
APPENDIX F

Quarterly Site Inspection Reports

Clean Harbors Canada, Inc.

2017 Annual Landfill Report



Memorandum

April 18, 2017

To: Erica Carabott/Clean Harbors
Mike Parker/Clean Harbors

Ref. No.: 044985

From:  Jim Yardley/Neil Shannick/mg/21

Tel: 519-884-0510

Subject: 2017 First Quarter Site Inspection

1. Introduction

In accordance with requirements outlined in Section 8.1 of the Design and Operations Report, GHD conducted the 2017 first quarter Site Inspection (Inspection) of the Clean Harbors Canada, Inc. (Clean Harbors) Lambton Facility (Site) in Corunna, Ontario. The Inspection was conducted on March 23, 2017 by Neil Shannick.

The Inspection consisted of a walk around the Site. The Inspection focused primarily on the active landfill and waste disposal operations, including an inspection of each of the surface water, leachate, and process water ponds.

1.1 Weather and Site Conditions

At the time of the Inspection, the temperature was -6 °C. Weather conditions at the Site were sunny, with a slight wind from the south. During the week preceding the Inspection, the Site experienced 2.0 mm of total precipitation, and a mean temperature of 0.4°C. During the Inspection, the Site was generally dry with frost remaining in the ground. Ponding was noted in low, flat areas. Figure 1 provides a Site plan showing features referenced herein, as well as any notes related to specific issues noted in this memorandum. Figure 2 provides the Landfill Expansion Subcell Fill Progression Plan, identifying the cell and subcell locations, as presented in the “*Design and Operations Report - Lambton Landfill Expansion, Clean Harbors Canada, Inc.*”, as prepared by Tetra Tech WEI Inc., dated October 8, 2015.

2. Landfill Operations

The Inspection was focused on landfill and waste disposal operations including Cell development, active disposal, waste hauling, and landfill capping efforts.



2.1 Landfill Cell Development

The following provides a description of the status of the Landfill Cell Development, including active waste disposal operations and internal waste transport routes:

- The active waste tipping face is located in the northern portion of Cell 19-1-2. Waste placement is occurring from north to south, as shown in Photo 1. The northern portion of Cell 19-1-1 remains active.
- The southern portion of Cell 19-1-2 is currently under construction. A ramp has been constructed in the western portion of Subcell 2, terminating at the boundary of Subcell 1 with an elevated platform for offloading of waste received from pre-approved, large-scale waste volume projects and deposited by off-site waste haulage vehicles.
- Waste Transport Route: Site waste haulers are directed around the east and south sides of the Process Area and enter Cell 19-1-2 from the north end on a dedicated haul road from the Waste Receiving Area.

2.2 Landfill Cap

The following provides a description of the status of the Landfill Cap, including cap placement during the first quarter, and the condition of the interim and final cap. With the recent approval of the vertical expansion, the previous capped areas are considered to be interim, since a portion of the cap will be removed and additional waste placed in these areas.

2.2.1 Interim and Final Cap Placement in Quarter

- The majority of the Site has received an interim cap, with the exception of the active landfilling area (the northern portion of Cells 19-1-2 and 19-1-1).
- The southern portion (approximately three-quarters) of Cell 19-1-1 received an interim cap during the previous quarter, with the exception of the eastern sidewall of the Cell. The interim cap in the southern portion of Cell 19-1-1 is shown on Photo 2.

2.2.2 Interim Cap Conditions

- The interim cap was noted to be in good condition, with minor erosion channels observed.
- Minor ponding was identified in several areas as described in Section 4. The interim cap requires minor grading to promote drainage to the perimeter ditches.
- Erosion channels should be addressed through additional clay placement and grading.

2.2.3 Final Cap Conditions

- Per Environmental Compliance Approval No. A031806, Notice No. 9 (dated October 19, 2015), no areas of the Site are considered to have received final capping. Per approval of the landfill expansion, all areas, as noted in Section 2.2.1, are considered to have received interim capping at this time.
- No areas have received topsoil. Natural vegetation is present in the northeast and southern (non-active) portions of the Site.



3. Perimeter Screening Berms

The following provides a description of the status of the Perimeter Screening Berms:

- Significant berm erosion was identified immediately west of proposed Cell 21-1. The erosion occurred on the landfill side of the berm, as identified on Figure 1 (previously identified in quarterly reports).
- Multiple larger erosion channels were identified on the landfill side of the north perimeter screening berm, as identified on Figure 1 (previously identified in quarterly reports).
- Minor erosion channels were noted throughout the Perimeter Screening Berms. These channels are prevalent throughout the un-vegetated interior side walls of the western and eastern perimeter screening berms.
- Several large erosion channels were noted on the elevated areas immediately northwest and southeast of the northern portion of the landfill. The erosion channels are located on plateaus/ramps within the screening berm. The erosion channel in the southeast corner extends into the east ditch.

4. Surface Water Management System

The following provides a description of the status of the Surface Water Management System, including the ditches, swales, and surface water ponds.

4.1 Ditches and Swales

The following provides a description of the status of the surface water ditches and swales:

- Shallow ponding was identified, located centrally within the northwest corner of the landfill, as shown on Figure 1 and Photo 3. The ponded area is significantly smaller than during the 2016 fourth quarter inspection due to overall dry conditions on Site. The area has been graded to drain to the north ditch with an internal swale, though at the time of the Inspection, the ponded area was not connected to the internal swale. The internal swale was damp during the Inspection, with no observed standing water.
- Another ponded area was noted in the northwest portion of proposed Cell 21-3 (i.e., located centrally in the northern portion of the Site), as shown in Photo 4. Ponding has decreased since the 2016 fourth quarter inspection. Two drainage paths were identified, both of which were nearly full with no observed flow.
- Water levels continue to be high in the central portion of the north ditch. High water levels in the north ditch have the potential to prohibit the above-noted ponded areas from draining.
- There is minimal water in the perimeter ditch in the northeast corner of the Site (i.e. at the location of the former perimeter screening berm access road), though no flow was noted in this area.
- Flow from the north ditch to the eastern ditch is impeded by sedimentation in the northeast corner of the Site, likely brought on by dense wetland vegetation within the ditch and sedimentation, as shown in Photo 5 and in Figure 1.



- Sedimentation is occurring in the east ditch as a result of minor erosion of the perimeter screening berm, along the entire length in the northern portion of the landfill, resulting in fluctuations in grade and flow breaks. The base of the east ditch had a small volume of water with little to no flow observed at the time of the Inspection.
- Significant erosion and sedimentation was identified in the southeast corner of the northern portion of the landfill, limiting water flow, as shown in Photo 6 and Figure 1. Water levels were low to medium in the east ditch and the internal swale to the north, with no observed flow.
- It was noted during Inspections that there was limited elevation difference available within the northeast corner of the perimeter ditch. As such, there is minimal ability to lower the base of ditch and maintain flow to the East Surface Water Pond.
- Water levels were dry to low in the east perimeter ditch between the empty bin storage area and the East Surface Water Pond. Sedimentation was noted in the base of the ditch, originating from the interior berm immediately south of the empty bin storage area, currently being used as a soil borrow area.
- The flow break in the south ditch has been re-established, immediately west of the access bridge located at Gate 6. The blockage is the result of wildlife activity (i.e., beavers), as shown in Photo 7.
- High water levels were identified in the western portion of the south ditch, with minimal flow noted. Significant sedimentation and accumulation of loose vegetation was identified in the southwest corner of the perimeter ditch, impeding flow of water toward the West Surface Water Pond, as shown in Photo 8.

4.2 East Surface Water Pond

The following provides a description of the status of the East Surface Water Pond (Photo 9):

- Water levels within the East Surface Water Pond were very low, well below the baseline of vegetation.
- Little to no flow was observed entering the East Surface Water Pond.
- The pump at the East Surface Water Pond was in operation at the time of the Inspection.

4.3 West Surface Water Pond

The following provides a description of the status of the West Surface Water Pond (Photo 10):

- Water levels within the West Surface Water Pond were low.
- Minimal to no flow was observed entering the West Surface Water Pond. This is a result of sedimentation in the southwest corner of the perimeter ditch.

4.4 Equalization Pond

The following provides a description of the status of the Equalization Pond (Photo 11):

- The Equalization Pond was at a normal operating water level.
- Minor cracking and sloughing of the concrete side walls of the Equalization Pond was observed during the Inspection.



- Fish and minnows were not observed within the Equalization Pond.

5. Process Water Management System

The Process Water Management System consists of three ponds and a series of ditches and swales. The North Process Water Pond is located immediately west of the TDU area, the South Process Water Pond is located immediately south of the Incinerator, and the West Process Water Pond is located adjacent to the West Storm Water Pond. Water retained in the Process Water Management System is used as quench water for Site incineration operations.

5.1 Process Water Ditches and Swales

The following provides a description of the status of the process water ditches and swales:

- The process water ditch adjacent to the TDU area exhibited a low to medium water level at the time of Inspection. This ditch was not being pumped at the time of Inspection.
- Water and ice was present in the process water ditch feeding the North Process Water Pond at the time of the Inspection. As shown in Photo 12, the ditch that feeds this, located immediately south of the Household Hazardous Waste Depot (HHW Depot), was full. Little to no flow toward the pond was observed. Significant sediment buildup was noted in the rip rap. It is recommended that sediment be removed from the ditch, including the ditch in front of the HHW Depot, and rip rap be re-instated where required due to sediment removal activities.
- It was also noted that the west end of the culvert beneath the North Process Water Pond access driveway is partially crushed. Repair should be evaluated during repairs to the ditch as recommended above.

5.2 North Process Water Pond

The following provides a description of the status of the North Process Water Pond (Photo 13):

- The water level within the North Process Water Pond was very low, well below the ditch inlet and culvert outlets.
- It was not noted if the pump at the North Process Water Pond was running at the time of the inspection.
- A washout was noted in the southeast corner of the North Process Water Pond.

5.3 South Process Water Pond

The following provides a description of the status of the South Process Water Pond (Photo 14):

- The water level within the South Process Water Pond was low.

5.4 West Process Water Pond

The following provides a description of the status of the West Process Water Pond:

- The water level within the West Process Water Pond was low at the time of the Inspection.



6. Leachate Management System

The leachate reservoirs are designed to receive leachate from the active fill area and process areas. Leachate transferred from the active fill area is detained within the leachate reservoirs prior to transfer to the incinerator for disposal.

6.1 South Leachate Reservoir

The following provides a description of the status of the South Leachate Reservoir (Photo 15):

- The South Leachate Reservoir is equipped with a permanent floating cover. Based on observation of the cover, the Reservoir is not currently being used for leachate storage. During the previous post-Inspection meeting, Clean Harbors indicated that leachate from this pond was pumped into the East Leachate Reservoir in preparation for enlargement of the South Leachate Reservoir.
- Clean Harbors maintains a record of the volume of leachate within the South Leachate Reservoir.

6.2 East Leachate Reservoir

The following provides a description of the status of the East Leachate Reservoir (Photo 16):

- The East Leachate Reservoir is equipped with a permanent floating cover. Based on observation of the cover, the Reservoir is currently being used as the main leachate storage.
- Clean Harbors maintains a record of the volume of leachate within the East Leachate Reservoir.

6.3 New Leachate Reservoir

The following provides a description of the status of a new Leachate Reservoir (Photo 17):

- A new Leachate Reservoir has been constructed immediately east of the East Leachate Reservoir. The new Leachate Reservoir is currently empty. At the time of the Inspection, it appeared as though several connections were required to be completed.

