Emissions are further controlled by a posted speed limit of 20 km/hr.

- 4.2.1 Unpaved operations areas at the landfill are regularly watered to keep down dust. The 20 km/hr. speed limit is enforced in unpaved areas as well to keep down dust and for safety reasons.
- 4.2.2 The Contractors conducting earth-moving operations will supply road-watering equipment and will keep their area of operation watered regularly to keep down road dust.
- 4.2.3 A dust suppressant will be applied to exposed waste in the landfill area during dry periods.
- 4.2.4 The Landfill facility will ensure that a soil stabilizer or vegetative cover is applied to the exterior of the perimeter berm as well as areas on the site that have been capped.
- 4.2.5 During dry spells the transportation staging areas and the laydown yards will be watered down regularly.

43 STORAGE PILES

The Facility may have uncovered storage piles of clay and excess top soil, used to cover the waste face and eventually to cap the landfill. Continuous unloading and loading may occur in this area during capping and other operations. During dry conditions water can be sprayed directly onto the piles if immediate fugitive dust mitigation is

required. Piles may be seeded to grass if they are going to be inactive for longer periods of time.

44 CONTAINER LAYDOWN AREAS

The Ryley facility operates under a specific site procedure attached in the appendix of this Plan that outlines the specific requirements for the site employees to follow to mitigate odours from the lay down areas. The main preventative measure is to ensure that all containers remain properly tarped/covered this requires that routine inspections are conducted on these areas. Water is used as a dust control measure in these areas. The containers in these areas are kept covered to reduce the potential of releasing odours at the facility.

45 LANDFILL

The following general measures are implemented at the landfill to minimize VOC emissions from the landfill and to reduce the potential for off-site odours:

- The waste is pre-screened at the laboratory to identify potentially odorous waste streams and appropriate handling and packaging procedures are recommended to the waste generator and shipper;
- The waste on-receipt at the landfill is transferred in bulk to the landfill working face to minimize its disturbance;
- The area of exposed waste including the working face of the landfill is minimized to the extent possible to reduce the exposed surface area of the waste; and,
- Odorous wastes are covered with non-odorous low porosity waste materials to the extent possible. This is done in accordance with existing procedures for odour control.
- As a precautionary measure the company has purchased 3 portable mister fans that can be transported to an area where additional control may be necessary. These units can be placed in predominately downwind locations in order to suppress the airborne odours. The product used for this application is EcoSorb 606.
- A portable sprayer that can be towed by an ATV is available to spray the odour suppressing chemical directly on the waste surface. The product used for this application is EcoSorb 606.
- Straw may also be used as a means to control dust and odours. Round straw bales can be spread over the landfill using a bale buster.

5.0 INSPECTION AND MAINTENANCE PROCEDURES

- Daily inspections are conducted by the Landfill Supervisors at the Facility to monitor the effectiveness of dust control practices. The treated roads are reviewed as part of these daily inspections, and further treatment requirements are identified at that time.
- Landfill personnel are instructed to watch for dust generation and to be aware of odor sources. If they see dust blowing or notice the presence of odours, they are to notify their supervisor and take immediate action to stop the dust and/or suppress the odour.
- All employees are instructed to report any occurrence of visibly blowing dust from anywhere in the facility. The management staff of the area takes immediate action to mitigate the situation.

6.0 TRAINING OF STAFF

As part of maintaining best management practices for controlling and preventing fugitive dust emissions, an initial training program will be provided for all applicable Facility staff. The training will cover the control techniques in place for managing fugitive emissions and how to maintain them; how to conduct a fugitive dust observation check and fill out the associated paperwork; what to do in the case of an unexpected fugitive dust release; and, who to notify of any concerns or problems pertaining to fugitive dust. Refresher training will be provided as necessary, based on changes to the fugitive dust emission control techniques.

7.0 CONTINUING IMPROVEMENTS

As part of implementing a successful fugitive dust and odour best management plan, it is important to be aware of areas where fugitive dust and odour emissions can be reduced further. The Facility is endeavoring to improve their capacity for controlling fugitive dust emissions, and several areas in particular have been identified as potential future improvements, as follows;

- Opportunities to reduce the size of storage piles and the retention time of materials in the piles are a continual improvement process; and
- Staging areas/laydown areas may be paved in the future to reduce wind-blown dust from these areas.
- If the waste area is going to be inactive for an extended period of time it should be covered with a minimum of 20 centimeters of intermediate cover to prevent odours or waste movement.

TITLE: Environmental Management Program			
Facility: Ryley Facility	Prepared by: Don White	SOP Number: 90RY-206-00	Page 1 of 7
	Title: Compliance Manager	Issue Date: August 2019	
Reviewed By: Stan Yuha	Title: General Manager	Next Review Date: August 2024	
Reviewed By:	Title: Operations Manager		

1.0 Objective

Clean Harbors' Ryley Facility is dedicated to protecting the environment and therefore has developed this Standard Operating Procedure to establish an Environmental Management Program. The purpose of the Environmental Management Program is to identify and prevent potential Environmental impacts on site or off site. The Environmental Management Program identifies the controls in place, including checklists and reports, to manage odours and dust.

2.0 Site Specific Terms

- Bale Buster – unit pulled behind a farm tractor which breaks down straw bales and blows the straw onto the ground surface.
- EcoSorb 606 – deodorizing chemical that can be diluted and misted through a fan dispersion system or sprayed through an agricultural sprayer unit (MSDS attached).
- Dust Lynx – dust suppression chemical that mixes with water and is placed using a watertruck or other pumping unit (MSDS attached).

3.0 Responsibilities

General Manager

The General Manager is responsible for ensuring all reasonable measures are taken to minimize the impact of this facility on the environment, the employees and the community. The General Manager is responsible for addressing concerns from members of the community and for alerting Alberta Environment's Environmental Response line promptly should there be any emission issues.

Supervisors

The Supervisors will ensure that all inspections are done as scheduled and controls are functioning properly. The Supervisors are responsible for ensuring all employees are aware of the components of the Environmental Management Program and the equipment involved.

Employees

Employees will ensure that Environmental Control equipment is used when appropriate and that any environmental concerns are brought to the attention of the Supervisor. If an employee is unsure of any part of this Standard Operating Procedure, he/she will go to the Supervisor for clarification.

4.0 Prerequisites

The following prerequisites must be completed prior to performing this procedure.

Health and Safety

- Any incidents, including near misses, are to be reported immediately to the supervisor.

Environmental

- If an incident occurs, report it immediately to your supervisor, and implement the facility's Emergency Preparedness Plan, if applicable.
- Spills are to be cleaned up immediately.

Documented Training

- SOP training, refreshed every three years.
- Task specific training.

5.0 Procedure

5.1 ODOUR CONTROL

5.1.1 *Odour Action Plan*

This plan re-emphasizes previous practices that have demonstrated success and incorporates improvements elaborated below:

5.1.1.1 Identification of Odorous Materials

The onsite laboratory staff, as part of the company's waste profiling procedure, will screen all potential waste streams. All wastes will be assessed for potential odours based on the following criteria:

1. Knowledge of the generating process (i.e. chemical production, refining wastes, etc.).
2. Assessment of the concentration of the contaminants concerned (i.e. does the waste contain known odorous components – such as naphthalene, reduced sulphur species).
3. Visit to the site (project work only) to better determine odour potential if appropriate.
4. Develop and access better analytical methods and protocols for the quantification of odour levels.
5. Establish a data bank of known odour causing wastes or compounds.

5.1.1.2 Odorous Materials Shipment and Receipt

Once an odorous waste stream has been identified as a potential candidate for disposal at the Ryley Facility, a team approach will be used to assess requirements for shipment, receipt and onsite management.

Members of this team may include Operations, Landfill, Laboratory, Technical Services staff and Management. This team will establish the full management cycle of the waste transaction including, but not limited to the following:

1. Container selection (i.e. roll-off, tanker, etc.)
2. Special packaging requirements (i.e. plastic roll-off box liners)
3. Sampling protocols upon arrival
4. Arrival times
5. Cell placement, tanker off-loading procedures

6. Daily receiving volumes
7. Special operational procedures.

5.1.1.3 Onsite Management of Odorous Materials

All odorous wastes transported to the site will be received in suitable containers. This includes tankers, roll-offs, dump trailers and lugger boxes and drums. Atmospheric exposure of odorous materials will be restricted by adherence to the requirement to tarp roll-off boxes, lugger and dump trailers and closing all hatches on tankers; except when sampling, for short duration's while off-loading, and during tanker cleaning operations.

Landfill

The preferred way to receive and manage odorous wastes at the Landfill is in lined roll-off or lugger boxes. The waste will be transported into the Landfill cell in the lined container and placed in the cell. Every effort will be made to ensure that the integrity of the liner is maintained. Once the odorous material has been placed in the cell, non-odorous wastes or some other suitable non-odorous cover material will cover it. This same principle will be followed for wastes that come in via end dump units.

5.1.2 Operator Odour Checks

All employees will report any odours to his or her immediate supervisor upon detection and complete an Internal Complaint Form, Appendix A. In addition, operators expected to check their area to identify any sources of odour.

The operator shall include the following in this check:

- All hatches on storage are closed;
- All vent systems are monitored to ensure that there are no significant odours being emitted;
- Lids are on pails when not in use;
- Sumps are maintained as low as possible;
- Odorous tramp material is cleaned up; and
- Scrubber system is checked to ensure it is within operating parameters.

An odour is considered to have a potential for off-site impact if it can be detected 3 meters downwind. This inspection is documented by completion of the checklist for the area.

5.1.3 Controlling Odorous Solid Waste

The Landfill Supervisor will have responsibility for the detection of odours that may specifically originate from Landfill activities. It will be the responsibility of the Landfill Supervisor to check for odours intermittently throughout the day. A final check will be carried out at the end of the day's receiving. If an odour problem is detected, remedial action will be taken as soon as possible. Odours may emanate from the landfill operating face, landfill leachate and the solidification/stabilization pit.

Odour control procedures for the landfill are outlined below:

- a) All waste streams being considered for disposal are screened by the laboratory for odour levels. Wastes possessing odours that cannot be managed are not accepted into the plant site.
- b) Incoming loads are monitored for odour levels as part of the receiving procedure. Wastes with strong odours may be rejected if this procedure and mitigative efforts are ineffective.
- c) Landfilled wastes with noticeable odours are covered with non-odorous wastes or other material, such as odour absorbing reagent, as soon as practical.

- d) Leachate is removed from the landfill cells daily as a part of normal landfill operations.
- e) The size of the landfill's working face is minimized as best as is practical.
- f) Vehicles containing waste are kept closed or covered until ready to dump and during sampling.
- g) Special packaging provisions are employed as needed (drums, bags, etc.).
- h) Wastes offloaded for solidification/stabilization processing are dumped directly in the mix pit.
- k) Wastes mixed in the solidification/stabilization area are subject to conditions a) through c) above.
- l) On deposition of waste or mixing, if a persistent, noxious or strong odour is encountered that may have an external impact, the operator shall report the odour to the landfill supervisor and immediately apply corrective measures to reduce or eliminate the odours. These corrective measures can be found in section 5.1.6.1 of this procedure (they involve covering the waste and/or adding reagents to mask or reduce the chemical characteristics that contribute to odours).
- m) The facility receives waste from transfer stations and original generators. If a waste is received from either of these sources and a persistent noxious odour is detected, treatment will occur – however, if these best efforts are not successful, alternative measures will be employed to minimize offsite impacts of successive shipments. These measures include;
 - Odour treatment at an alternative location (possibly the generator's site),
 - Restrict/retard acceptance of odourous waste for processing at the site.

When an odour is detected by an employee, or when an odour complaint is received from a neighbor or the MOE, corrective action suitable for the source of the odour is initiated and the complaint and corrective action is documented (see Appendices A and B for forms).

Documentation related to each odour complaint, investigation or corrective action is distributed to the General Managers, as well as the Compliance Manager. These individuals review each incident to ensure that appropriate actions are taken to control off-site odour impacts.

5.1.4 Scrubber/Carbon Absorber

Vapours may occur during the storage and processing of organic wastes in the Processing and Staging Building. The facility has a scrubber system that removes air from these buildings and passes it through a sodium hydroxide/sodium sulfite reducing solution and then through a carbon absorbers to remove acidic gases and organic vapours.

1. The scrubber pH is monitored daily and must remain above a pH of 8.0. This value is reported on the Operator's Daily Inspection entered into WINWEB.
2. The carbon absorber exhaust is monitored weekly for Total Petroleum Hydrocarbons. This value is entered into the WINWEB Inspection report. If the level of Total Petroleum Hydrocarbon exceeds 50 ppm, the carbon must be changed out.

5.1.5 Site Inspection

Similar to the Landfill Operations, the Transfer Station Operations group also monitors for odors and dust on a continuous basis. If either is detected, they will initiate the appropriate corrective actions as well as notify their Supervisor. The Supervisor will then forward the notification onto the Operations or General Manager. If any odours are detected steps will be taken to eliminate the odour and an "Internal Odour Complaint Form" (See Appendix A) will be completed.

5.1.6 Mitigation Steps

5.1.6.1 Mitigation of Landfill Odours

The following is a list of steps to mitigate landfill related odours that may stem from the landfill face, mixing pit or the receiving cells:

- a) Immediate cover with non-odorous soil or material
- b) The addition of materials that exhibit odour-suppressing properties. These materials may consist of straw or a direct application of Ecosorb.
- f) Handling potentially problematic waste streams or projects during those colder months, where lower temperatures result in lower effusion of odorous compounds from the waste mass into the atmosphere.
- g) Working waste in smaller batches, thus lowering the surface area of the exposed material to the atmosphere.
- h) Certain waste streams or projects that produce known odours may necessitate specific handling procedures to mitigate odours.
- i) Adhering to the steps outlined in 5.1.3

5.1.7 Dealing With the Public

Removed – See Community Complaint Response Plan

5.1.8 Reporting

Removed – See Community Complaint Response Plan

5.2 DUST ABATEMENT

5.2.1 Road and Un-Paved Operating Areas

- Roads and unpaved operating areas at the Landfill will be regularly watered to keep down road dust.
- A road sweeper will operate as needed to remove as much dust as possible from paved roads throughout the facility.

5.2.2 Earth Moving Contractors

- The Contractors conducting earth-moving operations will supply road-watering equipment and will keep their area of operation watered regularly to keep down road dust.

5.2.2 Dust Reduction from Active Waste Face, Final Cap and Berm

- A suitable dust suppressant will be applied to exposed waste in the area of the landfill as needed. This may include but not limited to; straw, water and a suitable dust control liquid such as Dust Lynx.
- The facility will ensure that a vegetative cover is applied to the exterior of the perimeter berm as well as areas on the site that have a final cap.

5.2.3 Dust Reduction from Staging Areas and Container Storage Areas

- During dry periods the Transportation Staging Areas and Container Storage Areas will have water or dust suppressant applied as needed to keep dust from blowing from these unpaved areas.

5.2.4 Traffic on Facility Roads

- All facility roads have a speed limit of 20 km/hr intended to keep down dust as well as for safety reasons.
- Drivers, including yard drivers, found to be exceeding the speed limit will be disciplined.

5.2.5 Visible Emissions

- If an incident occurs, report it immediately to the Shift Supervisor. Supervisors must advise the General Manager of each reported emission.

6.0 Consequences of Deviations

In addition to the process interruptions which can occur, the following additional consequences of deviations could result:

- Injuries and/or fatalities
- Property damage
- Regulatory violations and/or fines
- Damaged public relations and/or customer relations
- Disciplinary actions up to and including termination

7.0 Appendices

Appendix A SDS

MSDS SHEETS

Material Safety Data Sheet
 May be used to comply with
 OSHA's Hazard Communication Standard,
 29 CFR 1910.1200. Standard must be
 consulted for specific requirements

U.S. Department of Labor
 Occupational Safety and Health Administration
 (Non-Mandatory Form)
 Form Approved
 OMB No. 1218-0072

IDENTITY (As Used on Label and List)

Ecosorb 606

Note: Blank spaces are not permitted.
 If any item is not applicable, or no
 information is available, the space
 must be marked to indicate that.

SECTION I

Manufacturer's Name	Emergency Telephone Number
OMI Industries	(800) 662-6367
Address (Number, Street, City, State and Zip Code)	Telephone Number for Information
	(847) 304-9111
One Corporate Dr., Suite 100 Long Grove, IL 60047	Date Prepared
	01-05-11

SECTION II - Hazardous Ingredients/Identity Information

Hazardous Components (Specify Chemical Identity: Common Name(s))	N/A OSHA PEL	ACGIH TLV	Other Limits Recommended	%
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Product is a proprietary blend of essential oils, surfactant, and water. All constituents are not considered hazardous according to the Federal Hazard Communication Standard (29 CFR 1910.1200)

HMIS Classification: Health 0; Flammability 0, Reactivity 0, Protective Equipment B

Product has been tested for toxicity according to United States Environmental Protection Agency Guidelines
 Acute Oral Toxicity Study per EPA OPPTS 870.1100- Not toxic by oral ingestion
 Acute Dermal Toxicity Study per EPA OPPTS 870.1200 - Not toxic by dermal absorption
 Acute Inhalation Toxicity Study per EPA OPPTS 870.1300- Not toxic by inhalation exposure
 Acute Eye Irritation Study per EPA OPPTS 870.2400 - Product not an eye irritant
 Acute Skin Irritation Study per EPA OPPTS 870.2500 - Product is not skin irritant
 Dermal Sensitization Study per EPA OPPTS 870.2600- Product is not a skin sensitizer

**All Ingredients can be found listed on the following chemical substance inventories:
 United States TSCA, Canadian DSL, European EINECS and Australian AICS**

SECTION III - Physical/Chemical Characteristics

Boiling Point	~212° F	Specific Gravity (H2O) = 1)	0.99
Percent Volatile	<1.5	Melting Point	32° F
		pH	~6.3
Solubility in Water	Soluble		
Appearance and Odor	Milky white/opaque white, slight citrus or floral odor		

SECTION IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	None	Flammable Limits	LEL N/A	UEL N/A
Extinguishing Media	Does not burn			
Special Fire Fighting Procedures	None	Unusual Fire and Explosion Hazards	None	

SECTION V - Reactivity Data

Stability	Stable
Incompatibility (Materials to Avoid)	Strong oxidizing agents
Hazardous Decomposition or By-products	None knowr
Hazardous Polymerization	Will not occur

SECTION VI - Health Hazard Data

Route(s) of Entry	Inhalation? Yes	Eyes Yes	Ingestion? No
Health Hazards (Acute and Chronic)	Eye contact may cause mild irritation - Wash 15 minutes with water Seek medical attention if symptoms persist		
Carcinogenicity:	NTP? No	IARC Monographs? No	OSHA Regulated? No
Signs and Symptoms of Exposure	None		
Medical Conditions Generally Aggravated by Exposure	None knowr		
Emergency and First Aid Procedures	Eyes - wash with water 15 minutes Ingestion - drink several glasses of water, see physician if symptoms persist		

SECTION VII - Precautions for Safe Handling and Use

Steps to be Taken in Case Material is Released or Spilled	Flush to drain with large quantities of water
Waste Disposal Method	Flush with water to drain
Precautions to Be Taken in Handling and Storing	Storage of product below 32 deg and above 85 degrees may cause layering
Other Precautions	Wash with soap and water if exposed

SECTION VIII - Control Measures

Respiratory Protection (Specify Type)	None required
Ventilation	Good ventilation
Eye Protection	Goggles recommended
Gloves/Other Protective Clothing or Equipment	Gloves recommended
Work/Hygienic Practices	Wash with soap and water before eating or smoking

Material Safety Data Sheet

Dust Lynx H56



1. Identification of the Product and the Company

Product Name: Dust Lynx H56

Chemical Family: Polymer - Glycerol blend

Material Uses: Dust Lynx H56 is used for dust control on roadways and parking lots.

Supplier: Clearflow Enviro Systems Group Inc.
#140, 134 Pembina Road
Sherwood Park, AB T8H 0M2
Ph. 780 -410-1403
Fx. 780-410-1406
www.clearflowgroup.com

In Case of Emergency: 780-410-1403

2. Composition / Information on Ingredients

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

3. Hazard Identification

Potential Acute Health Effects

Inhalation: Inhalation not likely. Mists may cause upper tract irritation.

Ingestion: Can irritate the mouth, throat and stomach.

Skin: May cause mild irritation.

Eyes: May cause mild irritation.

Carcinogenicity: No information was located.

Reproductive Toxicity: No information was located.

Mutagenicity: No information was located.

4. First Aid Measures

Inhalation: Remove victim to fresh air. If symptoms persist, get medical attention.

Skin contact: Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. Get medical attention if irritation develops or persists.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes. Seek medical attention immediately if irritation develops or persists.

Ingestion: If material is ingested, immediately contact a physician or poison control center. Do not induce vomiting.

5. Fire-Fighting Measures

Flammable Class:	The product is not flammable .		
Extinguishing Media:	Use an extinguishing media suitable for the surrounding fire (dry powder, CO ₂).		
Special Exposure Hazards:	This product presents no unusual hazards in a fire situation.		
Protection Against Fire:	Do not enter fire area without proper protective equipment , including respiratory protection.		
NFPA Ratings for this product are:	HEALTH2	FLAMMABILITY 0	INSTABILITY 0
HMIS Ratings for this product are:	HEALTH2	FLAMMABILITY 0	REACTIVITY 0

6. Accidental Release Measures

Personal precautions:	Wear suitable protective clothing and gloves. Avoid contact with the eyes and skin.
Environmental Precautions:	Prevent entry to sewers and public waters .
Procedure for Clean-up:	Dike for recovery or absorb with appropriate material. Recover the cleaning water for disposal.

7. Handling and Storage

General:	Avoid contact with the eyes and skin.
Handling:	Wear suitable protective clothing. Wash hands and other exposed areas with mild soap and water before eat, drink or smoke and when leaving work . Handle in accordance with good industrial hygiene and safety procedures.
Storage:	Store in a dry, well-ventilated area.

8. Exposure Controls / Personal Protection

Personal Protection

Respiratory:	No special respiratory protection equipment is recommended under normal conditions of use with adequate ventilation.
Hands:	Wear gloves in case of repeated or prolonged contact.
Eyes:	Even though no eye contact is expected under reasonable conditions of use, appropriate eye protection should be worn when handling this material (safety glasses with side shields).
Skin	Wear suitable protective clothing.
Ingestion:	When using, do not eat, drink or smoke.

9. Physical and Chemical Properties

Physical State:	Viscous liquid
Color:	Brown
pH:	9-11 (1% solution)
Specific Gravity:	1.1-1.2 (@20°C)
Boiling/Condensing Point:	> 100°C (212°F)
Vapour Pressure:	<0.01 mm Hg (0.00 kPa)
Evaporation Rate:	<0.01
Flash Point:	>100°C (212°F) (open cup)

15. Regulatory Information

EC Labelling:	Non-dangerous under transport regulations .
S Phrase(s):	None.
R Phrase(s):	None.
Domestic Substances List:	Yes.
Non-Domestic Substances List (NDSL):	Yes.
Toxic Substances Control Act:	Yes.
WHMIS Classification:	02B.

16. Other Information

Recommended Uses and Restrictions:

See product technical data sheet for detailed information.

Additional Information: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Prepared By: Cleartlow Enviro Systems Group, Inc.

Date of Issue: 05/13/2013

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Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from Cleartlow Enviro Systems Group.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources . While the information is believed to be accurate, Cleartlow makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Cleartlow's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use , handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.

END OF MSDS

MSDS- MATERIAL SAFETY DATA SHEET

CALCIUM CHLORIDE, LIQUID

CAS NUMBER: 10043-52-4

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION:

TRADE NAME {COMMON NAME}: Liquid Calcium Chloride

SYNONYMS: Calcium Chloride Aqueous Solution

CaCl²

CaCl² Aqueous Solution

Calcium (II) Chloride

Calcium (II) Chloride Aqueous Solution

Calcium Dichloride

Calcium Dichloride Aqueous Solution

MANUFACTURER/SUPPLIER:

Lady Carmen Trucking Ltd.

P.O. Box398

Brooks, Alberta

T1R 184

EMERGENCY TELEPHONE NUMBERS:

Plant Operator: Glenn Stinn - (403) 793-4397

Plant Owner: Carmen Dussault - (403) 793-7846

PRODUCT USE: Road Dust Control

Road Base Stabilization

Drilling Mud Lubricant

Heavy Equipment Tire Ballast

MSDS PREPARATION: Envirotech Services (403) 362-2651, (403) 362-9567 cell

CURRENT ISSUE DATE: June 6, 2011

2. COMPOSITION/INGREDIENTS:

28-30% Calcium Chloride Aqueous Solution

Calcium Chloride: **CAS#** 10043-52-4

LOS0 Oral Rat 1000mg/kg

LCS0/96 Hour Fish >100mg/L

Water: CAS#7732-18-5

cact2 Brine MSDS - 2011

13. HAZARDS IDENTIFICATION:

LOW TOXICITY - MAY CAUSE IRRITATION TO SKIN, EYES. RESPIRATORY AND GASTROINTESTINAL TRACTS, HARMFUL IF SWALLOWED OR INHALED.

ROUTES OF ENTRY/POTENTIAL ACUTE EXPOSURE HEALTH EFFECTS:

SKIN CONTACT: May cause skin irritation. Prolonged contact may cause superficial burns. Contact with abraded or broken skin may cause severe necrosis.

EYES: May irritate or burn eyes. possible corneal injury.

INHALATION: Mist inhalation may irritate nose, throat and lungs, may cause nosebleeds.

INGESTION: Low toxicity, *may* irritate gastrointestinal tract- cause nausea and vomiting.

CHRONIC EXPOSURE EFFECTS: None identified.

14. FIRST AID MEASURES:

SKIN CONTACT: Wipe off excess solution from skin and flush with water.

EYES: Immediately flush with water including behind eyelids and continue for at least 15 minutes. Obtain medical attention.

INHALATION: Remove to fresh air. Obtain medical attention.

INGESTION: Low toxicity if ingested in small quantity. For large quantity if conscious immediately ingest 2-4 glasses of water or milk and obtain medical attention.

NOTE TO PHYSICIAN: Oral ingestion *may* cause serum acidosis.

15. FIRE FIGHTING MEASURES:

NON FLAMMABLE & NON COMBUSTIBLE.

FIRE: Not considered a fire hazard.

EXPLOSION: Not considered an explosion hazard.

FIRE CONTROL: Isolate area and use appropriate means to extinguish surrounding fire.

SPECIAL INFORMATION: At high temperatures calcium chloride may produce toxic or irritating fumes. Fire fighters should wear full protective clothing and equipment.

16. ACCIDENTAL RELEASE MEASURES:

ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT (SECTION 8). SPILLED BRINE MAY CREATE A SLIPPING HAZARD.

SMALL SPILLS: Isolate area, eliminate source and contain spilled material if possible, recover free liquid with absorbant, mop or other appropriate means and collect for disposal. Dilute residues with water, recover liquid with absorbant. Repeat as necessary.

LARGE SPILLS: Isolate area, eliminate source and contain with Impermeable or absorbent barrier. Recover free liquid and treat residues as *for* smallspills. Prevent spills *from* entering sewers or waterways.

1. HANDLING & STORAGE:

VENTILATION: Natural ventilation is adequate for exterior areas. Local exhaust should be used in confined storage, packaging and uploading areas, over open processing equipment and wheremist is produced.

HANDLING: Avoid contact with eyes, skin or clothing and use appropriate personal protective equipment. Avoid inhaling mist or vapours. Use good personal hygiene and housekeeping.

STORAGE: Store in secure corrosion resistant container. Do not use zinc or galvanized metal containers.

2. EXPOSURE CONTROLS/PERSONAL PROTECTION:

RESPIRATORY PROTECTION: For mist and/or vapour exposure wear NIOSH/MSHA approved respirator. Respirator should be constructed of corrosion resistant materials.

EYES & FACE: For mist exposure and general handling wear chemical safety glasses and a hard hat Contact lenses should not be worn.

HANDS: Chemical resistant gloves.

BODY: Coveralls and/or long sleeve shirt and trousers. Chemical resistant safety boots with non-slip soles..

EXPOSURE RESPONSE: Readily accessible eye-wash station and shower recommended.

19. PHYSICAL & CHEMICAL PROPERTIES:

PHYSICAL STATE: Clear to slightly turbid brownish liquid.

ODOUR: Slight acrid odour.

CALCIUM CHLORIDE: CaCl₂, Molecular Weight 110.99

SOLUBILITY IN WATER: Solid 74.5gm/100ml @20°C, brine 100% miscible.

SPECIFIC GRAVITY@20°C: 20% Solution 1.19, 30% Solution 1.30, 40% Solution 1.44.

VAPOUR PRESSURE@ 20°C: 20% Solution 16mm Hg, 30% Solution 11mm Hg, 40% Solution 7.3mm Hg.

VAPOUR DENSITY: N/A (water vapour only).

EVAPORATION RATE: N/A (water vapour only).

BOILING POINT: 20% Solution +105°C, 30% Solution +110°C, 40% Solution +118°C.

FREEZING POINT: 20% Solution -20°C, 30% Solution -47°C. 40% Solution +16°C.

pH: Neutral or slightly alkaline.

COEFFICIENT OF WATER/OIL DISTRIBUTION: N/A

1.0. STABILITY & REACTIVITY:

STABILITY: Product is stable.

INCOMPATIBILITY (MATERIALS TO AVOID):

- Reacts violently with boron trifluoride (BF₃) or; mixture of boron trioxide & calcium oxide (820³ + CaCO₃).
- Water-reactive materials (eg. Sodium) cause an exothermic reaction.
- Methyl vinyl ether can start a runaway polymerization reaction.
- Zinc metal (galvanized coatings) react to generate potentially explosive hydrogen.
- Metals in general and aluminum, aluminum alloys and yellow brass in particular are corroded by calcium chloride.

HAZARDOUS DECOMPOSITION PRODUCTS: Chlorine gas is generated when heated to decomposition.

11. TOXICOLOGICAL INFORMATION:

RAT ORAL LD50: 1000mg/kg (anhydrous).

IRRITANCY: May cause irritation.

SENSITIZATION: May cause irritation.

CARCINOGENICITY: None known.

REPRODUCTIVE TOXICITY: None known.

TERATOGENICITY: None known.

MUTAGENICITY: None known.

TOXICOLOGICALLY SYNERGISTIC PRODUCTS: None known.

12. ECOLOGICAL INFORMATION:

NOT KNOWN TO BIODEGRADE OR BIOACCUMULATE.

AQUATIC TOXICITY: LC50/96 is over 100 mg/L.

13. DISPOSAL CONSIDERATIONS:

Disposal Methods must comply with Provincial, State, Federal and Local disposal or discharge laws.

In limited quantities *and* if permitted by applicable disposal regulations dilute with water and flush to sewer with additional water. May require disposal at an approved waste facility.

14. TRANSPORT INFORMATION:

Not a dangerous good, not regulated.

15. REGULATORY INFORMATION:

CALCIUM CHLORIDE WHMIS CLASSIFICATION: 02B -Toxic material causing other toxic effects (Eye & Skin irritant).

16. OTHER INFORMATION:

NFPA 704 CLASSIFICATION: Health - 1
Flammability - 0
Reactivity - 0
Specific Hazard - None

The data contained herein is believed to be accurate and reliable. No warranty is expressed or implied and Lady Carmen Trucking Ltd. and Envirotech Services assume no responsibility regarding the accuracy or completeness of the data provided or its application.

REFERENCES;

"Calcium Chloride Handbook" - Dow Chemical Company, August, 2003

"MSDS Calcium Chloride, Liquid" - General Chemical, Parsippany, NJ, May, 2001

Material Safety Data Sheet

Section 1: PRODUCT AND COMPANY INFORMATION

Product Name(s): Lafarge Portland Cement (cement)

Product Identifiers: Cement, Portland Cement, Hydraulic Cement, Oil Well Cement, Trinity® White Cement, Antique White Cement, Portland Limestone Cement, Portland Cement Type I, IA, IE, II, 1/11, IIA, II L.A., III, **IIIA**, IV, IVA, V, VA, 10, 20, 30, 40, 50, GU, GUL, MS, MH, HE, LH, HS, OWH, OWG Cement, OW Class GHSR

Manufacturer: Lafarge North America Inc.
12018 Sunrise Valley Dr, Suite 500
Reston, VA 20191

Information Telephone Number: 703-480-3600 (9am to 5pm EST)

Emergency Telephone Number: 1-800-451-8346 (3E Hotline)

Product Use: Cement is used as a binder in concrete and mortars that are widely used in construction. Cement is distributed in bags, totes and bulk shipment.

Note: This MSDS covers many types of Portland cement. Individual composition of hazardous constituents will vary between types of Portland cement.


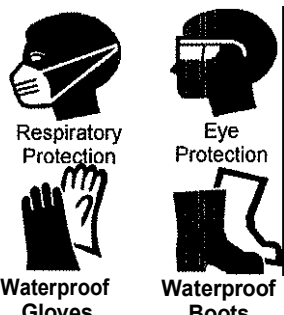
Section 2: COMPOSITION/INFORMATION ON INGREDIENTS

Component	Percent (By Weight)	CAS Number	OSHA PEL-TWA (mgm ³)	ACGIHTLV-TWA(m /m ³)	LD•o (mouse, intra eritoneal)	LC50
Portland Cement'	100	65997-15-1	.15 (T); 5J L	1(R)	NA	NA
Calcium Sulfate*	2-10	13397-24-5	15(T); 5(R)	10 (T)	NA	NA
Calcium Carbonate*	0-15	1317-65-3	15 (T); 5(R)	3 (R), 10 (T)	NA	NA
Calcium Oxide	0-5	1305-78-8	5(T)	2 (T)	3059m9.i,l<J	NA
• Magnesium Oxide	0-4	1309-48-4	15 (T)	10 (T.)	NA	NA
Crystalline Silica	0-0.2	14808-60-7	[(10) / (%SiO ₂ +2)] (R); [(30) / (%SiO ₂ +2)] (T)	0.025 (R)	NA	NA

Note: Exposure limits for components noted with an • contain no asbestos and <1% crystalline silica

Cement is made from materials mined from the earth and is processed using energy provided by fuels. Trace amounts of chemicals may be detected during chemical analysis. For example, cement may contain trace amounts of calcium oxide (also known as free lime or quick lime), free magnesium oxide, potassium and sodium sulfate compounds, chromium compounds, nickel compounds, and other trace compounds.

Section 3: HAZARD IDENTIFICATION

	<div style="background-color: #cccccc; padding: 5px; font-weight: bold; font-size: 1.2em;">WARNING</div> <p>Corrosive - Causes severe burns. Toxic - Harmful by inhalation. (Contains crystalline silica)</p> <p>Use proper engineering controls, work practices, and personal protective equipment to prevent exposure to wet or dry product.</p> <p>Read MSDS for details.</p>	
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Section 3: HAZARD IDENTIFICATION (continued)

Emergency Overview: Cement is a solid, grey, off white, or white odorless powder. It is not combustible or explosive. A single, short-term exposure to the dry powder presents little or no hazard. Exposure of sufficient duration to wet cement, or to dry cement on moist areas of the body, can cause serious, potentially irreversible tissue (skin, eye, respiratory tract) damage due to chemical (caustic) burns, including third degree burns.

Potential Health Effects:

Eye Contact: Airborne dust may cause immediate or delayed irritation or inflammation. Eye contact with large amounts of dry powder or with wet cement can cause moderate eye irritation, chemical burns and blindness. Eye exposures require immediate first aid and medical attention to prevent significant damage to the eye.

Skin Contact: Cement may cause dry skin, discomfort, irritation, severe burns, and dermatitis.

Burns: Exposure of sufficient duration to wet cement, or to dry cement on moist areas of the body, can cause serious, potentially irreversible damage to skin, eye, respiratory and digestive tracts due to chemical (caustic) burns, including third degree burns. A skin exposure may be hazardous even if there is no pain or discomfort.

Dermatitis: Cement is capable of causing dermatitis by irritation and allergy. Skin affected by dermatitis may include symptoms such as, redness, itching, rash, scaling, and cracking.

Irritant dermatitis is caused by the physical properties of cement including alkalinity and abrasion.

Allergic contact dermatitis is caused by sensitization to hexavalent chromium (chromate) present in cement. The reaction can range from a mild rash to severe skin ulcers. Persons already sensitized may react to the first contact with cement. Others may develop allergic dermatitis after years of repeated contact with cement.

Inhalation (acute): Breathing dust may cause nose, throat or lung irritation, including choking, depending on the degree of exposure. Inhalation of high levels of dust can cause chemical burns to the nose, throat and lungs.

Inhalation (chronic): Risk of injury depends on duration and level of exposure.

Silicosis: This product contains crystalline silica. Prolonged or repeated inhalation of respirable crystalline silica from this product can cause silicosis, a seriously disabling and fatal lung disease. See Note to Physicians in Section 4 for further information.

Carcinogenicity: Cement is not listed as a carcinogen by IARC or NTP; however, cement contains trace amounts of crystalline silica and hexavalent chromium which are classified by IARC and NTP as known human carcinogens.

Autoimmune Disease: Some studies show that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis may be associated with the increased incidence of several autoimmune disorders such as scleroderma (thickening of the skin), systemic lupus erythematosus, rheumatoid arthritis and diseases affecting the kidneys.

Tuberculosis: Silicosis increases the risk of tuberculosis.

Renal Disease: Some studies show an increased incidence of chronic kidney disease and end-stage renal disease in workers exposed to respirable crystalline silica.

Section 3: HAZARD IDENTIFICATION (continued)

Ingestion: Do not ingest cement. Although ingestion of small quantities of cement is not known to be harmful, large quantities can cause chemical burns in the mouth, throat, stomach, and digestive tract.

Medical Conditions Aggravated by Exposure: Individuals with lung disease (e.g. bronchitis, emphysema, COPD, pulmonary disease) or sensitivity to hexavalent chromium can be aggravated by exposure.

Section 4: FIRST AID MEASURES

Eye Contact: Rinse eyes thoroughly with water for at least 15 minutes, including under lids, to remove all particles. Seek medical attention for abrasions and burns.

Skin Contact: Wash with cool water and a pH neutral soap or a mild skin detergent. Seek medical attention for rash, burns, irritation, dermatitis, and prolonged unprotected exposures to wet cement, cement mixtures or liquids from wet cement.

Inhalation: Move person to fresh air. Seek medical attention for discomfort or if coughing or other symptoms do not subside.

Ingestion: Do not induce vomiting. If conscious, have person drink plenty of water. Seek medical attention or contact poison control center immediately.

Note to Physician: The three types of silicosis include:

- Simple chronic silicosis - which results from long-term exposure (more than 20 years) to low amounts of respirable crystalline silica. Nodules of chronic inflammation and scarring provoked by the respirable crystalline silica form in the lungs and chest lymph nodes. This disease may feature breathlessness and may resemble chronic obstructive pulmonary disease (COPD).
- Accelerated silicosis - occurs after exposure to larger amounts of respirable crystalline silica over a shorter period of time (5-15 years). Inflammation, scarring, and symptoms progress faster in accelerated silicosis than in simple silicosis.
- Acute silicosis - results from short-term exposure to very large amounts of respirable crystalline silica. The lungs become very inflamed and may fill with fluid, causing severe shortness of breath and low blood oxygen levels.

Progressive massive fibrosis may occur in simple or accelerated silicosis, but is more common in the accelerated form. Progressive massive fibrosis results from severe scarring and leads to the destruction of normal lung structures.

Section 5: FIREFIGHTING MEASURES

Flashpoint & Method:	Non-combustible	Firefighting Equipment:	Cement poses no fire-related hazard. A SCBA is recommended to limit exposures to combustion products when fighting any fire.
General Hazard:	Avoid breathing dust. Wet cement is caustic.		
Extinguishing Media:	Use extinguishing media appropriate for surrounding fire.	Combustion Products:	None.

Section 6: ACCIDENTAL RELEASE MEASURES

General: Place spilled material into a container. Avoid actions that cause the cement to become airborne. Avoid inhalation of cement and contact with skin. Wear appropriate protective equipment as described in Section 8. Scrape wet cement and place in container. Allow material to dry or solidify before disposal. Do not wash cement down sewage and drainage systems or into bodies of water (e.g. streams).

Waste Disposal Method: Dispose of cement according to Federal, State, Provincial and Local regulations.

Section 7: HANDLING AND STORAGE

General: Keep bulk and bagged cement dry until used. Stack bagged material in a secure manner to prevent falling. Bagged cement is heavy and poses risks such as sprains and strains to the back, arms, shoulders and legs during lifting and mixing. Handle with care and use appropriate control measures.

Engulfment hazard. To prevent burial or suffocation, do not enter a confined space, such as a silo, bin, bulk truck, or other storage container or vessel that stores or contains cement. Cement can buildup or adhere to the walls of a confined space. The cement can release, collapse or fall unexpectedly.

Properly ground all pneumatic conveyance systems. The potential exists for static build-up and static discharge when moving cement powders through a plastic, non-conductive, or non-grounded pneumatic conveyance system. The static discharge may result in damage to equipment and injury to workers.

Usage: Cutting, crushing or grinding hardened cement, concrete or other crystalline silica-bearing materials will release respirable crystalline silica. Use all appropriate measures of dust control or suppression, and Personal Protective Equipment (PPE) described in Section 8 below.

Housekeeping: Avoid actions that cause the cement to become airborne during clean-up such as dry sweeping or using compressed air. Use HEPA vacuum or thoroughly wet with water to clean-up dust. Use PPE described in Section 8 below.

Storage Temperature: Unlimited. **Storage Pressure:** Unlimited.

Clothing: Promptly remove and launder clothing that is dusty or wet with cement. Thoroughly wash skin after exposure to dust or wet cement.

Section 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls: Use local exhaust or general dilution ventilation or other suppression methods to maintain dust levels below exposure limits.

Personal Protective Equipment (PPE):

Respiratory Protection: Under ordinary conditions no respiratory protection is required. Wear a NIOSH approved respirator that is properly fitted and is in good condition when exposed to dust above exposure limits.

Eye Protection: Wear ANSI approved glasses or safety goggles when handling dust or wet cement to prevent contact with eyes. Wearing contact lenses when using cement, under dusty conditions, is not recommended.

Section 15: REGULATORY INFORMATION (continued)

RCRA: If discarded in its purchased form, this product would not be a hazardous waste either by listing or characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste.

TSCA: Portland cement and crystalline silica are exempt from reporting under the inventory update rule.

California Proposition 65: Crystalline silica (airborne particulates of respirable size) and Chromium (hexavalent compounds) are substances known by the State of California to cause cancer.

WHMIS/DSL: Products containing crystalline silica and calcium carbonate are classified as O2A, E and are subject to WHMIS requirements.

Section 16: OTHER INFORMATION

Abbreviations:

>	Greater than	JNA	Not Applicable
ACGIH	American Conference of Governmental Industrial Hygienists	NFPA	National Fire Protection Association
GAS No	Chemical Abstract Service number	NIOSH	National Institute for Occupational Safety and Health
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	OSHA	Occupational Safety and Health Administration
CFR	Code for Federal Regulations	PEL	Permissible Exposure Limit
CL	Ceiling Limit	pH	Negative log of hydronium concentration
DOT	U.S. Department of Transportation	PPE	Personal Protective Equipment
EST	Eastern Standard Time	R	Respirable Fraction
HEPA	High-Efficiency Particulate Filter	RCRA	Resource Conservation and Recovery Act
HMIS	Hazardous Materials Identification System	SARA	Superfund Amendments and Reauthorization Act
IARC	International Agency for Research on Cancer	T	Total Particulate
LC ₅₀	Lethal Concentration	TOG	Transportation of Dangerous Goods
LD ₅₀	Lethal Dose	TLV	Threshold Limit Value
mg/m ³	milligrams per cubic meter	MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration	IS	Information System

This MSDS (Sections 1-16) was revised on March 1, 2011.

An electronic version of this MSDS is available at: www.lafarge-na.com under the Sustainability section.

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**Clean Harbors
Ryley Facility**

**Run-off & Industrial
Wastewater
Monitoring and
Management Program**

Approval 10348-03-01

Sec. 4.6.34(n)

A. Run-off & industrial wastewater monitoring and management program

- 1) Surface water from the active facility areas is collected in three surface water detention ponds. Precipitation falling on the paved plant area (Pond B), waste container storage areas (pond C) the landfill access roads and tipping pad (Pond D) is collected in these surface water holding ponds. This process prevents any potentially contaminated surface water from leaving the site.
- 2) Once any pond reaches approximately two thirds of its capacity it must be sampled according to the Water Sampling SOP and analyzed by a commercial laboratory and the results compared to the facility's discharge criteria as specified in Table 4.3-B of Operating Approval 10348-03-01. **The analytical results must be reviewed by 2 of the following people, Facility Manager, Operations Manager or Laboratory Chemist, to confirm that the results meet discharge criteria.** If the analysis meets the specified criteria, discharge to the neighbouring natural drainage area can begin.

TABLE 4.3-B: RUNOFF LIMITS FOR SURFACE WATER DETENTION PONDS

PARAMETER	LIMITS (Maximum unless otherwise indicated)
pH	6.0 – 9.5 pH units
COD	50 mg/L
TDS	2500 mg/L
TSS	25 mg/L
Ammonia (expressed as Nitrogen)	5 mg/L
Chloride	250 mg/L
Sodium	200 mg/L
Sulphate	500 mg/L
Oil or other substances	Not present in amounts sufficient to create a visible film or sheen
96-Hour Multiple Concentration Acute Lethality Test Using Rainbow Trout (<i>Oncorhynchus mykiss</i>)	50% or greater survival

- 3) Surface discharge is accomplished by pumping the water via a suction hose, pump and discharge hose to the natural drainage area east of Cell 3E through the culvert and under Hwy 854 into Bible Creek. Discharge volumes must be recorded daily.

Results of all testing of the surface water holding ponds are submitted to Alberta Environment as part of the Monthly Industrial Runoff Report by the end of the month following the month in which the discharge occurred.

Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



Landfill Leachate and Leak Detection Monitoring and Management Program

Ryley, AB

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TITLE: Landfill Leachate Monitoring and Management Program	SOP No.: 90RY 4.6.34(o & p)	Page 3 of 12
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TITLE: Landfill Leachate System			
Facility: 90RY - Ryley	Prepared by: Stan Yuha	SOP Number: 90RY 4.6.34(o & p)	Page 3 of 5
Reviewed By:	Title: Senior Health and Safety Manager	Issue Date: Oct. 2023	
Approved By: Stan Yuha	Title: General Manager	Next Review Date: Oct. 2024	
Approved By:	Title: WPC Worker Representative		

1.0 Objective

This Standard Operating Procedure (SOP) is to provide the guidance and necessary steps to manage all the leachate systems associated with all the individual landfills.

2.0 Site Specific Terms

- SOP – Standard Operating Procedure
- JHA – Job Hazard Analysis
- PPE – Personal Protective Equipment
- T5400 Cell 2, 3A & 3B leachate tank
- T5500 Cell 3C leachate tank
- T5600 Cell 3D leachate tank
- T5700 Cell 3E leachate tank
- T5800 Cell 4 leachate tank
- Level logger – instrument that is used to measure the level (height) of leachate in the bottom of the landfill
- Baro-logger – similar to the level logger but this measures the barometric pressure

3.0 Responsibilities

3.1 General Manager

The General Manager will ensure that all employees are trained and knowledgeable regarding the proper operating procedures.

3.2 Supervisors

The supervisor and/or lead foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.

3.3 Employees

Employees are responsible for adhering to safe work practices and all provisions found in this procedure. Employees must inspect all equipment prior to use. If deficiencies are found, the equipment must be locked out/ tagged out and reported to the supervisor immediately.

4.0 Prerequisites

The following prerequisites must be completed prior to performing this procedure.

4.1 Health and Safety

- 4.1.1 Any incidents, including near misses, are to be reported immediately to the supervisor.
- 4.1.2 Review the Job Hazard Analysis to become familiar with the hazards associated with this process.
- 4.1.3 Consult the PPE Hazard Assessments for proper PPE to be worn for this job task.
- 4.1.4 In the event the employees' personal gas detection instrument goes into alarm mode, the employee is to leave the area immediately and report the condition to their supervisor.

4.2 Environmental

- 4.2.1 If an incident occurs, report it to your supervisor immediately, and implement the facility's Contingency Plan, if applicable.
- 4.2.2 Incidental releases are to be cleaned up immediately in the process designated PPE.

4.3 Documented Training

- 4.3.1 For new employees, these rules will be reviewed during the facility orientation. A member of supervision, to ensure that a clear understanding and agreement to follow is achieved, should do this review in a two-way discussion. Simply having an employee read these rules is not adequate or acceptable.
- 4.3.2 A periodic review with all employees is to be conducted to help ensure continuing awareness.
- 4.3.3 HAZWOPER training
- 4.3.4 Monthly HAZWOPER Update Modules
- 4.3.5 TDG training as applicable
- 4.3.6 SOP training
- 4.3.7 Equipment training

5.0 Procedure

- 5.1.1 All gas detection equipment must be bump tested and calibrated as per the manufacturer's recommendations, or daily bump test, with a 30 day calibration schedule, whichever awards the employee the greater level of protection. If there is a problem with the gas detection equipment, it must be reported to the supervisor immediately for repair and/ or replacement.
- 5.1.2 Each leachate building will have a portable gas detection instrument capable of measuring for hydrogen sulfide (H₂S) and the lower explosive limit (LEL) at a minimum. The instrument will be placed in a position agreed to by the employee whereas the instrument will not be affected or influenced by winds entering the building, and awards the employee the ability to hear the audible alarm and/ or see the visual alarm, prior to approaching the leachate building. These portable gas detection instruments will have to be swapped out daily in accordance with the manufacturer's recommendations for bump testing and calibration, or daily bump test with a 30 day calibration frequency, whichever awards the employee the greater level of protection.

[Type here]

5.1 Compliance

5.2.1 Leachate Head Measurement

The leachate head level must be monitored in the primary systems of each landfill. Leachate Head is defined as the depth of the liquid (leachate) above the primary synthetic liner. The Operating Approval requires that the Leachate Head be monitored at least once every three (3) working days. As per the Operating Approval Sect. 4.3.11, the leachate head shall only exceed the maximum level for a maximum duration of 14 days subsequent to precipitation event. Electric timers shall be utilized to ensure consistent, scheduled pumping. Pump cavitation may occur if pumps are plugged in for too long at once which may cause pump burn out. Level loggers shall be used to measure and record the primary leachate levels in the active landfill cells. If any levels are not within allowance levels after 14 days without precipitation, contact management immediately.

