March 31, 2016 Project No. 1530908-1000

Department of National Defence Canada
ADM (Infrastructure & Environment)
Ottawa, Ontario
K1A 0K2
ATTN: Laura D'Costa and Cynthia Tremblay

FINAL 2015 DYE-M MONITORING REPORT

QIKIQ15 BAFFIN REGION DEW LINE SITE MONITORING

Dear Ms. D'Costa and Ms. Tremblay;

Please find attached final report on 2015 monitoring at the DYE-M DEW Line Site for the QIKIQ15 Baffin Region monitoring contract.

If you wish to discuss any aspect of this report, please do not hesitate to contact the undersigned.

Yours very truly,

GOLDER ASSOCIATES LTD.

Darrin Johnson, P.Eng.
Project Manager

DCJ

Attachment: Final 2015 DYE-M Monitoring Report

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March 2016

QIKIQ15 BAFFIN REGION DEW LINE SITE MONITORING

2015 DYE-M Monitoring Report

Submitted to:
Department of National Defence
ADM (Infrastructure & Environment)
Ottawa, Ontario
K1A 0K2

ATTN: Laura D'Costa and Cynthia Tremblay

Report Number: 1530908-R4-V2

Distribution:

Department of National Defence - 2 hard copies and 8 electronic copies

Golder Associates Ltd. - 1 hard copy and 1 electronic copy

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Executive Summary

Golder Associates Ltd. (Golder) has been contracted by Public Works and Government Services Canada (PWGSC), on behalf of the Department of National Defence (DND), to complete the 2015-2018 Distant Early Warning (DEW) Line Sites Landfill Monitoring Program in the Baffin Region of Nunavut. The four DEW Line sites that were monitored in 2015 as part of the QIKIQ15 contract are DYE-M, FOX-3, FOX-2 and CAM-5. These sites are all now in the Post-Construction Monitoring Phase of their remedial program.

This Monitoring Report presents the 2015 post-construction inspection and monitoring results for thirteen landfills at DYE-M: Lower Site NWS, Lower Site Tier II Disposal Facility, Lower Site Crossroads landfill, Lower Site Foundation Landfill, Lower Site Powerhouse Landfill, Lower Site Non-Hazardous Waste Landfill (NHWL), Upper Site Tier II Disposal Facility, Upper Site West Landfills, Upper Site Pallet Line Landfill, Upper Site NHWL, Upper Site Helipad landfill, Upper Site NWS Landfill, Upper Site South Landfill West.

Lower Site NWS

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site NWS Landfill. A new minor settlement area was observed in 2015 but the overall stability performance of the landfill was assessed as Acceptable.

Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean. The highest concentrations of the above noted metals were measured in the shallow soil sample at location DM-09, located downgradient of the east side of the landfill, however, the concentrations observed in 2015 do not represent an overall increase from 2014. At upgradient location DM-07 and downgradient locations DM-08 and DM-10, the majority of metals concentrations were slightly higher than or similar to previous monitoring results. No exceedances of the baseline concentrations plus three standard deviations (3σ) were reported in 2015.

A concentration of petroleum hydrocarbon (PHC) F3 fraction above the baseline concentration was noted in the shallow soil sample at DM-08, however, the average total petroleum hydrocarbon (TPH) concentration was well below the baseline concentration. No detectable concentrations of polychlorinated biphenyl (PCB) were noted in any of the samples in 2015.

Lower Site Tier II Disposal Facility

Based on the visual inspection, there does not appear to be any significant settlement, exposed waste or indications of instability at the Lower Site Tier II Disposal Facility. However, in 2015 there was an increase in the amount of observed self-armouring erosion, cracking and minor sloughing on the landfill slopes resulting in the overall stability performance being assessed as Marginal.

Concentrations of copper, nickel, cobalt, zinc, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location MW05-15 (shallow sample), located downgradient of the north side of the landfill, however, similar elevated metal concentrations were also observed upgradient at MW05-16. The metal concentrations observed at these locations in 2015 were generally higher than those reported in 2014. No soil sample exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the soil samples in 2015.

Exceedances of the baseline values were reported for zinc in the groundwater samples collected at MW05-16 and MW05-15. The concentration of zinc in groundwater at MW05-15 also exceeded the baseline concentration plus 3σ. Groundwater samples were not collected at these locations in 2014. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

Based on the monitoring results, there does not appear to be significant impact to groundwater quality from the landfill at the monitoring well locations. The elevated concentrations of zinc observed in the groundwater sample collected from MW05-15 may be reflective of an ongoing impact from the landfill.

Lower Site Crossroads landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site Crossroads Landfill. Some minor tension cracks on the southeast and northeast slopes and ponding of water along the southern toe of the landfill were observed but these features do not appear to be impacting stability of the landfill.

Concentrations of copper and arsenic were detected in the soil samples above the background/baseline arithmetic mean in a number of samples but was less than the baseline concentration plus 3σ. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-02 (shallow sample), located downgradient of the southwest side of the landfill, however, the concentrations observed in 2015 were lower than those reported in 2014. At upgradient location DM-01 and downgradient location DM-03, the majority of metals concentrations were less than or similar to previous monitoring results.

TPH concentrations above the baseline concentration were noted in the shallow sample at DM-01 and in the deep sample at DM-02. These TPH concentrations were greater than the TPH concentrations reported in 2014. The PHC F2 fraction concentration in the shallow sample at DM-01 exceeded the baseline concentration plus 3σ. No detectable concentrations of PCB were noted in any of the samples in 2015

Lower Site Foundation Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site Foundation Landfill. Some minor tension cracks and a minor differential settlement area were observed. Overall stability performance for this landfill was assessed as Acceptable.

Concentrations of copper, nickel, cobalt, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-06 (shallow sample), located downgradient of the south side of the landfill. The concentrations observed at this location in 2015 were similar to those reported in 2014. At upgradient location DM-04 and downgradient location DM-05, the majority of metals concentrations were less than or similar to previous monitoring results. No exceedances of the baseline concentrations plus 3σ were reported in 2015.

PHC concentrations were noted in both samples at DM-04; however, concentrations were below the baseline TPH concentration. These TPH concentrations were greater than the TPH concentrations reported in 2014. The PCB concentration in the shallow sample at DM-04 exceeded the background concentration but was less than the baseline concentration. The PCB concentration was higher than the concentration reported in 2014. No detectable concentrations of PHC or PCB were noted at DM-05 and DM-06 in 2015.

Lower Site Powerhouse Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site Powerhouse Landfill. Some ponding of water along the east toe of the landfill was observed. Overall stability performance for this landfill was assessed as Acceptable.

Concentrations of copper, nickel, lead, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location MW05-08 (shallow sample), located upgradient of the south side of the landfill, and at MW05-05 (shallow sample), located downgradient of the north side of the landfill. The metal concentrations observed at MW05-08 were higher than those reported in 2014; however, the concentrations observed at MW05-05 were well below those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015.

TPH concentrations were detected at concentrations less than the baseline concentration. PCB concentrations (maximum of 0.24 mg/kg in the shallow sample at MW05-08) were detected above the background/baseline arithmetic mean. The PCB concentration at MW05-08 was below the concentration of 0.46 mg/kg in 2014.

Exceedances of the baseline values were reported for zinc in the groundwater samples collected at MW05-06 and MW05-08. Groundwater samples were not collected at these locations in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

Based on the monitoring results, there does not appear to be significant impact to groundwater quality from the landfill at the monitoring well locations.

Lower Site Non-Hazardous Waste Landfill (NHWL)

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site Non-Hazardous Waste Landfill. Some self-armouring erosion and ponding of water along the toe of the landfill was observed. Overall stability performance for this landfill was assessed as Acceptable.

Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean at a number of locations. It is noted that concentrations of the above noted metals were highest overall at the sample location MW05-12 (shallow and deep sample), located downgradient of the northeast side of the landfill, and at MW09-28 (shallow sample), located downgradient of the north side of the landfill. The metal concentrations observed at MW05-12 were less than those reported in 2014, which was similarly the case for most other sampling locations. The metal concentrations observed at MW09-28 were similar to those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015.

Detectable concentrations of PHC were noted at downgradient locations MW05-09 and MW09-27, at TPH concentrations ranging from 36 mg/kg to 58 mg/kg. The maximum TPH concentration was detected in the shallow sample at MW05-09 at concentrations less than the baseline concentration. A PCB concentration in the deep sample at MW05-09 was detected above the background/baseline arithmetic mean. No detectable concentrations of PHC or PCB were noted in any of the other samples in 2015.

The concentration of copper in the groundwater sample collected at MW06-28 exceeded the baseline concentration but was less than the baseline concentration plus 3σ. No sample was collected at MW09-28 in 2014.

No detectable concentrations of the PHC F1 fraction were noted in the groundwater sample collected at MW09-28 in 2015. PHC F2-F4 and PCB could not be analyzed from the groundwater sample at MW05-15 due to insufficient water.

Based on the monitoring results, there does not appear to be significant impact to groundwater quality from the landfill at the soil sampling locations or MW09-28, adjacent to the landfill.

Upper Site Tier II Disposal Facility

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site Tier II Disposal Facility. Some self-armouring erosion along the slopes of the facility and a minor tension crack on the Northwest crest were observed. The overall stability performance of this landfill was assessed as Acceptable.

Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean at a number of locations. It is noted that concentrations of the above noted metals were highest overall at the sample location MW07-22 (deep sample), located upgradient of the northeast side of the landfill, and at MW08-25 (shallow sample), located downgradient of the northwest side of the landfill. The metal concentrations observed at MW07-22 and MW08-25 were higher than those reported in 2014, which was similarly the case for downgradient location MW08-24. The metals concentrations observed at downgradient location MW07-23 were less than those reported in 2014.

The only detectable concentration of PHC was reported in the shallow samples at MW08-24. The TPH concentration was greater than the baseline concentration. The PHC F1 fraction was equal to the baseline concentration plus 3σ. No detectable concentrations of PCB were noted in any of the soil samples in 2015.

Exceedances of the baseline values were reported in the groundwater samples for copper, nickel and zinc. It is noted that concentrations of the above noted metals were highest overall at downgradient monitoring locations MW08-24 and MW08-25. The concentrations at MW08-24 were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. Groundwater samples were not collected at MW07-22 or MW08-25 locations in 2014. No detectable concentrations of PHC were noted in any of the groundwater samples in 2015. PCB could not be analyzed from the groundwater samples at MW07-22, MW08-24 and MW08-25 due to insufficient water.

Overall, it was noted that a number of the environmental sampling results (i.e. MW07-22, MW08-24 and MW08-25) were greater than in 2014 monitoring session. Additional data is required to assess if the increases relate to impact from the landfill or reflect variations in natural conditions or sampling/analytical program influences.

Upper Site West Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site West Landfill (West, Centre, Centre Lobe A and East Lobes). Some occasional self-armouring erosion and minor tension cracks were observed. The overall stability performance of these landfill areas was assessed as Acceptable.

Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean at a number of locations. Copper, zinc and chromium exceeded baseline concentration plus 3σ at a few locations. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-40 (shallow sample), located upgradient of the Centre Lobe of the landfill, DM-41 (shallow sample), located downgradient of the Centre Lobe of the landfill and DM-48 (shallow sample), located

downgradient of the East Lobe of the landfill. At these locations, the concentrations of most metals were greater than the concentrations reported in 2014. Similarly, at most other sampling locations, the concentrations of metals were greater than or similar to the concentrations reported in 2014.

Detectable concentrations of PHC were noted at DM-38, DM-39, DM-40, DM-41, DM-47, DM-48 and DM-49, at TPH concentrations ranging from 16 mg/kg to 3,316 mg/kg. The concentrations of TPH were highest in the sample at DM-47. The TPH concentration was greater than the concentration reported in 2014. The average concentration of PCB in the shallow samples at DM-48 exceeded the background concentration but was less than the baseline concentration. No PCB were detected at this location in 2014. No detectable concentrations of PHC or PCB were noted in any of the other samples in 2015.

Whereas there are some notable elevated concentrations of the measured parameters, no modifications to the ongoing monitoring program at this landfill are currently recommended. Additional data is required to assess if the increases relate to impact from the landfill or reflect variations in natural conditions or sampling/analytical program influences. Careful review of the exceedances, notably at DM-40 and DM-47 following further sampling in 2016, is warranted.

Upper Site Pallet Line Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site Pallet Line Landfill. Some self-armouring erosion, minor tension cracks and ponding of water along the toe of the landfill were observed. The overall stability performance of this landfill was assessed as Acceptable.

Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean at a number of locations. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-50 (deep sample), located downgradient of Lobe 1. At DM-50, the concentrations of most metals were less than the concentrations reported in 2014. At most other sampling locations, the concentrations of metals were greater than or similar to the concentrations reported in 2014. The concentrations of copper in the shallow sample at DM-50 and arsenic in the shallow and deep samples at DM-55 exceeded the baseline concentration plus 3σ.

The only detectable concentration of PHC was reported in the deep sample at downgradient location DM-53. The concentration of TPH was less than the baseline concentration; however, the PHC F2 fraction and PHC F3 fraction concentrations exceeded their baseline concentrations. No PHC were detected at this location in 2014. No detectable concentrations of PCB were noted in any of the soil samples in 2015.

Upper Site NHWL

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site Non-hazardous Waste Landfill. Some areas with cover material segregation, self-armouring erosion and ponding of water on the cover surface the landfill were observed. The overall stability performance of the landfill was assessed as Acceptable.

Concentrations of nickel and arsenic were detected in the soil samples above the background/baseline arithmetic mean at two or more locations. It is noted that concentrations of the above noted metals were highest overall at the sample location MW06-19 (shallow sample), located downgradient of the west side of the landfill, and at MW07-21 (shallow sample), located downgradient of the north side of the landfill. The metal concentrations observed in the shallow sample at MW07-21 were higher than those reported in 2014, which was similarly the

case for shallow sample at MW06-20. At MW06-19 and the deep sample at MW07-21, the metal concentrations were similar to those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the soil samples in 2015.

In 2015, a groundwater sample was collected from MW06-19, located west of the landfill. The groundwater results at MW06-19 indicated all parameters were less than the baseline values. A groundwater sample was not collected at this location in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

Based on the results, there does not appear to be significant impact to groundwater quality from the landfill at the soil sampling locations or monitoring wells adjacent to the landfill.

Upper Site NWS Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site NWS Landfill. Some erosion channels along the upper south slope of the landfill were observed. The overall stability performance of this landfill was assessed as Acceptable.

Concentrations of copper, nickel, cobalt, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-18 (shallow sample), located upgradient of the north side of the landfill. The concentrations of most metals at this location were greater than the concentrations reported in 2014. The concentrations of chromium and arsenic at this location exceeded their baseline concentration plus 3σ. At downgradient locations DM-20 and DM-22, it was noted that some metals were greater than the concentrations reported in 2014, however, the majority of metals concentrations were less than the concentrations reported in 2014. The metal concentrations at downgradient location DM-23 were generally lower than the concentrations reported in 2014. No detectable concentrations of PHC or PCB were noted in any of the samples in 2015.

Upper Site South Landfill West

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site South Landfill West. Some self-armouring erosion and minor erosion channels were observed on the cover surface. The overall stability performance of this landfill was assessed as Acceptable.

Concentrations of copper, nickel, zinc, chromium and arsenic were detected in the soil samples above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-28 (shallow sample), located downgradient of the west side of the landfill. The concentrations of most metals at this location were greater than the concentrations reported in 2014. At downgradient locations DM-29 and DM-30, the majority of metals concentrations were greater than the concentrations reported in 2014, whereas the metal concentrations at upgradient location DM-23 were generally lower than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the samples in 2015.

Upper Site Helipad landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site Helipad Landfill. Some minor settlement, rough grading and ponding of water in a tire track were observed in this landfill. The overall stability performance of the landfill was assessed as Acceptable.

Concentrations of copper, cobalt, lead, zinc, chromium and arsenic were detected in the soil samples above the background mean at a number of sampling locations. It is noted that concentrations of the above noted metals were highest overall at the sample locations DM-12 (shallow sample), located cross-gradient of the northeast side of the landfill and DM-17 (shallow sample), located downgradient of the west side of the landfill..

Detectable concentrations of PHC were noted in the deep sample at DM-12 and the shallow sample at DM-13, at TPH concentrations ranging from 61 mg/kg to 81 mg/kg. Concentrations of PCB above the background concentration were noted in the shallow sample at DM-12 and the deep sample at DM-12. No detectable concentrations of PCB or PHC were noted in any other sampling locations in 2015.

Table of Contents

1.0 INTRODUCTION 1

1.1 Objective of the Study 1

1.2 Scope of Work 1

2.0 BACKGROUND 2

2.1 Site Description 2

2.2 Site Geology, Hydrogeology and Hydrology 4

2.3 Land-Use Description 4

2.4 Field Program Staff and Schedule 5

2.5 Weather Conditions 5

2.6 Project References 6

2.7 Report Structure 6

3.0 APPROACH & METHODOLOGY (GENERAL) 7

3.1 Summary of Work 7

3.1.1 Health and Safety 7

3.1.2 Field Program 7

3.1.3 Visual Inspection 9

3.1.4 Thermal Monitoring 10

3.1.5 Soil Sampling 10

3.1.6 Groundwater Sampling 11

3.2 Field Notes and Data 12

3.3 QA/QC 12

4.0 2015 MONITORING PROGRAM RESULTS 14

4.1 Lower Site NWS 14

4.1.1 Landfill Description 14

4.1.2 Summary of any Scope Deviations 16

4.1.3 Visual Inspection 16

4.1.4 Soil Sampling 21

4.1.5 Conclusions and Overall Performance of the Lower Site NWS Landfill 24

4.1.6 Recommendations for Lower Site NWS Landfill 24

4.2 Lower Site Tier II Disposal Facility 25
4.2.1 Landfill Description 25
4.2.2 Summary of any Scope Deviations 27
4.2.3 Visual Inspection 27
4.2.4 Thermal Monitoring 33
4.2.5 Soil Sampling 33
4.2.6 Groundwater Sampling 36
4.2.7 Conclusions and Overall Performance of the Lower Site Tier II Disposal Facility 38
4.2.8 Recommendations for Lower Site Tier II Disposal Facility 38
4.3 Lower Site Crossroads Landfill 39
4.3.1 Landfill Description 39
4.3.2 Summary of any Scope Deviations 41
4.3.3 Visual Inspection 41
4.3.4 Soil Sampling 46
4.3.5 Conclusions and Overall Performance of the Lower Site Crossroads Landfill 49
4.3.6 Recommendations for Lower Site Crossroads Landfill 49
4.4 Lower Site Foundation Landfill 50
4.4.1 Landfill Description 50
4.4.2 Summary of any Scope Deviations 51
4.4.3 Visual Inspection 51
4.4.4 Soil Sampling 56
4.4.5 Conclusions and Overall Performance of the Lower Site Foundation Landfill 59
4.4.6 Recommendations for Lower Site Foundation Landfill 59
4.5 Lower Site Powerhouse Landfill 60
4.5.1 Landfill Description 60
4.5.2 Summary of any Scope Deviations 62
4.5.3 Visual Inspection 62
4.5.4 Thermal Monitoring 66
4.5.5 Soil Sampling 66
4.5.6 Groundwater Sampling 70
4.5.7 Conclusions and Overall Performance of the Lower Site Powerhouse Landfill 72

4.5.8 Recommendations for Lower Site Powerhouse Landfill 72
4.6 Lower Site Non-Hazardous Waste Landfill 73
4.6.1 Landfill Description 73
4.6.2 Summary of any Scope Deviations 75
4.6.3 Visual Inspection 75
4.6.4 Soil Sampling 80
4.6.5 Groundwater Sampling 84
4.6.6 Conclusions and Overall Performance of the Lower Site NHWL 86
4.6.7 Recommendations for Lower Site NHWL 86
4.7 Upper Site – Tier II Disposal Facility 87
4.7.1 Landfill Description 87
4.7.2 Summary of any Scope Deviations 89
4.7.3 Visual Inspection 89
4.7.4 Thermal Monitoring 94
4.7.5 Soil Sampling 94
4.7.6 Groundwater Sampling 98
4.7.7 Conclusions and Overall Performance of the Upper Site Tier II Disposal Facility 100
4.7.8 Recommendations for Upper Site Tier II Disposal Facility 100
4.8 Upper Site West Landfill – West Lobe, Centre Lobe and East Lobe 101
4.8.1 Landfill Description 101
4.8.2 Summary of any Scope Deviations 104
4.8.3 Visual Inspection 104
4.8.4 Soil Sampling 113
4.8.5 Conclusions and Overall Performance of the Upper Site West Landfill 128
4.8.6 Recommendations for Upper Site West Landfill 128
4.9 Upper Site Pallet Line Landfill - Lobes 1 to 5, and Abandoned Landfill Lobe 129
4.9.1 Landfill Description 129
4.9.2 Summary of any Scope Deviations 131
4.9.3 Visual Inspection 131
4.9.4 Soil Sampling 138
4.9.5 Conclusions and Overall Performance of the Upper Site Pallet Line Landfill 146

4.9.6 Recommendations for Upper Site Pallet Line Landfill 146
4.10 Upper Site Non-hazardous Waste Landfill 147
4.10.1 Landfill Description 147
4.10.2 Summary of any Scope Deviations 149
4.10.3 Visual Inspection 149
4.10.4 Soil Sampling 154
4.10.5 Groundwater Sampling 156
4.10.6 Conclusions and Overall Performance of the Upper Site Non-hazardous Waste Landfill 158
4.10.7 Recommendations for Upper Site Non-hazardous Waste Landfill 158
4.11 Upper Site NWS Landfill 159
4.11.1 Landfill Description 159
4.11.2 Summary of any Scope Deviations 161
4.11.3 Visual Inspection 161
4.11.4 Soil Sampling 166
4.11.5 Conclusions and Overall Performance of the Upper Site NWS Landfill 169
4.11.6 Recommendations for Upper Site NWS Landfill 169
4.12 Upper Site South Landfill West 170
4.12.1 Landfill Description 170
4.12.2 Summary of any Scope Deviations 172
4.12.3 Visual Inspection 172
4.12.4 Soil Sampling 177
4.12.5 Conclusions and Overall Performance of the Upper Site South Landfill West 181
4.12.6 Recommendations for Upper Site South Landfill West 181
4.13 Upper Site Helipad Landfill 182
4.13.1 Landfill Description 182
4.13.2 Summary of any Scope Deviations 184
4.13.3 Visual Inspection 184
4.13.4 Soil Sampling 188
4.13.5 Conclusions and Overall Performance of the Upper Site Helipad Landfill 192
4.13.6 Recommendations for Upper Site Helipad Landfill 192

5.0 QA/QC RESULTS 193

5.1 Hold Times 193

5.2 Accuracy 194

5.3 Reliability 194

5.4 Reproducibility (Duplicate Analysis) 194

5.4.1 Soil Samples 196

5.4.2 Groundwater Samples 198

TABLES

Table 2-1: Field Personnel and Roles 5

Table 3-1: Summary of QIKIQ15 Project Monitoring Schedule 8

Table 3-2: Summary of Monitoring Requirements by Landfill 8

Table 4-1: Visual Inspection Checklist – Lower Site NWS Landfill 18

Table 4-2: Preliminary Stability Assessment – Lower Site NWS Landfill 20

Table 4-3: Summary Table of Photographic Log – Lower Site NWS Landfill 20

Table 4-4: Soil Chemical Analysis Results - Lower Site NWS Landfill 23

Table 4-5: Visual Inspection Checklist – Lower Site Tier II Disposal Facility 29

Table 4-6: Preliminary Stability Assessment – Lower Site Tier II Disposal Facility 31

Table 4-7: Summary Table of Photographic Log – Lower Site Tier II Disposal Facility 31

Table 4-8: Soil Chemical Analysis Results – Lower Site Tier II Disposal Facility 35

Table 4-9: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Lower Site Tier II Disposal Facility 37

Table 4-10: Visual Inspection Checklist – Lower Site Crossroads Landfill 43

Table 4-11: Preliminary Stability Assessment – Lower Site Crossroads Landfill 45

Table 4-12: Summary Table of Photographic Log – Lower Site Crossroads Landfill 45

Table 4-13: Soil Chemical Analysis Results – Lower Site Crossroads Landfill 48

Table 4-14: Visual Inspection Checklist – Lower Site Foundation Landfill 53

Table 4-15: Preliminary Stability Assessment – Lower Site Foundation Landfill 55

Table 4-16: Summary Table of Photographic Log – Lower Site Foundation Landfill 55

Table 4-17: Soil Chemical Analysis Results – Lower Site Foundation Landfill 58

Table 4-18: Visual Inspection Checklist – Lower Site Powerhouse Landfill 64

Table 4-19: Preliminary Stability Assessment – Lower Site Powerhouse Landfill 65

Table 4-20: Summary Table of Photographic Log – Lower Site Powerhouse Landfill 65

Table 4-21: Soil Chemical Analysis Results – Lower Site Powerhouse Landfill 69

Table 4-22: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Lower Site Powerhouse Landfill 71
Table 4-23: Visual Inspection Checklist – Lower Site Non-Hazardous Waste Landfill 77
Table 4-24: Preliminary Stability Assessment – Lower Site Non-Hazardous Waste Landfill 79
Table 4-25: Summary Table of Photographic Log – Lower Site Non-Hazardous Waste Landfill 79
Table 4-26: Soil Chemical Analysis Results – Lower Site Non-Hazardous Waste Landfill 83
Table 4-27: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Lower Site Non-Hazardous Waste Landfill 85
Table 4-28: Visual Inspection Checklist – Upper Site Tier II Disposal Facility 91
Table 4-29: Preliminary Stability Assessment - Upper Site Tier II Disposal Facility 93
Table 4-30: Summary Table of Photographic Log – Upper Site Tier II Disposal Facility 93
Table 4-31: Soil Chemical Analysis Results – Upper Site Tier II Disposal Facility 97
Table 4-32: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Upper Site Tier II Disposal Facility 99
Table 4-33: Visual Inspection Checklist – Upper Site West Landfill (West Lobe) 106
Table 4-34: Visual Inspection Checklist – Upper Site West Landfill (Centre and East Lobes) 109
Table 4-35: Preliminary Stability Assessment – Upper Site West Landfill (West, Centre and East Lobes) 111
Table 4-36: Summary Table of Photographic Log – Upper Site West Landfill (West, Centre and East Lobes) 111
Table 4-37: Soil Chemical Analysis Results – Upper Site West Landfill (West, Centre and East Lobes) 123
Table 4-38: Visual Inspection Checklist – Upper Site Pallet Line Landfill 133
Table 4-39: Preliminary Stability Assessment – Upper Site Pallet Line Landfill 136
Table 4-40: Summary Table of Photographic Log – Upper Site Pallet Line Landfill 136
Table 4-41: Soil Chemical Analysis Results – Upper Site Pallet Line Landfill 144
Table 4-42: Visual Inspection Checklist – Upper Site Non-Hazardous Waste Landfill 151
Table 4-43: Preliminary Stability Assessment – Upper Site Non-Hazardous Waste Landfill 153
Table 4-44: Summary Table of Photographic Log – Upper Site Non-Hazardous Waste Landfill 153
Table 4-45: Soil Chemical Analysis Results - Upper Site Non-hazardous Waste Landfill 155
Table 4-46: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Upper Site Non-hazardous Waste Landfill 157
Table 4-47: Visual Inspection Checklist – Upper Site NWS Landfill 163
Table 4-48: Preliminary Stability Assessment - Upper Site NWS Landfill 165
Table 4-49: Summary Table of Photographic Log – Upper Site NWS Landfill 165
Table 4-50: Soil Chemical Analysis Results – Upper Site NWS Landfill 168
Table 4-51: Visual Inspection Checklist – Upper Site South Landfill West 174
Table 4-52: Preliminary Stability Assessment – Upper Site South Landfill West 176
Table 4-53: Summary Table of Photographic Log – Upper Site South Landfill West 176

Table 4-54: Soil Chemical Analysis Results – Upper Site South Landfill West 180
Table 4-55: Visual Inspection Checklist – Upper Site Helipad Landfill 186
Table 4-56: Preliminary Stability Assessment – Upper Site Helipad Landfill 187
Table 4-57: Summary Table of Photographic Log – Upper Site Helipad Landfill 187
Table 4-58: Soil Chemical Analysis Results - Upper Site Helipad Landfill 191

FIGURES

Figure DYE-M.1: Site Plan....3
Figure DYE-M.2: Lower Site NWS Landfill Plan (with photo numbers and feature annotations) 15
Figure DYE-M.3: Lower Site Tier II Disposal Facility Plan (with photo numbers and feature annotations) 26
Figure DYE-M.4: Lower Site Crossroads and Foundation Landfill Plan (with photo numbers and feature annotations) 40
Figure DYE-M.5: Lower Site Powerhouse Landfill Plan (with photo numbers and feature annotations) 61
Figure DYE-M.6: Lower Site Non-Hazardous Waste Landfill Plan (with photo numbers and feature annotations) 74
Figure DYE-M.7: Upper Site Tier II Disposal Facility Plan (with photo numbers and feature annotations) 88
Figure DYE-M.8: Upper Site West Landfill (West Lobe) Plan (with photo numbers and feature annotations) 102
Figure DYE-M.9: Upper Site West Landfill (Centre and East Lobes) Plan (with photo numbers and feature annotations) 103
Figure DYE-M.10: Upper Site Pallet Line Landfill Plan (with photo numbers and feature annotations) 130
Figure DYE-M.11: Upper Site Non-hazardous Waste Landfill Plan (with photo numbers and feature annotations) 148
Figure DYE-M.12: Upper Site NWS Landfill Plan (with photo numbers and feature annotations) 160
Figure DYE-M.13: Upper Site South Landfill West Plan (with photo numbers and feature annotations) 171
Figure DYE-M.14: Upper Site Helipad Landfill Plan (with photo numbers and feature annotations) 183

APPENDICES

APPENDIX A
Report Limitations

APPENDIX B
Field Records

APPENDIX C
Laboratory Data

APPENDIX D
Photograph Log

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been contracted by Public Works and Government Services Canada (PWGSC), on behalf of the Department of National Defence (DND), to complete the 2015-2018 Distant Early Warning (DEW) Line Sites Landfill Monitoring Program in the Baffin Region of Nunavut (hereafter referred to as the "Project"). The contract number with PWGSC is W6837-151002/001/NCS. The DND file number for the Project is QIKIQ15. The contracted scope of work is in accordance with Golder Proposal P1530908 dated June 16, 2015 ("Golder Proposal").