6.4 Leachate Storage Tank and Pumping System

The following provides a description of the status of the Leachate Storage Tank and Pumping System:

- The Leachate Storage Tank is in operation, serving as the feed tank to the incinerator.

7. Waste Processing Operations

The following provides a description of the Waste Processing Operations:

- A slight odour was noted in the parking lot upon arrival on Site. As noted above, wind was blowing from the south during the Inspection.
- A very slight odour was noted on the north perimeter berm, near the northwest corner.



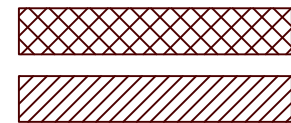
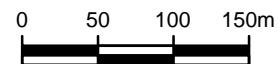
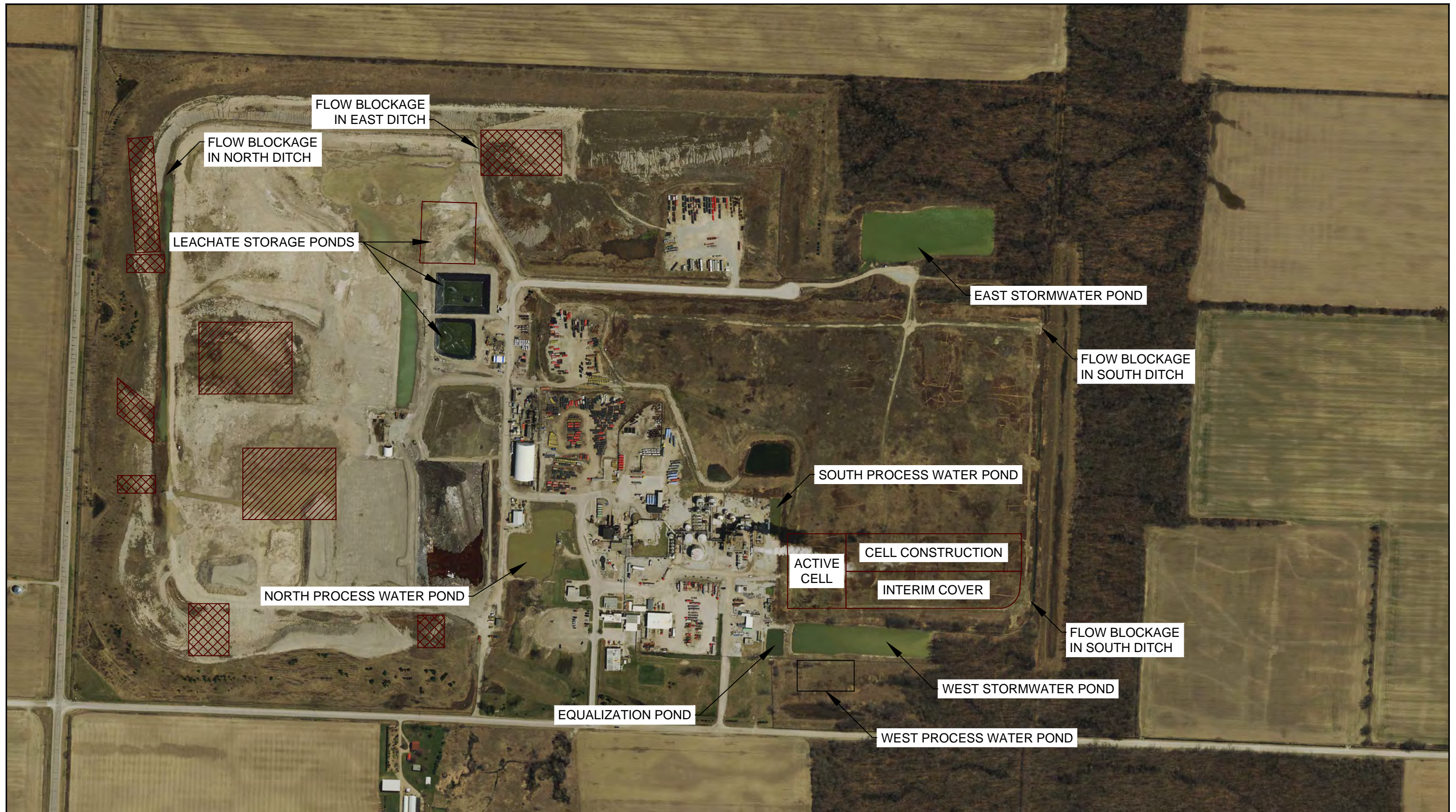
- A slight odour was noted in the vicinity of active landfilling operations in Cell 19-1, immediately south of the active landfilling area, likely originating from the open eastern face of Cell 19-1.
- No odour was noted within the TDU pit area.

8. Conclusions and Recommendations

Interim cover work has been completed in the northern area of the Site. As such, the former stockpile area and other areas in the north that have ponded water are scheduled to be assessed and re-graded to promote drainage.

Maintenance of the perimeter ditches is required to remove areas where sediment has accumulated and is restricting flow of water. Maintenance of the perimeter ditches is a key component to minimize ponding of water on the interim cover and transfer of water to stormwater ponds.

Portions of the interior side of the perimeter screening berms have significant erosion. These areas should be assessed and corrected to minimize erosion into the perimeter ditches. Installation of reinforced ditches from the top of the berm to the perimeter ditches may be a solution for these areas, as well as vegetation of the internal berm slopes.



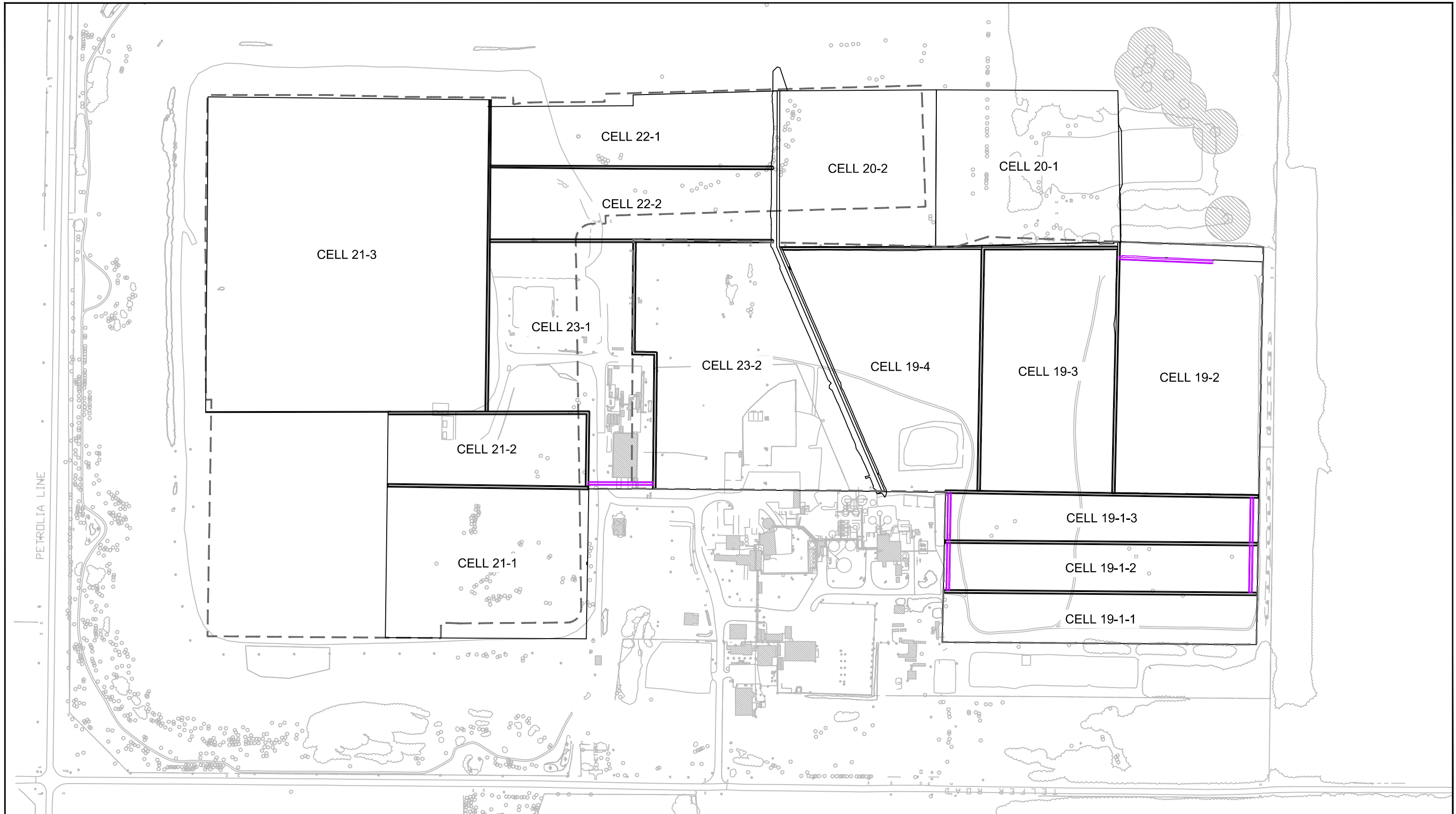
LEGEND:
 LARGE EROSION CHANNELS
 LARGE AREAS OF SURFACE WATER PONDING



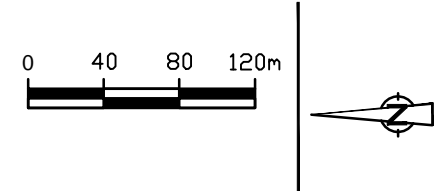
LAMBTON FACILITY
 CLEAN HARBORS CANADA INC.
 2017 FIRST QUARTER SITE INSPECTION
 SITE PLAN

44985-20
 Apr 18, 2017

FIGURE 1



Source: DESIGN AND OPERATIONS REPORT - LAMBTON LANDFILL EXPANSION, CLEAN HARBORS CANADA, INC. PREPARED BY TETRA TECH WEI INC. DATED OCTOBER 8, 2015



LAMBTON FACILITY
 CLEAN HARBORS CANADA INC.
 2017 FIRST QUARTER SITE INSPECTION
 LANDFILL EXPANSION SUBCELL FILL EXPANSION PLAN

44985-20
 Apr 18, 2017

FIGURE 2

Attachment 1 Photographic Log



Photo 1 - Active landfilling cell (northern portion of Cell 19-1-2)



Photo 2 - Interim cap placement, southern portion of Cell 19-1-1





Photo 3 - Ponding within northwest corner of Site



Photo 4 - Ponding in northern, central portion of Site





Photo 5 - North ditch, surface water blockage



Photo 6 - North landfill area, southeast ditch, partial surface water blockage





Photo 7 - South ditch, surface water blockage west of access bridge



Photo 8 - Southwest ditch, surface water blockage





Photo 9 - East Surface Water Pond



Photo 10 - West Surface Water Pond





Photo 11 - Equalization Pond



Photo 12 - North Process Water Pond ditch





Photo 13 - North Process Water Pond



Photo 14 - South Process Water Pond





Photo 15 - South Leachate Reservoir



Photo 16 - East Leachate Reservoir





Photo 17 - Newly Constructed Leachate Reservoir





Memorandum

July 4, 2017

To: Erica Carabott/Clean Harbors
Mike Parker/Clean Harbors

Ref. No.: 044985

From: Jim Yardley/Neil Shannick/mg/24

Tel: 519-884-0510

Subject: **2017 Second Quarter Site Inspection**

1. Introduction

In accordance with requirements outlined in Section 8.1 of the Design and Operations Report, GHD conducted the 2017 second quarter Site Inspection (Inspection) of the Clean Harbors Canada, Inc. (Clean Harbors) Lambton Facility (Site) in Corunna, Ontario. The Inspection was conducted on June 8, 2017 by Neil Shannick.