5.2.2 Leak Detection Maximum Volumes

As per section 4.3.12 in the approval; "The volume of liquid in the leak detection system, as monitored in Table 4.5-B, shall not exceed the action leakage rate of 790 liters/ha/day in any cell." The maximum volumes are listed below for each individual cell. If the volumes are exceeded you must report this to Management immediately.

5.2.3 Leachate Sampling

Leachate sampling must be completed on a quarterly basis. Consulting with the Lab Manager to schedule sampling dates is required. Consideration for leachate systems that do not regularly produce enough liquid to provide a sample must be taken. These samples must be collected whenever sufficient leachate is recorded. All leachate samples must be submitted to the Lab Manager who will prepare them for analytical submission.

5.2.4 Cell 1 (Capped/Inactive)

- Primary Leachate Collection
 - At the south-east corner of Cell #1 at the top of the base berm a pipe protrudes out of the cell. A submersible pump is deep inside the pipe. The primary level must be pumped by placing the end of the hose into a tank or tote and plugging in the submersible pump and collected in the storage tote. The volume must be recorded in the Cell # 1 leachate book. This may not be possible in the winter time due to the leachate system being frozen.
- Secondary Leachate Collection
 - The secondary leachate is pumped using the submersible pump which is in the manhole sump at the SE corner of the landfill. Secondary leachate is collected for Cell # 1 in the storage tote.
- Leachates for Cell can be pumped quarterly since the volumes collected are extremely small.
- In the event a volume over 790 L in a 24 hour period accumulates in the secondary system, the Manager must be notified immediately. The maximum volume per day is 730 liters.
- Pumping Secondary Leachate
 - Place the secondary leachate hose into the tote inside the containment berm by T5100. Plug in the secondary leachate pump. Measure & record any volume removed. When no more fluid can be pumped, unplug the pump and drain the hose into the tote if possible.

5.2.5 Cell 2

- Primary Leachate Collection
 - Readings should be taken in the mornings of each working day. Note: Cell 3 leachates are also pumped into T5400 tank via insulated line from cell 2.
 - Primary leachate is collected by plugging in the submersible pump in the primary pipe in the Cell # 2 building. Ensure that the hose is connected to the Cell # 4 tank or vacuum truck for proper disposal of liquids. Ensure that the proper valves are opened to prevent damage or an incident. Above ground pipelines must be inspected daily for leaks.

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- Record the barometric pressure correction by connecting the Barologger to the Leveloader or Tablet PC using the appropriate cable. Write reading in the Log Book.
- Record the primary leachate level by connecting the Levelogger cable to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
- Calculate the Leachate level by subtracting the Barologger reading from the Levelogger reading. Report **any reading greater than 1.0 m** to the Operations and/or Facility Manager.
- Estimated volume of leachate pumped per day will be calculated by multiplying the hourly flow rate of the pump by the number of hours the pump operated. This reading shall be entered into the Log Book. If a flowmeter is installed, enter the flowmeter reading.
- Secondary Leachate Collection
 - Daily Reading
 - Try to be taken in the mornings of each working day the secondary leachate levels will be measured.
 - a. Ensure the proper valves are open to pump secondary liquid to the measurement container
 - b. Plug in the secondary submersible pump.
 - c. When pumping is complete, unplug pump.
 - d. Record volume in Cell # 2 Leachate book and on the daily reading sheet.
 - In the event a volume over 790L per hectare per day accumulates in the secondary system, Management must be notified immediately. For Cell 2 this volume is 1068L per day.
- Cell 2 Tank
 - When the tank requires emptying, a tanker or vacuum truck will be used to transport the leachate liquids. Refer to procedures for operation of these particular units.
 - Leachate from Cell 2 and from Cell 3 are both pumped into T5400. This water may contain dissolved H₂S. To ensure H₂S is not released, the water may need to be treated with an alkaline liquid such as sodium hydroxide. Contact Management to discuss if treatment is needed and at what concentrations. This is a case-by-case procedure.
 - Landfill personnel must ensure that the tank is emptied before low temperatures in the fall cause the leachate to freeze or that an insulated and/or heated tank is in place. In the colder months, the heaters and heat trace lines must be checked daily.

5.2.6 Cell 3A

- Primary Leachate Collection
 - Readings should be taken in the mornings of each working day. Note; Cell 3 leachates are also pumped into T5400 tank, same as Cell 2 leachates via pipeline.
 - Primary leachate is collected by plugging in the submersible pump in the primary pipe in the Cell # 3A building. Ensure that the hose is connected to the Cell # 3A tank or vacuum truck for proper disposal of liquids. Ensure that the proper valves are opened to prevent damage or an incident. Inspect piping for leaks daily.
 - Record the barometric pressure correction by connecting the Barologger to the Leveloader or Tablet PC using the appropriate cable. Write reading in the Log Book.
 - Record the primary leachate level by connecting the Levelogger cable to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
 - Calculate the Leachate level by subtracting the Barologger reading from the Levelogger reading. Report **any reading greater than 1.0 m** to the Operations and/or Facility Manager.

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- Estimated volume of leachate pumped per day will be calculated by multiplying the hourly flow rate of the pump by the number of hours the pump operated. This calculation shall be entered into the Log Book. If a flowmeter is installed, enter the flowmeter reading.
- Secondary Leachate Collection
 - Daily Reading
 - Try to be taken in the mornings of each working day the secondary leachate levels will be measured.
 - a. Ensure the proper valves are open to pump the secondary liquids to the measuring container.
 - b. Plug in the secondary submersible pump.
 - c. When pumping is complete, unplug pump and close appropriate valves.
 - d. Record volume in Cell # 3A Leachate book and on the daily reading sheet.
 - In the event a volume over 790L per hectare per day accumulated in the secondary system, Management must be notified immediately. For Cell 3A this volume is 1678L per Day.
- Cell 3A Tank
 - Refer to Cell 2 Tank above.

5.2.7 Cell 3B

- Primary Leachate Collection
 - Readings should be taken in the mornings of each working day.
 - Primary leachate is collected by plugging in the submersible pump in the primary pipe in Cell #3B building. Ensure that the hose is connected to the Cell #3B tank or the tanker truck for proper disposal of liquids. Ensure that the proper valves are opened to prevent damage or an incident.
 - In sub-zero weather the primary leachate lines must be drained before the end of the day to prevent damage from freezing. Check heat trace and lines daily.
 - Record the barometric pressure correction by connecting the barologger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
 - Record the Primary Leachate level by connecting the Levelogger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
 - Calculate the Leachate level by subtracting the Barologger reading from the Levelogger reading. Report **any reading greater than 1.0 m** to the Operations and/or Facility Manager.
 - Estimated volume of leachate pumped will be calculated by multiplying the hourly flow rate of the pump by the number of hours the pump operated. This calculation shall be entered into the Log Book. If a flowmeter is installed, enter the flowmeter reading.
- Secondary Leachate Collection (Leak Detection)
 - Daily Reading
 - Try to be taken in the mornings of each working day the secondary leachate levels will be measured.
 - a. Ensure the proper valves are open to pump secondary liquid the measurement container.
 - b. Plug in the secondary submersible pump
 - c. When pumping is complete, unplug pump and close appropriate valves.
 - d. Record volume in Cell # 3B Leachate book and on the daily reading sheet.

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- In the event a volume over 790 L per hectare per day accumulates in the secondary system, Management must be notified immediately. For Cell 3B this volume is 1678 L per day.
- Cell 3B Tank
 - When the tank requires emptying, a tanker or vacuum truck will be used to transport the leachate liquids. Refer to procedures for operation of these particular units.
 - Landfill personnel must ensure that the tank is emptied before low temperatures in the fall cause the leachate to freeze or that an insulated and/or heated tank is in place.

5.2.8 Cell 3C

- Primary Leachate Collection
 - Readings should be taken in the mornings of working day.
 - The primary leachate is collected by plugging in the submersible pump in the primary pipe in Cell #3C building. Ensure that the hose is connected to the Cell #3C tank or the tanker truck for proper disposal of liquids. Ensure that the proper valves are opened to prevent damage or an incident.
 - In sub-zero weather the primary leachate lines must be drained before the end of the day to prevent damage from freezing.
 - Record the barometric pressure correction by connecting the barologger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
 - Record the Primary Leachate level by connecting the Levelogger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
 - Calculate the Leachate level by subtracting the Barologger reading from the Levelogger reading. Report **any reading greater than 1.0 m** to the Operations and/or Facility Manager.
 - Estimated volume of leachate pumped will be calculated by multiplying the hourly flow rate of the pump by the number of hours the pump operated. This calculation shall be entered into the Log Book. If a flowmeter is installed, enter the flowmeter reading.
- Secondary Leachate Collection
 - Daily Reading
 - Try to be taken in the mornings of each working day the secondary system shall be measured.
 - a. Ensure the proper valves are open to pump the secondary liquid to the measurement container.
 - b. Plug in the secondary submersible pump.
 - c. When pumping is complete, unplug pump and close appropriate valves.
 - d. Record volume in Cell # 3C Leachate book and on the daily reading sheet.
 - In the event a volume over 790 L per hectare per day accumulates in the secondary system, Management must be notified immediately. For Cell 3C this volume is 2011 L per day.
- Cell 3C Tank
 - When the tank requires emptying, a tanker or vacuum truck will be used to transport the leachate liquids. Refer to procedures for operation of these particular units.
 - Landfill personnel must ensure that the tank is emptied before low temperatures in the fall cause the leachate to freeze or that an insulated and/or heated tank is in place.

5.2.9 Cell 3D

- Primary Leachate Collection
 - Readings should be taken in the mornings of each working day.

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- The primary leachate is collected by plugging in the submersible pump in the primary pipe in Cell #3D building. Ensure that the hose is connected to the Cell #3D tank or the tanker truck for proper disposal of liquids. Ensure that the proper valves are opened to prevent damage or an incident.
- In sub-zero weather the primary leachate lines must be drained before the end of the day to prevent damage from freezing.
 - Record the barometric pressure correction by connecting the barologger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
- Record the Primary Leachate level by connecting the Levelogger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
- Calculate the Leachate level by subtracting the Barologger reading from the Levelogger reading. Report **any reading greater than 30 cm** to the Operations and/or Facility Manager.
- Estimated volume of leachate pumped will be calculated by multiplying the hourly flow rate of the pump by the number of hours the pump operated. This calculation shall be entered into the Log Book. If a flowmeter is installed, enter the flowmeter reading.
- Secondary Leachate Collection
 - Daily Reading
 - Try to be taken in the mornings of each working day the secondary system shall be measured.
 - a. Ensure the proper valves are open to pump the secondary liquid to the measurement container.
 - b. Plug in the secondary submersible pump.
 - c. When pumping is complete, unplug pump and close appropriate valves.
 - d. Record volume in Cell # 3D Leachate book and on the daily reading sheet.
 - In the event a volume over 790 L per hectare per day accumulates in the secondary system, Management must be notified immediately. For Cell 3D this volume is 2002 L per day.
- Cell 3D Tank
 - When the tank requires emptying, a tanker or vacuum truck will be used to transport the leachate liquids. Refer to procedures for operation of these particular units.
 - Landfill personnel must ensure that the tank is emptied before low temperatures in the fall cause the leachate to freeze or that an insulated and/or heated tank is in place.

5.2.10 Cell 3E

- Primary Leachate Collection
 - Readings should be taken in the mornings of each working day.
 - The primary leachate is collected by plugging in the submersible pump in the primary pipe in Cell #3E building. Ensure that the hose is connected to the Cell #3E tank or the tanker truck for proper disposal of liquids. Ensure that the proper valves are opened to prevent damage or an incident.
 - In sub-zero weather the primary leachate lines must be drained before the end of the day to prevent damage from freezing.
 - Record the barometric pressure correction by connecting the barologger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
 - Record the Primary Leachate level by connecting the Levelogger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.

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- Calculate the Leachate level by subtracting the Barologger reading from the Levelogger reading. Report **any reading greater than 30 cm** to the Operations and/or Facility Manager.
- Estimated volume of leachate pumped will be calculated by multiplying the hourly flow rate of the pump by the number of hours the pump operated. This calculation shall be entered into the Log Book. If a flowmeter is installed, enter the flowmeter reading.
- Secondary Leachate Collection
 - Daily Reading
 - Try to be taken in the mornings of each working day the secondary system shall be measured.
 - a. Ensure the proper valves are open to pump the secondary liquid to the measurement container
 - b. Plug in the secondary submersible pump.
 - c. When pumping is complete, unplug pump and close appropriate valves.
 - d. Record volume in Cell # 3E Leachate book and on the daily reading sheet.
 - In the event a volume over 790 L per hectare per day accumulates in the secondary system, Management must be notified immediately. For Cell 3E this volume is 2433 L per day.
- Cell 3E Tank
 - When the tank requires emptying, a tanker or vacuum truck will be used to transport the leachate liquids. Refer to procedures for operation of these particular units.
 - Landfill personnel must ensure that the tank is emptied before low temperatures in the fall cause the leachate to freeze or that an insulated and/or heated tank is in place.

5.2.11 Cell 4

- Primary Leachate Collection
 - Readings should be taken in the mornings of each working day.
 - The primary leachate is collected by plugging in the submersible pump in the primary pipe in Cell 4 building. Ensure that the hose is connected to the Cell 4 tank or the tanker truck for proper disposal of liquids. Ensure that the proper valves are opened to prevent damage or an incident.
 - In sub-zero weather the primary leachate lines must be drained before the end of the day to prevent damage from freezing.
 - Record the barometric pressure correction by connecting the barologger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
 - Record the Primary Leachate level by connecting the Levelogger to the Leveloader or Tablet PC using the appropriate cable. Write the reading in the Log Book.
 - Calculate the Leachate level by subtracting the Barologger reading from the Levelogger reading. Report **any reading greater than 30 cm** to the Operations and/or Facility Manager.
 - Estimated volume of leachate pumped will be calculated by multiplying the hourly flow rate of the pump by the number of hours the pump operated. This calculation shall be entered into the Log Book. If a flowmeter is installed, enter the flowmeter reading.
- Secondary Leachate Collection
 - Daily Reading
 - Try to be taken in the mornings of each working day the secondary system shall be measured.
 - a. Ensure the proper valves are open to pump the secondary liquid to the measurement container
 - b. Plug in the secondary submersible pump.

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- c. When pumping is complete, unplug pump and close appropriate valves.
 - d. Record volume in Cell 4 Leachate book and on the daily reading sheet.
 - o In the event a volume over 790 L per hectare per day accumulates in the secondary system, Management must be notified immediately. For Cell 4 this volume is 1920 L per day.
- Cell 4 Tank
 - o When the tank requires emptying, a tanker or vacuum truck will be used to transport the leachate liquids. Refer to procedures for operation of these particular units.
 - o Landfill personnel must ensure that the tank is emptied before low temperatures in the fall cause the leachate to freeze or that an insulated and/or heated tank is in place.

5.2.12 Reporting

- Primary Leachate Exceedances

Section 4.4.3 of the facility Operating Approval 10348-03-00 states that “Notwithstanding 4.4.4, the leachate head shall only exceed the maximum acceptable leachate head for a maximum duration of 14 days subsequent to a precipitation event, unless otherwise authorized in writing by the Director.”

Therefore, if at any time the leachate head level exceeds the 1.0 meter or 0.3 meter level for each applicable cell, for more than 14 days following a precipitation event, the Facility Manager or Operations Manager will report the contravention to the Alberta Environmental Response Centre via telephone (780-422-4505). A file or reference number will be received from the operator taking the report.

A letter referring to the file or reference number describing the contravention, any environmental impacts and any measures taken to correct or remedy the situation must be submitted to the Environmental Response Centre within seven (7) days. This letter may be faxed to 780-427-3178.

- Leak Detection System Liquid Exceedances

Section 4.4.5 of the facility Operating Approval states that “The volume of liquid in the leak detection system, as monitored in TABLE 4.6-B, shall not exceed the action leakage rate of 790 litres/ha/day in any cell.”

Therefore, if at any time the volume of liquid in the leak detection system exceeds 790 liters/ha/day, the Facility Manager or Operations Manager will report the contravention to the Alberta Environmental Response Centre via telephone (780-422-4505). A file or reference number will be received from the operator taking the report.

A letter referring to the file or reference number describing the contravention, any environmental impacts and any measures taken to correct or remedy the situation must be submitted to the Environmental Response Centre within seven (7) days. This letter may be faxed to 780-427-3178.

5.2.13 Proposed Engineered Solution – Awaiting Management of Change Approval by Engineering Department

- The ends of the primary leachate pipes have round barriers installed that seal the ends of the pipes to prevent vapors from entering the buildings. The pipes are vented before the barrier seal which allows vapors to escape

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the pipe. However it is possible that leachate water may contain amounts of H₂S and/or flammable organic vapors. Precautions must be taken to ensure employee safety when performing any tasks related to leachate water. These barriers are removable to allow leachate pump replacement.

- Personal gas detection monitors for H₂S along with an LEL monitor at a minimum, will be worn by any individual that performs these tasks. The tasks include but are not limited to:
 - Pumping of leachate systems in any cell and/or collection of samples
 - Leachate level head readings
 - Loading tankers
 - Pump replacement
 - Sealed barriers must be removed prior to replacing leachate pumps. Leave the door open while removing the barrier. After barrier has been removed vacate the building to allow enough time for any gases to dissipate. Check the atmosphere with a gas meter before entering to replace the pump.

6.0 Consequences of Deviations

In addition to the process interruptions which can occur, the following additional consequences of deviations could result:

- Injuries and/or fatalities
- Property damage
- Regulatory violations and/or fines
- Damaged public relations and/or customer relations
- Disciplinary actions up to and including termination

Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



Groundwater Monitoring Program

Approval 10348-03-01

Sec. 4.6.34(q)

Ryley, AB



May 11, 2023

Clean Harbors Canada Inc.
Box 390
Ryley, AB T0B 4A0

ISSUED FOR USE | CONFIDENTIAL
FILE: 704-PSWM.SWOP04401-01
Via Email: Yuha.Stan@cleanharbors.com

Attention: Stan Yuha, Facility Manager

Subject: Scope of Work and Cost Estimate
2023 Groundwater Monitoring Program
Clean Harbors Class I Waste Management Facility
Ryley, Alberta

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1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) is pleased to submit this updated scope of work and cost estimate to Clean Harbors Canada Inc. (Clean Harbors) to conduct the 2023 Groundwater Monitoring Program (GMP) at the Class I Waste Management Facility (the Facility) near Ryley, Alberta.

This scope of work has been developed to address the groundwater monitoring requirements as outlined in the Facility's Approval No. 10348-03-01 (Approval), issued by Alberta Environment and Parks (AEP), effective from June 21, 2022 and will expire on March 31, 2027. This scope of work is also based on the "Revised Groundwater Monitoring Program"¹ proposal that Tetra Tech submitted to AEP on behalf of Clean Harbors in December 2022 to address expanded landfill area to the north of the existing facility.

This document has been updated to reflect agreed upon changes to the cost, and additional scope items as required by recommendations provided in the 2022 groundwater monitoring report.

The following Section 2.0 and Section 3.0 provide details of the proposed scope of work, cost estimate, and schedule to complete this project. The 2023 project will be the final year of a three-year program, ending April 1, 2024, and costs provided for 2023 only, as 2021 and 2022 programs are now complete and submitted.

¹ Tetra Tech, 2017. Revised Groundwater Monitoring Program: Class I Waste Management Facility, Ryley, Alberta. September 25, 2017.

2.0 SCOPE OF WORK

2.1 Groundwater Monitoring and Sampling Program

Tetra Tech will monitor and sample the active groundwater monitoring wells at the Facility in June 2023. Fieldwork will be conducted in accordance with the monitoring data and laboratory testing requirements described in the amended Approval. The active monitoring wells to be monitored and sampled will include:

MW-1B	MW-12B*	MW-21A	MW-25B	MW-29A	MW-32B	MW-36-Deep
MW-1C	MW-18A	MW-21B	MW-26A	MW-29B	MW-33A	MW-36A
MW-8A	MW-18B	MW-22A	MW-26B	MW-30A	MW-33B	MW-37A*
MW-8B	MW-19A	MW-22B	MW-27A	MW-30B	MW-35-Deep	MW-37B*
MW-10	MW-19B	MW-23A	MW-27B	MW-31A	MW-35A	MW-38A*
MW-11	MW-20A	MW-23B	MW-28A	MW-31B	MW-35B	MW-38B*
MW-12A*	MW-20B	MW-25A	MW-28B	MW-32A	MW-35C	

*Decommissioned or to be decommissioned in 2023

Monitoring wells MW12A, MW12B, MW-37A, and MW-37B will be sampled, if possible, before they are decommissioned in 2023 due to ongoing construction activities for the Ryley Landfill Expansion.

Monitoring wells MW-38A and MW-38B were decommissioned in 2021.

Monitoring wells 23MW01, 23MW02, and 23MW04 will be installed in the spring of 2023 in conjunction with Expansion Construction, as per the amended GMP. These wells will be sampled after installation and development. Groundwater analytical results will also be included in the annual groundwater report.

As described in Section 4.9.12 of the Approval, Tetra Tech will conduct the following activities at each of the monitoring well listed above or installed in 2023:

- Prepare a site-specific Health & Safety Plan for the field program;
- Measure the static groundwater levels of fluid phases in the groundwater monitoring well prior to purging;
- Purge each well for three volumes of standing water or until the well is practically dry;
- Sample each well and preserve all samples with laboratory provided preservatives;
- Measure field parameters including temperature, pH, and electrical conductivity (EC) for each well at the time of sampling;
- Store samples in laboratory supplied containers and keep at 4°C for submission to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory under chain-of-custody (COC). Lab to be utilized is ALS Global based on a three-year quote for this project; and
- Follow quality control protocols for sampling, collecting, and analyzing field duplicate samples, trip blanks and field blanks for quality assurance/quality control (QA/QC).

The Approval requires annual groundwater sampling for the parameters listed below:

- Routine water analysis (pH, total dissolved solids [TDS], alkalinity, EC, hardness [as CaCO₃], chloride, calcium, magnesium, sodium, potassium, sulphate, nitrate-N and nitrite-N);

- Dissolved metals (aluminum, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, lead, lithium, manganese, molybdenum, mercury, nickel, phosphorus, silicon, silver, strontium, thallium, tin, vanadium, uranium and zinc);
- Nutrients (Total Kjeldahl Nitrogen [TKN] and Ammonia-N);
- Chemical Oxygen Demand (COD);
- Dissolved Organic Carbon (DOC);
- BTEX, and PHC fractions F1 and F2;
- Total phenols; and
- Volatile organic compounds (VOCs) (methylene chloride, vinyl chloride, trichloroethylene [TCE], and tetrachloroethylene [PCE]).

The quote from ALS Laboratories (ALS), including field duplicates amounting to 10% (four duplicates total, plus a trip blank and field blank sample) is included in Appendix A.

Groundwater analytical results tables will be compiled within a month following the field sampling event and provided electronically in PDF format to Clean Harbors as progress draft tables and charts to assist in early identification of any unexpected groundwater results and allowing re-testing or re-sampling (if required).

2.2 Monitoring Well MW27B Inspection

In 2022, chloride concentrations were noted to be steadily increasing at monitoring well MW27B as reported in the 2022 GMP report. In the annual compliance report, it was recommended that the integrity of the well and local operational activities be assessed during the 2023 field event. To assess the integrity of the well, Tetra Tech will meet Clean Harbors operators on site and confirm operation procedures in the vicinity of the monitoring well. Leachate Tank 3C is located near monitoring well MW27B, Tetra Tech will discuss operational procedures at the Tank 3C including filling, sampling and cleanout procedures and conduct a visual inspection of the Tank 3C with Clean Harbors. Tetra Tech will take photos of Tank 3C and record any observations that may aid in understanding increasing chloride concentrations at MW27B. Tetra Tech will also inspect monitoring well MW27B to determine if the monitoring well has become compromised or and is allowing surface water infiltration around the standpipe or casing. Results of this review will be summarized in the annual report.

3.0 COST ESTIMATE AND SCHEDULE

In addition to the quoted 2023 cost plus permitted 2.0% escalation, an additional \$2,500 has been included in this proposal for time to inspect MW27 and report the findings in the 2023 compliance report. The lump sum total budget of **\$39,290** (excluding GST) has been estimated for the above work scope for 2023. Of this total, \$12,140 (including 10% disbursement fee) relates directly to the laboratory testing cost (see attached ALS quote in Appendix A).

Tetra Tech will ensure that project staff for the proposed 2023 work will be familiar with the Ryley facility to ensure continuity of the fieldwork program. A schedule of key milestone dates to complete the 2023 groundwater program is provided in the following Table B.

An 'Issued for Review' (IFR) report, complete with all figures, text, and appendices, will also be issued electronically in PDF format for review and comments by Clean Harbors in December 2023. After receiving comments from Clean Harbors, an 'Issued for Use' (IFU) report will be completed (one electronic PDF copy and a hard copy, if

required), together with any recommended modifications to the future monitoring program. The IFU report will be submitted to Clean Harbors prior to the regulatory deadline of March 31, 2024. This scope, budget, and schedule is part of a three-year commitment, with a 2.0% increase in professional fees in each year. The disbursements and lab (ALS) costs remain fixed and based on a preferred rate for the 3-year program term.

Note: The costs for drilling and installing new monitoring wells 23MW01, 23MW02, and 23MW04 in 2023 are included in a separate landfill construction budget and are not part of this GMP budget.

Table B: Project Schedule

Task Description	Preliminary Milestone Date
Client Authorization	May 19 2023
Fieldwork: Groundwater Sampling	June 2023
Draft: Issue Tables (PDF)	July 2023
IFR Report (PDF)	December 2023
Client Comments on IFR Report	January 2024
IFU Report: Issue One Hard Copy and One PDF	February 2024
IFU Report Due to EPA (report to be sent by Clean Harbors)	March 31, 2024

Note: Schedule contingent on authorization date, as noted.

4.0 CLOSURE

With respect to contractual terms, this assignment will be undertaken subject to the attached Services Agreement and Limitations on the Use of this Document in Appendix B or other mutually agreed upon contract.

We trust this proposal meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

FILE: 704-PSWM.SWOP04401-01
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/jmt

Attachments: Table (1)
Appendix A – ALS Quote
Appendix B – Tetra Tech Services Agreement and Limitations on the Use of this Document

TABLES

Table 1 Task Summary - Total Project Cost

Table 1: Task Summary - Total Project Cost

Name Resource	Michele Crawford	Michael Delisle	Amy Homister	Admin	Drafting	Junior Staff	Carl Forkheim	EsDat	Total Hours	Total Labour	Subcontractor /Subconsultant	SSC	ODC	Total Price per Task
	S3	T3	S4	X4	S1	T1	S2	S2						
Billing Rate	\$152.85	\$115.40	\$179.90	\$90.40	\$112.30	\$90.40	\$127.90	\$127.90						
DESCRIPTION														
Task 001 - 2023 Groundwater Monitoring Program	19.00	44.00	5.00	7.48	6.00	48.00	48.00	6.00	183.48	\$21,477.39	\$0.00	\$1,288.64	\$14,021.36	\$36,787.39
Task 002 - Monitoring Well MW27 Inspection	2.00	4.00	4.00	0.00	0.00	4.00	4.00	0.00	18.00	\$2,360.10	\$0.00	\$141.61	\$0.00	\$2,501.71
Total Hours	21.00	48.00	9.00	7.48	6.00	52.00	52.00	6.00	201.48	\$23,837.49				
Price	\$3,209.85	\$5,539.20	\$1,619.10	\$676.54	\$673.80	\$4,700.80	\$6,650.80	\$767.40		\$23,837.49	\$0.00	\$1,430.25	\$14,021.36	\$39,289.10

Notes:

SSC - Support, Supplies, and Communications (6% of fees) - to cover internal photocopying, graphics, fax, postage and local courier costs
 ODC - Other Direct Costs-disbursement, laboratory costs, travel costs, material and equipment costs (third party costs are marked up by 10% if paid through Tetra Tech Canada).
 The cost estimate is based on the Tetra Tech Canada 2022 fee schedule. The fee schedule will be held for the duration of the project
 Tetra Tech Canada will only bill for work completed on a time and materials basis

SUMMARY

Total Labour	\$23,837.49
SSC (6%)	\$1,430.25
Total Sub (incl. Markup)	\$0.00
Total ODC (incl. Markup)	\$14,021.36
Total Price	\$39,289.10
Contingency (0%)	\$0.00
Grand Total	\$39,289.10

APPENDIX A

ALS QUOTE



February 02, 2021

ALS Quote: Q83988

Created: 02-Feb-2021

Michele Crawford
TETRA TECH CANADA INC..
14940 123 Ave NW
North Bldg.
Edmonton, AB T5V 1B4

Dear: Michele Crawford,

RE: Price Quotation for Groundwater wells analysis 2021

We are pleased to present our technical and price quotation to carry out the work as outlined under the above referenced project.

Our price quotation and a list of ALS Environmental's unique technical and service advantages are attached.

Thank you for requesting our quotation. We look forward to the prospect of providing you with the quality service you require. Please call us at (780) 413-5227 or 1-800-668-9878 if you require any additional information.

Sincerely,

Nicole Thibault, B.Sc. (Hons)
Account Manager

Erin Perez Nafarrate
Business Development Representative



Price Quotation for Groundwater wells analysis 2021

Please reference the above ALS quote number on the chain of custody when submitting samples for analysis under this quotation.

The following prices are in Canadian dollars, and are valid from 02-Feb-2021 to 03-Aug-2021.

Est. # of Samples	Product	Description	Price per Sample	Sub-Total Price
Water Samples				
54	BTX,F1,F2-ED	BTEX, F1 (C6-C10) & F2 (>C10-C16), no S	\$35.00	\$1,890.00
54	C-DIS-ORG-CL	Dissolved Organic Carbon	\$12.00	\$648.00
54	HG-D-CVAA-ED	Dissolved Mercury in Water by CVAAS	\$17.20	\$928.80
54	MET-D-CCMS-ED	Dissolved Metals in Water by CRC ICPMS	\$25.00	\$1,350.00
54	NH3-COL-ED	Ammonia in Water by Colour	\$10.00	\$540.00
54	PHENOLS-4AAP-ED	Phenols (4AAP)	\$13.00	\$702.00
54	ROU-ED	Routine Water Analysis	\$28.00	\$1,512.00
54	TKN-F-ED	TKN (as N) by Fluorescence	\$17.20	\$928.80
54	VOC-HS-8260-ED	EPA 8260 Volatile Organics	\$45.00	\$2,430.00
Misc. Samples				
54	SAMPLE-DISPOSAL	Sample Handling and Disposal Fee	\$2.00	\$108.00
Total Amount (excluding taxes)				\$11,037.60



Technical and Service Highlights (Canada)

The ALS Group's Environmental Division (ALS) is a full-service, testing, research, and consulting laboratory specializing in environmental chemistry. We offer several unique advantages that will benefit your project. The most notable highlights are as follows:

Previous Experience - ALS has provided analytical services and technical support to environmental consulting and engineering firms, industry, and government since 1982. These environmental projects routinely involve trace level determinations in a variety of sample matrices, and require stringent quality control and rapid sample turnaround. Repeat business by our valued clients shows that they appreciate our unique services and dedication to quality. Routine testing for all industries is supported by more specialized services, such as;

- Agricultural Testing
- Air Quality Analysis including stack testing, ambient air monitoring and siloxanes testing from landfills
- Asbestos Testing
- Drilling Waste Testing
- Drinking water microbial source tracking
- Drug Testing
- Emergency spill response
- Food Microbiology Services
- Food Safety
- Occupational Exposure Monitoring including arsenic speciation and other metals in urine
- Industrial Hygiene
- Ultra Trace Metals Analysis including speciation of Arsenic, Chromium, Mercury and Selenium
- Mould Analysis
- Mining Industry Services including acid base accounting (ABA) and kinetic cell testing
- Radiochemistry
- Research and Method Development

Laboratory Locations - ALS's Environmental Division (Canada) has 17 locations throughout BC, AB, SK, MB, ON, NWT, and YT with the additional support from over 50 ALS laboratories in 21 countries all over the globe. Please visit www.alsglobal.com for more details.

Range of Services and Resources - ALS's Canadian Environmental laboratories are well-equipped and staffed by more than 600 professionals who provide the necessary technical resources required by our clients. Many alternative analytical procedures and the instrumentation necessary are readily available in our facility. ALS can meet our promised turnaround time commitments because we have a large test capacity, each primary piece of equipment has one or more backup systems, and our chemists are cross-trained in a variety of procedures. This gives us a great deal of flexibility to direct resources where they are most needed.

For information about ALS accreditations and certifications please contact your Account Manager or visit our webpage at www.alsglobal.com (see Canada downloads).

Sampling Supplies - ALS will provide all necessary sample containers, labels (including pre-labeling of containers), chain of custody, preservation chemicals, and shipping containers. Instructions for sampling and preservation will be provided as required.

Analysis Methods - All samples will be analyzed in accordance with the needs of the requisite regulatory agency. We perform only environmental analyses so all equipment and apparatus is dedicated to low-level determinations.

Data Reliability - Environmental professionals trust ALS because of consistent performance in providing credible results



Technical and Service Highlights (Canada)

using validated methods and incorporating a comprehensive quality management program. ALS strives to be a leader among laboratories in quality. Through participation in inter laboratory and certification programs, we have demonstrated exceptional performance in testing for a wide range of parameters in various sample types. At ALS, we stand behind all data produced.

Data Management - ALS's Environmental Division in Canada has a fully integrated computer system utilized by all our locations for data management and reporting. All data is entered "only once" by the analysts into our Laboratory Information Management System (LIMS) which improves quality by eliminating future transcription errors. Data will be provided in a formal report summarizing the results, methodology, and appropriate comments.

Data can be sent in a variety of custom electronic data deliverables (EDDs) or accessed 24/7 through our secure web-based server (Webtrieve). Webtrieve will allow registered clients to automatically compare their data against most commonly used regulations in Canada and provide a quick visual presentation of any results that have exceeded regulatory limits.

Project Support and Access to Expertise - ALS is well known for an ability to complete projects on time and on budget. We provide qualified assistance with project mobilization, final review, and follow up. ALS has a philosophy of open communication that ensures direct contact with all personnel, including senior management and our Centre of Excellence. This "resource" can often be of assistance in problem solving or data interpretation.

Security and Confidentiality - All information generated by ALS, and all communication with our clients, is treated confidentially. The security and integrity of our database has always been a priority.



APPENDIX

GENERAL TERMS AND CONDITIONS:

These terms and conditions are incorporated in and form part of the Agreement between ALS Group's Environmental Division and the party named in the Offer (the "Client").

1. Definitions. Capitalized Terms not defined in these Terms and Conditions have the definitions set out in the other Agreement documents.
2. The Services. ALS will provide the Services to the Client as described in the Offer and in any chain of custody form provided with any sample. Unless otherwise agreed, ALS may elect to re-allocate testing, without prior notice, to other ALS Canada laboratories with equivalent services and applicable accreditations and licenses, if required to prevent hold time or due date exceedance due to unanticipated over-capacity situations.
3. Prices. ALS may review and change all prices, fees, surcharges or other charges set out in the Agreement if there are changes to ALS's cost beyond ALS's control, including changes in legislative requirements, Client variations of sample numbers and Client requests for changes to standard reporting requirements. Notwithstanding Condition 3, all quotations expire after three years.
4. Payment Terms. The Client shall pay ALS within 30 days of the invoice date OAC. ALS may, for reasonable business reasons, require the Client to arrange for payment in advance.
5. Quotation Numbers. The Client shall provide the quotation number to ALS (where applicable) to ensure correct pricing.
6. Taxes. Applicable taxes are not included in prices. Applicable surcharges and additional fees and will be added at the time of invoicing.
7. Quality Control. ALS has an extensive QA/QC program. Clients' samples are analyzed using approved, referenced procedures followed by thorough data validation prior to reporting the analytical results.
8. Test Results. Results are obtained from analytical measurements that are subject to inherent variability. Measurement results reflect characteristics of submitted test samples at time of analysis. The Client is responsible for informing itself on the limitation of test results and acknowledges that test results are not guaranteed. When statements of conformity are requested on test reports (e.g. within Criteria Reports), measurement uncertainty is not applied to test results prior to the evaluation.
9. Standard of Care. ALS will use reasonable care and diligence as required by the laws of the province or territory where the sample is tested.
10. Storage. Where possible, ALS will store; soil and water samples for 45 days from date of receipt, tissue/biota samples for 6 months from date of receipt, air samples or re-usable media for 14 days from date of receipt, and microbiological samples for 3 days from date of receipt.
11. Holds. If the Client requests a sample to be placed on hold, ALS will store the samples according to paragraph 10, after which ALS will invoice the Client and discard the sample. Each sample is subject to a minimum \$5.00 hold fee. Longer hold periods are available upon request. See paragraph 12.
12. Archives. If the Client requests a sample be archived, ALS will invoice in advance and store the sample for the period requested, after which ALS may discard the sample.
13. Legal Sample Handling Protocol. Legal sample handling protocol must be arranged before samples are collected. ALS charges a surcharge on the list price plus the hourly technologist or chemist rates for legal sample protocol. Additional charges will apply for samples that require storage by ALS.
14. Samples. The quality, condition, content and source of samples stored and tested are not known to ALS except as declared and described on the chain of custody form completed and submitted by the Client and accompanying the sample.
15. Risk of Loss. ALS will use reasonable care to protect samples during storage, however all samples are stored at the Client's risk and the Client is responsible for obtaining appropriate insurance, if desired. The Client acknowledges that during the performance of the Services samples may be altered, lost, damaged or destroyed and the Client releases ALS from any claim the Client may have for any loss or damage to the sample.
16. Environmental. The Client must comply with all applicable environment legislation, including labeling all hazardous samples to comply with GHS and TDG regulations, and must provide appropriate Safety Data that include the nature of the hazard and a contact name and phone number to call for information. The Client will indemnify ALS for all loss or damages, including any fine or cost of complying with an order of any government authority, resulting from the Client's breach of this paragraph.
17. Hazardous Materials Disposal. ALS may return, at the Client's cost, hazardous material to the Client for disposal.
18. Hazardous Materials Surcharge. ALS may apply an additional surcharge for handling of hazardous samples or samples with Naturally Occurring Radioactive Materials (NORM), H2S, CN, etc.
19. Sample Containers. ALS may ship sample containers to the Client's location by the most cost effective means using ALS preferred courier suppliers, within the specified project timeline.
20. Additional Charges. ALS may charge the Client (a) its cost for emergency bottle shipments and shipments to and from a remote site, and (b) where pick up and delivery services are provided, subject in each instance to a minimum charge of \$25.00.
21. Holding Times. Samples and chain of custody forms should be submitted to ALS as soon as possible after sampling, with a minimum of half the analytical hold time remaining, unless prior arrangements are made.
22. Re-Tests. ALS reserves the right to re-test any samples that remain in its possession. Re-tests requested by the Client may be subject to charges.
23. Waiver. The Client is responsible for making any assessment regarding the suitability of the Services and the intended results for the Client's purposes and waives any claims against ALS it may have as a result of the interpretation of the results. The Client shall indemnify ALS for all claims made by any third party against ALS in respect of all losses however arising from the performance of the Services or the use of any report provided in the performance of the Services.
24. Limitation of Liability. In no event shall ALS be liable for any consequential, indirect, incidental, special, exemplary, or punitive damages, whether foreseeable or unforeseeable (including claims for loss of profits or revenue or losses caused by stoppage of other work or impairment of other assets), incurred by the Client arising out of breach or failure of express or implied warranty, breach of contract, breach of warranty, misrepresentation, negligence, strict liability in tort or otherwise. In any event, the liability of ALS to the Client shall be limited to the cost of testing the sample as requested in the chain of custody form under which the sample was originally deposited. For the purposes of this paragraph and paragraphs 8, 15, 16, 23 and 25, as applicable, "ALS" includes without limitations its directors, officers, employees and affiliates and the "Client" includes without limitation any third party that may have a claim against ALS through the Client.
25. Notice of Liability. Notwithstanding paragraph 24, ALS shall not be liable to the Client unless the Client provides notice in writing to ALS of such loss or damage, together with full particulars thereof, within 30 days of the Client's receipt of the report of the analysis of the sample giving rise to such liability. The provisions of this paragraph allocate the risk under the Agreement between the Client and ALS, and the fees to be paid by the Client to ALS reflect this allocation of risks and the limitations of liability in this Agreement.
26. Third Party Service Provider Indemnity. For testing not performed at ALS, and where the Client requires ALS to forward samples to a third party service provider, the Client indemnifies ALS against any breach of this Agreement, all liabilities or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
27. Third Party Service Provider Indemnity. If ALS is required to engage a third party service provider for whatever reason, the Client indemnifies ALS against any breach of this Agreement, liabilities or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
28. Entire Agreement. The Agreement is the entire agreement between the parties and supersedes and takes precedence over any terms and conditions contained in any documentation provided by the Client. ALS's execution of any subsequent documentation from the Client only acknowledges receipt and not acceptance of any terms or conditions therein. If there is a conflict between these terms and conditions and any other Agreement document, these terms and conditions prevail.
29. Term. Providing the first batch of samples to which this tender refers is submitted within three months of the starting date of this quotation, the following prices, terms and conditions will remain firm until the closing date. This offer, and terms and conditions will automatically lapse if the offer has not been accepted, and samples not delivered to ALS by the Closing Date.
30. Termination. (a) Either party may terminate this Agreement for any reason by giving the other party thirty (30) days written notice (Notice Period). (b) If the Agreement is terminated pursuant to clause (a), then the Client must pay ALS for all Services performed up to the expiry of the Notice Period.



Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Water-Anions and Nutrients			
Alkalinity, Total (as CaCO ₃)	APHA 4500-H, 2510, 2320	2.0	mg/L
Ammonia, Total (as N)	APHA 4500 NH ₃ -NITROGEN (AMMONIA)	0.050	mg/L
Bicarbonate (HCO ₃)	APHA 4500-H, 2510, 2320	5.0	mg/L
Carbonate (CO ₃)	APHA 4500-H, 2510, 2320	5.0	mg/L
Chloride (Cl)	EPA 300.1 (mod)	0.50	mg/L
Conductivity (EC)	APHA 4500-H, 2510, 2320	2.0	uS/cm
Fluoride (F)	EPA 300.1 (mod)	0.020	mg/L
Hardness (as CaCO ₃)	APHA 1030E	1	
Hydroxide (OH)	APHA 4500-H, 2510, 2320	5.0	mg/L
Ion Balance	APHA 1030E	-100	
Nitrate and Nitrite (as N)	CALCULATION	0.0050	mg/L
Nitrate (as N)	EPA 300.1 (mod)	0.020	mg/L
Nitrite (as N)	EPA 300.1 (mod)	0.010	mg/L
pH	APHA 4500-H, 2510, 2320	0.10	pH
Sulfate (SO ₄)	EPA 300.1 (mod)	0.30	mg/L
TDS (Calculated)	APHA 1030E	1	
Total Kjeldahl Nitrogen	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC	0.20	mg/L
Water-Organic / Inorganic Carbon			
Dissolved Organic Carbon	APHA 5310 B-Instrumental	1.0	mg/L
Water-Dissolved Metals			
Calcium (Ca)-Dissolved	APHA 3030B/6020A (mod)	0.5	mg/L
Dissolved Mercury Filtration Location	APHA 3030B/EPA 1631E (mod)		
Dissolved Metals Filtration Location	APHA 3030B/6020A (mod)		
Magnesium (Mg)-Dissolved	APHA 3030B/6020A (mod)	0.1	mg/L
Mercury (Hg)-Dissolved	APHA 3030B/EPA 1631E (mod)	0.0000050	mg/L
Potassium (K)-Dissolved	APHA 3030B/6020A (mod)	0.5	mg/L
Sodium (Na)-Dissolved	APHA 3030B/6020A (mod)	1	mg/L
Water-Aggregate Organics			
Phenols (4AAP)	EPA 9066 AUTO-DISTILL-COLORIMETRIC	0.0010	mg/L
Water-Volatile Organic Compounds			
1,1,1,2-Tetrachloroethane	SW 846 8260-GC-MS	0.0010	mg/L
1,1,1-Trichloroethane	SW 846 8260-GC-MS	0.0010	mg/L
1,1,2,2-Tetrachloroethane	SW 846 8260-GC-MS	0.0020	mg/L
1,1,2-Trichloroethane	SW 846 8260-GC-MS	0.0010	mg/L
1,1-Dichloroethane	SW 846 8260-GC-MS	0.0010	mg/L
1,1-Dichloroethene	SW 846 8260-GC-MS	0.0010	mg/L
1,1-Dichloropropene	SW 846 8260-GC-MS	0.0010	mg/L



Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
1,2,3-Trichlorobenzene	SW 846 8260-GC-MS	0.0010	mg/L
1,2,3-Trichloropropane	SW 846 8260-GC-MS	0.0020	mg/L
1,2,4-Trichlorobenzene	SW 846 8260-GC-MS	0.0010	mg/L
1,2,4-Trimethylbenzene	SW 846 8260-GC-MS	0.0010	mg/L
1,2-Dibromo-3-chloropropane	SW 846 8260-GC-MS	0.0010	mg/L
1,2-Dichlorobenzene	SW 846 8260-GC-MS	0.00050	mg/L
1,2-Dichloroethane	SW 846 8260-GC-MS	0.0010	mg/L
1,2-Dichloropropane	SW 846 8260-GC-MS	0.0010	mg/L
1,3,5-Trimethylbenzene	SW 846 8260-GC-MS	0.0010	mg/L
1,3-Dichlorobenzene	SW 846 8260-GC-MS	0.0010	mg/L
1,3-Dichloropropane	SW 846 8260-GC-MS	0.0010	mg/L
1,4-Dichlorobenzene	SW 846 8260-GC-MS	0.0010	mg/L
1,4-Difluorobenzene (SS)	EPA 5021/8015&8260 GC-MS & FID	1	%
1,4-Difluorobenzene (SS)	SW 846 8260-GC-MS	1	
2,2-Dichloropropane	SW 846 8260-GC-MS	0.0010	mg/L
2-Chlorotoluene	SW 846 8260-GC-MS	0.0010	mg/L
3,4-Dichlorotoluene (SS)	EPA 5021/8015&8260 GC-MS & FID	1	%
3,4-Dichlorotoluene (SS)	SW 846 8260-GC-MS	1	
4-Bromofluorobenzene (SS)	EPA 5021/8015&8260 GC-MS & FID	1	%
4-Bromofluorobenzene (SS)	SW 846 8260-GC-MS	1	
4-Chlorotoluene	SW 846 8260-GC-MS	0.0010	mg/L
p-Isopropyltoluene	SW 846 8260-GC-MS	0.0010	mg/L
Benzene	EPA 5021/8015&8260 GC-MS & FID	0.0005	mg/L
Benzene	SW 846 8260-GC-MS	0.00050	mg/L
Bromobenzene	SW 846 8260-GC-MS	0.0010	mg/L
Bromochloromethane	SW 846 8260-GC-MS	0.0010	mg/L
Bromodichloromethane	SW 846 8260-GC-MS	0.0010	mg/L
Bromoform	SW 846 8260-GC-MS	0.0010	mg/L
Bromomethane	SW 846 8260-GC-MS	0.010	mg/L
Carbon tetrachloride	SW 846 8260-GC-MS	0.00050	mg/L
Chlorobenzene	SW 846 8260-GC-MS	0.0010	mg/L
Dibromochloromethane	SW 846 8260-GC-MS	0.0010	mg/L
Chloroethane	SW 846 8260-GC-MS	0.010	mg/L
Chloroform	SW 846 8260-GC-MS	0.0010	mg/L
Chloromethane	SW 846 8260-GC-MS	0.010	mg/L
cis-1,2-Dichloroethene	SW 846 8260-GC-MS	0.0010	mg/L
cis-1,3-Dichloropropene	SW 846 8260-GC-MS	0.0010	mg/L
Dibromomethane	SW 846 8260-GC-MS	0.0010	mg/L
Dichlorodifluoromethane	SW 846 8260-GC-MS	0.0010	mg/L



Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
EthylBenzene	EPA 5021/8015&8260 GC-MS & FID	0.0005	mg/L
Ethylbenzene	SW 846 8260-GC-MS	0.00050	mg/L
1,2-Dibromoethane	SW 846 8260-GC-MS	0.0010	mg/L
Hexachlorobutadiene	SW 846 8260-GC-MS	0.0010	mg/L
Isopropylbenzene	SW 846 8260-GC-MS	0.0010	mg/L
m+p-Xylene	EPA 5021/8015&8260 GC-MS & FID	0.0005	mg/L
m+p-Xylenes	SW 846 8260-GC-MS	0.00050	mg/L
Methylene chloride	SW 846 8260-GC-MS	0.0010	mg/L
n-Butylbenzene	SW 846 8260-GC-MS	0.0010	mg/L
n-Propylbenzene	SW 846 8260-GC-MS	0.0010	mg/L
o-Xylene	EPA 5021/8015&8260 GC-MS & FID	0.0005	mg/L
o-Xylene	SW 846 8260-GC-MS	0.00050	mg/L
sec-Butylbenzene	SW 846 8260-GC-MS	0.0010	mg/L
Styrene	SW 846 8260-GC-MS	0.00050	mg/L
tert-Butylbenzene	SW 846 8260-GC-MS	0.0010	mg/L
Tetrachloroethene	SW 846 8260-GC-MS	0.0010	mg/L
Toluene	EPA 5021/8015&8260 GC-MS & FID	0.0005	mg/L
Toluene	SW 846 8260-GC-MS	0.00050	mg/L
trans-1,2-Dichloroethene	SW 846 8260-GC-MS	0.0010	mg/L
trans-1,3-Dichloropropene	SW 846 8260-GC-MS	0.0010	mg/L
Trichloroethene	SW 846 8260-GC-MS	0.0010	mg/L
Trichlorofluoromethane	SW 846 8260-GC-MS	0.0010	mg/L
F1(C6-C10)	EPA 5021/8015&8260 GC-MS & FID	0.1	mg/L
F1-BTEX	EPA 5021/8015&8260 GC-MS & FID	0.1	mg/L
Vinyl chloride	SW 846 8260-GC-MS	0.0010	mg/L
Xylenes	EPA 5021/8015&8260 GC-MS & FID	0.0007	mg/L

Water-Hydrocarbons

2-Bromobenzotrifluoride	EPA 3510/CCME PHC CWS-GC-FID	1	
F2 (C10-C16)	EPA 3510/CCME PHC CWS-GC-FID	0.10	mg/L

Methodology

Product	Matrix	Product Description	Analytical Method Reference
BTXS,F1-ED	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. BTEX Target compound concentrations are measured using mass spectrometry detection. The instrumental portion of F1 analysis is carried out in accordance with the Canada Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method.