The four DEW Line sites that were monitored in 2015 as part of the QIKIQ15 contract are DYE-M, FOX-3, FOX-2 and CAM-5. They are all now in the Post-Construction Monitoring Phase of their remedial program. Post-Construction Monitoring was carried out in accordance with the Project Terms of Reference (TOR) and the Logistics and Work Plan (LAWP) dated July 30, 2015. Monitoring activities included geotechnical visual inspection, thermal monitoring, soil and groundwater sampling.

This Monitoring Report presents the 2015 post-construction inspection and monitoring results for DYE-M (the Site).

Appendix A is a summary of the report limitations and forms part of the report.

1.1 Objective of the Study

The objective of the Landfill Monitoring Program is to collect sufficient information to assess the performance, integrity, and stability of the landfills from a geotechnical and environmental perspective for human health and environmental protection. The monitoring program is designed to monitor landfill integrity and to determine, in the event of any evident deterioration, if remedial measures are required.

1.2 Scope of Work

The scope of work for this Project includes the following:

1) Project Management including liaison with DND, project team coordination, scope management, cost management, schedule management, resource coordination, and preparation of invoices.
2) Preparation of site-specific Health Safety and Environment Plan and procurement of safety equipment and supplies (e.g., personal protective equipment, first aid kits and satellite phones).
3) Development of Logistics and Work Plan for each field season that outlines the field schedule, travel plans, accommodation, Inuit hiring, ATV rental and charter aircraft.
4) Completion of field work consisting of soil and water sample collection, visual inspection, photograph documentation and thermistor data collection.
5) Preparation of a Field Work Progress Report that summarizes field work activities completed each year (submitted under separate cover).
6) Preparation of a Consultant Inuit Participation Plan and Report (submitted under separate cover).
7) Preparation of draft and final Monitoring Reports for each site with visual inspection results, photographic log, thermistor data collection, figures of inspection features and photograph locations, soil and groundwater quality monitoring results, QA/QC and data interpretation.

2.0 BACKGROUND

2.1 Site Description

DYE-M is a former Distant Early Warning Line (DEW Line) site, located at Cape Dyer, Nunavut, on the Cumberland Peninsula on the easternmost point of Baffin Island. It is bordered by Davis Strait and Coronation Gulf, at 66° 40' N, 61° 21' W. The DYE-M station is currently operated by Canada's Department of National Defence (DND) as a North Warning System (NWS) long-range radar (LRR) site.

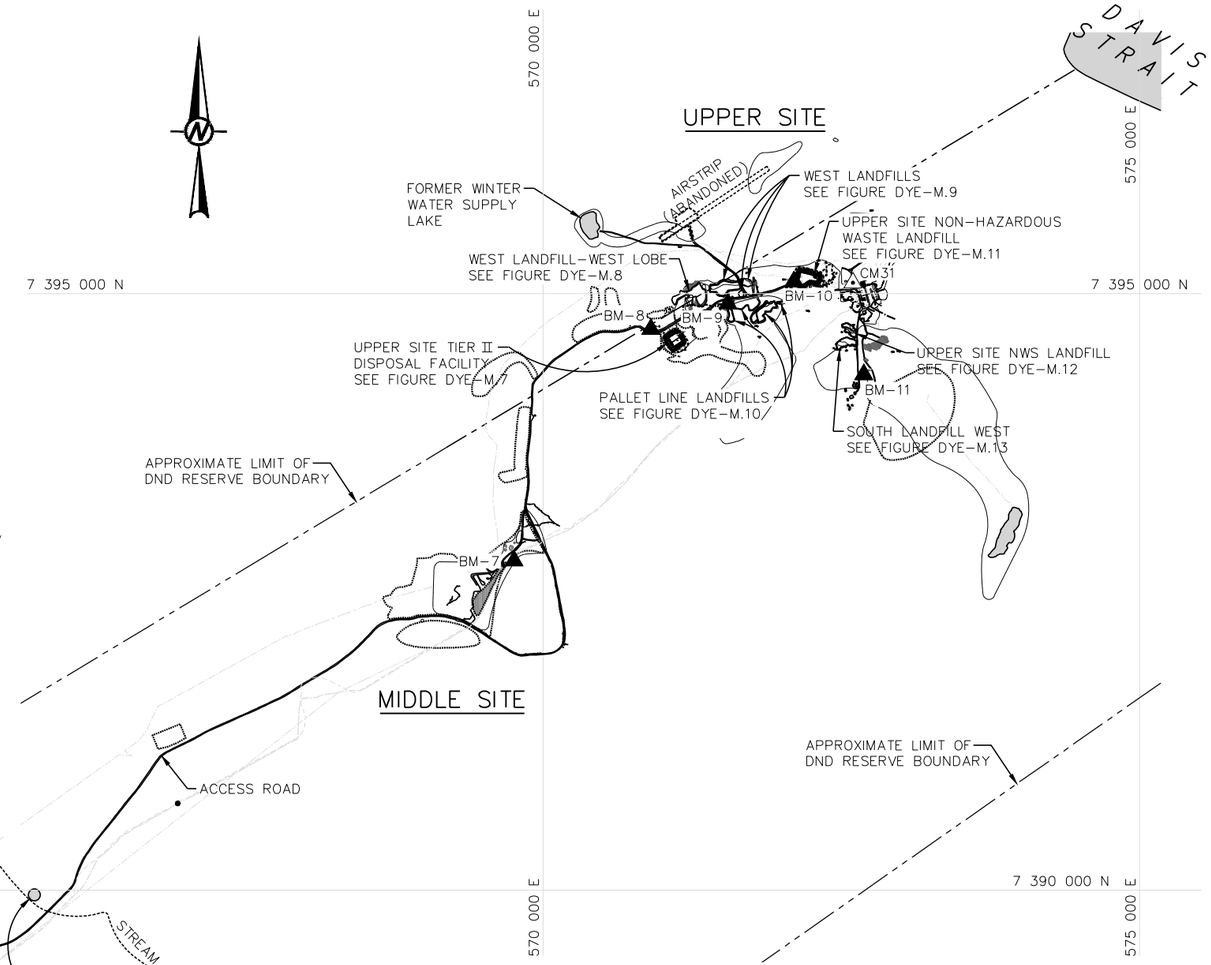
The elevation across the site varies from less than 300 m to over 500 m above sea level. The station is about 15 km inland from the Sunneshine Fiord shore. The site is divided into three areas: Upper Site, Lower Site and Beach Area. The main site facilities (the Upper Site-Station Area) are located at the top of a summit, approximately 16 km east-northeast of the Airstrip and Lower Camp Area. The main DEW site is connected by road to the Lower Site where petroleum, oil, and lubricants (POL) storage, vehicle maintenance, and airstrip facilities were located. The Beach Area facilities consist of POL storage facilities, and open storage areas. The DYE-M site is currently operated as a North Warning Long Range Radar (LRR) site. The former DEW Line site was comprised of communications, accommodations and maintenance facilities. In 1993, the site was upgraded to an unmanned LRR site as part of the NWS. Much of the station infrastructure was no longer required, and most buildings were subsequently abandoned. Only those structures required to support the NWS site and house the remotely operated communications systems are still present.

The cleanup included the remediation of existing landfills and the construction of new landfills for the disposal of non-hazardous wastes generated from demolition and collection of site debris and the construction of new Tier II Disposal Facilities for the disposal of Tier II contaminated soil. The landfills included in the long term monitoring program are shown on the overall site plan, Figure DYE-M.1, and are listed below:

- Lower Site NWS
- Lower Site Tier II Disposal Facility
- Lower Site Crossroads landfill
- Lower Site Foundation Landfill
- Lower Site Powerhouse Landfill
- Lower Site NHWL
- Upper Site – Tier II Disposal Facility
- Upper Site West Landfills
- Upper Site Pallet Line Landfill
- Upper Site – NHWL
- Upper Site NWS Landfill
- Upper Site South Landfill West
- Upper Site Helipad landfill

LOCATION OF CAPE DYER WITHIN NUNAVUT TERRITORY

SCALE: NTS



LEGEND:

- APPROXIMATE LIMIT OF DND RESERVE BOUNDARY
- CM1 — SURVEY CONTROL MONUMENT (2)
- BM-1 — PERMANENT BENCHMARK LOCATION (11)
- ARCHAEOLOGICAL FEATURES
- BODY OF WATER

NOTE
GRID PROJECTION IS NAD83 ZONE 20N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 1,000 2,000
1:50,000 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
OVERALL SITE PLAN

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

0

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada\99_PRO\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0001_DYE_M_Field_Summary_Report | File

2.2 Site Geology, Hydrogeology and Hydrology

The site is on the northeastern edge of the Precambrian (Canadian) Shield. Most Precambrian bedrock has been metamorphosed (altered by intense heat and pressure) into granite. Surficial soils have been formed by the erosive forces of glaciation and deposited by retreating glaciers. Glacial retreat has deposited glacial till moraine, boulders and talus slopes over the landscape. The landscape is dominated by bedrock outcrops and boulder fields; tundra vegetation is generally limited to valleys.

The groundwater flow processes at the site are expected to be significantly influenced by the presence of continuous permafrost. Annual active thaw layers are typically limited to a few metres below ground surface, depending on ground cover, soil materials and surface water features. Shallow groundwater representing meltwater (both surficial and within the active layer) and infiltration from precipitation during the summer thaw is perched within the active layer during the short summer season. Movement of the groundwater is dictated by soil type, presence of shallow permafrost and hydraulic pressures resulting from topographic differences and distribution (elevation) of the water within the soils. Water elevations are only measured at some wells, and therefore the use of terms upgradient or downgradient may not be truly reflective of the actual flow direction. Nevertheless, for the purposes of this report, upgradient and downgradient are used to maintain consistency with the identification of monitoring locations in previous annual reports. .

The landscape at DYE-M varies from a shallow marine beach to the southwest, broad glacial U-shaped valleys, broad rounded hills, boulder covered uplands, to sheer cliff walls along the eastern coast. Rugged topography and the presence of permafrost at the site have created many small, shallow perched lakes and seasonal streams from drainage of melting snow. Smaller, shallow surface water features typically freeze solid during the winter months. Some of the larger, deeper lakes may not freeze solid, potentially allowing them to support fish populations.

2.3 Land-Use Description

In the 1950's DEW Line sites were constructed along the latitude of 65 to 70 degrees to maintain surveillance of the North American Airspace. In 1963, technology upgrades led to the closure of most of these sites and later replacement with the North Warning System (NWS). Since the 1990's, investigations, decommissioning, and clean-up activities have been undertaken. Clean-up and decommissioning activities involved the demolition of surplus buildings and structures, excavation of contaminated soils, and the retrofit of existing landfills. New engineered landfills were also constructed for the disposal of excavated soils and building materials.

Landfills at DEW Line sites can be categorized as follows:

- **Regraded:** Existing landfills that were re-graded and capped with gravel;
- **Leachate Contained:** Existing landfills that were capped with gravel and provided with an impermeable membrane keyed into the permafrost (either only on the sides or over the surface) to contain leachate;
- **New NH:** New non-hazardous waste landfills; and,
- **New Tier II:** New Tier II disposal facilities (used for the disposal of Tier II soils as described by the DEW Line Cleanup Criteria) with an impermeable liner underneath and on top of the contaminated soil to encapsulate the contents (leachate contained). Tier II landfills have a saturated granular perimeter berm keyed into the permafrost and sufficient cover of granular material to promote permafrost aggradation into the landfilled materials.

The airstrips remain in place for ongoing site operations, maintenance and monitoring.

2.4 Field Program Staff and Schedule

Table 2-1 presents a list of field personal, roles, responsibilities and dates for the DYE-M 2015 monitoring program.

Table 2-1: Field Personnel and Roles

Name (Affiliation)	Role / Responsibility	Site	Date
Don Plenderleith (Golder)	Sr. Environmental Eng. / Local Inuit H&S Orientation Training / Sampling	DYE-M	August 9-11
Darrin Johnson (Golder)	Sr. Geotechnical. Eng. / Inspections	DYE-M	August 9-13
Reza Moghaddam (Golder)	Field Geotechnical Lead / Inspections	DYE-M	August 9-13
Kevin Rattray (Golder)	Field Environmental Lead / Sampling	DYE-M	August 9-13
Jaypootie Moesesie (Inuit Subcontractor)	Wildlife Monitor	DYE-M	August 9-13
Jeremiah Toomasie (Inuit Subcontractor)	Wildlife Monitor	DYE-M	August 11-13
Kathy Kuniliusiee (Inuit Subcontractor)	Environmental Assistant / Sampling	DYE-M	August 9-13
Tony Atsanirk (Inuit Subcontractor)	Environmental Assistant / Sampling	DYE-M	August 11-13
Ricky Nookiguak (Inuit Subcontractor)	Environmental Assistant / Sampling	DYE-M	August 9-13

2.5 Weather Conditions

Table 2-2 presents a summary of weather conditions on each day the DYE-M monitoring program.

Table 2-2: Summary of Weather Conditions

Date	Weather
August 9	Morning: Clear, 5°C Afternoon: Overcast with light rain, 0°C
August 10	Morning: Foggy with light snow, 0°C Afternoon: Overcast, 3°C to 8°C
August 11	Overcast, -3°C to 0°C
August 12	Overcast with light rain, 0°C to 5°C
August 13	Clear with some clouds, 3°C to 5°C

2.6 Project References

Canadian Council of Ministers of the Environment (CCME, 1993), "Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volumes I and II, Main Report and Analytical Methods."

Department of National Defence (DND, 2015), "Terms of Reference, DEW Line Monitoring Program CAM-5, FOX-M, 2, 3, 4, 5, DYE-M", QIKIQ15 Contract, April 2015.

Environmental Sciences Group (ESG 2002a), "DYE-Main, Cape Dyer, Nunavut: Lower Site Investigation, 1997-2001", Royal Military College of Canada, Kingston, Ontario.

Environmental Sciences Group (ESG 2002b), "DYE-Main, Cape Dyer, Nunavut: Upper Site Investigation, 1997-2001", Royal Military College of Canada, Kingston, Ontario.

Environmental Sciences Group (ESG 2015), "DYE-M Cape Dyer, Nunavut Baseline and First Year Environmental Monitoring Report 2014", Royal Military College, Kingston, Ontario.

Golder Associates Ltd. (Golder, 2015a), "Solicitation No. W6837-151002/A Baffin Region Dew Line Sites Monitoring Program", Report P1530908, dated June 16, 2015.

Golder Associates Ltd. (Golder, 2015 b). "*Baffin Region DEW Line Site Monitoring Health Safety and Environment Plan*", Report 1530908-1200-Rev2, dated July 31, 2015.

Golder Associates Ltd. (Golder, 2015c), "2015 Landfill Monitoring for DEW Line Sites: Logistics and Work Plan", Report 1530908-1300-Rev2, dated July 31, 2015.

Golder Associates Ltd. (Golder, 2015d). "*2015 Baffin Region DEW Line Site Landfill Monitoring Field Work Progress Report*", Report 1530908-1300-Rev2, dated October 5, 2015.

2.7 Report Structure

This report describes the monitoring program carried out in August 2015 at DYE-M. Results from soil and groundwater sampling, thermal monitoring and visual inspection activities are presented in accordance with the TOR.

The report is organized with a separate section for each of the landfills (Sections 4.1 to 4.5). Each section contains the following 2015 monitoring information for that landfill:

- Visual Inspection Checklist;
- Preliminary Stability Assessment Table;
- Table of visual inspection photographs;
- Landfill plan with photograph locations and observed features;
- Summary of thermal monitoring (if applicable for landfill);
- Summary of soil sampling analytical results;
- Summary of groundwater sampling analytical results (if applicable for landfill); and,
- Discussion of overall landfill performance based on available monitoring data.

Appendix A provides a Limitation of Responsibilities and forms part of the report. Thermal and groundwater monitoring field record sheets are included in Appendix B. Laboratory Certificates of Analysis, historical landfill monitoring results and QA/QC Reports are included in Appendix C. A photographic log is included in Appendix D. A visual inspection report on the regraded thermokarst area is included in Appendix E. An electronic version of the report, tables, figures, full resolution photos and Laboratory Certificates of Analysis are saved on a DVD-ROM, which is appended to the hardcopy of the report.

3.0 APPROACH & METHODOLOGY (GENERAL)

3.1 Summary of Work

3.1.1 Health and Safety

Golder developed a Health and Safety Environment Plan (Golder, 2015b) for the QIKIQ15 field program that described potential hazards, risks and proposed mitigation measures. Unique health and safety risks included the potential for wildlife encounters, long distances to the nearest emergency health care facilities and variable weather conditions. In addition, Golder developed a Logistics and Work Plan (Golder, 2015c) for the field program that outlined travel plans, contact information, accommodation details, transportation, communications, field equipment and sampling protocols.

3.1.2 Field Program

Table 3-1 provides a summary of the monitoring schedule for the seven DEW Line sites that are part of the QIKIQ15 Project. DYE-M was monitored in 2015 (Year 2) and will be monitored again in 2016 (Year 3). The field monitoring program consisted of the following activities:

- Visual inspection including photographic documentation of observed conditions;
- Thermal monitoring (i.e., datalogger downloading at landfills with thermistors);
- Soil sampling; and
- Groundwater sampling (at landfills with monitoring wells).

Table 3-2 provides a summary of monitoring activities by landfill.

Table 3-1: Summary of QIKIQ15 Project Monitoring Schedule

DEW Line Site	Year			
	2015	2016	2017	2018
CAM-5 Mackar Inlet	Year 5		Year 7	
FOX-M Hall Beach			Year 10	
FOX-2 Longstaff Bluff	Year 4	Year 5		Year 7
FOX-3 Dewar Lakes	Year 4[a]	Year 5		Year 7
FOX-4 Cape Hooper		Year 18		Year 20
FOX-5 Broughton Island		Year 10		
DYE-M Cape Dyer	Year 2	Year 3	Year 4	Year 5

Legend	Phase I Monitoring Phase II Monitoring

Note:

a) At FOX-3 in 2015 (Year 4) – Complete a geotechnical inspection of the thermokarst regrade.

Table 3-2: Summary of Monitoring Requirements by Landfill

Landfill Designation	Type of Landfill	Visual Inspection	Soil Sampling[a]	Groundwater Sampling	Thermal Monitoring
		✓ = yes	# of Locations	# of Monitoring Wells	# of Thermistors
DYE-M					
Lower Site NWS	Regraded	✓	4 x 2		
Lower Site Tier II Disposal Facility	NEW Tier II	✓	4 x 2	4	4 + 1 (background)
Lower Site Crossroads Landfill	Regraded	✓	3 x 2		
Lower Site Foundation Landfill	Regraded	✓	3 x 2		
Lower Site Powerhouse Landfill	Leachate contained	✓	4 x 2	4	3
Lower Site NHWL	NEW NH	✓	5 x 2	5	
Upper Site Tier II Disposal Facility	NEW Tier II	✓	5 x 2	5	5 + 1 (background)
West Landfill – West Lobe	Regraded	✓	9 x 2		
West Landfill – Centre Lobe and East Lobe	Regraded	✓	13 x 2		
Pallet Line Landfill – Lobes 1 to 5, and Abandoned Lobe	Regraded	✓	10 x 2		
Upper Site – NHWL	NEW NH	✓	4 x 2	4	
Upper Site NWS Landfill	Regraded	✓	5 x 2		
Upper Site South Landfill West	Regraded	✓	8 x 2		
Upper Site Helipad Area Landfill	Regraded	✓	7 x 2		
	TOTAL	**14**	**168**	**22**	**14**

Notes:

a) (# x #) Indicates approximate number of sampling points at each landfill and requirement to collect samples from 2 depths at each sampling point; from 0-15 cm and from 40-50 cm (or at refusal).

3.1.3 Visual Inspection

At each of the landfill locations mentioned above, a visual inspection was conducted to observe whether there were any visual signs of erosion, cracking, seepage, ponded water, stressed vegetation (potentially caused by the landfill) and for physical stability. Photographic records of the landfill were taken to document the observed condition of the landfill and other notable features that were observed. GPS coordinates were recorded of all photograph and feature locations.

Visual inspection information was used to complete a Preliminary Stability Assessment for each landfill. Each observed feature was assigned a Severity Rating (Acceptable, Marginal, Significant or Unacceptable) and Extent (Isolated, Occasional, Numerous or Extensive) and then the landfill was assigned an overall Performance Rating (Acceptable, Marginal, Significant or Unacceptable). Definitions of these terms are as follows:

Feature Severity Rating / Landfill Performance Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement. • Liner exposed. • Slope failure.

Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

3.1.4 Thermal Monitoring

The landfills that require leachate containment (e.g., Tier II disposal facilities) and rely on permafrost aggradation incorporate ground temperature monitoring systems with vertical thermistor strings that measure temperature at various depths and automated data loggers that allow for data collection. The data recorded on the data loggers was downloaded using a laptop computer and Prolog software from Lakewood Systems Ltd. Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

3.1.5 Soil Sampling

Soil samples were collected in accordance with the TOR, the Golder Proposal, Logistics and Work Plan and Canadian Council of Ministers of the Environment (CCME) Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volumes I and II, Main Report and Analytical Methods (CCME, 1993). The only soil sampling procedures that deviated from the TOR are those stated below (*in italics*):

- Soil samples were collected within 2 to 4 m of monitoring wells (where applicable). Where there was no corresponding monitoring well, soil samples were collected within 2 to 4 m of the previous sample locations;
- GPS readings of the 2015 soil sampling locations were recorded and confirmed to be consistent with previous/required sampling locations prior to sampling;
- Test pits were dug with a shovel that was washed between sample locations. Soil samples were collected by hand using a single-use disposable nitrile glove and placed into new/clean glass sample jars provided by the laboratory that were labelled with the sample location ID and depth;
- Soil samples were generally collected at depths of 0 to 15 centimetres (cm) and 40 to 50 cm at the locations, in accordance with the TOR. *At some locations, the sample collection depth was adjusted where soil was frozen or refusal on rock was encountered. Where refusal on a large rock(s) was encountered near surface, the sampling location was moved slightly to avoid the rock. When rocks were encountered prior to reaching the target sampling depth, the test pit was enlarged and the rock(s) were excavated, if possible. If the specified sampling depth could not be reached after expending reasonable effort to enlarge the hole and remove rock(s), a sample was collected at or near the zone of refusal (in accordance with the TOR). If refusal was encountered after the shallow soil sample depth and even with additional effort it was not possible to remove the rock(s) causing refusal, then only one soil sample was collected at that location (noted as "refusal" in summary tables below);*
- *At locations where the ground was covered with snow and ice, excavation of the snow was attempted but, in most cases, it was impossible to dig through the ice and frozen ground beneath the snow to collect a soil sample (noted as "frozen" in summary tables below); and,*
- Inter-lab field duplicates were collected for 10% of the total soil samples collected. The field duplicates were collected from relatively homogenous soil material that was mixed either in a stainless steel bowl *or in the test pit*, so that the composition of the two samples was considered to be the same.

3.1.6 Groundwater Sampling

Groundwater samples were collected in accordance with the TOR, the Golder Proposal, Logistics and Work Plan and CCME (1993). Groundwater sampling procedures of note are as follows (*deviations in italics*):

- Water levels in the wells were measured with an interface probe that was decontaminated with soap and water, then methyl hydrate and rinsed with distilled water prior to use;
- *At monitoring well locations where there was snow on the ground surrounding the well and no measurable water level or water that could be pumped with the peristaltic pump, water samples were not collected (noted as "frozen" in the summary tables below);*
- *At monitoring well locations that had no measurable water level or water that could be pumped with the peristaltic pump, water samples were not collected (noted as "dry" in summary tables below);*
- *In wells with limited water depth and/or slow recharge, purging was only carried out until a steady flow was observed* and then sampling was commenced in the priority order outlined in the TOR. *The number of water sample bottles collected and parameters that could not be analyzed are listed in footnotes following the respective summary tables below;*
- Purging and sampling was carried out using a peristaltic pump. Peristaltic pump flexible tubing and nylon tubing extending down the well was single-use and disposed after use at each well (i.e., was not re-used). Sample tubing was removed from the wells after completion of the sampling event and disposed off-site;
- Groundwater samples were pumped directly from the well into analysis-specific glass bottles provided by the laboratory, which were labelled with the sample location ID and date. Groundwater samples were not field filtered and were not field-acidified or preserved, in accordance with the TOR. The low-flow sampling technique used here was to ensure low turbidity which is critical when the samples are not field filtered;
- Where groundwater was insufficient for collection of a complete suite of samples, sampling was prioritized in the following order:
  - Petroleum hydrocarbons (PHC): F1 fraction;
  - Inorganic elements – total concentrations: arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc and mercury;
  - PHC: F2, F3 and F4 fractions; and,
  - PCB (polychlorinated biphenyls – Total Aroclor analysis).
- Inter-lab duplicates were collected for 10% of the total groundwater samples collected;
- A field blank was filled in the field and analyzed for all parameters; and,
- Trip blanks were brought to the field and back and analyzed for all parameters.

3.2 Field Notes and Data

Visual inspection photographs, features, locations and notes were recorded in the field with a tablet computer equipped with a camera and Global Positioning System (GPS). Field data and photographs from the tablet were uploaded to an online Geographic Information System (GIS) database that was used to generate the photograph log and figures presented in this report.

Thermistor inspection and monitoring data was recorded on field record sheets included in Appendix B. Thermistor locations were recorded with either the field tablet or a hand-held GPS.

Soil sampling locations were photographed with location identification (ID) cards before test pit excavation, at the maximum depth of the test pit excavation and after backfilling. Soil sampling locations were recorded with either the field tablet or a hand-held GPS.

Groundwater monitoring data was recorded on field record sheets included in Appendix B. Monitoring well locations were recorded with either the field tablet or a hand-held Global Positioning System (GPS).

3.3 QA/QC

Quality Assurance (QA) is the set of procedures which are incorporated into the project's standard operating procedures to ensure that it achieves its quality objectives. Quality control (QC) is the system of checks and validations that are performed to measure quality in order to determine if the quality objectives have been met.

The QA procedures incorporated into the monitoring program carried out at DYE-M included:

- Using only ISO 17025 certified environmental labs to perform the soil and groundwater analyses. Golder used Paracel Laboratories Ltd. (Paracel) of Ottawa as the primary lab and AGAT Environmental (AGAT) of Mississauga for the duplicate samples. Both of these laboratories are ISO 17025 certified for all of the analyses performed. The laboratories also exchanged their "Standard Methods" for the analyses in the program to harmonize their procedures for the duplicate analysis;
- The field sampling for soil and groundwater was completed by two-person teams (one Golder and one Inuit helper), which helped to ensure that all of the sampling and field identification procedures were followed;
- Duplicate soil samples were prepared in the field by mixing the soil in a stainless steel bowl and taking small portions of soil and alternately filling the sample jars for the two labs. If a duplicate from the lower of the two sample intervals was being prepared, it was sometimes mixed at the bottom of the test pit;
- Duplicate groundwater samples were prepared by alternately filling bottles for each lab for each parameter type; the yield of the wells in some cases prevented filling the whole suite of sample bottles;
- To minimize the possibility of cross contamination, soil samples were collected directly from the test pits with nitrile-gloved hands, at the designated depth intervals, and placed into lab-supplied sample jars leaving no headspace. New gloves were used for each sample. The shovel and trowel used to open the test pit were cleaned off manually then rinsed with methyl-hydrate and de-ionized water;
- To minimize the risk of cross-contamination, groundwater samples were pumped from the monitoring wells using dedicated tubing inserted into the well and another dedicated length of tubing between the rollers in the peristaltic pump and a third section of dedicated tubing from the pump to the sample bottles. Staff holding the sample bottles wore nitrile-gloves. Samples were labelled at the monitoring well with the well name, time and date;

- Groundwater samples were neither filtered nor preserved in the field. The low-flow sampling technique was employed to minimize the presence of sediment in the water sample;
- Soil samples were not preserved in the field;
- To minimize the time delay from actual sample collection to receipt at the lab, Golder sent coolers from the site back to the staging point of Qikiqtarjuaq every time a resupply flight occurred. From the staging point, the coolers were sent via First Air to Ottawa Airport where Golder staff picked them up and took them to Golder's office in Ottawa, where they were checked for breakage, legibility of the labels and accuracy and completeness of the chain of custody. After being checked in Ottawa, the samples were dispatched to the primary and duplicate labs. The maximum allowable hold times for samples were largely met; and where they were exceeded, it was by a maximum of two days due to the logistical limitations of flying in and out of the sites and the long chain of transport from the staging points to the labs.

Quality control was measured by the analysis of duplicate samples and review of the QA/QC data contained in each laboratory certificate of results. In addition to the duplicate analyses, a field blank (consisting of bottles filled with distilled water in the field) was submitted to AGAT for analysis of all specified parameters. Trip blanks were also used. They consisted of bottles filled with distilled water and sealed at the laboratory. These were brought to the field for the overall 2015 program and back, then submitted to both Paracel and AGAT for analysis of all specified parameters.

No equipment blanks were prepared because neither the soil samples nor the water samples touched non-dedicated equipment. The water sampling tubing was single-use, and soil samples were collected from the test pits into sample jars with gloved hands. This was possible because the texture of the soil samples was generally loose sandy soil.

A discussion of the QA/QC results is provided in Section 5.

4.0 2015 MONITORING PROGRAM RESULTS

Photographs 1 through 276 (in Appendix D) document the observed conditions during the visual inspection. Photographs 277 through 284 record the condition of the groundwater monitoring wells. Photographs 285 through 501 illustrate soil sample locations before excavation, after excavation and after backfilling. Photographs 502 through 514 illustrate the condition of thermistors. A complete log of all photographs are included in Appendix D. Copies of all digital photograph files are included on a DVD attached to this report. Visual inspection photographs taken with the field tablet are identified by an "ATT number" in the file name which are noted in brackets in the visual inspection photograph log tables.