The Inspection consisted of a walk around the Site. The Inspection focused primarily on the active landfill and waste disposal operations, including an inspection of each of the surface water, leachate, and process water ponds.

1.1 Weather and Site Conditions

At the time of the Inspection, the temperature was 16°C. Weather conditions at the Site were sunny, with a slight wind from the south. During the week preceding the Inspection, the Site experienced 4.2 mm of total precipitation, and a mean temperature of 15.8°C. During the Inspection, the Site was generally dry. Minimal ponding was noted in low, flat areas. Figure 1 provides a Site plan showing features referenced herein, as well as any notes related to specific issues noted in this memorandum. Figure 2 provides the Landfill Expansion Subcell Fill Progression Plan, identifying the cell locations, as presented in the "*Design and Operations Report - Lambton Landfill Expansion, Clean Harbors Canada, Inc.*", as prepared by Tetra Tech WEI Inc., dated October 8, 2015.

2. Landfill Operations

The Inspection was focused on landfill and waste disposal operations including Cell development, active disposal, waste hauling, and landfill capping efforts.



2.1 Landfill Cell Development

The following provides a description of the status of the Landfill Cell Development, including active waste disposal operations and internal waste transport routes:

- The active waste tipping face is located in the central portion of Cell 19-1-2 and is referred to as 19-1-2B. Waste placement is occurring from north to south, as shown in Photo 1. The northern portion of Cells 19-1-1 and 19-1-2 (hereinafter referred to as 19-1-2A) are no longer active.
- The southern portion of Cell 19-1-2 (19-1-2C) is currently under construction.
- Waste Transport Route: Site waste haulers are directed around the east side of the Process Area and enter Cell 19-1-2B from the west side, located centrally, on a dedicated haul road from the Waste Receiving Area.

2.2 Landfill Cap

The following provides a description of the status of the Landfill Cap, including cap placement during the second quarter, and the condition of the interim and final cap. With the recent approval of the vertical expansion, the previous capped areas are considered to be interim, since a portion of the cap will be removed and additional waste placed in these areas.

2.2.1 Interim and Final Cap Placement in Quarter

- The majority of the Site has received an interim cap, with the exception of the active landfilling area (Cell 19-1-2B).
- Cell 19-1-1 received additional interim cap during the previous quarter, with the exception of the eastern sidewall of the Cell. Cell 19-1-2A has also received interim cap. The interim cap in the northern portion of Cell 19-1-1 and 19-1-2A is shown on Photo 2.

2.2.2 Interim Cap Conditions

- The interim cap was noted to be in good condition, with minor erosion channels observed.
- Minor ponding was identified in several areas as described in Section 4. The interim cap requires minor grading to promote drainage to the perimeter ditches.
- Erosion channels should be addressed through additional clay placement and grading.

2.2.3 Final Cap Conditions

- Per Environmental Compliance Approval No. A031806, Notice No. 9 (dated October 19, 2015), no areas of the Site are considered to have received final capping. Per approval of the landfill expansion, all areas, as noted in Section 2.2.1, are considered to have received interim capping at this time.
- No areas have received topsoil. Natural vegetation is present in the northeast and southern (non-active) portions of the Site.



3. Perimeter Screening Berms

The following provides a description of the status of the Perimeter Screening Berms:

- Significant berm erosion was identified immediately west of proposed Cell 21-1. The erosion occurred on the landfill side of the berm, as identified on Figure 1 (previously identified in quarterly reports).
- Multiple larger erosion channels were identified on the landfill side of the north perimeter screening berm, as identified on Figure 1 (previously identified in quarterly reports).
- Minor erosion channels were noted throughout the Perimeter Screening Berms. These channels are prevalent throughout the un-vegetated interior side walls of the western and eastern perimeter screening berms.
- Several large erosion channels were noted on the elevated areas immediately northwest and southeast of the northern portion of the landfill. The erosion channels are located on plateaus/ramps within the screening berm. The erosion channel in the southeast corner extends into the east ditch.

4. Surface Water Management System

The following provides a description of the status of the Surface Water Management System, including the ditches, swales, and surface water ponds.

4.1 Ditches and Swales

The following provides a description of the status of the surface water ditches and swales:

- No ponding was identified within the northwest corner of the landfill, where ponding is generally present (location as shown on Figure 1 and Photo 3). The area was damp to dry during the Inspection. The area has been graded to drain to the north ditch with an internal swale. The internal swale was dry during the Inspection, with no observed standing water.
- Very minor ponding was noted in the northwest portion of proposed Cell 21-3 (i.e., located centrally in the northern portion of the Site), as shown in Photo 4. Ponding has decreased since the 2017 first quarter inspection. Two drainage paths were identified, one of which was full, while the other was damp with minor standing water noted. No flow was observed.
- Water levels continue to be high in the central portion of the north ditch. High water levels in the north ditch have the potential to prohibit the above-noted ponded areas from draining during wetter periods.
- There was minimal to no water in the perimeter ditch in the northeast corner of the Site (i.e. at the location of the former perimeter screening berm access road), though no flow was noted in this area.
- Flow from the north ditch to the eastern ditch is impeded by sedimentation in the northeast corner of the Site, likely brought on by dense wetland vegetation within the ditch and sedimentation, as shown in Photo 5 and in Figure 1.
- Sedimentation is occurring in the east ditch as a result of erosion of the perimeter screening berm, along the entire length in the northern portion of the landfill, resulting in fluctuations in grade and flow breaks.



Erosion channels range from minor to large. The base of the east ditch had a small volume of water with little to no flow observed at the time of the Inspection.

- Significant erosion was identified in the southeast corner of the northern portion of the landfill, resulting in sedimentation of the perimeter ditch and limited water flow, as shown in Photo 6 and Figure 1. Water levels were low to medium in the east ditch and the internal swale to the north, with no observed flow.
- It was noted during previous Inspections that there was limited elevation difference available within the northeast corner of the perimeter ditch. As such, there is minimal ability to lower the base of ditch and maintain flow to the East Surface Water Pond.
- Water levels were dry to low in the east perimeter ditch in front of the empty bin storage area. Water levels were higher between the soil borrow area and the East Surface Water Pond. During the previous inspection, sedimentation was noted in the base of the ditch, originating from the soil borrow area. This area has been repaired to address erosion, however, sediment buildup remains at the culvert inlets and outlets.
- The flow break in the south ditch has been re-established, immediately west of the access bridge located at Gate 6. The blockage is the result of wildlife activity (i.e., beavers), as shown in Photo 7. During the post-Inspection discussion, it was noted that the wildlife concerns have been addressed and the remaining dams will be removed.
- High water levels were identified in the western portion of the south ditch, with minimal flow noted. Significant sedimentation and accumulation of loose vegetation was identified in the southwest corner of the perimeter ditch, impeding flow of water toward the West Surface Water Pond, as shown in Photo 8. A small channel is present within the blockage, allowing minimal flow.

4.2 East Surface Water Pond

The following provides a description of the status of the East Surface Water Pond (Photo 9):

- Water levels within the East Surface Water Pond were very high, extending nearly to the baseline of vegetation. This is the result of several significant rainfall events in May 2017.
- Little to no flow was observed entering the East Surface Water Pond.
- The pump at the East Surface Water Pond was not in operation at the time of the Inspection.

4.3 West Surface Water Pond

The following provides a description of the status of the West Surface Water Pond (Photo 10):

- Water levels within the West Surface Water Pond were high, extending nearly to the baseline of vegetation.
- Minimal to no flow was observed entering the West Surface Water Pond. This is a result of sedimentation in the southwest corner of the perimeter ditch.
- The pump at the West Surface Water Pond was in operation at the time of the Inspection.



4.4 Equalization Pond

The following provides a description of the status of the Equalization Pond (Photo 11):

- Water levels within the Equalization Pond were slightly higher than normal. Water was being pumped into the Equalization Pond at the time of the Inspection.
- Minor cracking and sloughing of the concrete side walls of the Equalization Pond was observed during the Inspection. Additional sloughing was noted in several areas around the perimeter.
- Fish and minnows were observed within the Equalization Pond, visible within Photo 11.

5. Process Water Management System

The Process Water Management System consists of three ponds and a series of ditches and swales. The North Process Water Pond is located immediately west of the TDU area, the South Process Water Pond is located immediately south of the Incinerator, and the West Process Water Pond is located adjacent to the West Storm Water Pond. Water retained in the Process Water Management System is used as quench water for Site incineration operations.

5.1 Process Water Ditches and Swales

The following provides a description of the status of the process water ditches and swales:

- The process water ditch adjacent to the TDU area exhibited a low water level at the time of Inspection. This ditch was not being pumped at the time of Inspection. Significant erosion channels were observed immediately to the west, along the Landfill Container Compound access road.
- The ditches feeding the North Process Water Pond had minimal standing water at the time of the Inspection. As shown in Photo 12, these ditches have significant sediment buildup in the rip rap and culverts, with little to no flow toward the pond. It is recommended that sediment be removed from the ditch, including the ditch in front of the HHW Depot.
- It was also noted that the west end of the culvert beneath the North Process Water Pond access driveway is partially crushed. Repair and culvert cleaning should be evaluated during repairs to the ditch as recommended above.
- Standing water was noted in several small ditches in the vicinity of the South Process Water Pond, as well as in the maintenance shop parking lot.

5.2 North Process Water Pond

The following provides a description of the status of the North Process Water Pond (Photo 13):

- The water level within the North Process Water Pond was low, well below the ditch inlet and culvert outlets.
- The pump at the North Process Water Pond was running at the time of the inspection. Inspection of the side slopes indicate the pond was recently drawn down.



- A significant washout was noted in the southeast corner of the North Process Water Pond. Some large rip rap has been placed in the washout, however, repair of the side slope is necessary.

5.3 South Process Water Pond

The following provides a description of the status of the South Process Water Pond (Photo 14):

- The water level within the South Process Water Pond was very high, nearly completely full. It was noted that this area is also receiving clean runoff from east of the active landfill area.

5.4 West Process Water Pond

The following provides a description of the status of the West Process Water Pond:

- The West Process Water Pond was full at the time of the Inspection.

6. Leachate Management System

The leachate reservoirs are designed to receive leachate from the active fill area and process areas. Leachate transferred from the active fill area is detained within the leachate reservoirs prior to transfer to the incinerator for disposal.

6.1 South Leachate Reservoir

The following provides a description of the status of the South Leachate Reservoir (Photo 15):

- The South Leachate Reservoir is equipped with a permanent floating cover. Based on observation of the cover, the Reservoir is not currently being used for leachate storage. During a previous post-Inspection meeting, Clean Harbors indicated that leachate from this pond was pumped into the East Leachate Reservoir in preparation for enlargement of the South Leachate Reservoir.
- Clean Harbors maintains a record of the volume of leachate within the South Leachate Reservoir.

6.2 East Leachate Reservoir

The following provides a description of the status of the East Leachate Reservoir (Photo 16):

- The East Leachate Reservoir is equipped with a permanent floating cover. Based on observation of the cover, the Reservoir is currently being used for leachate storage.
- Clean Harbors maintains a record of the volume of leachate within the East Leachate Reservoir.

6.3 New Leachate Reservoir

The following provides a description of the status of a new Leachate Reservoir (Photo 17):

- A new Leachate Reservoir has been constructed immediately east of the East Leachate Reservoir. The new Leachate Reservoir is currently operational, being used for leachate storage.