Methodology

Product	Matrix	Product Description	Analytical Method Reference
C-DIS-ORG-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
<p>Filtered (0.45 um) sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO₂ which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.</p>			
CL-IC-N-ED	Water	Chloride in Water by IC	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
F-IC-N-ED	Water	Fluoride in Water by IC	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
F2-ED	Water	F2 (>C10-C16)	EPA 3510/CCME PHC CWS-GC-FID
HG-D-CVAA-ED	Water	Dissolved Mercury in Water by CVAAS	APHA 3030B/EPA 1631E (mod)
<p>Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.</p>			
IONBALANCE-ED	Water	Ion Balance Calculation	APHA 1030E
MET-D-CCMS-ED	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
<p>Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.</p> <p>Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.</p>			
NH3-COL-ED	Water	Ammonia in Water by Colour	APHA 4500 NH ₃ -NITROGEN (AMMONIA)
<p>This analysis is carried out using procedures adapted from APHA Method 4500 NH₃ "NITROGEN (AMMONIA)". Ammonia is determined using the automated phenate colourimetric method.</p>			
NO ₂ +NO ₃ -CALC-ED	Water	Nitrate+Nitrite	CALCULATION
NO ₂ -IC-N-ED	Water	Nitrite in Water by IC	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
NO ₃ -IC-N-ED	Water	Nitrate in Water by IC	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
PH/EC/ALK-ED	Water	pH, Conductivity and Total Alkalinity	APHA 4500-H, 2510, 2320
<p>All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed).</p> <p>pH measurement is determined from the activity of the hydrogen ions using a hydrogen electrode and a reference electrode. Alkalinity measurement is based on the sample's capacity to neutralize acid. Auto-titration to pH 4.5 using 0.02N H₂SO₄ is performed.</p> <p>Conductivity measurement is based on the sample's capacity to convey an electric current, and is measured with a conductivity meter.</p>			



Methodology

Product	Matrix	Product Description	Analytical Method Reference
PHENOLS-4AAP-ED	Water	Phenols (4AAP)	EPA 9066 AUTO-DISTILL-COLORIMETRIC
<p>This automated method is based on the distillation of phenol and subsequent reaction of the distillate with an oxidizing agent (alkaline potassium ferricyanide), and 4-aminoantipyrine to form a red complex which is measured at 505 nm. The method will include ortho and meta-substituted phenols, and is collectively named 4AAP phenols.</p>			
SAMPLE-DISPOSAL	Misc.	Sample Handling and Disposal Fee	
SO4-IC-N-ED	Water	Sulfate in Water by IC	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
TKN-F-ED	Water	TKN (as N) by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
<p>This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.</p>			
VOC-HS-8260-ED	Water	EPA 8260 Volatile Organics	SW 846 8260-GC-MS
<p>The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.</p>			

APPENDIX B

TETRA TECH'S SERVICES AGREEMENT AND LIMITATIONS ON THE USE OF THIS DOCUMENT

Project Name:	2023 Groundwater Monitoring Program		
Project Location:	Ryley, Alberta		
Project Date:	May 11, 2023		
Client Name:	Clean Harbors Canada Inc.		
Contact Person:	Stan Yuha	Phone:	780.717.9606
Client Address:	Box 390 Ryley, AB T0B 4A0	Email:	Yuha.Stan@cleanharbors.com
Invoice To:	Clean Harbors Canada Inc.		
Purchase Order No.:	tba		
Services:	Dugouts Monitoring and Sampling Program		
Project Manager:	Brian Adeney	Direct Line:	587.460.3445
Project/Proposal No.:	SWM.SWOP	Phase No.:	001
Agreed Budget:	Fees: \$20,500.00	Other: -	Disbursements: \$15,420
	Total Budget: \$35,920.00	GST/HST: Not included	Retainer: Not required

Thank you for your instructions in connection with this Project. Tetra Tech Canada Inc. (hereinafter referred to as Tetra Tech) will proceed with the work defined upon the following terms and conditions.

ARTICLE 1 - BINDING AGREEMENT

1.1 The following conditions shall be binding upon, and shall govern the mutual rights and obligations between you (hereinafter referred to as the CLIENT) and Tetra Tech in the provision of services by Tetra Tech for this Project.

ARTICLE 2 - SCOPE OF SERVICES

2.1 The scope of services shall be as agreed in Tetra Tech's Proposal No. 704-PSWM.SWOP04402-01, or in the absence of a proposal, as requested by the CLIENT from time to time (hereinafter referred to as the Services).

ARTICLE 3 - TERMS OF PAYMENT

- 3.1 The CLIENT will pay Tetra Tech as consideration for the performance of the Services, in accordance with the above-noted proposal, or in the absence of a proposal, in accordance with Tetra Tech's Schedule of Rates in effect at the time of signing this Services Agreement.
- 3.2 Invoices will be issued monthly or as outlined in the proposal. Invoices are payable within 30 days unless otherwise agreed in writing. Interest of 1.5% per month (18% annually) shall be payable on all amounts not paid within 30 days.
- 3.3 Where a retainer amount is specified, the CLIENT shall pay the retainer to Tetra Tech prior to Tetra Tech commencing work on the Project. If the Project is to be carried out through a number of distinct sequential phases, the total retainer may be paid in prorated amounts proportionate to the estimated Tetra Tech fees for each phase and the retainer amount for each phase must be received by Tetra Tech prior to the start of that respective Project phase.
- 3.4 In the event that payment is not received by Tetra Tech within forty-five (45) days of an invoice being rendered to the CLIENT on this Project, Tetra Tech may suspend its work on the Project and apply any retainer to the unpaid invoice(s). Subject to Article 13.1, Tetra Tech shall not be required to resume work on the Project until payment is received and the retainer is fully replenished. Otherwise, the retainer shall be applied by Tetra Tech in satisfaction of the last invoice rendered by Tetra Tech to the CLIENT on this Project.

ARTICLE 4 - EXTRA SERVICES

4.1 The CLIENT shall have the right to request Tetra Tech to perform services in connection with the Project that are in addition to the Scope of Services ("Extra Services") and Tetra Tech may, subject to agreement on the payment for such Extra Services, agree to perform such Extra Services, such agreement not to be unreasonably withheld. The CLIENT shall pay Tetra Tech for the performance of the Extra Services in accordance with Tetra Tech's schedule of rates in effect at that time. All other conditions within this Services Agreement shall apply to the provision of the Extra Services.

ARTICLE 5 - LIMITATION OF LIABILITY

- 5.1 In consideration of the provision of the Services, the CLIENT agrees that any and all claims which it has or hereafter may have against Tetra Tech in any way arising out of or related to Tetra Tech's duties and responsibilities pursuant to this Services Agreement, whether such claims are in contract, negligence or other tort, shall be limited to \$102,500.
- 5.2 In no event shall Tetra Tech be liable for any loss, damages, expenses or claims ("Loss") which is occasioned by a delay beyond the control of Tetra Tech, or for any Loss which in any manner relates to a loss of earnings, profits or products, economic loss, delay, business interruption or which relates to special damages or consequential damages caused in any manner whatsoever, or any other damages which are not direct damages flowing from a breach of Tetra Tech's standard of care. Tetra Tech shall not be liable for any pre-existing environmental site conditions and any such Loss incurred by Tetra Tech shall be for the CLIENT's account.

- 5.3 Any action or claim by the CLIENT against Tetra Tech in contract, negligence or other tort in connection, or arising out of the Services provided by Tetra Tech shall be commenced within and not later than two (2) years from the date of (a) Tetra Tech's last Invoice for the Project; (b) the Suspension Date as set out in Article 12; (c) the Certificate of Completion or Substantial Performance for the Project; or (d) the termination of Tetra Tech's Services, whichever occurs first (the "Limitation Period"). The CLIENT further agrees that, following the expiration of the Limitation Period, Tetra Tech's liability for any claim brought by the CLIENT shall absolutely cease to exist and the CLIENT shall bring no legal proceedings against Tetra Tech.
- 5.4 The CLIENT expressly agrees that Tetra Tech's employees shall have no personal liability to the CLIENT in respect of this Project, whether in contract, negligence or other tort and/or any other cause of action in law. Accordingly, the CLIENT expressly agrees that it will bring no legal proceedings against any of Tetra Tech's employees or principals in their personal capacity.
- 5.5 Where Tetra Tech retains independent contractors or subconsultants required to perform the Services provided by Tetra Tech under this Services Agreement, the CLIENT expressly agrees that those independent contractors or subconsultants are retained for and on behalf of the CLIENT. Tetra Tech shall have no liability for any breach of contract, tort and/or any other cause of action in law caused or contributed to by any independent contractor or subconsultant.
- 5.6 The CLIENT recognizes that property containing contaminants and hazardous wastes creates a high risk of claims brought by third parties arising out of the presence of those materials. In consideration of these risks, and in consideration of Tetra Tech providing the Services requested, the CLIENT agrees that Tetra Tech has no liability with respect to any issues relating to contaminants or other hazardous wastes located on the subject site. *(Note: For example, these risks may include delays in site investigation(s) and/or site development until such time that the contaminants or hazardous waste issue(s) is properly identified and addressed.)*
- 5.7 In further consideration of Tetra Tech providing the Services to the CLIENT in connection with the Project in which contaminants and hazardous wastes are involved, the CLIENT agrees that in connection with incidents and claims initiated by third parties involving contaminants and hazardous wastes, the CLIENT shall indemnify, defend and hold harmless Tetra Tech of and from any and all suits, actions, legal, administrative or arbitration proceedings, claims, demands, damages, penalties, fines, losses, costs and expenses of whatsoever kind of character, arising or alleged to arise out of the Services of Tetra Tech or any claims against Tetra Tech arising or alleged to arise from the acts, omissions or work of others. Such indemnification shall apply to the fullest extent permitted by law, regardless of fault or breach of contract by Tetra Tech and shall include the fees and charges of solicitors in defending or advising Tetra Tech as to such claims. Without limiting the generality of the foregoing, such indemnity extends to claims which arise out of the actual or threatened dispersal, discharge, escape, release or saturation (whether sudden or gradual) of any contaminant or hazardous waste in or into the atmosphere, or on, onto, upon, in or into the surface or subsurface soils, water or watercourses, persons, objects or any other tangible matter.
- 5.8 With respect to monitoring wells and all other installations that may have been installed by Tetra Tech, such devices are the property of the CLIENT; the CLIENT agrees to therefore indemnify, defend and hold harmless Tetra Tech from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs and expenses of every nature and kind whatsoever, including solicitor costs, arising or alleged to arise either in whole or in part out of Services provided by Tetra Tech, whether the claim be brought against Tetra Tech for breach of contract, negligence or other tort.

ARTICLE 6 - INSURANCE

- 6.1 If the CLIENT should obtain a course of construction insurance policy in connection with any construction project for which the Services are provided, the CLIENT shall cause Tetra Tech to be a Named Insured to that policy, and shall maintain and keep in force that policy during the construction period.

ARTICLE 7 - SAFETY

- 7.1 Tetra Tech is only responsible for the activities of its employees on the job site and is not responsible for the supervision of any other persons whatsoever. The presence of Tetra Tech employees on site shall not be construed in any way to relieve the CLIENT or any other persons on site from their responsibility for job site safety.
- 7.2 The CLIENT undertakes to inform Tetra Tech of all hazardous conditions, or possible hazardous conditions, which are known to it. The CLIENT recognizes that the activities of Tetra Tech may uncover previously unknown hazardous materials or conditions and that such discovery may result in the necessity to undertake emergency procedures to protect Tetra Tech employees, other persons and the environment. Tetra Tech shall, as soon as practical, report to the CLIENT the need to undertake emergency procedures. These procedures may involve additional costs outside of any budgets previously agreed upon. The CLIENT agrees to pay Tetra Tech for any expenses incurred as a result of such discoveries and to compensate Tetra Tech through payment of additional fees and expenses for time spent by Tetra Tech to deal with the consequences of such discoveries.

ARTICLE 8 - STANDARDS OF CARE AND WARRANTY

- 8.1 In the performance of professional Services, Tetra Tech will use the degree of care and skill ordinarily exercised under similar circumstances by other members of its profession practicing in the same or similar localities, based on the current state of practice. No other warranty or guarantee expressed, implied or statutory is made or intended by this Services Agreement.
- 8.2 The CLIENT recognizes that conditions may vary from those encountered at the locations where tests, borings or samplings are made by Tetra Tech and that the data, interpretation and recommendations of Tetra Tech are based solely on the information available. There is no warranty expressed or implied by Tetra Tech, that any investigation can fully delineate all subsurface features and characteristics.
- 8.3 Tetra Tech is not responsible for the interpretation by others of the information developed under this Services Agreement.
- 8.4 The CLIENT shall be responsible for reporting the results of any investigation to the relevant regulatory agency if such reporting is required and the CLIENT acknowledges that Tetra Tech may be required by law to disclose information to regulatory agencies and hereby consents to such disclosure.

ARTICLE 9 - DISCLOSURE OF INFORMATION BY CLIENT

- 9.1 The CLIENT agrees to fully cooperate with Tetra Tech with respect to the provision of all available information pertinent to the Services being performed by Tetra Tech. The CLIENT acknowledges that in order for Tetra Tech to properly provide the service, Tetra Tech is relying upon the full disclosure and accuracy of any such information. If the CLIENT becomes aware of any information provided to Tetra Tech that is inaccurate or incomplete, the CLIENT shall forthwith notify Tetra Tech of any error in the previous information provided to Tetra Tech.
- 9.2 Reports and other Services of Tetra Tech shall be performed by Tetra Tech on the assumption that information provided by the CLIENT or by any person on behalf of or with instructions from the CLIENT is correct. Tetra Tech shall not be liable to the CLIENT for any loss, damage or extra cost arising from any inaccuracy of such information.
- 9.3 If any information furnished by the CLIENT is determined by Tetra Tech to be inaccurate or incomplete, Tetra Tech shall notify the CLIENT and Tetra Tech shall be entitled to make any necessary changes in any reports, design documents or construction documents at the expense of the CLIENT.

ARTICLE 10 - CONFIDENTIAL INFORMATION

- 10.1 Tetra Tech shall not disclose any confidential information of the CLIENT relating to the Project communicated to or acquired by Tetra Tech in the course of carrying out the Services which, if known by others, would have a material and adverse effect on the business and operations of the CLIENT. Tetra Tech shall use such confidential information only for purposes that relate to the performance of the Services and not for any other purpose without the consent of the CLIENT. Similarly, the CLIENT shall not disclose any confidential information of Tetra Tech's communicated to or acquired by the CLIENT except as may be required by others who are performing work or Services in connection with the Project and who have entered into a Confidentiality Agreement satisfactory to Tetra Tech.
- 10.2 Confidential information shall not include any information which:
- (a) was at the time of disclosure or thereafter became part of the public domain through no act or omission of Tetra Tech or the CLIENT, or
 - (b) became available to Tetra Tech or the CLIENT from a third party who did not acquire such confidential information under an obligation of confidentiality either directly or indirectly from Tetra Tech or the CLIENT, or
 - (c) was known to Tetra Tech at the time of disclosure thereof by the CLIENT and vice versa, or
 - (d) was required to be disclosed by law.
- 10.3 The provisions of this section shall be in force during the period the Services are being performed and shall remain in force for a period of five years from the date of Tetra Tech's last Invoice for the Project.

ARTICLE 11 - INTELLECTUAL PROPERTY

- 11.1 All concepts, products or processes produced by or resulting from the Services rendered by Tetra Tech in connection with the Project, or which are otherwise developed or first reduced to practice by Tetra Tech in the performance of Services, and which are patentable, capable of trademark, trade secret, industrial designs, proprietary information or know-how, or intellectual property (collectively "Intellectual Property"), shall be and remain the property of Tetra Tech, and other than as hereinafter set forth, the CLIENT shall not use, infringe upon or appropriate such Intellectual Property without the express written agreement and remuneration of Tetra Tech.
- 11.2 The CLIENT shall have a non-exclusive, worldwide royalty-free licence to use Intellectual Property for the life of the Project, and for no other purposes or project.
- 11.3 Both the CLIENT and Tetra Tech acknowledge that it may be mutually beneficial to publish and disseminate the results of the Services as contributions to the scientific and professional communities and to other stakeholders. The CLIENT and Tetra Tech shall inform each other of any intent to publish or present information about the Services at least 60 days prior to the intended date of publication or presentation. In the case of professional and scientific publications or presentations, the publication shall be by joint authorship, except where either the CLIENT or Tetra Tech does not wish to participate as author, but is willing to allow publication (or presentation). In this case, permission to publish under sole authorship shall be requested, and such permission shall not be unreasonably withheld, and the author shall acknowledge the other party. Either party shall make available to the other party, a draft paper or presentation at least ten (10) days before submission or presentation to allow for review, comments, changes, additions or deletions ("Changes"). Changes shall be incorporated wherever reasonably possible and shall be transmitted to the author at least five (5) working days prior to the intended publication or presentation date.

ARTICLE 12 - SUSPENSION

- 12.1 If the Project or any part thereof is suspended by the CLIENT for any reason, the CLIENT may suspend the performance of the Services in whole or in part on 45 days' notice to Tetra Tech (such date being the "Suspension Date"). The CLIENT shall pay Tetra Tech in accordance with the provisions for remuneration for Services performed or incurred up to and including the Suspension Date and for any additional time and expenses which are necessary or incidental to the suspension of the Services which are expended or incurred subsequent to the Suspension Date or which are requested by the CLIENT subsequent to the Suspension Date.

ARTICLE 13 - TERMINATION

- 13.1 In the event that the CLIENT shall fail to pay to Tetra Tech the amount of any invoice or retainer as specified in Article 3 of this Services Agreement, Tetra Tech shall be entitled on fifteen (15) days written notice to the CLIENT to terminate this Services Agreement.
- 13.2 Either party hereto may, at its option, terminate this Services Agreement forthwith by written notice in the event the other party is adjudged bankrupt, or a receiver is appointed on account of its insolvency or it enters into an arrangement for the benefit of its creditors.
- 13.3 Either party shall be entitled to terminate this Services Agreement on fifteen (15) days written notice to the other party in the event the other party is in substantial default of its obligations pursuant to this Services Agreement and such default has not been corrected or reasonably commenced to be corrected within fifteen (15) days following receipt of written notice of such default.

ARTICLE 14 - UNDERGROUND STRUCTURES AND UTILITIES

- 14.1 It is the responsibility of the CLIENT to provide Tetra Tech with the location of underground structures and utilities in the vicinity of any construction, exploration or investigation. Tetra Tech will assist the client in obtaining the information if requested. The CLIENT and Tetra Tech may rely upon third party sources in order to determine the existence and approximate location of any underground structures and utilities of any kind. The CLIENT acknowledges that Tetra Tech is not responsible for the accuracy or completeness of information provided by third parties, or for any damage or any consequential damage done to any such subsurface structures or utilities as a result of any inaccuracies or errors in the information provided by the CLIENT and/or third parties.

ARTICLE 15 - FORCE MAJEURE

- 15.1 If either party is impacted in whole or in part by any event of force majeure including without limitation any act of God, war, riot, labour dispute, change in law, terrorism, civil unrest, flood, strike, fire, or any cause beyond the control of such party (except for financial inability), then such party so impacted shall be relieved of its obligations herein. Any party so impacted in whole or in part by force majeure shall promptly give the other party notice of the force majeure event including reasonably full particulars in respect thereof. Any of the party so impacted shall also be entitled to an equitable adjustment of the Services Agreement, which may include an increase in price, extension of time or other equitable relief as in good faith is reasonable, appropriate and supportable.

ARTICLE 16 - REPORTS

Use of Reports

16.1 The report pertains to a specific site, a specific development and a specific scope of service. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary assessment.

The report and the recommendations contained in it are intended for the sole use of Tetra Tech's CLIENT. Tetra Tech does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Tetra Tech's CLIENT unless otherwise authorized in writing by Tetra Tech. Any unauthorized use of the report is at the sole risk of the user without recourse to Tetra Tech.

16.2 The report is subject to copyright and shall not be reproduced either wholly or in part without prior, written permission of Tetra Tech. Additional copies of the report, if required, may be obtained upon request.

Limitations of Reports

16.3 The report is based solely on conditions which exist on site at the time of Tetra Tech's investigation. The CLIENT, and any other parties using the report with the express written consent of the CLIENT and Tetra Tech, acknowledge that conditions affecting the assessment of the site can vary with time and that the conclusions and recommendations set out in the report may be time sensitive

16.4 The CLIENT, and any other party using the report with the express written consent of the CLIENT and Tetra Tech, also acknowledges that the conclusions and recommendations set out in the report are based on observations and testing on the subject site and that conditions may vary across the site which, in turn, could affect the conclusions and recommendations made.

16.5 The CLIENT acknowledges that Tetra Tech is neither qualified to, nor is it making, any recommendations with purchase, sale, investment, or development of the property, the decisions on which are the sole responsibility of the CLIENT.

Information Provided to Tetra Tech by Others

16.6 During the performance of the work and the preparation of the report, Tetra Tech may rely on information provided by persons other than the CLIENT. While Tetra Tech endeavours to verify the accuracy of such information when instructed to do so by the CLIENT, Tetra Tech accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

ARTICLE 17 - GENERAL

17.1 This Services Agreement represents the entire integrated agreement between the parties with respect to the subject matter hereof and supersedes all prior negotiations, representations, understandings or agreements, either written or oral, made or exchanged between the parties.

17.2 The CLIENT may not assign this Services Agreement except with the consent of Tetra Tech, which consent shall not be unreasonably withheld.

17.3 This Services Agreement shall be governed by and construed in accordance with the laws of the Province or Territory in which Tetra Tech's contracting offices are located without given effect to conflict of law considerations. Any action brought to enforce or interpret this Services Agreement may be brought and prosecuted only in the Courts of that province or in the appropriate Federal Court in that province. Before submitting a dispute to the Courts, the parties agree to submit such disputes to senior management to attempt to resolve the dispute.

17.4 Nothing in this Services Agreement shall create or shall be construed so as to create the relationship of principal and agent between the CLIENT and Tetra Tech, and for all purposes, Tetra Tech shall be an Independent Contractor in performing the Services.

17.5 No waiver by either party hereto of any breach of any of the covenants herein contained shall take effect or be binding upon that party unless the same be expressed in writing and any waiver so given shall extend only to the particular breach so waived and shall not limit or affect any rights with respect to any other future breach.

17.6 The invalidity of any provision or unenforceability thereof shall not affect the validity or enforceability of any other provisions hereof.

17.7 The provisions of Articles 3, 5, 9, 10, 11 13, 16 and 17 shall survive the suspension or termination of this Services Agreement.

IN WITNESS WHEREOF the parties hereto have duly executed and entered into this SERVICES AGREEMENT the day and year first above written.

The Parties, intending to be legally bound, have made, accepted and executed this SERVICES AGREEMENT as of the Date noted below:

Tetra Tech Canada Inc.

Type Client Name (above)

Print Name and Title (above)

Print Name and Title (above)

Per: _____
Tetra Tech Canada Inc. (signature above)

Per: _____
Client (signature above)

Date

Date

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner

consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.



Remediation Plan to Deal with Groundwater Quality Deterioration

Approval 10348-03-01

Sec. 4.6.34 (r)

Ryley, AB

Remediation plan to deal with groundwater deterioration

In the event that groundwater impacts due to the landfill operations are detected, Clean Harbors and its consultants will formulate a remediation plan based on the contaminant and the site conditions at that time. This program will be formulated in conjunction with discussions with AEP.



Soil Monitoring Program

Approval 10348-03-01

Sec. 4.6.34 (s)

Ryley, AB

S. Soil Monitoring Program.

As per Section 4.10.2 of the facilities Approval, a 2022 Baseline Soil Monitoring Program Proposal for the NE 9-50-17 W4M facility expansion area was submitted to the Director on October 31, 2022. Following a review by the Department's Soil Specialist, a meeting between Alberta Environment and Protected Areas staff, Clean Harbors, and Tetra Tech to review the deficiencies identified by the Director, a revised 2023 Baseline Soil Monitoring Program Proposal was submitted to the Director on March 20, 2023. The Revised Baseline Soil Monitoring Program Proposal included advancing six boreholes to a depth of 10.5 meters below grade to describe the soil conditions before commencement of operations in the NE 9-50-17 W4M facility expansion area. Authorization to implement the proposed Baseline Soil Monitoring Program was received on July 14, 2023. Soil sampling for the Baseline Soil Monitoring Program was completed on October 10, 2023 and final laboratory analytical results were received on November 9, 2023. Construction of a new landfill Cell 5 in NE 9-50-17 W4M was in progress during implementation of Baseline Soil Monitoring Program, but in accordance with Section 4.10.4 of the facilities Approval, all fieldwork was completed prior to Clean Harbors commencing operation of the new Cell 5. The Baseline Soil Monitoring Program was completed in accordance with the facility Approval No. 10348-03-01, the 2009 Soil Monitoring Directive, the 1987 Soil Quality Criteria Relative to Disturbance and Reclamation, and the 2022 Alberta Tier 1 Soil and Groundwater Remediation Guidelines. In accordance with Section 4.10.5 of the facilities Approval, the Baseline Soil Monitoring Report is due to the Director on or before May 9, 2024 (within 6 months of completing the Baseline Soil Monitoring Program).

As per Section 4.10.6 b) of the facilities Approval, a 2024 Operational Soil Monitoring Program Proposal was submitted to the Director on January 31, 2024. Clean Harbors is currently awaiting review and authorization of the 2024 Operational Soil Monitoring Program. As per Section 4.10.9 of the facilities Approval, if authorization or a deficiency letter is not received by Clean Harbors prior to May 30, 2024 (120 days after submission), Clean Harbors shall implement the proposed Operational Soil Monitoring program prior to October 27, 2024 (within 270 days of proposal submission). The proposed 2024 Operational Soil Monitoring Program includes collecting soil samples at 23 assessment points around the facility. The Operational Soil Monitoring Program will be completed in accordance with the facility Approval No. 10348-03-01, the 2009 Soil Monitoring Directive, the 1987 Soil Quality Criteria Relative to Disturbance and Reclamation, and the 2022 Alberta Tier 1 Soil and Groundwater Remediation Guidelines.

November 1, 2023

Clean Harbors Canada Inc.
P.O. Box 390
Ryley, AB T0B 4A0

ISSUED FOR USE | REVISION 01
FILE: PENW.BIOS03000-01.106
Via Email: yuha.stan@cleanharbors.com

Attention: Stan Yuha
Facility Manager

Subject: 2024 Operational Soil Monitoring Program Proposal Cost Estimate - Revision 01
Clean Harbors Ryley Industrial Waste Management Facility
EPEA Approval No. 10348-03-01
SE and NE-09-50-17 W4M
Ryley, Alberta

CONFIDENTIALITY STATEMENT

This proposal is the property of Tetra Tech Canada Inc., and it is protected by copyright for intellectual property. The content of this proposal is not intended for the use of, nor is it intended to be relied upon, by any person, firm, or corporation other than Clean Harbors Canada Inc. This document contains confidential commercial and technical information and must not be released in whole, or in part, to any third party without express written consent. Tetra Tech Canada Inc. denies any liability whatsoever to other parties who may obtain access to this proposal for damages or injury suffered by such third parties arising from the use of this document or the information contained herein. If the recipient of the Proposal chooses not to accept it, it shall be returned to Tetra Tech Canada Inc. without delay. If the recipient of the proposal is subject to an Access To Information Act, either Provincial/Territorial and/or Federal, we waive the terms in this statement that do not comply with that Act(s).

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) is pleased to submit the following cost estimate to Clean Harbors Canada Inc. (Clean Harbors) for services to prepare an Operational Soil Monitoring Program (SMP) Proposal for the Clean Harbors Ryley Industrial Waste Management Facility for submission to AEP for approval. This cost estimate has been developed in accordance with Alberta Environment and Parks (AEP) Approval No. 10348-03-01 (the Approval) with the AEP 2009 Soil Monitoring Directive¹.

Five (5) previous soil monitoring programs were conducted by Tetra Tech in 1996, 2001, 2009, 2014, and 2019. Previous soil management programs have also been completed by Tetra Tech including delineation in 2017, remediation and confirmatory sampling in 2018, delineation in 2020, and remediation and confirmatory sampling in 2021, and 2022. A Baseline Soil Monitoring Program was completed for the NE-09-50-17 W4M Landfill Expansion Area in 2023 (reporting in progress).

2.0 PROPOSED SCOPE OF WORK

The proposed scope of work to prepare the 2024 SMP Proposal for submission to AEP includes the following:

- Review historical reports and the expanded development footprint for the Ryley Facility to determine soil sample locations.
- Review the Approval document and corresponding reference documents to determine sample collection and analysis protocols.

¹ Government of Alberta. 2009. Soil Monitoring Directive. ISBN: 978-0-7785-8121-5 (On-line Edition).

- Develop a soil sampling program based on historical and Approval information suitable for submission to AEP.
- Submit the 2024 SMP Proposal to AEP for approval.
- Prepare Supplemental Information Request responses for AEP if required.
- Develop a cost estimate for implementation of the 2024 Operational SMP for approval by Clean Harbors.

3.0 SCHEDULE

A draft SMP Proposal, complete with all tables, figures, and appendices, will be issued electronically (pdf) for review and comment by Clean Harbors by January 19, 2024.

After receiving comment from Clean Harbors, a final 2024 SMP proposal will be prepared, suitable for submission to AEP, prior to January 31, 2024.

4.0 COST ESTIMATE

The estimated cost to prepare the 2024 SMP Proposal is \$ 11,865 plus GST.

- \$1,278 has been budgeted for project management and client communication.
- \$9,772 for development of the 2024 SMP Proposal and prepare a cost estimate for the 2024 SMP.
- \$815 (4 hours) to prepare responses to potential Supplemental Information Requests (SIR's) from AEP.

Tetra Tech does not anticipate extensive SIR's, but the level of effort required is unknown until such requests, if any, are received. More extensive SIR responses will be managed under a scope change if required.

The project will be billed on a time and materials basis, with a 6% supplies, support, and communication (SSC) charge on all fees and a 10% disbursement fee on all third party invoices processed and paid by Tetra Tech.

5.0 CLOSURE

We trust this proposal meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.



FILE: PENW.BIOS03000-01
FILE: PENW.BIOS03000-01
FILE: PENW.BIOS03000-01

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FILE: PENW.BIOS03000-01
FILE: PENW.BIOS03000-01
FILE: PENW.BIOS03000-01

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Environment & Water Practice
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Attachments: Tetra Tech's Limitations on the Use of This Document

APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

NATURAL SCIENCES

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL ISSUES

The ability to rely upon and generalize from environmental baseline data is dependent on data collection activities occurring within biologically relevant survey windows.

It is incumbent upon the Client and any Authorized Party, to be knowledgeable of the level of risk that has been incorporated into the project design or scope, in consideration of the level of the environmental baseline information that was reasonably acquired to facilitate completion of the scope.

1.8 NOTIFICATION OF AUTHORITIES

TETRA TECH professionals are bound by their ethical commitments to act within the bounds of all pertinent regulations. In certain instances, observations by TETRA TECH of regulatory contravention may require that regulatory agencies and other persons be informed. The client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.



Soil Management Program

Approval 10348-03-01

Sec. 4.6.34 (t)

Ryley, AB

T. Soil Management Program

No Soil Management activities were completed on the facility in 2023. As per Section 4.10.16 of the facilities Approval, a Soil Management Program 2022 Soil Remediation Report describing soil remediation and confirmatory sampling activities completed in 2022 was submitted to the Director on March 28, 2023. The 2022 Soil Management Program activities included the excavation and landfilling of surface clay and gravels with PAH and/or metals guideline exceedances north of Cell 4 around boreholes 19-6 and 19-8 in accordance with Approval No. 10348-03-01, the Tetra Tech 2019 Soil Management Program Proposal and 2020 Deficiency Response Letter, the 2021 Soil Management Plan Update (included in the 2021 Soil Remediation Report), the 2009 AEP Soil Monitoring Directive, the 1987 Soil Quality Criteria Relative to Disturbance and Reclamation, and the 2022 Alberta Tier 1 Soil and Groundwater Remediation Guidelines. In 2022, a total of 47 final confirmatory sample locations were sampled north of Cell 4 around boreholes 19-6 and 19-8. Analytical results for all final confirmatory sampling locations were less than the Alberta Tier 1 Guidelines. A total of approximately 530 m³ of PAH and metals impacted material from north of Cell 4 around boreholes 19-6 and 19-8 was excavated and landfilled at the Clean Harbors Ryley facility and the remediation area was backfilled and regraded as part of ongoing construction activities with material from the borrow area characterized during the 2021 remediation program.



Landfill Cover Program

Approval 10348-03-01

Sec. 4.6.34(u)

**Ryley
Alberta**

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1. Objective

This SOP is to provide guidance and the information required for waste acceptance, handling, and disposal of waste as to remain compliant with its current approval.

2. Site Specific Terms

None

3. Responsibilities

3.1. *General Manager*

- The General Manager will ensure that all employees are trained and knowledgeable regarding these controls.

3.2. *Supervisors*

- *The Operations Manager and/or Lead Foreman for this process is responsible for training, monitoring, and enforcing this procedure with the employees, and for ensuring all equipment and required PPE are available to the employees.*

3.3. *Employees*

- Employees are responsible for adhering to safe work practices and all provisions found in this procedure.
- Employees must inspect equipment and report any failures or deficiencies to the appropriate Supervisor.

4. Prerequisites

4.1. *Health and Safety*

- Any incidents, including near misses, are to be reported immediately to the supervisor.
- A Job Hazard Analysis will be made available if required (Appendix 1)
- Consult the PPE Hazard Assessments (Appendix 2) to be worn when required.

4.2. *Environmental*

- Ensure all applicable monitoring equipment is available.
- If an incident occurs, report it immediately to your supervisor.
- Incidental releases are to be cleaned up immediately in the process designated PPE.
- If the incident requires additional assistance or equipment, the Contingency Plan may need to be implemented.

4.3. *Documented Training*

- SOP training

5.0 *Procedure*

Clean Harbors has developed the following procedure for covering inactive areas of the landfill.

Landfill Cell Cover System at Ryley Facility

The Ryley landfill accepts mainly industrial waste, as such much of the waste received is soil, filter cakes and other materials that do not attract nuisance vectors such as birds and rodents. This material is typically not as susceptible to dispersion by the wind and therefore, does not require the same type of cover frequency that may be necessary in a municipal solid waste landfill.

Cover should be immediately applied to dispersible wastes, odorous waste, as well as materials that require special handling.

Areas of the landfill that will remain inactive for extended periods of time should be covered with 10 to 15 centimeters of clean material such as non-regulated soil, sand, or clay.

Waste Disposal and Tracking

1.0 Scope and Application

This procedure is intended to guide personnel on how to apply adequate cover to inactive portions of the landfill. Wastes that may be dispersible in the wind are to be covered immediately. These materials can include smaller pieces of light plastics, lead painted debris or light dusty material. For wastes that require special handling may also require immediate cover, please refer to Waste Asbestos Management SOP and/or Waste Sulphur Management SOP.

2.0 Materials and Apparatus

- Heavy equipment (ie. Bulldozer, rock truck etc.)
- Non-odorous, relatively debris free soil based material (as cover)

3.0 Procedure

- 3.1** All waste is typically received into the receiving pits on the tipping pad, with the exception of Asbestos wastes. The waste is then removed from receiving pit/sludge pit with a track-hoe and place into rock truck.
- 3.2** The dozer operator will decide which coordinate the working face will be in for that day and relay as to where the rock truck driver is to dump his load. (Reference the Placing of Waste in the Landfill 4.6.34 (f). The rock truck driver will dump the load accordingly.
- 3.3** The bulldozer will spread the cover material over the waste in need of covering. All loads placed in the landfill for the day using the landfill grid system.
 - Specialty waste will have cover pushed from an elevated height, as to not disrupt the wastes placement.
- 3.4** Ensure waste is adequately covered – 10-15 cm

Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved



**Scale House and Heavy
Operational Equipment
Monitoring & Maintenance
Program**

Approval 10348-03-01

Sec. 4.6.34 (v)

Ryley, AB

Scale and equipment maintenance and monitoring program

Scale Maintenance

The weigh scales at the Ryley facility are checked for accuracy semi-annually (spring & fall) by a third-party calibration company. Any problems with load cells and cables are repaired as they occur by their trained service personnel. The Scale is also subject to periodic inspections by Weights and Measures Canada.

The monitoring and maintenance program is electronically tracked and full-filled with the Clean Harbors WinWeb Maintenance Program. Past records of calibration and inspection records are available upon request.

Equipment Maintenance

All equipment maintenance is recorded and monitored using an electronic maintenance program. This system is linked to each facility and maintenance hub which is accessed through our WinWeb program. Landfill operators are responsible for completing and recording in a logbook daily maintenance checks and notifying the maintenance mechanic of any issues. The facility's maintenance mechanic based on the manufacturer's recommended schedules performs routine maintenance on the landfill equipment and records it in the program. Other larger repairs may be completed by or sent to our larger repair shops.



Health & Safety Program

Approval 10348-03-01

Sec. 4.6.34 (w)

Ryley, AB

Health and site safety program

Clean Harbors believes that its employees' safety and protection of the environment are the two most important priorities that the company has. The Ryley facility has always maintained a high standard of safety and environmental compliance. Its commitment to safety is exemplified by participation in Alberta Human Resources and Employment's Certificate of Recognition program and the use of an external auditor to monitor compliance with the standards. The corporate Health and Safety manager for facility visits the site regularly to conduct inspections, assist with training and the implementation of improved health and safety management practices.

Clean Harbors maintains a Health and Safety SharePoint site that contains corporate Policies and Standards, Guideline, Safe Work Practices and a Forms library that gives employees and managers access to current information. The Ryley facility follows a Health and Safety Program containing policies and procedures regarding safety. The program identifies program responsibilities, hazard identification and communication, personal protective equipment, including respiratory protection, confined space entry guidelines, drum handling guidelines, grounding and bonding guidelines for transfer of flammable liquids. It also includes the procedures for accident and incident reporting and health and safety committee operation.

The facility has an Orientation Program form that must be completed for new employees. New personnel are given basic information in their first days of employment. The orientation program ensures that personnel have read the appropriate Standard Operating Procedures (SOP) before being sent onto the site to work with an experienced employee.

The employees complete on-line monthly safety modules which include OSHA 24/40 Hour Hazardous Waste Operations program (HAZWOPER). These modules also include topics such as personal protective equipment, hazard communication and WHMIS, confined space entry and lockout/tag-out of energy sources and many more.

In addition to supplying first aid and CPR training for employees, the facility has purchased an Automatic External Defibrillator (AED) as a supplement to the training program



Wildlife Management Program

Approval 10348-03-01
Sec. 4.6.34(x)

**Ryley
Alberta**

WILDLIFE MANAGEMENT PLAN

WMP

RYLEY HAZARDOUS WASTE STORAGE FACILITY AND LANDFILL

MANAGEMENT PLAN Wildlife REVISION NO.: 01 PAGE: 1 of 15 + attachments
SUBCATEGORY: All Activities CREATION DATE: October 2023 APPROVED DATE: December 2023
EXPIRY DATE: November 2024

Rev	Revision History (Section and Reason for Change)	Approval Date	Expiry Date
00	Initial Release	October 2022	October 2023
01	Annual review, address auditor's comments	December 2023	December 2024

1.0 PURPOSE

The Wildlife Management Plan (WMP) is a condition of the approval amendment (Approval No. 10348-03-01) under the Alberta *Environmental Protection and Enhancement Act* (EPEA) for the construction, operation, and reclamation of a Class I and Class II Industrial Landfill and a Hazardous Waste/Recyclable Storage and Processing Facility (the Ryley Landfill) issued to Clean Harbors Canada Inc. (Clean Harbors) on June 21, 2022. The WMP is intended to provide Clean Harbors employees, contractors, and visitors with Standard Operating Procedures (SOPs) to prevent, remove, and report wildlife sightings, including wildlife residences (dens, nests, roosts, hibernacula) and alert others of potentially dangerous or aggressive animals.

This WMP applies to all wildlife and/or wildlife residences seen on the landfill facility, including roads, pad sites, temporary laydowns, and/or wherever workers are present.

2.0 DEFINITIONS

Aggressive Animal: threatening animal behaviour that could result in actual or potential harm to people (e.g., animal does not flee when deterrents are used, flattened ears, bluff-charge, attack).

Deterrent: a noise, visual, or physical stimuli used towards/on an animal with the intent of repelling.

Food Conditioned: wildlife that has learned to associate people, waste storage areas, and landfill activities as potential food sources. Wildlife can become food conditioned after obtaining a food item even the once and can become an aggressive animal.

Habituated: wildlife can become habituated to people and landfill activities after repeated exposure without negative consequence. Habituated wildlife respond to people and/or activities onsite with little fear (respond weakly or not at all) and can become an aggressive animal.

Potentially Dangerous Animal: any of the big game species (black bear [*Ursus americanus*], cougar [*Puma concolor*], Canada lynx [*Lynx canadensis*], moose [*Alces alces*], elk [*Cervus canadensis*], white-tailed deer [*Odocoileus virginianus*], and mule deer [*Odocoileus hemionus*]), as well as coyote [*Canis latrans*]) have the potential to become dangerous to people.

Property Damage: any incident in which the property of the Ryley Landfill, its employees, contractors, and/or visitors is damaged by an animal and requires repair or replacement.

Qualified Environmental Professional: a Qualified Environmental Professional (QEP) is an experienced wildlife biologist who is appropriately trained in the identification of wildlife species, the federal and provincial regulatory requirements, and has experience with the management and mitigation of human-wildlife interactions. The QEP must be a registered biologist (e.g., Professional biologist with the Alberta Institute of Biologists) in good standing. The QEP may be a Clean Harbors employee or contractor provided they meet the training and qualifications as a wildlife biologist.

Wildlife Attractant: a substance or item that could be reasonably expected to attract an animal, including, but not limited to food and petroleum products. Natural food sources, such as a carcass and other putrescent waste are also attractants.

Wildlife Incident: all wildlife incidents are reported to the Facility General Manager with potential escalation of reporting. A reportable wildlife incident includes:

- Wildlife mortality and/or injury due to, or suspected from landfill activities;
- Accidental destruction of a wildlife residence (den, nest);
- Human-wildlife interactions that present a risk to either people or animals, including incidents of an aggressive animal and wildlife-caused property damage;
- Any big game species has, or potentially has, gained access to a man-made attractant; and
- Anytime that deterrent action is taken.

Wildlife Residence: nests, dens, burrows, roosts, hibernacula.

3.0 BACKGROUND

The Ryley Landfill is located approximately two kilometres (km) north of the Town of Ryley, Alberta. The landscape surrounding the facility is prairie parkland, including a mix of agricultural lands, another waste management facility, and pockets of aspen forests and wetlands. This location appears to be outside of the black bear distribution range in the province according to Alberta Environment and Protected Areas (EPA)¹, however, Ryley is within the black bear range identified in Mammals of Alberta², and the nearby Beaver Hills area has recent confirmed sightings of black bear in the area. Therefore, it is considered likely that black bears may be in the area and should be considered in wildlife management planning. There are several additional big game species with potential to occur in the area, including cougar, moose, elk, white-tailed deer, and mule deer. Smaller mammals with potential to occur in the area which may require management/mitigation include striped skunk (*Mephitis mephitis*), common raccoon (*Procyon lotor*, as their range expands into central Alberta), rabbits and hares, and American badger (*Taxidea taxus*). Other wildlife which may be found within the Ryley Landfill includes birds, amphibians, and reptiles, some of which may be protected under federal and provincial legislation, including the Alberta *Wildlife Act*, federal *Migratory Birds Convention Act*, and/or the federal *Species at Risk Act* (SARA).

Key prohibitions under relevant wildlife legislation include:

- Section 12(1h) of the Migratory Birds Convention Act “prohibits the killing, capturing, injuring, taking, or disturbing of migratory birds or the damaging, destroying, removing, or disturbing of nests”;
- The SARA also provides legal protection for migratory bird species listed on Schedule 1 of the SARA as ‘Extirpated’, ‘Endangered’, and ‘Threatened’. Although the SARA generally applies only to federal lands, Section 34[1] states that migratory birds are protected even on private and provincial lands. There are additional provisions that allow the federal government to apply SARA regulations for other Schedule 1 species (e.g., mammals) on private or provincial lands should circumstances dictate a need (Section 34[2]); and
- The Alberta *Wildlife Act* Section 36(1) states that “A person shall not willfully molest, disturb or destroy a house, nest, or den of prescribed wildlife”³.

According to Environment and Climate Change Canada (ECCC), the general nesting period for migratory birds near the Ryley, AB area is from April 14 to August 28⁴; however, that date range does not factor in the nesting period for selective raptor species that breed throughout Alberta. Many raptor species begin nesting in late winter or early spring (February and March) and therefore, a more inclusive timing window for breeding birds in central Alberta is February 15 to August 31⁵. During this period, there is increased potential for active nesting to occur within the facility, and activity within natural areas (e.g., wetlands, grasslands, trees) is at increased risk of disturbing active nest sites. Prior to work within previously

¹ Government of Alberta. 2022. Black Bear Management – Overview. Available at: <https://www.alberta.ca/black-bears-overview.aspx>. Accessed September 19, 2022.

² Pattie, D. and Fisher, C. 1999. Mammals of Alberta. Lone Pine Publishing: Edmonton, Alberta. 240 pp.

³ Province of Alberta. 2000. *Wildlife Act*. Available at: <https://kings-printer.alberta.ca/documents/Acts/w10.pdf>.

⁴ Environment and Climate Change Canada. 2023. General Nesting Periods of Migratory Birds. Available at: <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html>.

⁵ Government of Alberta. 2013. Sensitive Species Inventory Guidelines. Last Updated April 2015. Edmonton, Alberta: King’s Printer.

undisturbed or developed areas of the Ryley landfill, it is recommended that a QEP be consulted regarding the need for a Pre-disturbance Wildlife Sweep, in accordance with the Government of Alberta Protocols⁶.

There are several raptor species listed as Sensitive under the General Status of Alberta Wild Species that have the potential to occur within the greater Ryley area. Examples include golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), peregrine falcon (*Falco peregrinus*), and prairie falcon (*Falco mexicanus*)⁷.

For the purposes of this Wildlife Management Plan, wildlife species of management concern are any that meet one or more of the following criteria:

- Species assessed as 'Special Concern', 'Threatened' or 'Endangered' according to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)⁸.
- Species listed as 'Special Concern', 'Threatened' or 'Endangered' under Schedule 1 of the federal SARA⁹.
- Species listed as 'Threatened' or 'Endangered' under the Alberta *Wildlife Act*¹⁰ and species listed as 'Special Concern' by the Endangered Species Conservation Committee and its Scientific Subcommittee¹¹.
- Species listed as 'At Risk', 'May Be At Risk' or 'Sensitive' under the General Status of Alberta Wild Species¹².
- Species listed as S1, S2, or S3 using the Alberta Conservation Information Management System (ACIMS)¹³, ranked by NatureServe¹⁴.

Wildlife species of management concern with historical occurrence records within 5 km of the Ryley Landfill are barn swallow (*Hirundo rustica*), black tern (*Chlidonias niger*), eastern kingbird (*Tyrannus tyrannus*), and sora (*Porzana carolina*)⁷.

⁶ Government of Alberta. 2020. Wildlife Sweep Protocols. Sensitive Species Inventory Guidelines. Available at: <https://open.alberta.ca/dataset/d15221f2-f6d8-4671-8b49-d8fff6eab2b6/resource/6968392a-9e05-4bd8-bd76-ea107ba86c1c/download/aep-wildlife-sweep-protocols-sensitive-species-inventory-guidelines-2020.pdf>.

⁷ Alberta Environment and Protected Areas. 2023. Fish and Wildlife Internet Mapping Tool (FWIMT). Available at: <https://www.alberta.ca/access-fwmis-data> [accessed October 2023].

⁸ Government of Canada. 2023. Committee on the Status of Endangered Wildlife in Canada. Available at: <http://www.cosewic.ca/>.

⁹ Government of Canada. 2002. *Species at Risk Act*. Available at: <https://laws-lois.justice.gc.ca/eng/acts/s-15.3/>.

¹⁰ Province of Alberta. 2000. *Wildlife Act*. Available at: <https://kings-printer.alberta.ca/documents/Acts/w10.pdf>

¹¹ Government of Alberta. 2023. Species at Risk Assessed in Alberta. Available at: <https://open.alberta.ca/dataset/0b3421d5-c6c1-46f9-ae98-968065696054/resource/f797b0ab-c05c-482a-939f-81604f8b060f/download/epa-species-at-risk-assessed-alberta-2023-01.pdf>

¹² Government of Alberta. 2020. Alberta Wild Species General Status Listing – 2020. Available at: <https://extranet.gov.ab.ca/env/wild-species-status/>.

¹³ Alberta Parks. 2022. Alberta Conservation Information Management System (ACIMS). Available at: <https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/>.

¹⁴ NatureServe. 2022. NatureServe. Available at: <https://www.natureserve.org/>.

4.0 WILDLIFE MITIGATIONS AND DETERRENTS

The primary mitigation measure for preventing large-bodied wildlife from entering the Ryley Landfill Facility is a 6-foot fence (1.8 metres) with three strings of barbed wire at the top which encloses the entire facility. Access to the facility is via a gate with a similar structure to the fence. The gate is always closed, except when access is required by vehicles. Areas of grass/vegetation within and around the facility is mowed as required and the waste streams accepted within the facility typically do not attract vermin, including:

- Hazardous waste: petroleum products, solvents, paints, inorganic waste, organic chemicals, contaminated soils from spills, etc.
- Non-hazardous waste: inorganic sludges, slurries, solids, inert inorganic waste, organic chemicals, activated carbon, contaminated soil and debris, etc.

Secondary deterrent measures that can be used on an as-needed basis to deter large-bodied wildlife, if they gain access inside the perimeter fencing is vehicle herding or the use of an airhorn (refer to Section 6.2.7).