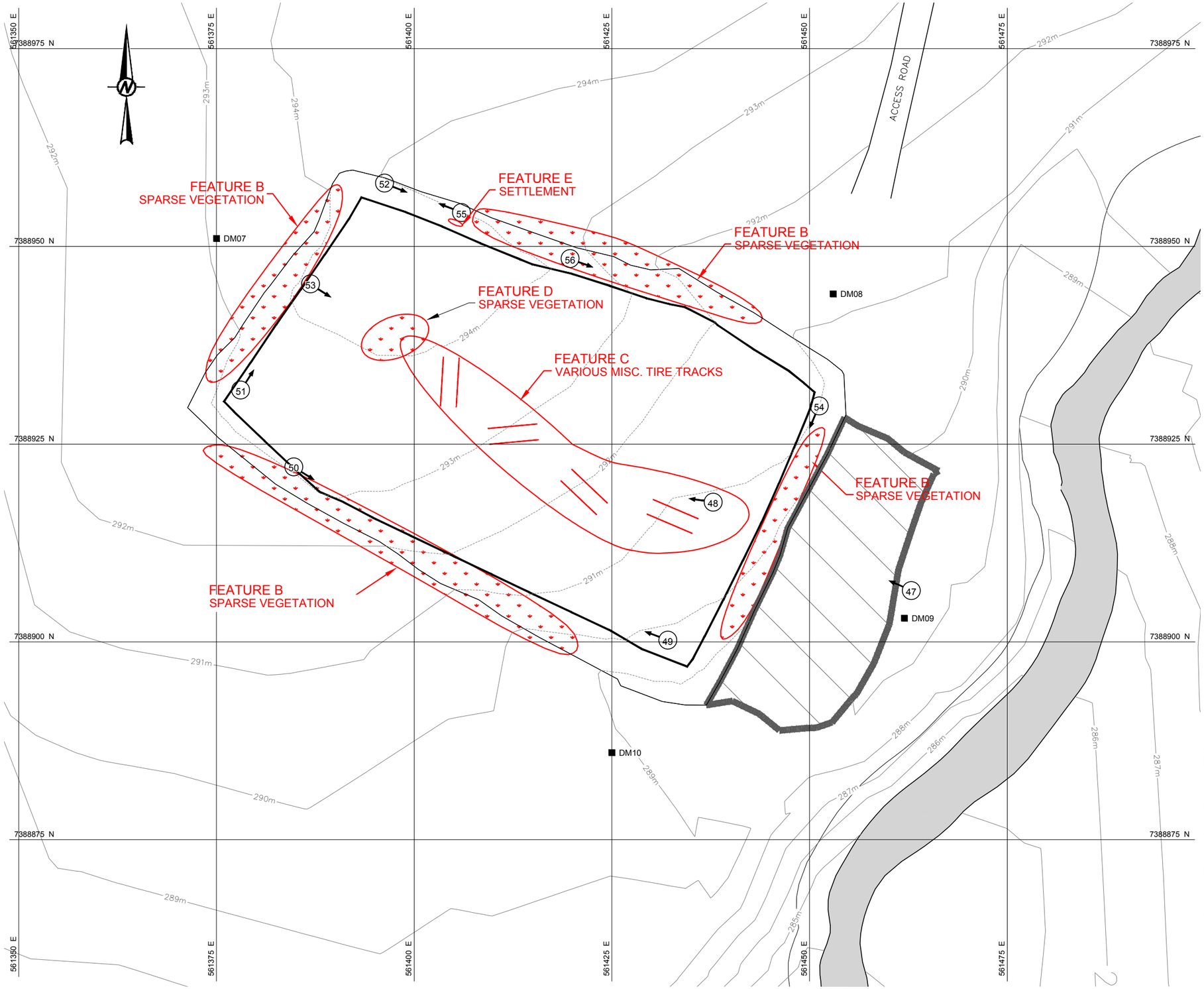
The monitoring program results are listed for each landfill in the sections below. Soil and groundwater analytical data in the tables are flagged where they exceed the background data - arithmetic mean (bold) and baseline data – arithmetic mean (underlined). Soil and groundwater are also compared to their baseline concentration plus three standard deviations (3σ). A modified total petroleum hydrocarbons (TPH) value, calculated as the sum of the PHC F1, F2 and F3 fractions, is discussed throughout this report to allow for comparison to TPH baseline data.

Historical soil and groundwater results and charts are included in Appendix C. It is recommended that seven data points be used at a minimum to identify a soil or groundwater quality trend for these landfills. As of the end of 2015, there are less than seven years of monitoring data available for these landfills, and there therefore insufficient information available to establish a reliable trend.

4.1 Lower Site NWS

4.1.1 Landfill Description

The Lower Site NWS Landfill was created during DEW Line operations. The landfill is located approximately 1.5 km northwest of the lower camp facilities, 100 m west of the lower camp road. The landfill area is approximately 3,300 m^2. The toe of the landfill is less than 20 m from a river that flows southwest into Exeter Bay. The overall gradient of the surrounding area slopes towards the southwest, in the direction of the river and Exeter Bay. The landfill and the disturbed area immediately around the landfill are covered in sparse vegetation (less than 20% of the surface). The landfill is underlain by sand and gravel, to boulders and bedrock at varying depths. The remediation of this landfill was completed in 2008 and consisted of regrading the surface with clean fill. Approximate sampling locations are provided in Figure DYE-M.2.



LEGEND:

- SETTLEMENT (NTS)
- VEGETATION (NTS)
- TIRE TRACKS (NTS)
- SOIL SAMPLING LOCATION
- 48 PHOTOGRAAPH LOCATION
- BODY OF WATER

NOTE
GRID PROJECTION IS NAD83 ZONE 20N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 10 20
1:500 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
LOWER SITE
NWS LANDFILL

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO. 1530908 | PHASE 1000 | REV. B | FIGURE DYE-M.2

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4.1.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- The deep soil samples at DM-08, DM-09 and DM-10 could not be collected due to refusal on bedrock and/or frozen ground.

4.1.3 Visual Inspection

The Lower Site NWS Landfill has locations with observed minor settlement and sparse vegetation features. Table 4-1 presents a summary of observed visual inspection features and Table 4-2 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance as all observed features were assessed as “Acceptable.” Table 4-3 is a log of photographs taken during the 2015 visual inspection.

The occasional minor tension cracks noted on the top surface of the landfill during in the 2014 monitoring report were not observed in 2015. Occasional tire tracks were noted on the surface of the landfill (previously identified Feature C). There were occasional areas of vegetation (previously identified Feature B) on the side slopes of the landfill and top surface. The newly observed minor settlement area (Feature E) has a length of 1 m and a width of 0.5 m.

Table 4-1: Visual Inspection Checklist – Lower Site NWS Landfill

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Lower Site NWS Landfill
DATE OF INSPECTION: August 12, 2015
DATE OF PREVIOUS INSPECTION: August 11, 2014
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-1: Visual Inspection Checklist – Lower Site NWS Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	Y	E	Northeast slope	561406	7388954	1	0.5	0.01-0.02	0.02%	Minor settlement (Acceptable)	New feature	55
Erosion	N											
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N	A	Cover surface							Previously noted minor crack (1.5 m x 0.5 m) (Acceptable)	Not identified in 2015	
Animal Burrows	N											
Vegetation	Y	B	Southeast slope	561451	7388930	28	3	-	2.5%	Sparse vegetation	Unchanged since previous observation	47 and 54
		B	Southwest slope	561385	7388922	50	5	-	7.6%	Sparse vegetation	Unchanged since previous observation	50
		B	Northwest slope	561378	7388932	29	5	-	4.4%	Sparse vegetation	Unchanged since previous observation	51
		B	Northeast slope	561396	7388958	37	5	-	5.6%	Sparse vegetation	Unchanged since previous observation	52 and 56
		D	Cover surface	561387	7388945	10	5	-	1.5%	Sparse vegetation	New feature	53
Staining	N											

Table 4-1: Visual Inspection Checklist – Lower Site NWS Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Vegetation Stress	N											
Seepage or Ponded Water	N											
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	N	C	Cover surface	561438	7388918	50	2	-	3.0%	Tire tracks (Acceptable)	Unchanged since previous observation	48

Landfill Area = 3,302 m^2.

Table 4-2: Preliminary Stability Assessment – Lower Site NWS Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Isolated
Erosion	Acceptable	N/A
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Acceptable	N/A
Cracking	Acceptable	N/A
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	Numerous
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	N/A
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	Isolated
Overall Landfill Performance	**Acceptable**	

Table 4-3: Summary Table of Photographic Log – Lower Site NWS Landfill

Photo	Description (file name)	Easting	Northing	Date
47	Southeast slope, facing northwest – Feature B, sparse vegetation (ATT189_Photo1.jpg)	561462.8564	7388906.488	12-Aug-2015
48	Feature C, tire track on cover surface, facing northwest (ATT191_Photo2.jpg)	561437.7958	7388917.658	12-Aug-2015
49	Southwest crest and slope, facing northwest (ATT192_Photo1.jpg)	561432.0618	7388900.21	12-Aug-2015
50	Southwest slope and crest, facing southeast – Feature B, sparse vegetation (ATT193_Photo1.jpg)	561384.7786	7388922.129	12-Aug-2015
51	Northwest slope and crest, facing northeast – Feature B, sparse vegetation (ATT194_Photo1.jpg)	561378.0353	7388931.829	12-Aug-2015
52	Northeast slope and crest, facing southeast – Feature B, sparse vegetation (ATT195_Photo1.jpg)	561396.2405	7388957.991	12-Aug-2015
53	Cover surface, facing southeast from the northwest crest edge – Feature D, sparse vegetation (ATT196_Photo1.jpg)	561386.8865	7388945.258	12-Aug-2015
54	Southeast slope and crest, facing southwest – Feature B (ATT198_Photo1.jpg)	561451.2236	7388929.831	12-Aug-2015
55	Feature E, minor settlement on the northeast slope, facing northwest (ATT199_Photo1.jpg)	561405.9821	7388954.268	12-Aug-2015
56	Northeast slope south end, facing southeast – Feature B (ATT201_Photo2.jpg)	561419.7138	7388948.44	12-Aug-2015

4.1.4 Soil Sampling

Table 4-4 presents a summary of analytical results for soil samples collected at the Lower Site NWS Landfill. DM-07 represents an upgradient sampling location, whereas DM-08, DM-09 and DM-10 represent downgradient sampling locations. These latter locations are within approximately 30 m of a streambed leading southwest to Exeter Bay. The deep soil samples at DM-08, DM-09 and DM-10 could not be collected due to refusal on bedrock and/or frozen ground.

DM-07

Sampling location DM-07 is located upgradient of the landfill, approximately 8 m northwest of the toe. The estimated elevation of this sampling point is 293 masl. As shown in Photo 339, the area consists of sand and gravel with some boulders and established vegetation. The soils consisted of brown sand with stone.

In the shallow sample at DM-07 (0-15 cm), the concentration of nickel (37 mg/kg) and chromium (68.3 mg/kg) exceeded their baseline concentrations (34 mg/kg and 65 mg/kg, respectively) but were less than their background concentrations (38 mg/kg and 94 mg/kg, respectively). In addition, the concentration of arsenic (1.2 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentrations of most metals, including nickel (29 mg/kg in 2014) and chromium (47 mg/kg in 2014), were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-07 in 2015.

In the deep sample at DM-07 (40-50 cm), the concentration of nickel (37.6 mg/kg) and chromium (67 mg/kg) exceeded their baseline concentrations (34 mg/kg and 65 mg/kg, respectively) but were less than their background concentrations (38 mg/kg and 94 mg/kg, respectively). The concentration of most metals, including nickel (33 mg/kg in 2014) and chromium (58 mg/kg in 2014), were greater than or similar to the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-07 in 2015.

DM-08

Sampling location DM-08 is located downgradient of the landfill, approximately 7 m north of the toe. The estimated elevation of this sampling point is 291 masl. As shown in Photo 342, the area is largely covered with sand and gravel and is sparsely vegetated. The soils consisted of brown sand with gravel and stone. A deep soil sample could not be collected at this location due to refusal on bedrock and/or frozen ground.

A duplicate sample was collected at the shallow DM-08 (0-15 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated relative percent difference (RPD) values indicated the original and duplicate sample results differ by less than 27% for all parameters.

In the shallow samples at DM-08 (0-15 cm), the average concentration of lead (11 mg/kg) exceeded the baseline (10 mg/kg) and background (10 mg/kg) concentrations. The concentration of lead was equal to the concentration reported in 2014 (11 mg/kg). The concentrations of most other metals were similar to the concentrations reported in 2014. The average concentration of TPH (16 mg/kg) was less than the baseline concentration (101 mg/kg); however, the average PHC F3 fraction concentration of 11 mg/kg exceeded the baseline concentration (9 mg/kg). No PHC F3 fraction were detected at this location in 2014(less than 10 mg/L). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the shallow sample at DM-08 in 2015.

DM-09

Sampling location DM-09 is located downgradient of the landfill, approximately 17 m east of the toe. The estimated elevation of this sampling point is 289 masl. As shown in Photo 345, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of brown sand with gravel and stone. A deep soil sample could not be collected at this location due to refusal on bedrock and/or frozen ground.

The shallow sample at DM-09 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (40.5 mg/kg) and zinc (70.1 mg/kg) exceeded their baseline concentrations (26 mg/kg and 51 mg/kg, respectively) but were less than their background concentrations (43 mg/kg and 84 mg/kg, respectively). In addition, the concentration of nickel (53.7 mg/kg), cobalt (19 mg/kg), chromium (107 mg/kg) and arsenic (1.8 mg/kg) exceeded their background and baseline concentrations. The concentrations of all metals were less than or similar to the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-09 in 2015.

DM-10

Sampling location DM-10 is located downgradient of the landfill, approximately 7 m south of the toe. The estimated elevation of this sampling point is 289 masl. As shown in Photo 348, the area consists of sand, gravel and rocks and is not vegetated. The soils consisted of brown sand with gravel and stone. A deep soil sample could not be collected at this location due to refusal on bedrock and/or frozen ground.

The shallow sample at DM-10 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (30.8 mg/kg), zinc (55.7 mg/kg) and chromium (74.7 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of nickel (39.2 mg/kg), cobalt (14.5 mg/kg) and arsenic (1.7 mg/kg) exceeded their background and baseline concentrations. The concentrations of all metals were higher than or similar to the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-10 in 2015.

Table 4-4: Soil Chemical Analysis Results - Lower Site NWS Landfill

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		43	38	12	1.0	10	84	94	1.00	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**26**	**34**	**12**	**1.0**	**10**	**51**	**65**	**1.0**	**0.10**	**0.10**	**10**	**4.0**	**9.0**	**NA**
Baseline + 3σ		48	64	23	1.0	22	97	126	3.0	0.10	0.15	10	15	43	NA
Upgradient															
DM-07 (0-15)	0-15	23.5	**37**	11.3	<0.5	3.8	39.5	**68.3**	**1.2**	<0.1	<0.05	<7	<4	<8	<6
DM-07 (40-50)	40-50	23.8	**37.6**	11.2	<0.5	4.9	38.7	**67**	<1	<0.1	<0.05	<7	<4	<8	<6
Downgradient															
DM-08 (0-15)	0-15	22.5	29.6	9.9	<0.5	**10.5**	48.1	58.3	**1.3**	<0.1	<0.05	<7	<4	<8	<6
DM-08 (0-15) (Duplicate)	0-15	24	31	8.7	<0.5	**11**	**52**	52	1	<0.10	<0.05	<5	<4	**13**	<6
DM-08 (0-15) (Dup Avg)	0-15	23	30	9.3	<0.5	**11**	50	55	1	<0.1	<0.05	<6	<4	**11**	<6
DM-08 (deep) [1]															
DM-09 (0-15)	0-15	**40.5**	**53.7**	**19**	<0.5	9.7	**70.1**	**107**	**1.8**	<0.1	<0.05	<7	<4	<8	<6
DM-09 (deep) [1]															
DM-10 (0-15)	0-15	**30.8**	**39.2**	**14.5**	<0.5	8.9	**55.7**	**74.7**	**1.7**	<0.1	<0.05	<7	<4	<8	<6
DM-10 (deep) [1]															

Notes:

NA: Not available

Underlined values: Results exceed Background arithmetic mean.

Bold Values: Results exceed Baseline arithmetic mean.

1: The deep soil samples at DM-08, DM-09 and DM-10 could not be collected due to refusal.

4.1.5 Conclusions and Overall Performance of the Lower Site NWS Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site NWS Landfill. A new minor settlement area was observed in 2015 but the overall stability performance of the landfill was assessed as Acceptable.

Soil samples were collected at all designated locations in 2015, however the deeper samples at the downgradient locations could not be collected due to frozen conditions; two soil samples (shallow and deep) were collected at the upgradient location, DM-07. Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-09 (shallow sample), located downgradient of the east side of the landfill, however, the concentrations observed in 2015 do not represent an overall increase from 2014. At DM-07, DM-08 and DM-10, the majority of metals concentrations were slightly higher than or similar to previous monitoring results. No exceedances of the baseline concentrations plus 3σ were reported in 2015.

A concentration of PHC F3 fraction above the baseline concentration (10 mg/kg) was noted in the shallow sample at DM-08, at an average concentration of 11 mg/kg, however, the average TPH concentration (16 mg/kg) was well below the baseline concentration of 101 mg/kg. No detectable concentrations of PCB were noted in any of the samples in 2015.

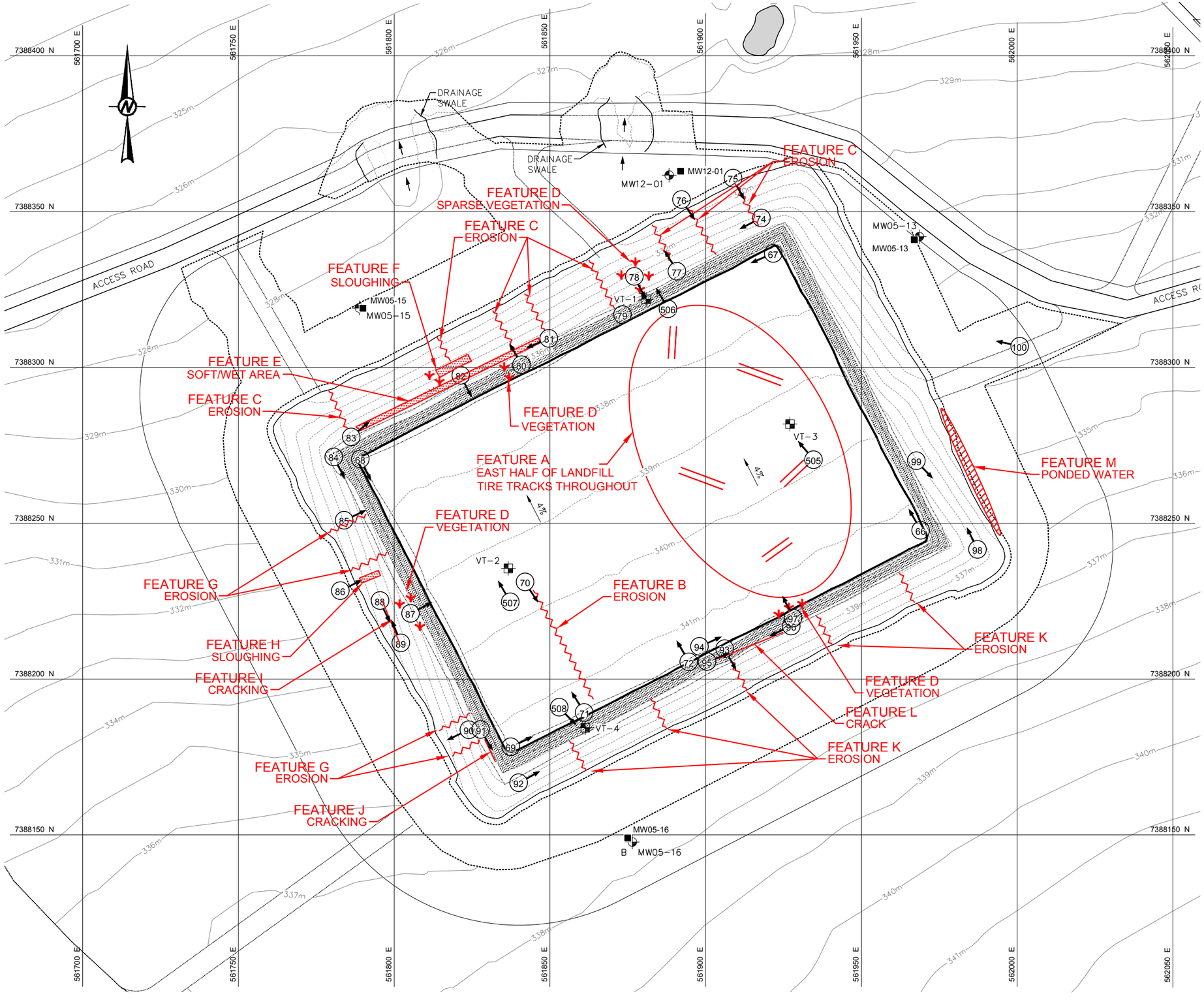
4.1.6 Recommendations for Lower Site NWS Landfill

No modifications to the ongoing monitoring program at this landfill are recommended.

4.2 Lower Site Tier II Disposal Facility

4.2.1 Landfill Description

The Lower Site (LS) Tier II Disposal Facility is located northwest of the crossroad area, beside the road to the Lower site NWS Landfill. The facility was designed to contain contaminated soil exceeding Tier II criteria excavated from the Lower Site and has an area of approximately 29,100 m^2. The design of this facility was based on the characteristics of the contaminants in the soil, the geothermal properties of the area, and the local permafrost regime. Permafrost provides the primary containment barrier: both the Tier II-contaminated soil in the facility and the wet, silty gravel perimeter berms were designed to be continuously frozen. The monitoring program at the Tier II Disposal Facility consists of visual inspection of physical features, soil and groundwater sampling, as well as collection of thermal data. Approximate locations of the four monitoring wells installed are provided in Figure DYE-M.3.



LEGEND:

- CRACKING (NTS)
- EROSION (NTS)
- SEEPAGE / PONDING(NTS)
- WET/SOFT/SLOUGHING (NTS)
- VEGETATION (NTS)
- TIRE TRACKS (NTS)
- SOIL SAMPLING LOCATION
- PHOTOGRAAPH LOCATION
- BODY OF WATER
- MONITORING WELL LOCATION BACKGROUND
- MONITORING WELL LOCATION
- VERTICAL GROUND TEMPERATURE CABLE LOCATION
- KEY TRENCH

NOTE
GRID PROJECTION IS NAD83 ZONE 20N. ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

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CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
LOWER SITE TIER II DISPOSAL FACILITY

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
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4.2.2 Summary of any Scope Deviations

The field work was conducted as per the TOR, with the following exception:

- PCB could not be analyzed from the groundwater sample at MW05-15 due to insufficient recovery of water from the well.

4.2.3 Visual Inspection

The Lower Site Tier II Disposal Facility has multiple locations with observed erosion, cracking, sloughing, wet and ponded water areas and sparse vegetation features. Table 4-5 presents a summary of observed visual inspection features and Table 4-6 presents the Preliminary Stability Assessment results. This landfill was assessed to have a “Marginal” overall landfill performance because some observed features were assessed as “Marginal.” Table 4-7 is a log of photographs taken during the 2015 visual inspection.

No significant features were observed in the previous inspection reports, but physical performance of this landfill appears to be deteriorating slightly with time as there is an increase in the amount of self-armouring erosion (Features B, C, G and K), sloughing (Features F and H) and cracking (Features I, J and L) on the slopes. In addition, there is a wet/soft area (Feature E) on the northwest slope with no signs of seepage. However, these features do not appear to have had an impact on landfill stability to date.

Areas of sparse vegetation were also observed on the slopes (Feature D) and isolated ponded water (Feature M) was observed at the toe of the northeast slope. Tire tracks were observed (Feature A, previously noted as soft area) on the cover surface of landfill. All thermistors were intact and functional.

Table 4-5: Visual Inspection Checklist – Lower Site Tier II Disposal Facility

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Lower Site Tier II Disposal Facility
DATE OF INSPECTION: August 13, 2015
DATE OF PREVIOUS INSPECTION: August 14, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-5: Visual Inspection Checklist – Lower Site Tier II Disposal Facility

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	Y	Feature B	Cover surface	561842	7388231	45	0.15	0.05	0.02%	Minor self-armouring erosion (Acceptable)	New Feature	70
		Feature C	Along the North slope	561920	7388343	150	20	0.1	10.31%	Self-armouring erosion (each 20 m x 0.3-0.4 m) (Marginal)	New Feature	75, 76, 77, 78, and 79
		Feature G	West slope	561824	7388184	25	15	0.1	1.29%	Self-armouring erosion (each 15 m x 0.3-0.4 m) (Marginal)	New Feature	85 and 90
		Feature K	South slope	561906	7388210	150	15	0.1	7.73%	Self-armouring erosion (each 15 m x 0.3-0.4 m) (Marginal)	New Feature	92, 93 and 94
Lateral Movement	N											
Frost Action	N											
Sloughing	Y	Feature F	North slope	561821	7388297	2	1	0.2	0.01%	Sloughing, wet no sign of seepage (Marginal)	New Feature	82
		Feature H	West slope	561797	7388235	2	2	0.3	0.01%	Minor sloughing - wet no sign of seepage (Marginal)	New Feature	86
Cracking	Y	Feature I	Along West slope near toe	561802	7388212	14	0.02	-	0.001%	Minor crack (Acceptable)	New Feature	88 and 89
		Feature J	Near crest on West slope	561828	7388184	8	0.02	-	0.001%	Minor crack (Acceptable)	New Feature	91
		Feature L	South slope near crest	561900	7388206	28	0.05	-	0.005%	Minor crack (Acceptable)	New Feature	94, 95, and 96

Table 4-5: Visual Inspection Checklist – Lower Site Tier II Disposal Facility

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Animal Burrows	N											
Vegetation	Y	Feature D	North slope	561,877	7,388,329	1	1	-	0.003%	Sparse vegetation	New Feature	78 and 80
		Feature D	West slope	561805	7388221	2	1	-	0.007%	Sparse vegetation	New Feature	87
		Feature D	South slope	561928	7388220	2	0.5	-	0.003%	Sparse vegetation	New Feature	97
Staining	N											
Vegetation Stress	N											
Seepage or Ponded Water	Y	Feature M	East toe	561968	7388270	45	1	-	0.15%	Ponded water (Acceptable)	New Feature	98 and 99
		Feature E	Middle of north slope	561786.2057	7388277.692	70	2	-	0.48%	Wet and soft area - no signs of seepage (Acceptable)	New Feature	81 and 83
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	Y	VT1, 2, 3, 4, BL								Thermistors intact and functional		505-507
Features of Note / Other Observations	Y	Feature A	Cover surface			100	60	-	16.18%	Tire tracks in a soft area over east half of landfill crest surface (Acceptable)	Unchanged since previous observation	-

Landfill Area = 29,105 m^2.