6.4 Leachate Storage Tank and Pumping System

The following provides a description of the status of the Leachate Storage Tank and Pumping System:

- The Leachate Storage Tank is in operation, serving as the feed tank to the incinerator.

7. Waste Processing Operations

The following provides a description of the Waste Processing Operations:

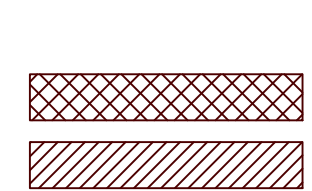
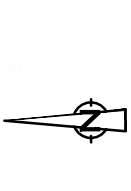
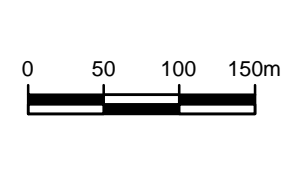
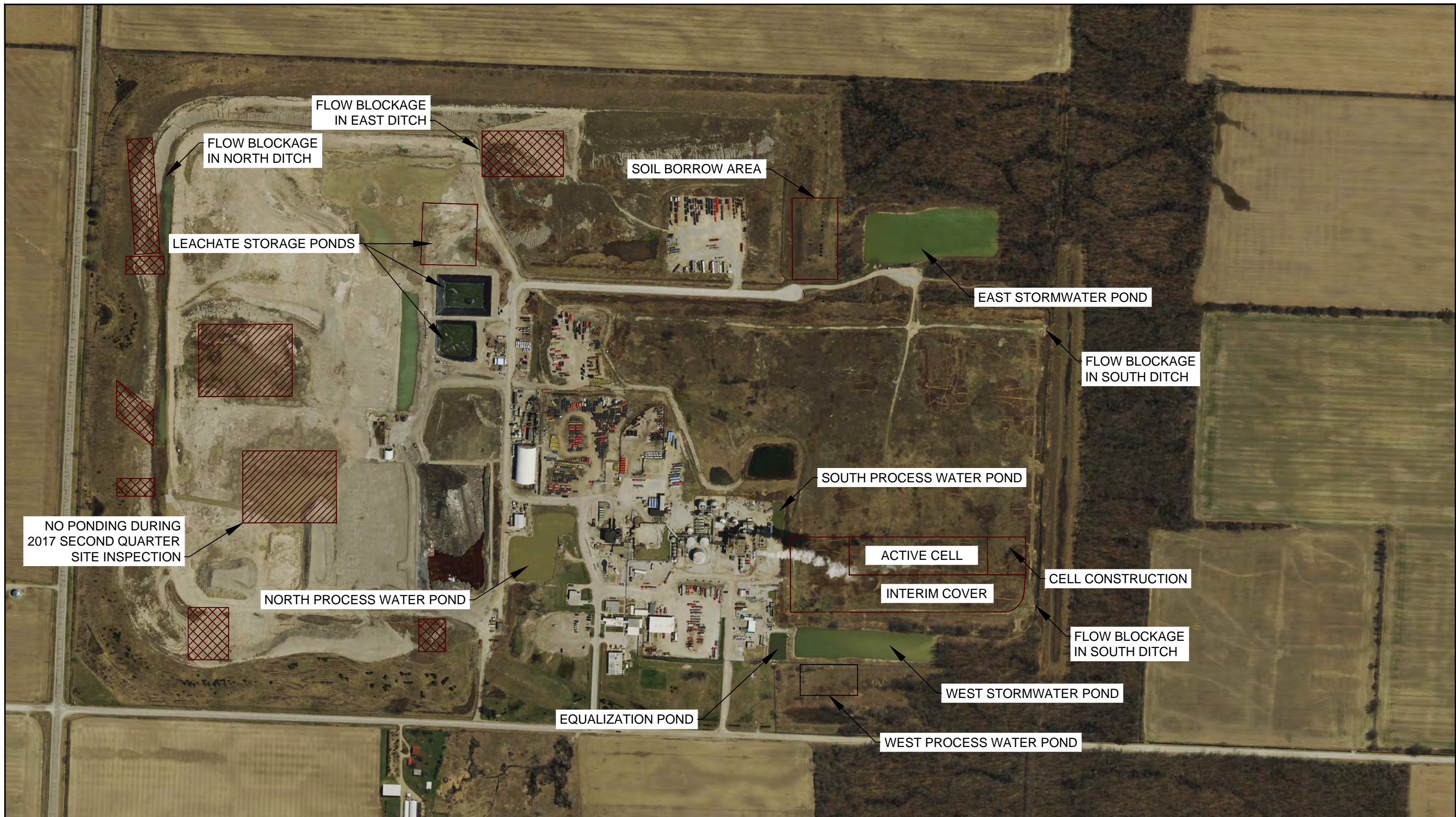
- A slight odour was noted in the vicinity of active landfilling operations in Cell 19-1-2, immediately south of the active landfilling area, likely originating from the active landfilling area and open eastern face of Cell 19-1-2.
- A slight odour was noted within the TDU storage and pit areas.

8. Conclusions and Recommendations

Interim cover work has been completed in the northern area of the Site. As such, the former stockpile area and other areas in the north that have ponded water are scheduled to be assessed and re-graded to promote drainage.

Maintenance of the perimeter ditches is required to remove areas where sediment has accumulated and is restricting flow of water. Maintenance of the perimeter ditches is a key component to minimize ponding of water on the interim cover and transfer of water to stormwater ponds.

Portions of the interior side of the perimeter screening berms have significant erosion. These areas should be assessed and corrected to minimize erosion into the perimeter ditches. Installation of reinforced ditches from the top of the berm to the perimeter ditches may be a solution for these areas, as well as vegetation of the internal berm slopes.



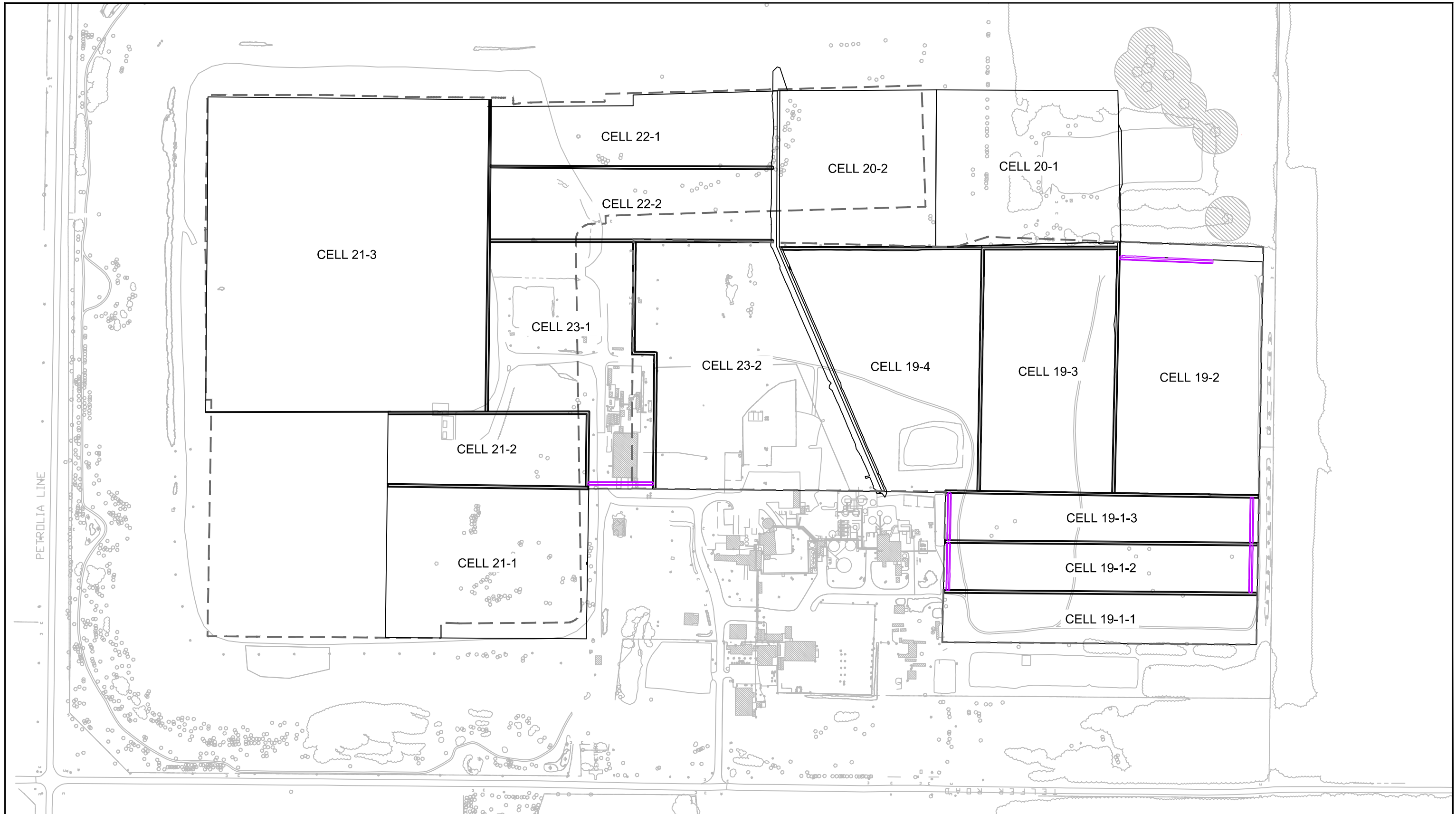
LEGEND:
 LARGE EROSION CHANNELS
 LARGE AREAS OF SURFACE WATER PONDING



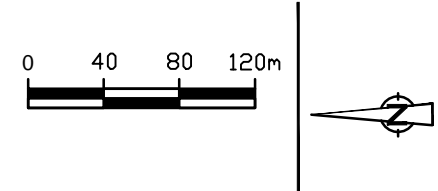
LAMBTON FACILITY
 CLEAN HARBORS CANADA INC.
 2017 SECOND QUARTER SITE INSPECTION
 SITE PLAN

44985-16
 Apr 18, 2017

FIGURE 1



Source: DESIGN AND OPERATIONS REPORT - LAMBTON LANDFILL EXPANSION, CLEAN HARBORS CANADA, INC. PREPARED BY TETRA TECH WEI INC. DATED OCTOBER 8, 2015



LAMBTON FACILITY
 CLEAN HARBORS CANADA INC.
 2017 SECOND QUARTER SITE INSPECTION
 LANDFILL EXPANSION SUBCELL FILL EXPANSION PLAN

44985-16
 Apr 18, 2017

FIGURE 2

Attachment 1 Photographic Log



Photo 1 - Active landfilling cell (southern portion of Cell 19-1-2)



Photo 2 - Interim cap placement, southern portion of Cell 19-1-1



Photo 3 - Ponding within northwest corner of Site



Photo 4 - Ponding in northern, central portion of Site



Photo 5 - North ditch, surface water blockage



Photo 6 - North landfill area, southeast ditch, partial surface water blockage



Photo 7 - South ditch, surface water blockage west of access bridge



Photo 8 - Southwest ditch, surface water blockage



Photo 9 - East Surface Water Pond



Photo 10 - West Surface Water Pond



Photo 11 - Equalization Pond



Photo 12 - North Process Water Pond ditch



Photo 13 - North Process Water Pond



Photo 14 - South Process Water Pond



Photo 15 - South Leachate Reservoir



Photo 16 - East Leachate Reservoir



Photo 17 - New Leachate Reservoir



Memorandum

October 20, 2017

To: Erica Carabott/Clean Harbors
Mike Parker/Clean Harbors

Ref. No.: 044985

From: Jim Yardley/Neil Shannick/mg/32

Tel: 519-884-0510

Subject: 2017 Third Quarter Site Inspection

1. Introduction

In accordance with requirements outlined in Section 8.1 of the Design and Operations Report, GHD conducted the 2017 third quarter Site Inspection (Inspection) of the Clean Harbors Canada, Inc. (Clean Harbors) Lambton Facility (Site) in Corunna, Ontario. The Inspection was conducted on September 13, 2017 by Neil Shannick.