Additional passive, non-lethal, wildlife deterrent options to be used on a continual basis for small mammals and birds include visual deterrents (e.g., predator decoys and light-reflecting devices), sonic repellents (e.g., airhorns, broadcast predatory bird calls and static distress calls), and roost inhibitors (e.g., bird exclusion netting or steel spikes). Each of these non-lethal deterrent options has moderate success on its own, but when paired together, the efficacy greatly improves.

A combination of physical, visual, and sonic deterrent measures is recommended for the control of nuisance birds and the general discouragement of all bird species from breeding, nesting, scavenging, loafing, and roosting within the landfill property. BirdXCanada¹⁵ is a Canadian company specializing in the design and retail of bird deterrent products which have been referenced to demonstrate the types of deterrents discussed.

To prevent waterfowl and shorebirds from landing on and utilizing open water areas within the landfill, a combination of sonic deterrents and visual deterrents will be used. Typically, a physical barrier method, such as bird exclusion netting, would be ideal to effectively prevent birds from landing on the open water; however, the open water cells within the landfill are large in size (e.g., > 1 hectare), and therefore, installing and maintaining bird exclusion netting would be impractical. Clean Harbors will install and utilize a sonic repeller device (e.g., BroadBand Pro sonic bird repeller) and a visual deterrent device (e.g., laser light, flock reflector, GatorGuard, or similar) at each open water pond location on the property. Based on current site operations, Table 1, below, outlines the deterrents proposed for deployment in 2024, assuming there are three open waterbodies on-site; two retention ponds (west of the laydown area, south of the office) and the Cell 3 borrow pit. Locations of deterrents will be reviewed annually by the QEP for potential updates to deployment locations in the subsequent year based on wildlife observations and changes to the site's layout or operational activities.

¹⁵ BirdXCanada. 2023. Available at: <https://www.birdxcanada.com/> [accessed October 24, 2023].

Table 1: Wildlife Deterrent Deployment

Deterrent Type	Deployment Locations	Notes
Prowler Owls	3 to 5 locations on top of existing buildings and adjacent to the currently active waste cell	
Gator Guards	1 per open water body	
Sonic Repeller Broadcaster	1 per open water body	Requires available power. If not available and/or audio deterrents are not viable, use flock reflectors
Flock Reflectors	At corners of open water bodies if Broadcasters are not used	

The BroadBand Pro device by BirdXCanada is a programmable species-specific high frequency (near ultrasonic) and sonic bird repeller that works by broadcasting harassment sounds (near ultrasonic frequency noises) and distress calls (sonic frequency) of specific birds such as gulls, geese, starlings, pigeons, etc. The combination of near ultrasonic noise (inaudible to most adult humans), and sonic distress calls (audible) has been proven to be most effective at repelling birds in larger outdoor settings where physical deterrents are not practical.

Visual deterrents such (e.g., BirdXCanada’s Outdoor Laser and Flock Reflector) function well near open water to reflect or project light into the bird's eyes which dissuades them from landing in the area. A floating alligator decoy that mimics a predator (e.g., BirdXCanada GatorGuard) that many migratory birds (gulls and waterfowl) know to avoid from witnessing them within their overwintering habitat. Visual predatory bird deterrents (e.g., BirdXCanada’s Prowler Owl) can also be used to prevent nesting on buildings, fences, or other hard-surface structures. All bird deterrent devices installed would be installed and maintained according to the manufacturer’s instructions. The Facilities General Manager, or their designate, will be responsible for monthly inspection of all installed bird deterrent devices to ensure they are functioning as intended and remain in good working condition.

5.0 RESPONSIBILITIES

5.1 Facility General Manager

- Ensures this WMP is communicated to and accessible to on-site employees, contractors, and visitors.
- Provides appropriate training and incorporate the review of this Wildlife Management Plan as a part of the site’s orientation training for new employees and routine visitors.
- Ensures this plan is updated, implemented, and followed.
- Ensures that the Wildlife Observation Log (Appendix A) is accessible, being utilized by all staff, and remains stocked with blank log pages.
- Reviews the Wildlife Observation Logs on a weekly basis to identify where wildlife is repeatedly sighted and to inform adaptive management. A repeat wildlife sighting may indicate an improperly stored attractant, a possible wildlife residence, or maintenance needs on the perimeter fence.

- Follows the SOP guidance outlined within this WMP (Section 6.0) regarding when to contact a wildlife QEP for additional support, inspection, review, or adaptive management strategies.
- Conducts monthly inspections of all wildlife mitigation measures (i.e., passive wildlife deterrent devices) on site using the Wildlife Mitigation/Deterrent Inspection Log (Appendix B).

5.2 Qualified Environmental Professional

- An environmental professional with accreditation through the Alberta Society for Professional Biologists (e.g., P.Biol), or similar, and with wildlife biology experience and training. The QEP may be a Clean Harbors employee or a contractor, if qualified.
- Conducts a technical review of this WMP on an annual basis, which includes a review of that year's Wildlife Observation records (Appendix A), the Wildlife Mitigation/Deterrent Inspection Logs (Appendix B), and Wildlife Incident Reports (Appendix C).
- Is available to respond to wildlife concerns brought forward by the Facility General Manager (e.g., provide adaptive management strategies and/or specific mitigations to address site-specific and situation-specific requirements to avoid destruction of and disturbance to wildlife and or their nests, dens, roosts, and hibernacula).
- Notifies and take advice from regulatory authorities, as required, when nests, dens, and roosts, or hibernacula have the potential to be destroyed/disturbed.
- Issues temporary stop-work and setback distances, as appropriate with the Facility General Manager.
- Supports the Facility General Manager, when necessary, for actions regarding assessment of wildlife deterrents, potentially dangerous and/or aggressive animals, and follow procedures outlined in SOP #2 *Reporting and Responding to a Wildlife Sighting and Deterrent Use*.

5.3 All Employees, Contractors, and Visitors

- Understand and follow this procedure.
- Communicate the locations of wildlife to other employees, and travel with extra caution and restrict speeds in these areas.
- Report wildlife sightings and residences in the Wildlife Observation Log, as required.
- Report any deficiencies observed about wildlife mitigation measures and deterrent devices to the Facilities General Manager.
- Take reasonable precaution to avoid disturbing wildlife, if any, on site.
- Ask the Facility General Manager for clarification of the WMP, when required.

6.0 STANDARD OPERATING PROCEDURES

In support of this WMP, SOPs have been developed for the identification, reporting, response, and preventative measures to reduce/mitigate wildlife interactions within the Ryley Landfill.

6.1 SOP #1 Wildlife Preventative Measures

The purpose of this procedure is to provide Clean Harbors employees, contractors, and visitors with guidelines for reducing and managing wildlife attractants and reducing risk of wildlife habituation, injury, and mortality. This procedure provides direction to all on-site workers on how to reduce the risk of human-wildlife conflict by reducing wildlife attractants and restricting access of wildlife to the Ryley Landfill.

6.1.1 Waste Management and Material Storage

The proper storage, handling, and disposal of waste products and facility maintenance materials is essential to reduce the risk of wildlife attraction and habituation to the facility. Failure to properly contain wildlife attractants may result in food conditioning and aggressive animal behaviour. Improper storage of maintenance materials such as wood/lumber, fuel, tools, or machinery can be attractive to wildlife seeking an opportunistic place to rest/roost.

The following waste management and material storage steps will be followed by all Ryley Landfill employees:

1. Employees, contractors, and visitors will ensure that no litter, wildlife attractants, or hazardous materials are accessible to wildlife. This includes ensuring proper storage and use of any material that could be considered an attractant or hazard to wildlife.
2. Cover and store any lumber, wood, tools, small machinery, or other supplies in a dry location off of the ground, preferably indoors (e.g., maintenance/ tools shed).
3. Inspect equipment or supplies at the start of each day and those that have been stationary for more than 48 hours for signs of wildlife before moving them.
4. All personnel on site will monitor the site for litter, improperly stored attractants, and misdirected waste, and, if safe to do so, properly dispose of them.
5. All personnel on site are prohibited from feeding wildlife or leaving food out for wildlife.
6. All personnel who suspect wildlife is attracted to the worksite will report it to the Facility General Manager immediately.
7. All personnel are responsible for minimizing harm to, harassment of, or accidental death of wildlife.

6.1.2 Ryley Landfill Infrastructure

The following infrastructure and access management mitigation measures will be followed by all employees:

1. The access gate will remain closed when not in use or will have a monitor to watch for potential wildlife ingress if the gate is left open for an extended period. If the gate is found open with no monitor present it will be reported to the Facility General Manager.
2. The facility boundary fence and gate shall be routinely inspected (i.e., once a month) for signs of damage or wildlife passage. Any locations where wildlife can access the facility will be reported to the Facility General Manager and they will implement the necessary maintenance.

3. Facility infrastructure (e.g., building, light standards, etc.) shall be routinely monitored for signs of wildlife use (e.g., nests, roosts, feeding, sheltering). Any location of persistent wildlife use will be reported to the Facility General Manager. If necessary, a QEP may be required to provide support and determine mitigation measures to deter wildlife use.
4. Ensure trailers, buildings, bins, and vacant buildings are secured at the end of each day.
5. On-site personnel will inform the Facility General Manager of maintenance needs to prevent wildlife from sheltering.
6. Entry/exit points of facility infrastructures should store and maintain a working airhorn deterrent device to be used by employees upon discovery of dangerous wildlife (e.g., black bears) inside the perimeter fencing.

6.2 SOP #2 Reporting and Responding to Wildlife Sightings

This procedure is intended to provide Clean Harbors employees, contractors, and visitors with guidelines to report wildlife sightings, including wildlife residences (dens, burrows, nests, roosts, hibernacula), safely respond to a wildlife sighting, use deterrents (including herding), and report actions taken. This procedure also includes the steps for employees to take if they discover a wildlife species of management concern within the grounds.

Wildlife deterrents only work if there is an absence of food, shelter, and other rewards for animals at the facility. Refer to SOP #1 for procedures to reduce wildlife attractants. Should the situation permit, consultation with a QEP and/or EPA regarding the appropriate and effective use of deterrents prior to implementation is recommended.

6.2.1 General Wildlife Sightings

This procedure applies to all areas of the Ryley Landfill, including the roads, pad sites, temporary laydowns, and/or wherever workers are present. All wildlife sightings, including routine wildlife species (e.g., gulls, geese, magpies, etc.) must be recorded within the Wildlife Observation Log (see the Wildlife Observation Log, attached). Records of wildlife sightings and wildlife residences are used to apply and evaluate the efficacy of existing mitigations and to avoid/reduce the likelihood of adverse wildlife effects.

Routine wildlife observation and reporting procedures should be handled as follows:

1. Everyone on site is to record all wildlife and wildlife residences observed within the perimeter fence, including birds and bird nests.
2. Promptly enter the wildlife sighting into the Wildlife Observation Log (Appendix A), which is located inside the Ryley Landfill office. Ensure that each observation includes all the required information including:
 - a. Date;
 - b. Location;
 - c. Time;
 - d. Wildlife species and number;

- e. Observer's name; and
 - f. Relevant notes (e.g., the animal's behaviour, reaction to humans, state of health).
3. If a potentially dangerous or aggressive animal is observed, immediately alert others of the animal's location via radio and follow the procedures outlined in Section 6.2.3 (Aggressive Animal).
 4. If wildlife are reported on or near roads, traffic will stop for all wildlife seen crossing or attempting to cross. Headlights are to be turned off once the vehicle is stopped to allow the animal to cross, if applicable. All employees/contractors are to remain in the vehicle and shall not attempt to herd the animal off the road. Should the animal not move off the road, notify the Facility General Manager and they will respond, if required, by following the deterrent action outlined in Section 6.2.7.
 5. Copies of the logs will be retained and filed at the office. A Wildlife QEP will review the Wildlife Observation Log on an annual basis during the review of this WMP.
 6. In general, most wildlife should be left undisturbed. Many routine wildlife sightings won't require action, including when:
 - a. The animal poses no danger because the species is not a risk to people or property (e.g., snowshoe hare);
 - b. The animal (and its residence) is not in danger of harassment or harm; and
 - c. The animal has not gained access to an attractant, such as a food reward.

6.2.2 Species of Management Concern Wildlife Sightings

Several wildlife species of management concern have the potential to occur on-site (refer to Section 3.0). Upon discovery of a wildlife species of management concern, employees shall follow the below steps:

1. Record the wildlife observation within the Wildlife Observation Log and be sure to note the wildlife's behaviour (e.g., scavenging, foraging, roosting/resting, rearing young, breeding/nesting, etc.).
2. Promptly notify the Facility General Manager that the wildlife observation you recorded is a confirmed (or if unsure, a suspected) wildlife species of management concern.
3. The Facility General Manager will review the species of management concern wildlife observation entry and communicate the findings to the QEP.
4. Depending on the species and the behavioural action observed, the QEP may decide to develop a species-specific mitigation plan to safeguard the species while it remains on-site, or to deter that species from future utilization of the site, if appropriate. The QEP will liaise with EPA for advice and support, as needed.

6.2.3 Aggressive Animal Sightings

Any employee, contractor, or visitor who observes or encounters an aggressive animal are to follow these steps:

1. Take refuge. Get to and remain in a safe shelter or vehicle until either you (the observer) or another on-site personnel (e.g., the Facility General Manager or QEP) is able to confirm that the dangerous wildlife has left the site.
2. Immediately alert others of the animal's location via radio.
3. Radio or phone the Facility General Manager and provide the following information: the species, the animal's location, staff locations (including those nearby), and perceived risk to people.
4. The Facility General Manager and/or designated person(s) will respond immediately to secure the site and people's safety.
5. If the situation permits, the Facility General Manager may consult with the QEP for advice and additional support to safely deter the animal away from the facility and people (refer to Section 6.2.7 Responding with Wildlife Deterrents).
6. In the unlikely event that no deterrents are proving successful, and the aggressive animal remains in the area, the Facility General Manager or the QEP will contact EPA for advice and/or additional support.
7. The Facility General Manager, with support from the QEP, will follow the procedures in Section 6.2.8 including filling out a Wildlife Incident Report and reporting the aggressive animal incident to EPA within 24 hours.

6.2.4 Nest, Den, Roost, or Hibernaculum

Birds, bats, and other wildlife may nest, roost, den, or take refuge in man-made buildings, culverts, light standards, soil piles, as well as any natural habitat in/near the facility. No employee, contractor, or visitor shall disturb, destroy, or collect a nest (or egg), den, roost, or hibernaculum.

The below steps will be followed if wildlife residence is discovered on-site:

1. Employees, contractors, and visitors will record a nest, roost, den, or hibernaculum seen or suspected in the Wildlife Observation Log and notify the Facility General Manager immediately of the observation.
2. Once notified of the presence of a wildlife residence, the Facility General Manager will confirm the observation (if required), and notify a QEP, who will determine an appropriate setback distance and the species-specific restrict activity period so that the landfill operations do not disturb the wildlife residence. No person shall destroy a nest, den, roost, or hibernacula at any time, even if unoccupied, unless the direction has been provided from a QEP.
3. The QEP is to notify and consult with EPA within 24 hours of the observation if the wildlife residence was, or has the potential to be, destroyed or disturbed by landfill activity (e.g., Project activities within the setback distances recommended by the QEP).

4. The QEP will discuss adaptive management actions with the regulatory authority on an appropriate setback distance to active worksites to minimize disturbances to a wildlife residence. In cases where the residence cannot be avoided, the QEP will discuss adaptive management actions, including any permit requirements, with the regulatory authority on how to proceed.
5. The Facility General Manager, with support from a QEP, if applicable, will record the incident in a Wildlife Incident Report and provide a copy of the report to EPA within 24 hours when a wildlife residence was disturbed because of landfill activities. The Facility General Manager will also investigate the cause of the incident and consider adaptive management action, evaluating if (and how) wildlife mitigation may have failed as outlined in Section 6.2.8. Mitigation methods will be updated to reduce the likelihood of the incident reoccurring, if applicable.

6.2.5 Animal Carcass or Injured or Sick Animal

The below procedure is to be followed in the event of an injured or sick animal discovered on-site.

1. All employees, contractors, and visitors are to immediately report a sighting of an animal carcass, injured, or sick animal to the Facility General Manager, including if the animal was accidentally harmed by the observer.
2. If the animal is behaving in ways that suggest that they may be infected with rabies (e.g., unusual aggression or boldness, excess saliva or foaming around the mouth, drooping head, and partial paralysis) get to and remain in a safe shelter or vehicle, until confirmation can be made that the area is clear.
3. If the animal was accidentally harmed by an employee, contractor, or visitor, all persons involved and/or witnesses are to remain on the scene and stay in a shelter or vehicle for safety.
4. Provide the Facility General Manager with information such as the time, events leading up to the incident, condition of the animal and its location, cause of incident (if known), and staff involved which will be reported in the Wildlife Incident Report (see Section 6.2.8).
5. Once notified, the Facility General Manager is to immediately respond to an animal carcass and/or injured or sick animal, including those that look to have been harmed by a predator. In response to the incident, the Facility General Manager will:
 - a. Assess the level of harm and safety risk to any person(s) involved in the incident and in the area. Injured animals may act aggressively. Implement a temporary shut-down of applicable work sites, if required;
 - b. If the animal remains on the scene, consider the animal's injuries, without touching the animal. If the animal has left the scene, assess the conditions through discussions with the person who reported the incident;
 - c. Consider the animal's behavior and general body condition. Animals behaving in ways that suggest that they may be infected with rabies include unusual aggression or boldness, excess saliva or foaming around the mouth, drooping head, and partial paralysis;
 - d. Look for an apparent cause of death (if applicable); and

- e. Inform a QEP of the events.
6. All Wildlife Incident Reports involving deceased wildlife must be reported to EPA within 24 hours. The Facility General Manager and the QEP are responsible for notifying EPA. EPA will advise the Facility General Manager and QEP on applicable permit requirements and instructions regarding how to safely dispose of the carcass. Do not move the carcass of an animal possibly diseased until direction is provided by EPA. Appropriate personal protective safety measures must be taken when handling all carcasses.
7. All Wildlife Incident Reports involving a sick or injured animal must also be reported to EPA within 24 hours. The Facility General Manager will notify a QEP and EPA immediately and follow EPA's directions. If the incident occurs during regular working hours, the Facility General Manager will call the Camrose/Vegreville EPA Fish and Wildlife Office. If the incident occurs after working hours and is an emergency, call the Report a Poacher Line and/or 9-1-1.
 - a. EPA Camrose/Vegreville Fish and Wildlife Office: 780.632.5410.
 - b. EPA 24-hour Emergency Line: 1.800.642.3800 (Report a Poacher Line, also used for wildlife emergencies).

6.2.6 Animal-Related Property Damage

Upon discovery of animal-related property damage, follow the below steps:

1. Determine if the suspected wildlife is still within the facility grounds. If there is a potentially dangerous animal nearby, move to a secure location and follow the steps within Section 6.2.3 (Aggressive Animal).
2. Notify the Facility General Manager of the property damage and animal, if applicable.
3. Once notified, the Facility General Manager will respond to instances of animal-related property damage.
4. If property damage is ongoing and/or a dangerous animal remains nearby, the Facility General Manager will use appropriate deterrent action to move the animal and secure the area (refer to Section 6.2.7). Should the situation permit, consultation with a QEP and/or EPA regarding the appropriate use of deterrents prior to action is recommended.
5. Once the area is secure, the Facility General Manager will conduct an inspection of the property damage, undertake the required maintenance (e.g., fix holes in/under the facility perimeter fence), and, with support from the QEP, follow the procedures in Section 6.2.8 for a wildlife incident.

6.2.7 Responding with Wildlife Deterrents

Often deterrent action is not required, and the animal moves away on their own accord once aware of human presence. All employees, contractors, and visitors may make an animal aware of their presence by talking loudly or waving their arms.

Deterrent action may be required when:

- An animal is acting aggressively and/or poses an immediate threat to people or property;

- The animal is in a potentially hazardous location and not moving off on their own accord; and
- The animal has, or has the potential to, gain access to a food reward.

Herding is used to move wildlife away slowly and safely from potentially hazardous sites, such as active construction and/or operational sites where there is risk to harming and/or alarming an animal. Herding actions will always prioritize the safety of site personnel but must be conducted in a manner that minimizes the risk of injury to both wildlife and personnel and stress to the animal. Herding should be completed using a vehicle to ensure safety to people and the animal.

The Facility General Manager will designate a responsible person to conduct the herding and notify any employees, contractors, and visitors in the area that wildlife herding is going to be undertaken and to clear the area.

Herding wildlife off-site should be conducted as follows:

1. Ensure a safe exit pathway for the animal (e.g., back through the perimeter fence or gate) prior to approaching the animal.
2. Slowly (at a walking pace) use the vehicle to approach the animal to encourage the animal to move away out of the facility. Continue the approach until the animal begins moving. If the animal stops moving again the approach can be resumed until the animal has moved back through the facility boundary fence.
3. Advancement towards the animal should be temporarily halted if the animal shows signs of alarmed response (fight or flight). The herder must be careful not to overstress the animal and must back off when the animal begins moving in the desired location. Undue harassment must be avoided. The vehicle horn can be used as an auditory deterrent only when the animal is not moving on their own accord.
4. Advancement should not exceed closer than 30 metres (m) from the animal when herding with the vehicle.
5. If the animal continues an approach towards humans, and/or will not move, the animal should be treated as though it may be aggressive (refer to Section 6.2.3).
6. Should the situation permit, consultation with a QEP and/or EPA regarding appropriate use of deterrents prior to action is recommended.
7. The location where the fence has been breached, if applicable, will be immediately repaired following confirmation that there are no other animals inside of the facility.

6.2.8 Incident Reporting

A Wildlife Incident Report (Appendix C) must be filled out by the Facility General Manager when:

1. Wildlife mortality and/or injury due to, or suspected from, the landfill or activities at the facility;
2. Accidental destruction of a wildlife residence (e.g., den, nest);

3. Human-wildlife interactions that present a risk to either people or animals, including incidents of wildlife exhibiting aggressive behaviour (e.g., animal does not flee when deterrents are used, flattened ears, charge or bluff-charge, attack) or wildlife-caused property damage;
4. Big game species has, or potentially has, gained access to a man-made attractant (food/shelter); and
5. Anytime an active deterrent action is taken (e.g., herding or airhorn blast).

In the event of a wildlife incident, the Facility General Manager, with support from a QEP, if applicable, will record the incident in a Wildlife Incident Report and will conduct an investigation to the cause of the incident. Considerations for adaptive management action and evaluating if (and how) wildlife mitigation may have failed will be completed. Mitigation methods will be updated to reduce the likelihood of the incident reoccurring, if applicable. If wildlife (or its residence) was harmed as a result of Project activities, the Facility General Manager will provide a copy of the incident report to EPA within 24 hours.

The Facility General Manager will also discuss the incident with personnel (e.g., safety memo, meeting), including what happened, how it was mitigated, and any lessons learned from the incident.

7.0 APPENDICES (SUPPORTING DOCUMENTS)

- A. Wildlife Observation Log
- B. Wildlife Mitigation/Deterrent Inspection Log
- C. Wildlife Incident Report

APPENDIX A: WILDLIFE OBSERVATION LOG

APPENDIX B: WILDLIFE MITIGATION/DETERRENT INSPECTION LOG

Wildlife Mitigation/Deterrent Inspeccion Log

Inspection Date (mmm/dd/yyyy):

Inspector's Name:

Note: Wildlife mitigation measures and deterrent devices must be inspected on a monthly basis and the inspection logs are to be retained on-site and made available upon request (e.g., yearly reviews/audits). Deficiencies must be reported to the Facilities General Manager.

Wildlife Mitigation/Deterrent Inspection Item	Yes	No	N/A	Comments/Recommendations/ Defficiencies/ Observations	Action Item for Facilities General Manager?	
					Yes	No
Are the visual deterrent devices installed correctly, and in good working condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Are the visual deterrent devices clean and free from excessive dust/dirt/debris which could decrease their effectiveness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Are the Sonic Deterrents operating effectively (broadcasting as designed), and in good physical condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Is the site's perimeter fencing intact, in good/strong condition free from holes, weak spots, extensive rust or damage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Are there working airhorn devices readily available at entry/exit points of key facility buildings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Are there wildlife routinely residing within the facility grounds that warrant an updated mitigation strategy to effectively manage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX C: WILDLIFE INCIDENT REPORT

RYLEY LANDFILL WILDLIFE INCIDENT REPORT

INCIDENT REPORT NO.:

Location of Incident (e.g., detailed worksite location):

Date of Incident:	Time of Incident:	Incident Report No.:
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Name(s) of Individual(s) Involved:

Contact Number(s):

Nature of Wildlife Incident:

- Wildlife Mortality/Injury from Project; Euthanized? Yes; No
- Wildlife Attack
- Aggressive/Threatening Wildlife Behaviour
- Deterrent Used
- Property Damaged
- Wildlife Has, or Potentially Has, Accessed an Attractant
- Wildlife Residence Damaged
- Other: _____

Species: _____

of Animals Involved: _____

Cubs/Young Present? Yes; No

Evidence of Disease, Injury, or Malnourished? Yes; No. Explain: _____

Wildlife Behaviour (select multiple, if applicable): Predatory; Defensive; Curious/Approached;

Feeding; Food Conditioned Running/Traveling; Fled the Scene; Other: _____

Details of Incident (e.g., age and sex of wildlife, distinguishing features of the animal (colour, markings), the animal's direction of travel, aggressive behaviour, weather conditions, unsecured attractants, estimate how long the animal was dead, any other animals seen in the area, description of property damage, photographs):



Community Complaint Response Plan

Approval 10348-03-01
Sec. 4.6.34(y)

Ryley Facility, Alberta

November 2023

CLEAN HARBORS RYLEY COMMUNITY COMPLAINT RESPONSE PLAN

1. Purpose

Having impacts on the local community from Ryley Facility operations can result in short and long-term problems in areas such as: regulatory compliance and community relations. Odours are an inherent part of the operations of landfills and transfer station facilities and must be properly and proactively managed. It is important to understand that it is our host community that is affected by odours and other issues from our operations. The management and control of off-site impacts is not always an easy task.

The purpose of this Community Complaint Response Plan is to establish standard procedures to be followed in actively handling and managing odour issues and complaints. The plan establishes resources and procedures for collecting data pertinent to complaints and defines methods for responding to complaints. The plan is divided into four main sections. Section 2 deals with the complaint processing and procedure of receiving the complaint and handling the complainant. Section 3 describes the gathering of the environmental data. Section 4 outlines procedures implementation of any corrective actions. Section 5 includes notifications, record keeping and reporting procedures for documentation regarding odour management and complaints.

2. Complaint Processing

When a complaint is received, it should be routed to the Facility General Manager or designee. These people are the only site personnel authorized to receive the complaint except in the event both are absent and unable to be reached.

The Facility General Manager or designee should then discuss the complaint issue with the complainant. The site-specific list of discussion points referenced should be used as a guide during this conversation.

a. Odour Complaints

- At the time the complaint is received, the Facility General Manager or designee should complete the Complaint Call Log Form found in Appendix A, paying special attention to recording the specific time and location of the detected odours. When answering a complaint call:
 - Get caller's name address and telephone number.
 - Do not argue with the complainant.
 - Be sympathetic to the person's situation; tell them you are sorry for their inconvenience.
 - Let them air all their frustrations.
 - Ask questions pertaining to the odour complaint form such as:
 - What type of odour do you smell?
 - How strong is the odour?
 - When did you first begin smelling the odour?
 - Has the same odour been noticed before?
 - What direction is the odour coming from?
 - Was/Is the weather unusual in any way when you smelled the odour?
 - Ask if the neighbour wishes a follow-up check/communication with the Facility General Manager or designee.

- Tell the complainant what your course of action is to help with the problem.
- Tell the complainant that you will follow-up to make sure the problem has been resolved.
- The Site Manager or designee should:
 - Visit the location of the complaint to confirm odour. The visit should occur shortly after the complaint is received.
 - Speak to the supervisors if necessary (if source may be from their area).
 - Check weather station data for the specific time and date of the odour complaint. Record the relevant data on Complaint Call Log Form.
- Make follow-up call(s) to the complainant as required. The follow-up call should include, at a minimum:
 - The manager's findings concerning the complaint.
 - The source of the odours, if determined.
 - The duration of the odour, if known.
 - Any corrective measures if odours are from the facility.
- File the Odour Complaint Call Log Form in an accessible electronic file folder.

b. Other Complaints

Other complaints will be received and handled similar to an odour complaint but more specific to the style of complaint received.

3. Weather Data Collection

The facility has installed an on-site meteorological station to record meteorological data. The meteorological station records data at minimum 1-minute intervals which is documented using electronic downloads. The site has devices capable of measuring the following meteorological parameters:

- Wind Direction and Speed
- Rainfall/Precipitation Amounts
- Temperature

4. Corrective Actions

To prevent further complaints, the facility should:

- Compare present odour complaint received to past odour complaints. Determine any correlation between the complaints. For example, do the complaints come at a specific time of day or when a specific operation is taking place on the site?
- Review list of common on-site sources for the cause of the odour complaint.
- Identify corrective measures for all potential odour sources. Some examples are:
 - Revamp housekeeping and operational controls of landfill waste.
 - For one-time events that involve disposing of odorous waste, dispose of in a dedicated trench or pit, cover frequently, and utilize an odour control agent misted around the perimeter of the disposal area.
 - Add liquid odour control chemicals directly to leachate or sludge tanker truck.
 - Apply daily cover.
 - Evaluate potential pre-treatment of odorous waste streams with customer.
- Implement and document corrective measures.

When the Manager or designee returns to the site:

- Speak to the supervisors if necessary (if source may be from their area).
- Document all findings as well as a record of your communication with the neighbour.
- Complete the Complaint Call Log Form and internal incident report.
- Complete an Incident Report in the Clean Harbors WINWEB system.
- Report back to the neighbours if so requested.

Complaints are recorded upon receipt using the Odour Complaint Call Log Form. On-site wind speed and direction are recorded prior to initiating an off-site investigation of the complaint.

- The complaint is investigated by the Manager, or designated company representative, as soon as possible after receipt.
- The Manager is responsible for notifying the 24-hour Environmental Hotline of the Alberta Environment and Parks (AEP) within two hours of the complaint.
- The Manager is responsible for completing a Notification Report email to Facility management, CAO of Village of Ryley, CAO of Beaver County and AEP.
- The Manager is responsible for completing an Incident Report on the company's WINWEB system.
- The purpose of the investigation by the Manager is to substantiate the complaint in order for Clean Harbors to identify the specific source/cause and take the appropriate steps to rectify the situation.
- The complaint, including details of location, time of day, nature of the complaint, weather conditions (including on-site wind speed and direction, cloud conditions, local precipitation and temperature) and any on-site operating circumstances are documented on the Complaint Report form.
- Subject to the investigation of the complaint and any potential on-site operating conditions associated with the complaint, corrective actions are taken by the Manager, as appropriate.
- Results of the investigation, corrective actions taken, or reasons for no action are documented by completing the Complaint Call Log Form and the internal incident report kept on file by Clean Harbors.
- A direct response from Clean Harbors regarding the complaint investigation, findings and corrective actions is provided to the complainant within 24 hours, if requested.

5. Notification

A summary of the complaint investigation, findings and corrective actions is to be provided to the CAO of Village of Ryley and the CAO of Beaver County within 24 hours, or one business day. Follow up information will be provided as appropriate depending on the nature and duration of the situation leading to the complaint.

A summary of all complaints received at the facility is provided to the CAO of Village of Ryley, CAO of Beaver County and AEP. This includes corrective actions taken to address the specific complaint.

A summary of all complaints received at the facility is included in the Annual Landfill Report which will be submitted to the AEP by March 31st each year. Copies of the report are also provided to CAO of Village of Ryley, CAO of Beaver County and posted on the Clean Harbors website.

Appendix A: Odour Complaint Call Log Form

Caller Information <i>(Recommended)</i>				
Caller name <i>(optional)</i>		Phone number <i>(optional)</i>		
Call Date		Call Time		
Issue details <i>(Recommended)</i>				
Location where air quality or odour issue was experienced				
Alleged source of air quality or odour issue				
When was the air quality or odour issue first noticed? How long did it last?				
<input type="checkbox"/> One time	Start time:		End time:	
<input type="checkbox"/> Continuous since	Date:		Time:	
<input type="checkbox"/> Daily	Time of day		Frequency	
Intensity <i>(Optional; used primarily for odours)</i>				
<input type="checkbox"/> Faint: odour barely detectable (e.g. have to be standing still, facing into the wind to detect odour)				
<input type="checkbox"/> Moderate: odour is easily detected but not overpowering (e.g. can detect odour while walking and breathing normally)				
<input type="checkbox"/> Strong: odour is penetrating (e.g. can be detected easily, detected at all times and is hard to escape)				
Description <i>(Optional; used primarily for odours, checking off as applies)</i>				
Chemical	Earthy		Offensive	
<input type="checkbox"/> Acidic	<input type="checkbox"/> Grass		<input type="checkbox"/> Garbage	
<input type="checkbox"/> Bleach	<input type="checkbox"/> Hay		<input type="checkbox"/> Garlic/Onion	
<input type="checkbox"/> Glue	<input type="checkbox"/> Mould		<input type="checkbox"/> Rancid	
<input type="checkbox"/> Mothballs	<input type="checkbox"/> Peat-like		<input type="checkbox"/> Sour milk	
<input type="checkbox"/> Nail polish	<input type="checkbox"/> Pine		<input type="checkbox"/> Sweet & sour	
<input type="checkbox"/> Petroleum	<input type="checkbox"/> Swamp		<input type="checkbox"/> Rotten eggs	
<input type="checkbox"/> Plastic	<input type="checkbox"/> Wood		<input type="checkbox"/> Rotting meat	
<input type="checkbox"/> Rubbery	<input type="checkbox"/> Yeast		<input type="checkbox"/> Rotting vegetables	
<input type="checkbox"/> Solvent			<input type="checkbox"/> Skunk	
<input type="checkbox"/> Tar			<input type="checkbox"/> Urine	
<input type="checkbox"/> Turpentine			<input type="checkbox"/> Vomit	
<input type="checkbox"/> Vinegar			<input type="checkbox"/> Yeast	
<input type="checkbox"/> Varnish				

Medicinal	Fecal	Putrid
<input type="checkbox"/> Alcohol	<input type="checkbox"/> Manure	<input type="checkbox"/> Burning carcasses
<input type="checkbox"/> Ammonia	<input type="checkbox"/> Septic	<input type="checkbox"/> Dead animal
<input type="checkbox"/> Methanol	<input type="checkbox"/> Sewer	<input type="checkbox"/> Decay
Fruity	Floral	Smoky
<input type="checkbox"/> Citrus	<input type="checkbox"/> Flowers	<input type="checkbox"/> Burnt plastic
<input type="checkbox"/> Fermented	<input type="checkbox"/> Fragrant	<input type="checkbox"/> Burnt rubber
<input type="checkbox"/> Fruity	<input type="checkbox"/> Herbal	<input type="checkbox"/> Coffee-like
<input type="checkbox"/> Over ripe fruit	<input type="checkbox"/> Perfume	<input type="checkbox"/> Exhaust
	<input type="checkbox"/> Spicy	<input type="checkbox"/> Grass-smoke
		<input type="checkbox"/> Wood-smoke
Fishy	Other	
<input type="checkbox"/> Dead fish		

Weather conditions *(Recommended; at the time the issue was noticed)*

General Conditions	Cloud Cover	Wind speed	Wind Direction
<input type="checkbox"/> Dry	<input type="checkbox"/> Clear	<input type="checkbox"/> None	What direction was the wind coming from?
<input type="checkbox"/> Rainy	<input type="checkbox"/> Light cloud	<input type="checkbox"/> Light	
<input type="checkbox"/> Foggy	<input type="checkbox"/> Scattered cloud	<input type="checkbox"/> Steady	
<input type="checkbox"/> Snowy	<input type="checkbox"/> Overcast	<input type="checkbox"/> Strong/Gusting	

Action Taken *(Recommended)*

Investigation Results:	
Actions Taken:	
AEP Notification: (Contact must be made within two hours of the complaint)	Time: AEP Incident Number:
Company Representative:	

Incident Completion Date:

Revision Summary

Section	Revision Detail	Approved By (Name and Title)	Date Approved
1-5	Initial development of plan	Michael Parker, VP Compliance	July 6, 2022
Rev. Summary	Added Cover Sheet and Revision Summary section	Brian Fraser, ECM	June 23, 2023
Minor edits 1-5	Revised plan and form	Michael Parker, VP Compliance	November 29, 2023



Emergency Management Plan

Approval 10348-03-01

Sec. 4.6.34(z)

Ryley Facility, Alberta

Revision Summary

Section	Revision Detail	Approved By (Name and Title)	Date Approved
All	Annual review	Stan Yuha, Facility Manager	January 9, 2023
Rev. Summary	Added Revision Summary section	Brian Fraser, ECM	June 23, 2023

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EMERGENCY MANAGEMENT PLAN



Approved By: Stan Yuha, Facility Manager

Signature

Approved By: Wayne Codd, Operations Manager

Signature

1.0 Introduction

1.1 Emergency Management Plan

This Emergency Management Plan has been written with the intent of providing operating guidelines to deal with any foreseeable emergencies which may arise during the course of operations at the Ryley Facility or during transportation of wastes to or from Ryley.

1.2 Purpose

The purpose of the Emergency Management Plan is to provide a framework for both general and specific policies and procedures and lines of communication that can be put into motion in the event of an emergency. By implementing and maintaining an effective Emergency Management Plan, Clean Harbors Canada, Inc. plans to reduce the Corporations exposure to loss by providing for:

- i) The safety and well-being of all employees and others;
- ii) Minimizing damage to the environment;
- iii) Process of recovery and resumption of operations;
- iv) And effective incident reporting chain.

1.3 Revision Procedure

1.3.1 The Emergency Management Plan policies, frameworks, roles, and responsibilities described, will be reviewed and revised annually and will be the responsibility of the Facility Manager or his delegate. Employees who actually participate in any emergency response are in the best position to determine the safest and most efficient methods.

1.3.2 Revisions to the Plan will be initiated by completing the Revision Request Form (Figure 1). The Revision Request must pass through the stages identified on the form.

1.3.3 The Facility Manager or his delegate has the responsibility for maintaining the currency of the Emergency Management Plan procedures at Clean Harbors Canada, Inc...(Ryley)

2.0 Company Operations

- 2.1 Clean Harbors Canada, Inc. (Ryley), owns and operates a Transfer Station, Class 1 Secure Landfill, and Hazardous Waste Transportation and Service Centre.
- 2.2 Clean Harbors Canada, Inc. (Ryley), offers as a service, the transportation, consolidation, and storage of acceptable specified waste streams.

2.3 Office Location

Clean Harbors Canada, Inc.
50114 – Range Road 173
Ryley, Alberta T0B 4A0
Ph #780-663-3828
Fax #780-663-3539

3.0 Emergency Response

- 3.1 In case of emergency, this facility is equipped with an audible emergency alarm system. This system consists of alarm horns located throughout the facility. The horns are positioned in such a manner that they will be heard regardless of an employee's location, or activity. The alarm will be activated from a control panel located in the dispatcher's office. Personnel working in landfill will be notified of an emergency via the radio
- 3.2 For the purpose of the alarm system, certain areas of the plant have been designated as emergency assembly points. The locations of these points are as follows:
 - a) Primary assembly point – NW corner of parking lot in front of office facilities;
 - b) Secondary assembly point – green landfill shack;
 - c) Tertiary assembly point – move crosswind to a safe distance from the emergency site; this area will be determined by the E.R.T. Coordinator at the time.

4.0 Facility Alarm System Procedure

4.1 Emergency Procedure

In the event of an emergency, the alarm system will be activated, causing the plant emergency horn to sound. After approximately twenty (10) seconds, the horn will cease. Once the alarm has sounded, employees will proceed as follows:

- a) Secure their worksite to ensure that it is not left in a hazardous state;
 - b) Insure that all personnel in the area are aware that the alarm has been sounded;
 - c) Proceed to the appropriate assembly point and await instructions.
- Termination of an emergency will be announced over the loud speaker (All-Clear).

In the event of an emergency, the Facility Manager or designate will initiate the Facility Alarm System.

4.2 Emergency Phone List

Fire Dept	911
RCMP, Tofield	911
Ambulance, Tofield	911
Village Office	780-663-3653
County Office	780-6633730
Alberta Public Safety Service (Evacuation and Disaster Services)	1-800-272-9600
Hospital (Health Center).	780-662-3263
Poison Center (If busy, call Calgary)	1-800-332-1414 1-403-270-1414
Federal Health & Safety Office	1-800-641-4049
Canutec	1-613-996-6666
Alberta Environment & Parks	1-800-222-6514

4.3 Facility Alarm System

4.3.1 Testing Procedures

Testing of the plant alarm system to ensure operational readiness should take place once monthly before the 15 (fifteenth) day of the month. It will consist of activating the alarm system for approximately 5-10 seconds.

5.0 Emergency Situations Classification

5.0.1 This section will outline the responsibilities and communications network for the following incidents:

- 5.0.1.1** Serious injury/death at facility
- 5.0.1.2** Fire/explosion at facility
- 5.0.1.3** Leaks/spills
- 5.0.1.4** Bomb threats
- 5.0.1.5** Demonstration/pickets at facility

5.0.2 During most of the above listed incidents, the Resource Team will convene to assist and advise the Response Team and Emergency Response Coordinator. The Resource Team will consist of the following personnel:

- i)** Facility Manager (Stan Yuha)
- ii)** The Emergency Response Coordinator position will be filled by the Operations Manager (Wayne Codd)
- iii)** Receiving Coordinator (who will bring office radio to the conference room).

5.0.3 Duties of the Resource Team

- i) To assemble in the conference room in the Administration Building or alternate, as required.
- ii) Pick-up visitor's log and driver's sign-in log on the way to conference room.
- iii) Receive all area head counts and confirm with records.
- iv) Advise and assist the Emergency Response Team to deal with the incident.
- v) Advise building wardens as to where the staff should reassemble in the event of adverse weather or changes in conditions.
- vi) To provide assistance to Facility Manager, as required.
- vii) To advise when "all-clear" can be sounded.
- viii) To contact all external agencies for accident investigation.

5.0.4 The incidents involving fire, explosion, bomb threat, and evacuations of the plant outline some of the responsibilities for the Building Wardens, listed below:

- i) Administration/Maintenance Building: Krystle Venables
Alternate: Leanne Monteith
- ii) Drum Staging & Process Building: Thomas Peschel
Alternate: Nick Sideroff
- iii) Lab Buildings: Todd Webb
Alternate: Thomas Peschel
- iv) Landfill Area: Jerimiah Meyn
Alternate: Bill Fawcett

5.0.5 For all buildings, a Warden shall be named.

5.0.6 The degree to which the outlined procedures are implemented will depend upon the severity of the incident.

5.1 Serious Injury or Death at Facility

The following procedures outline the responsibilities and communications network in the event of a serious injury or death. Serious injury would include broken bones, traumatic amputation, internal bleeding, loss of an eye, third degree burns, paralysis, poisoning, or significant exposure to designated substances.

5.1.1 Senior Employee at the Scene

Should a serious injury occur at the facility, the Senior Employee should:

- i) Sound alarm and inform Dispatch;
- ii) Assess hazards and provide First Aid until relieved;
- iii) Secure and isolate area;
- iv) In the event of a fatality, the body should be covered but not moved.

The senior employee will then secure the accident site until Emergency Response Team arrives and makes notes for a preliminary accident investigation.

5.1.2 Supervisor

The Operations Supervisor should:

- i) Advise Facility Manager of incident and situation;
- ii) Conduct detailed assessment of cause of incident, and damage to material or equipment;
- iii) Determine if additional personnel or equipment is required;
- iv) Act as coordinator between Emergency Response Team and Resource Team;
- v) Log sequence of events as they occur.

5.1.3 The Facility Manager

The Facility Manager should:

- i) Begin Clean Harbors Canada, Inc. (Ryley) incident alert procedures;
- ii) Convene Resource Team;
- iii) Maintain communication with E.R. Coordinator;
- iv) See Figure 2;
- v) In the event of a fatality, the RCMP must be notified. They will then contact the Medical Examiner's Office.
- vi) Notify the Federal Health & Safety Office.

Note: Telephone use is to be restricted during an emergency. All incoming calls are to be forwarded to the Resource Team.

5.2 Fire and/or Explosion at Facility

The following procedures outline the responsibilities and communications network in the event of a fire and/or explosion at the Facility. The activities outlined may be implemented in varying degrees depending upon the nature and extent of the situation. See Figure 3. For location of the fire hydrant, stand pipes and man-gates, See Figure 4, 5 and 6.