Table 4-6: Preliminary Stability Assessment – Lower Site Tier II Disposal Facility

Feature	Severity Rating	Extent
Settlement	Acceptable	N/A
Erosion	Marginal	Occasional
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Marginal	Occasional
Cracking	Acceptable	Isolated
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	Isolated
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	Isolated
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	N/A
Overall Landfill Performance	**Marginal**	

Table 4-7: Summary Table of Photographic Log – Lower Site Tier II Disposal Facility

Photo	Description (file name)	Easting	Northing	Date
66	East crest surface, facing north (ATT176_Photo1.jpg)	561968.9951	7388247.737	13-Aug-15
67	North crest surface, facing west (ATT177_Photo1.jpg)	561921.705	7388336.55	13-Aug-15
68	West crest surface, facing south (ATT180_Photo1.jpg)	561789.1196	7388270.584	13-Aug-15
69	South crest surface, facing east (ATT181_Photo1.jpg)	561837.4307	7388178.242	13-Aug-15
70	Feature B, minor self-armouring erosion, facing south from the north end point (ATT183_Photo1.jpg)	561842.0157	7388231.179	13-Aug-15
71	Cover surface, facing north from south crest edge (west half) (ATT185_Photo1.jpg)	561860.969	7388189.268	13-Aug-15
72	Cover surface, facing north from south crest edge (east half) (ATT186_Photo1.jpg)	561894.561	7388205.538	13-Aug-15
73	Overview north and west slopes, from VT background facing east (ATT188_Photo1.jpg)	561634.6524	7388228.668	13-Aug-15
74	North slope and toe, facing west (ATT203_Photo2.jpg)	561918.7959	7388343.101	13-Aug-15
75	Feature C, self-armouring erosion on north slope (ATT204_Photo2.jpg)	561920.2959	7388342.744	13-Aug-15
76	Feature C, self-armouring erosion on north slope and accumulation of fines (ATT205_Photo1.jpg)	561892.2233	7388353.861	13-Aug-15
77	Feature C, self-armouring erosion on north slope and accumulation of fines at toe, facing north (ATT206_Photo1.jpg)	561890.7591	7388330.84	13-Aug-15
78	Feature D, sparse vegetation on north slope, (ATT207_Photo1.jpg)	561877.1166	7388329.196	13-Aug-15
79	Feature C, self-armouring erosion on north slope, facing north from crest edge (ATT208_Photo1.jpg)	561873.2772	7388316.919	13-Aug-15
80	Feature C, self-armouring erosion on north slope, facing north from crest (ATT209_Photo1.jpg)	561840.8483	7388300.88	13-Aug-15

Table 4-7: Summary Table of Photographic Log – Lower Site Tier II Disposal Facility

Photo	Description (file name)	Easting	Northing	Date
81	Feature E, wet and soft area in the middle of north slope, facing west from east end – No signs of seepage only wet (ATT210_Photo1.jpg)	561849.6264	7388309.328	13-Aug-15
82	Feature F, sloughing on north slope, wet no sign of seepage, facing the slope (ATT211_Photo1.jpg)	561821.3661	7388297.453	13-Aug-15
83	Feature E, wet and soft area in the middle of north slope, facing east from west end – no signs of seepage (ATT212_Photo1.jpg)	561786.2057	7388277.692	13-Aug-15
84	West slope and toe, facing south (ATT213_Photo1.jpg)	561780.5949	7388271.286	13-Aug-15
85	Feature G, self-armouring erosion along west slope (ATT214_Photo1.jpg)	561783.9294	7388250.973	13-Aug-15
86	Feature H, minor sloughing on west slope, no sign of seepage (ATT215_Photo1.jpg)	561797.2445	7388234.898	13-Aug-15
87	Feature D, sparse vegetation on west slope, facing slope (ATT216_Photo1.jpg)	561805.2425	7388221.083	13-Aug-15
88	Feature I, minor crack along west slope near toe, facing south from north endpoint (ATT218_Photo2.jpg)	561795.4378	7388225.176	13-Aug-15
89	Feature I, minor crack on west slope near toe, facing north from south endpoint (ATT219_Photo1.jpg)	561802.116	7388211.591	13-Aug-15
90	Feature G, self-armouring erosion, west slope facing down from slope (ATT220_Photo1.jpg)	561823.9979	7388183.702	13-Aug-15
91	Feature J, minor crack near crest on west slope, facing south from north endpoint (ATT221_Photo2.jpg)	561827.748	7388183.805	13-Aug-15
92	South slope and toe, facing east from SW corner – Feature K, frequent self-armouring erosion along south slope (ATT222_Photo1.jpg)	561839.9634	7388166.72	13-Aug-15
93	Feature K, self-armouring erosion on south slope, facing down from south crest edge (ATT223_Photo1.jpg)	561906.1156	7388209.736	13-Aug-15
94	Feature L, minor crack on south slope near crest, facing east from west endpoint (ATT224_Photo1.jpg)	561900.4394	7388205.595	13-Aug-15
95	Feature L, minor crack on south slope near crest – good coarse structure beneath the crack (ATT225_Photo2.jpg)	561900.4394	7388205.595	13-Aug-15
96	Feature L, minor crack on south slope near crest, facing west from east endpoint (ATT226_Photo1.jpg)	561927.4995	7388216.998	13-Aug-15
97	Feature D, sparse vegetation on south slope, facing north (ATT227_Photo1.jpg)	561928.0762	7388219.613	13-Aug-15
98	Feature M, ponded water at east toe, facing north (ATT228_Photo1.jpg)	561987.2519	7388241.586	13-Aug-15
99	Feature M, ponded water at east toe, facing south (ATT229_Photo1.jpg)	561967.6522	7388270.082	13-Aug-15
100	East slope, facing west (ATT230_Photo1.jpg)	562000.7841	7388306.804	13-Aug-15
505	Thermistor VT3 – Lower Site – Tier II Disposal Facility	561927.6313	7388281.692	13-Aug-15
506	Thermistor VT1 – Lower Site – Tier II Disposal Facility	561882.2619	7388323.383	13-Aug-15
507	Thermistor VT2 – Lower Site – Tier II Disposal Facility	561838.4898	7388237.902	13-Aug-15
508	Thermistor VT4 – Lower Site – Tier II Disposal Facility	561859.7673	7388188.832	13-Aug-15
509	Thermistor VTBL – Lower Site – Tier II Disposal Facility	561635.2373	7388228.606	13-Aug-15

4.2.4 Thermal Monitoring

Thermistor dataloggers VT1, VT2, VT3, VT4, VTBL located at the Lower Site Tier II Disposal Facility were downloaded using Lakewoods Systems Ltd. Prolog software and a laptop computer. Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

4.2.5 Soil Sampling

Table 4-8 presents a summary of analytical results for soil samples collected at the Lower Site Tier II Disposal Facility. MW05-16 represents an upgradient sampling location, whereas MW05-13, MW05-15 and MW12-01 represent downgradient sampling locations.

MW05-16

Sampling location MW05-16 is located upgradient of the landfill, approximately 20 m south of the toe. The estimated elevation of this sampling point is 337.5 masl. As shown in Photo 468, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of brown sand with some gravel.

The shallow sample at MW05-16 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (34.6 mg/kg), zinc (51 mg/kg) and chromium (88.1 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of nickel (41.5 mg/kg), cobalt (12.4 mg/kg) and arsenic (1.6 mg/kg) exceeded their background and baseline concentrations. The concentrations of most metals were higher than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW05-16 in 2015.

The deep sample at MW05-16 (40-50 cm) exhibited elevated concentrations of metals, at similar concentrations to those in the shallow sample. The concentrations of copper (33.1 mg/kg), zinc (52 mg/kg) and chromium (90.7 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of nickel (41.3 mg/kg), cobalt (13.2 mg/kg) and arsenic (1.4 mg/kg) exceeded their background and baseline concentrations. Elevated metal concentrations were observed in 2014 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW05-16 in 2015.

MW05-13

Sampling location MW05-13 is located downgradient of the landfill, approximately 17 m east of the toe. The estimated elevation of this sampling point is 331.5 masl. As shown in Photo 462, the area consists of sand and gravel with some rocks and boulders and is sparsely vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at MW05-13 (0-15 cm), the concentration of arsenic (1.3 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations but was less than the baseline concentration plus 3σ (2.7 mg/kg). The concentrations of all metals, including arsenic (0.9 mg/kg), were higher than those reported in 2014. No PHC or PCB were detected from the shallow sample at MW05-13 in 2015.

The results of the deep sample at MW05-13 (20-30 cm) indicated that all parameters were less than the background and baseline values. Most metal concentrations were slightly higher than those reported in 2014. No PHC or PCB were detected from the deep sample at MW05-13 in 2015.

MW05-15

Sampling location MW05-15 is located downgradient of the landfill, approximately 17 m north of the toe. The estimated elevation of this sampling point is 328.5 masl. As shown in Photo 465, the area consists of sand and gravel with some rocks and is sparsely vegetated. The soils consisted of brown sand with some gravel.

A duplicate sample was collected at the shallow MW05-15 (0-15 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicate the original and duplicate sample results differ by less than 18% for all parameters, with the exception of the arsenic, for which the results differed by approximately 52%.

The shallow samples at MW05-15 (0-15 cm) exhibited elevated concentrations of metals. The average concentrations of copper (39 mg/kg), zinc (61 mg/kg) and chromium (93 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the average concentrations of nickel (48 mg/kg) and cobalt (13.9 mg/kg) exceeded their background and baseline concentrations. The concentrations of most metals were higher than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW05-15 in 2015.

The deep sample at MW05-15 (30-40 cm) exhibited elevated concentrations of metals, at generally lower concentrations than those in the shallow sample. The concentrations of copper (34.1 mg/kg), zinc (53.3 mg/kg) and chromium (88.9 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of nickel (42.5 mg/kg), cobalt (13.2 mg/kg) and arsenic (1.6 mg/kg) exceeded their background and baseline concentrations. The concentrations of most metals were higher than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW05-15 in 2015.

MW12-01

Sampling location MW12-01 is located downgradient of the landfill, approximately 7 m north of the toe. The estimated elevation of this sampling point is 328.5 masl. As shown in Photo 498, the area is largely covered with sand and gravel, with some boulders and sparse vegetation. The soils consisted of wet brown sand with stone.

In the shallow sample at MW12-01 (0-15 cm), the concentration of arsenic (1.5 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations but was less than the baseline concentration plus 3σ (2.7 mg/kg). The concentrations of all metals, including arsenic (0.98mg/kg in 2014), were higher than those reported in 2014. No PHC or PCB were detected from the shallow sample at MW12-01 in 2015.

In the deep sample at MW12-01 (20-30 cm), the concentration of arsenic (1 mg/kg) was equal to the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentration of arsenic was lower than the concentration reported in 2014 (1.2 mg/kg). Most other metal concentrations were similar to those than those reported in 2014. No PHC or PCB were detected from the deep sample at MW12-01 in 2015.

Table 4-8: Soil Chemical Analysis Results – Lower Site Tier II Disposal Facility

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		43	38	12	1.0	10	84	94	1.0	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**28**	**38**	**12**	**1.0**	**10**	**47**	**72**	**1.0**	**0.10**	**0.050**	**10**	**4**	**15**	**NA**
Baseline + 3σ		52	64	20	1.0	10	79	120	2.7	0.10	0.086	10	18	55	NA
Upgradient															
MW05-16 (0-15)	0-15	**34.6**	**41.5**	**12.4**	<0.5	5.5	**51**	**88.1**	**1.6**	<0.1	<0.05	<7	<4	<8	<6
MW05-16 (40-50)	40-50	**33.1**	**41.3**	**13.2**	<0.5	5.4	**52**	**90.7**	**1.4**	<0.1	<0.05	<7	<4	<8	<6
Downgradient															
MW05-13 (0-15)	0-15	21.8	33.7	8.9	<0.5	3.7	35.9	60.4	**1.3**	<0.1	<0.05	<7	<4	<8	<6
MW05-13 (20-30)	20-30	20.8	30.7	8.6	<0.5	3.5	33.6	56.3	<1	<0.1	<0.05	<7	<4	<8	<6
MW05-15 (0-15)	0-15	**35.5**	**44.8**	**14.1**	<0.5	4.9	**55.2**	**92.8**	**1.7**	<0.1	<0.05	<7	<4	<8	<6
MW05-15 (0-15) (Duplicate)	0-15	**43**	**51**	**13.7**	<0.5	5	**66**	**94**	1	<0.10	<0.05	<5	<4	<8	<6
MW05-15 (0-15) (Dup Avg)	0-15	**39**	**48**	**13.9**	<0.5	5	**61**	**93**	1	<0.1	<0.05	<6	<4	<8	<6
MW05-15 (30-40)	30-40	**34.1**	**42.5**	**13.2**	<0.5	5.2	**53.3**	**88.9**	**1.6**	<0.1	<0.05	<7	<4	<8	<6
MW12-01 (0-15)	0-15	**27.7**	32.8	9.6	<0.5	4.4	42	69	**1.5**	<0.1	<0.05	<7	<4	<8	<6
MW12-01 (20-30)	20-30	27.5	32.3	10	<0.5	4.7	42	70.5	1	<0.1	<0.05	<7	<4	<8	<6

Notes:

NA: Not available. ID: Soil sample location ID. Underlined values: Results exceed Background arithmetic mean. **Bold Values**: Results exceed Baseline arithmetic mean.

4.2.6 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-9 presents a summary of groundwater levels and analytical results for groundwater samples collected at the Lower Site Tier II Disposal Facility.

MW05-16

The depth to groundwater measured at MW05-16 in 2015 was 0.80 m below grade. The concentration of zinc (4.96 mg/L) exceeded the baseline concentration (3.1 mg/L) but was less than the baseline concentration plus 3σ (15 mg/L). No sample was collected at MW05-16 in 2014. No PHC or PCB were detected in the groundwater sample collected at MW05-16 in 2015.

MW05-13

A duplicate sample was collected at MW05-13 sample location, and therefore the average concentrations are discussed relative to baseline values. The calculated RPD values indicate the original and duplicate sample results differ by less than 3% for all parameters, with the exception of the nickel, for which the results differed by approximately 40%.

The depth to groundwater measured at MW05-13 in 2015 was 0.67 m below grade. The groundwater results at MW05-13 indicated all parameters were less than the baseline values. No sample was collected at MW05-13 in 2014. No PHC or PCB were detected in the groundwater samples collected at MW05-13 in 2015.

MW05-15

The depth to groundwater measured at MW05-15 in 2015 was 1.08 m below grade. The concentration of zinc (18.7 mg/L) exceeded the baseline concentration (3.1 mg/L) and also exceeded the baseline concentration plus 3σ (15 mg/L). No sample was collected at MW05-15 in 2014. No PHC were detected in the groundwater sample collected at MW05-15 in 2015. PCB could not be analyzed from the groundwater sample at MW05-15 due to insufficient recovery of water from the well.

MW12-01

The depth to groundwater measured at MW12-01 in 2015 was 0.57 m below grade. The groundwater results at MW12-01 indicated all parameters were less than the baseline values. The concentrations of all detected metals were greater than those observed in 2014. No PHC or PCB were detected in the groundwater sample collected at MW12-01 in 2015.

Table 4-9: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Lower Site Tier II Disposal Facility

ID	GW Depth BGS (m)	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F4 (mg/L)
Baseline Mean		**0.07**	**0.19**	**0.017**	**0.001**	**0.010**	**3.1**	**0.30**	**0.003**	**0.0004**	**0.003**	**0.050**	**0.50**	**1.0**	**NA**
Baseline + 3σ		0.23	0.52	0.057	0.0019	0.027	15	0.94	0.0058	0.0004	0.0049	0.050	0.50	1.0	NA
Upgradient															
MW05-16	0.80	0.0013	0.002	<0.0005	<0.0001	0.002	**4.96**	<0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
Downgradient															
MW05-13	0.67	<0.0005	0.002	<0.0005	<0.0001	0.0007	2.84	0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
MW05-13 (Duplicate)	0.67	0.002	0.003	<0.001	0.0017	<0.001	2.9	<0.002	<0.001	<0.000016	<0.00005	<0.025	<0.1	<0.1	<0.1
MW05-13 (Dup Avg)	0.67	0.001	0.003	<0.001	0.001	0.001	2.9	0.002	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
MW05-15	1.08	0.0017	0.01	0.0012	0.0001	0.0022	**18.7**	<0.001	<0.001	<0.0001	NA [1]	<0.025	<0.1	<0.1	<0.1
MW12-01	0.57	0.0005	0.02	0.0018	<0.0001	<0.0001	0.018	<0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1

Notes:
ID: Monitoring well location ID.
GW: Groundwater.
BGS: Below ground surface.
NA: Not Available.
Bold Values: Results exceed Baseline arithmetic mean.
1: PCB could not be analyzed from the groundwater sample at MW05-15 due to insufficient recovery of water.

4.2.7 Conclusions and Overall Performance of the Lower Site Tier II Disposal Facility

Based on the visual inspection, there does not appear to be any significant settlement, exposed waste or indications of instability at the Lower Site Tier II Disposal Facility. However, in 2015 there was an increase in the amount of observed self-armouring erosion, cracking and sloughing on the landfill slopes resulting in the overall stability performance being assessed as Marginal.

Soil samples were collected at all designated locations in 2015; two soil samples were collected at all four sampling locations. Concentrations of copper, nickel, cobalt, zinc, chromium and arsenic were detected above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location MW05-15 (shallow sample), located downgradient of the north side of the landfill, however, similar elevated metal concentrations were also observed upgradient at MW05-16. The metal concentrations observed at these locations in 2015 were generally higher than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the soil samples in 2015.

In 2015, groundwater samples were collected from all four monitoring wells adjacent to the landfill. Exceedances of the baseline values were reported for zinc at MW05-16 and MW05-15. The concentration of zinc at MW05-15 also exceeded the baseline concentration plus 3σ. Groundwater samples were not collected at these locations in 2014. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

Comparison of groundwater elevations based on estimated grade elevation and the measured water depth in the wells indicates that groundwater was higher at MW05-16, and lower towards the south at MW05-13, MW05-15 and MW12-01, which follows the topography in the area.

Based on the monitoring results, there does not appear to be significant impact to groundwater quality from the landfill at the monitoring well locations. The elevated concentrations of zinc observed in the groundwater sample collected from MW05-15 may be reflective of an ongoing impact from the landfill.

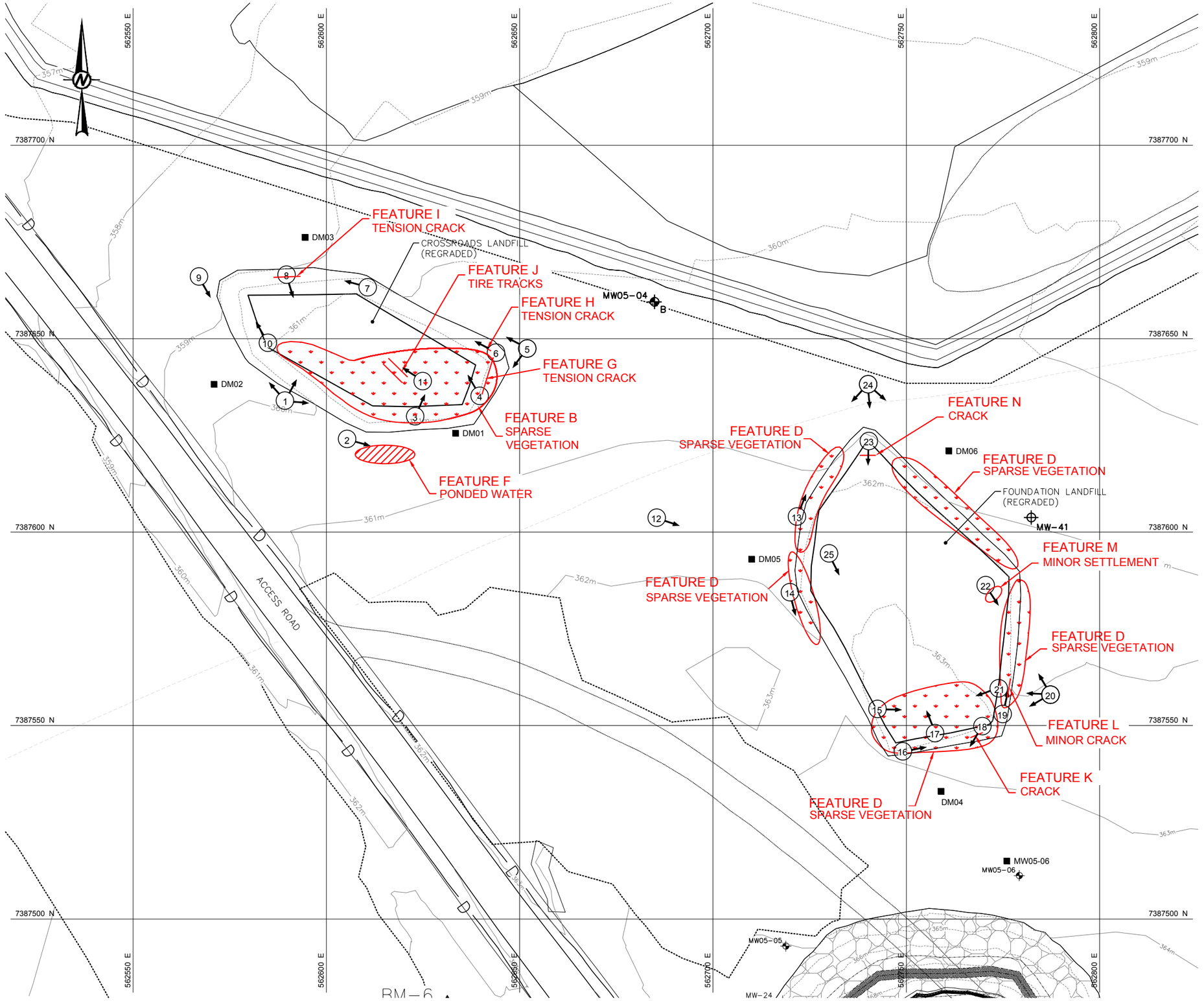
4.2.8 Recommendations for Lower Site Tier II Disposal Facility

No modifications to the ongoing monitoring program at this landfill are recommended.

4.3 Lower Site Crossroads Landfill

4.3.1 Landfill Description

The Lower Site Crossroads Landfill was created during DEW Line operations. The landfill is located Northwest of the lower camp hangar, southeast of the landfarm and east of the Lower Site access road. The area has moderate (<50%) vegetation cover. The area is underlain by sand and gravel to frozen ground (ESG 2002a). The landfill was regraded in 2007 as part of the DEW Line remediation program and has an area about 2,140 m^2. Approximate soil sampling locations for the Lower Site Crossroads Landfill are provided in Figure DYE-M.4.



LEGEND:

- CRACKING (NTS)
- SEEPAGE / PONDING(NTS)
- SETTLEMENT (NTS)
- VEGETATION (NTS)
- TIRE TRACKS (NTS)
- SOIL SAMPLING LOCATION
- PHOTOGRAAPH LOCATION
- BODY OF WATER
- MONITORING WELL LOCATION BACKGROUND
- MONITORING WELL LOCATION
- TYPE 1 GRANULAR A
- KEY TRENCH

NOTE
GRID PROJECTION IS NAD83 ZONE 20N. ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 25 50
1:1,000 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
CROSSROADS AND FOUNDATION LANDFILLS

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm
0

Path: \\golder.gds\gal\Mississauga\SIM\Client\Public_Works_Canada\Canada\99_PROJ\1530908_PWGSC_Dew_Line_Mon_Program_2015_2016\40_PROD\0001_DYE_M_Field_Summary_Report\ | File Name: 1530908-0001-BG-0015.dwg

4.3.2 Summary of any Scope Deviations

The field work was conducted as per the TOR. There were no notable exceptions to the scope of work.

4.3.3 Visual Inspection

The Lower Site Crossroads Landfill has locations with observed cracking, sparse vegetation and ponded water features. Table 4-10 presents a summary of observed visual inspection features and Table 4-11 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-12 is a log of photographs taken during the 2015 visual inspection.

The occasional minor tension cracks observed near the southwest corner on the side slope (Feature A) in the previous inspection report were not observed in 2015. However, new occasional minor tension cracks were observed on the southeast (Feature G), northeast (Feature H) and north slopes (Feature I). As previously noted, sparse vegetation (Feature B) was also observed on the landfill surface along with tire tracks. Newly observed ponded water is located at the south toe of the landfill (Feature F). These features do not appear to be having an impact on landfill stability.

Table 4-10: Visual Inspection Checklist – Lower Site Crossroads Landfill

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Lower Site Crossroads Landfill
DATE OF INSPECTION: August 9, 2015
DATE OF PREVIOUS INSPECTION: August 11, 2014
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-10: Visual Inspection Checklist – Lower Site Crossroads Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	N											
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	Y	Feature A	West slope	-	-	-	-	-	-	Tension crack (Acceptable)	Previously Observed but not observed in 2015	NA
		Feature G	Southeast slope	562640	7387635	10	0.02	-	0.01%	Minor thaw creep tension cracks (Acceptable)	New Feature	4
		Feature H	Northeast slope	562644	7387646	1	0.02	-	0.00%	Minor thaw crack (Acceptable)	New Feature	6
		Feature I	North slope	562590	7387667	7	0.02	-	0.01%	Minor thaw crack (Acceptable)	New Feature	8
Animal Burrows	N											
Vegetation	Y	Feature B	Slopes and crest surface	562623	7387630	40	20	-	37.44%	Sparse grass	Slightly expanded area compared to previous observation	3
Staining	N											

Table 4-10: Visual Inspection Checklist – Lower Site Crossroads Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Vegetation Stress	N											
Seepage or Ponded Water	Y	Feature F	Southwest toe	562605	7387624	15	5	-	3.51%	Ponded water (Acceptable)	New Feature	2
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	Y	Feature J	Crest surface	562625	7387639	5	2	-	0.47%	Weathered tire/dozer tracks (Acceptable)	New Feature	11

Landfill Area = 2,137 m^2.

Table 4-11: Preliminary Stability Assessment – Lower Site Crossroads Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	N/A
Erosion	Acceptable	N/A
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Acceptable	N/A
Cracking	Acceptable	Occasional
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	Isolated
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	Isolated
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	Isolated
Overall Landfill Performance	**Acceptable**	

Table 4-12: Summary Table of Photographic Log – Lower Site Crossroads Landfill

Photo	Description (file name)	Easting	Northing	Date
1	Southwest slope from road (ATT301_Photo1.jpg) (ATT302_Photo2.jpg) (ATT303_Photo3.jpg	562589.2483	7387633.987	9-Aug-2015
2	Feature F, ponded water at southwest toe (ATT304_Photo1.jpg)	562605.3498	7387624.074	9-Aug-2015
3	Feature B, sparse grass on slopes and crest surface (ATT305_Photo1.jpg)	562622.9267	7387629.936	9-Aug-2015
4	Feature G, minor thaw creep tension cracks on southeast slope (ATT306_Photo1.jpg)	562639.6299	7387635.22	9-Aug-2015
5	Side slopes from east end corner (ATT307_Photo1.jpg) (ATT308_Photo2.jpg)	562651.9567	7387647.468	9-Aug-2015
6	Feature H, minor thaw crack on northeast slope (ATT309_Photo1.jpg)	562643.8537	7387646.411	9-Aug-2015
7	North slope, facing northwest (ATT310_Photo1.jpg)	562610.6463	7387663.277	9-Aug-2015
8	Feature I, minor thaw crack on north slope (ATT311_Photo1.jpg)	562589.6712	7387666.556	9-Aug-2015
9	Northwest corner facing southeast (ATT312_Photo1.jpg)	562567.0079	7387666.08	9-Aug-2015
10	Cover surface, facing southeast (ATT313_Photo1.jpg)	562584.8243	7387648.94	9-Aug-2015
11	Crest surface, facing northwest – Feature J, weathered tire/dozer tracks (ATT314_Photo1.jpg)	562624.8777	7387639.049	9-Aug-2015

4.3.4 Soil Sampling

Table 4-13 presents a summary of analytical results for soil samples collected at the Lower Site Crossroads Landfill. DM-01 represents an upgradient sampling location, whereas DM-02 and DM-03 represent downgradient sampling locations.

DM-01

Sampling location DM-01 is located upgradient of the landfill, immediately south of the toe. The estimated elevation of this sampling point is 361 masl. Photo 2 displays ponding of water along the toe of the landfill, approximately 10 m west of the sampling location. As shown in Photo 285, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of wet grey sand with some gravel.

In the shallow sample at DM-01 (0-15 cm), the concentration of arsenic (1.2 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentration of arsenic was equal to the concentration reported in 2014. Most other metal concentrations were slightly lower than those reported in 2014. The PHC F2 fraction concentration (65 mg/kg) and TPH concentration (79 mg/kg) were greater than their baseline concentrations (10 mg/kg and 70 mg/kg, respectively). The PHC F2 fraction concentration also exceeded the baseline concentration plus 3σ (60 mg/kg). In 2014, PHC concentrations were non-detectable. No PHC F4 fraction or PCB were detected from the shallow sample at DM-01 in 2015.

In the deep sample at DM-01 (40-50 cm), the concentration of arsenic (1.3 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations but was less than the baseline concentration plus 3σ (3.4 mg/kg). The concentrations of most metals, including arsenic (3.3 mg/kg in 2014), were less than those reported in 2014. No PHC or PCB were detected from the deep sample at DM-01 in 2015.

DM-02

Sampling location DM-02 is located downgradient of the landfill, approximately 8 m southwest of the toe. The estimated elevation of this sampling point is 359.5 masl. As shown in Photo 286, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of wet grey sand with some gravel.

In the shallow sample at DM-02 (0-15 cm), the concentration of copper (31.7 mg/kg) exceeded the baseline concentration (30 mg/kg), but was less than the background concentration (43 mg/kg). In addition, the concentration of arsenic (1.4 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentrations of most metals, including arsenic (1.6 mg/kg in 2014), were less than the concentrations reported in 2014. The concentration of TPH (41 mg/kg) was less than the baseline concentration (70 mg/kg), however, the PHC F3 fraction concentration of 35 mg/kg exceeded the baseline concentration (22 mg/kg). In 2014, PHC concentrations were non-detectable. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the shallow sample at DM-02 in 2015.

In the deep sample at DM-02 (15-30 cm), the concentration of copper (31.3 mg/kg) exceeded the baseline concentration (30 mg/kg), but was less than the background concentration (43 mg/kg). In addition, the concentration of arsenic (1.3 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentrations of most metals, including copper (42 mg/kg in 2014) and arsenic (1.6 mg/kg in 2014), were less than the concentrations reported in 2014. The PHC F2 fraction concentration of 39 mg/kg, PHC F3 fraction concentration of 57 mg/kg and TPH concentration of 100 mg/kg exceeded their baseline

concentrations. A TPH concentration of 66 mg/kg was reported in 2014. The concentration of PHC F4 fraction in 2015 was 10 mg/kg. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PCB were detected from the deep sample at DM-02 in 2015.

DM-03

Sampling location DM-03 is located downgradient of the landfill, approximately 7 m north of the toe. The estimated elevation of this sampling point is 359 masl. As shown in Photo 287, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of grey sand and gravel.

In the shallow sample at DM-03 (0-15 cm), the concentration of arsenic (1.2 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentration of arsenic was less than the concentration reported in 2014 (1.4 mg/kg), which was similarly the case for all other metals. The average concentration of TPH (47 mg/kg) was less than the baseline concentration (70 mg/kg); however, the PHC F3 fraction concentration of 41 mg/kg exceeded the baseline concentration (22 mg/kg). In 2014, PHC concentrations were non-detectable. The concentration of the PHC F4 fraction in 2015 was 6 mg/kg. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PCB were detected from the shallow sample at DM-03 in 2015.

A duplicate sample was collected at the deep DM-03 (40-50 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicate the original and duplicate sample results differ by less than 27% for all parameters.

In the deep sample at DM-03 (40-50 cm), the average concentration of arsenic (1 mg/kg) was equal to the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentration of arsenic (1.3 mg/kg) in one of the two samples slightly exceeded the baseline and background concentrations. The average concentration of arsenic was slightly higher than the concentration reported in 2014 (0.9 mg/kg). Most other metal concentrations were similar to those reported in 2014. The average concentration of the PHC F4 fraction in 2015 was 6 mg/kg. No PCB were detected from the deep sample at DM-03 in 2015.