The Inspection consisted of a walk around the Site. The Inspection focused primarily on the active landfill and waste disposal operations, including an inspection of each of the surface water, leachate, and process water ponds.

1.1 Weather and Site Conditions

At the time of the Inspection, the temperature was 17°C. Weather conditions at the Site were sunny, with a slight wind from the south, southeast. During the week preceding the Inspection, the Site experienced 0.0 mm of total precipitation, and a mean temperature of 13.0°C. During the Inspection, the Site was generally dry. Minimal ponding was noted in low, flat areas. Figure 1 provides a Site plan showing features referenced herein, as well as any notes related to specific issues noted in this memorandum. Figure 2 provides the Landfill Expansion Subcell Fill Progression Plan, identifying the cell locations, as presented in the "*Design and Operations Report - Lambton Landfill Expansion, Clean Harbors Canada, Inc.*", as prepared by Tetra Tech WEI Inc., dated October 8, 2015.

2. Landfill Operations

The Inspection was focused on landfill and waste disposal operations including Cell development, active disposal, waste hauling, and landfill capping efforts.



2.1 Landfill Cell Development

The following provides a description of the status of the Landfill Cell Development, including active waste disposal operations and internal waste transport routes:

- The active waste tipping face is located in the central portion of Cell 19-1-2 and is referred to as 19-1-2B. Waste placement is occurring from north to south, as shown in Photo 1. The northern portion of Cells 19-1-1 and 19-1-2 (hereinafter referred to as 19-1-2A) are no longer active. Odour was noted in the immediate vicinity of the active landfill area.
- The southern portion of Cell 19-1-2 (19-1-2C) is currently under construction.
- Waste Transport Route: Site waste haulers are directed around the east side of the Process Area and enter Cell 19-1-2B from the east side, located at the northern end of the active area, on a dedicated haul road from the Waste Receiving Area.

2.2 Landfill Cap

The following provides a description of the status of the Landfill Cap, including cap placement during the third quarter, and the condition of the interim and final cap. With the recent approval of the vertical expansion, the previous capped areas are considered to be interim, since a portion of the cap will be removed and additional waste placed in these areas.

2.2.1 Interim and Final Cap Placement in Quarter

- The majority of the Site has received an interim cap, with the exception of the active landfilling area (Cell 19-1-2B).
- Cells 19-1-1 and 19-1-2A have received interim cap, including the eastern sidewall of the Cells. The interim cap in the northern portion of Cell 19-1-1 and 19-1-2A is shown on Photo 2.

2.2.2 Interim Cap Conditions

- The interim cap was noted to be in good condition, with minor erosion channels observed.
- Minor ponding was identified in several areas as described in Section 4. The interim cap requires minor grading to promote drainage to the perimeter ditches.
- Erosion channels should be addressed through additional clay placement and grading.

2.2.3 Final Cap Conditions

- Per Environmental Compliance Approval No. A031806, Notice No. 9 (dated October 19, 2015), no areas of the Site are considered to have received final capping. Per approval of the landfill expansion, all areas, as noted in Section 2.2.1, are considered to have received interim capping at this time.
- No areas have received topsoil. Natural vegetation is present in the northeast and southern (non-active) portions of the Site.



3. Perimeter Screening Berms

The following provides a description of the status of the Perimeter Screening Berms:

- Significant berm erosion was identified immediately west of proposed Cell 21-1. The erosion occurred on the landfill side of the berm, as identified on Figure 1 (previously identified in quarterly reports).
- Multiple larger erosion channels were identified on the landfill side of the north perimeter screening berm, as identified on Figure 1 (previously identified in quarterly reports).
- Minor erosion channels were noted throughout the Perimeter Screening Berms. These channels are prevalent throughout the un-vegetated interior side walls of the western and eastern perimeter screening berms.
- Several large erosion channels were noted on the elevated areas immediately northwest and southeast of the northern portion of the landfill. The erosion channels are located on plateaus/ramps within the screening berm. The erosion channel in the southeast corner extends into the east ditch.

4. Surface Water Management System

The following provides a description of the status of the Surface Water Management System, including the ditches, swales, and surface water ponds.

4.1 Ditches and Swales

The following provides a description of the status of the surface water ditches and swales:

- Shallow ponding was identified within the southwest corner of the Original Landfill Area (OLA).
- Shallow ponding was identified within the northwest corner of the landfill (location as shown on Figure 1 and Photo 3). Ponding was not evident at this location during the previous inspection. The area has been graded to drain to the north ditch with an internal swale. The internal swale was damp to dry during the Inspection, with no observed standing water.
- Minor ponding was noted in the northwest portion of proposed Cell 21-3 (i.e., located centrally in the northern portion of the Site), as shown in Photo 4. Two drainage paths were identified, both of which were nearly full. No flow was observed.
- Water levels continue to be high in the central portion of the north ditch. High water levels in the north ditch have the potential to prohibit the above-noted ponded areas from draining during wetter periods.
- There was minimal to no water in the perimeter ditch in the northeast corner of the Site (i.e. at the location of the former perimeter screening berm access road), though no flow was noted in this area.
- Flow from the north ditch to the eastern ditch is impeded by sedimentation in the northeast corner of the Site, likely brought on by dense wetland vegetation within the ditch and sedimentation, as shown in Photo 5 and in Figure 1.



- Sedimentation is occurring in the east ditch as a result of erosion of the perimeter screening berm, along the entire length of the OLA, resulting in fluctuations in grade and flow breaks. Erosion channels range from minor to large. The southern half of the east ditch had standing water with no flow observed at the time of the Inspection.
- Significant erosion was identified in the southeast corner of the OLA, resulting in sedimentation of the perimeter ditch and limited water flow, as shown in Photo 6 and Figure 1. Water levels were low to medium in the east ditch and the internal swale to the north, with no observed flow.
- It was noted during previous Inspections that there was limited elevation difference available within the northeast corner of the perimeter ditch. As such, there is minimal ability to lower the base of ditch and maintain flow to the East Surface Water Pond.
- Water levels were low in the east perimeter ditch, extending from the empty bin storage area to the East Surface Water Pond. Erosion was noted on the downstream side of the borrow area driveway. During the previous inspection, this area had been repaired to address erosion. Sediment buildup remains at the culvert inlets and outlets.
- The flow break in the south ditch has been re-established, beneath the access bridge located at Gate 6. The blockage is the result of wildlife activity (i.e., beavers), as shown in Photo 7. During the previous inspection, it was noted that the wildlife concerns had been addressed and the remaining dams would be removed.
- High water levels were identified in the western portion of the south ditch, with minimal flow noted. Previous inspections identified significant sedimentation and accumulation of loose vegetation in the southwest corner of the perimeter ditch, impeding flow of water toward the West Surface Water Pond. A clear picture of the blockage could not be obtained due to dense vegetation.

4.2 East Surface Water Pond

The following provides a description of the status of the East Surface Water Pond (Photo 8):

- Water levels within the East Surface Water Pond were medium to high.
- Little to no flow was observed entering the East Surface Water Pond.
- The pump at the East Surface Water Pond was not in operation at the time of the Inspection.

4.3 West Surface Water Pond

The following provides a description of the status of the West Surface Water Pond (Photo 9):

- Water levels within the West Surface Water Pond were high, extending to the baseline of vegetation.
- Minimal to no flow was observed entering the West Surface Water Pond. This is a result of sedimentation in the southwest corner of the perimeter ditch.
- The pump at the West Surface Water Pond was not in operation at the time of the Inspection.



4.4 Equalization Pond

The following provides a description of the status of the Equalization Pond (Photo 10):

- The Equalization Pond was at a normal operating water level.
- Minor cracking and sloughing of the concrete side walls of the Equalization Pond was observed during the Inspection. Additional sloughing was noted in several areas around the perimeter.
- Fish and minnows were observed within the Equalization Pond.

5. Process Water Management System

The Process Water Management System consists of three ponds and a series of ditches and swales. The North Process Water Pond is located immediately west of the TDU area, the South Process Water Pond is located immediately south of the Incinerator, and the West Process Water Pond is located adjacent to the West Storm Water Pond. Water retained in the Process Water Management System is used as quench water for Site incineration operations.

5.1 Process Water Ditches and Swales

The following provides a description of the status of the process water ditches and swales:

- The process water ditch adjacent to the TDU area exhibited a medium water level at the time of Inspection. This ditch was not being pumped at the time of Inspection. Significant erosion channels were previously observed immediately to the west, along the Landfill Container Compound access road.
- The ditches feeding the North Process Water Pond had minimal standing water at the time of the Inspection. As shown in Photo 11, these ditches have significant sediment buildup in the rip rap and culverts, with little to no flow toward the pond. It is recommended that sediment be removed from the ditch, including the ditch in front of the HHW Depot.
- It was also noted that the west end of the culvert beneath the North Process Water Pond access driveway is partially crushed. Repair and culvert cleaning should be evaluated during repairs to the ditch as recommended above.
- No standing water was noted in several small ditches near the South Process Water Pond.

5.2 North Process Water Pond

The following provides a description of the status of the North Process Water Pond (Photo 12):

- The water level within the North Process Water Pond was low, well below the ditch inlet and culvert outlets.
- The pump at the North Process Water Pond was running at the time of the inspection. Inspection of the side slopes indicate the pond was recently drawn down.
- A significant washout remains in the southeast corner of the North Process Water Pond. Some large rip rap has been placed in the washout, however, repair of the side slope is necessary.



5.3 South Process Water Pond

The following provides a description of the status of the South Process Water Pond (Photo 13):

- The water level within the South Process Water Pond was medium to high, with algae growth on the surface.
- It was noted that this area is also receiving clean runoff from east of the active landfill area. Partial vegetative blockage of this drainage path was identified immediately east of the South Process Water Pond, limiting drainage of the Cell 19-1-3 area.

5.4 West Process Water Pond

The following provides a description of the status of the West Process Water Pond:

- The West Process Water Pond was low at the time of the Inspection, as observed from the top of Cell 19-1-1.

6. Leachate Management System

The leachate reservoirs are designed to receive leachate from the active fill area and process areas. Leachate transferred from the active fill area is detained within the leachate reservoirs prior to transfer to the incinerator for disposal.

6.1 South Leachate Reservoir

The following provides a description of the status of the South Leachate Reservoir (Photo 14):

- The South Leachate Reservoir is equipped with a permanent floating cover. Based on observation of the cover, the Reservoir is not currently being used for leachate storage. During a previous post-Inspection meeting, Clean Harbors indicated that leachate from this pond was pumped into the East Leachate Reservoir in preparation for enlargement of the South Leachate Reservoir.
- Clean Harbors maintains a record of the volume of leachate within the South Leachate Reservoir.

6.2 East Leachate Reservoir

The following provides a description of the status of the East Leachate Reservoir (Photo 15):

- The East Leachate Reservoir is equipped with a permanent floating cover. Based on observation of the cover, the Reservoir is currently being used for leachate storage.
- Clean Harbors maintains a record of the volume of leachate within the East Leachate Reservoir.