Figure 1

Clean Harbors Canada, Inc
Ryley, Alberta

Suggested Revision of Operating Policies and Procedures

Location: _____ Section: _____

Suggested Revision: _____

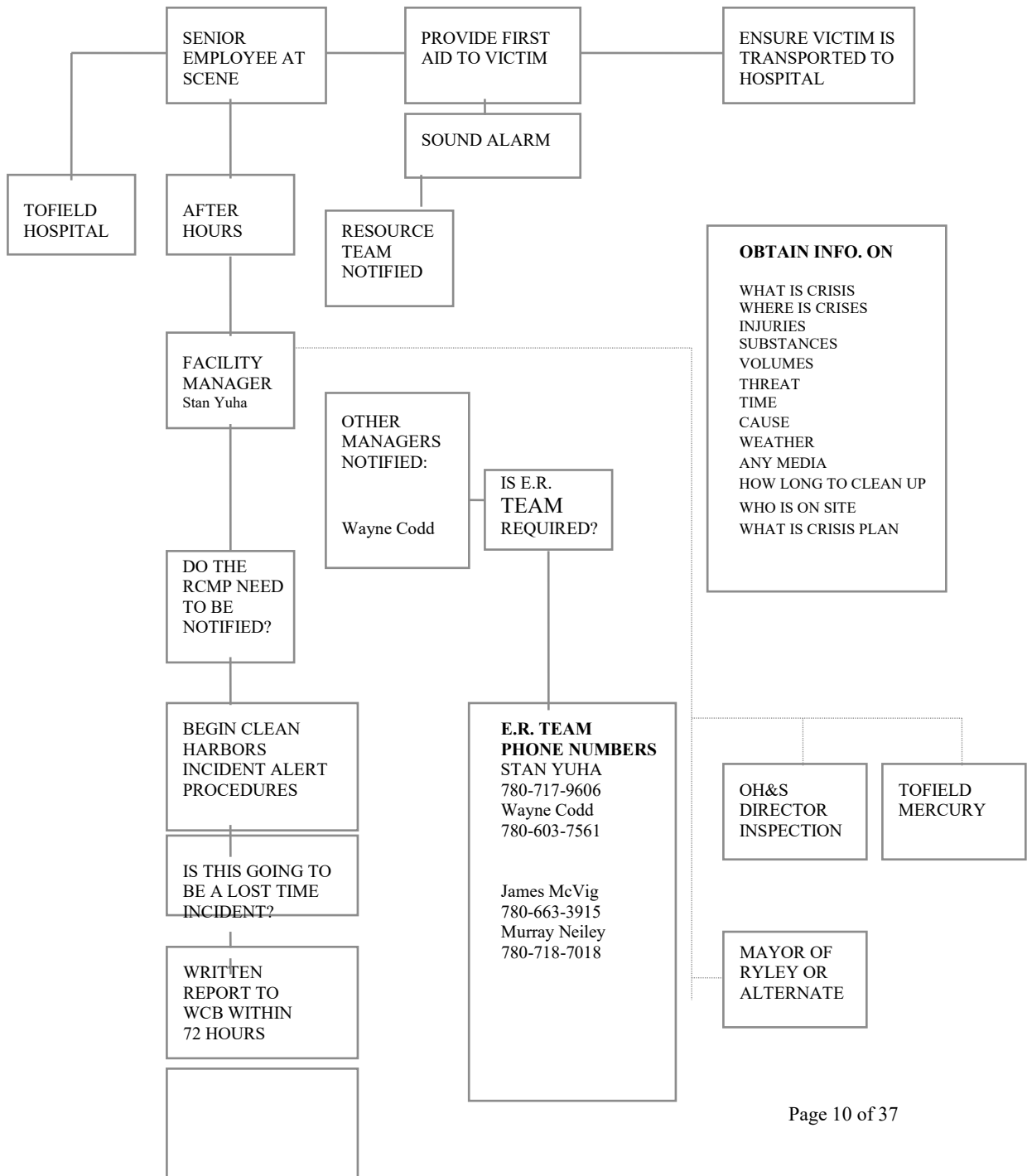
Suggested Date: _____ By: _____

Concurred By: _____

Routing: Operations Manager

Figure 2

SERIOUS INJURY OR DEATH



WHEN SITUATION
STABILIZES, HAVE
INCIDENT REPORT
STARTED

Figure 3

FIRE AND/OR EXPLOSION

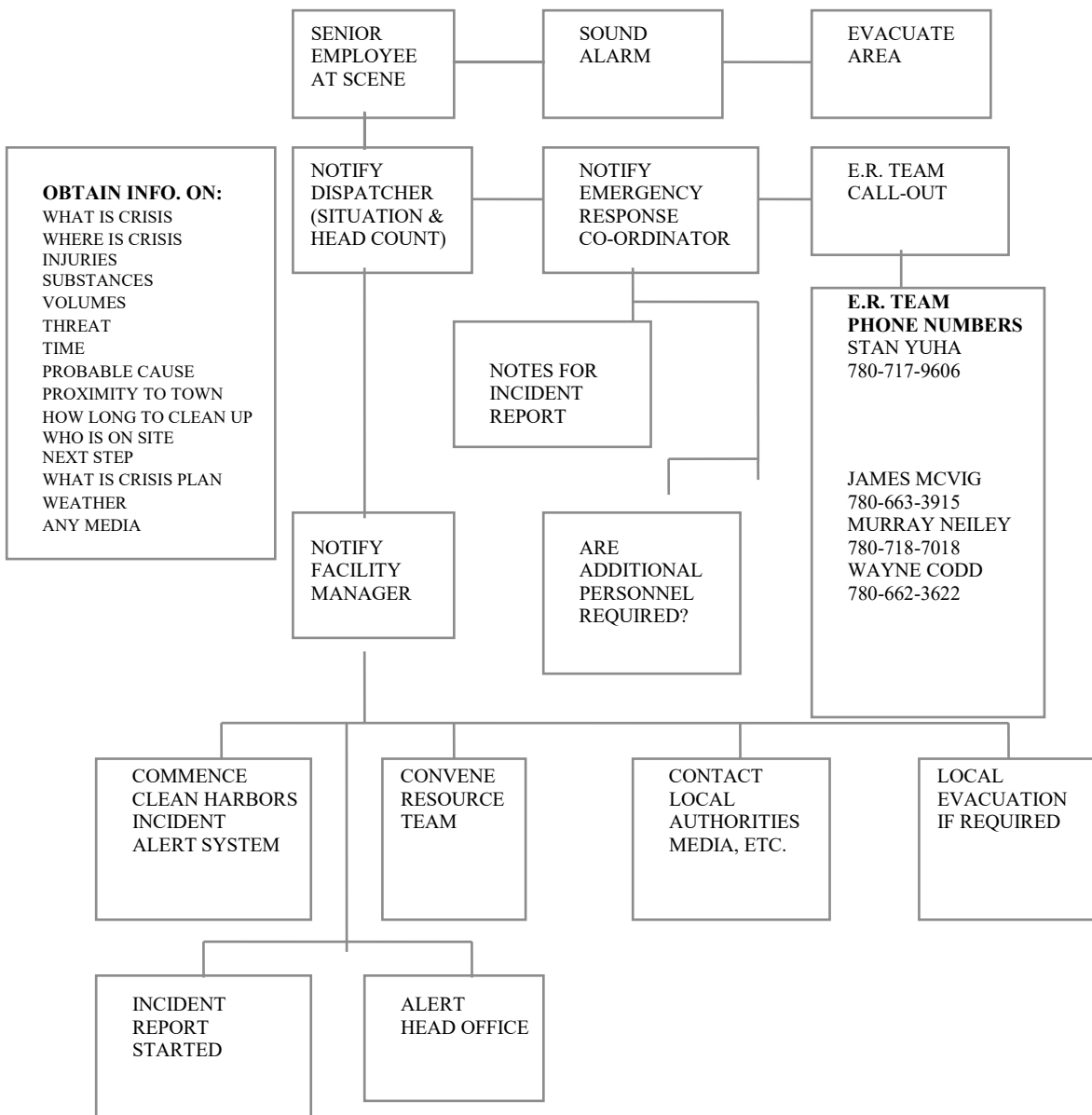


Figure 4

FIRE EXTINGUISHER LOCATIONS - LANDFILL

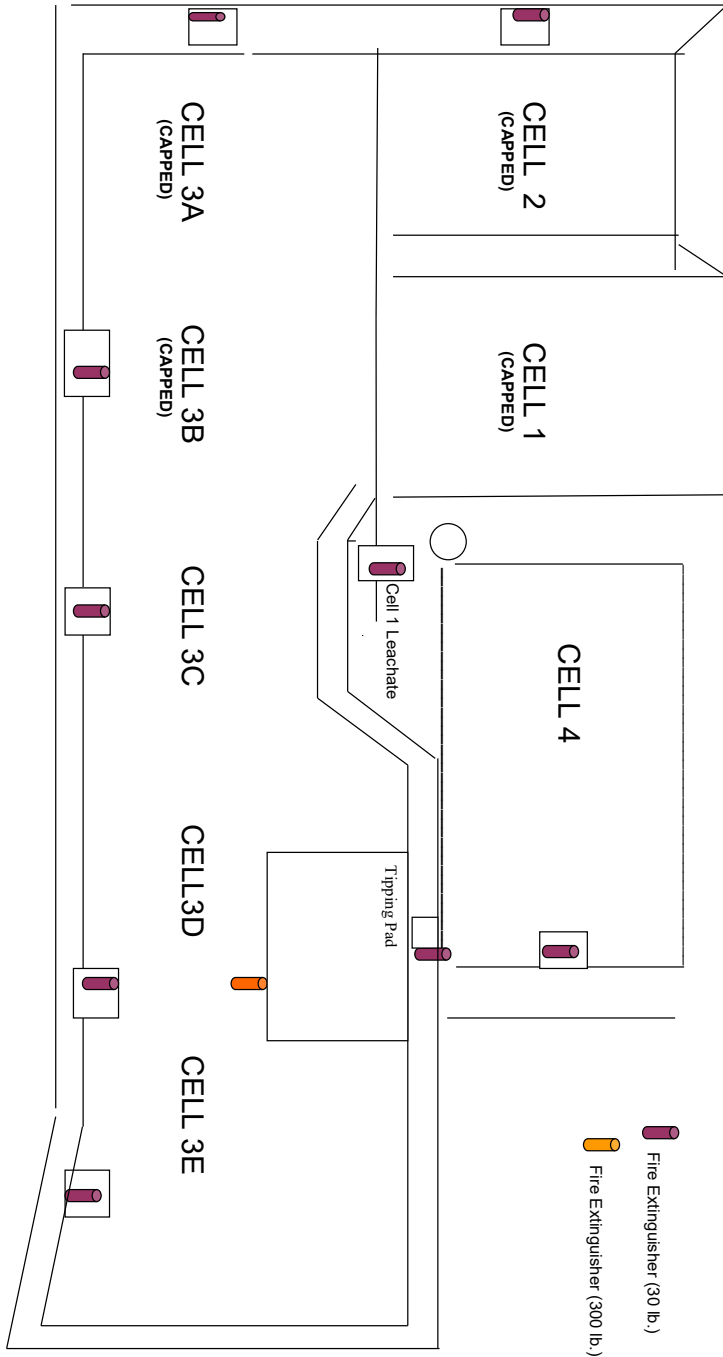


Figure 5

FIRE HYDRANT AND EXTINGUISHER LOCATIONS

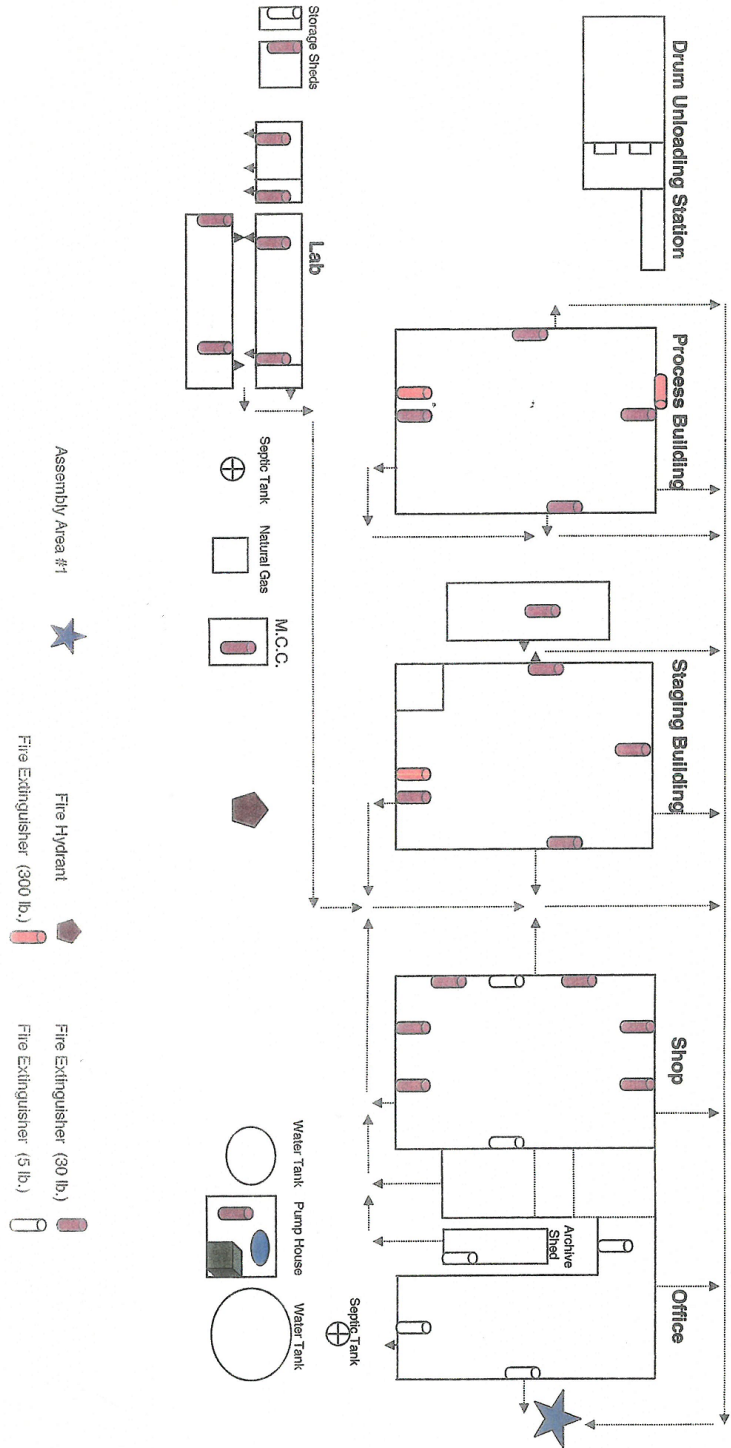
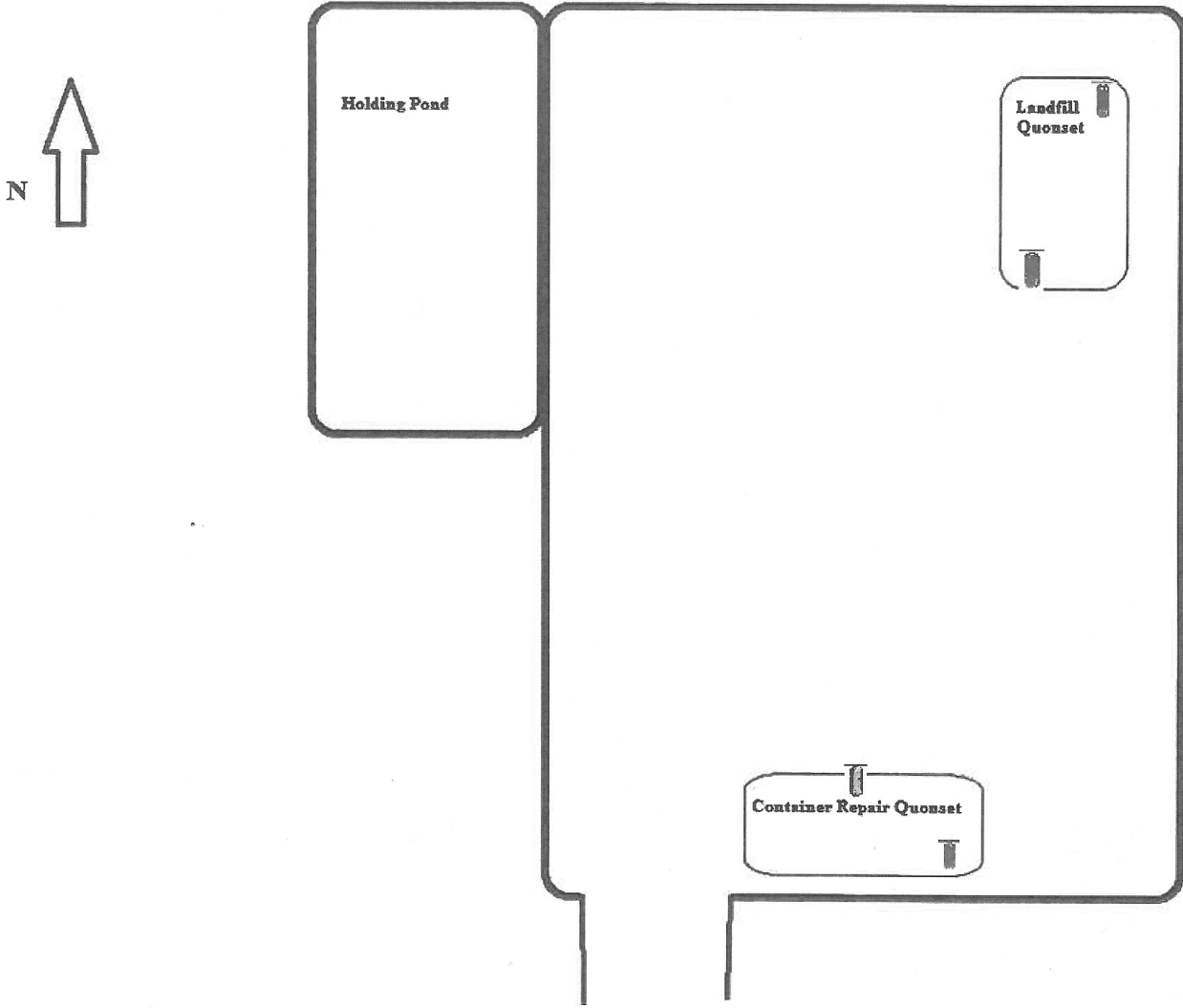


Figure 6

FIRE EXTINGUISHER LOCATIONS - LAYDOWN AREA



5.2.1 Senior Employee at Scene

Should a fire or explosion occur at the Facility, the Senior Employee should:

- i) Sound alarm and inform Dispatch
- ii) Assure that all personnel are accounted for and out of danger;
- iii) Secure and isolate area;
- iv) Assess additional manpower needs for firefighting;
- v) Take steps to minimize risk to personnel and loss or damage equipment or material;
- vi) Be prepared for the situation to deteriorate further.

5.2.2 Operations Manager

The Operations Manager should:

- i) Advise Facility Manager of incident and situation;
- ii) Conduct detailed assessment of cause of incident, and damage to material or equipment;
- iii) Determine if additional personnel or equipment is required;
- iv) Act as coordinator between Emergency Response Team and Resource Team;
- v) Log sequence of events as they occur.

5.2.3 Facility Manager

The Facility Manager should:

- i) Convene Resource Team;
- ii) Maintain communication with E.R. Coordinator;
- iii) Begin Clean Harbors Canada, Inc. (Ryley) emergency response procedure;
- iv) Contact local authorities as required (RCMP, etc.).

5.3 Leakage and Spills at Facility

5.3.1 The following procedures outline the responsibilities of personnel and the communication network to be established in the event of a leak or spill at the Facility.

5.3.2 The activities outlined may be implemented in varying degrees depending upon the nature and severity of the incident. See Figure 7.

5.3.3 Definitions

A **leak** is defined as seepage of special waste from a drum or small container or tank (less than 10 liters).

A **small spill** is defined as seepage or spillage of special waste from a drum or small container (more than 10 liters but less than 100 liters).

A **large spill** is defined as a loss of special waste from a drum or drums, or other containers, or from a tank in which the amount lost is greater than 100 liters.

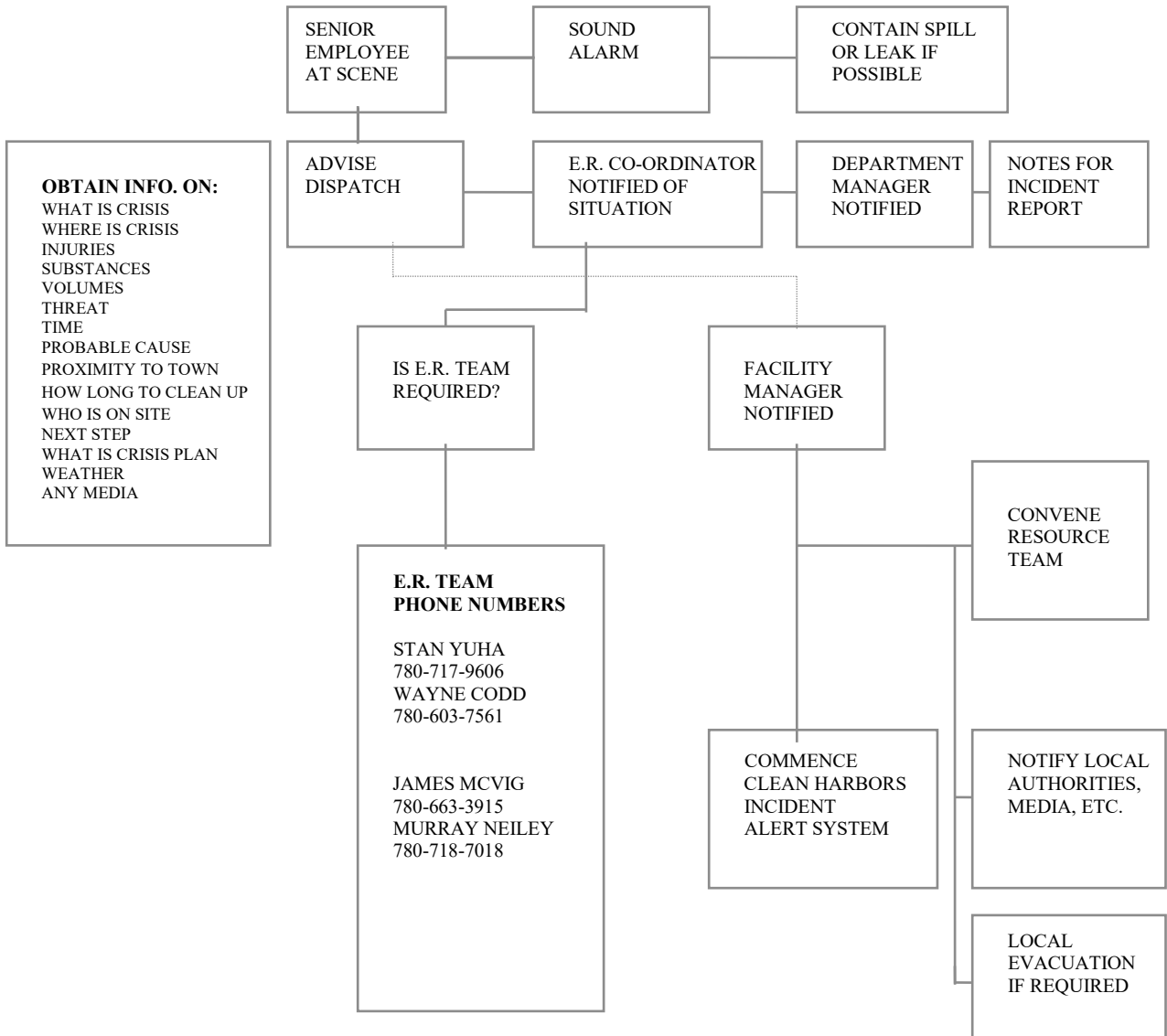
5.3.4 Senior Employee at Scene

The Senior Employee should:

- i) Take measures to contain spill or stop leak, if possible;

Figure 7

LEAKAGE AND SPILLS



- ii) Identify the components of the waste that has been spilled or is leaking;
- iii) Advise Dispatcher;
- iv) Refer to appropriate WASTE PROFILE SHEET and MATERIAL SAFETY DATA SHEET for information on substance, potential hazards and handling precautions.

5.3.5 Department Supervisor

The Department Supervisor should:

- i) Confirm the identification of the spilled or leaking waste;
- ii) Determine volume of spilled or leaking waste;
- iii) Confirm all necessary immediate response has been initiated;
- iv) Assess need for additional manpower, i.e.: Response Team, contractors;
- v) Advise Facility Manager
- vi) Make notes for incident report.

5.3.6 Facility Manager

The Facility Manager should:

- i) Commence Clean Harbors Canada, Inc. (Ryley) Incident Alert System;
- ii) Convene Resource Team;
- iii) Communicate with E.R. Coordinator during response.

5.4 Bomb Threats

5.4.1 The following procedures outline the responsibilities of personnel and the communications network in the event of a bomb threat at the Facility.

5.4.2 The activities outlined may be implemented in varying degrees depending upon the nature and severity of the incident.

5.4.3 This procedure is designed to combat bomb threats by incorporating the following basic elements:

- i) Obtain as much information as possible from caller;
- ii) Contact Tofield RCMP (911) and other emergency services (Facility Manager);
- iii) Appraise the threat (see Flow Chart for questions). Figure 8;
- iv) Record time, take notes;
- v) Keep caller on the line as long as possible;
- vi) Ask where the bomb is;
- vii) Ask when the bomb will go off;
- viii) Listen for any clues that may be helpful;
- ix) Did the caller have an accent?;
- x) List for background noises and sounds.

5.4.4 Emergency Action

Upon receipt of information, the person answering the phone will advise Dispatch to sound alarm.

The Dispatcher will inform the E.R. Coordinator of the situation and then inform the Facility Manager.

5.5 Demonstration and Pickets

The possibility exists that the Facility will be a target of demonstrators and pickets. During any such incident, the physical security of the plant assumes a greater importance than under normal conditions.

5.5.1 Advance Warning

Any employee learning that a demonstration is to occur will inform his Department Supervisor or the Facility Manager as soon as possible.

5.5.2 Facility Manager

Once the Facility Manager becomes aware that a demonstration will occur, he will:

- i) Initiate Incident Alert System as required;
- ii) Advise the Tofield RCMP (911) and request assistance;
- iii) Assess the need for additional Facility security;
- iv) Review physical protection of essential services and supplies (water, gas, electrical and phone);
- v) Advise all personnel against antagonistic or threatening behavior;
- vi) Move personal vehicles into secure area if possible;
- vii) Ensure that no shipments will be received until further notice and process operations suspended and secured;
- viii) Discuss with Resource Team;
- ix) See Figure 9.

DO NOT CONFRONT PICKETERS, PLAY A PASSIVE ROLL

5.6 Storms and Tornadoes

Notification: Upon receipt of a severe weather alert via radio, the Dispatcher will notify the Operation's Manager via portable radio and the rest of the plant via the P.A. System.

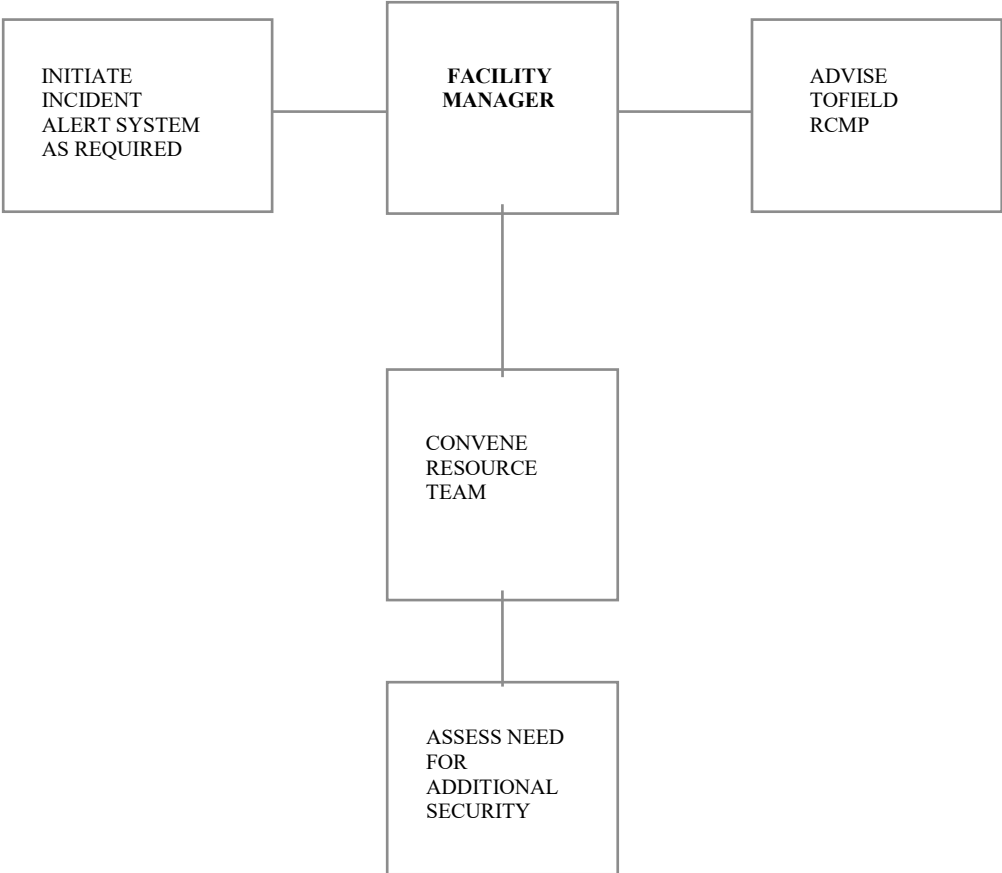
Severe Weather Warning and Severe Thunderstorms Imply the Possibility of Tornadoes

5.6.1 Direct Response

- i) The Emergency Response Coordinator should watch for approaching storm and keep the Plant updated on storm's path via the Dispatcher;
- ii) If a tornado is sighted, inform all staff over the radio and a 911 call will be placed immediately;
- iii) Alert Emergency Response Team to be ready to respond to the aftermath of a severe thunderstorm/tornado;
- iv) Take cover if necessary. See Safety Hints 5.6.3, 5.6.4, 5.6.5, and 5.6.6.

Figure 9

DEMONSTRATIONS AND PICKETS



Watch Procedure for Tornadoes

- i) Upon receiving a "Tornado Watch" via radio or Weather Alert System, the Dispatcher will notify the Coordinator via the portable radio; the Plant Employees via P.A. System; and Landfill via the mobile radio;
- ii) The Coordinator needs to watch the sky for approaching severe weather, which implies possibility of a tornado;
- iii) The Dispatcher will keep the Coordinator updated by listening to the radio;
- iv) Based on area conditions around the Plant site, the Coordinator will send a spotter to a watch point. The Coordinator will select the watch point and spotter. The spotter must have a clear view in the direction in which the possible tornado is most apt to come from, and stay relatively close to the Plant. This person will stay in continuous contact with the Coordinator via the mobile and/or portable radio.
- v) Upon spotting a tornado, the spotter will notify the Coordinator immediately and proceed to move out of the path himself.
- vi) When the Coordinator and Dispatcher hear that there is a tornado approaching the site, the Dispatcher will announce over the P.A. System for everyone to take cover and also notify Landfill via mobile radio. The Coordinator will notify everyone wearing a portable radio.
- vii) Shut Main Breakers in MCC and Maintenance Shop. After power shutdown radios will work on channel 2 only.
- viii) At this time all Operations will be shut down and the Operators will take cover in the closest safe place.
- ix) Everyone will stay in the safe area until the Coordinator gives the "all clear" via radio, then they will report to their supervisor for a head count;
- x) The Coordinator is responsible for activating any Emergency Response Teams required to respond to the aftermath of a tornado.
- xi) Restoration of power will be determined after the evaluation of any damage.

5.6.2 Safety Hints (Tornado)

- i) Stay away from windows, doors and outside walls;
- ii) Protect your head;
- iii) Shelter under a stairway, sturdy table or in a closet;
- iv) Stay near the center of a building or the side away from the storm;
- v) Avoid large unsupported roof areas like the Vehicle Maintenance Building. If caught in such a building, head for the lowest floor, an inside hallway, small room or get under something sturdy;
- vi) If caught outside or in the tornado path, move away at a right angle. Example: flat in a ditch, depression or ravine;

- vii) DO NOT remain in a small vehicle or light truck, it may over turn;
- viii) If no shelter can be found, hang onto a small tree or shrub.

5.6.3 Safety Hints (Thunderstorm)

- i) Downpours accompanying thunderstorms can cause flash floods, so do not shelter where you may be trapped by rising water.

5.6.4 Safety Hints (Lightning)

- i) Don't make yourself into a lightning rod or stand near a possible lightning conductor;
- ii) Don't project yourself above the surrounding terrain.
- iii) Stay indoors and away from electrical appliances;
- iv) Avoid using phones or showers;
- v) Don't stand under trees or near tall objects;
- vi) In open country drop to your knees, bend forward so that your head is lower than your back, put your hands on your thighs, but don't let your head touch the ground. Don't lie flat on the ground.
- vii) Stay away from open water and metal objects such as clotheslines; wire fences, rails, golf carts, bicycles and farm machinery;
- viii) Don't carry such things as umbrellas, golf clubs, fishing rods, etc.
- ix) Remember that people who are struck by lightning receive severe shocks and may be burned, but they can be handled safely. Victims who appear dead may be revived. Artificial resuscitation is a good start point after help is activated.
- x) Refer to the Facility's Severe Weather Action Plan for more details.

5.6.5 Safety-Hints (Hailstorm)

- i) Large hail often accompanies severe thunderstorms. If caught outdoors, crouch to create as small as an area as possible and protect your head and neck.

5.6.6 All Clear

- i) The Emergency Response Coordinator will announce the "All Clear" via portable radio.
- ii) The Dispatcher will relay this information via the Plant P.A. System.

6.0 Evacuation Plan

- 6.1** In the event that a local evacuation is required, coordination with local authorities will be required. Call 911 and ask for Police and Fire and answer all the questions of the 911 dispatcher to the best of your ability. Once Police and Fire arrive they will obtain as much information as possible to assist their evacuation plans. They will initiate and coordinate any evacuation if needed.

7.0 Emergency Response Team Areas of Responsibility

- 7.0.1** In the event of an emergency team (E.R.T.) call out, the areas of responsibility must be established to avoid duplication of effort, confusion and delay in action.
- 7.0.2** Upon arrival at the scene, the E.R.T. captain should begin the site assessment and control of two (2) priorities, which are as follows:
- a) Search and rescue (SAR); immediately call Fire & EMS (911)
 - b) Control of hazard (CH).

7.1 Search and Rescue

- 7.1.1** A three-(3) man team should immediately begin to co-ordinate a SAR effort. The ERT Captain can contact the E.R. Coordinator to confirm and determine whether or not all personnel have been accounted for. Specific items to be determined by the SAR leader are:
- a) Extent of hazard;
 - b) Specific hazards not readily noticeable;
 - c) Probable/possible locations of any personnel not accounted for;
 - d) Equipment required initiating response;
 - e) Probable cause;
 - f) Any other pertinent information.
- 7.1.2** The remaining members can begin to assemble personal equipment deemed necessary to affect a rescue. When the SAR captain has finished his assessment, he can brief the other members as to what specialized equipment or procedures will be required to commence rescue operations. While the other team members are assembling the required gear, the captain can brief the E.R.T. Coordinator, then begin to organize his own personal gear into position.

7.2 Control of Hazard

- 7.2.1** The E.R.T. members not involved in SAR should begin an immediate control of hazard response. The CH team should begin an immediate site assessment to determine the appropriate response action. The E.R.T. Captain can request through the E.R. Coordinator, information from computerized MSDS files, which may help to determine;
- a) Extent of hazard;
 - b) Specific hazards not readily noticeable;
 - c) Equipment required initiating response;
 - d) Probable cause;
 - e) Any other pertinent information.

7.2.2 The CH team leader can then brief the other CH team members to what specialized equipment or procedures will be required to initiate the response. While the other members are assembling the required gear, the captain can brief the E.R.T. Coordinator, then begin to assemble his own gear into position.

7.3 Specific Personnel Requirements

7.3.1 The E.R.T. Coordinator should ideally be someone from management (Operations). This position is to act as a liaison between the E.R.T. Captain and the Resource Team. The Resource Team will be composed of the Facility Manager, the Transportation Supervisor, and the Lab Supervisor, and will liaise with off-site resources such as Ryley Fire Department, RCMP, Ambulance and Hospital and the media.

7.3.2 The E.R.T. Captain is responsible for the command and control of the team while on call-out. He should keep the E.R.T. Coordinator briefed of the situation and of any developments as they occur, within reason.

7.3.3 One of the CH team members should be a chemical technician with knowledge of the properties and characteristics of substances being dealt with. The other CH team member should be a driver/operator. The remaining members of the team can be made up of personnel that have received the prerequisite training.

7.3.4 The E.R.T. Coordinator can brief other plant personnel and designate assistance if deemed necessary by the E.R.T. Captain. (i.e.: firefighting, etc.).

7.4 Communications

7.4.1 During an E.R.T. call-out, all communications should follow the same path as the organization chart. During call-out, personnel, by human nature, will respond adversely to stress, which will be present. By following prescribed guidelines for communication, errors or omissions can be reduced, allowing for a faster, more effective response to be achieved.

7.4.2 Ideally, communications should be secured to prevent the unauthorized release of information to those not having the “need to know”. All information relative to the response should be made available to the Resource Team, who can then determine which information can be given wider circulation.

7.4.3 A possible series of codes to indicate given situations should be established for use with radio communications to keep information secure. (See Figure 10).

8.0 Quarantine

- 8.1** When an E.R.T. response is initiated, and it has been determined where the problem has occurred, all documentation relative to that shipment should be quarantined to provide an accurate record of material. By keeping an accurate record of material, it will be possible to determine how much, if any, material is lost during the response. (ie. by fire, leak, or evaporation, etc.).
- 8.2** Other documents to be put under quarantine should also include the following:
 - a)** Visitor lists;
 - b)** Contractor lists.

9.0 Department Wardens

- 9.1** A designated warden for each department will provide a head count of each department to the Resource Team. The normal Resource Team station will be the Administration building Conference room, and the alternate station will be the Lab Office.

10.0 Wrap-up

- 10.1** When the response has been completed, the E.R.T. members will:
 - a)** Decontaminate, clean, store, and replenish gear as required;
 - b)** Make notes of aspects of response that they were directly involved in;
 - c)** Make notes of any aspects of the response that they witnessed;
 - d)** Make notes of any deficiencies, errors, or omissions in the procedures, equipment, etc.
- 10.2** All notes should be given to the E.R.T. Captain so that a brief report can be written (1 hour) and submitted to the E.R.T. Coordinator. An in-depth report should then be written (24 hour) covering all aspects of the response.
- 10.3** During Step A, team members should be discouraged from discussing the response, in order that a clear progression of events can be maintained by each member. These can then be cross-referenced to the E.R.T. Coordinator's log of events to obtain a precise record of the response. Response members should then meet to discuss the incident in order to diffuse stress.
- 10.4** A follow-up meeting should be held (1 week) to address any concerns, and allows for input regarding changes or additions to policy, procedure, etc. Arrangements for critical incident stress debriefing can be determined as required.

11.0 Training

- 11.1** Training requirements at the Ryley Facility have been set such that response team employees will receive as a minimum, the following courses:
 - a)** Fire extinguisher training;
 - b)** First aid;
 - c)** CPR;
 - d)** WHMIS;
 - e)** TDG.

12.0 Response Team Training

12.1 In addition to the general plant training, the Response Team may also receive, but not limited to the following additional training:

- a) Fire-fighting;
- b) Emergency response;
- c) Confined spaces entry and rescue.

12.2 Training will be provided to members such that a level of competence, that meets industry standards, is achieved.

13.0 Drills

13.1 The E.R.T. will perform practice drills of varying difficulty and scope. These drills will be defined as follows:

- a) **Minor** – a leaking drum or flange;
- b) **Moderate** – split container, vehicle accident (including injuries), small fire; moderate emergencies are such that they have a very real potential of becoming major if not acted upon quickly.
- c) **Major** – a large spill involving a large tank, difficult terrain, fire, toxic chemicals, or men down.

- **Note** – A major drill may incorporate a moderate drill and a moderate drill may incorporate a minor drill.

13.2 Drill Log and Evaluation

A record shall be kept indicating when emergency response drills are performed, the scope of the drill (minor, moderate, or major) and the effectiveness of the drill.

Figure 10

Radio Secure Transmission Codes

INJURY/DEATH

Green	- minor injury	- treatable on site
Yellow	- moderate injury	- treatable off site - not requiring hospitalization
Red	- major injury	- treatable off site - requiring hospitalization
Black	- fatality	- do not move unless threatened by fire

FIRE/EXPLOSION

Orange	- fire	- any fire on site shall be considered serious, regardless of size
White	- explosion	- may be a result of fire or may cause fire to spread

These codes may be given in random to explain sequence of event.

LEAKS/SPILLS

Brown	- loss of containment of waste.
-------	---------------------------------

13.3 Emergency Response Drills

13.3.1 The following scenarios listed for each category of emergency (minor, moderate, and major) will have a sub-category of injury, fire, and spill.

13.3.2 Minor emergency scenarios:

- a)** Leaking drum of glycol in drum storage building;
- b)** Small fire in wastepaper basket;
- c)** Person slips on ice; suspected sprained ankle.

Minor emergencies are such that they should be able to be responded to by any plant personnel. The E.R.T Captain and the E.R.T. Coordinator should be made aware of the situation as soon as possible, in the event that the situation deteriorates further. Minor emergencies pose little or no threat to personnel, property or environment.

13.3.3 Moderate emergency scenarios:

- a)** Tanker parked in yard has leaked approximately 200 gallons of used motor oil;
- b)** Fire in vehicle engine compartment;
- c)** Person struck by vehicle backing up; suspected broken leg and concussion.

Moderate emergencies are such that they should be responded to by the E.R.T., as special equipment or procedures may be required to affect a response. Moderate emergencies pose a possible threat to personnel, property and/or environment.

13.3.4 Major emergency scenarios:

- a)** Leak in tank farm; unknown quantity of caustic liquid on ground;
- b)** Reactive fire in labpack processing area;
- c)** Man down in leachate system pit area; unconscious, unknown injuries.

Major emergencies are such that they must be responded to by the E.R.T. as quickly as possible. Major emergencies constitute a definite and immediate threat to personnel, property and/or the environment.

14.0 Evaluation

14.1 A process of determining the effectiveness of the response must be laid out prior to the institution of an E.R.T. program, in order that a fair and objective evaluation can be made. By assessing each response in a similar manner, standards can be achieved and maintained at desired levels.

14.2 The evaluation should be broad in scope in order that no aspect of the response is overlooked, yet able to pinpoint areas of weakness in procedure or policy that deter from the required objective.

14.3 The following areas should be the basis of an evaluation to an emergency response:

- a)** Actual response times:
 - how quickly after the incident was the alarm sounded;
 - how long did evacuation plans take to complete;
 - how long before an accurate account of personnel on site was completed;

- how long before form-up of E.R.T.;
 - how long before site assessment by E.R.T. Captain;
 - how long before E.R.T. Coordinator was briefed by E.R.T. Captain.
- b) Operational procedures:
- are operational procedures streamlined enough to provide an effective response yet broad enough in scope to encompass all aspects of the response?
- c) Technical procedures:
- most procedures (i.e. use of specialized equipment) will be set out according to the manufacturer's operations manual.
- These procedures can be tailored to Ryley's own requirements as required and refined during training.
- d) Communications:
- review communications network to determine any areas that require change or improvement.
- e) Personnel:
- determine any areas where training of personnel can be improved. Constructive criticism of personnel performance to determine where improvements can be made.
- f) Equipment:
- review equipment performance to determine effectiveness;
 - maintain a catalogue of equipment, which may improve or streamline ability to complete required tasks.
- g) Miscellaneous:
- any other aspects of the response that need to be addressed.

15.0 Critique of Evaluation

A critique of each evaluation should be done to determine if all aspects were dealt with accordingly. The critique should be done in a manner that ensures that criticism is kept on a constructive level.

16.0 Emergency Response Protocol

The proper emergency response requires preparation. The purpose of this document is to provide guidance for the medical management of exposure situations. Clearly, training and experience must augment portions of this protocol.

The recommended protocol is:

- a) Rescue, when necessary, employing proper equipment and methods.
- b) Attention to emergency health problems – breathing, cardiac functions, bleeding, shock.
- c) Obtain as much exposure history as possible (a sample is attached).
- d) Transfer the victim to the medical facility designated by suitable and appropriate conveyance.

- e) Call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the EMR physician. EMR will contact the medical facility and request specific testing which may be appropriate. EMR physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- f) Call EMR, being prepared to provide:
 - i) Any known information about the nature of the exposure;
 - ii) As much of the exposure history as was feasible to determine in the time allowed;
 - iii) Name and phone number of the medical facility to which the victim(s) has/have been taken.
 - iv) Names of the exposed individuals.
 - v) Name and phone number of an informed site officer who will be responsible for further investigations.

As environmental data is gathered and the exposure scenario becomes more clearly defined, this information should be forwarded to the EMR Medical Director or Assistant Medical Director.

EMR will compile the results of all data and provide a summary report of the incident. A copy of this report should be placed in each victim's medical file in addition to being distributed to appropriately designated company officials.

Each individual worker will receive a letter describing the incident but deleting any personal or individual comments. A personalized letter describing the individual findings/results will accompany this generalized summary. A copy of the personal letter will be filed in the continuing medical file maintained by EMR.

Potential Exposure Report

Name: _____ Date of Exposure: _____

Social Security No: _____ Age: _____ Sex: _____

Client Contact: _____ Phone #: _____ Co: _____

I. Exposing Agent

What was individual doing? _____

How long did individual work in area before signs/symptoms developed? _____

Was protective gear being used? If yes, what was the PPE? _____

Was there skin contact? _____

Was the exposing agent inhaled? _____

Were other persons exposed? If yes, did they experience symptoms? _____

II. Signs and Symptoms (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat

Tearing

Headache

Cough

Shortness of breath

Chest tightness/pressure

Nausea/vomiting

Dizziness

Weakness

Delayed Symptoms:

Weakness

Nausea/vomiting

Shortness of breath

Cough

Loss of appetite

Abdominal pain

Headache

Numbness/tingling

III. Present Status of Symptoms (check off appropriate symptoms)

Burning eyes, nose, or throat

Tearing

Headache

Cough

Shortness of breath

Chest tightness/pressure

Cyanosis

Nausea/vomiting

Dizziness

Weakness

Loss of appetite

Abdominal pain

Numbness/tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)

Improved _____ Worsened _____ Remained Unchanged _____

IV. Treatment of Symptoms (check off appropriate response)

None _____

Self-medicated _____

Physician Treated _____

17.0 PCB Handling

17.1 PCB Fires

The Ryley facility's Process and Staging buildings are supplied with all necessary equipment to handle PCB fires. It should be noted that should a fire occur in one of the above-mentioned buildings, the building exhaust fans will not start as per the fire system interlock. The exhaust fans are for fume removal only, should it be required.

The foam fire suppression sprinkler system is more than capable of containing PCB fires as per the Alberta Fire Code –1997.

17.2 PPE for PCB Waste Handling

Routine precautions should be observed when handling liquids containing PCB's. The protective clothing to be worn will vary with individual circumstances, such as concentration, quantity of PCBs and whether in solid or liquid form. Where workers may come in direct contact with askarel (pure PCBs), protective clothing impervious to PCBs should be worn. Gloves, boots, disposal coveralls, bib-type aprons, and eye protection (face shields or chemical safety goggles) should be worn as necessary. Materials used to protect against dermal exposure are compared in the following Table 1.

TABLE 1

Materials used for Protection from Dermal Exposure to Undiluted PCBs

Highly Recommended (provides protection for over one hour)	Recommended (provides protection for 1 hour)	Limited use or <u>Not Recommended</u> (provides protection for less than 1 hour)
Butyl Rubber Neoprene Nitrile Rubber Polyvinyl Alcohol Viton Saranex Teflon	Chlorinated Polyethylene	Styrene Butadiene Rubber Natural Rubber

Where PCBs are in closed containers such as capacitors, transformers, tanks or drums, or are entrapped in solid substances or equipment, and there is not direct contact with PCBs, special clothing and apparatus may not be necessary, e.g., if a lift truck operator is moving a drum or a palletized piece of PCB equipment.

As a general rule, the handling of hot liquids should be avoided. If the temperature of the liquid is above 55°C, a full-face, self-contained breathing apparatus should be worn for other than brief periods of exposure.

**EMERGENCY PHONE NUMBERS
OUR LICENCE NUMBER: 10348-02-00**

AEP (Spill & Contravention Reporting)	1-800-222-6514
AMBULANCE – Tofield	911
RCMP – Tofield.	911
FIRE – Ryley.	911
FIRE – Tofield	911
POISON CENTRE	1-800-332-1414
CHUBB SECURITY	1-888-353-7989
	1-780-423-3281
	1-780-421-4841
AFTER HOURS EMERGENCY #	1-800-483-3718
VILLAGE OF RYLEY	780-663-3653
COUNTY OF BEAVER	780- 663-3730
Allan Weiss – (Regional Emergency Manager)	cell 1-780 208-1500
Health & Safety Officer (Federal).....	1-800641-4049
AEP - EMERGENCY #	1-800-222-6514
AEP - Non-Emergency	1-800-272-9600
Ryan Taylor (Health & Safety Mgr)	1-435-393-1050
Brian Fraser (Compliance Manager)	1-780-288-2797
Mike Parker (V.P Environmental Compliance)	1-519-312-8522
Cliff's Towing – (Edmonton)	1-780-451-5555
Plumber – B & M – (Tofield)	780-662-2454
Electrician – D-2 Electric	1-780-672-8700
Backhoe & Heavy Equipment – Jerry's Backhoe – (Tofield)	780- 662-3408
Transportation Department – Mobile Numbers	
Tyler Esak.....	1-780-777-6906
Leanne Monteith.....	1-780-235-5374
On-Call Personnel – Mobile	Stan Yuha 1-780-717-9606
	Wayne Codd 1-780-603-7561

RESPONSE TEAM HOME NUMBERS

Stan Yuha	780-662-3889
Wayne Codd	780-662-3622
James McVig.....	780-663-3915
Murray Neiley.....	780-718-7018



EMERGENCY RESPONSE PLAN

Stan Yuha

Approved By: Stan Yuha, Facility Manager

Signature

Approved By: Wayne Codd, Operations Manager

Signature

1.0 Emergency Response Procedure

1.1 Purpose of Procedure

To establish a pre-determined plan of action for facility staff and visitors during emergency situations at the facility. Such emergency procedures should be designed to protect personnel, property and the environment.

1.2 Introduction

The nature of the Ryley facility is such that emergency situations could arise from the operations of waste management. Emergency situations could include fire, spills, and uncontrolled reactions of incompatible wastes and/or reagents, personal injury accidents, severe weather scenarios and other unforeseen situations.

The Ryley facility is equipped with an alarm horn which when sounded will initiate the following emergency actions of plant staff and visitors.

The objective of these emergency procedures is to manage the emergency around the following points:

- a) Sound an audible alarm to initiate appropriate actions.
- b) Account for all staff and visitors by gathering all persons except our response team in a pre-determined assembly area.
- c) Confirm the location and safety of individuals by means of a head count and to initiate a search for those persons unaccounted for.
- d) Set up a communications system to facilitate crisis management.
- e) Secure the facility, control and rectify the emergency and initiate further Incident Alert Procedures.
- f) Ensure all visitors or contractors on site have an assigned sponsor to sign them in.
- g) Define role of third party Emergency Response Teams if required by facility. (Local Fire Departments, Ambulance & RCMP)

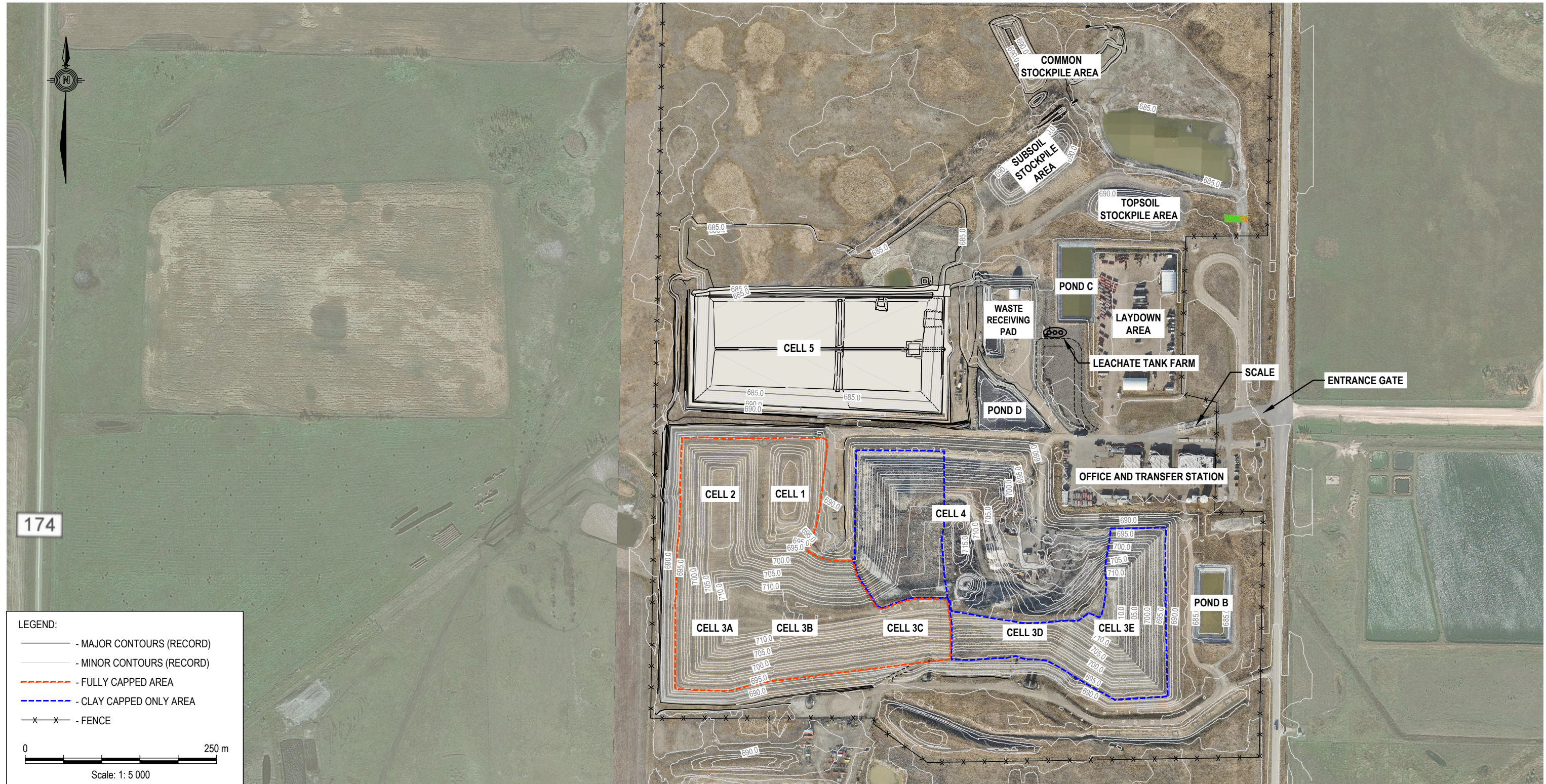
1.3 Steps to Follow During an Emergency

- a) Emergencies will normally be reported by plant staff via telephone, radio communication or face to face reports. Once reported, the alarm switch in the Dispatch office should be activated. Announce alarm over radio as well.
- b) Once the alarm has been sounded, a brief P.A. announcement giving the nature and location of the emergency will be made. After the P.A. announcement is made, the same announcement will be made over the two-way radio system.
- c) Upon hearing the alarm all personnel, including contractors, will secure their job and report immediately to the appropriate assembly area.
- d) Upon hearing the alarm, the Response Team will congregate at the Fire Pump House to plan any needed response. The Operations Manager or his delegate will coordinate the Response Team.
- e) Upon hearing the alarm, facility personnel, contractors and visitors will congregate at the designated assembly area. In cases of inclement weather, and at the conclusion of a satisfactory head count, plant personnel in the main assembly area may be directed to enter the administrative building for the remainder of the emergency.
- f) Upon hearing the alarm, the Fire Warden or Designate will deliver the sign-in register to the conference room along with a two-way radio and cell phone. The supervisor will then secure the front gate and conduct the head count. After performing the head count, the Fire Warden will join the Resource Team in the conference room.
- g) Upon hearing the alarm, the Facility Manager or designate and the Fire Warden will meet in the conference room and make up the Resource Team.
- h) Upon hearing the alarm, the Receptionist will forward all incoming calls to the answering service and proceed to the appropriate assembly area for a head count.
- i) The Resource Team will initiate the incident alert system as required, supply support for the Emergency Response Coordinator (the Operations Manager or his delegate).
- j) Upon hearing the alarm, the Emergency Response Coordinator will determine the location and nature of the emergency and coordinate the Emergency Response Team's response as necessary.
- k) Upon hearing the alarm, it will be the responsibility of each Manager and Supervisor to account for his or her staff for the purpose of the head count.
- l) Upon hearing the alarm, each sponsor of a visitor or contractor is responsible to account for his or her visitor or contractor.
- m) Unless directed (otherwise), all personnel should report to the normal assembly areas. Each situation may require that an alternate assembly area be used; this alternate area will be announced on the P.A. system and radio system. Any permits issued prior to the alarm are void and new permits will have to be made out for all contractors or operations requiring them.
- n) At the conclusion of the emergency, on advice from the Emergency Coordinator, the Resource Team will sound the "All Clear".