Table 4-13: Soil Chemical Analysis Results – Lower Site Crossroads Landfill

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		43	38	12	1.0	10	84	94	1.00	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**30**	**38**	**11**	**1.0**	**10**	**47**	**69**	**1.0**	**0.10**	**0.10**	**5.0**	**10**	**22**	**NA**
Baseline + 3σ		52	61	19	1.0	19	71	106	3.4	0.10	0.16	5.0	60	85	NA
Upgradient															
DM-01 (0-15)	0-15	24.2	30.1	8.2	<0.5	5.1	32.2	53.7	**1.2**	<0.1	<0.05	<7	**65**	10	<6
DM-01 (40-50)	40-50	20.9	29.5	7.9	<0.5	4.2	28.9	51.1	**1.3**	<0.1	<0.05	<7	<4	<8	<6
Downgradient															
DM-02 (0-15)	0-15	**31.7**	35.8	9.9	<0.5	8.1	43.8	67.5	**1.4**	<0.1	<0.05	<7	<4	**35**	<6
DM-02 (15-30)	15-30	**31.3**	34.1	9.1	<0.5	6.1	40	64.7	**1.3**	<0.1	<0.05	<7	**39**	**57**	10
DM-03 (0-15)	0-15	26.6	27.7	7.7	<0.5	3.1	29.4	47.8	**1.2**	<0.1	<0.05	<7	<4	**41**	8
DM-03 (40-50)	40-50	29	28.9	8.1	<0.5	3.9	32	51.1	**1.3**	<0.1	<0.05	<7	<4	**28**	6
DM-03 (40-50) (Duplicate)	40-50	28	29	7.6	<0.5	3	33	48	1	<0.10	<0.05	<5	<4	<8	<6
DM-03 (40-50) (Dup Avg)	40-50	29	29	7.9	<0.5	3	33	50	1	<0.1	<0.05	<6	<4	18	6

Notes:

NA: Not available

Underlined values: Results exceed Background arithmetic mean.

Bold Values: Results exceed Baseline arithmetic mean.

4.3.5 Conclusions and Overall Performance of the Lower Site Crossroads Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site Crossroads Landfill. Some minor tension cracks on the southeast and northeast slopes and ponding of water along the southern toe of the landfill were observed but these features do not appear to be impacting stability of the landfill.

Soil samples were collected at all designated locations in 2015; two soil samples (shallow and deep) were collected at all three sampling locations. Concentrations of copper and arsenic were detected above the background/baseline arithmetic mean in a number of samples. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-02 (shallow sample), located downgradient of the southwest side of the landfill, however, the concentrations observed in 2015 were lower than those reported in 2014. At DM-01 and DM-03, the majority of metals concentrations were less than or similar to previous monitoring results.

TPH concentrations above the baseline concentration of 70 mg/kg were noted in the shallow sample at DM-01 (79 mg/kg) and in the deep sample at DM-02 (100 mg/kg). These TPH concentrations were greater than the TPH concentrations reported in 2014 (maximum of 66 mg/kg in the deep sample at DM-02). The PHC F2 fraction concentration (65 mg/kg) in the shallow sample at DM-01 exceeded the baseline concentration plus 3σ (60 mg/kg). No detectable concentrations of PCB were noted in any of the samples in 2015.

4.3.6 Recommendations for Lower Site Crossroads Landfill

No modifications to the ongoing monitoring program at this landfill are recommended.

4.4 Lower Site Foundation Landfill

4.4.1 Landfill Description

The Lower Site Foundation Landfill was created during DEW Line operations. The landfill is located southeast of the Crossroads Landfill, and north of the Powerhouse Landfill. The landfill covers an area of approximately 3,340 m^2. The ground surface surrounding the landfill has a moderate amount of vegetation (50 to 60%) with poorly defined drainage. The area is underlain by sand and gravel to frozen ground (ESG 2002a). The remediation of this landfill was completed in 2008 and consisted of regrading the surface of the landfill and placement of clean cover material. Approximate soil sampling locations are provided in Figure DYE-M.4.

4.4.2 Summary of any Scope Deviations

The field work was conducted as per the TOR. There were no notable exceptions to the scope of work.

4.4.3 Visual Inspection

The Lower Site Foundation Landfill has locations with observed settlement, cracking and sparse vegetation features. Table 4-14 presents a summary of observed visual inspection features and Table 4-15 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-16 is a log of photographs taken during the 2015 visual inspection.

The occasional minor tension cracks observed near the northwest crest surface in the previous inspection report were not observed in 2015. However, new occasional minor tension cracks were observed on the south crest (Feature K), southeast (Feature L) and north crest corner (Feature N). An isolated area of differential settlement (Feature M) was observed on the cover surface in 2015. Previously observed sparse vegetation (Feature D) was observed on the landfill surface and slopes in 2015. Observed features do not appear to be having an impact on landfill stability. Previously observed exposed debris was not observed in 2015.

Table 4-14: Visual Inspection Checklist – Lower Site Foundation Landfill

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Lower Site Foundation Landfill
DATE OF INSPECTION: August 13, 2015
DATE OF PREVIOUS INSPECTION: August 11, 2014
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-14: Visual Inspection Checklist – Lower Site Foundation Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	Y	Feature M	Cover surface	562770	7387586	3	2	0.1		Minor settlement depression (Acceptable)	New Feature	22
Erosion	N											
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	Y	Feature C	Along northwest crest	-	-	4	0.5	-	0.060%	Minor tension crack (Acceptable)	Previously Observed but not observed in 2015	NA
		Feature K	South crest	562770	7387550	4	0.02	-	0.002%	Minor thaw crack (Acceptable)	New Feature	18
		Feature L	Southeast slope	562775	7387555	10	0.02	-	0.006%	Minor thaw crack (Acceptable)	New Feature	19
		Feature N	North crest corner	562740	7387624	4	0.02	-	0.002%	Minor thaw cracks (Acceptable)	New Feature	23
Animal Burrows	N											
Vegetation	Y	Feature D	Crest at south end and east slope	562743	7387554	30	15	-	13.5%	Moderately vegetated	Unchanged since previous observation	15 to 21
		Feature D	Northwest and west slopes	562720	7387584	50	5	-	7.5%	Moderate grass vegetation	Unchanged since previous observation	13 and 14
Staining	N											
Vegetation Stress	N											

Table 4-14: Visual Inspection Checklist – Lower Site Foundation Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Seepage or Ponded Water	N											
Debris and/or Liner Exposed	Y	Feature E	North crest corner	-	-	-	-		-	Steel debris	Previously Observed but not observed in 2015	NA
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	N											

Landfill Area = 3,340 m^2.

Table 4-15: Preliminary Stability Assessment – Lower Site Foundation Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Isolated
Erosion	Acceptable	N/A
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Acceptable	N/A
Cracking	Acceptable	Occasional
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	Occasional
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	N/A
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	N/A
Overall Landfill Performance	**Acceptable**	

Table 4-16: Summary Table of Photographic Log – Lower Site Foundation Landfill

Photo	Description (file name)	Easting	Northing	Date
12	Southeast view of landfill (ATT315_Photo1.jpg)	562685.4044	7387603.716	13-Aug-2015
13	Northwest slope, facing northeast (Feature D) (ATT316_Photo1.jpg)	562721.7034	7387604.019	13-Aug-2015
14	Feature D, moderate grass vegetation (ATT317_Photo1.jpg)	562719.9004	7387584.483	13-Aug-2015
15	Crest at south end, Feature D, moderately vegetated (ATT318_Photo1.jpg)	562742.5432	7387554.295	13-Aug-2015
16	South slope, facing east (ATT319_Photo1.jpg)	562749.1086	7387543.349	13-Aug-2015
17	Crest surface facing north (Feature D) (ATT320_Photo1.jpg)	562757.4103	7387548.035	13-Aug-2015
18	Feature K, minor thaw crack at south crest (ATT321_Photo1.jpg)	562769.6708	7387549.856	13-Aug-2015
19	Feature L, minor thaw crack on southeast slope (ATT322_Photo1.jpg)	562775.3967	7387554.743	13-Aug-2015
20	East slope, facing west – 3 photo panorama (ATT323_Photo1.jpg) (ATT324_Photo2.jpg) (ATT325_Photo3.jpg)	562787.2701	7387557.986	13-Aug-2015
21	South end crest surface – Feature D, moderately vegetated with grasses (ATT326_Photo1.jpg)	562773.8745	7387559.634	13-Aug-2015
22	Feature M, minor settlement depression (ATT327_Photo1.jpg)	562770.4987	7387586.3	13-Aug-2015
23	Feature N, minor thaw cracks at crest corner (ATT328_Photo1.jpg)	562740.2931	7387623.526	13-Aug-2015
24	Landfill from north end, facing south (ATT329_Photo1.jpg) (ATT330_Photo2.jpg)	562740.1075	7387638.222	13-Aug-2015
25	Crest surface facing south towards hangar – More grass vegetation at south end (Feature D) (ATT331_Photo1.jpg)	562729.9945	7387594.506	13-Aug-2015

4.4.4 Soil Sampling

Table 4-17 presents a summary of analytical results for soil samples collected at the Lower Site Foundation Landfill. DM-04 represents an upgradient sampling location, whereas DM-05 and DM-06 represent downgradient sampling locations.

DM-04

Sampling location DM-04 is located upgradient of the landfill, approximately 9 m south of the toe. The estimated elevation of this sampling point is 363 masl. As shown in Photo 289, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of grey sand with stone.

In the shallow sample at DM-04 (0-15 cm), the concentration of arsenic (1.2 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentration of arsenic was greater than the concentration reported in 2014 (1.0 mg/kg); however, the concentrations of most other metals were less than or similar to those reported in 2014. The TPH concentration (44 mg/kg) was less than the baseline concentration (133 mg/kg); however, the PHC F3 fraction concentration of 38 mg/kg exceeded the baseline concentration (25 mg/kg). In 2014, PHC results were non-detectable. The concentration of the PHC F4 fraction in 2015 was 30 mg/kg. The PCB concentration (0.09 mg/kg) exceeded the background concentration (0.002 mg/kg) but was less than the baseline concentration (0.10 mg/kg). The PCB concentration was higher than the concentration reported in 2014 (0.027 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015.

The results of the deep sample at DM-04 (40-50 cm) indicated that all metal concentrations were less than the background and baseline values. The metals concentrations were similar to those observed in 2014. The TPH concentration (34 mg/kg) was less than the baseline concentration (133 mg/kg), however, the PHC F3 fraction concentration of 28 mg/kg exceeded the baseline concentration (25 mg/kg). In 2014, PHC results were non-detectable. The concentration of the PHC F4 fraction in 2015 was 18 mg/kg. No PCB were detected from the deep sample at DM-04 in 2015.

DM-05

Sampling location DM-05 is located downgradient of the landfill, approximately 9 m west of the toe. The estimated elevation of this sampling point is 362 masl. As shown in Photo 292, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of wet brown sand with some gravel and stone.

In the shallow sample at DM-05 (0-15 cm), the concentration of chromium (67 mg/kg) was equal to the baseline concentration but less than the background concentration (94 mg/kg). In addition, the concentration of arsenic (2.1 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations but was less than the baseline concentration plus 3σ (2.6 mg/kg). Elevated concentrations of metals were observed in 2014 at similar concentrations. No PHC or PCB were detected from the shallow sample at DM-05 in 2015.

The results of the deep sample at DM-05 (40-50 cm) indicated that all parameters were less than the background and baseline values. The concentrations of all metals were lower than those reported in 2014. No PHC or PCB were detected from the deep sample at DM-05 in 2015.

DM-06

Sampling location DM-06 is located downgradient of the landfill, approximately 8 m northeast of the toe. The estimated elevation of this sampling point is 361 masl. As shown in Photo 295, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of brown sand with some gravel and stone.

The shallow sample at DM-06 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (29.7 mg/kg), nickel (36.3 mg/kg), cobalt (11.1 mg/kg) and chromium (71.8 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of arsenic (2.2 mg/kg) exceeded the background (1.0 mg/kg) and baseline (1.0 mg/kg) concentrations. Elevated concentrations of metals were reported in 2014 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-06 in 2015.

In the deep sample at DM-06 (40-50 cm), the concentration of arsenic (1.7 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations but was less than the baseline concentration plus 3σ (2.6 mg/kg). The concentration of arsenic was greater than the concentration reported in 2014 (1.3 mg/kg). The concentrations of all other metals were lower than those reported in 2014. No PHC or PCB were detected from the deep sample at DM-06 in 2015.

Table 4-17: Soil Chemical Analysis Results – Lower Site Foundation Landfill

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		43	38	12	1.0	10	84	94	1.0	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**28**	**35**	**11**	**1.0**	**10**	**61**	**67**	**1.0**	**0.10**	**0.10**	**10**	**4.8**	**25**	**NA**
Baseline + 3σ		67	53	18	1.0	66	179	98	2.6	0.10	0.42	10	14	121	NA
Upgradient															
DM-04 (0-15)	0-15	25.3	31.2	9.3	<0.5	9.1	41.6	61.3	**1.2**	<0.1	0.09	<7	<4	**38**	30
DM-04 (40-50)	40-50	18.5	24.8	7.4	<0.5	6.8	31.4	49.3	<1	<0.1	<0.05	<7	<4	**28**	18
Downgradient															
DM-05 (0-15)	0-15	27.8	34.2	9.9	<0.5	3.6	38.5	67	**2.1**	<0.1	<0.05	<7	<4	<8	<6
DM-05 (40-50)	40-50	17.4	23.6	6.9	<0.5	2.4	24.8	45	<1	<0.1	<0.05	<7	<4	<8	<6
DM-06 (0-15)	0-15	**29.7**	**36.3**	**11.1**	<0.5	4.6	42.4	**71.8**	**2.2**	<0.1	<0.05	<7	<4	<8	<6
DM-06 (40-50)	40-50	27.8	30.8	8.9	<0.5	3.4	38.3	59.3	**1.7**	<0.1	<0.05	<7	<4	<8	<6

Notes:
NA: Not available
Underlined values: Results exceed Background arithmetic mean.
Bold Values: Results exceed Baseline arithmetic mean.

4.4.5 Conclusions and Overall Performance of the Lower Site Foundation Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site Foundation Landfill. Some minor tension cracks and a minor differential settlement area were observed. Overall stability performance for this landfill was assessed as Acceptable.

Soil samples were collected at all designated locations in 2015; two soil samples (shallow and deep) were collected at all three sampling locations. Concentrations of copper, nickel, cobalt, chromium and arsenic were detected above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-06 (shallow sample), located downgradient of the south side of the landfill. The concentrations observed at this location in 2015 were similar to those reported in 2014. At DM-04 and DM-05, the majority of metals concentrations were less than or similar to previous monitoring results. No exceedances of the baseline concentrations plus 3σ were reported in 2015.

PHC concentrations were noted in both samples at DM-04 (maximum TPH concentration of 44 mg/kg in the shallow sample), however, concentrations were below the baseline TPH concentration of 133 mg/kg. These TPH concentrations represent an increase from the TPH concentrations reported in 2014. The PCB concentration (0.09 mg/kg) in the shallow sample at DM-04 exceeded the background concentration (0.002 mg/kg) but was less than the baseline concentration (0.10 mg/kg). The PCB concentration was higher than the concentration reported in 2014. No detectable concentrations of PHC or PCB were noted at DM-05 and DM-06 in 2015.

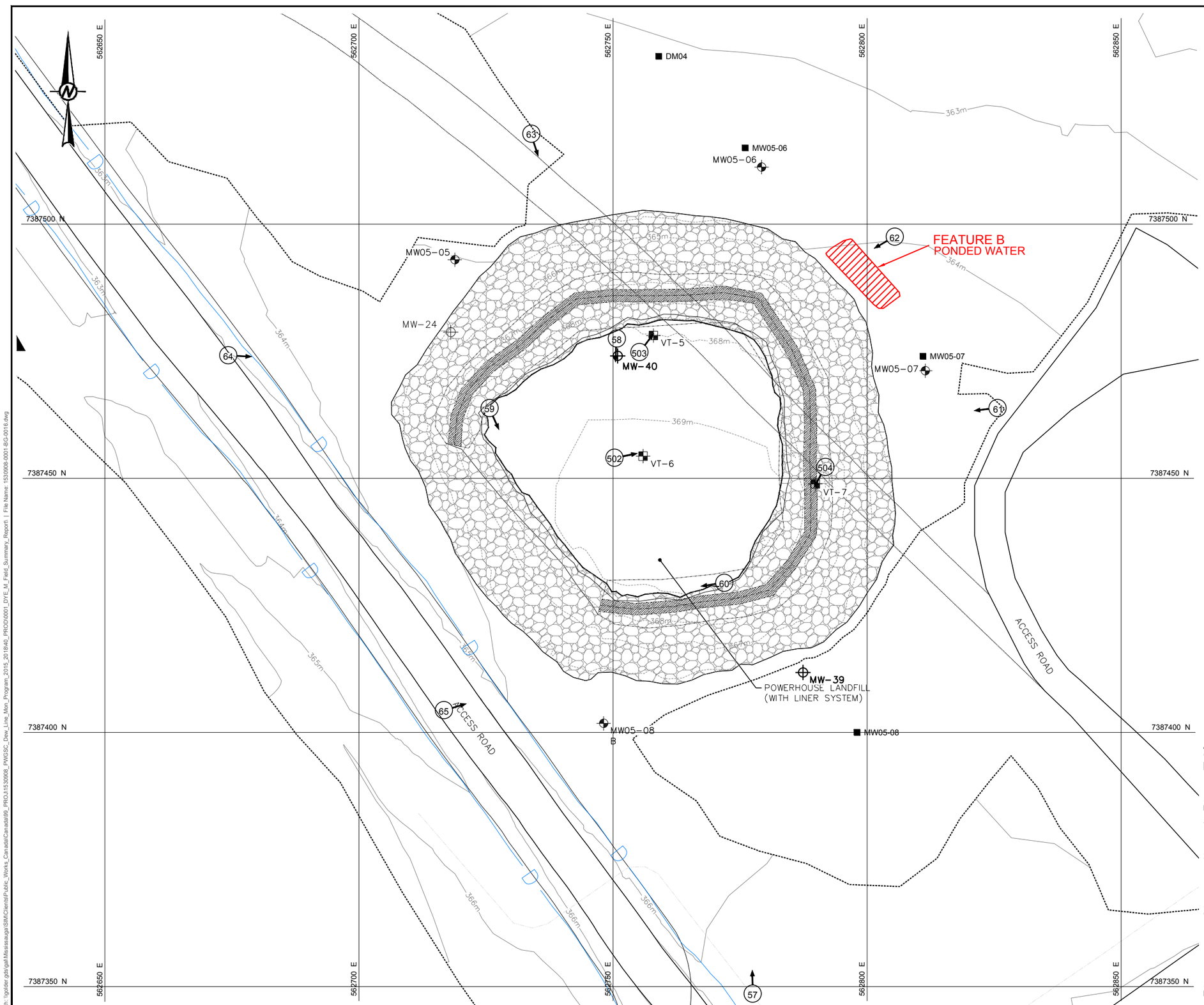
4.4.6 Recommendations for Lower Site Foundation Landfill

No modifications to the ongoing monitoring program at this landfill are recommended.

4.5 Lower Site Powerhouse Landfill

4.5.1 Landfill Description

The Lower Site Powerhouse Landfill was created during DEW Line operations. It is located northwest of the lower camp hangar and southeast of the Foundation Landfill. Soils in the landfill area consist of sand and gravel over frozen ground (ESG 2002a). The remediation of the Powerhouse Landfill consisted of the installation of a leachate containment system and capping of the surface with clean granular material. The landfill has an area approximately 7,000 m^2, including side slopes. Approximate soil and groundwater sampling locations are provided on Figure DYE-M.5.



LEGEND:

- SEEPAGE / PONDING(NTS)
- SOIL SAMPLING LOCATION
- 48 PHOTOGRAPH LOCATION
- BODY OF WATER
- B MONITORING WELL LOCATION BACKGROUND
- MONITORING WELL LOCATION
- VERTICAL GROUND TEMPERATURE CABLE LOCATION
- TYPE 1 GRANULAR A
- KEY TRENCH

NOTE
GRID PROJECTION IS NAD83 ZONE 20N. ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
POWERHOUSE LANDFILL

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada\99_PROJ\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0001_DYE_M_Field_Summary_Report\ | File Name: 1530908-0001-BG-0016.dwg

4.5.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exception:

- The groundwater sample at MW05-07 could not be collected because the groundwater in the well was frozen.

4.5.3 Visual Inspection

The Lower Site Powerhouse Landfill has only one observed feature (Feature B, isolated ponded water at the east toe). Table 4-18 presents a summary of observed visual inspection features and Table 4-19 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because the observed feature was assessed as “Acceptable.” Table 4-20 is a log of photographs taken during the 2015 visual inspection. All thermistors were intact and functional.

Table 4-18: Visual Inspection Checklist – Lower Site Powerhouse Landfill

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Lower Site Powerhouse Landfill
DATE OF INSPECTION: August 9, 2015
DATE OF PREVIOUS INSPECTION: August 12, 2014
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-18: Visual Inspection Checklist – Lower Site Powerhouse Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	N											
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation	N											
Staining	N											
Vegetation Stress	N											
Seepage or Ponded Water	Y	Feature B	East toe	562805	7387498	20	5	-	1.43%	Ponded water at toe (Acceptable)	New Feature	62
Debris and/or Liner Exposed	N	Feature A	East slope	-	-	-	-	-	-	Steel debris	Previously observed but not observed in 2015	
Presence / Condition of Monitoring Instruments	Y	VT5, 6 and 7								Thermistors intact and functional		470, 471 and 472
Features of Note / Other Observations	N											

Landfill Area = 6,996 m^2.

Table 4-19: Preliminary Stability Assessment – Lower Site Powerhouse Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	N/A
Erosion	Acceptable	N/A
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Acceptable	N/A
Cracking	Acceptable	N/A
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	N/A
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	Isolated
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	N/A
Overall Landfill Performance	**Acceptable**	

Table 4-20: Summary Table of Photographic Log – Lower Site Powerhouse Landfill

Photo	Description (file name)	Easting	Northing	Date
57	South slope, facing North (ATT24_Photo1.jpg)	562777.4592	7387348.616	9-Aug-2015
58	Cover surface, facing south (ATT27_Photo1.jpg)	562750.7427	7387477.505	9-Aug-2015
59	Crest edge along west side, facing southeast (hanger) (ATT28_Photo1.jpg)	562725.6881	7387463.817	9-Aug-2015
60	South crest edge, facing west (ATT29_Photo1.jpg)	562771.864	7387429.442	9-Aug-2015
61	East slope (ATT31_Photo1.jpg)	562825.6569	7387463.8	9-Aug-2015
62	Feature B, ponded water at east toe (ATT34_Photo1.jpg)	562805.4148	7387497.516	9-Aug-2015
63	North slope, facing south (ATT35_Photo1.jpg)	562733.9141	7387517.786	9-Aug-2015
64	Northwest slope, facing southeast from toe (ATT37_Photo1.jpg)	562674.2493	7387474.21	9-Aug-2015
65	East crest surface, facing north (ATT176_Photo1.jpg)	562716.6841	7387404.384	9-Aug-2015
502	Thermistor VT6	562755.8033	7387453.108	9 Aug 2015
503	Thermistor VT5	562758.7426	7387478.244	9 Aug 2015
504	Thermistor VT7	562790.8174	7387445.335	9 Aug 2015

4.5.4 Thermal Monitoring

Thermistor dataloggers VT5, VT6 and VT7 located at the Lower Site Powerhouse Landfill were downloaded using Lakewoods Systems Ltd. Prolog software and a laptop computer. Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

4.5.5 Soil Sampling

Table 4-21 presents a summary of analytical results for soil samples collected at the Lower Site Powerhouse Landfill. MW05-08 represents an upgradient sampling location, whereas MW05-05, MW05-06 and MW05-07 represent downgradient sampling locations.

MW05-08

Sampling location MW05-08 is located upgradient of the landfill, approximately 9 m south of the toe. The estimated elevation of this sampling point is 365.5 masl. As shown in Photo 453, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of wet grey sand with stone.

The shallow sample at MW05-08 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (32.9 mg/kg), nickel (34.5 mg/kg) and chromium (68.2 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of lead (17 mg/kg) and arsenic (1.8 mg/kg) exceeded their background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.2 mg/kg, respectively) concentrations. The concentrations of all detected metals were greater than those reported in 2014. The TPH concentration (115 mg/kg) was less than the baseline concentration (194 mg/kg); however, the PHC F3 fraction concentration of 109 mg/kg exceeded the baseline concentration (44 mg/kg). The TPH and PHC F3 fraction concentrations were greater than those reported in 2014. The concentration of the PHC F4 fraction in 2015 was 15 mg/kg. The PCB concentration (0.24 mg/kg) exceeded the background (0.005 mg/kg) and baseline (0.17 mg/kg). The PCB concentration was less than the concentration reported in 2014 (0.46 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015.

The results of the deep sample at MW05-08 (40-50 cm) indicated that all metal concentrations were less than the background and baseline values. The metals concentrations were similar to those observed in 2014. The TPH concentration (65 mg/kg) was less than the baseline concentration (194 mg/kg); however, the PHC F3 fraction concentration of 59 mg/kg exceeded the baseline concentration (44 mg/kg). In 2014, PHC results were non-detectable. No PHC F4 fraction or PCB were detected from the deep sample at MW05-08 in 2015.

MW05-05

Sampling location MW05-05 is located downgradient of the landfill, approximately 6 m northwest of the toe. The estimated elevation of this sampling point is 364 masl. As shown in Photo 447, the area consists of sand and gravel with some rocks and boulders and is sparsely vegetated. The soils consisted of brown sand with gravel and stone.

The shallow sample at MW05-05 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (31.2 mg/kg), nickel (34.2 mg/kg) and chromium (69 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of lead (27.9 mg/kg) exceeded the background (10 mg/kg) and baseline (10 mg/kg) concentrations. The concentrations of all metals were less than those reported in 2014. The PCB concentration (0.09 mg/kg) exceeded the background concentration (0.005 mg/kg) but was less than the baseline concentration (0.17 mg/kg). In 2014, PCB results were non-detectable. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC were detected from the shallow sample at MW05-05 in 2015.

The deep sample at MW05-05 (40-50 cm) exhibited metals at concentrations lower than those in the shallow sample. The concentration of copper (27.2 mg/kg) exceeded the baseline concentration (27 mg/kg) but was less than the background concentration (43 mg/kg). The concentration of arsenic (1.2 mg/kg) exceeded the background concentration (1.0 mg/kg) and was equal to the baseline (1.2 mg/kg). In addition, the concentration of lead (14.4 mg/kg) exceeded the background (10 mg/kg) and baseline (10 mg/kg) concentrations. Elevated metal concentrations were reported in 2014 at similar concentrations. The TPH concentration (110 mg/kg) was less than the baseline concentration (194 mg/kg), however, the PHC F2 fraction concentration of 43 mg/kg and the PHC F3 fraction concentration of 63 mg/kg exceeded their baseline concentrations (32 mg/kg and 44 mg/kg, respectively). In 2014, PHC results were non-detectable. The concentration of the PHC F4 fraction in 2015 was 10 mg/kg. The PCB concentration (0.11 mg/kg) exceeded the background concentration (0.005 mg/kg) but was less than the baseline concentration (0.17 mg/kg). The PCB concentration was greater than the concentration reported in 2014 (0.013 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015.

MW05-06

Sampling location MW05-06 is located downgradient of the landfill, approximately 12 m north of the toe. The estimated elevation of this sampling point is 363.5 masl. As shown in Photo 448, the area consists of sand and gravel with some rocks and boulders and is sparsely vegetated. The soils consisted of brown sand with gravel and stone.

The results of the shallow sample at MW05-06 (0-15 cm) indicated that all parameters were less than the background and baseline values. The concentrations of all metals were lower than those reported in 2014. No PHC or PCB were detected from the shallow sample at MW05-06 in 2015.

The results of the deep sample at MW05-06 (40-50 cm) indicated that all parameters were less than the background and baseline values. The concentrations of all metals were lower than those reported in 2014. No PHC or PCB were detected from the deep sample at MW05-06 in 2015. It should be noted that an elevated TPH concentration of 2064 mg/kg was reported in the deep sample at MW05-06 in 2014.

MW05-07

Sampling location MW05-07 is located downgradient of the landfill, approximately 8 m northeast of the toe. The estimated elevation of this sampling point is 364.5 masl. Photo 62 displays ponding of water along the toe of the landfill, approximately 12 m northwest of the sampling location. As shown in Photo 450, the area consists of sand and gravel with some rocks and is sparsely vegetated. The soils consisted of wet brown sand with some gravel.

The shallow sample at MW05-07 (0-15 cm) exhibited elevated concentrations of metals. The concentration of copper (29.8 mg/kg) exceeded the baseline concentration (27 mg/kg) but were less than the background concentration (43 mg/kg). In addition, the concentration of lead (14.8 mg/kg) and arsenic (2.3 mg/kg) exceeded their background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.2 mg/kg, respectively) concentrations. The concentrations of all metals were greater than those reported in 2014. The TPH concentration (107 mg/kg) was less than the baseline concentration (194 mg/kg); however, the PHC F3 fraction concentration of 101 mg/kg exceeded the baseline concentration (44 mg/kg). In 2014, PHC results were non-detectable. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the shallow sample at MW05-07 in 2015.

The results of the deep sample at MW05-07 (15-30 cm) indicated that all parameters were less than the background and baseline values. The concentrations of all metals were lower than those reported in 2014. No PHC or PCB were detected from the deep sample at MW05-07 in 2015. An elevated TPH concentration of 2,981 mg/kg was reported in the deep sample at MW05-07 in 2014, which may be anomalous based on the 2015 result.