6.3 New Leachate Reservoir

The following provides a description of the status of a new Leachate Reservoir (Photo 16):

- A new Leachate Reservoir has been constructed immediately east of the East Leachate Reservoir. The new Leachate Reservoir is currently operational, being used for leachate storage.



6.4 Leachate Storage Tank and Pumping System

The following provides a description of the status of the Leachate Storage Tank and Pumping System:

- The Leachate Storage Tank is in operation, serving as the feed tank to the incinerator.

7. Waste Processing Operations

The following provides a description of the Waste Processing Operations:

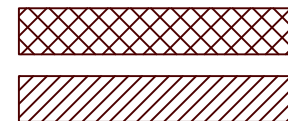
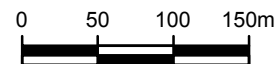
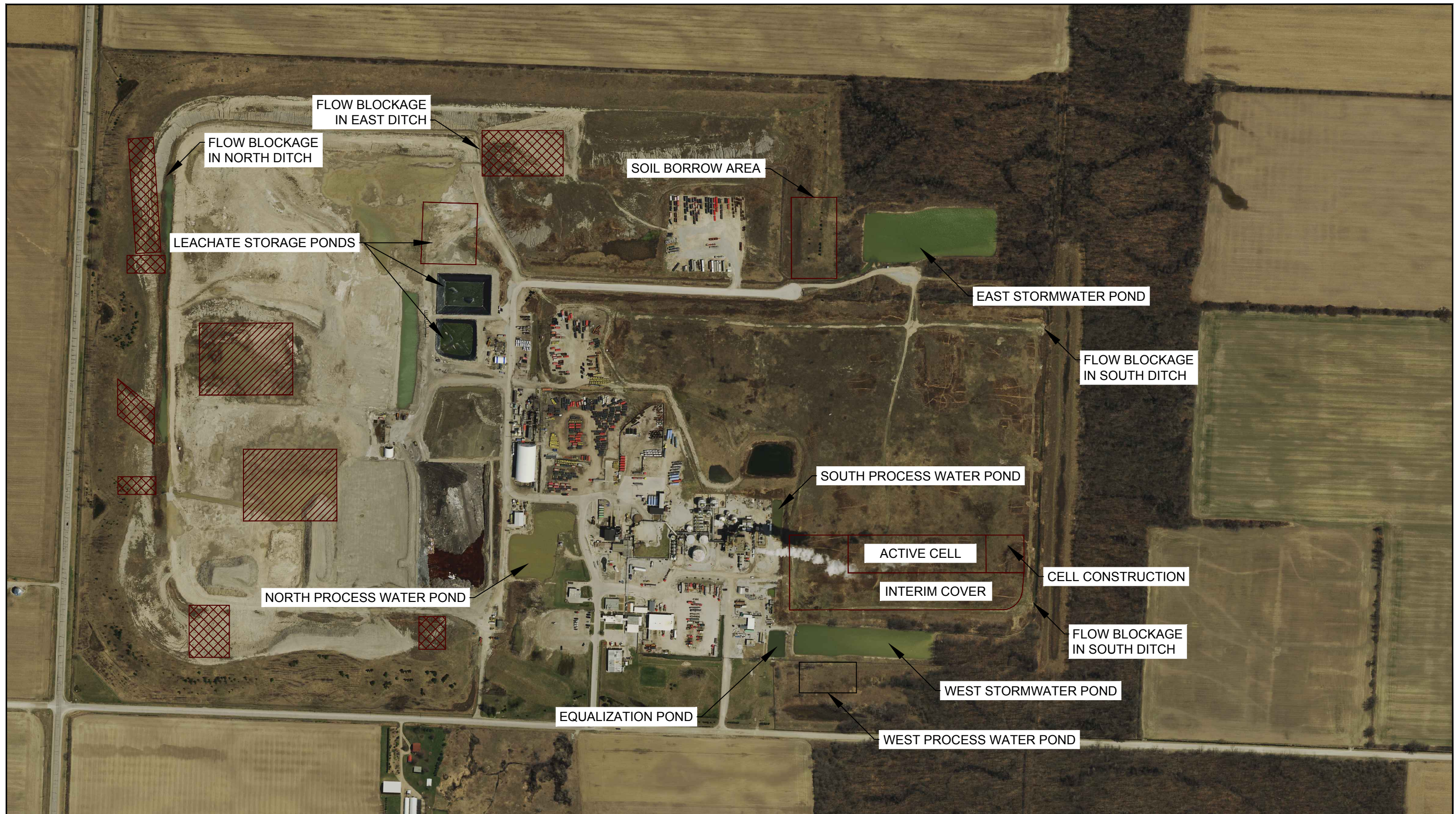
- A slight odour was noted in the vicinity of active landfilling operations in Cell 19-1-2, likely originating from the active landfilling area.
- A slight odour was noted to the north of the TDU storage and pretreatment areas.
- Identified odours were localized and were not identified at or beyond Site boundaries.

8. Conclusions and Recommendations

Interim cover work has been completed in the northern area of the Site. As such, the former stockpile area and other areas in the north that have ponded water are scheduled to be assessed and re-graded to promote drainage.

Maintenance of the perimeter ditches is required to remove areas where sediment has accumulated and is restricting flow of water. Maintenance of the perimeter ditches is a key component to minimize ponding of water on the interim cover and transfer of water to stormwater ponds.

Portions of the interior side of the perimeter screening berms have significant erosion. These areas should be assessed and corrected to minimize erosion into the perimeter ditches. Installation of reinforced ditches from the top of the berm to the perimeter ditches may be a solution for these areas, as well as vegetation of the internal berm slopes.



LEGEND:

LARGE EROSION CHANNELS

LARGE AREAS OF SURFACE WATER PONDING

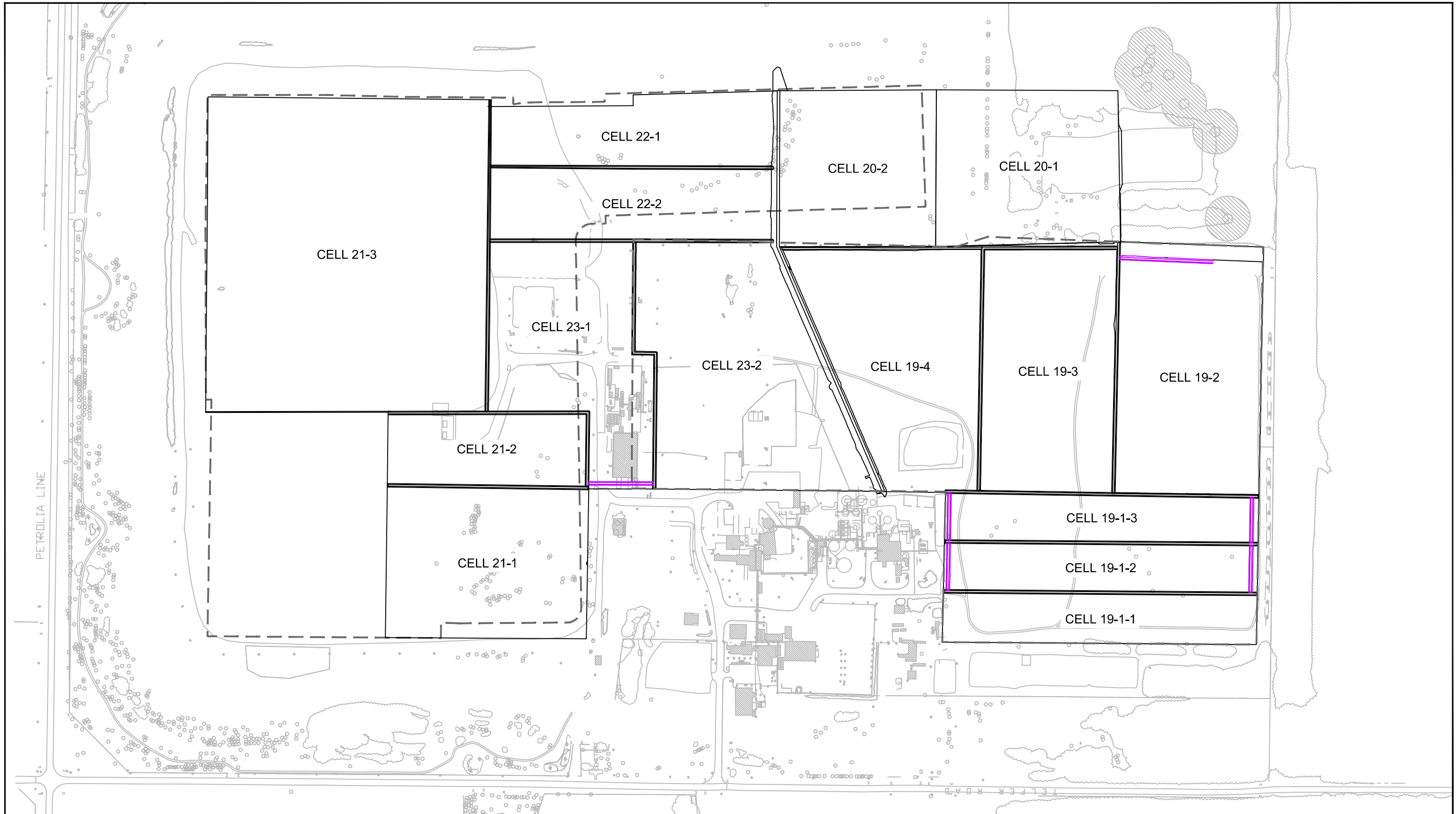


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 SITE PLAN

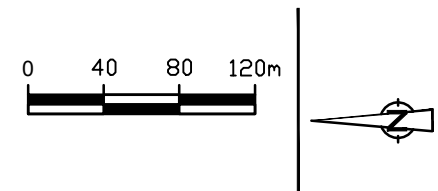
44985-16

Oct 17, 2017

FIGURE 1



Source: DESIGN AND OPERATIONS REPORT - LAMBTON LANDFILL EXPANSION, CLEAN HARBORS CANADA, INC. PREPARED BY TETRA TECH WEI INC. DATED OCTOBER 8, 2015



LAMBTON FACILITY
 CLEAN HARBORS CANADA INC.
 2017 THIRD QUARTER SITE INSPECTION
 LANDFILL EXPANSION SUBCELL FILL EXPANSION PLAN

44985-16
 Oct 17, 2017

FIGURE 2

Attachment 1 Photographic Log



Photo 1 - Active landfilling cell (southern portion of Cell 19-1-2)



Photo 2 - Interim cap placement, southern portion of Cell 19-1-1





Photo 3 - Ponding within northwest corner of Site



Photo 4 - Ponding in northern, central portion of Site





Photo 5 - North ditch, surface water blockage



Photo 6 - North landfill area, southeast ditch, partial surface water blockage





Photo 7 - South ditch, surface water blockage west of access bridge



Photo 8 - East Surface Water Pond





Photo 9 - West Surface Water Pond



Photo 10 - Equalization Pond





Photo 11 - North Process Water Pond ditch



Photo 12 - North Process Water Pond





Photo 13 - South Process Water Pond



Photo 14 - South Leachate Reservoir





Photo 15 - East Leachate Reservoir



Photo 16 - New Leachate Reservoir





Memorandum

November 29, 2017

To: Erica Carabott/Clean Harbors
Mike Parker/Clean Harbors

Ref. No.: 044985

From: Jim Yardley/Neil Shannick/mg/35

Tel: 519-884-0510

Subject: 2017 Fourth Quarter Site Inspection

1. Introduction

In accordance with requirements outlined in Section 8.1 of the Design and Operations Report, GHD conducted the 2017 fourth quarter Site Inspection (Inspection) of the Clean Harbors Canada, Inc. (Clean Harbors) Lambton Facility (Site) in Corunna, Ontario. The Inspection was conducted on November 7, 2017 by Neil Shannick.