1.4 Roles of Third Party Response Teams

- a)** In the event that the facility's Emergency Response Team needs assistance from a third party Emergency Response Team, this request is to be made by the Response Team Coordinator to the Resource Team who will in turn contact the required services.
- b)** Once the third party Emergency Response Team(s) arrive, they will stop outside the fence/gate and await further instruction from the Emergency Response Coordinator.
- c)** The Clean Harbors Response Coordinator will remain Incident Scene Commander or a joint command will be formed.

Q:\Edmonton\Drafting\00_MASTER PROJECT BASE PLANS\Clean Harbors Ryley\PROJECTS\SWM\SWOP04490-01_North Quarter Development\04_Production Drawings\05_Issued for Record\SWM\SWOP04490-01-C001_R0_Operations Plan.dwg [-] March 08, 2024 - 10:56:41 am (BY: DMS, DEBASHS)



LEGEND:

- MAJOR CONTOURS (RECORD)
- MINOR CONTOURS (RECORD)
- FULLY CAPPED AREA
- CLAY CAPPED ONLY AREA
- FENCE

0 250 m

Scale: 1: 5 000

NUM	DATE	APR	DESCRIPTION
REVISIONS			
A	MAR 08/24	SS	ISSUED FOR REVIEW
NUM	DATE	APR	DESCRIPTION
DRAWING STATUS			

PERMIT

FILE NO: SWM.SWOP04490-01
 FILE NO: SWM.SWOP04490-01
 FILE NO: SWM.SWOP04490-01

PROFESSIONAL SEAL

CLIENT

CLEAN HARBORS RYLEY INDUSTRIAL WASTE MANAGEMENT FACILITIES, ALBERTA

OVERALL SITE PLAN

PROJECT No. SWM.SWOP04490-01	OFFICE EDM	DES SS	CKD SS	REV 1	DRAWING --
DATE: March 2024	SHEET No. 1 of 1	DWN DBD	APP SS	STATUS -	



Hazardous Waste/Recyclable Storage and Processing Facility Plan

Approval 10348-03-01
Sec. 4.6.4

*CLEAN HARBORS CANADA, INC. HWRSP
FACILITY PLAN*

1. HWRSP Facility Operations

Clean Harbors Ryley Facility manages its Hazardous Waste/ Recyclable Storage and Processing facility (HWRSP) operations through various SOP's which can be found in the Facility's SOP binder. The following sections summarize some of the relevant SOP's.

2. Drum Receiving

For the intention of this document "drum(s)" refers to all containers that may be received in the transfer station buildings. The loading dock is the primary means used for unloading trucks that deliver waste to the facility. Items may also be off-loaded directly off a truck (i.e. flat deck) if deemed necessary and can be done in a safe manner.

Limits

Maximum Hazardous Waste and Hazardous recyclable volume storage limits for the HWRSP Facility can be found in the Approval 10348-03-00 in Sections 4.6.20 – 23.

Off-loading

Off-loaded drums will be brought primarily into the Process building but may also be placed in the Staging area if there is not sufficient room in Process building. After the load is placed in a building it will be assigned a label with a unique bar-code. Bar-code numbers are tracked through the company's data base system

(WINWEB) and can be tracked from cradle to grave. Drums are confirmed to match their waste profile or waste code either visually or through a quick set of simple tests (such as pH paper test). If a drum is found not to match its code or profile it is sampled and submitted to the main lab for code verification. After the drums have been either sampled or verified, they can be further processed or moved to the Staging building and stored for future shipping.

3. Drum Processing

The scrubber shall be operable during any processing, transferring or while containers are open in both or either of the Process and Staging buildings as per section 4.2 in the Approval.

Bulking

Drums of liquids that have similar characteristics and that are confirmed to be compatible may be comingled or “bulked” together to save space and money. Flammable liquids and liquids with high heat values may be bulked together following SOP 90RY-101-00. Low heat value and non-flammable or aqueous liquids may also be bulked together following the same SOP. A site vacuum truck is used when bulking drums. After the procedure has been completed the bulked liquid will either be transferred to its corresponding storage tank or straight to a tanker that is waiting to be shipped. The Ryley Facility has 3 storage tanks inside the Process building that store bulk liquids.

- a) T100 – Flammable Liquids (18,000 L)
- b) T200 – Flammable Liquids (18,000 L)
- c) T300 – Non-Flammable Liquids (36,000 L)

Each tank is equipped with high levels alarms and level measuring devices.

Lab Pack Processing

Labpacks are processed at the labpack bulking station. Ensuring the scrubber system is operable during processing is mandatory as per the Approval. Typical labpack waste streams that are bulked into drums are acids, bases, flammable liquids, non-flammable liquids and flammable sludges. All labpacks that are processed must be tracked through the WINWEB system.

Landfilling

Drums and containers that arrive at the facility via the transfer station intended for the landfill are typically staged onsite prior to disposal at the landfill. Typically, a forklift is used to load a haul truck with the drums and the haul truck is driven to the landfill for final disposal. Clearance must be obtained from the landfill crew prior to the

delivery of items for landfill. Drums that are coded as sludge and require solidification prior to final placement must be dumped into the sludge pit as directed by the landfill crew. All drums delivered to the landfill and/or sludge pit must be tracked through the WINWEB system.

Off-spec Drums

If a drum is found to not match its profile (off-spec) then a new code is determined as a result of laboratory testing. The new code and any changes in processing are then communicated to the customer.

4. WINWEB Data base and Tracking System

The facility incorporates an internal waste tracking and data base network called WINWEB that is designed, built and exclusive to Clean Harbors. Almost every aspect of the business is tracked, recorded or tied to the WINWEB system in some way or another. Clean Harbors utilizes a data and information management system called WINWEB to record and store all information associated with shipments entering the facility including Generator's names, locations and manifest related data. The WINWEB system is currently used by all of Clean Harbors' sites across North America including the Ryley facility. The Company will use this system to track and record arrival and departure dates of all waste.

1. Revision Summary

Section	Revision/Review Detail	Approved By (Name and Title)	Date Approved
	Cover page & formatting	S. Yuha GM	Mar. 8, 2024

APPENDIX M

Inspection Form Examples



RY - DAILY WASTE CELLS
INSPECTION LOG

Response Id:
2045993

Compliance Header	
Inspector Name	
Area of Inspection	
Inspection Date and Time	
Instructions 1	
Note condition of inspection items. If item does not apply to an area, mark N/A. Describe the problems and remedial actions in the space provided under each inspection item.	
Cell 1	
Leachate building and tank	
Secondary water pumped (litres)	
Cell 1 cap condition (grass, erosion)	
Cell 2	
Leachate building and tank	
Secondary water pumped (litres)	
Cell 2 cap condition (grass, erosion)	
Cell 3	
Leachate building and tank	
Secondary water pumped (litres)	
Cell 3 cap condition (grass, erosion)	
Cell 4	
Leachate building and tank	
Secondary water pumped (litres)	
Cell 4 cap condition (grass, erosion)	
Cell 5	
Leachate building and tank	
Secondary water pumped (litres)	
Cell 5 cap condition (grass, erosion)	
Cell 6	
Leachate building and tank	

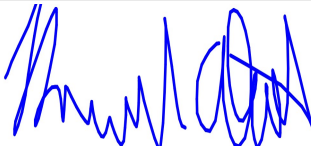
Secondary water pumped (litres)	
Cell 6 cap condition (grass, erosion)	
Cell 7	
Leachate building and tank	
Secondary water pumped (litres)	
Cell 7 cap condition (grass, erosion)	
Pond 1	
Type in pond level (Below first mark; Between marks; Above top mark; Pumping)	
Pond 1 compliance	
Pond 2	
Type in pond level (Below first mark; Between marks; Above top mark; Pumping)	
Pond 2 compliance	
Dispersible waste must not be landfilled when wind exceeds 30 KM/HR	
Average wind speed (km/hr)	
Wind Direction (Wind direction is the direction the wind is coming from.)	
Precipitation (inches)	
Appearance/ cleanliness: Cell entrance, roads, buildings, bone yard, security	
Lugger pad	
Compliance Footer	
Inspector Signature	
Inspection Overall Assessment	



RY - DAILY WASTE CELLS
INSPECTION LOG

Response Id:
11590530

Compliance Header	
Inspector Name	421252 - Otto Alcott (ALCOTTO421252)
Area of Inspection	Ryley Facility
Inspection Date and Time	07/06/2023 10:22 AM
Instructions 1	
Note condition of inspection items. If item does not apply to an area, mark N/A. Describe the problems and remedial actions in the space provided under each inspection item.	
Cell 1	
Leachate building and tank	Pass
Secondary water pumped (litres)	0
Cell 1 cap condition (grass, erosion)	Pass
Cell 2	
Leachate building and tank	Pass
Secondary water pumped (litres)	0
Cell 2 cap condition (grass, erosion)	Pass
Cell 3A (Cell 3)	
Leachate building and tank	Pass
Secondary water pumped (litres)	12
Cell 3 cap condition (grass, erosion)	Pass
Cell 3B (Cell 4)	
Leachate building and tank	Pass
Secondary water pumped (litres)	35
Cell 4 cap condition (grass, erosion)	Pass
Cell 3C (Cell 5)	
Leachate building and tank	Pass
Secondary water pumped (litres)	3
Cell 5 cap condition (grass, erosion)	Pass
Cell 3D (Cell 6)	
Leachate building and tank	Pass

Secondary water pumped (litres)	0
Cell 6 cap condition (grass, erosion)	Pass
Cell 3E (Cell 7)	
Leachate building and tank	Pass
Secondary water pumped (litres)	66
Cell 7 cap condition (grass, erosion)	Pass
Cell 4 (Cell 8)	
Leachate building and tank	Pass
Secondary water pumped (litres)	0
Cell 4 cap condition (grass and erosion)	Pass
Pond 2	
Type in pond level (Below first mark; Between marks; Above top mark; Pumping)	3/4
Pond 2 compliance	Pass
Pond 3	
Type in pond level (Below first mark; Between marks; Above top mark; Pumping)	3/4
Pond 3 compliance	Pass
Dispersible waste must not be landfilled when wind exceeds 30 KM/HR	
Average wind speed (km/hr)	6.12
Wind Direction (Wind direction is the direction the wind is coming from.)	NNE
Precipitation (inches)	0
Appearance/ cleanliness: Cell entrance, roads, buildings, bone yard, security	Pass
Lugger pad	Pass
Compliance Footer	
Inspector Signature	
Inspection Overall Assessment	Inspection Passed



R/Y Transfer Station Daily Inspection

Form Code: 863

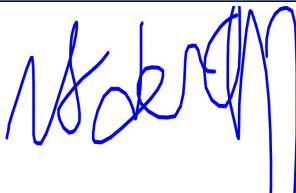
Compliance Header	
Inspector Name	
Area of Inspection	
Inspection Date and Time	
Instructions1	
Inspections must be conducted daily when the facility is in operation. Note condition of inspection items. All unsatisfactory findings must be explained below. Include any repairs, changes or other remedial actions required.	
Fire pumphouse	
Engine fuel (%)	
Fire tank level (%)	
Fire tank temp. (°C)	
Potable tank (%)	
Potable tank temp. (°C)	
Fire pumphouse compliance	
Scrubber building	
Caustic tank pH > 8.0	
Weekly exhaust PPM	
Scrubber building compliance	
Inspection items1	
MCC building	
Staging building	
Process building	
Yard	
Compliance Footer	
Inspector Signature	
Attach Photo	

Inspection Overall Assessment	
-------------------------------	--



R/Y Transfer Station Daily
Inspection

Response Id:
11885597

Compliance Header	
Inspector Name	415151 - Nicholas Sideroff (SIDERON415151)
Area of Inspection	Ryley Facility
Inspection Date and Time	09/01/2023 4:03 PM
Instructions1	
Inspections must be conducted daily when the facility is in operation. Note condition of inspection items. All unsatisfactory findings must be explained below. Include any repairs, changes or other remedial actions required.	
Fire pumphouse	
Engine fuel (%)	95
Fire tank level (%)	100
Fire tank temp. (°C)	16
Potable tank (%)	75
Potable tank temp. (°C)	16
Fire pumphouse compliance	Pass
Scrubber building	
Caustic tank pH > 8.0	9.16
Weekly exhaust PPM	0
Scrubber building compliance	Pass
Inspection items1	
MCC building	Pass
Staging building	Pass
Process building	Pass
Yard	Pass
Compliance Footer	
Inspector Signature	
Inspection Overall Assessment	Inspection Passed



Landlord Header	
Inspector Name	
Area of Inspection	Ryley
Inspection Date and Time	
CO Management Inspection Instructions	
Instructions: Note condition of inspection items. If item does not apply to an area, mark N/A. All unsatisfactory findings must be explained below. Include any repairs, changes or other remedial actions required or performed.	
Container Storage Areas	
The housekeeping meets Clean Harbors standards. [Clean floors, clean walls, no trash, clean equipment, tools in proper storage locations, no odors or spills]	
There are no visible stains in the containment or other plant areas.	
The containers do not have waste/staining on the outside which would require cleaning or over-packing	
The Containers are in good condition, (not crushed, pinched or damaged), properly closed, with legible labels that are facing the aisle.	
Containers are stored in an organized fashion that allows for easy inspection; aisle space meets regulatory/permit requirements, and is clear and free of obstructions	
The containers have labels that are completed properly with no missing information (i.e. accumulation start date, hazard identification, etc.)	
There are no cracks or gaps in containment that need to be caulked/sealed. Any areas of older cracks that have been previously repaired are still in good condition.	
If concrete is sealed, sealant is in good	

condition with no cracks, gaps or areas needing repairs.	
Any sumps in containment are empty and clean.	
Satellite or accumulation containers are properly marked and closed.	
There are no observed safety issues (trips/slips/fall hazards, damaged equipment).	
Tanks	
Housekeeping meets Clean Harbors' standards.. There is no debris, plant matter, accumulated rain water or other material accumulated within containment.	
There are no visible stains in the containment area.	
Any small containers within the containment are properly marked and closed (unless adding or removing material).	
Sumps are clean and empty.	
If the tanks store hazardous waste they are marked with the words Hazardous Waste, have a NFPA diamond and appropriate "confined space" markings at entrances, and any other registration or permit required markings.	
If the tanks are out of service, they are marked with the words Out of Service and properly documented in the WIN tank management system.	
Satellite or accumulation containers are properly marked and closed.	
Level indicators are functional and do not indicate any potential overflow condition.	
All tanks are documented in the WIN tank management system.	
There are no observed safety issues.	
PCB Storage	

Any spills or visible stains have had a proper decon and wipe test	
All pumps and equipment associated with PCBs have PCB labeling.	
Out of Service dates and PCB marks are properly placed on containers	
Tanks have PCB mark	
Containment areas used to store PCB's are coated and the coatings are free of cracks, gaps, and damage.	
Entrances to the storage area are marked with the PCB Label as well as all access points into the facility. These marking requirements are also followed in the laboratory (if applicable).	
Housekeeping meets Clean Harbors' standards [Clean floors, clean walls, no trash, clean equipment, tools in proper storage locations, no odors or spills]	
There are no observed safety issues.	
Process Areas	
Process areas are free of heavy residues (accumulated solids, sludges or other process residues) that indicate a spill or equipment leak has occurred.	
Satellite or accumulation containers are labeled properly and remain closed.	
No visible staining on floors	
Housekeeping meets Clean Harbors' standards.	
There are no observed safety issues.	
Yard/General	
There are no incoming loads sitting in the yard that exceed the allowed time limit.	
There are no outgoing loads sitting in the yard for more than the allowed time limit (10 days in	

most cases).	
Trucks in staging or storage areas containing hazardous waste have the manifest attached to the truck or in close proximity.	
Truck landing gear is supported and is not sinking into the ground.	
There are no visible stains on the surfaces outside the facility.	
There are no vehicles parked in the yard that are leaking.	
Housekeeping meets Clean Harbors' standards.	
Facility signage is in good order and legible, including all required perimeter signs.	
Security fencing is not damaged or compromised; gates are closed and locked when facility is not manned, or if required to be closed and locked due to permit conditions during normal operations.	
Security cameras (if required) are operational.	
Yard lights are all operational.	
Spare or excess equipment storage area (Boneyard) is organized and neat.	
There are no observed safety issues.	
Permit or SOP Requirements	
All operations are compliant with permit requirements	
All operations are compliant with SOP or BMP requirements	
Inspections are properly done and findings are documented on work tickets	
All pending work tickets are promptly managed to completion.	
Landlord Footer	


Inspector Signature	
Inspection Overall Assessment	



Landlord Header	
Inspector Name	013193 - Stan Yuha (YUHAS1)
Area of Inspection	Ryley
Inspection Date and Time	11/09/2023 1:40 PM
CO Management Inspection Instructions	
Instructions: Note condition of inspection items. If item does not apply to an area, mark N/A. All unsatisfactory findings must be explained below. Include any repairs, changes or other remedial actions required or performed.	
Container Storage Areas	
The housekeeping meets Clean Harbors standards. [Clean floors, clean walls, no trash, clean equipment, tools in proper storage locations, no odors or spills]	Comments: Floors need to be swept.,Fail,Reason for failure: housekeeping,Work Ticket Status: Review
There are no visible stains in the containment or other plant areas.	Pass
The containers do not have waste/staining on the outside which would require cleaning or over-packing	Pass
The Containers are in good condition, (not crushed, pinched or damaged), properly closed, with legible labels that are facing the aisle.	Pass
Containers are stored in an organized fashion that allows for easy inspection; aisle space meets regulatory/permit requirements, and is clear and free of obstructions	Pass
The containers have labels that are completed properly with no missing information (i.e. accumulation start date, hazard identification, etc.)	Pass
There are no cracks or gaps in containment that need to be caulked/sealed. Any areas of older cracks that have been previously repaired are still in good condition.	Pass
If concrete is sealed, sealant is in good	Pass

condition with no cracks, gaps or areas needing repairs.	
Any sumps in containment are empty and clean.	Pass
Satellite or accumulation containers are properly marked and closed.	N/A,N/A
There are no observed safety issues (trips/slips/fall hazards, damaged equipment).	Pass
Tanks	
Housekeeping meets Clean Harbors' standards.. There is no debris, plant matter, accumulated rain water or other material accumulated within containment.	Pass
There are no visible stains in the containment area.	Pass
Any small containers within the containment are properly marked and closed (unless adding or removing material).	N/A
Sumps are clean and empty.	Pass
If the tanks store hazardous waste they are marked with the words Hazardous Waste, have a NFPA diamond and appropriate "confined space" markings at entrances, and any other registration or permit required markings.	Pass
If the tanks are out of service, they are marked with the words Out of Service and properly documented in the WIN tank management system.	N/A
Satellite or accumulation containers are properly marked and closed.	N/A
Level indicators are functional and do not indicate any potential overflow condition.	Pass
All tanks are documented in the WIN tank management system.	Pass
There are no observed safety issues.	Pass,Pass,Pass,Pass
PCB Storage	

Any spills or visible stains have had a proper decon and wipe test	N/A
All pumps and equipment associated with PCBs have PCB labeling.	N/A
Out of Service dates and PCB marks are properly placed on containers	N/A
Tanks have PCB mark	N/A
Containment areas used to store PCB's are coated and the coatings are free of cracks, gaps, and damage.	Pass
Entrances to the storage area are marked with the PCB Label as well as all access points into the facility. These marking requirements are also followed in the laboratory (if applicable).	Pass
Housekeeping meets Clean Harbors' standards [Clean floors, clean walls, no trash, clean equipment, tools in proper storage locations, no odors or spills]	Pass
There are no observed safety issues.	Pass,Pass,Pass
Process Areas	
Process areas are free of heavy residues (accumulated solids, sludges or other process residues) that indicate a spill or equipment leak has occurred.	Pass
Satellite or accumulation containers are labeled properly and remain closed.	Pass
No visible staining on floors	Pass
Housekeeping meets Clean Harbors' standards.	Pass,Pass
There are no observed safety issues.	Pass,Pass
Yard/General	
There are no incoming loads sitting in the yard that exceed the allowed time limit.	Pass
There are no outgoing loads sitting in the yard for more than the allowed time limit (10 days in most cases).	Pass
Trucks in staging or storage areas containing	Pass

hazardous waste have the manifest attached to the truck or in close proximity.	
Truck landing gear is supported and is not sinking into the ground.	Pass
There are no visible stains on the surfaces outside the facility.	Pass
There are no vehicles parked in the yard that are leaking.	Pass
Housekeeping meets Clean Harbors' standards.	Pass
Facility signage is in good order and legible, including all required perimeter signs.	Pass
Security fencing is not damaged or compromised; gates are closed and locked when facility is not manned, or if required to be closed and locked due to permit conditions during normal operations.	Pass
Security cameras (if required) are operational.	Pass
Yard lights are all operational.	Pass
Spare or excess equipment storage area (Boneyard) is organized and neat.	Pass
There are no observed safety issues.	Pass
Permit or SOP Requirements	
All operations are compliant with permit requirements	Pass
All operations are compliant with SOP or BMP requirements	Pass
Inspections are properly done and findings are documented on work tickets	Pass
All pending work tickets are promptly managed to completion.	Pass
Landlord Footer	
Inspector Signature	
Inspection Overall Assessment	Inspection Failed

APPENDIX N

Financial Security Calculations

Clean Harbors Ryley Facility - Financial Security Calculations
Closure and Post Closure Net Present Value Calculation

Closure Cost		Post Closure Cost	
Cell Closure Cost	\$3,211,297	Inspection	\$3,574
Pond 2	\$122,505	Maintenance	\$12,000
Transfer Station	\$1,910,324	Administration	\$9,520
Tipping Pad	\$331,510	Leachate Management (First Year)	\$868,896
Laydown Area	\$397,933	Groundwater Monitoring	\$35,920
		Leachate Monitoring	\$16,720
TOTAL Closure	\$5,973,569	TOTAL Annual Post Closure	\$946,630
		TOTAL Annual Post Closure (Excl. Leachate)	\$77,734.08

Total Post Closure Period Costs (NPV)		
Discount Rate *	3.38%	
Inflation **	1.92%	

* Bank of Canada long-term (30 year) Benchmark

Bond Yield - Average between 03/2023 - 01/2001

[Selected bond yields - Bank of Canada](#)

** Average CPI inflation from Q1 1993 - Q4 2022 in Canada

[Inflation: Definitions, graphs and data - Bank of Canada](#)

Summary	Total \$
Closure Cost	\$5,973,569
Post Closure (25 year period with Discount Factor applied)	\$5,168,036
Total	\$11,141,605

Annual Post Closure Cost

Year	1	2	3	4	5
Inflated Values	1.000	1.019	1.039	1.059	1.079

\$946,630

\$821,485

\$817,170

\$819,331

\$312,698

**Post Closure Costs
(With Leachate
Reduction and
Inflation Factor
Applied)**

6	7	8	9	10	11	12
1.100	1.121	1.142	1.164	1.186	1.209	1.232

\$245,206
 \$277,944
 \$167,242
 \$145,757
 \$131,586
 \$122,308
 \$116,719

13	14	15	16	17	18	19
1.256	1.280	1.305	1.330	1.355	1.381	1.408

\$113,701

\$112,195

\$112,894

\$115,059

\$117,265

\$119,513

\$121,805

20	21	22	23	24	25
1.435	1.462	1.490	1.519	1.548	1.578

\$124,141 \$126,521 \$128,947 \$131,420 \$133,940 \$136,508

Closure and Post-Closure Cost Calculations 2023 (includes Cell 5)

CLOSURE COST ESTIMATES											
ITEM	QUANTITY	COST/UNIT	CELL 1	CELL 2	CELL 3A	CELL 3B	CELL 3C	Cell 3D	Cell 3E	Cell 4	Cell 5
CLOSURE COSTS, LANDFILL CELLS											
Cell area (m2)			10530	15210	20408	18517	19357	26058	28551	25046	41550
Capping Status			Capped	Capped	Capped	Capped	64% Capped	29% Clay Cap - 6% Capped	Clay Cap 76%	0% Capped	0% Capped
Surface prep/n/m2*		\$ 2.00	\$ -	\$ -	\$ -	\$ -	\$ 17,808.44	\$ 37,002.36	\$ 13,704.48	\$ 50,092.00	\$ 83,100.00
Clay req'd/m2 @ 0.6 m thickness(m3) *	0.6	\$ 11.00	\$ -	\$ -	\$ -	\$ -	\$ 58,767.85	\$ 122,107.79	\$ 45,224.78	\$ 165,303.60	\$ 274,230.00
Supply & install HDPE liner/m2 (black) *		\$ 13.05	\$ -	\$ -	\$ -	\$ -	\$ 116,200.07	\$ 319,653.49	\$ 372,590.55	\$ 326,850.30	\$ 542,227.50
Supply & install Geotextile/m2 **		\$ 2.00	\$ -	\$ -	\$ -	\$ -	\$ 17,808.44	\$ 48,989.04	\$ 57,102.00	\$ 50,092.00	\$ 83,100.00
QA/QC (15% of total of first 4 items) ***	15%		\$ -	\$ -	\$ -	\$ -	\$ 31,587.72	\$ 79,162.90	\$ 73,293.27	\$ 88,850.69	\$ 147,398.63
Sub-soil @ 0.45 m thickness (m3) *	0.45	\$ 7.25	\$ -	\$ -	\$ -	\$ -	\$ 31,576.11	\$ 85,014.23	\$ 93,147.64	\$ 81,712.58	\$ 135,556.88
Native soil cover @ 0.15 m thickness (m3) *	0.15	\$ 7.25	\$ -	\$ -	\$ -	\$ -	\$ 10,525.37	\$ 28,338.08	\$ 31,049.21	\$ 27,237.53	\$ 45,185.63
Fertilizer & hydroseeding - cost/m2 ****		\$ 2.00	\$ -	\$ -	\$ -	\$ -	\$ 19,357.00	\$ 52,116.00	\$ 57,102.00	\$ 50,092.00	\$ 83,100.00
Subtotal Closure Costs			\$ -	\$ -	\$ -	\$ -	\$ 303,631.00	\$ 772,383.88	\$ 743,213.94	\$ 840,230.69	\$ 1,393,898.63
Engineering ***	5%		\$ -	\$ -	\$ -	\$ -	\$ 15,181.55	\$ 38,619.19	\$ 37,160.70	\$ 42,011.53	\$ 69,694.93
Contingency	15%		\$ -	\$ -	\$ -	\$ -	\$ 47,821.88	\$ 121,650.46	\$ 117,056.19	\$ 132,336.33	\$ 219,539.03
Total Closure Costs			\$ -	\$ -	\$ -	\$ -	\$ 366,634.43	\$ 932,653.53	\$ 897,430.83	\$ 1,014,578.55	\$ 1,683,132.59
* Unit rates based on Cell 5 Bid Sheet 2023											
** Based on standard industry unit rate											
*** Based on Typical Capping Engineering & QA-QC											
**** Unit rate based on recent hydroseed rates (2023)											
CELL CLOSURE COST											
\$3,211,297.34											
STORMWATER RETENTION POND CLOSURE											
ITEM		COST/UNIT	POND 1*	POND 2		POND 3**					
Pond Volume (m3)				7600		0					
Pond Area (m2)				5000		0					
Clay fill (m3)		\$ 8.00	\$ -	\$ 66,880.00	\$ -	\$ -					
Sub-soil @ 0.35 m thickness (m3)		\$ 7.25	\$ -	\$ 12,687.50	\$ -	\$ -					
Native soil cover @ 0.15 m thickness (m3)		\$ 7.25	\$ -	\$ 5,437.50	\$ -	\$ -					
Seeding - cost/m2		\$ 0.50	\$ -	\$ 2,500.00	\$ -	\$ -					
Pond surface gravel removal incl geotextile		\$ -	\$ -	\$ -	\$ -	\$ -					
Geomembrane liner removal		\$ 5.00	\$ -	\$ 25,000.00	\$ -	\$ -					
pumping the water down		\$ 10,000.00	\$ -	\$ 10,000.00	\$ -	\$ -					
* Decommissioned											
** Closure of Pond 3 is included in the Closure Costs for the Equipment Storage and Laydown Area, below.											
STORMWATER RETENTION POND CLOSURE (POND 2 ONLY)											
\$122,505.00											
CLOSURE COSTS, TRANSFER STATION											
DISPOSAL COST FOR INVENTORY REMOVAL*		\$548,687.37									
TRANSPORTATION COST FOR INVENTORY DISPOSAL**		\$238,971.53									
MOBILIZATION***		\$6,225.00									
UTILITY LOCATES/CONFIRM UTILITY DISCONNECT***		\$12,450.00									
TANK CLEANING***		\$193,082.32									
REMOVE TANKS ***		\$10,130.57		Leachate Tank T5100 removed and disposed							
REMOVE SECONDARY CONTAINMENT***		\$28,738.34									
BUILDING DEMOLITION & REMOVAL***		\$142,192.70									
BUILDING FOUNDATION REMOVAL***		\$376,078.40									
PROCESS EQUIPMENT REMOVAL***		\$4,357.50									
REMOVE MISCELLANEOUS ITEMS, ASPHALT, FENCING ETC***		\$138,534.89									
DEMOLITION***		\$6,225.00									
CONFIRMATORY SOIL SAMPLING***		\$31,125.00									
ENVIRONMENTAL REPORTING***		\$9,337.50									
REMEDICATION & RECLAMATION CERTIFICATE/CONFIRMATION OF NO IMPACT***		\$12,450.00									
ON-SITE CONSULTING FEES (SITE SUPERVISION, LABORERS***		\$44,820.00									
ON-SITE CONSULTING FEES (POST-CLOSURE ACTIVITIES***		\$22,410.00									
PROJECT MANAGEMENT FEE (10% OF TOTAL CONSTRUCTION ABANDONMENT/DEMOLITION COSTS)***		\$84,508.11									

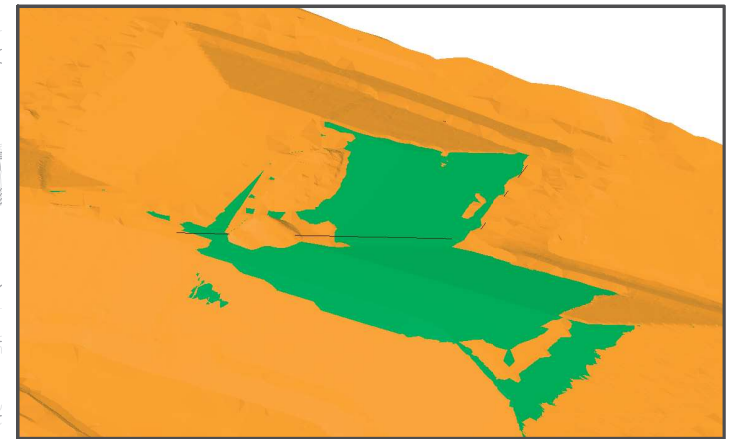
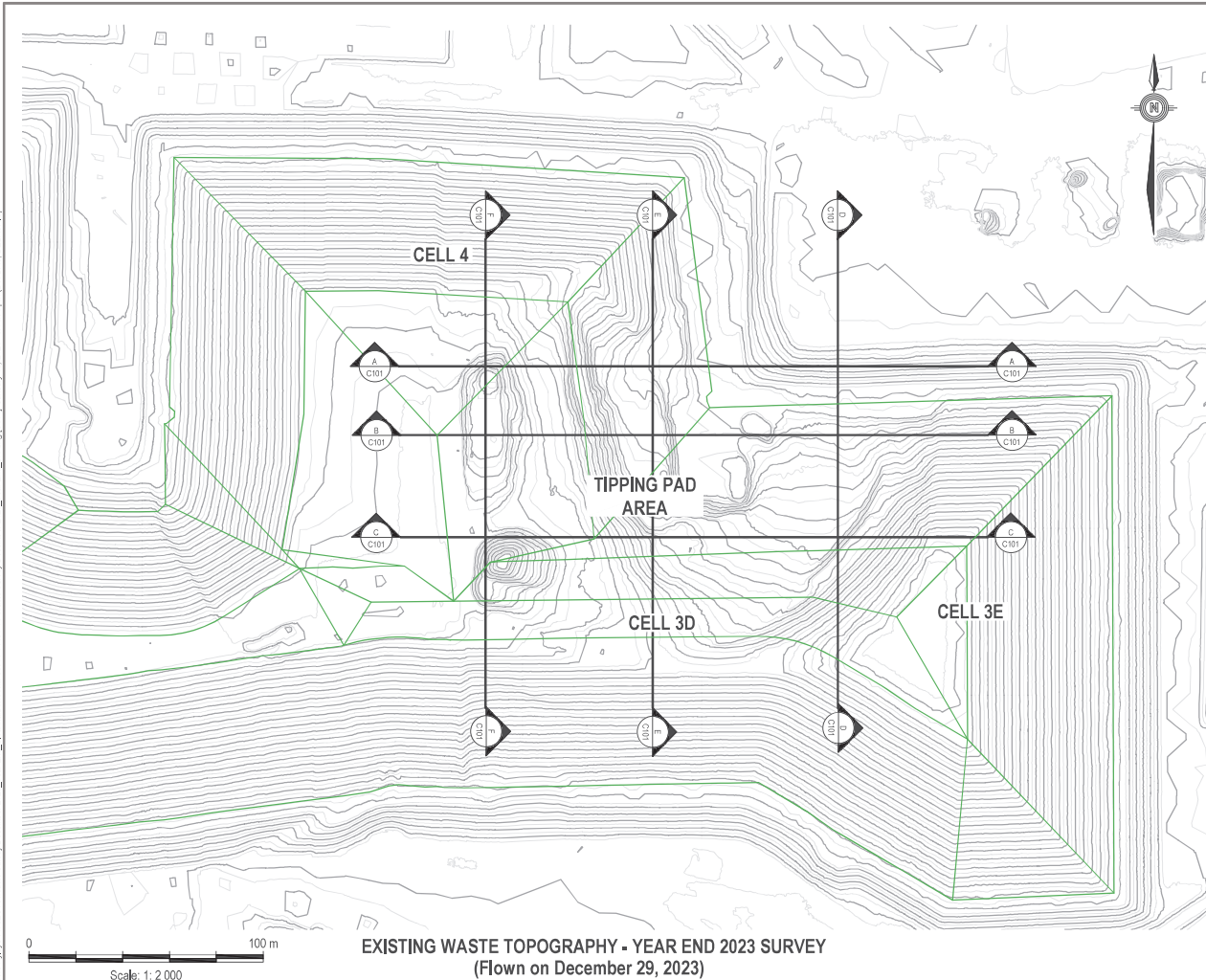
Closure and Post-Closure Cost Calculations 2023 (includes Cell 5)

INSPECTIONS BY TECHNICIAN	Number of Inspections	TIME (HOUR)	COST/HOUR*	AVERAGE ANNUAL COST (# INSPECTIONS)(TIME)(COST)/25 YR)																
1/WEEK, FIRST 3 MONTHS	12																			
1/MONTH, 4-12 MONTHS	9																			
1 PER 2 MONTHS, YEARS 2-5	24																			
1 PER 6 MONTHS, YEARS 6-25	40																			
TOTAL	85	8	\$ 95.00	\$ 2,584.00																
INSPECTIONS BY ENGINEER																				
2/YEAR, FIRST YEAR	2																			
1/YEAR, YEARS 2-25	24																			
TOTAL	26	8	\$ 119.00	\$ 990.08																
*Costs based on Tetra Tech 2023 T1 rate and E1 rate																				
*Company min range																				
TOTAL AVERAGE ANNUAL INSPECTION COSTS				\$ 3,574.08																
MAINTENANCE																				
GRASS MOWING, PER YEAR				\$ 12,000.00																
- Based on information provided by Clean Harbors (March 2023), assumed a total grass mowing of 12,000																				
TOTAL ANNUAL MAINTENANCE COSTS				\$ 12,000.00																
ADMINISTRATION COSTS																				
ESTIMATED ANNUAL ADMIN. (HOURS)	0																			
COST/HOUR*	80																			
ANNUAL ADMINISTRATION COST	\$ 119.00																			
*Costs based on Tetra Tech 2023 E1 rate																				
*Company min range																				
TOTAL ANNUAL ADMINISTRATION COST				\$ 9,520.00																
LANDFILL GAS MANAGEMENT & MONITORING																				
Not applicable - no gas generated from industrial landfill wastes, no landfill gas monitoring and management currently at the landfill facility																				
SURFACE WATER/STORMWATER MANAGEMENT & MONITORING																				
Not applicable - site will be re-vegetated, surface water & stormwater will flow to natural drainage areas. Closure costs are shown above																				
LEACHATE MONITORING																				
	Quantity	UNITS	COST/UNIT*	\$	-															
Leachate head monitoring, monthly	12	8	\$95.00	\$9,120.00																
Leachate analysis - annual (primary & secondary) (Clean Harbors 2023)	8	2	\$475.00	\$7,600.00																
*Costs based on Tetra Tech 2023 T1 Minimum rate																				
ANNUAL LEACHATE MONITORING COSTS				\$16,720.00																
GROUNDWATER MONITORING																				
# MONITORING WELLS*	48	[Confirmed in 2022 annual report]																		
# MONITORING EVENTS/YEAR*	1	[Monitored and sampled in June 2022]																		
COST OF MONITORING/WELL (includes est. reporting costs)	\$ 748.33																			
ANNUAL MONITORING COSTS**	\$ 35,920.00																			
* Tetra Tech 2022 Groundwater Monitoring Program, Ryley Class I Waste Management Facility, Ryley, Alberta																				
**The Tetra Tech 2022 budget for the GMP is 35,920.00.																				
TOTAL ANNUAL GROUNDWATER MONITORING COSTS				\$35,920.00																
SUMMARY:																				
ANNUAL POST CLOSURE COST				\$ 77,734.08																
POST CLOSURE COST (25 YEARS)				\$ 1,943,352.00																
CUMULATIVE LEACHATE MANAGEMENT COSTS (25 YEARS)				\$ 3,768,569.54																
CLOSURE & POST POST CLOSURE (NO NET PRESENT VALUE)				\$ 11,431,714.66																

APPENDIX O

Site Development Plan

Q:\Environment\00_MASTER PROJECT BASE PLUS\03 Clean Harbor Rfly\PROJECTS\Waste Survey December 2022_year_end_CleanHarbor\SWMS\WOP04490-01.dwg [C:\01] January 08, 2024 - 5:04:59 pm (By: DAS, DEBASHS)



DESIGN TOP OF WASTE (GREEN) VS. YEAR END 2023 WASTE SURVEY (ORANGE)

REMAINING AIRSPACE TOTAL.....78,176 m³
(Cut: 7,753, Fill: 85,929, Net: 78,176)

WASTE PLACED SINCE DECEMBER 2022 SURVEY.....114,315 m³

NOTES:

1. TOPOGRAPHY SHOWN IS THE 2023 YEAR END WASTE SURVEY (Surveyed by Clean Harbors on Dec 29, 2023)
2. UTM with NAD83 datum, Zone 12, Meter, Central Meridian 111d W

STATUS
ISSUED FOR USE

NUM	DATE	APR	SB	ISSUED FOR USE	DESCRIPTION
0	JAN 08/24	APR	SB	ISSUED FOR USE	DESCRIPTION
REVISIONS					
NUM	DATE	APR	SB	ISSUED FOR REVIEW	DESCRIPTION
A	JAN 08/24	APR	SB	ISSUED FOR REVIEW	DESCRIPTION
DRAWING STATUS					

PERMIT

PROFESSIONAL SEAL

CLIENT

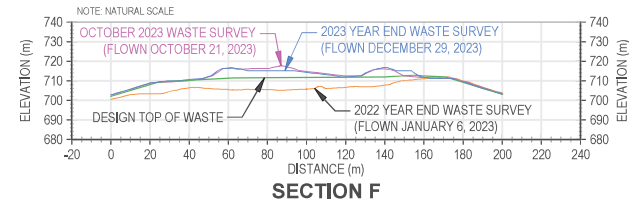
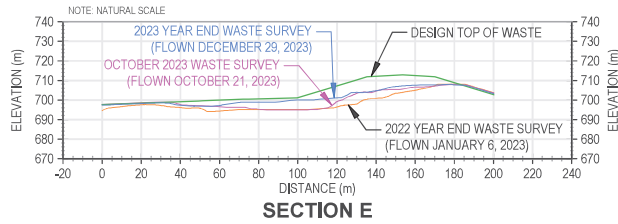
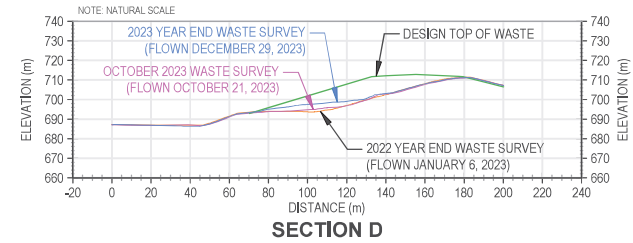
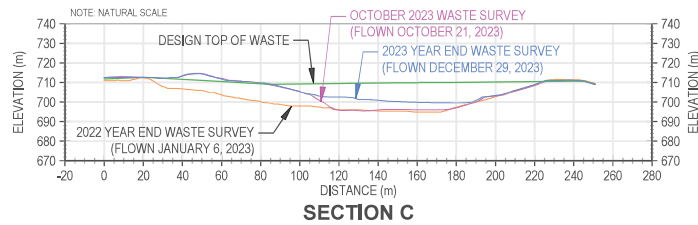
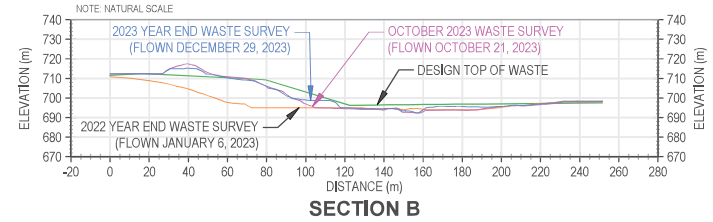
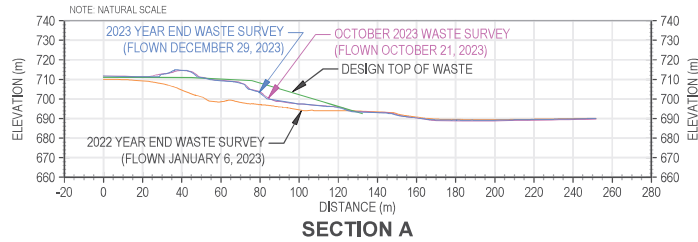


CLEAN HARBORS
2023 YEAR END WASTE SURVEY

PLAN
2023 YEAR END WASTE SURVEY

PROJECT No. SWMS.WOP04490-01	OFFICE EDM	DES -	CKD SB	REV 0	DRAWING
DATE: January 2024	SHEET No. 1 of 2	DWN DRG / DBD	APP SB	STATUS -	C100

Q:\Environment\Hunting\00_MASTER PROJECT\BASE PLAN\Qian Harbor\Ripley\PROJECTS\Waste Survey\December 2022_Year End_CleanHarbor\SWM\SWP04490-01.dwg [D:\1 January 08 2024 - 5:08:26 pm] (Dr. DAS, DEBASIS)



STATUS
ISSUED FOR USE

NUM	DATE	APR	DESCRIPTION
0	JAN 08/24	SB	ISSUED FOR USE
REVISIONS			
A	JAN 08/24	SB	ISSUED FOR REVIEW
DRAWING STATUS			

PERMIT

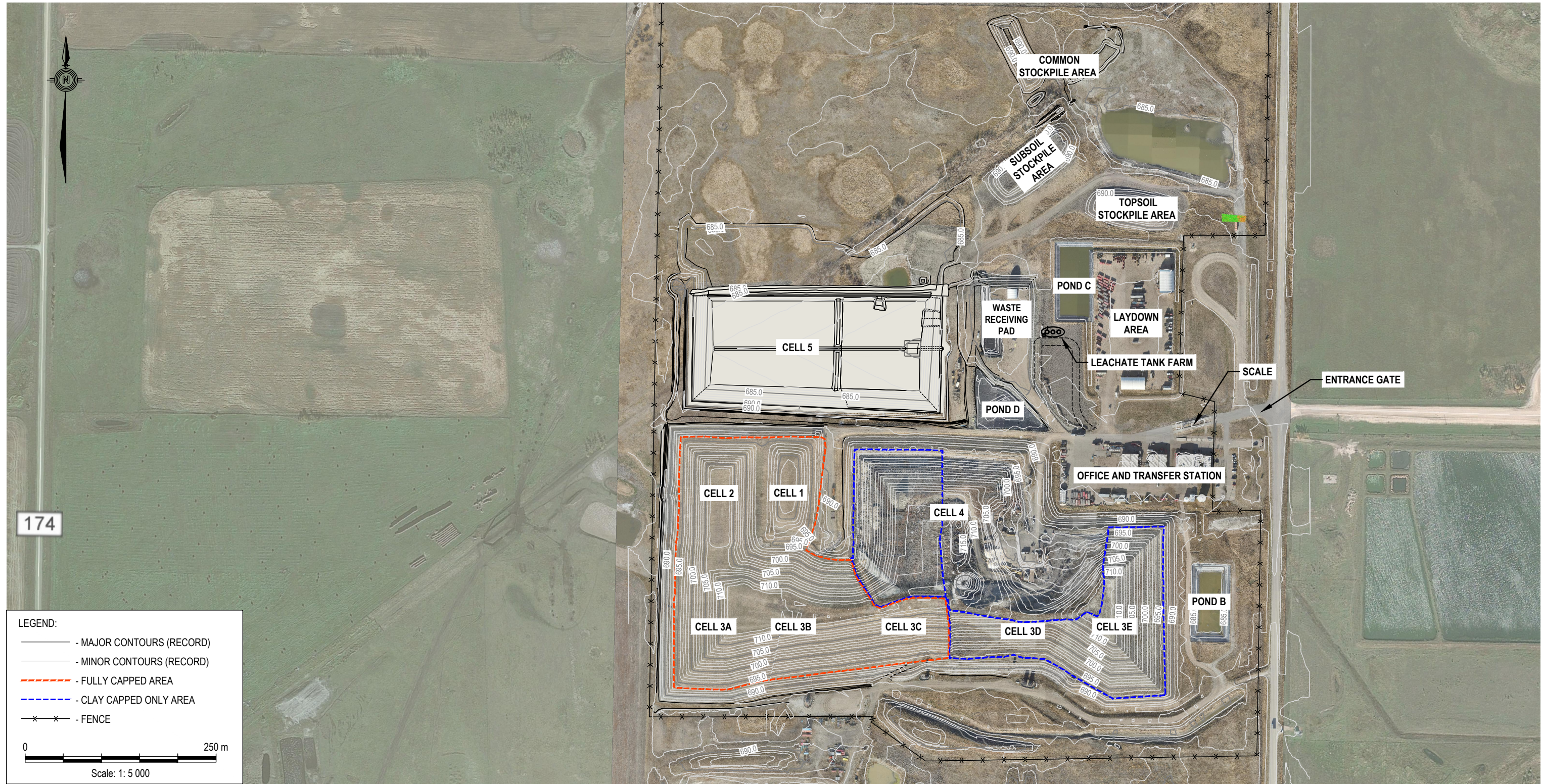
PROFESSIONAL SEAL

CLIENT




CLEAN HARBORS					
2023 YEAR END WASTE SURVEY					
CROSS-SECTIONS A - F					
2023 YEAR END WASTE SURVEY					
PROJECT No. SWM.SWP04490-01	OFFICE EDM	DES -	CKD SB	REV 0	DRAWING
DATE: January 2024	SHEET No. 2 of 2	DWN DRG / DBD	APP SB	STATUS -	C101

Q:\Edmonton\Drafting\00_MASTER PROJECT BASE PLANS\Clean Harbors Ryley\PROJECTS\SWM\SWOP04490-01_North Quarter Development\04_Production Drawings\05_Issued for Record\SWM\SWOP04490-01-C001_R0_Operations Plan.dwg [-] March 08, 2024 - 10:56:41 am (BY: DMS, DEBASHS)



174

NUM	DATE	APR	DESCRIPTION
REVISIONS			
A	MAR 08/24	SS	ISSUED FOR REVIEW
NUM	DATE	APR	DESCRIPTION
DRAWING STATUS			

PERMIT

FILE NO: SWM.SWOP04490-01
 FILE NO: SWM.SWOP04490-01
 FILE NO: SWM.SWOP04490-01
 PROFESSIONAL SEAL

CLIENT

CLEAN HARBORS RYLEY INDUSTRIAL WASTE MANAGEMENT FACILITIES, ALBERTA

OVERALL SITE PLAN

PROJECT No. SWM.SWOP04490-01	OFFICE EDM	DES SS	CKD SS	REV 1	DRAWING --
DATE: March 2024	SHEET No. 1 of 1	DWN DBD	APP SS	STATUS -	

APPENDIX P

Annual Landfill Cell Closure Report

Annual Landfill Cell Closure Report

No landfill cells were closed in 2023.