Table 4-21: Soil Chemical Analysis Results – Lower Site Powerhouse Landfill

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		43	38	12	1.0	10	84	94	1.0	0.50	0.005	NA	NA	NA	NA
Baseline Mean		**27**	**34**	**10**	**1.0**	**10**	**55**	**64**	**1.2**	**0.10**	**0.17**	**10**	**32**	**44**	**NA**
Baseline + 3σ		55	62	19	1.0	20	132	104	3.6	0.10	0.78	18	302	156	NA
Upgradient															
MW05-08 (0-15)	0-15	**32.9**	**34.5**	9.3	<0.5	**17**	53.9	**68.2**	**1.8**	<0.1	**0.24**	<7	<4	**109**	15
MW05-08 (40-50)	40-50	25.3	30.7	8.6	<0.5	8.7	39.1	57.3	<1	<0.1	<0.05	<7	<4	**59**	<6
Downgradient															
MW05-05 (0-15)	0-15	**31.2**	**34.2**	9.4	<0.5	**27.9**	53.9	**69**	1	<0.1	0.09	<7	<4	<8	<6
MW05-05 (40-50)	40-50	**27.2**	31.1	8.4	<0.5	**14.4**	43.4	62	1.2	<0.1	0.11	<7	**43**	**63**	10
MW05-06 (0-15)	0-15	15.4	20.4	5.7	<0.5	3	23.4	38.5	<1	<0.1	<0.05	<7	<4	<8	<6
MW05-06 (40-50)	40-50	15.5	21.7	6	<0.5	3	24.2	38.9	<1	<0.1	<0.05	<7	<4	<8	<6
MW05-07 (0-15)	0-15	**29.8**	33.1	9.2	<0.5	**14.8**	48.8	64	**2.3**	<0.1	0.1	<7	<4	**101**	<6
MW05-07 (15-30)	15-30	12.9	18.6	5.1	<0.5	4.3	22.6	34.8	<1	<0.1	<0.05	<7	<4	<8	<6

Notes:
NA: Not available
ID: Soil sample location ID.
Underlined values: Results exceed Background arithmetic mean.
Bold Values: Results exceed Baseline arithmetic mean.

4.5.6 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-22 presents a summary of groundwater levels and analytical results for groundwater samples collected at the Lower Site Powerhouse Landfill. The groundwater sample at MW05-07 could not be collected because the groundwater in the well was frozen.

MW05-08

The depth to groundwater measured at MW05-08 in 2015 was 0.15 m below grade. The concentration of zinc (12.1 mg/L) exceeded the baseline concentration (4.9 mg/L) but was less than the baseline concentration plus 3σ (17 mg/L). No sample was collected at MW05-08 in 2014. No PHC or PCB were detected in the groundwater sample collected at MW05-08 in 2015.

MW05-05

A duplicate sample was collected at MW05-05 sample location, and therefore the average concentrations are discussed relative to baseline values. The calculated RPD values indicate the original and duplicate sample results differ by up to 68% for all parameters, and are typically lower in the duplicate sample. These variations in analytical results are discussed further in Section 5 (below).

The depth to groundwater measured at MW05-05 in 2015 was 0.52 m below grade. The groundwater results at MW05-05 indicated all parameters were less than the baseline values. No sample was collected at MW05-05 in 2014. No PHC or PCB were detected in the groundwater sample collected at MW05-05 in 2015.

MW05-06

The depth to groundwater measured at MW05-06 in 2015 was 0.65 m below grade. The concentration of zinc (15.1 mg/L) exceeded the baseline concentration (4.9 mg/L) but was less than the baseline concentration plus 3σ (17 mg/L). No sample was collected at MW05-06 in 2014. No PHC or PCB were detected in the groundwater sample collected at MW05-06 in 2015.

Table 4-22: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Lower Site Powerhouse Landfill

ID	GW Depth BGS (m)	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F4 (mg/L)
Baseline Mean		**NA**	**NA**	**NA**	**NA**	**NA**	**4.9**	**0.09**	**0.003**	**0.0004**	**0.003**	**0.05**	**0.50**	**1.0**	**NA**
Baseline + 3σ		NA	NA	NA	NA	NA	17	0.18	0.0096	0.00020	0.0032	0.025	0.25	0.50	NA
Upgradient															
MW05-08	0.15	<0.0005	0.016	0.0011	0.0005	0.0006	**12.1**	0.001	<0.001	<0.0001	<0.0001	<0.025	<0.1	<0.1	<0.1
Downgradient															
MW05-05	0.52	0.0061	0.018	0.0026	<0.0005	0.0365	4.79	<0.005	<0.005	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
MW05-05 (Duplicate)	0.52	0.003	0.009	0.001	0.00033	0.022	4.05	<0.002	<0.001	0.000017	<0.00005	<0.025	<0.1	<0.1	<0.1
MW05-05 (Dup Avg)	0.52	0.005	0.014	0.002	0.0004	0.029	4.42	<0.004	<0.003	0.00006	<0.00005	<0.025	<0.1	<0.1	<0.1
MW05-06	0.65	0.0097	0.009	<0.0025	<0.0005	<0.0005	**15.1**	<0.005	<0.005	<0.0001	<0.0001	<0.025	<0.1	<0.1	<0.1
MW05-07 [1]															

Notes:
ID: Monitoring well location ID.
GW: Groundwater.
BGS: Below ground surface.
NA: Not available
Bold Values: Results exceed Baseline arithmetic mean.
1: The groundwater sample at MW05-07 could not be collected because the groundwater in the well was frozen.

4.5.7 Conclusions and Overall Performance of the Lower Site Powerhouse Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site Powerhouse Landfill. Some ponding of water along the east toe of the landfill was observed. Overall stability performance for this landfill was assessed as Acceptable.

Soil samples were collected at all designated locations in 2015; two soil samples were collected at all four sampling locations. Concentrations of copper, nickel, lead chromium and arsenic were detected above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location MW05-08 (shallow sample), located upgradient of the south side of the landfill, and at MW05-05 (shallow sample), located downgradient of the north side of the landfill. The metal concentrations observed at MW05-08 were higher than those reported in 2014; however, the concentrations observed at MW05-05 were well below those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015.

TPH concentrations (maximum of 115 mg/kg in the shallow sample at MW05-08) were detected at concentrations less than the baseline concentration of 194 mg/kg. PCB concentrations (maximum of 0.24 mg/kg in the shallow sample at MW05-08) were detected above the background/baseline arithmetic mean. The PCB concentration at MW05-08 was below the concentration of 0.46 mg/kg in 2014.

In 2015, groundwater samples were collected from three of four monitoring wells adjacent to the landfill. Exceedances of the baseline values were reported for zinc at MW05-06 and MW05-08. Groundwater samples were not collected at these locations in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

Comparison of groundwater elevations based on estimated grade elevation and the measured water depth in the wells indicates that groundwater was higher at MW05-08, and lower towards the south at MW05-05, MW05-05 and MW05-08, which follows the topography in the area.

Based on the monitoring results, there does not appear to be significant impact to groundwater quality from the landfill at the monitoring well locations.

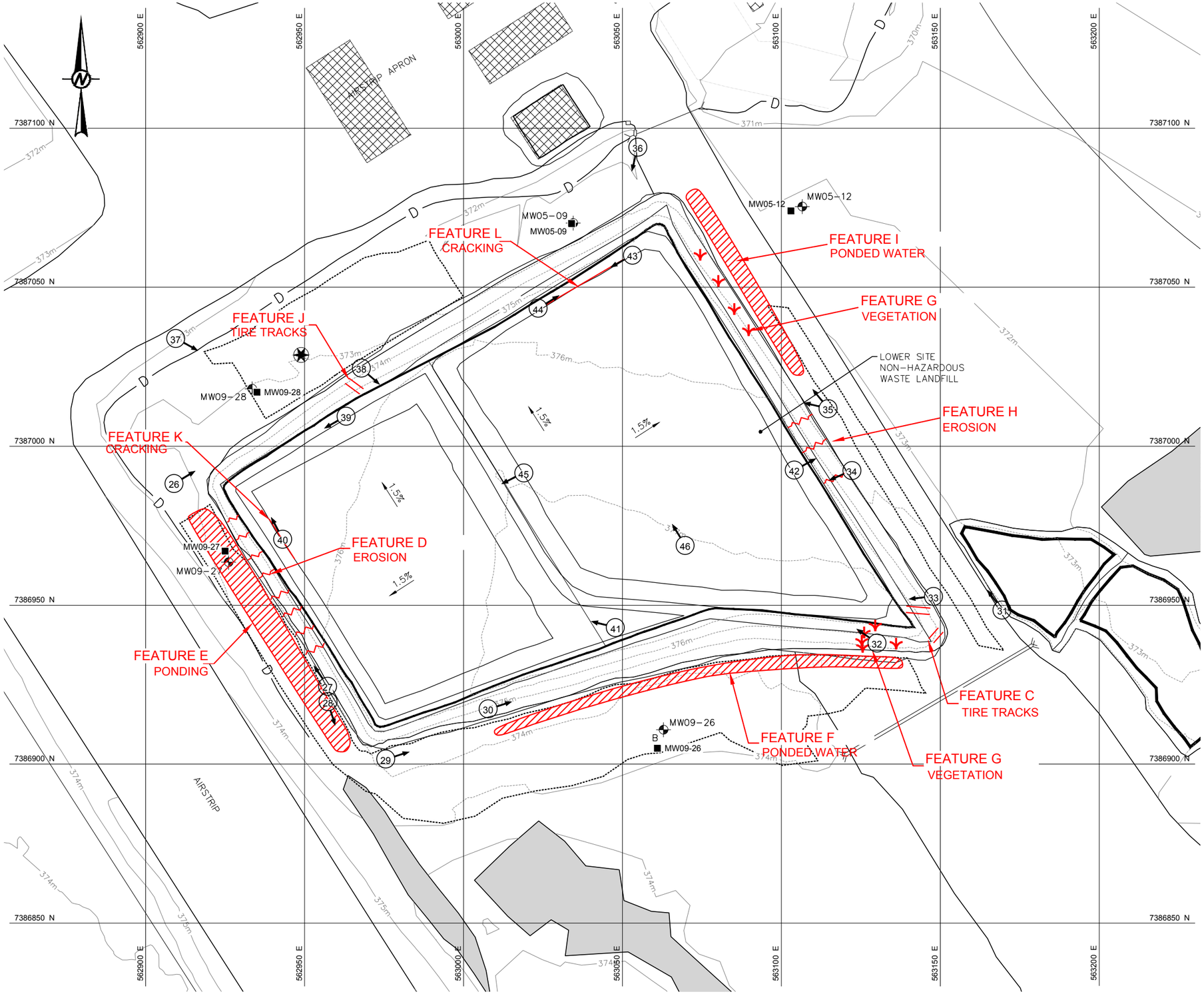
4.5.8 Recommendations for Lower Site Powerhouse Landfill

No modifications to the ongoing monitoring program at this landfill are recommended.

4.6 Lower Site Non-Hazardous Waste Landfill

4.6.1 Landfill Description

The Lower Site Non-Hazardous Waste Landfill (NHWL) was constructed as part of the DEW Line remediation program. The facility was constructed to contain non-hazardous waste generated during decommissioning of the DEW Line installations. The landfill has an area approximately 23,200 m^2. The Lower Site NHWL is located in the southern portion of the Lower Site area, immediately east of the airstrip. Approximate soil and groundwater sampling locations are provided in Figure DYE-M.6.



LEGEND:

- CRACKING (NTS)
- EROSION (NTS)
- SEEPAGE / PONDING(NTS)
- VEGETATION (NTS)
- TIRE TRACKS (NTS)
- SOIL SAMPLING LOCATION
- PHOTOGRAPH LOCATION (48)
- BODY OF WATER
- MONITORING WELL LOCATION BACKGROUND
- MONITORING WELL LOCATION (B)
- APPROXIMATE LOCATION OF COMMEMORATIVE PLAQUE
- DEMOLISHED BUILDING

NOTE
GRID PROJECTION IS NAD83 ZONE 20N. ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 25 50
1:1,250 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
LOWER SITE
NON-HAZARDOUS WASTE LANDFILL

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm
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4.6.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- The deep soil sample at MW09-26 could not be collected due to refusal.
- The groundwater sample at MW05-09 could not be collected because the groundwater in the well was frozen.
- The groundwater sample at MW05-12 could not be collected because the groundwater in the well was dry.
- The groundwater samples at MW09-26 and MW09-27 could not be collected due to an out-of-specification lock (that was too large to be cut with bolt cutters).
- PHC F2-F4 and PCB could not be analyzed from the groundwater sample at MW05-15 due to insufficient recovery of water from the well.

4.6.3 Visual Inspection

The Lower Site Non-Hazardous Waste Landfill has locations with observed minor erosion, cracking, sparse vegetation and ponded water features. Table 4-23 presents a summary of observed visual inspection features and Table 4-24 presents the Preliminary Stability Assessment results. This landfill was assessed to have an "Acceptable" overall landfill performance because all observed features were assessed as "Acceptable." Table 4-25 is a log of photographs taken during the 2015 visual inspection.

No significant features were noted in the previous inspection report. New occasional minor tension cracks were observed along the west and north crest edge (Features K and L). Self-armouring erosion was observed on the west and east slopes (Features D and H). Sparse vegetation (Feature G) was also observed on the south and west slopes. Ponded water areas (Features E, I and F) were observed along the west, south and east toes of the landfill during the 2015 visual inspection. These features do not appear to be having an impact on landfill stability. Tire tracks (Features C and J) and a rough area were observed on the surface of the landfill. There was no evidence of settlement or slope stability issues.

Table 4-23: Visual Inspection Checklist – Lower Site Non-Hazardous Waste Landfill

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Lower Site Non-Hazardous Waste Landfill
DATE OF INSPECTION: August 9, 2015
DATE OF PREVIOUS INSPECTION: August 18, 2014
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-23: Visual Inspection Checklist – Lower Site Non-Hazardous Waste Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	Y	Feature D	West slope	562957	7386924	45	5	-	1.0%	Minor self-armouring erosion with fines washing down slope (Acceptable)	New feature	27
		Feature H	East slope	563122	7386992	20	10	-	0.9%	Self-armouring erosion (Acceptable)	New feature	34 and 42
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	Y	Feature K	Along west crest 7 m from edge	562943	7386971	15	0.005	-	0.000%	Minor crack (Acceptable)	New feature	40
		Feature L	Along crest edge	563053	7387060	35	0.005	-	0.001%	Minor thaw crack (Acceptable)	New feature	43 and 44
Animal Burrows	N											
Vegetation	Y	Feature G	South slope	563130	7386938	2	2	-	0.02%	Sparse grass	New feature	32
		Feature G	East slope	563115	7387012	25	0.5	-	0.05%	Sparse grass	New feature	35
Staining	N											
Vegetation Stress	N											
Seepage or Ponded Water	Y	Feature E	Entire west toe	562957	7386923	90	10	-	4%	Ponded water (Acceptable)	New feature	28
		Feature I	East toe	563115	7387012	55	5	-	1.19%	Ponded water (Acceptable)	New feature	35
		Feature F	South toe	563008	7386917	120	5	-	3%	Ponded water (Acceptable)	New feature	30

Table 4-23: Visual Inspection Checklist – Lower Site Non-Hazardous Waste Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	Y	MW-09, 12, 26, 27, 28								Monitoring wells intact		
Features of Note / Other Observations	Y	Feature C	East slope	563148	7386953	10	4	-	0.2%	Previously noted tire tracks (Acceptable)	Unchanged since previous observation	33
		Feature J	North slope	562968	7387025	10	4	-	0.2%	Previously noted tire tracks (Acceptable)	Unchanged since previous observation	38

Landfill Area = 23,178 m^2.

Table 4-24: Preliminary Stability Assessment – Lower Site Non-Hazardous Waste Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	N/A
Erosion	Acceptable	Occasional
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	Isolated
Sloughing	Acceptable	N/A
Cracking	Acceptable	Occasional
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	Isolated
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	Occasional
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	Isolated
Overall Landfill Performance	**Acceptable**	

Table 4-25: Summary Table of Photographic Log – Lower Site Non-Hazardous Waste Landfill

Photo	Description (file name)	Easting	Northing	Date
26	North toe, facing northeast (ATT3_Photo1.jpg)	562908.9011	7386988.261	9-Aug-2015
27	Feature D, minor self-armouring erosion on west slope with fines washing down slope (ATT4_Photo1.jpg)	562957.2198	7386924.464	9-Aug-2015
28	Feature E, Ponded water along west toe – Entire east toe, 10 m wide (ATT5_Photo1.jpg)	562956.6686	7386922.705	9-Aug-2015
29	South slope, facing east (ATT6_Photo1.jpg)	562975.4914	7386901.594	9-Aug-2015
30	Feature F, ponded thaw water at south toe (ATT7_Photo1.jpg)	563007.7521	7386917.382	9-Aug-2015
31	East slope, facing north (ATT8_Photo1.jpg)	563169.3892	7386948.461	9-Aug-2015
32	Feature G, Sparse grass on south slope (ATT9_Photo1.jpg)	563130.0456	7386938.047	9-Aug-2015
33	Feature C, tire tracks previously observed on east slope (ATT10_Photo1.jpg)	563147.8533	7386952.727	9-Aug-2015
34	Feature H, self-armouring erosion on east slope – Fines accumulating at toe washed from above (ATT11_Photo1.jpg)	563122.1715	7386992.301	9-Aug-2015
35	Feature I, ponded water at east toe and Feature G, spare grasses on east slope (ATT12_Photo1.jpg)	563114.6547	7387011.792	9-Aug-2015
36	North slope, facing south (ATT13_Photo2.jpg)	570620.0154	7395023.431	9-Aug-2015
37	North slope facing south towards monument (ATT14_Photo1.jpg)	562909.4382	7387033.861	9-Aug-2015
38	Feature J, previously noted tire tracks – No degradation (ATT15_Photo1.jpg)	562967.8374	7387024.559	9-Aug-2015
39	North crest, facing west (ATT16_Photo1.jpg)	562963.01	7387009.377	9-Aug-2015
40	Feature K, minor crack along west crest (ATT17_Photo1.jpg)	562943.0866	7386970.733	9-Aug-2015
41	Crest surface facing northwest (ATT18_Photo1.jpg)	563047.7265	7386942.954	9-Aug-2015

Table 4-25: Summary Table of Photographic Log – Lower Site Non-Hazardous Waste Landfill

Photo	Description (file name)	Easting	Northing	Date
42	East slope with minor self-armouring erosion (Feature H) (ATT19_Photo1.jpg)	563104.0398	7386992.482	9-Aug-2015
43	Feature L, minor thaw crack along north crest edge, facing west (ATT20_Photo1.jpg)	563053.1499	7387060.047	9-Aug-2015
44	Feature L, minor thaw crack along crest edge (ATT21_Photo1.jpg)	563023.4317	7387043.35	9-Aug-2015
45	Cover surface, facing west (ATT22_Photo1.jpg)	563018.9433	7386991.565	9-Aug-2015
46	Cover surface, facing north (ATT23_Photo1.jpg)	563069.6921	7386968.785	9-Aug-2015

4.6.4 Soil Sampling

Table 4-26 presents a summary of analytical results for soil samples collected at the Lower Site Non-Hazardous Waste Landfill. MW09-26 represents an upgradient sampling location, whereas MW05-09, MW05-12, MW09-27 and MW09-28 represent downgradient sampling locations. The deep soil sample at MW09-26 could not be collected due to refusal.

MW09-26

Sampling location MW09-26 is located upgradient of the landfill, approximately 20 m south of the toe. The estimated elevation of this sampling point is 374 masl. As shown in Photo 490, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of wet yellow-brown sand. Ponding of water is observed along the toe of the landfill in the area of the sampling location.

In the shallow sample at MW09-26 (0-20 cm), the concentration of arsenic (1.4 mg/kg) exceeded the baseline (1.1 mg/kg) and background (1.0 mg/kg) concentrations but was less than the baseline concentration plus 3σ (3.6 mg/kg). The concentration of arsenic was slightly higher than the concentration reported in 2014 (1.2 mg/kg). The concentrations of most other metals were slightly lower than those observed in 2014. No PHC or PCB were detected from the shallow sample at MW09-26 in 2015.

MW05-09

Sampling location MW05-09 is located downgradient of the landfill, approximately 5 m north of the toe. The estimated elevation of this sampling point is 372.5 masl. As shown in Photo 456, the area is largely covered with sand and gravel and some rocks and sparse vegetation. The soils consisted of yellow-brown sand with some gravel.

The shallow sample at MW05-09 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (38.3 mg/kg) exceeded the baseline concentration (27 mg/kg) but were less than the background concentration (43 mg/kg). In addition, the concentration of lead (12.5 mg/kg) and arsenic (1.4 mg/kg) exceeded their background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.1 mg/kg, respectively) concentrations. The concentrations of all metals were less than those reported in 2014. The TPH concentration (58 mg/kg) was less than the baseline concentration (59 mg/kg); however, the PHC F3 fraction concentration of 52 mg/kg exceeded the baseline concentration (36 mg/kg). In 2014, PHC results were non-detectable.

No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the shallow sample at MW05-09 in 2015.

The deep sample at MW05-09 (40-50 cm) exhibited elevated concentrations of metals. The concentration of copper (31 mg/kg) exceeded the baseline concentration (27 mg/kg) but was less than the background concentration (43 mg/kg). In addition, the concentration of lead (23.7 mg/kg) exceeded the background (10 mg/kg) and baseline (10 mg/kg) concentrations. The concentration of lead was greater than the concentration reported in 2014 (less than 10 mg/kg). The concentrations of most other metals were reported in 2014 at similar concentrations. The TPH concentration (48 mg/kg) was less than the baseline concentration (59 mg/kg); however, the PHC F3 fraction concentration of 42 mg/kg exceeded the baseline concentration (36 mg/kg). In 2014, PHC results were non-detectable. No PHC F4 fraction was detected from the deep sample at MW05-09 in 2015. The PCB concentration (0.09 mg/kg) exceeded the background concentration (0.0002 mg/kg) and the baseline concentration (0.05 mg/kg). The PCB concentration was greater than the concentration reported in 2014 (0.018 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015.

MW05-12

Sampling location MW05-12 is located downgradient of the landfill, approximately 25 m northeast of the toe. The estimated elevation of this sampling point is 372 masl. As shown in Photo 459, the area is largely covered with sand and gravel and is sparsely vegetated. The soil in the area of the sample location consisted of grey sand, gravel and stone. Photo 35 displays ponding of water along the toe of the landfill, approximately 25 m west of the sampling location.

The shallow sample at MW05-12 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (31.3 mg/kg), cobalt (11.2 mg/kg) and chromium (77.2 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of nickel (40.1 mg/kg) exceeded the background (38 mg/kg) and baseline (35 mg/kg) concentrations. The concentrations of all metals were less than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW05-12 in 2015. It is noted that the concentration of PCB (0.3 mg/kg) reported for this location in 2014 exceeded the background (0.0002 mg/kg) and baseline (0.05 mg/kg) concentrations.

The deep sample at MW05-12 (40-50 cm) exhibited elevated concentrations of metals, at similar concentrations to those in the shallow sample. The concentrations of copper (30.8 mg/kg), cobalt (10.8 mg/kg) and chromium (75 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of nickel (39.6 mg/kg) and arsenic (1.2 mg/kg) exceeded their background (38 mg/kg and 1.0 mg/kg, respectively) and baseline (35 mg/kg and 1.1 mg/kg, respectively) concentrations. The concentrations of all metals were less than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW05-12 in 2015. It is noted that the concentration of PCB (0.12 mg/kg) reported for this location in 2014 exceeded the background (0.0002 mg/kg) and baseline (0.05 mg/kg) concentrations.

MW09-27

Sampling location MW09-27 is located downgradient of the landfill, approximately 5 m west of the toe. The estimated elevation of this sampling point is 373.5 masl. As shown in Photo 494, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of wet yellow-brown sand and gravel. Some ponding of water was observed along the toe of the landfill in the area of the sampling location.

In the shallow sample at MW09-27 (0-15 cm), the concentration of copper (28.9 mg/kg) exceeded the baseline concentration (27 mg/kg) but was less than the background concentration (43 mg/kg). In addition, the concentration of arsenic (2 mg/kg) exceeded the baseline (1.1 mg/kg) and background (1.0 mg/kg) concentrations. The concentration of arsenic was equal to the concentration reported in 2014. The concentrations of all other metals were lower than those observed in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW09-27 in 2015.

In the deep sample at MW09-27 (30-40 cm), the concentration of copper (27.1 mg/kg) exceeded the baseline concentration (27 mg/kg) but was less than the background concentration (43 mg/kg). In addition, the concentration of arsenic (1.4 mg/kg) exceeded the baseline (1.1 mg/kg) and background (1.0 mg/kg) concentrations. The concentrations of all metals, including copper (20 mg/kg in 2014) and arsenic (0.7 mg/kg in 2014), were greater than those observed in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW09-27 in 2015.

MW09-28

Sampling location MW09-28 is located downgradient of the landfill, approximately 12 m northwest of the toe. The estimated elevation of this sampling point is 373 masl. As shown in Photo 496, the area consists of sand and gravel with some rocks and is not vegetated. The soil in the area of the sample location consisted of wet grey sand, gravel and stone.

The shallow sample at MW09-28 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (36.9 mg/kg), cobalt (10.9 mg/kg), zinc (54.4 mg/kg) and chromium (76 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of nickel (38.6 mg/kg), lead (14.7 mg/kg) and arsenic (1.9 mg/kg) exceeded their background and baseline concentrations. Elevated concentrations of metals were reported in 2014 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW09-28 in 2015. It is noted that the concentration of PCB (0.16 mg/kg) reported for this location in 2014 exceeded the background (0.0002 mg/kg) and baseline (0.05 mg/kg) concentrations.

The deep sample at MW09-28 (40-50 cm) exhibited elevated concentrations of metals, at lower concentrations than those in the shallow sample. The concentrations of copper (33.6 mg/kg) and chromium (69.4 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of lead (11.8 mg/kg) exceeded the background (10 mg/kg) and baseline (10 mg/kg) concentrations. The concentrations of all metals were less than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW09-28 in 2015.

Table 4-26: Soil Chemical Analysis Results – Lower Site Non-Hazardous Waste Landfill

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		43	38	12	1.0	10	84	94	1.0	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**27**	**35**	**10**	**1.0**	**10**	**54**	**69**	**1.1**	**0.10**	**0.05**	**10**	**16**	**36**	**NA**
Baseline + 3σ		49	50	17	1.0	27	135	105	3.6	0.10	0.37	43	234	251	NA
Upgradient															
MW09-26 (0-20)	0-20	24.8	34.8	9.8	<0.5	4.9	40.7	67.2	**1.4**	<0.1	<0.05	<7	<4	<8	<6
MW09-26 (deep) [1]															
Downgradient															
MW05-09 (0-15)	0-15	**38.3**	34.4	7.6	<0.5	**12.5**	48.9	62.1	**1.4**	<0.1	<0.05	<7	<4	**52**	<6
MW05-09 (40-50)	40-50	**31**	32	8.7	<0.5	**23.7**	52.3	58.7	1	<0.1	**0.09**	<7	<4	**42**	<6
MW05-12 (0-15)	0-15	**31.3**	**40.1**	**11.2**	<0.5	6.8	50.6	**77.2**	1	<0.1	<0.05	<7	<4	<8	<6
MW05-12 (40-50)	40-50	**30.8**	**39.6**	**10.8**	<0.5	8	51.3	**75**	**1.2**	<0.1	<0.05	<7	<4	<8	<6
MW09-27 (0-15)	0-15	**28.9**	34.3	9.3	<0.5	7.5	43.2	65.6	**2**	<0.1	<0.05	<7	<4	<8	<6
MW09-27 (30-40)	30-40	**27.1**	32.9	9.1	<0.5	6.1	40.4	63.6	**1.4**	<0.1	<0.05	<7	<4	30	<6
MW09-28 (0-15)	0-15	**36.9**	**38.6**	**10.9**	<0.5	**14.7**	**54.4**	**76**	**1.9**	<0.1	<0.05	<7	<4	<8	<6
MW09-28 (40-50)	40-50	**33.6**	32.8	9.5	<0.5	**11.8**	48.3	**69.4**	<1	<0.1	<0.05	<7	<4	<8	<6

Notes:
NA: Not available
ID: Soil sample location ID.
Underlined values: Results exceed Background arithmetic mean.
Bold Values: Results exceed Baseline arithmetic mean.
1: The deep soil sample at MW09-26 could not be collected due to refusal

4.6.5 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-27 presents a summary of groundwater levels and analytical results for groundwater samples collected at the Lower Site Non-Hazardous Waste Landfill. The groundwater sample at MW05-09 could not be collected because the groundwater in the well was frozen. The groundwater sample at MW05-12 could not be collected because the groundwater in the well was dry. The groundwater samples at MW09-26 and MW09-27 could not be collected due to an out-of-specification lock.

MW09-28

The depth to groundwater measured at MW09-28 in 2015 was 0.43 m below grade. The concentration of copper (0.0292 mg/L) exceeded the baseline concentration (0.021 mg/L) but was less than the baseline concentration plus 3σ (0.052 mg/L). No sample was collected at MW09-28 in 2014. No PHC F1 fractions were detected in the groundwater sample collected at MW09-28 in 2015. PHC F2-F4 fractions and PCB could not be analyzed from the groundwater sample at MW09-28 due to insufficient water.

Table 4-27: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Lower Site Non-Hazardous Waste Landfill

ID	GW Depth BGS (m)	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F4 (mg/L)
Baseline Mean		**0.021**	**0.11**	**0.003**	**0.001**	**0.010**	**4.2**	**0.20**	**0.003**	**0.0004**	**0.003**	**0.050**	**0.5**	**1.0**	**NA**
Baseline + 3σ		0.052	0.27	0.012	0.001	0.057	21	0.57	0.008	0.0004	0.005	0.050	0.50	1.00	NA
Upgradient															
MW09-26 [1]															
Downgradient															
MW05-09 [2]															
MW05-12 [3]															
MW09-27 [1]															
MW09-28	0.43	**0.0292**	0.024	0.0009	<0.0001	0.003	1.34	0.015	<0.001	<0.0001	NA	<0.025	NA	NA	NA

Notes:
ID: Monitoring well location ID.
GW: Groundwater.
BGS: Below ground surface.
NA: Not available
Bold Values: Results exceed Baseline arithmetic mean.
1: The groundwater samples at MW09-26 and MW09-27 could not be collected due to an out-of-specification lock.
2: The groundwater sample at MW05-09 could not be collected because the groundwater in the well was frozen.
3: The groundwater sample at MW05-12 could not be collected because the groundwater in the well was dry.