The Inspection consisted of a walk around the Site. The Inspection focused primarily on the active landfill and waste disposal operations, including an inspection of each of the surface water, leachate, and process water ponds.

1.1 Weather and Site Conditions

At the time of the Inspection, the temperature was 4°C. Weather conditions at the Site were sunny, with generally calm conditions. During the week preceding the Inspection, the Site experienced 0.0 mm of total precipitation, and a mean temperature of 7.0°C. During the Inspection, the Site was generally dry. Minimal ponding was noted in low, flat areas and high water levels were noted in several ditches. Figure 1 provides a Site plan showing features referenced herein, as well as any notes related to specific issues noted in this memorandum. Figure 2 provides the Landfill Expansion Subcell Fill Progression Plan, identifying the cell locations, as presented in the "*Design and Operations Report - Lambton Landfill Expansion, Clean Harbors Canada, Inc.*", as prepared by Tetra Tech WEI Inc., dated October 8, 2015.

2. Landfill Operations

The Inspection was focused on landfill and waste disposal operations including Cell development, active disposal, waste hauling, and landfill capping efforts.



2.1 Landfill Cell Development

The following provides a description of the status of the Landfill Cell Development, including active waste disposal operations and internal waste transport routes:

- The active waste tipping face is located at the transition from the central to southern portions of Cell 19-1-2, referred to as 19-1-2B and 19-1-2C, respectively. Waste placement is occurring from north to south, as shown in Photo 1. The northern portion of Cells 19-1-1 and 19-1-2 (hereinafter referred to as 19-1-2A) are no longer active. Odour was noted in the immediate vicinity of the active landfill area.
- Construction of Cell 19-1-2C has been completed.
- Cell 19-1-3 is currently under construction.
- Waste Transport Route: Site waste haulers are directed around the east side of the Process Area and enter Cell 19-1-2B from the east side, located at the northern end of the active area, on a dedicated haul road from the Waste Receiving Area.

2.2 Landfill Cap

The following provides a description of the status of the Landfill Cap, including cap placement during the fourth quarter, and the condition of the interim and final cap. With the recent approval of the vertical expansion, the previous capped areas are considered to be interim, since a portion of the cap will be removed and additional waste placed in these areas.

2.2.1 Interim and Final Cap Placement in Quarter

- The majority of the Site has received an interim cap, with the exception of the active landfilling area (Cell 19-1-2C and the eastern portion of Cell 19-1-2B).
- Cells 19-1-1, 19-1-2A, and the western portion of 19-1-2B have received interim cap, including the eastern sidewall of Cells 19-1-1 and 19-1-2A. The interim cap in the northern portion of Cell 19-1-1 and 19-1-2 is shown on Photo 2.

2.2.2 Interim Cap Conditions

- The interim cap was noted to be in good condition, with minor erosion channels observed.
- Minor ponding was identified in several areas as described in Section 4. The interim cap requires minor grading to promote drainage to the perimeter ditches.
- Erosion channels should be addressed through additional clay placement and grading.

2.2.3 Final Cap Conditions

- Per Environmental Compliance Approval No. A031806, Notice No. 9 (dated October 19, 2015), no areas of the Site are considered to have received final capping. Per approval of the landfill expansion, all areas, as noted in Section 2.2.1, are considered to have received interim capping at this time.
- No areas have received topsoil. Natural vegetation is present in the northeast and southern (non-active) portions of the Site.



3. Perimeter Screening Berms

The following provides a description of the status of the Perimeter Screening Berms:

- Significant berm erosion was identified immediately west of proposed Cell 21-1. The erosion occurred on the landfill side of the berm, as identified on Figure 1 (previously identified in quarterly reports).
- Multiple larger erosion channels were identified on the landfill side of the north perimeter screening berm, as identified on Figure 1 (previously identified in quarterly reports).
- Minor erosion channels were noted throughout the Perimeter Screening Berms. These channels are prevalent throughout the un-vegetated interior side walls of the western and eastern perimeter screening berms.
- Several large erosion channels were noted on the elevated areas immediately northwest and southeast of the northern portion of the landfill. The erosion channels are located on plateaus/ramps within the screening berm. The erosion channel in the southeast corner extends into the east ditch.

4. Surface Water Management System

The following provides a description of the status of the Surface Water Management System, including the ditches, swales, and surface water ponds.

4.1 Ditches and Swales

The following provides a description of the status of the surface water ditches and swales:

- Shallow ponding was identified within the southwest corner of the Original Landfill Area (OLA).
- Water levels were high in the southern perimeter ditch of the OLA. Pumping was active during the Inspection.
- Shallow ponding was identified within the northwest corner of the landfill (location as shown on Figure 1 and Photo 3). The area has been graded to drain to the north ditch with an internal swale. The internal swale was half full during the Inspection, with no observed flow.
- Minor ponding was noted in the northwest portion of proposed Cell 21-3 (i.e., located centrally in the northern portion of the Site). Two drainage paths were identified, both of which were full. No flow was observed. This area was not photographed during the Inspection.
- Water levels continue to be high in the central portion of the north ditch, as shown in Photo 4. High water levels in the north ditch have the potential to prohibit the above-noted ponded areas from draining during wetter periods.
- There was minimal to no water in the perimeter ditch in the northeast corner of the Site (i.e. at the location of the former perimeter screening berm access road), though no flow was noted in this area.



- Flow from the north ditch to the eastern ditch is impeded by sedimentation in the northeast corner of the Site, likely brought on by dense wetland vegetation within the ditch and sedimentation, as shown in Photo 5 and in Figure 1.
- Sedimentation is occurring in the east ditch as a result of erosion of the perimeter screening berm, along the entire length of the OLA, resulting in fluctuations in grade and flow breaks. Erosion channels range from minor to large. Minimal water was noted in the northern half of the east ditch. Low water levels were observed in the southern half, with no flow observed at the time of the Inspection.
- Significant erosion was identified in the southeast corner of the OLA, resulting in sedimentation of the perimeter ditch and limited water flow, as shown in Photo 6 and Figure 1. Water levels were low to medium in the east ditch and the internal swale to the north, with no observed flow.
- It was noted during previous Inspections that there was limited elevation difference available within the northeast corner of the perimeter ditch. As such, there is minimal ability to lower the base of ditch and maintain flow to the East Surface Water Pond.
- Water levels were high in the east perimeter ditch between the OLA and the empty bin storage area. Minimal flow was noted at the culverts beneath the borrow area driveway and water levels were low, extending from the empty bin storage area to the East Surface Water Pond. Erosion was noted on the downstream side of the borrow area driveway. Sediment buildup remains at the culvert inlets and outlets.
- The flow break in the south ditch has been re-established, beneath the access bridge located at Gate 6. The blockage is the result of wildlife activity (i.e., beavers), as shown in Photo 7. During a previous inspection, it was noted that the wildlife concerns had been addressed and the remaining dams would be removed.
- High water levels were identified in the western portion of the south ditch, with minimal flow noted. Previous inspections identified significant sedimentation and accumulation of loose vegetation in the southwest corner of the perimeter ditch, impeding flow of water toward the West Surface Water Pond. A clear picture of the blockage could not be obtained due to dense vegetation.

4.2 East Surface Water Pond

The following provides a description of the status of the East Surface Water Pond (Photo 8):

- Water levels within the East Surface Water Pond were low to medium.
- Little to no flow was observed entering the East Surface Water Pond.
- The pump at the East Surface Water Pond was not in operation at the time of the Inspection.

4.3 West Surface Water Pond

The following provides a description of the status of the West Surface Water Pond (Photo 9):

- Water levels within the West Surface Water Pond were high, extending nearly to the baseline of vegetation.
- Minimal to no flow was observed entering the West Surface Water Pond. This is a result of sedimentation in the southwest corner of the perimeter ditch.



- The pump at the West Surface Water Pond was not in operation at the time of the Inspection.

4.4 Equalization Pond

The following provides a description of the status of the Equalization Pond (Photo 10):

- The water level within the Equalization Pond was low.
- Minor cracking and sloughing of the concrete side walls of the Equalization Pond was observed during the Inspection. Additional sloughing was noted in several areas around the perimeter.
- Fish and minnows were not observed within the Equalization Pond.

5. Process Water Management System

The Process Water Management System consists of three ponds and a series of ditches and swales. The North Process Water Pond is located immediately west of the TDU area, the South Process Water Pond is located immediately south of the Incinerator, and the West Process Water Pond is located adjacent to the West Storm Water Pond. Water retained in the Process Water Management System is used as quench water for Site incineration operations.

5.1 Process Water Ditches and Swales

The following provides a description of the status of the process water ditches and swales:

- The process water ditch adjacent to the TDU area exhibited a very low water level at the time of Inspection. This ditch was not being pumped at the time of Inspection. Significant erosion channels remain immediately to the west, along the Landfill Container Compound access road.
- The ditches feeding the North Process Water Pond had minimal standing water at the time of the Inspection. As shown in Photo 11, these ditches have significant sediment buildup in the rip rap and culverts, with little to no flow toward the pond. It is recommended that sediment be removed from the ditch, including the ditch in front of the HHW Depot.
- It was also noted that the west end of the culvert beneath the North Process Water Pond access driveway is partially crushed. Repair and culvert cleaning should be evaluated during repairs to the ditch as recommended above.
- No standing water was noted in several small ditches near the South Process Water Pond.

5.2 North Process Water Pond

The following provides a description of the status of the North Process Water Pond (Photo 12):

- The water level within the North Process Water Pond was low, well below the ditch inlet and culvert outlets.
- The pump at the North Process Water Pond was running at the time of the inspection.



- A significant washout remains in the southeast corner of the North Process Water Pond. Some large rip rap has been placed in the washout, however, repair of the side slope is necessary.

5.3 South Process Water Pond

The following provides a description of the status of the South Process Water Pond (Photo 13):

- The water level within the South Process Water Pond was high.
- It was noted that this area is also receiving runoff from east of the active landfill area. Partial vegetative blockage of this drainage path was identified immediately east of the South Process Water Pond, limiting drainage of the Cell 19-1-3 area.

5.4 West Process Water Pond

The following provides a description of the status of the West Process Water Pond:

- The West Process Water Pond was low at the time of the Inspection, as observed from the top of Cell 19-1-1.

6. Leachate Management System

The leachate reservoirs are designed to receive leachate from the active fill area and process areas. Leachate transferred from the active fill area is detained within the leachate reservoirs prior to transfer to the incinerator for disposal.

6.1 South Leachate Reservoir

The following provides a description of the status of the South Leachate Reservoir (Photo 14):

- The South Leachate Reservoir is equipped with a permanent floating cover. Based on observation of the cover, the Reservoir is not currently being used for leachate storage. During a previous post-Inspection meeting, Clean Harbors indicated that leachate from this pond was pumped into the East Leachate Reservoir in preparation for enlargement of the South Leachate Reservoir.
- Clean Harbors maintains a record of the volume of leachate within the South Leachate Reservoir.

6.2 East Leachate Reservoir

The following provides a description of the status of the East Leachate Reservoir (Photo 15):

- The East Leachate Reservoir is equipped with a permanent floating cover. Based on observation of the cover, the Reservoir is currently being used for leachate storage.
- Clean Harbors maintains a record of the volume of leachate within the East Leachate Reservoir.