Appendix Q
Contravention Reports
(7-Day Letters)



February 10, 2023

Environmental Response Centre
Alberta Environment
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 409379

On February 3rd, 2023 I attempted to retrieve the wind data for the month of January, from our monitoring station on top of the Ryley School as required in our Approval, Section 4.2.19. However, when I reviewed the raw data, I discovered the wind data had not been recording properly. It seems the program had been corrupted and the instrument was recording zeros. I returned to the School station Friday 3rd afternoon, Monday 6th and Tuesday 7th making several attempts to reprogram the instrument, however I was unsuccessful. I am now working with the company that provided the original programing and we will have the instrument back in compliance as soon as possible. The wind data was retrieved successfully from the Facility monitoring station.

There were no environmental impacts associated with the unusual failure of the wind data instrument.

If you have any questions, do not hesitate to contact me at (780) 663-2509.

Yours truly,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
Facility GM
Clean Harbors Canada, Inc.



May 29th, 2023

Environmental Response Centre
Alberta Environment
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 409379 – UPDATE

Update: On May 26th, the school hi-vol translator was up and recording the wind data properly again. This issue can now be closed.

Regards,
Stan yuha

Original message below:

On February 3rd, 2023 I attempted to retrieve the wind data for the month of January, from our monitoring station on top of the Ryley School as required in our Approval, Section 4.2.19. However, when I reviewed the raw data, I discovered the wind data had not been recording properly. It seems the program had been corrupted and the instrument was recording zeros. I returned to the School station Friday 3rd afternoon, Monday 6th and Tuesday 7th making several attempts to reprogram the instrument, however I was unsuccessful. I am now working with the company that provided the original programing and we will have the instrument back in compliance as soon as possible. The wind data was retrieved successfully from the Facility monitoring station.

There were no environmental impacts associated with the unusual failure of the wind data instrument.

If you have any questions, do not hesitate to contact me at (780) 663-2509.

Yours truly,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
Facility GM
Clean Harbors Canada, Inc.



April. 28, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 412087
Clean Harbors Approval No. 10348-03-01

On Wednesday, December 26th, 2023 Clean Harbors received a phone call followed by an email from EPA regarding an odor complaint they received on the Tuesday evening prior from a Ryley resident. The odor was described as noxious terrible chemicals. The call was received at 6:05 pm.

Upon investigation, the Facility Manager was able to confirm the wind was blowing from the NNW/N/NNE Tuesday evening. The manager discovered that two loads had been received around 5:00 pm that evening that carried an odor. The landfill operators did a wind check and according to the windsock, thought the wind was blowing from the west enough for it not to be a concern. However, after the loads were dumped, the wind shifted towards town. They covered the waste with what they thought was enough cover.

The manager reviewed the strict acceptance conditions of odorous waste with the landfill operators and reminded them to double check with management if there is any doubt. The customer that delivered the loads was also contacted and notified that no more odorous loads would be accepted from that facility and that they were not allowed to deliver loads after management and the lab manager had gone home for the day so that their loads could be tested prior to dumping. This will remain in effect until they prove their waste is non-odorous with no issues.

We have also re-installed our odor control fans. This units are only operational during non-freezing temperatures and were not set up yet at the time. As well, we treated our operating area in the landfill with deodorizer, which proves to be very effective.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha



General Manager



August 4, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 412087
Clean Harbors Approval No. 10348-03-01

Update: Event was on April 26th, 2023.

**Regards,
Brian Fraser**

Original message below:

On Wednesday, December 26th, 2023 Clean Harbors received a phone call followed by an email from EPA regarding an odor complaint they received on the Tuesday evening prior from a Ryley resident. The odor was described as noxious terrible chemicals. The call was received at 6:05 pm.

Upon investigation, the Facility Manager was able to confirm the wind was blowing from the NNW/N/NNE Tuesday evening. The manager discovered that two loads had been received around 5:00 pm that evening that carried an odor. The landfill operators did a wind check and according to the windsock, thought the wind was blowing from the west enough for it not to be a concern. However, after the loads were dumped, the wind shifted towards town. They covered the waste with what they thought was enough cover.

The manager reviewed the strict acceptance conditions of odorous waste with the landfill operators and reminded them to double check with management if there is any doubt. The customer that delivered the loads was also contacted and notified that no more odorous loads would be accepted from that facility and that they were not allowed to deliver loads after management and the lab manager had gone home for the day so that their loads could be tested prior to dumping. This will remain in effect until they prove their waste is non-odorous with no issues.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,



Stan Yuha

Stan Yuha
General Manager



May 2, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 412268
Clean Harbors Approval No. 10348-03-01

On Tuesday May 1st, 2023 Clean Harbors notified Alberta Environment of a contravention being their March Air Monitoring Report was submitted electronically one day late. The report was due by April 30th but wasn't submitted until May 1st.

Clean Harbors employs GHD to professionally complete and submit their monthly and annual air monitoring reports. On April 28th, at approximately 4:17 pm, GHD sent an email to myself stating the March Monthly report had been completed and was just going through formatting at which time it would be emailed to me for my review and signatures. At 6:18 pm Friday, I had sent an email stating that I hadn't received the report yet. I continued to monitor my email the rest of the evening and over the weekend. On Monday May 1st, GHD called me and asked if I had received the report? I replied I hadn't. We discovered the report size was too big, in excess of 27 MB, and the server was not letting it through. GHD promptly sent the report as a zip file and I signed it and returned to them to submit.

The previous reports were only approximately 14 MB and there were never issues sending them via email before. We will now zip the files to ensure timely delivery.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
General Manager



May 2, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 412333
Clean Harbors Approval No. 10348-03-01

On Tuesday May 2nd, 2023 Clean Harbors received a phone call followed by an email from EPA regarding an odor complaint they received at 9:25am from a Ryley resident. The odor was described as noxious, toxic, gross chemical smell.

Upon investigation, the Facility Manager was able to confirm the wind was blowing from the NNE at the time of the call. After the call from EPA was received, at approximately 11:00 am, the Manager, Compliance VP and Compliance Manager all went for a drive into Ryley. As we drove on hwy. 834 past the lagoon, we all noticed a strong lagoon odor, about an 8 out of 10. We turned onto 57 Ave into Ryley and past 49 street and could still smell the lagoon, but it wasn't near as strong, only about a 2 or 3 out of 10. We proceeded to drive to 49 street and 55 avenue and could still detect faint lagoon odor. We drove west on 55 avenue and by the time we crossed main street, we didn't detect any odors. We approached 51 street and we could detect faint odor from Clean Harbors landfill, about a 1 or 2 out of 10.

The landfill was treated with deodorizer at 8:30 am that morning. Our odor control fans were also operational at the time of the call.

As a result of the investigation Clean Harbors feels the odor was most likely coming from the lagoon and the source was not Clean Harbors at that time. At 11:30, as a preventative measure and according to our procedure, we rejected a load that arrived at our facility that had potential to cause an odor towards the village. We will continue to monitor loads closely at this time.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha". The signature is written in a cursive, flowing style.

Stan Yuha



General Manager



May 12, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 412578
Clean Harbors Approval No. 10348-03-01

On Friday, May 5th, 2023, Clean Harbors reported to EPA that 3 ground water monitoring wells were damaged by heavy equipment. The well numbers were MW16, MW12A and MW12B. Upon further investigation, only two wells were damaged, being MW12A and MW12B. There was a misunderstanding about MW16 as it was not damaged. Unfortunately, MW12A was greatly compromised because it was partially lifted out of the ground and the screened section of the well had changed. It was decided the well should be decommissioned which was completed on April 27th by pulling the PVC out and backfilling with bentonite through depth. MW12B was also damaged, however the integrity was evaluated, and it was determined that it could still be sampled. Following sampling this spring, it will be decommissioned as both MW12A and MW12B were slated to be this spring. Any wells that are slated to be decommissioned will be replaced by a new installation at a slightly different location.

To prevent further occurrences, Clean Harbors will install concrete barriers to protect any wells that are in a greater risk of being damaged by equipment.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
General Manager



May 11, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 412682, 412724, 412725, 412800
Clean Harbors Approval No. 10348-03-01

Clean Harbors, Ryley Facility, has recently received four odor complaints, one on May 8th, two on May 9th and the fourth on the morning of May 10th. As per request of Inspector Mark Pickering, one 7-Day Letter will suffice for all four Reference numbers.

Reference # 412682

On May 8th, the Facility Manager was contacted by EPA via text at 2:05 pm regarding a strong, terrible chemical odor complaint received from an anonymous caller located at 49 St. and 55 Ave. in Ryley. Manager was not at the facility at the time of the notification. Manager called the facility and verified the wind to be blowing strong from the southeast as it had been all day. It was noted the Ryley lagoon had a strong odor that day. No comments about the Claystone landfill. Due to the strong wind direction from the SE, any source of odor in Ryley at that time could not be coming from Clean Harbors. No further investigation taken.

Reference # 412724 & 412725

Facility Manager received email notification of two odor complaints that occurred at 6:00 am and 6:05 am the morning of May 9th. Both callers described the odor as a chemical smell. Notification was received at approximately 8:30 am. The Manager downloaded the wind data and verified the wind was very light that morning, shifting back & forth from the W, NW, N, NE and NNE. At approximately 8:50 am the manager drove into Ryley, noticing a slight odor on Hwy 854, about a 2 out of 10 scale. The wind was blowing from the west at that time. No odors were detected on the drive through Ryley at that time. The deodorizer fans were started. The manager and an operator walked the landfill for over an hour and no significant odors were detected. The manager also instructed the operators to spray the landfill with deodorizer. Later in the afternoon the manager walked the upper south berm of the landfill for over 20 minutes and did not detect any odors drifting towards Ryley.



Reference # 412800

At approximately 9:45 am May 10th, the manager was notified of another odor complaint from a resident in the Village of Ryley located at the same address as all the other complaints. Within minutes of receiving the email, the manager and one other employee drove into Ryley and past the area and the blocks around. The wind was calm at the time. No odors were detected anywhere. They drove down the back alley of the address which is between the landfill and his house. They noticed a neighbor directly across the alley working in his backyard. He was asked if he noticed any odors that morning and he replied that he had not. They continued to drive around, not detecting any odors. A return call was made to the Inspector during this time.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
General Manager



May 29, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 413712
Clean Harbors Approval No. 10348-03-01

On Thursday May 25th, 2023 Clean Harbors received a text followed by an email at 8:29 am from EPA regarding an odor complaint they received at 7:21 am from a Ryley resident located near 49 St. and 55 Ave. The odor was described as a very bad nasty chemical smell.

Upon investigation, no activities were going on at the site at the time of the complaint. The wind was light out of the north/north east. The odor control fans had not been started yet that morning. I drove into Ryley at about 8:45 am and drove around the area for about 5 minutes but could not detect any odors. I noticed the Kushnir's were in their front yard so I stopped and talked to them for about 20 minutes. We did not notice any odors during our discussion. However just as I was leaving we detected a faint landfill odor, no more than a 2 out of 10 and it lasted less than 10 seconds and went away. They said it comes and goes. I drove around for about 5 more minutes and did not detect any more odors. I concluded that a faint landfill odor may have entered town for a very short while but it was certainly not a 10 out of 10 odor.

The odor control fans were turned on at approximately 8:15 am that morning. The operating face of the landfill was about the length of a football field but about half as wide. Clean Harbors will continue to cover non-active areas with non-odorous material.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha". The signature is cursive and fluid.

Stan Yuha
General Manager



May 29, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 413875
Clean Harbors Approval No. 10348-03-01

On Monday May 29th, 2023 Clean Harbors received a text followed by an email at 7:28 am from EPA regarding an odor complaint they received at 5:30 am from a Ryley resident. The odor was described as a nasty chemical smell.

As I was on my way to work, I drove through Ryley at about 7:40 am. I could not detect any odors any where in town. When I arrived at work a short time later, I notice the wind was blowing from the west and south. I uploaded the wind data for earlier that morning, and it had been very calm all morning with the anemometer recording directions of west, northwest and north, but basically zero speed. The source of the odor remains unknown.

Even though the wind was blowing away from town, we sprayed the landfill with a load of deodorizer. The working face is about the length of a football field but half as wide. We will continue to use non-odorous material to cover non-operating areas.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
General Manager



July 4, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 415610
Clean Harbors Approval No. 10348-03-01

On Wednesday June 28th, 2023 Clean Harbors notified Alberta Environment of a contravention against section 4.1.6(b)(i). The liner on the top of the berm wall between cell 3D and cell 4 was nicked by the blade of our dozer and caused a tear about 6 feet by 3 feet.

The far west end of the berm, where this occurred was previously covered with extra protective material to protect it. The GPS on the dozer was telling the blade to “cut” the extra material away. This is part of the area we are preparing for clay capping. That small area where the east/west berm of cell 3D and cell 4, meets perpendicular to the north/south wall of cell 3D and cell 4 was not in the coordinates of the dozer.

Immediately after the tear occurred, the area was cleared of waste material and the tear was covered with a tarp and secured to help prevent any infiltration of water. A berm was also created above the tear to divert any rain water from coming near the area. A liner repair company was contacted, and their crew successfully repaired the liner July 1st before any rainfall happened. There were no environmental impacts as a result of this incident.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha". The signature is written in a cursive, flowing style.

Stan Yuha
General Manager



Tear



Protected



Repair in Progress



Repair Complete



July 4, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 415751
Clean Harbors Approval No. 10348-03-01

On Tuesday July 4th, 2023 Clean Harbors received an email at 10:57 am from EPA regarding an odor complaint they received on July 1st at 1:00 am from a Ryley resident. The odor was described as a 10 out of 10 nasty chemical smell.

I reviewed the loads that were received on June 30th and no odorous loads were received during the day. I reviewed the wind station data from the school and the facility and they both recorded the wind blowing from the east and south east during the time of the complaint. Therefore the source of the odor could not have been Clean Harbors. No other actions required.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha". The signature is cursive and fluid.

Stan Yuha
General Manager



August 3, 2023

Environmental Response Centre
Alberta Environment
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 417300

On August 1st, 2023 I retrieved the wind data for the month of July from our monitoring station on top of the Ryley School as required in our Approval, Section 4.2.19. However, when I reviewed the raw data, I discovered the wind data was missing a large segment of data points. The instrument recorded all the wind data from July 1st at 12:00 am to July 12th at 15:23 hrs and then it didn't start recording again until July 24th at 3:22 am. It is highly suspected a power failure was the cause, but strange a power failure would last 12 days at the school. There have been a few lightning storms in the area during that time of missing data which may have had something to do with it. Ultimately, we are not certain what caused the issue, but the instrument started back up by itself and is running fine now.

There were no environmental impacts associated with the unusual failure of the wind data instrument.

If you have any questions, do not hesitate to contact me at (780) 663-2509.

Yours truly,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
Facility GM
Clean Harbors Canada, Inc.



August 9, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 417409
Clean Harbors Approval No. 10348-03-01

On Thursday August 3rd, 2023 Clean Harbors received a phone call at 9:47 am from a Ryley resident regarding odor coming from Clean Harbors Landfill since approximately 4:00 am. There were no odorous loads received that morning and landfill operations didn't start until after 8:00 am. I uploaded the wind data and the wind was blowing from the north that morning. We originally thought that the source of the odor may have been when the operators were treating some leachate water from cell 4 leachate tank which was being done at about 9:30 am that morning, however that would not explain odors that may have occurred earlier than that. My Compliance VP and myself drove into Ryley at approximately 10:00 am to investigate any odors and neither of us could detect any odors anywhere in the village and the wind was still blowing from the north. We also drove the road just south of the landfill berms and did not detect any odors there either. The odor control fans were operating at the time of the call. We could not verify what the source of the odor was.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
General Manager



August 30, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 418553
Clean Harbors Approval No. 10348-03-01

On Wednesday, August 30th, 2023 at 9:08 am Clean Harbors received an email notification from AEP regarding an odor complaint they received on August 29th at 10:00 pm from a Ryley resident at 49 St. and 59 Ave in Ryley.

I uploaded the wind data during that time and the wind was blowing directly from the east at approximately 2 to 4 km/hr, before, during and after the time of the complaint. Therefore the Clean Harbors landfill could not have been the source of the odor at that time.

There were no landfill activities going on at the landfill during that time and good quality cover is being used on a daily basis at the landfill. No further investigation was done.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha". The signature is written in a cursive, flowing style.

Stan Yuha
General Manager

October 19, 2023

ISSUED FOR USE
FILE: 704-SWM.SWOP04927-01

Clean Harbours Canada Inc.
P.O. Box 390
Ryley, AB T0B 4A0

Attention: Alberta Environment and Protected Areas

Subject: *Water Act* Non-Compliance at NE 9-50-17 W4M 7-day Letter
Compliance File Reference Number 420627
Clean Harbours Ryley Industrial Waste Management Facility, Ryley, Alberta
EPEA Approval No. 10348-03-01

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by Clean Harbours Canada Inc. (Clean Harbours) to conduct a preliminary assessment of the wetlands within NE-9-50-17 W4M in support of sourcing borrow material for landfill expansion (Project Area; Figure 1). Clean Harbours requires additional borrow material for the construction of Cell 5 and retained Tetra Tech to assist in avoiding impacts to wetlands when identifying potential sources.

Tetra Tech completed a Wetland Assessment and Impact Report (WAIR; Tetra Tech 2018) in support of a *Water Act* application for the expansion of Cell 5 in 2018. The application was removed during the *Water Act* backlog reduction and in September 2021, Clean Harbours retained Tetra Tech to review the previous application and update the 2018 WAIR as necessary to submit a new *Water Act* application for impacts to the three wetlands required for the planned landfill expansion. The confirmation review included a desktop and field verification and the assessment confirmed that the wetland assessment completed for the as part of the 2018 WAIR remained applicable. The wetland boundaries, classifications, and relative wetland values assessed in 2018 were reflective of the conditions at the time and the mitigation measures proposed within Section 5.0 of the 2018 WAIR were reflective of the wetland impacts proposed for the Project¹. No updates were required for the 2018 WAIR in support of Clean Harbours *Water Act* application for the expansion of Ryley Landfill (*Environmental Protection and Enhancement Act* [EPEA] Amendment Application 015-10348).

An authorization under the *Water Act* for NE-09-50-27 W4M (the Project Area) appears in the AEPA Approval Viewer, *Water Act* Approval DAUT0009089.

The additional proposed borrow area was not assessed in the 2018 WAIR and is not within the *Water Act* Approval DAUT0009089. Clean Harbours initial plans for additional borrow material involved the Work Area identified on Figure 1. Within the Work Area, Wetland 1 (WL01) was previously assessed and an Amendment to *Water Act* Approval DAUT0009089 was submitted on August 29, 2023 to expand the approved wetland impacts to include the remaining 0.71 ha of the WL01. As part of *Water Act* Approval DAUT0009089, compensation (in-lieu fee) for the entire WL01 was paid by Clean Harbours as more than 50% of the wetland was impacted.

A Supplemental Information Request (SIR) was issued for the amendment application on September 14, 2023, requesting additional information regarding potential wetlands adjacent to WL01 within the Work Area (Figure 2). The preliminary wetland assessment completed by Tetra Tech included the remaining areas adjacent to WL01 within the proposed Work Area, which were assessed to avoid adjacent wetlands within the proposed borrow location.

¹ Tetra Tech Canada Inc. 2021. Ryley Landfill Expansion – Confirmation Assessment of 2018 Wetland Assessment and Impact Report. Submitted to Alberta Environment and Parks and Clean Harbours Canada Inc. October 2018. File: SWM.SWOP03871-01.

During the preliminary wetland assessment completed on September 1, 2023, potential non-compliances under the Alberta *Water Act*² were observed in the Project Area, regarding unauthorized impacts to wetlands (WL14 and WL23; Figure 2). Wetland 14 (WL14) and Wetland 23 (WL23) were not assessed within the 2018 WAIR or during the 2021 *Water Act* application and are not included in *Water Act* Approval DAUT0009089. Clean Harbors has identified that intrusion into WL14 and WL23 were not previously authorized and were completed accidentally during initial work to identify additional borrow sources.

Once the non-compliances issues were confirmed, Clean Harbors self-reported the non-compliant activities to Alberta Environment and Protected Areas (AEPA) using the Environmental Emergencies Hotline on October 11, 2023, and were provided Compliance File Reference Number 420627. Tetra Tech prepared this 7-day Letter to provide additional information regarding the non-compliant activities, including a summary of the historical review conducted as part of the preliminary wetland assessment Tetra Tech completed for the Project.

2.0 UNAUTHORIZED IMPACTS TO WETLANDS

2.1 Historical Conditions

Prior to the field visit Tetra Tech conducted a preliminary review of wetlands within the quarter section by digitizing wetlands from aerial imagery (Figure 3). Table 1 provides a summary of the historical review for the impacted wetlands.

Table 1: Historical Wetland Review

Wetland Id	Historical Classification*	Historical Area (Hectares)	Wetland Signatures**	Years Identified
WL14	Temporary Graminoid Marsh	0.24	Soil Saturation	1962, 1973, 1980, 1989, 2018, 2019, 2020, 2021
WL23	Temporary Graminoid Marsh	0.12	Soil Saturation	1962, 1998, 2018, 2019, 2020, 2021
WL23a	Ephemeral	0.04	Soil Saturation	1962, 2019
WL23b	Ephemeral	0.05	Soil Saturation	1980

*Classified in accordance with the Alberta Wetland Classification System³

**Identified signatures within Type 1 lands described in the Alberta Wetland Identification and Delineation Directive⁴

Wetland 14

Wetland 14 appears periodically throughout the photo record, first identifiable in 1962. The wetland was observed in eight of 12 historical images assessed, generally identified by soil saturation. Given the variable nature of the boundaries and the lack of open water observed, WL14 is classified as a Temporary Graminoid Marsh based on the historical review. No impacts were observed to the wetland within the air photos assessed. The impacts to the wetland occurred in 2023 when Clean Harbors stockpiled soil within the desktop delineated boundary (Figure 2).

² Province of Alberta. 2000. *Water Act*. Revised Statutes of Alberta, Chapter W-3. Current as of June 2, 2021. Alberta King's Printer, Edmonton, Alberta.

³ Alberta Environment and Sustainable Resource Development (ESRD). 2015. Alberta Wetland Classification System. Water Policy Branch, Policy and Planning Division, Edmonton, Alberta.

⁴ Government of Alberta. 2022. DRAFT – Alberta Wetland Identification and Delineation Directive. Alberta Environment and Parks. Water Conservation, 2022, No. 4. July 12, 2022. Pp. 57.

Wetland 23

Wetland 23 appears throughout the air photo record, first observed in 1962. The wetland was identified in six of 12 historical images assessed, predominately through soil saturation signatures. Given the variable nature of the boundaries and the lack of open water observed, WL23 is classified as a Temporary Graminoid Marsh based on the historical review.

Two nearby ephemeral waterbodies were also identified, WL23a and WL23b (Figure 2), which were observed in 1962 and 2019, and 1980, respectively. Given the lack of persistence in the air photos of these two features, they have been classified as ephemeral waterbodies based on the desktop review.

From the historical review, a drainage ditch that runs east/west through the northern portion of the pastureland was created by the landowner at the time between 1973 and 1980. The activity would have been subject to the Alberta *Water Resources Act*. This drainage ditch likely influences the hydrology of the wetlands it intersects and appears to start where WL23 is located.

Between 1973 to 2010 wetlands within the quarter section remain of similar size. After 1980 the northern half of the quarter section is cultivated.

In 2018, the southeastern portion of the quarter section is in the process of being developed; however, all wetlands appear intact.

In 2018, construction for landfill expansion began. Tetra Tech completed and submitted a WAIR⁵ for a *Water Act* application in 2018 for the expansion of the Ryley Landfill (*Water Act* Application Number 00425570). In 2018 Tetra Tech also completed a Pre-Disturbance Site Assessment⁶, which included a test hole within WL23 to a depth of 36 cm. Wetland vegetation was observed in the location as well as evidence of hydric soils. The soil profile was Ah/Ae/Aeg/Btg; gleying ("g" modifier to the horizon) is indicative of the presence of hydric soils, although the depths, size, and contrast of the mottles was not recorded. Within the Pre-Disturbance Assessment Report, the extended evaporation pond / borrow pit design was shown to avoid the WL23 boundary, and WL23 has not been impacted at this time.

In 2019 it appears that the construction of the landfill expansion is beginning to encroach on the ephemeral waterbody WL23b. It is also evident that the previously dug drainage ditch connects WL23 and WL23a. WL23 has not been impacted by construction activities at this time.

In 2020 and 2021 construction appears to encroach on WL23, however it has not been impacted at this time, indicating the impacts to WL23 occurred after 2021.

2.2 Current Conditions

Wetland 14 overlaps with the proposed Work Area and was observed to be partially impacted by recent earthworks, specifically stockpiling of material within the historical wetland boundary. Historically the wetland was estimated to be 0.24 ha. Due to construction activities, 0.19 ha is remaining, resulting in a loss of 0.05 ha, or a 21% reduction of wetland area for WL14 (Photos 1 and 2).

⁵ Tetra Tech Canada Inc. 2018. Wetland Assessment and Impact Report – Ryley Hazardous Waste Storage Facility and Landfill. Prepared for Clean Harbors Canada Inc. October 2018. File: SWM.SWOP03871-01.

⁶ Tetra Tech Canada Inc. 2018. Pre-Disturbance Site Assessment – Site Assessment for North Quarter Development Revision 01 South Half of NE-09-50-17 W4M. Prepared for Clean Harbors Canada Inc. November 2018. File: SWM.SWOP03803-01.

WL23 was observed to impacted by soil stockpiling (Photo 3). Wetland 23 was historically delineated as 0.12 ha, however, due to the construction activities, 0.16 ha of wetland area is now on the landscape; a 0.04 ha increase, or 33%, of wetland area. The alteration of the local hydrology in the area has resulted in the incorporation of two ephemeral waterbodies within WL23 which is attributed to the increase in area, as well as a change in permanence from temporary to seasonal (Photos 4 and 5).

Both WL14 and WL23 are historically considered to be Temporary Graminoid Marshes based on the air photo review. While the historic conditions at the wetlands can no longer be verified, the Contractor stated they did not observe wetland soils within the portion of the wetlands where topsoil has been stockpiled. The overall impact of the works is summarized in Table 2. Overall, the cumulative loss of wetland area is estimated to be 0.01 ha, however, there has also been a change in permanence of WL23 from temporary to seasonal.

Table 2: Wetland Impacts Summary

Wetland ID	Historical Delineated Wetland Area (Ha)	Current Delineated Wetland Area (Ha)	Change in Wetland Area (Ha)
WL14	0.24	0.19	- 0.05
WL23	0.12	0.16	+ 0.04
Total			- 0.01

3.0 MITIGATION PLAN

Tetra Tech understands that restoration of impacted wetlands is required to rectify non-compliant activities. Given that the cumulative effect of the intrusions into the wetlands has resulted in an estimated 0.01 ha change in overall wetland area within the Project Area, Clean Harbors is requesting that the current area of wetlands on the landscape be considered sufficient restoration for the non-compliant activities. The impacts of the soil stockpiles are affecting local hydrology only (i.e., no offsite changes in hydrology patterns) and attempting to restore an additional 0.01 ha of wetland area will involve additional works within the waterbodies, causing increased wetland impacts in the near term. Clean Harbors will put mitigation measures in place to prevent further impacts to the wetlands, including silt fence to separate the waterbodies from the soil stockpiles and a setback for any new works around the wetlands.

The Project Area has been zoned for future landfill expansion; therefore, any restoration works within the property will eventually be applied for removal. When Clean Harbors wishes to develop the remaining portion of the quarter section, a new WAIR will be submitted for Approval under the *Water Act* and appropriate compensation, or in-lieu payment will be completed for the remaining wetlands within the quarter section. To appropriately quantify the historical value of these two wetlands, Clean Harbors proposes to apply the average relative wetland value of wetlands within the Project Area of the same classification (i.e., Temporary Graminoid Marshes) for the desktop delineated areas of WL14 and WL23 (i.e., a total of 0.36 ha). In the interim, Clean Harbors is proposing that the current area of the remaining wetlands will be retained until an authorization for removal is received to maintain the functions of the wetlands on the landscape.

4.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Clean Harbors Canada Inc. and their agents. Tetra Tech Canada Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Clean Harbors Canada Inc., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in Appendix A or Contractual Terms and Conditions executed by both parties.

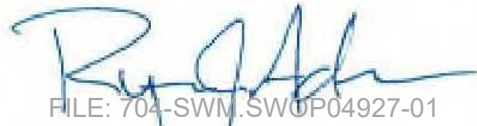
5.0 CLOSURE

We trust this document meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.



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Environment & Water Practice
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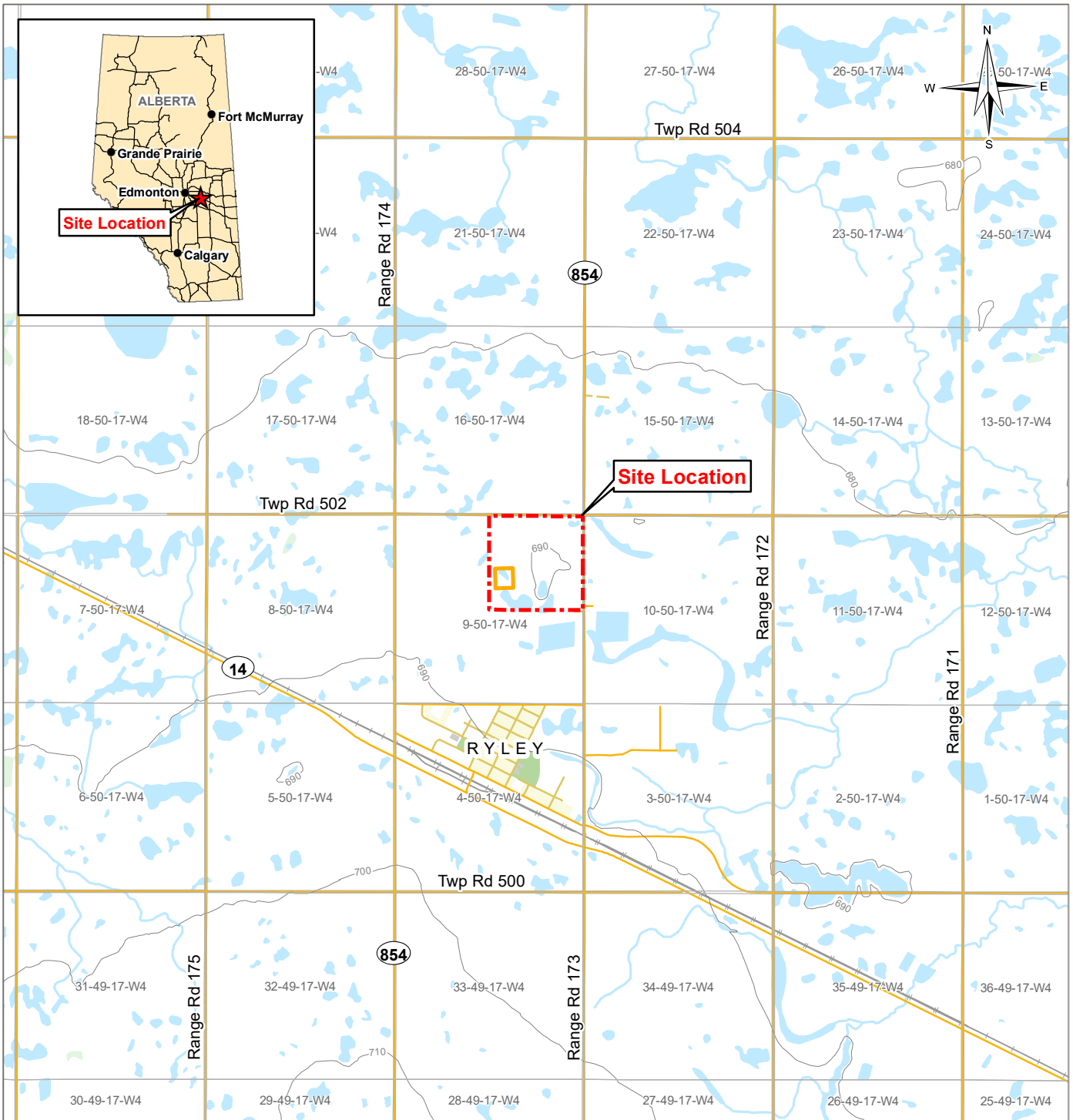
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Attachments: Figures (3)
Photos (5)
Appendix A: Tetra Tech's Limitations on the Use of this Document

FIGURES

- Figure 1 Site Location Plan
- Figure 2 Wetland Impacts
- Figure 3a-3l Aerial Photographs and Interpreted Wetland Boundaries

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LEGEND

- Project Area
- Work Area
- Main Road
- Local Road
- Resource/Recreational Road
- Railway
- Building
- Park
- Residential Area
- Contour (10 m)
- Watercourse
- Waterbody
- Wooded Area

NOTES
Base data source: CanVec 1:50,000.

STATUS
ISSUED FOR USE

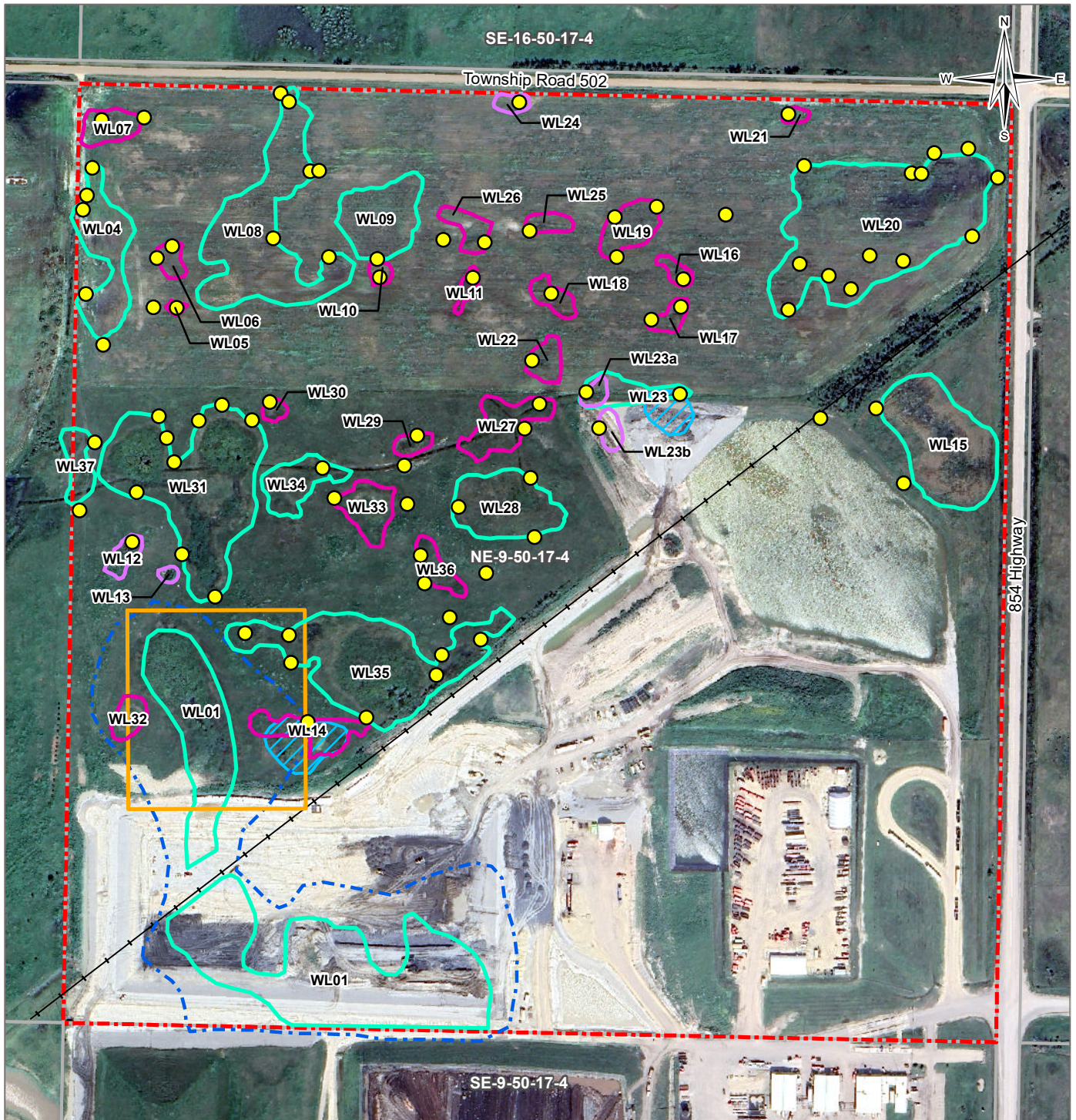
**RYLEY LANDFILL EXPANSION
NE 9-50-17-W4M**

Site Location Plan

PROJECTION UTM Zone 12		DATUM NAD83		CLIENT	
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FILE NO. SWOP04496-01_Figure01_SiteLocation.mxd					
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DATE October 17, 2023		PROJECT NO. SWM.SWOP04927-01			



Figure 1



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LEGEND

- Assessment Location
- Ephemeral
- Seasonal Graminoid Marsh (M-G-III)
- Temporary Graminoid Marsh (M-G-II)
- WL01 Catchment Boundary
- Historical Wetland
- Project Area
- Work Area
- Abandoned Railway Bed (Approximate Centreline)

NOTES

Base data source:
Imagery from Google Earth; Maxar (2023).

STATUS
ISSUED FOR USE

RYLEY LANDFILL EXPANSION NE 9-50-17-W4M

Wetland Impacts


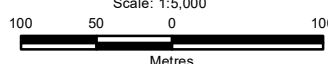
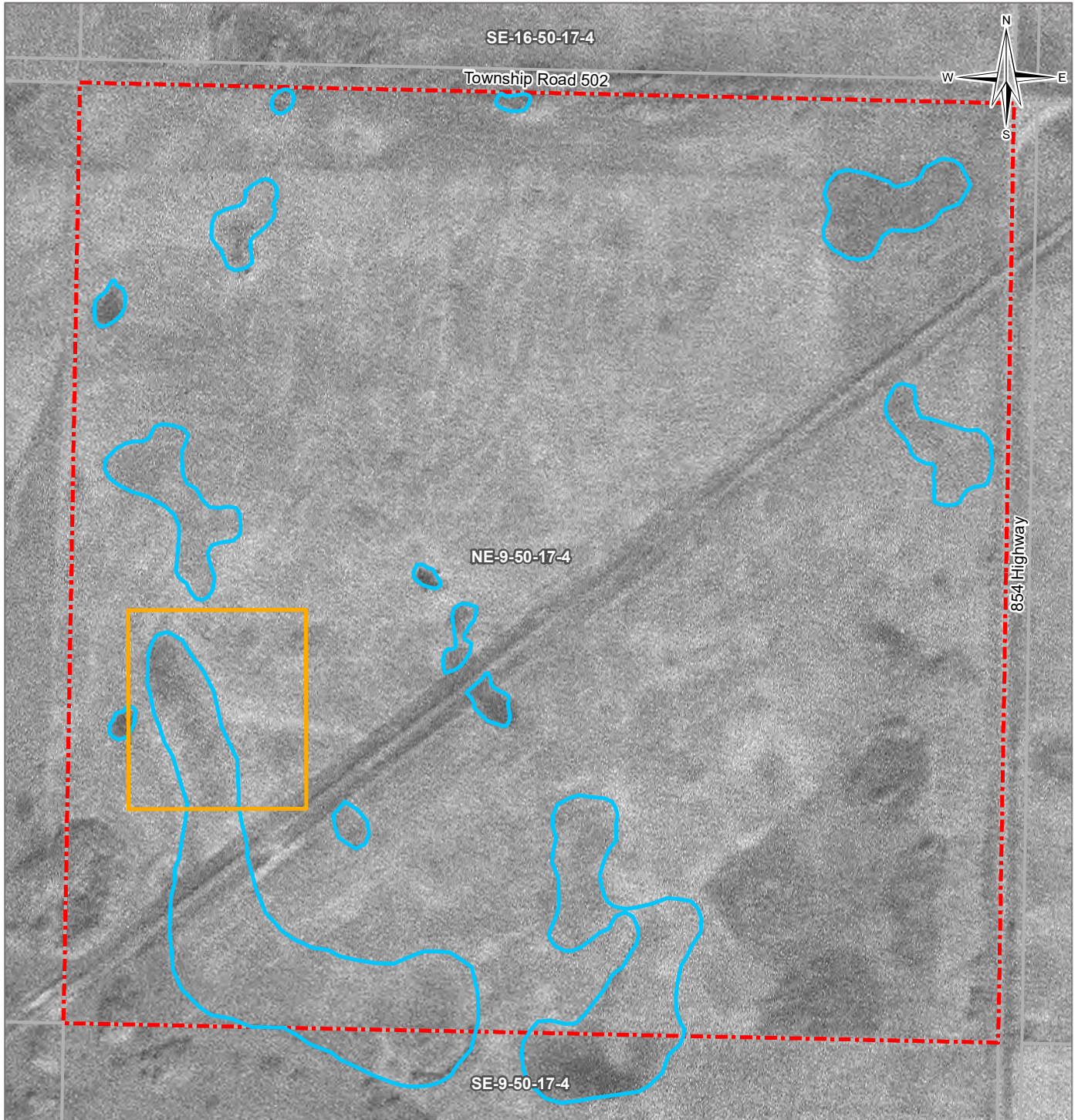
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DATE October 19, 2023		PROJECT NO. SWM.SWOP04927-01			



Figure 2



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LEGEND

- Project Area
- Work Area
- S Historical Wetland

NOTES

Base data source:
Imagery from Aerial Photographic Record System (APRS), 1949

STATUS
ISSUED FOR USE

RYLEY LANDFILL EXPANSION NE 9-50-17-W4M

1949 Aerial Photograph and Interpreted Wetland Boundaries

PROJECTION UTM Zone 12	DATUM NAD83	CLIENT
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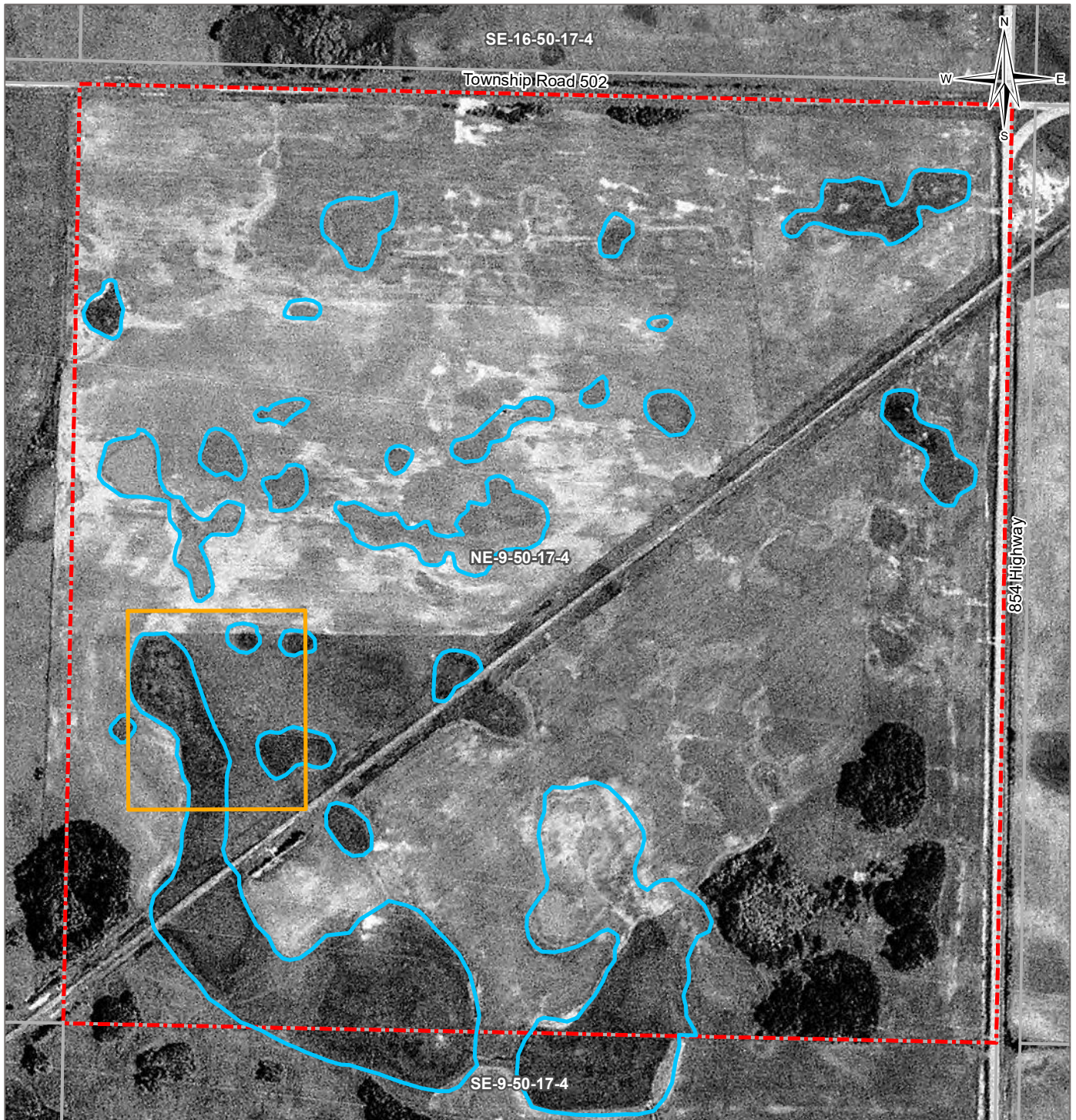
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Figure 3a



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LEGEND

- Project Area
- Work Area
- 3 Historical Wetland

NOTES

Base data source:
Imagery from Aerial Photographic Record System (APRS), 1962

STATUS
ISSUED FOR USE

RYLEY LANDFILL EXPANSION NE 9-50-17-W4M

1962 Aerial Photograph and Interpreted Wetland Boundaries

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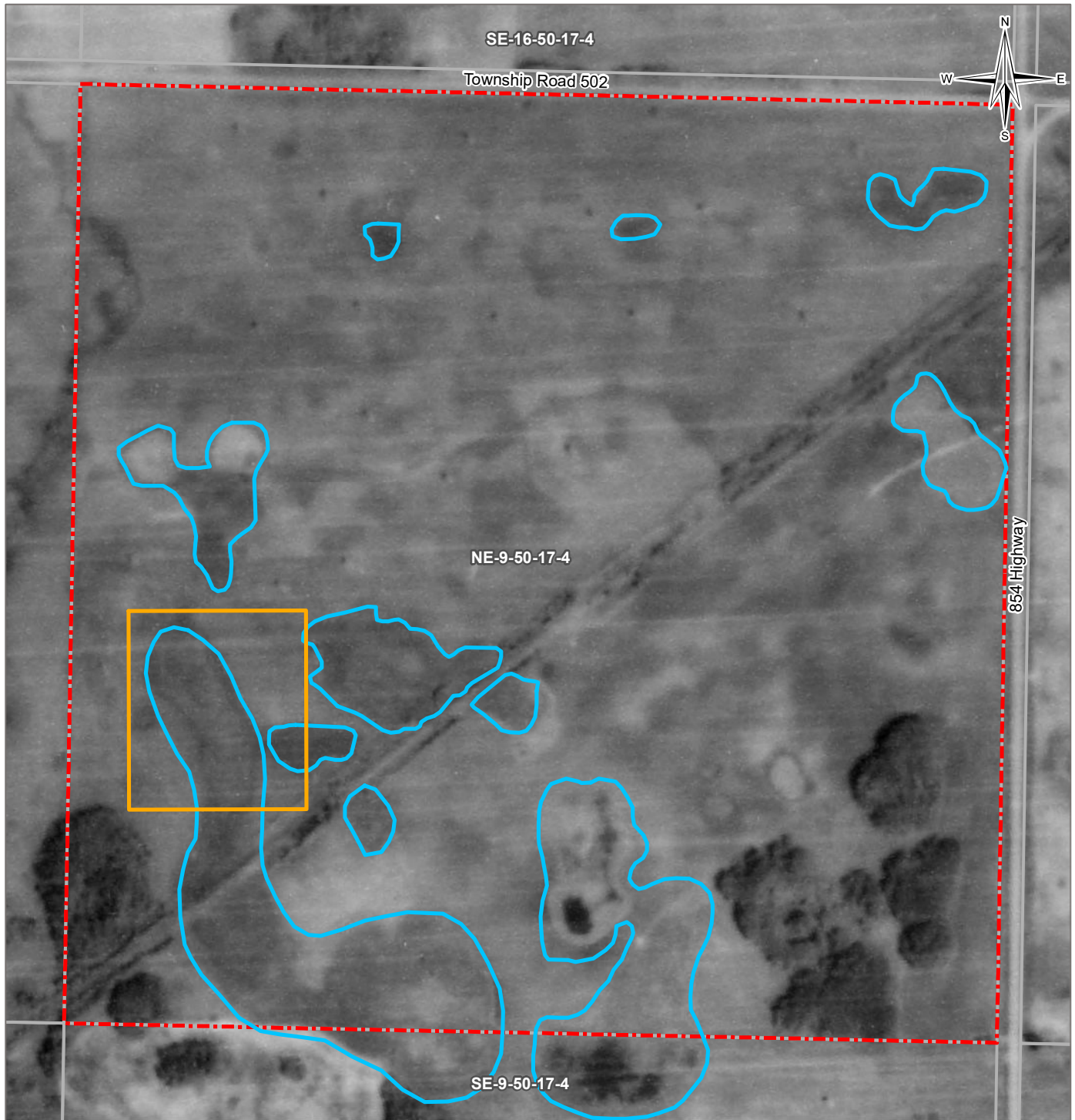
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Figure 3b