4.6.6 Conclusions and Overall Performance of the Lower Site NHWL

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Lower Site Non-Hazardous Waste Landfill. Some self-armouring erosion and ponding of water along the toe of the landfill was observed. Overall stability performance for this landfill was assessed as Acceptable.

Soil samples were collected at all designated locations in 2015; two soil samples were collected at four of the five sampling locations. Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected above the background/baseline arithmetic mean at a number of locations. It is noted that concentrations of the above noted metals were highest overall at the sample location MW05-12 (shallow and deep sample), located downgradient of the northeast side of the landfill, and at MW09-28 (shallow sample), located downgradient of the north side of the landfill. The metal concentrations observed at MW05-12 were less than those reported in 2014, which was similarly the case for most other sampling locations. The metal concentrations observed at MW09-28 were similar to those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015.

Detectable concentrations of PHC were noted at MW05-09 and MW09-27, at TPH concentrations ranging from 36 mg/kg to 58 mg/kg. The maximum TPH concentration (58 mg/kg) was detected in the shallow sample at MW05-09 at concentrations less than the baseline concentration of 194 mg/kg. A PCB concentration (0.09 mg/kg in the deep sample at MW05-09) was detected above the background/baseline arithmetic mean. No detectable concentrations of PHC or PCB were noted in any of the other samples in 2015.

In 2015, a groundwater sample was collected from a single monitoring well adjacent to the landfill, MW06-28. The concentration of copper (0.0292 mg/L) exceeded the baseline concentration (0.021 mg/L) but was less than the baseline concentration plus 3σ (0.052 mg/L). No sample was collected at MW09-28 in 2014. No detectable concentrations of the PHC F1 fraction were noted in the groundwater sample collected at MW09-28 in 2015. PHC F2-F4 and PCB could not be analyzed from the groundwater sample at MW05-15 due to insufficient water.

Based on the monitoring results, there does not appear to be significant impact to groundwater quality from the landfill at the soil sampling locations or MW09-28, adjacent to the landfill.

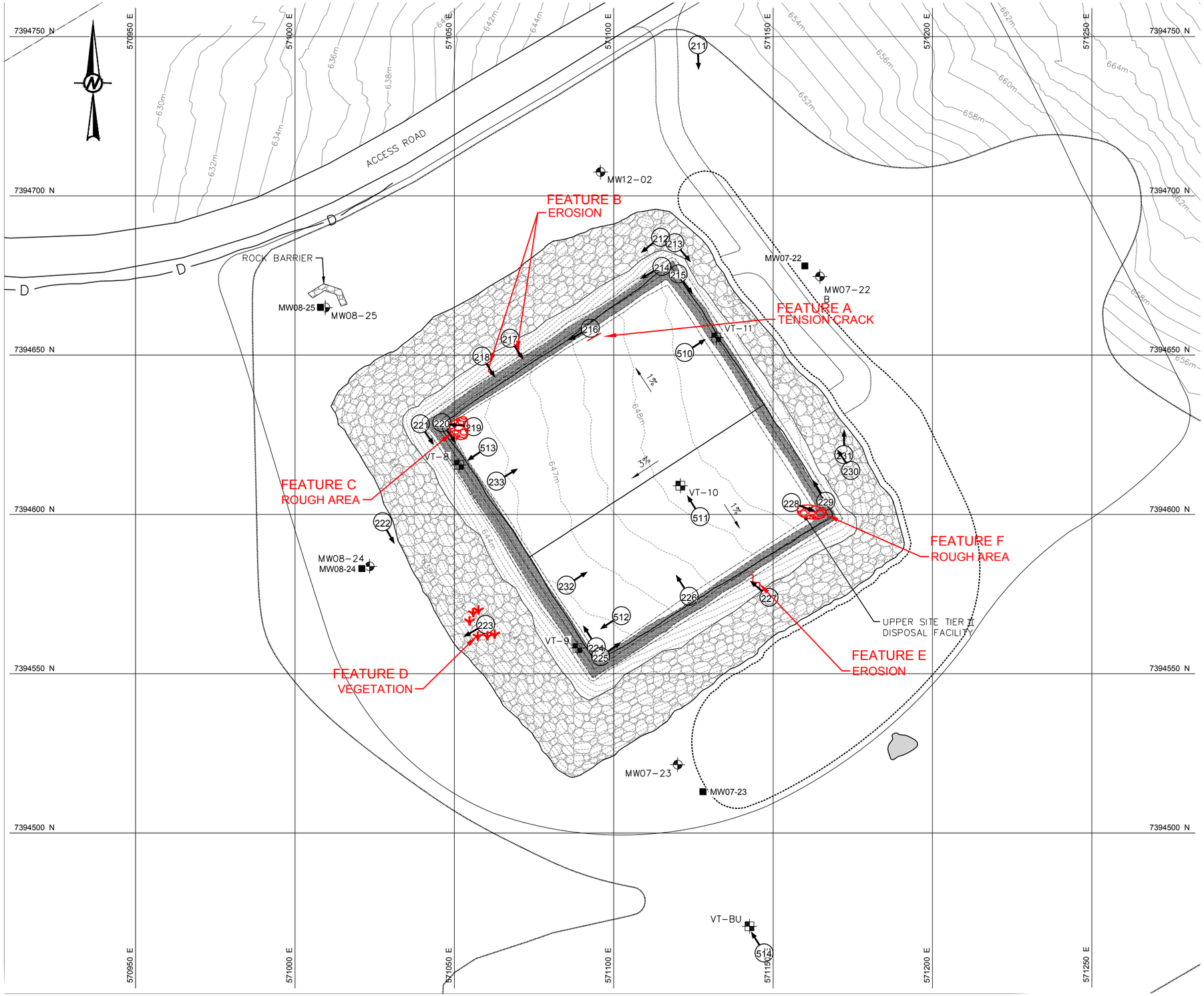
4.6.7 Recommendations for Lower Site NHWL

No modifications to the ongoing monitoring program at this landfill are recommended.

4.7 Upper Site – Tier II Disposal Facility

4.7.1 Landfill Description

The Upper Site (US) Tier II Disposal Facility is located on the south side of the road to the Upper Site, approximately 600 m west of the Pallet Line Landfill (ESG 2002b). The facility was designed to contain contaminated soil exceeding Tier II criteria excavated from the upper site areas. The design of this facility was based on the characteristics of the contaminants in the soil, the geothermal properties of the area, and the local permafrost regime. Permafrost provides the primary containment barrier: both the Tier II-contaminated soil in the facility and the silty gravel perimeter berms were designed to be continuously frozen. The landfill has an area of approximately 18,600 m^2. Approximate soil and groundwater sampling locations are provided in Figure DYE-M.7.



LEGEND:

- EROSION (NTS)
- ROUGH AREA (NTS)
- VEGETATION (NTS)
- CRACKING (NTS)
- SOIL SAMPLING LOCATION
- PHOTOGRAPH LOCATION
- BODY OF WATER
- MONITORING WELL LOCATION BACKGROUND
- MONITORING WELL LOCATION
- VERTICAL GROUND TEMPERATURE CABLE LOCATION
- TYPE 1 GRANULAR A
- KEY TRENCH

NOTE
GRID PROJECTION IS NAD83 ZONE 20N. ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 25 50
1:1,250 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
UPPER SITE
TIER II DISPOSAL FACILITY

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada99_PROJ\1530908_PWGSC_Dew_Line_Mon_Program_2015_2016\40_PROD\0001_DYE_M_Field_Summary_Report | File Name: 1530908-0001-BG-0018.dwg

4.7.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- The deep soil samples at MW07-23, MW08-24 and MW08-25 could not be collected due to refusal.
- No sample could be collected at MW12-02 due to frozen ground.
- PCB could not be analyzed from the groundwater samples at MW07-22, MW08-24 and MW08-25 due to insufficient recovery of water from the well.
- The groundwater sample at MW07-23 could not be collected because the groundwater in the well was frozen.
- The groundwater sample at MW12-02 could not be collected because the well was buried under snow.

4.7.3 Visual Inspection

The Upper Site Tier II Disposal Facility has locations with observed erosion, cracking and sparse vegetation features. Table 4-28 presents a summary of observed visual inspection features and Table 4-29 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-30 is a log of photographs taken during the 2015 visual inspection.

No significant features were noted in the previous inspection report except tire tracks and a rough area on the cover surface of the facility. However, these features were not considered as significant features in the 2015 inspection. Only rough areas at the east and west corner of the facility (Features C and F) were identified to be significant. A new isolated minor tension crack was observed along the northwest crest edge (Feature A). New self-armouring erosion features were also observed on the northwest and southeast slopes (Features B and E). Isolated sparse vegetation (Feature D) was also observed on the southwest slope. These features have no significant impact on landfill stability.

Table 4-28: Visual Inspection Checklist – Upper Site Tier II Disposal Facility

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Upper Site Tier II Disposal Facility
DATE OF INSPECTION: August 11, 2015
DATE OF PREVIOUS INSPECTION: August 13, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-28: Visual Inspection Checklist – Upper Site Tier II Disposal Facility

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	Y	Feature B	Northwest slope	571069	7394653	15	5	0.03	0.4%	Self-armouring erosion – a series with every 2-3 m frequency. (Acceptable)	New Feature	217-218
		Feature E	Southeast slope	571149	7394574	5	0.1	-	0.003%	Self-armouring erosion and accumulation of fines (Acceptable)	New Feature	227
		Feature C	West crest corner	571056	7394628	5	5	-	0.1%	Rough area (Acceptable)	Small part of the bigger area noted previously	219
		Feature F	East crest corner	571156	7394604	10	5	-	0.3%	Rough area (Acceptable)	Small part of the bigger area noted previously	228
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	Y	Feature A	Northwest crest	571093	7394658	1.5	0.1	0.02	0.001%	Tension crack (Acceptable)	New Feature	216
Animal Burrows	N											

Table 4-28: Visual Inspection Checklist – Upper Site Tier II Disposal Facility

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Vegetation	Y	Feature D	Southwest slope	571060	7394565	0.3	0.3	-	0.000%	Sparse vegetation	New Feature	223
Staining	N											
Vegetation Stress	N											
Seepage or Ponded Water	N											
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	Y	VT8, 9, 10, 11 and VTBU								Thermistors intact and functional		510-514
Features of Note / Other Observations	N											

Landfill Area = 18,631 m^2.

Table 4-29: Preliminary Stability Assessment - Upper Site Tier II Disposal Facility

Feature	Severity Rating	Extent
Settlement	Acceptable	N/A
Erosion	Acceptable	Occasional
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Acceptable	N/A
Cracking	Acceptable	Isolated
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	Isolated
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	N/A
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	N/A
Overall Landfill Performance	**Acceptable**	

Table 4-30: Summary Table of Photographic Log – Upper Site Tier II Disposal Facility

Photo	Description (file name)	Easting	Northing	Date
211	Overview, facing south (ATT151_Photo1.jpg)	571126.4418	7394747.391	11-Aug-2015
212	Northwest slope and toe, facing southwest (ATT152_Photo1.jpg)	571114.6677	7394686.943	11-Aug-2015
213	Northeast slope and toe, facing southeast (ATT153_Photo1.jpg)	571119.1856	7394685.238	11-Aug-2015
214	Northwest crest, facing west (ATT154_Photo1.jpg)	571115.1096	7394677.81	11-Aug-2015
215	Northeast crest, facing southeast (ATT155_Photo1.jpg)	571116.4484	7394677.343	11-Aug-2015
216	Feature A, tension crack, 2 m from northwest crest (ATT156_Photo1.jpg)	571092.6565	7394658.459	11-Aug-2015
217	Feature B, self-armouring erosion on northwest slope (ATT157_Photo1.jpg)	571068.8157	7394652.901	11-Aug-2015
218	Feature B, self-armouring erosion on northwest slope (ATT159_Photo2.jpg)	571060.0268	7394647.303	11-Aug-2015
219	Feature C, rough area at west crest corner, facing west (ATT160_Photo1.jpg)	571056.0111	7394627.517	11-Aug-2015
220	crest, facing southeast from west corner (ATT161_Photo1.jpg)	571046.0717	7394628.803	11-Aug-2015
221	Southwest slope and toe, facing southeast from west corner (ATT162_Photo1.jpg)	571039.3451	7394628.407	11-Aug-2015
222	Southwest toe, facing southeast from west corner (ATT163_Photo1.jpg)	571027.459	7394597.676	11-Aug-2015
223	Feature D, sparse vegetation on southwest slope (ATT164_Photo1.jpg)	571059.7913	7394565.481	11-Aug-2015
224	Southwest slope and crest, facing northwest from south corner (ATT165_Photo1.jpg)	571095.2047	7394557.045	11-Aug-2015

Table 4-30: Summary Table of Photographic Log – Upper Site Tier II Disposal Facility

Photo	Description (file name)	Easting	Northing	Date
225	Southeast slope and crest, facing east (ATT166_Photo1.jpg)	571095.9122	7394555.335	11-Aug-2015
226	Crest surface, from southeast to northwest (ATT167_Photo1.jpg)	571123.6457	7394574.32	11-Aug-2015
227	Feature E, self-armouring erosion, accumulation of fines on southeast slope – (ATT168_Photo1.jpg)	571148.6933	7394573.981	11-Aug-2015
228	Feature F, rough area at east crest corner (ATT169_Photo1.jpg)	571155.7461	7394603.734	11-Aug-2015
229	Northeast slope and crest, facing northwest from east corner (ATT170_Photo1.jpg)	571166.5116	7394604.141	11-Aug-2015
230	Northeast toe, from east corner (ATT171_Photo1.jpg)	571172.1644	7394618.729	11-Aug-2015
231	Northeast toe, from east corner (ATT172_Photo2.jpg)	571172.1644	7394618.729	11-Aug-2015
232	Cover surface, facing east – VT 10 shown (ATT173_Photo1.jpg)	571085.1611	7394577.807	11-Aug-2015
233	Cover surface, facing east, north half (ATT174_Photo1.jpg)	571063.2033	7394610.417	11-Aug-2015
510	Thermistor VT11	571132.588	7394658.56	11-Aug-2015
511	Thermistor VT10	571121.4946	7394609.429	11-Aug-2015
512	Thermistor VT9	571092.9733	7394562.117	11-Aug-2015
513	Thermistor VT8	571056.4323	7394617.175	11-Aug-2015
514	Thermistor VT BU	571146.8094	7394464.721	11-Aug-2015

4.7.4 Thermal Monitoring

Thermistor dataloggers VT8, VT9, VT10, VT11 and VTBU located at the Upper Site Tier II Disposal Facility were downloaded using Lakewoods Systems Ltd. Prolog software and a laptop computer. Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

4.7.5 Soil Sampling

Table 4-31 presents a summary of analytical results for soil samples collected at the Upper Site Tier II Disposal Facility. MW07-22 and MW12-02 represent upgradient sampling locations, whereas MW07-23, MW08-24 and MW08-25 represent downgradient sampling locations. The deep soil samples at MW07-23, MW08-24 and MW08-25 could not be collected due to refusal. No sample could be collected at MW12-02 due to frozen ground.

MW07-22

Sampling location MW07-22 is located upgradient of the landfill, approximately 20 m northeast of the toe. The estimated elevation of this sampling point is 648.5 masl. As shown in Photo 480, the area is largely covered with sand and gravel and is not vegetated. The soils consisted of grey sand with some gravel and stone.

The shallow sample at MW07-22 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of lead (10.6 mg/kg), chromium (112 mg/kg) and arsenic (3.5 mg/kg) exceeded their background concentrations but were less than their baseline concentrations. In addition, the concentration of copper (71.6 mg/kg) and zinc (98.3 mg/kg) exceeded their background (60 mg/kg and 70 mg/kg, respectively) and baseline (43 mg/kg and 77 mg/kg, respectively) concentrations. The concentrations of all metals, with the exception of lead (19 mg/kg in

2014), were greater than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW07-22 in 2015.

The deep sample at MW07-22 (15-30 cm) exhibited elevated concentrations of metals, at generally higher concentrations than those in the shallow sample. The concentration of copper (59.2 mg/kg) exceeded the baseline concentration (43 mg/kg) but was less than the background concentration (60 mg/kg). In addition, the concentrations of lead (18.4 mg/kg), zinc (89.6 mg/kg), chromium (142 mg/kg) and arsenic (3.9 mg/kg) exceeded their background and baseline concentrations. The concentrations of all metals, with the exception of lead (30 mg/kg in 2014), were greater than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW07-22 in 2015.

MW07-23

Sampling location MW07-23 is located downgradient of the landfill, approximately 12 m south of the toe. The estimated elevation of this sampling point is 638 masl. As shown in Photo 483, the area consists of sand, gravel and rock and is not vegetated. The soils consisted of grey sand with stone.

In the shallow sample at MW07-23 (0-25 cm), the concentration of nickel (86 mg/kg) exceeded the baseline concentration (83 mg/kg) but was less than the background concentration (141 mg/kg). The concentration of arsenic (3.3 mg/kg) exceeded the background concentration (1.0 mg/kg), but was less than the baseline concentration (3.7 mg/kg). In addition, the concentration of copper (71.9 mg/kg) exceeded the baseline (43 mg/kg) and background (60 mg/kg) concentrations. The concentration of arsenic was equal to the concentration reported in 2014. The concentrations of all metals, including copper (76 mg/kg in 2014) and nickel (180 mg/kg in 2014), were less than those observed in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW07-23 in 2015.

MW08-24

Sampling location MW08-24 is located downgradient of the landfill, approximately 10 m west of the toe. The estimated elevation of this sampling point is 636 masl. As shown in Photo 486, the area consists of sand, gravel and rock and is not vegetated. The soils consisted of grey sand with stone.

A duplicate sample was collected at the shallow MW08-24 (0-15 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicated the original and duplicate sample results differ by less than 30% for all parameters.

In the shallow sample at MW08-24 (0-15 cm), the average concentration of lead (13.8 mg/kg) exceeded the background concentration (10 mg/kg) but was less than the baseline concentration (18 mg/kg). In addition, the average concentration of arsenic (1.0 mg/kg) was equal to the background concentration but less than the baseline concentration (3.7 mg/kg). The concentration of arsenic was less than the concentration reported in 2014 (1.4 mg/kg). The concentrations of all other metals, including lead (less than 10 mg/kg in 2014), were greater than those observed in 2014. The average concentrations of TPH (39 mg/kg) and PHC F1 fraction (21 mg/kg) exceeded their baseline concentrations (18 mg/kg and 10 mg/kg, respectively). The PHC F1 fraction was equal to the baseline concentration plus 3σ (21 mg/kg). In 2014, PHC results were non-detectable. No PHC F4 fraction or PCB were detected from the shallow sample at MW08-24 in 2015

MW08-25

Sampling location MW08-25 is located downgradient of the landfill, approximately 22 m north of the toe. The estimated elevation of this sampling point is 635 masl. As shown in Photo 487, the area consists of sand and gravel with some rocks and is note vegetated. The soils consisted of grey sand with gravel and stone.

The shallow sample at MW08-25 (0-15 cm) exhibited elevated concentrations of metals. The concentration of arsenic (2.9 mg/kg) exceeded the background concentration (1.0 mg/kg) but was less than the baseline concentration (3.7 mg/kg). The concentrations of copper (65.2 mg/kg), cobalt (22 mg/kg), lead (41.3 mg/kg), zinc (133 mg/kg) and chromium (176 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. The concentrations of all metals were greater than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW08-25 in 2015.

Table 4-31: Soil Chemical Analysis Results – Upper Site Tier II Disposal Facility

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.5	0.002	NA	NA	NA	NA
Baseline Mean		**43**	**83**	**19**	**1.0**	**18**	**77**	**115**	**3.7**	**0.05**	**0.05**	**10**	**10**	**10**	**NA**
Baseline + 3σ		130	304	40	1.0	80	214	398	13	0.05	0.085	21	15	28	NA
Upgradient															
MW07-22 (0-15)	0-15	**71.6**	57.8	14.4	<0.5	10.6	**98.3**	112	3.5	<0.1	<0.05	<7	<4	<8	<6
MW07-22 (15-30)	15-30	**59.2**	76	15.9	<0.5	**18.4**	**89.6**	**142**	**3.9**	<0.1	<0.05	<7	<4	<8	<6
MW12-02 (shallow) [1]															
MW12-02 (deep) [1]															
Downgradient															
MW07-23 (0-25)	0-25	**71.9**	**86**	15.9	<0.5	7.4	37.8	49.1	3.3	<0.1	<0.05	<7	<4	<8	<6
MW07-23 (deep) [2]															
MW08-24 (0-15)	0-15	28	51	13	<0.5	13.6	52.1	72.8	1.2	<0.1	<0.05	<7	<4	<8	<6
MW08-24 (0-15) (Duplicate)	0-15	33	56	13.9	<0.5	14	70	81	<1	<0.10	<0.1	**35**	<10	<50	<50
MW08-24 (0-15) (Dup Avg)	0-15	31	54	13.5	0.5	13.8	61.1	76.9	1	<0.1	<0.1	**21**	<7	<29	<28
MW08-24 (deep) [2]															
MW08-25 (0-15)	0-15	**65.2**	82.7	**22**	<0.5	**41.3**	**133**	**176**	2.9	<0.1	<0.05	<7	<4	<8	<6
MW08-25 [2]															

Notes:

NA: Not available; ID: Soil sample location ID.

Underlined values: Results exceed Background arithmetic mean.

Bold Values: Results exceed Baseline arithmetic mean.

1: No sample could be collected at MW12-02 due to frozen ground.

2: The deep soil samples at MW07-23, MW08-24 and MW08-25 could not be collected due to refusal.

4.7.6 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-32 presents a summary of groundwater levels and analytical results for groundwater samples collected at the Upper Site Tier II Disposal Facility. The groundwater sample at MW07-23 could not be collected because the groundwater in the well was frozen. The groundwater sample at MW12-02 could not be collected because the well was buried under snow

MW07-22

The depth to groundwater measured at MW07-22 in 2015 was 1.57 m below grade. The concentration of copper (0.0062 mg/L) exceeded the baseline concentration (0.005 mg/L) but was less than the baseline concentration plus 3σ (0.13 mg/L). No sample was collected at MW07-22 in 2014. No PHC were detected in the groundwater sample collected at MW07-22 in 2015. PCB could not be analyzed from the groundwater sample at MW07-22 due to insufficient water.

MW08-24

The depth to groundwater measured at MW08-24 in 2015 was 0.53 m below grade. The concentration of copper (0.0242 mg/L) and nickel (0.031 mg/L) exceeded their baseline concentrations (0.005 mg/L and 0.005 mg/L, respectively). The concentrations of all detected metals were greater than those observed in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC were detected in the groundwater sample collected at MW08-25 in 2015. PCB could not be analyzed from the groundwater sample at MW08-24 due to insufficient water.

MW08-25

The depth to groundwater measured at MW08-25 in 2015 was 0.53 m below grade. The concentration of copper (0.0121 mg/L), nickel (0.027 mg/L) and zinc (0.939 mg/L) exceeded their baseline concentrations. No sample was collected at MW08-25 in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC were detected in the groundwater sample collected at MW08-25 in 2015. PCB could not be analyzed from the groundwater sample at MW08-25 due to insufficient water.

Table 4-32: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Upper Site Tier II Disposal Facility

ID	GW Depth BGS (m)	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F4 (mg/L)
Baseline Mean		**0.005**	**0.005**	**0.003**	**0.001**	**0.010**	**0.78**	**0.34**	**0.003**	**0.0004**	**0.003**	**0.05**	**0.5**	**1.0**	**NA**
Baseline + 3σ		0.13	0.53	0.014	0.001	0.033	6.6	1.1	0.010	0.0004	0.005	0.050	0.5	1.0	NA
Upgradient															
MW07-22	1.57	**0.0062**	0.004	0.0009	<0.0001	0.0052	0.072	0.004	0.001	<0.0001	NA [1]	<0.025	<0.1	<0.1	<0.1
MW12-02 [2]															
Downgradient															
MW07-23 [3]															
MW08-24	0.53	**0.0242**	**0.031**	0.0023	<0.0001	0.0024	0.379	0.012	<0.001	<0.0001	NA [1]	<0.025	<0.177	<0.177	<0.177
MW08-25	0.53	**0.0121**	**0.027**	0.0023	<0.0001	0.0034	**0.939**	0.01	<0.001	<0.0001	NA [1]	<0.025	<0.286	<0.286	<0.286

Notes:
ID: Monitoring well location ID.
GW: Groundwater.
BGS: Below ground surface.
NA: Not available.
Bold Values: Results exceed Baseline arithmetic mean.
1: PCB could not be analyzed from the groundwater samples at MW07-22, MW08-24 and MW08-25 due to insufficient recovery of water.
2: The groundwater sample at MW12-02 could not be collected because the well was buried under snow
3: The groundwater sample at MW07-23 could not be collected because the groundwater in the well was frozen.

4.7.7 Conclusions and Overall Performance of the Upper Site Tier II Disposal Facility

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site Tier II Disposal Facility. Some self-armouring erosion along the slopes of the facility and a minor tension crack on the Northwest crest were observed. The overall stability performance of this landfill was assessed as Acceptable.

Soil samples were collected at four of five designated locations in 2015, however the deeper samples at the downgradient locations could not be collected due to frozen conditions; two soil samples (shallow and deep) were collected at the upgradient location, MW07-22. Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected above the background/baseline arithmetic mean at a number of locations. It is noted that concentrations of the above noted metals were highest overall at the sample location MW07-22 (deep sample), located upgradient of the northeast side of the landfill, and at MW08-25 (shallow sample), located downgradient of the northwest side of the landfill. The metal concentrations observed at MW07-22 and MW08-25 were higher than those reported in 2014, which was similarly the case for MW08-24. The metals concentrations observed at MW07-23 were less than those reported in 2014.

The only detectable concentration of PHC was reported in the shallow samples at MW08-24. The TPH concentration (39 mg/kg) was greater than the baseline concentration of 18 mg/kg. The PHC F1 fraction was equal to the baseline concentration plus 3σ (21 mg/kg). No detectable concentrations of PCB were noted in any of the soil samples in 2015.

In 2015, groundwater samples were collected from three of five monitoring wells adjacent to the landfill. Exceedances of the baseline values were reported for copper, nickel and zinc. It is noted that concentrations of the above noted metals were highest overall at downgradient monitoring locations MW08-24 and MW08-25. The concentrations at MW08-24 were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. Groundwater samples were not collected at MW07-22 or MW08-25 locations in 2014. No detectable concentrations of PHC were noted in any of the groundwater samples in 2015. PCB could not be analyzed from the groundwater samples at MW07-22, MW08-24 and MW08-25 due to insufficient water.

Overall, it was noted that a number of the environmental sampling results (i.e. MW07-22, MW08-24 and MW08-25) were greater than in 2014 monitoring session. Additional data is required to assess if the increases relate to impact from the landfill or reflect variations in natural conditions or sampling/analytical program influences.

4.7.8 Recommendations for Upper Site Tier II Disposal Facility

No modifications to the ongoing monitoring program at this landfill are recommended.

4.8 Upper Site West Landfill – West Lobe, Centre Lobe and East Lobe

4.8.1 Landfill Description

The Upper Site West Landfill is located 800 m west of the Station Area on the north side of the road. The Upper Site West Landfill was created during DEW Line operations. The surface of the landfill was covered with additional sand and gravel cover material. Vegetative cover on the surface and in the surrounding area is sparse (ESG 2002b). The remediation of this landfill consisted of the complete excavation of certain areas and the regrading of the remainder of the landfill between 2008 and 2012. Additional work was also completed in 2013. The area of the West lobe is approximately 29,000 m^2 and the area of the Centre and East Lobes are about 32,000 m^2. Approximate soil sampling locations are provided in Figure DYE-M.8 (West Lobe) and Figure DYE-M.9 (Centre and East Lobes).

Note: Monitoring locations DM-50 and DM-51 overlap between the Upper Site West Landfill and the Upper Site Pallet Line Landfill. Results from these monitoring locations were used in the evaluation of both landfills.