6.3 New Leachate Reservoir

The following provides a description of the status of a new Leachate Reservoir (Photo 16):

- A new Leachate Reservoir has been constructed immediately east of the East Leachate Reservoir and is equipped with a permanent floating cover. The new Leachate Reservoir is currently operational and is being used for leachate storage, based on observation of the cover.

6.4 Leachate Storage Tank and Pumping System

The following provides a description of the status of the Leachate Storage Tank and Pumping System:

- The Leachate Storage Tank is in operation, serving as the feed tank to the incinerator.

7. Waste Processing Operations

The following provides a description of the Waste Processing Operations:

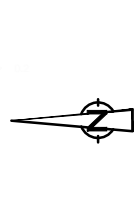
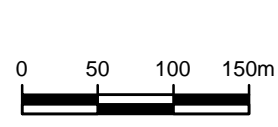
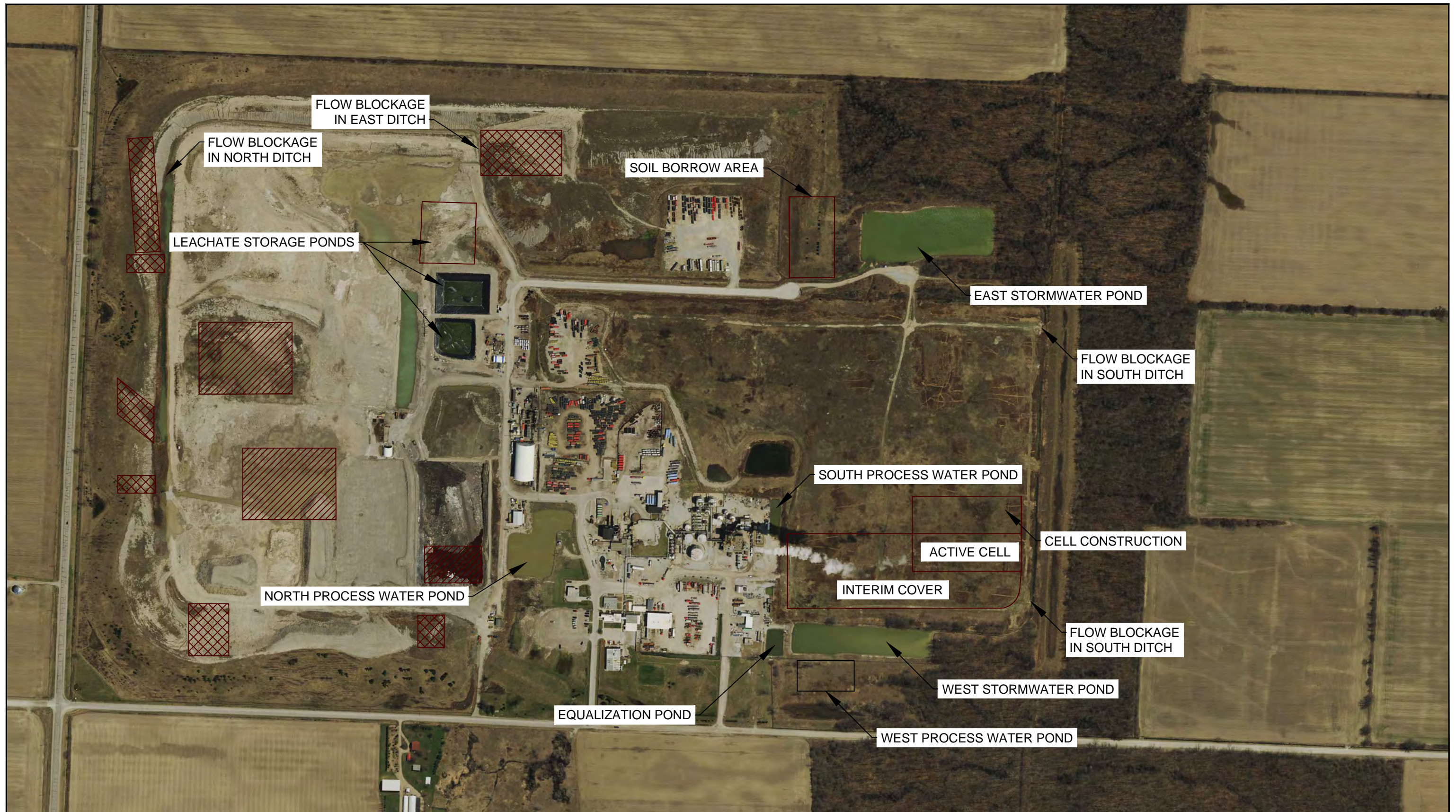
- A slight odour was noted in the vicinity of active landfilling operations in Cell 19-1-2, likely originating from the active landfilling area.
- A slight odour was noted to the north of the TDU storage and pretreatment areas. A very slight breeze to the north was observed at this time.
- Identified odours were localized and were not identified at or beyond Site boundaries.

8. Conclusions and Recommendations

Interim cover work has been completed in the northern area of the Site. As such, the former stockpile area and other areas in the north that have ponded water are scheduled to be assessed and re-graded to promote drainage.

Maintenance of the perimeter ditches is required to remove areas where sediment has accumulated and is restricting flow of water. Maintenance of the perimeter ditches is a key component to minimize ponding of water on the interim cover and transfer of water to stormwater ponds.

Portions of the interior side of the perimeter screening berms have significant erosion. These areas should be assessed and corrected to minimize erosion into the perimeter ditches. Installation of reinforced ditches from the top of the berm to the perimeter ditches may be a solution for these areas, as well as vegetation of the internal berm slopes.



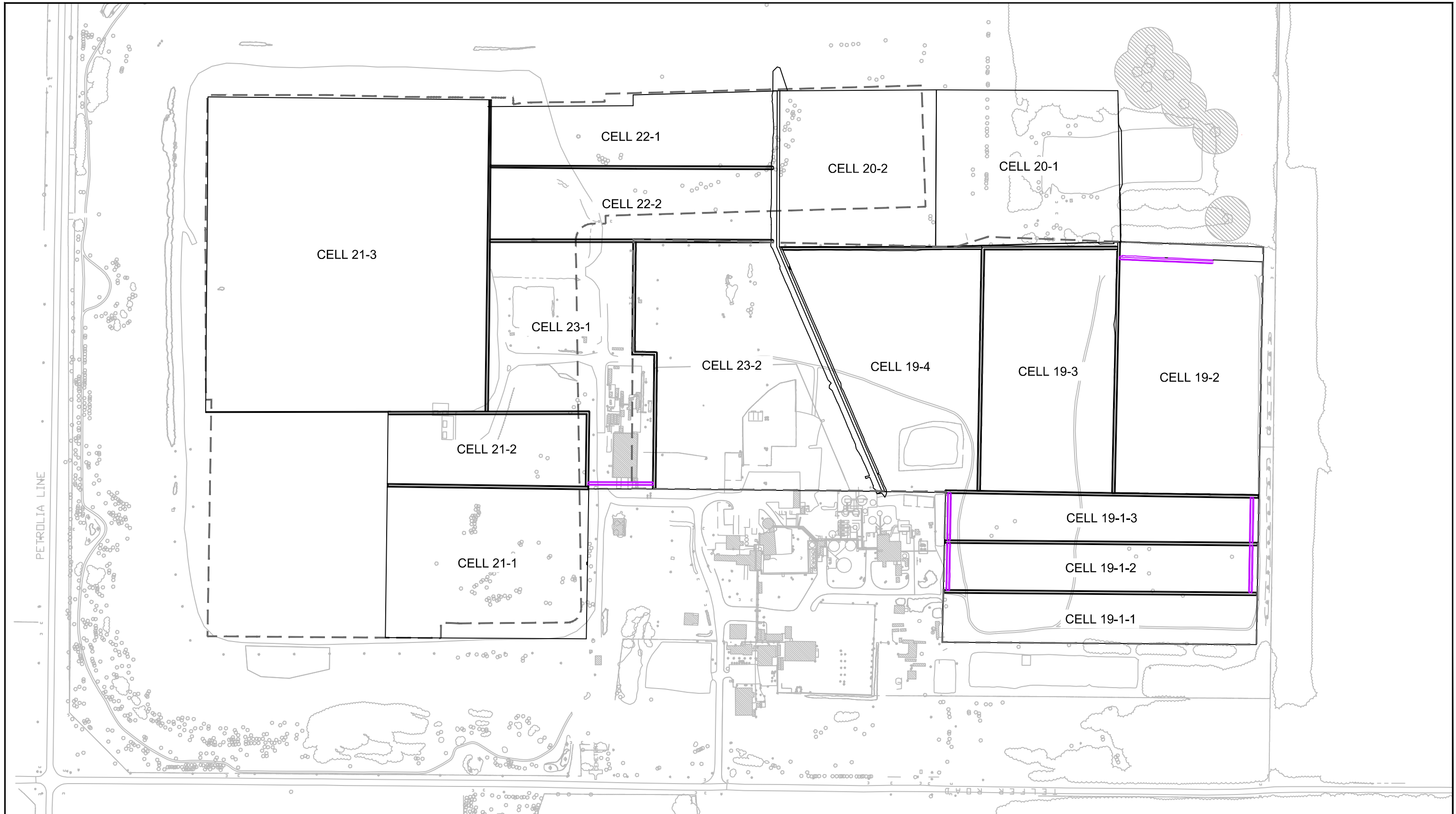
LEGEND:
 LARGE EROSION CHANNELS
 LARGE AREAS OF SURFACE WATER PONDING



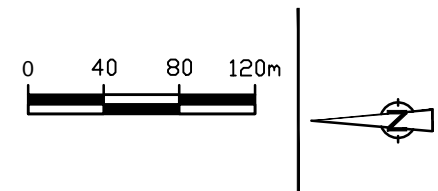
LAMBTON FACILITY
 CLEAN HARBORS CANADA INC.
 2017 FOURTH QUARTER SITE INSPECTION
 SITE PLAN

44985-16
 Nov 29, 2017

FIGURE 1



Source: DESIGN AND OPERATIONS REPORT - LAMBTON LANDFILL EXPANSION, CLEAN HARBORS CANADA, INC. PREPARED BY TETRA TECH WEI INC. DATED OCTOBER 8, 2015



LAMBTON FACILITY
 CLEAN HARBORS CANADA INC.
 2017 FOURTH QUARTER SITE INSPECTION
 LANDFILL EXPANSION SUBCELL FILL EXPANSION PLAN

44985-16
 Nov 29, 2017

FIGURE 2

Attachment 1 Photographic Log



Photo 1 - Active landfilling cell (southern portion of Cell 19-1-2)



Photo 2 - Interim cap placement, southern portion of Cells 19-1-1 and 19-1-2





Photo 3 - Ponding within northwest corner of Site



Photo 4 - High water levels in central portion of north perimeter ditch





Photo 5 - North ditch, surface water blockage



Photo 6 - North landfill area, southeast ditch, partial surface water blockage





Photo 7 - South ditch, surface water blockage west of access bridge



Photo 8 - East Surface Water Pond





Photo 9 - West Surface Water Pond



Photo 10 - Equalization Pond





Photo 11 - North Process Water Pond ditch



Photo 12 - North Process Water Pond





Photo 13 - South Process Water Pond



Photo 14 - South Leachate Reservoir





Photo 15 - East Leachate Reservoir



Photo 16 - New Leachate Reservoir