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LEGEND

-  Project Area
-  Work Area
-  Historical Wetland


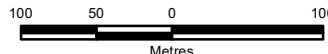

NOTES

Base data source:
Imagery from Aerial Photographic Record System (APRS), 1973

STATUS
ISSUED FOR USE

**RYLEY LANDFILL EXPANSION
NE 9-50-17-W4M**

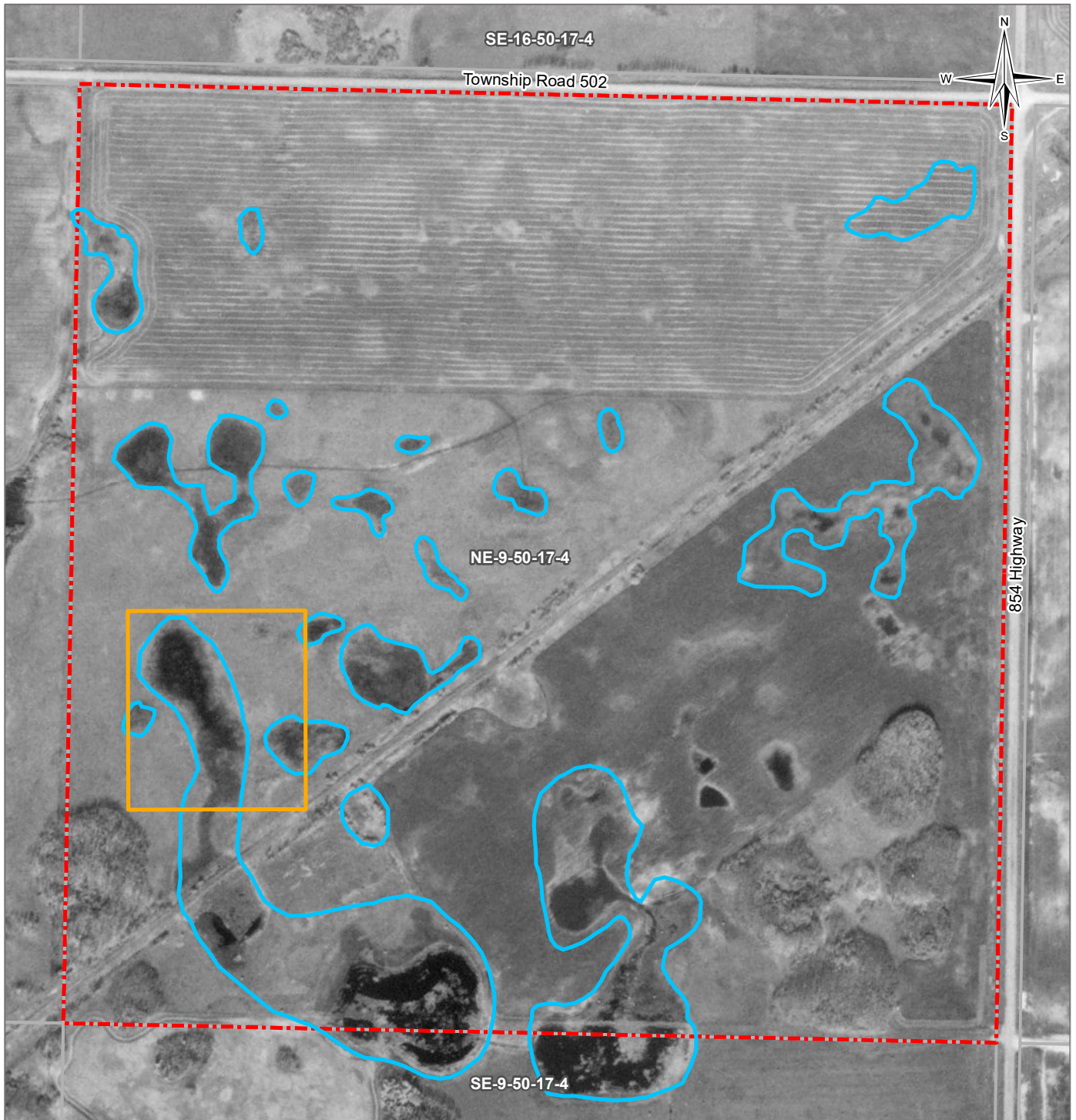
**1973 Aerial Photograph and
Interpreted Wetland Boundaries**

PROJECTION UTM Zone 12	DATUM NAD83	CLIENT 
Scale: 1:5,000 		

FILE NO.
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DATE October 18, 2023	PROJECT NO. SWM.SWOP04927-01			

Figure 3c



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LEGEND

- Project Area
- Work Area
- S Historical Wetland

NOTES

Base data source:
Imagery from Aerial Photographic Record System (APRS), 1980

STATUS
ISSUED FOR USE

RYLEY LANDFILL EXPANSION NE 9-50-17-W4M

1980 Aerial Photograph and Interpreted Wetland Boundaries

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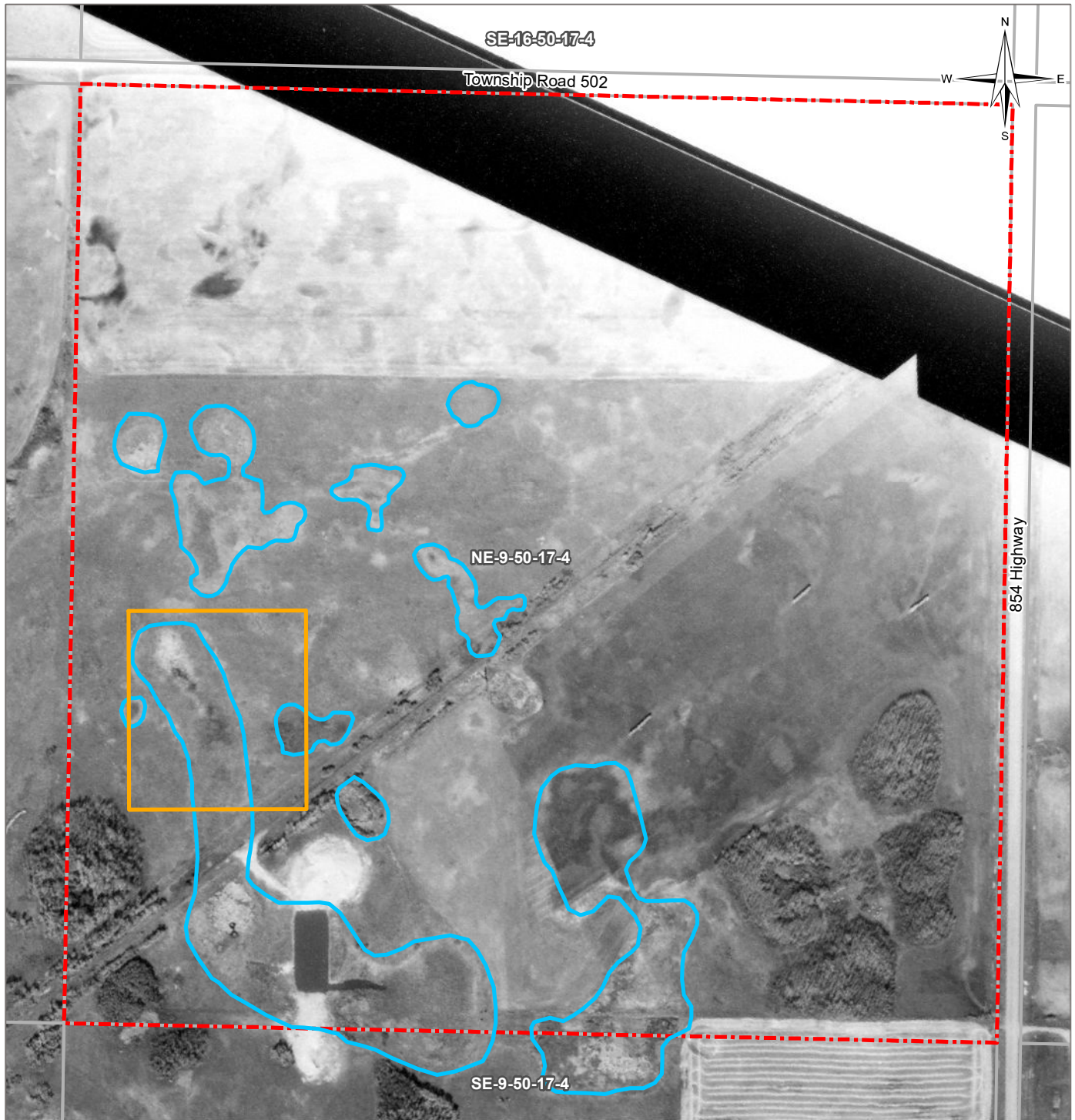
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Figure 3d

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LEGEND

-  Project Area
-  Work Area
-  Historical Wetland

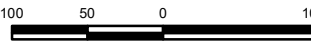
NOTES

Base data source:
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STATUS
ISSUED FOR USE

**RYLEY LANDFILL EXPANSION
NE 9-50-17-W4M**

**1989 Aerial Photograph and
Interpreted Wetland Boundaries**

PROJECTION UTM Zone 12	DATUM NAD83
Scale: 1:5,000	
	
Metres	

CLIENT

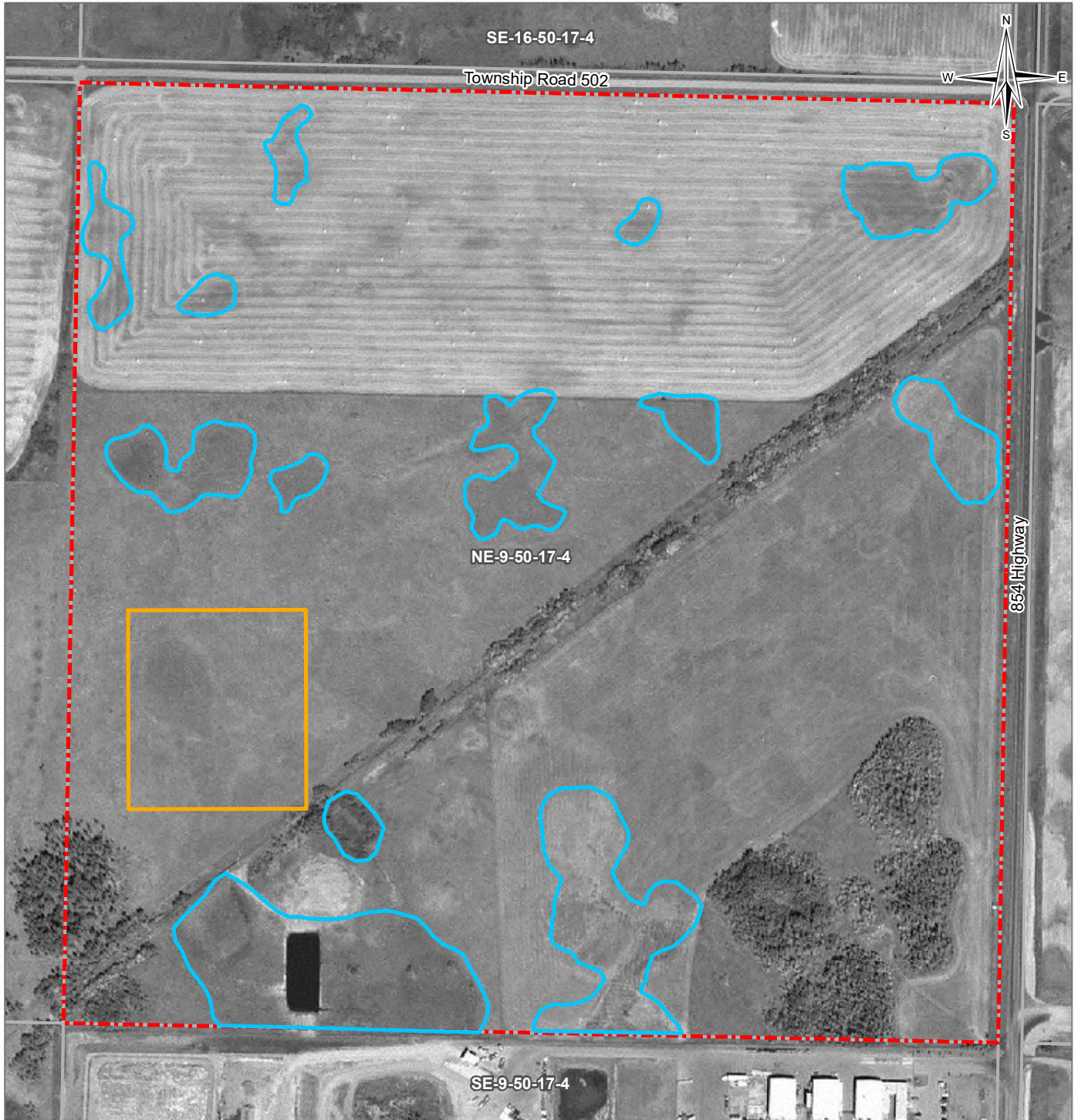

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Figure 3e



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LEGEND

- Project Area
- Work Area
- Ⓕ Historical Wetland


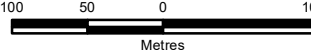
NOTES

Base data source:
Imagery from Aerial Photographic Record System (APRS), 1998

STATUS
ISSUED FOR USE

**RYLEY LANDFILL EXPANSION
NE 9-50-17-W4M**

**1998 Aerial Photograph and
Interpreted Wetland Boundaries**

PROJECTION UTM Zone 12	DATUM NAD83	CLIENT 
Scale: 1:5,000		
		

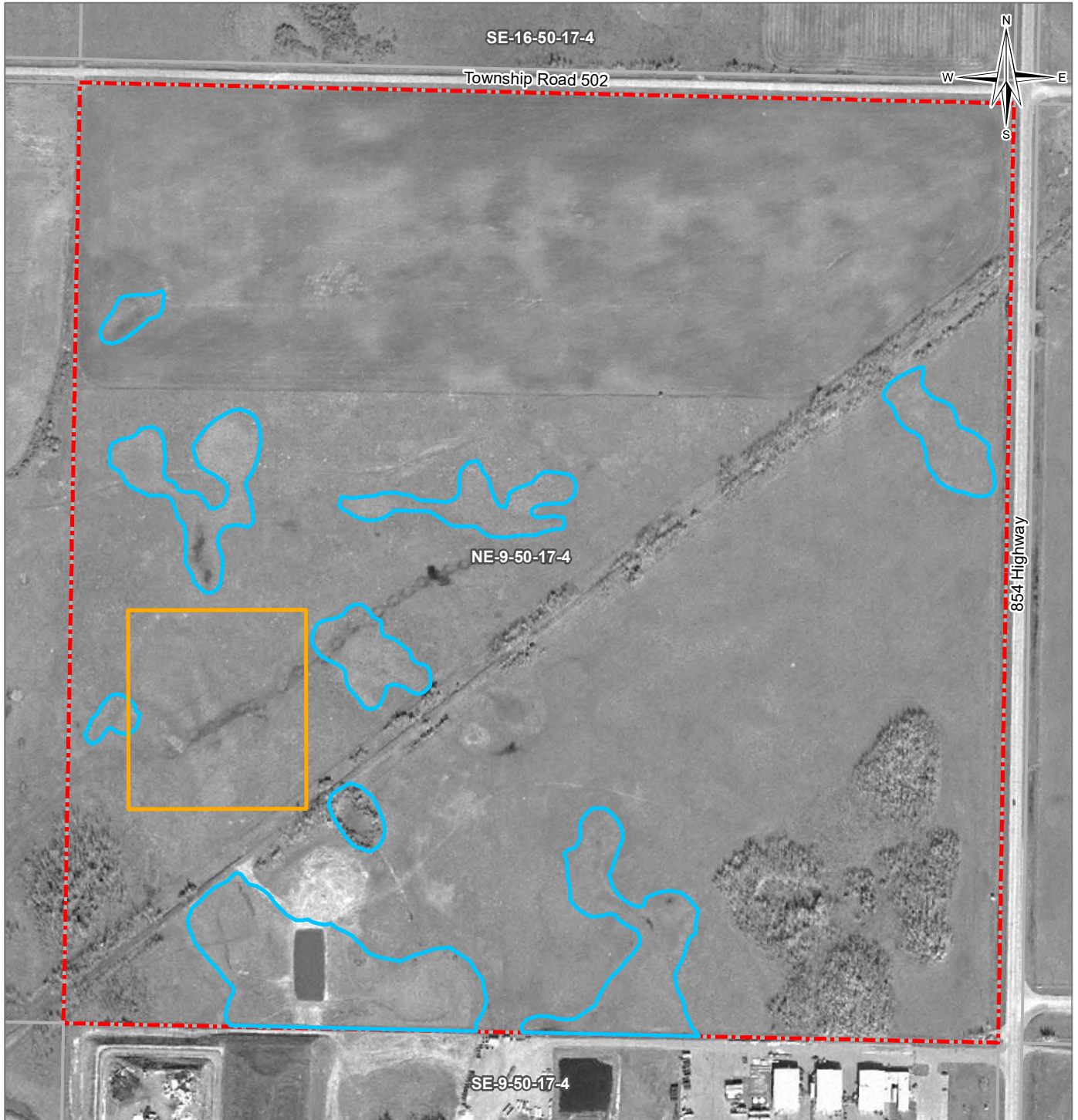
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Figure 3f



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LEGEND

-  Project Area
-  Work Area
-  Historical Wetland


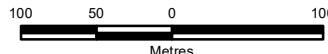

NOTES

Base data source:
Imagery from Aerial Photographic Record System (APRS), 2004

STATUS
ISSUED FOR USE

**RYLEY LANDFILL EXPANSION
NE 9-50-17-W4M**

**2004 Aerial Photograph and
Interpreted Wetland Boundaries**

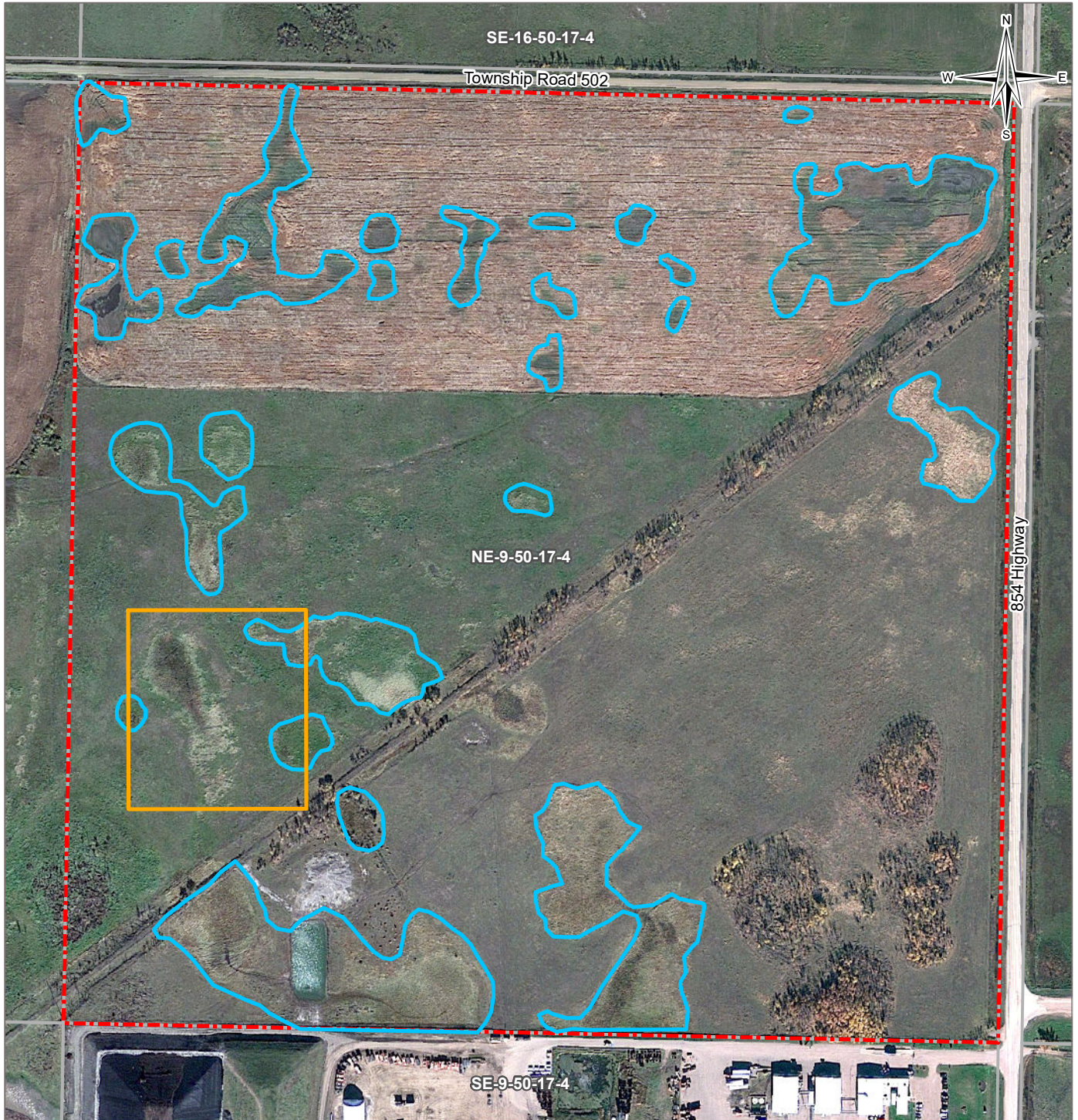
PROJECTION UTM Zone 12	DATUM NAD83	CLIENT 
Scale: 1:5,000  Metres		

FILE NO.
SWOP04496-01_Figure03_Historical.mxd

OFFICE Tl-VANC	DWN MRB	CKD SL	APVD AC	REV 0
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DATE October 18, 2023	PROJECT NO. SWM.SWOP04927-01
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Figure 3g



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LEGEND

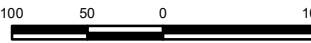
-  Project Area
-  Work Area
-  Historical Wetland

NOTES
Base data source:
Imagery from Google Earth, 2010

STATUS
ISSUED FOR USE

**RYLEY LANDFILL EXPANSION
NE 9-50-17-W4M**

**2010 Aerial Photograph and
Interpreted Wetland Boundaries**

PROJECTION UTM Zone 12	DATUM NAD83
Scale: 1:5,000	
	
Metres	

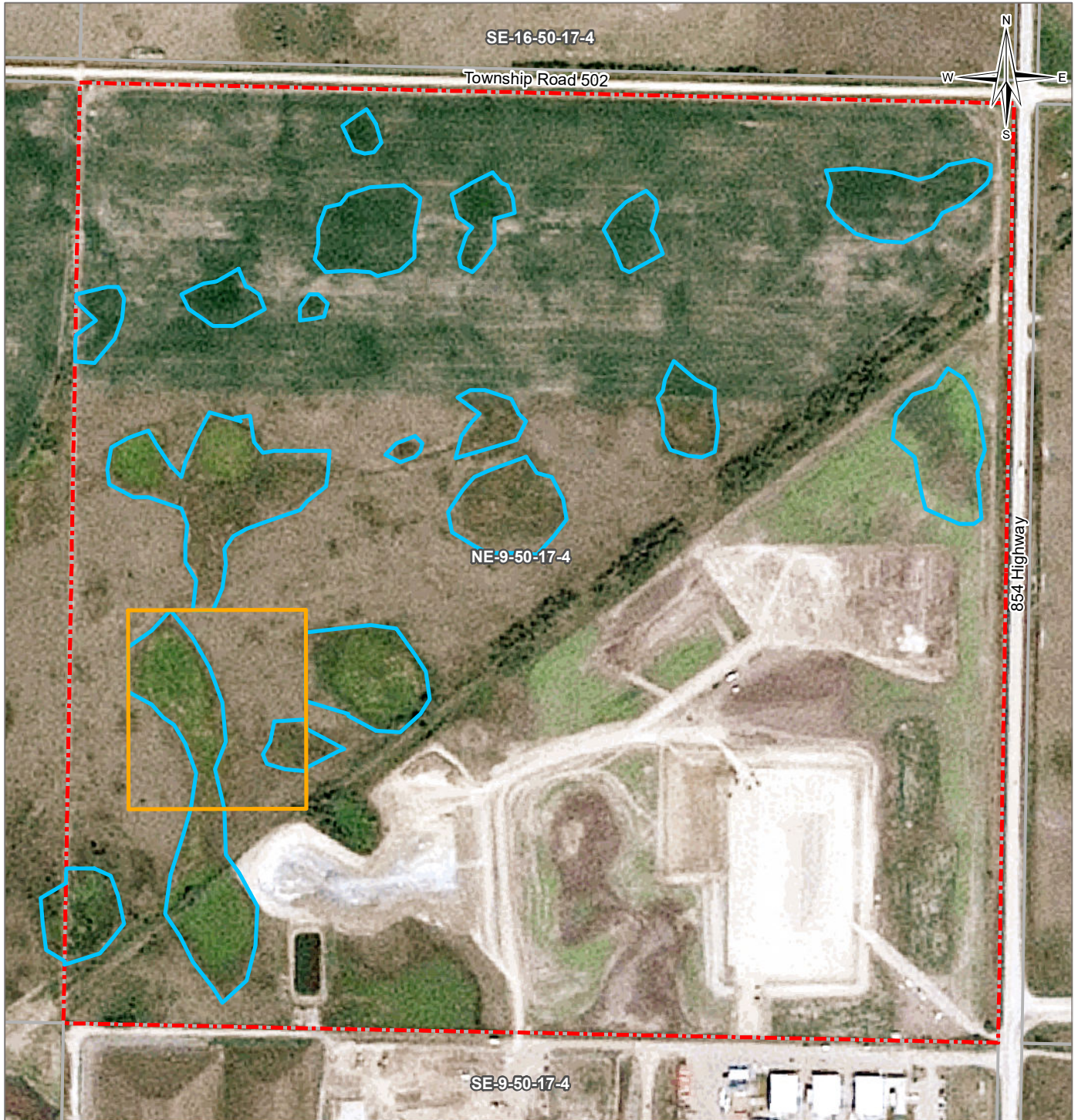


FILE NO.
SWOP04496-01_Figure03_Historical.mxd

OFFICE Tl-VANC	DWN MRB	CKD SL	APVD AC	REV 0
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DATE October 18, 2023	PROJECT NO. SWM.SWOP04927-01
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Figure 3h



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LEGEND

- Project Area
- Work Area
- S Historical Wetland

NOTES
Base data source:
Imagery from AbaData, 2018

STATUS
ISSUED FOR USE

RYLEY LANDFILL EXPANSION NE 9-50-17-W4M

2018 Aerial Photograph and Interpreted Wetland Boundaries

PROJECTION UTM Zone 12	DATUM NAD83	CLIENT
Scale: 1:5,000		
<div style="display: flex; justify-content: space-between; width: 100%;"> 100 50 0 100 </div> <p style="text-align: center;">Metres</p>		

FILE NO.
SWOP04496-01_Figure03_Historical.mxd

OFFICE TL-VANC	DWN MRB	CKD SL	APVD AC	REV 0
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DATE October 18, 2023	PROJECT NO. SWM.SWOP04927-01
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TETRA TECH

Figure 3i



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LEGEND

- Project Area
- Work Area
- ~ Historical Wetland

NOTES
Base data source:
Imagery from Google Earth, 2019

STATUS
ISSUED FOR USE

RYLEY LANDFILL EXPANSION NE 9-50-17-W4M

2019 Aerial Photograph and Interpreted Wetland Boundaries

PROJECTION UTM Zone 12	DATUM NAD83	CLIENT
Scale: 1:5,000		

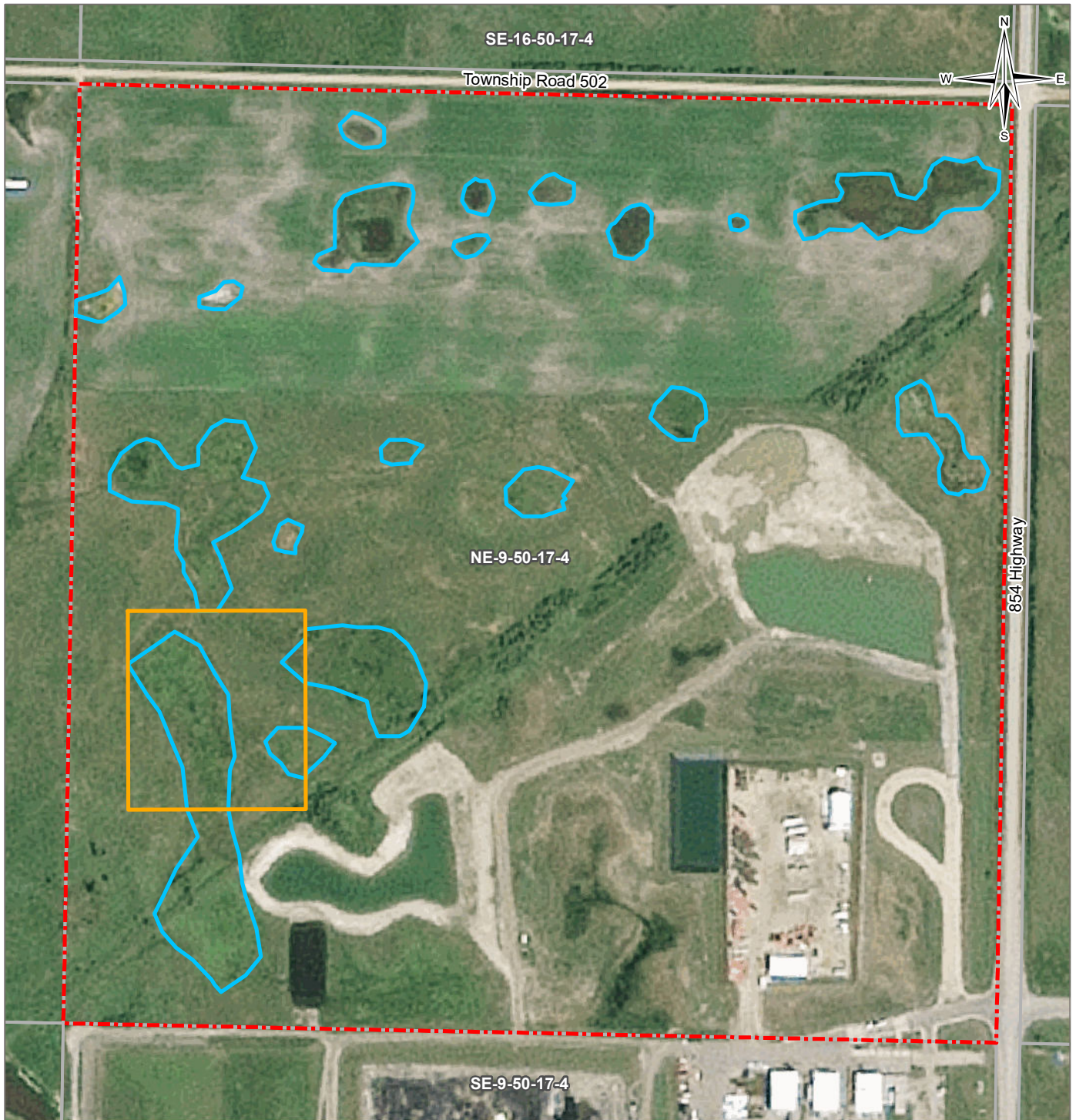
FILE NO.
SWOP04496-01_Figure03_Historical.mxd

OFFICE TL-VANC	DWN MRB	CKD SL	APVD AC	REV 0
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DATE October 18, 2023	PROJECT NO. SWM.SWOP04927-01
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Figure 3j



G:\SOLID_ID_WASTE\SWOP\SWOP04496-01\Maps\7DAY_LETTER\SWOP04496-01_Figure03_Historical.mxd modified 10/18/2023 by MEGAN_BURNS

LEGEND



- Project Area
- Work Area
- Ⓕ Historical Wetland

NOTES
Base data source:
Imagery from AbaData, 2020

STATUS
ISSUED FOR USE

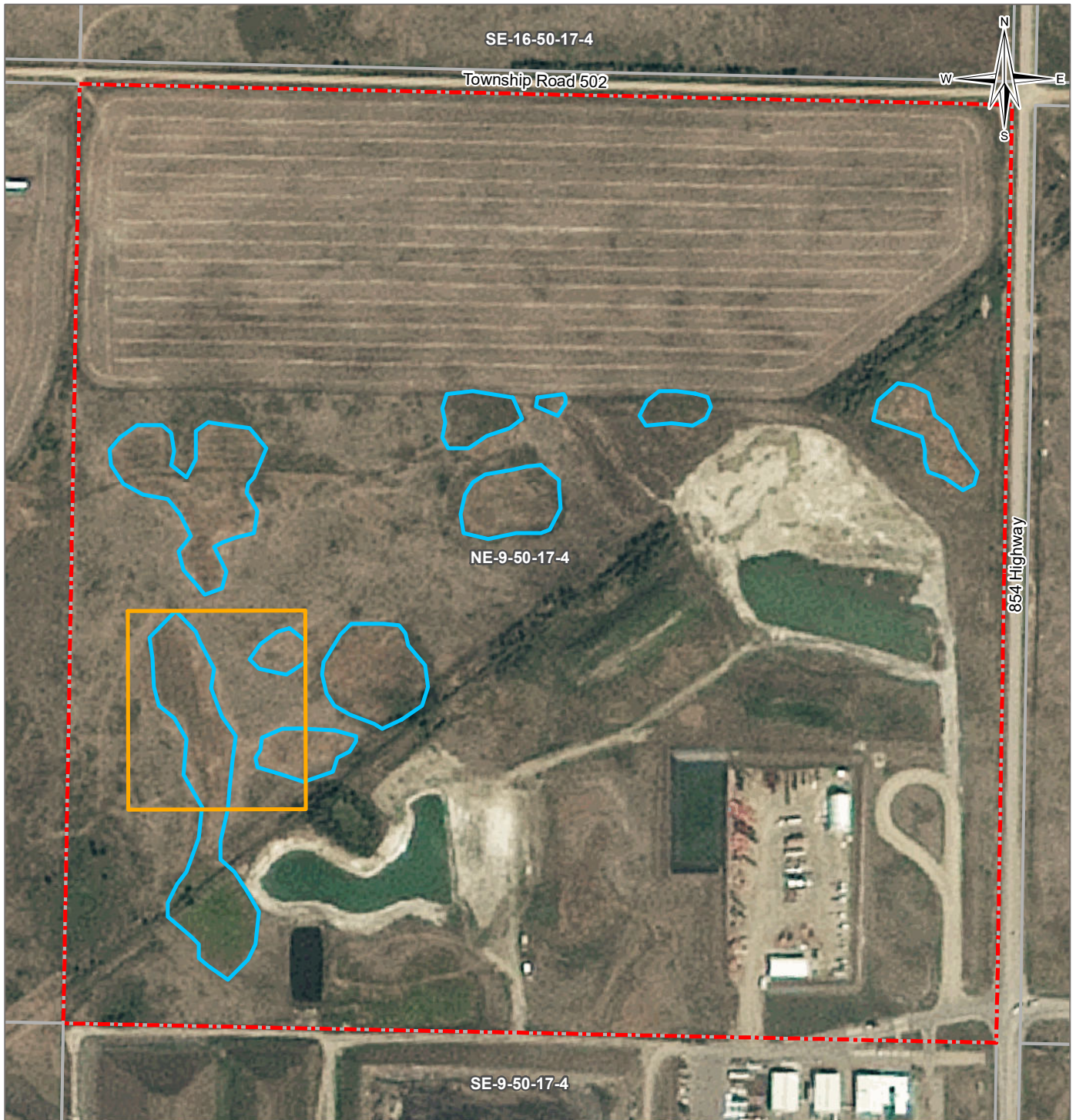
RYLEY LANDFILL EXPANSION NE 9-50-17-W4M

2020 Aerial Photograph and Interpreted Wetland Boundaries

PROJECTION UTM Zone 12	DATUM NAD83	CLIENT 
Scale: 1:5,000		
<div style="display: flex; justify-content: space-between; width: 100%;"> 100 50 0 100 </div> <div style="text-align: center; border-top: 1px solid black; width: 100%; height: 10px; margin-bottom: 5px;"></div> Metres		

FILE NO. SWOP04496-01_Figure03_Historical.mxd				
OFFICE Tl-VANC	DWN MRB	CKD SL	APVD AC	REV 0
DATE October 18, 2023	PROJECT NO. SWM.SWOP04927-01			

Figure 3k



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LEGEND

- Project Area
- Work Area
- 3 Historical Wetland

NOTES
Base data source:
Imagery from AbaData, 2021

STATUS
ISSUED FOR USE

RYLEY LANDFILL EXPANSION NE 9-50-17-W4M

2021 Aerial Photograph and Interpreted Wetland Boundaries

PROJECTION UTM Zone 12	DATUM NAD83	CLIENT
Scale: 1:5,000		
<div style="display: flex; justify-content: space-between; width: 100%;"> 100 50 0 100 </div> <p style="text-align: center;">Metres</p>		

FILE NO.
SWOP04496-01_Figure03_Historical.mxd

OFFICE Tl-VANC	DWN MRB	CKD SL	APVD AC	REV 0
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DATE October 18, 2023	PROJECT NO. SWM.SWOP04927-01
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TETRA TECH

Figure 31

PHOTOGRAPHS

Photo 1: Wetland conditions with stockpiled material observed at WL14 on September 1, 2023, facing south at 12 U 405000E 5907019N.

Photo 2: Wetland conditions with stockpiled material observed at WL14 on September 1, 2023, facing southwest at 12 U 405000E 5907019N.

Photo 3: Wetland conditions with stockpiled material observed at WL23 on September 1, 2023, facing south at 12U 405320E 5907300N.

Photo 4: Wetland conditions observed at WL23 on September 1, 2023, facing east at 12U 405239E 5907302N.

Photo 5: Overview of stockpiled material within WL23 on September 1, 2023, facing southeast at 12U 405320E 5907300N.



Photo 1: Wetland conditions with stockpiled material observed at WL14 on September 1, 2023, facing south at 12 U 405000E 5907019N.



Photo 2: Wetland conditions with stockpiled material observed at WL14 on September 1, 2023, facing southwest at 12 U 405000E 5907019N.



Photo 3: Wetland conditions with stockpiled material observed at WL23 on September 1, 2023, facing south at 12U 405320E 5907300N.



Photo 4: Wetland conditions observed at WL23a on September 1, 2023, facing east at 12U 405239E 5907302N.



Photo 5: Overview of stockpiled material within WL23 and WL23b on September 1, 2023, facing southeast at 12U 405320E 5907300N.

APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

NATURAL SCIENCES

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL ISSUES

The ability to rely upon and generalize from environmental baseline data is dependent on data collection activities occurring within biologically relevant survey windows.

It is incumbent upon the Client and any Authorized Party, to be knowledgeable of the level of risk that has been incorporated into the project design or scope, in consideration of the level of the environmental baseline information that was reasonably acquired to facilitate completion of the scope.

1.8 NOTIFICATION OF AUTHORITIES

TETRA TECH professionals are bound by their ethical commitments to act within the bounds of all pertinent regulations. In certain instances, observations by TETRA TECH of regulatory contravention may require that regulatory agencies and other persons be informed. The client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.



October 26, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 421101
Clean Harbors Approval No. 10348-03-01

On Tuesday, October 24th, 2023 at 7:45 am Clean Harbors received an email notification from AEP regarding an odor complaint they received on October 22nd at 7:40 am from a Ryley resident .

I uploaded the wind data during that time and the wind was blowing from the N/NNW between 3-4 km/hr, before, during and after the time of the complaint. Operations in the landfill had not started for the day at that time. Only 3 loads of waste were received that day, with the first load arriving at approximately 8:45 am and the others arriving around noon and the last load around 2:00 pm, which were all normal, non-odorous loads.

Good quality cover is being used on a daily basis at the landfill. No further investigation was done due to the delay in reporting.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
General Manager



Nov. 1, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 421225
Clean Harbors Approval No. 10348-03-01

On Monday, October 23rd, 2023, Clean Harbors received 26 cubic meter bags (33,620 kg) of non-regulated soil contaminated with hydrocarbons, Clean Harbors profile CH486273, from KBL Environmental Ltd. Upon a visual inspection by the equipment operator, there was no reason to believe the bags were not what they were supposed to be. The comment was that it looked like good soil material. These bags were unloaded and placed in Cell 3D.

On Wednesday, October 25th, the facility was notified by KBL that 10 of the 26 bags were loaded at their customer's site by mistake and they were not supposed to have been shipped off KBL's customer's site in the N.W.T. The 10 bags were suspected to have high arsenic concentrations which meant they would not meet the acceptance criteria for the Clean Harbors landfill in Alberta. The 10 bags were never actually sampled and tested.

We have recently received analytical from similar bags that KBL's customer still have on site. The results from four samples were (mg/kg): 52.9, 83.2, 87.3 and 2.24.

At this time the investigation continues, and we are waiting to hear from Alberta Environment on which steps we will be taking. I will send an updated 7-Day letter when more decisions have been made.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
General Manager



Nov. 15, 2023

Environmental Response Centre
Alberta Environment and Protected Areas
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 421225 – Risk Assessment
Clean Harbors Approval No. 10348-03-01

Risk Assessment

The Clean Harbors landfill was designed and built to the strict standards set by Alberta Environment and Protected Areas which are referenced in our approval. An engineered hazardous waste landfill facility design includes a combination of natural protection and engineered systems that work together to contain or control the waste. The Ryley hazardous waste landfill design consists of:

- A geo-composite drainage layer placed in direct contact with an underlying 80 mil HDPE geomembrane liner in both the primary and secondary liner.
- A geo-synthetic clay liner (GCL) placed in direct contact with an underlying clay liner that has a minimum thickness of 1.0 meter at all points and has been compacted to a hydraulic conductivity of 1×10^{-9} m/s or less.
- A leachate collection system as well as a leak detection system (specifications are listed in the approval)

The landfill incorporates leachate collection, leak detection and leak recovery systems which are designed to remove essentially all the detected liquids that leach from landfill. All leachate from the landfill is managed and disposed of at a nearby Class 1a disposal well.

Environmental monitoring programs on and in the surrounding landfill facility site area allow the owner and the jurisdiction of authority:

- to establish baseline conditions at the site,
- to detect natural and/or external trends,
- to demonstrate that the facility is performing as designed,
- to identify any potential impacts on the surrounding ecosystem, and
- to comply with jurisdiction of authority requirements.

One way Clean Harbors achieves this requirement is by onsite groundwater monitoring which is performed annually.



One must also consider the environmental risks, human health factors and transportation risks. In this case, the waste has already been placed and securely covered in a landfill that contains hazardous waste from other customers. The amount of material that would need to be removed would increase significantly. Digging up and removing the material would not only increase the risks of exposure but would mean the potential removal of hazardous waste from other customers. Transporting multiple loads of hazardous waste on the highways also poses a risk to the environment.

Taking into consideration all the above factors, it is Clean Harbors opinion the risk of any possible local environmental contamination is extremely low. Clean Harbors believes the best option in this case is to leave the waste where it is.

This is a rare occurrence. Clean Harbors has not had any issues with KBL loads from the N.W.T. in the past. We will continue our spot checks and periodic sampling to ensure their waste meets specifications in the profile.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
General Manager



Nov. 7, 2023

Environmental Response Centre
Alberta Environment and Parks
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 421520
Clean Harbors Approval No. 10348-03-01

On Wednesday November 1st at approximately 2:15 pm, one of our landfill equipment operators reported a small fire in the landfill approximately a foot by a foot in area. A water truck was nearby so an attempt was made to extinguish the fire however when water was sprayed on the flames, it essentially exploded into a small fire ball. It then burnt itself out. No one was injured and I was immediately notified of what happened.

I confirmed the fire was out and asked them not to cover the area to preserve evidence. Upon my investigation, the operator pointed to a specific piece of plastic bottle that was burning. I collected the partial container as well as three similar intact, empty bottles in the area. I took them to our lab. None of the bottles had any identifying markings or labels on them and they were about a liter in size. Our lab chemist set the partial plastic bottle in the fume hood and carefully added a couple drops of water to the residue on the inside of the plastic. It immediately started on fire. We tested the other empty bottles, but they were all inert. Our chemist was able to collect a small amount of sample from the residue in the piece of plastic bottle that was burning. He was able to run some tests and was able to determine with confidence that the water reactive component was most likely sodium metal.

The bottle was among a bulk load of material and debris that was received early that day and we are confident we know which customer it was. However, because multiple customers dump into the same receiving pit, and the material in the receiving pit is transferred by track-hoe into a rock truck and then placed in the landfill, there is a small chance the bottle could have come from a different load. Regardless, we contacted the suspect customer and let them know what happened. They were shocked by this notification because they said they never deal with any water reactive material on their site, but they said they would investigate.



On November 3rd, the customer contacted us saying they suspected the bottle may have come from one specific client, and they were taking steps to deal with their plastics and debris separately to ensure this won't happen again.

There were no other issues or environmental damage caused by this incident.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
General Manager



Feb. 5th, 2024

Environmental Response Centre
Alberta Environment and Protected Areas
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 424618
Clean Harbors Approval No. 10348-03-01

During the data entry process for all the landfill leachate data into spreadsheets for our annual report, I noticed a total of seven instances of non compliance that were not reported to AEPA. Descriptions are below:

Action Leakage rate – 4 Occurrences (Section 4.4.5 and 4.4.10)

Cell 2 – Max allowed per day = 1068 Liters/hectare/day

July 17th, recorded 31 liters
July 18th, recorded 1399 liters
July 19th, recorded 1738 liters
July 20th, recorded 901 liters

Cell 3E – Max allowed per day = 2433 Liters/hectare/day

July 17th, recorded 66 liters
July 18th, recorded 2628 liters
July 19th, recorded 77 liters

Cell 3C – Max allowed per day = 2011 Liters/hectare/day

July 20th, recorded 1854 liters
July 21st, recorded 2095 liters
July 25th, recorded 962 liters

Cell 3B – Max allowed per day = 1678 Liters/hectare/day

Aug. 3rd, recorded 226 liters
Aug. 4th, recorded 3485 liters
Aug. 8th, recorded 251 liters

There were significant rain events prior to the above exceedances.



Maximum Leachate Head Level – 3 Occurrences (Section 4.4.3)

Cell 2 – Max Level = 1.0 meter

May 12th, recorded 1.77 meters and received 1 mm of precipitation on that day. It was not under 1 meter until May 29th. Over 14 days.

Cell 3C – Max Level 0.30 meters

Sept. 15th, recorded 0.42 meters

Sept. 18th, recorded level logger error, no reading

Sept. 19th, recorded 2.90 m and it remained abnormally high until Oct. 13th at 0.04 m. Over 14 days. It rained 8mm on Sept. 20th however I highly suspect this was an instrument failure and not an actual contravention. It appears the level logger was corrected/repared on October 13th but no note was made in the log book.

Cell 3D – Max Level 0.30 meters

Oct. 4th, recorded 2.89 meters – received 1mm of rain

Oct. 5th, recorded 1.73 meters

Oct. 11th, fell back down to 0.31 meters, just barely over.

The level rose back up to 1.29 m on Oct. 16th and gradually rose to 2.97 m on Oct. 20th, with no more recorded rainfall since Oct. 4th. This is extremely strange. We received 13 mm of rain total on the 23rd and 24th and the level rose above 3 meters until it fell back to 0.20 meters on Nov. 6th where it stabilized back to normal for the rest of the year.

The individual that recorded the above events is no longer with the company. We already had clear postings in each landfill leachate building that reflect all maximum volumes and levels for each individual cell and clear wording as to when to notify management of any exceedances. We will also re-train all current operators on our Leachate Management SOP.

There were no environmental impacts as a result of the above exceedances.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
Facility Manager



Feb. 5th, 2024 – Revised sent March 5th, 2024

Environmental Response Centre
Alberta Environment and Protected Areas
111, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta T6B 2X3

To Whom It May Concern:

Re: Reference Number 424618
Clean Harbors Approval No. 10348-03-01

During the data entry process for all the landfill leachate data into spreadsheets for our annual report, I noticed a total of seven instances of non compliance that were not reported to AEPA. Descriptions are below:

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Cell 3E – Max allowed per day = 2433 Liters/hectare/day

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Cell 3C – Max allowed per day = 2011 Liters/hectare/day

July 20th, recorded 1854 liters
July 21st, recorded 2095 liters
July 25th, recorded 962 liters

Cell 3B – Max allowed per day = 1678 Liters/hectare/day

Aug. 3rd, recorded 226 liters
Aug. 4th, recorded 3485 liters
Aug. 8th, recorded 251 liters

There were significant rain events prior to the above exceedances.



Maximum Leachate Head Level – 3 Occurrences (Section 4.4.3)

Cell 2 – Max Level = 1.0 meter

April 24th, recorded 1.03 meters and rain was not recorded until May 8th. 15 consecutive days over. May 7th would be the max 14 days.

May 12th, recorded 1.77 meters and received 1 mm of precipitation on that day. It was not under 1 meter until May 29th. Over 14 days.

Cell 3C – Max Level 0.30 meters

Sept. 15th, recorded 0.42 meters

Sept. 18th, recorded level logger error, no reading

Sept. 19th, recorded 2.90 m and it remained abnormally high until Oct. 13th at 0.04 m. Over 14 days. It rained 8mm on Sept. 20th however I highly suspect this was an instrument failure and not an actual contravention. It appears the level logger was corrected/repared on October 13th but no note was made in the log book.

Cell 3D – Max Level 0.30 meters

Oct. 4th, recorded 2.89 meters – received 1mm of rain

Oct. 5th, recorded 1.73 meters

Oct. 11th, fell back down to 0.31 meters, just barely over.

The level rose back up to 1.29 m on Oct. 16th and gradually rose to 2.97 m on Oct. 20th, with no more recorded rainfall since Oct. 4th. This is extremely strange. We received 13 mm of rain total on the 23rd and 24th and the level rose above 3 meters until it fell back to 0.20 meters on Nov. 6th where it stabilized back to normal for the rest of the year.

The individual that recorded the above events is no longer with the company. We already had clear postings in each landfill leachate building that reflect all maximum volumes and levels for each individual cell and clear wording as to when to notify management of any exceedances. We will also re-train all current operators on our Leachate Management SOP.

There were no environmental impacts as a result of the above exceedances.

If you have any further questions, do not hesitate to contact Stan Yuha (Facility Manager) at (780) 663-2509.

Sincerely,

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
Facility Manager