LEGEND:

- EROSION (NTS)
- SEEPAGE / PONDING/RUNNING WATER (NTS)
- SOIL SAMPLING LOCATION
- PHOTOGRAPH LOCATION
- MONITORING WELL LOCATION
- REGRADED RIP RAP
- EXCAVATION LANDFILL OR DEBRIS

NOTE
GRID PROJECTION IS NAD83 ZONE 20N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 25 50
1:1,250 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
WEST LANDFILL - WEST LOBE

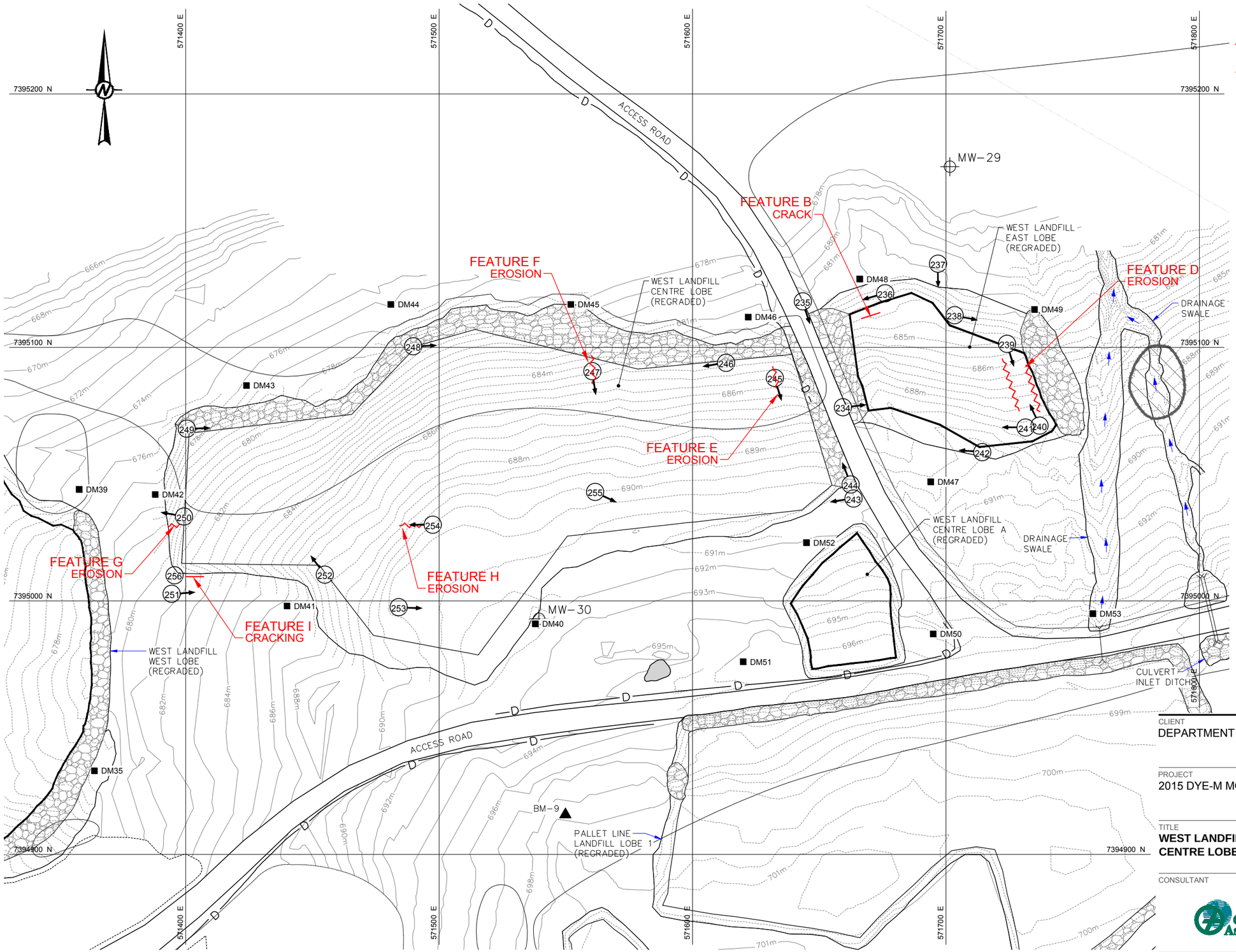
CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.8

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada\99_PRO\A1530908_PWGSC_Dew_Line_Mon_Program_2015_2016\40_PROD\0001_DYE_M_Field_Summary_Report\ | File Name: 1530908-0001-BG-0019.dwg



LEGEND:

- CRACKING (NTS)
- EROSION (NTS)
- SOIL SAMPLING LOCATION
- PHOTOGRAPH LOCATION
- BODY OF WATER
- MONITORING WELL LOCATION
- PERMANENT BENCHMARK LOCATION
- REGRADED RIP RAP
- EXCAVATION LANDFILL OR DEBRIS
- DRAINAGE

NOTE
GRID PROJECTION IS NAD83 ZONE 20N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 25 50
1:1,500 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
WEST LANDFILL
CENTRE LOBE, CENTRE LOBE A AND EAST LOBE

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.9

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

0

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada\09_PRO\A1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0001_DYE_M_Field_Summary_Report\ | File Name: 1530908-0001-BG-0020.dwg

4.8.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- The deep soil samples at DM-34, DM-35, DM-38, DM-40, DM-41, DM-44, DM-45, DM-51 and DM-52 could not be collected due to refusal on bedrock or frozen ground.
- The shallow sample at DM-35 was collected but the sample jars were broken in transit and unable to be tested.
- No sample could be collected at DM-36 due to frozen ground.

4.8.3 Visual Inspection

The Upper Site West Landfill (West, Centre and East Lobes) has multiple locations exhibiting observed erosion, cracking and ponded water features. Table 4-33 and Table 4-34 present a summary of observed visual inspection features and Table 4-35 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-36 is a log of photographs taken during the 2015 visual inspection.

Previously noted minor erosion (Feature A) on the cover surface at the west end of the West Lobe was observed in the 2015 inspection, whereas previously observed minor erosion in the middle of the landfill was not observed (Feature B, removed from feature list on Table 4-33). New areas of self-armouring erosion were observed on the cover surface and slopes of the West Lobe (Features D, H and G). Some new minor erosion channels were also identified on the southwest slope (Feature E) and along the north toe (Feature F) in the West Lobe. A new isolated running water and erosion feature along the southwest toe beyond the West Lobe riprap was observed (Feature C). These features do not appear to be impacting the stability of the Upper Site West Landfill (West Lobe).

Minor tension cracks (previously noted Feature B) were observed along the North edge of the East Lobe. Some new self-armouring erosion (Feature D) was also observed on the cover of the East Lobe.

All occasional self-armouring erosion (Features E, F, G and H) observed on the cover surface and slopes of the Centre Lobe were new features. A new tension crack (Feature I) was also observed on the southwest corner of the Centre Lobe. These features do not appear to be impacting the stability of the Upper Site West Landfill (Centre and East Lobes).

Table 4-33: Visual Inspection Checklist – Upper Site West Landfill (West Lobe)

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Upper Site West Landfill (West Lobe)
DATE OF INSPECTION: August 11, 2015
DATE OF PREVIOUS INSPECTION: August 10, 2014
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-33: Visual Inspection Checklist – Upper Site West Landfill (West Lobe)

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	Y	Feature E	Southwest slope	571300	7394928	10	0.3	0.2	0.01%	Small erosion channel (Acceptable)	New feature	262
		Feature A	Cover surface west end	571115	7394939	20	15	0.1	1.04%	Minor erosion area, some self-armouring erosion (Acceptable)	Unchanged since previous observation	270-271
		Feature D	Cover surface near southwest slope	571332	7394920	20	5	0.1-0.2	0.35%	Self-armouring erosion (Acceptable)	New feature	261
		Feature H	South slope	571203	7394926	16	2.5	0.1-0.2	0.14%	Self-armouring erosion (Acceptable)	New feature	273
		Feature F	North toe	571196	7395016	5	5	0.1-0.2	0.09%	Some erosion at toe (Acceptable)	New feature	266
		Feature G	Cover surface	571159	7394987	12	0.3	0.1-0.2	0.01%	Some minor self-armouring erosion (Acceptable)	New feature	267
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation	N											
Staining	N											

Table 4-33: Visual Inspection Checklist – Upper Site West Landfill (West Lobe)

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Vegetation Stress	N											
Seepage or Ponded Water	Y	Feature C	Southwest	571356	7394922	15	0.2		0.01%	Running water and erosion along toe beyond riprap (Acceptable)	New feature	259
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	N											

Landfill Area = 28,957 m^2.

Table 4-34: Visual Inspection Checklist – Upper Site West Landfill (Centre and East Lobes)

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Upper Site West Landfill (Centre and East Lobes)
DATE OF INSPECTION: August 11, 2015
DATE OF PREVIOUS INSPECTION: August 10, 2014
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-34: Visual Inspection Checklist – Upper Site West Landfill (Centre and East Lobes)

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	Y	Feature D	East slope	571724	7395101	50	10	-	1.6%	Self-armouring erosion with fines washing out downslope (Acceptable)	New	239-240
		Feature E	North slope	571632	7395088	15	5	0.1	0.2%	Self-armouring erosion (Acceptable)	New	245
		Feature F	North slope	571561	7395091	40	0.5	0.05	0.1%	Self-armouring erosion transporting fines down slope (Acceptable)	New	247
		Feature G	West slope	571399	7395033	10	5	-	0.2%	Self-armouring erosion (Acceptable)	New	250
		Feature H	Cover surface	571498	7395030	10	3	-	0.1%	Minor self-armouring erosion (Acceptable)	New	254
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	Y	Feature B	North slope	571662	7395118	10	0.1	0.05	0.00%	Tension cracks (Acceptable)	Previously observed	236
		Feature I	Southwest corner	571396	7395010	2	0.1	0.05	0.00%	Thaw creep cracks at SW corner (Acceptable)	New	256
Animal Burrows	N											
Vegetation	N											
Staining	N											
Vegetation Stress	N											

Table 4-34: Visual Inspection Checklist – Upper Site West Landfill (Centre and East Lobes)

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Seepage or Ponded Water	N											
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	N											

Landfill Area = 32,131 m^2.

Table 4-35: Preliminary Stability Assessment – Upper Site West Landfill (West, Centre and East Lobes)

Feature	Severity Rating	Extent
Settlement	Acceptable	N/A
Erosion	Acceptable	Occasional
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Acceptable	N/A
Cracking	Acceptable	Occasional
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	N/A
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	Isolated
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	N/A
Overall Landfill Performance	**Acceptable**	

Table 4-36: Summary Table of Photographic Log – Upper Site West Landfill (West, Centre and East Lobes)

Photo	Description (file name)	Easting	Northing	Date
234	Centre and East Lobes, facing east (ATT231_Photo1.jpg)	571659.3446	7395076.41	11-Aug-2015
235	Centre and East Lobes – Riprap along road facing south (ATT232_Photo1.jpg)	571643.5045	7395118.208	11-Aug-2015
236	Centre and East Lobes – Feature B, tension cracks on north slope (ATT233_Photo1.jpg)	571661.9924	7395117.722	11-Aug-2015
237	Centre and East Lobes – North slope facing south (ATT234_Photo1.jpg)	571696.8646	7395133.033	11-Aug-2015
238	Centre and East Lobes – North slope, rock fill berm in background (ATT235_Photo1.jpg)	571703.3769	7395112.72	11-Aug-2015
239	Centre and East Lobes – Feature D, self-armouring erosion with fines washing out downslope (ATT236_Photo1.jpg)	571724.1291	7395101.402	11-Aug-2015
240	Centre and East Lobes – Feature D, self-armouring erosion on east slope (ATT237_Photo1.jpg)	571736.9073	7395069.134	11-Aug-2015
241	Centre and East Lobes – Cover surface, facing west (ATT238_Photo1.jpg)	571731.3851	7395068.377	11-Aug-2015
242	Centre and East Lobes – South cover surface, facing west (ATT239_Photo1.jpg)	571714.3404	7395058.696	11-Aug-2015
243	Centre and East Lobes – South crest facing west (ATT240_Photo1.jpg)	571662.534	7395045.566	11-Aug-2015
244	Centre and East Lobes – Riprap slope facing north (ATT241_Photo1.jpg)	571662.3849	7395045.915	11-Aug-2015
245	Centre and East Lobes – Feature E, self-armouring erosion (ATT242_Photo1.jpg)	571632.4992	7395087.961	11-Aug-2015

Table 4-36: Summary Table of Photographic Log – Upper Site West Landfill (West, Centre and East Lobes)

Photo	Description (file name)	Easting	Northing	Date
246	Centre and East Lobes – Rip rap toe facing west (ATT243_Photo1.jpg)	571613.2418	7395093.947	11-Aug-2015
247	Centre and East Lobes – Feature F, self-armouring erosion transporting fines down slope, facing upslope to south on north slope (ATT244_Photo1.jpg)	571560.5041	7395090.589	11-Aug-2015
248	Centre and East Lobes – North slope surface facing east (ATT245_Photo1.jpg)	571489.7437	7395100.463	11-Aug-2015
249	Centre and East Lobes – Rip rap on north toe facing east (ATT246_Photo1.jpg)	571400.4195	7395067.964	11-Aug-2015
250	Centre and East Lobes – Feature G, self-armouring erosion on west slope (ATT247_Photo1.jpg)	571399.3654	7395033.255	11-Aug-2015
251	Centre and East Lobes – southwest toe facing east – Snow on slope (ATT248_Photo1.jpg)	571394.4279	7395002.795	11-Aug-2015
252	Centre and East Lobes – Cover surface facing northwest (ATT249_Photo1.jpg)	571454.9064	7395010.383	11-Aug-2015
253	Centre and East Lobes – Cover surface, facing east (ATT250_Photo1.jpg)	571484.0484	7394997.515	11-Aug-2015
254	Centre and East Lobes – Cover surface facing west – Feature H, some minor self-armouring erosion (ATT251_Photo1.jpg)	571497.5098	7395030.037	11-Aug-2015
255	Centre and East Lobes – Cover surface facing southeast (ATT252_Photo1.jpg)	571561.5845	7395043	11-Aug-2015
256	Centre and East Lobes – Feature I, thaw creep cracks at southwest corner – Snow on slope so just melted (ATT253_Photo1.jpg)	571395.5867	7395010.129	11-Aug-2015
257	West Lobe – Rip rap along east edge, facing south (ATT254_Photo1.jpg)	571359.2367	7395026.455	11-Aug-2015
258	West Lobe – Cover surface facing north (ATT255_Photo1.jpg)	571354.931	7394970.994	11-Aug-2015
259	West Lobe – Feature C, running water and erosion at southwest toe – Beyond riprap (ATT256_Photo1.jpg)	571355.7834	7394921.539	11-Aug-2015
260	West Lobe – southwest corner facing northwest – Snow covered toe (ATT257_Photo1.jpg)	571333.6025	7394907.193	11-Aug-2015
261	West Lobe – Feature D, self-armouring erosion on southwest slope (ATT258_Photo1.jpg)	571332.306	7394919.705	11-Aug-2015
262	West Lobe – Feature E, small erosion gulley facing downslope (ATT259_Photo1.jpg)	571299.9337	7394928.384	11-Aug-2015
263	West Lobe – Cove surface facing north – Slope and toe in foreground (ATT260_Photo1.jpg)	571286.9424	7394967.079	11-Aug-2015
264	West Lobe – Cover surface, facing south (ATT261_Photo1.jpg)	571276.3587	7395064.029	11-Aug-2015
265	West Lobe – North edge of cover with steep slope – Feature F, some erosion at toe – Facing west (ATT263_Photo1.jpg)	571247.6321	7395043.214	11-Aug-2015
266	West Lobe – North edge of cover with steep slope – Feature F, some erosion at toe – Facing west (ATT263_Photo1.jpg)	571196.2466	7395016.275	11-Aug-2015
267	West Lobe – Feature G, some minor self-armouring erosion (ATT264_Photo1.jpg)	571159.351	7394986.978	11-Aug-2015
268	West Lobe – Cover surface, facing northeast (ATT265_Photo1.jpg)	571122.4122	7394982.754	11-Aug-2015

Table 4-36: Summary Table of Photographic Log – Upper Site West Landfill (West, Centre and East Lobes)

Photo	Description (file name)	Easting	Northing	Date
269	West Lobe – West end facing southwest (ATT266_Photo1.jpg)	571087.3265	7394964.676	11-Aug-2015
270	West Lobe – Feature A, minor erosion area, some self-armouring gulley (ATT267_Photo1.jpg)	571114.8135	7394938.769	11-Aug-2015
271	West Lobe – Feature A, west end of erosion area (ATT268_Photo1.jpg)	571093.8777	7394925.257	11-Aug-2015
272	West Lobe – Facing north (ATT269_Photo1.jpg)	571173.8251	7394934.735	11-Aug-2015
273	West Lobe – Feature H, self-armouring erosion, from toe facing up slope (ATT270_Photo1.jpg)	571203.0167	7394926.196	11-Aug-2015
274	West Lobe – Rip rap along edge facing southwest (ATT271_Photo1.jpg)	571248.0175	7394953.007	11-Aug-2015
275	West Lobe – Perimeter slope facing southeast (ATT272_Photo1.jpg)	571247.3358	7394972.542	11-Aug-2015
276	West Lobe – Cover surface facing north (ATT273_Photo1.jpg)	571250.6394	7394977.032	11-Aug-2015

4.8.4 Soil Sampling

Table 4-37 presents a summary of analytical results for soil samples collected at the Upper Site West Landfill. DM-35, DM-39, DM-40, DM-47, DM-50, DM-51 and DM-52 represent upgradient sampling locations, whereas DM-31, DM-32, DM-33, DM-34, DM-36, DM-37, DM-38, DM-41, DM-42, DM-43, DM-44, DM-45, DM-46, DM-48, and DM-49 represent downgradient sampling locations. The deep soil samples at DM-34, DM-35, DM-38, DM-40, DM-41, DM-44, DM-45, DM-51 and DM-52 could not be collected due to refusal on bedrock or frozen ground. The shallow sample at DM-35 was collected but the sample jars were broken in transit and unable to be tested. No sample could be collected at DM-36 due to frozen ground.

DM-39

Sampling location DM-39 is located upgradient of West Lobe of the landfill, approximately 6 m northeast of the toe, and downgradient of Centre Lobe. The estimated elevation of this sampling point is 675.5 masl. As shown in Photo 405, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of brown sand with gravel and stone.

The shallow sample at DM-39 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (169 mg/kg), lead (10.7 mg/kg), zinc (153 mg/kg), chromium (187 mg/kg) and arsenic (1.9 mg/kg) exceeded their background and baseline concentrations. The concentration of copper also exceeded the baseline concentration plus 3σ (157 mg/kg). The concentration of most metals, including copper (95 mg/kg in 2014), were greater than the concentrations reported in 2014. No PHC or PCB were detected from the shallow sample at DM-39 in 2015.

The deep sample at DM-39 (40-50 cm) exhibited elevated concentrations of metals, at lower concentrations than those in the shallow sample. The concentrations of copper (111 mg/kg), zinc (126 mg/kg), chromium (172 mg/kg) and arsenic (1.9 mg/kg) exceeded their background and baseline concentrations. Elevated metal concentrations were reported in 2014 at similar concentrations. The concentration of TPH (56 mg/kg) was less than the

baseline concentration (138 mg/kg); however, the PHC F2 fraction concentration (48 mg/kg) exceeded the baseline concentrations (10 mg/kg). In 2014, PHC results were non-detectable. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the deep sample at DM-39 in 2015.

DM-40

Sampling location DM-40 is located upgradient of Centre Lobe of the landfill, immediately south of the toe. It is also downgradient of the West Landfill Centre Lobe A. The estimated elevation of this sampling point is 691 masl. As shown in Photo 408, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of reddish-brown sand with gravel and stone.

A duplicate sample was collected at the shallow DM-40 (0-15 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicated the original and duplicate sample results differ by less than 27% for all parameters, with the exception of lead, for which the difference was approximately 53%.

The shallow sample at DM-40 (0-15 cm) exhibited elevated concentrations of metals. The average concentrations of copper (166 mg/kg), lead (11 mg/kg), zinc (225 mg/kg), chromium (602 mg/kg) and arsenic (5 mg/kg) exceeded their background and baseline concentrations. The average concentrations of copper and chromium also exceeded the baseline concentration plus 3σ (157 mg/kg and 310 mg/kg, respectively). The concentration of most metals, including copper (97 mg/kg in 2014) and chromium (200 mg/kg in 2014), were greater than the concentrations reported in 2014. The average concentrations of TPH (16 mg/kg) and PHC F2 fraction (9 mg/kg) were less than the baseline concentration (138 mg/kg and 10 mg/kg, respectively). In 2014, PHC results were non-detectable. No PHC F4 fraction or PCB were detected from the shallow sample at DM-40 in 2015.

DM-47

Sampling location DM-47 is located upgradient of East Lobe of the landfill, approximately 13 m south of the toe. The estimated elevation of this sampling point is 690.5 masl. As shown in Photo 429, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of grey sand with some gravel and stone.

The shallow sample at DM-47 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of nickel (80.8 mg/kg) and cobalt (17.6 mg/kg) exceeded their baseline concentrations (61 mg/kg and 16 mg/kg, respectively) but were less than the background concentrations (141 mg/kg and 20 mg/kg, respectively). The concentrations of copper (111 mg/kg), lead (14.8 mg/kg), zinc (139 mg/kg), chromium (193 mg/kg) and arsenic (4.1 mg/kg) exceeded their background and baseline concentrations. Elevated metal concentrations were reported in 2014 at similar concentrations. The concentrations of TPH (3,316 mg/kg), PHC F1 fraction (187 mg/kg), PHC F2 fraction (3,000 mg/kg) and PHC F3 fraction (129 mg/kg) exceeded their baseline concentrations. The concentrations of TPH and PHC F2 fraction also exceeded the baseline concentration plus 3σ (1208 mg/kg and 264 mg/kg, respectively). The concentration of TPH was greater than the concentration reported in 2014 (2,144 mg/kg). No PHC F4 fraction or PCB were detected from the shallow sample at DM-47 in 2015.

The deep sample at DM-47 (40-50 cm) exhibited elevated concentrations of metals, at similar concentrations to those in the shallow sample. The concentration of nickel (66.2 mg/kg) exceeded the baseline concentration (61 mg/kg) but was less than the background concentrations (141 mg/kg). The concentrations of copper

(95.8 mg/kg), cobalt (21 mg/kg), lead (12.4 mg/kg), zinc (163 mg/kg), chromium (255 mg/kg) and arsenic (4 mg/kg) exceeded their background and baseline concentrations. Elevated metal concentrations were reported in 2014 at similar concentrations. The concentration of TPH (87 mg/kg) was less than the baseline concentration (138 mg/kg); however, the PHC F2 fraction concentration (79 mg/kg) exceeded the baseline concentrations (10 mg/kg). The concentration of TPH was less than the concentration reported in 2014 (617 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the deep sample at DM-47 in 2015

DM-50

Sampling location DM-50 is located upgradient of Centre Lobe A of the landfill, approximately 12 m east of the toe. The estimated elevation of this sampling point is 695 masl. As shown in Photo 438, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of brown sand with some gravel and stone.

The shallow sample at DM-50 (0-15 cm) exhibited elevated concentrations of metals. The concentration of zinc (82.3 mg/kg) exceeded the background concentration (70 mg/kg) but was less than the baseline concentration (115 mg/kg). The concentrations of copper (89.9 mg/kg), lead (12.2 mg/kg), chromium (154 mg/kg) and arsenic (2.6 mg/kg) exceeded their background and baseline concentrations. The concentration of all metals, with the exception of zinc (82 mg/kg in 2014), were less than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-50 in 2015.

The deep sample at DM-50 (30-40 cm) exhibited elevated concentrations of metals, at higher concentrations than those in the shallow sample. The concentration of zinc (92.9 mg/kg) exceeded the background concentration (70 mg/kg) but was less than the baseline concentration (115 mg/kg). The concentrations of copper (118 mg/kg), lead (13.8 mg/kg), chromium (186 mg/kg) and arsenic (4.2 mg/kg) exceeded their background and baseline concentrations. The concentration of all metals, with the exception of lead (10 mg/kg in 2014), were less than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-50 in 2015.

DM-51

Sampling location DM-51 is located upgradient of Centre Lobe A of the landfill, approximately 20 m west of the toe. The estimated elevation of this sampling point is 695 masl. As shown in Photo 441, the area is largely covered with sand and gravel and is not vegetated. The soils consisted of grey sand with some gravel and stone.

The shallow sample at DM-51 (0-15 cm) exhibited elevated concentrations of metals. The concentration of zinc (107 mg/kg) and chromium (104 mg/kg) exceeded their background concentrations (70 mg/kg and 90 mg/kg, respectively) but were less than the baseline concentrations (115 mg/kg and 133 mg/kg, respectively). In addition, the concentrations of lead (25.6 mg/kg) and arsenic (1.9 mg/kg) exceeded their background and baseline concentrations. The concentrations of all metals were greater than or similar to the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-51 in 2015.

DM-52

Sampling location DM-52 is located upgradient of Centre Lobe of the landfill, approximately 10 m south of the toe and 10 m north of the toe of Centre Lobe A. This location is downgradient of Centre Lobe A. The estimated elevation of this sampling point is 691 masl. As shown in Photo 444, the area is largely covered with sand, rock and boulders is not vegetated. The soils consisted of grey sand with some gravel and stone.

In the shallow sample at DM-52 (0-15 cm), the concentration of nickel (116 mg/kg) exceeded the baseline concentration (61 mg/kg) but was less than the background concentration (141 mg/kg). In addition, the concentration of cobalt (28.2 mg/kg) exceeded the background (20 mg/kg) and baseline (16 mg/kg) concentrations. The concentrations of all metals, including nickel (290 mg/kg in 2014) and cobalt (43 mg/kg in 2014) were less than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-52 in 2015.

DM-31

Sampling location DM-31 is located downgradient of the West Lobe of the landfill, approximately 10 m south of the toe. The estimated elevation of this sampling point is 660.5 masl. As shown in Photo 308, the area is largely covered with sand, gravel and some rock and is not vegetated. The soils consisted of grey sand with some gravel and stone.

The shallow sample at DM-31 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (76.4 mg/kg), zinc (150 mg/kg) and chromium (170 mg/kg) exceeded their background and baseline concentrations. The concentrations of most metals were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-31 in 2015.

The deep sample at DM-31 (30-40 cm) exhibited elevated concentrations of metals, at similar concentrations to those in the shallow sample. The concentrations of copper (61.5 mg/kg) and arsenic (1.1 mg/kg) exceeded their background concentrations (60 mg/kg and 1.0 mg/kg, respectively) but were less than the baseline concentrations (68 mg/kg and 1.3 mg/kg, respectively. The concentrations of zinc (138 mg/kg) and chromium (165 mg/kg) exceeded their background (70 mg/kg and 90 mg/kg, respectively) and baseline (115 mg/kg and 133 mg/kg) concentrations. The concentration of arsenic was less than the concentration reported in 2014 (1.7 mg/kg). The concentration of all metals, notably zinc (97 mg/kg in 2014) and chromium (100 mg/kg in 2014) were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-31 in 2015.

DM-32

Sampling location DM-32 is located downgradient of the West Lobe of the landfill, approximately 8 m southwest of the toe. The estimated elevation of this sampling point is 651 masl. As shown in Photo 386, the area is covered with gravel and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

The shallow sample at DM-32 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (152 mg/kg), lead (50.8 mg/kg), zinc (138 mg/kg), chromium (282 mg/kg) and arsenic (3.1 mg/kg) exceeded their background and baseline concentrations. The concentrations of all metals were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-32 in 2015.

The deep sample at DM-32 (20-30 cm) exhibited elevated concentrations of metals, at lower concentration than those in the shallow sample. The concentrations of copper (120 mg/kg), lead (26.2 mg/kg), zinc (117 mg/kg), chromium (223 mg/kg) and arsenic (2.3 mg/kg) exceeded their background and baseline concentrations. The concentrations of all metals, with the exception of arsenic (5.3 mg/kg in 2014) were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-32 in 2015.

DM-33

Sampling location DM-33 is located downgradient of the West Lobe of the landfill, approximately 10 m west of the toe. The estimated elevation of this sampling point is 652 masl. As shown in Photo 389, the area is covered with gravel and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at DM-33 (0-15 cm), the concentration of arsenic (1.5 mg/kg) exceeded the background (1.0 mg/kg) and baseline concentrations (1.3 mg/kg) but was less than the baseline concentration plus 3σ (8.3 mg/kg). The concentrations of most metals, including arsenic (0.6 mg/kg), were greater than or similar to those observed in 2014. No PHC or PCB were detected from the shallow sample at DM-33 in 2015.

The results of the deep sample at DM-33 (20-30 cm) indicated that all metal concentrations were less than the background and baseline values. The metals concentrations were similar to those observed in 2014. No PHC or PCB were detected from the deep sample at DM-33 in 2015.

DM-34

Sampling location DM-34 is located downgradient of the West Lobe of the landfill, approximately 8 m west of the toe. The estimated elevation of this sampling point is 660 masl. As shown in Photo 392, the area is largely covered with sand, rock and boulders is not vegetated. The soils consisted of reddish-brown sand with some gravel and stone.

A duplicate sample was collected at the shallow DM-34 (0-15 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicated the original and duplicate sample results differ by less than 28% for all parameters, with the exception of copper, for which the results differ by approximately 31%.

The results of the shallow sample at DM-33 (0-15 cm) indicated that all metal concentrations were less than the background and baseline values. The concentrations of all metals were less than those observed in 2014. No PHC or PCB were detected from the shallow sample at DM-34 in 2015.

DM-37

Sampling location DM-37 is located downgradient of the West Lobe of the landfill, approximately 6 m west of the southerly part of the landfill toe. The estimated elevation of this sampling point is 662 masl. As shown in Photo 399, the area consists of sand and gravel with some rocks and sparse vegetation. The soils consisted of brown sand with stone.

The shallow sample at DM-37 (0-15 cm) exhibited elevated concentrations of metals. The concentration of zinc (103 mg/kg) exceeded the background concentration (70 mg/kg) but was less than the baseline concentration (115 mg/kg). In addition, the concentrations of chromium (137 mg/kg) and arsenic (1.9 mg/kg) exceeded their

background (90 mg/kg and 1.0 mg/kg, respectively) and baseline (133 mg/kg and 1.3 mg/kg, respectively) concentrations. Elevated concentrations of metals were reported in 2014 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-37 in 2015.

In the deep sample at DM-37 (30-40 cm), the concentrations of zinc (93 mg/kg) and chromium (125 mg/kg) exceeded their background concentrations (70 mg/kg and 90 mg/kg, respectively) but were less than their baseline concentrations (115 mg/kg and 133 mg/kg, respectively). Elevated concentrations of metals were reported in 2014 at similar concentrations. No PHC or PCB were detected from the deep sample at DM-37 in 2015.

DM-38

Sampling location DM-38 is located downgradient of the West Lobe of the landfill, approximately 6 m southwest of the toe. The estimated elevation of this sampling point is 662 masl. As shown in Photo 402, the area is largely covered with sand, rock and boulders is not vegetated. The soils consisted of grey sand with some gravel and stone.

The shallow sample at DM-38 (0-15 cm) exhibited elevated concentrations of metals. The concentration of chromium (91.9 mg/kg) exceeded the background concentration (90 mg/kg) but was less than the baseline concentration (133 mg/kg). The concentrations of copper (92.3 mg/kg), lead (124 mg/kg), zinc (308 mg/kg) and arsenic (1.5 mg/kg) exceeded their background and baseline concentrations. In addition, the concentrations of lead and zinc exceeded their baseline concentrations plus 3σ (57 mg/kg and 254 mg/kg, respectively). Elevated concentrations of metals were reported in 2014 at similar concentrations. The concentration of TPH (89 mg/kg) was less than the baseline concentration (138 mg/kg); however, the PHC F3 fraction concentration (83 mg/kg) exceeded the baseline concentrations (10 mg/kg). In 2014, PHC results were non-detectable. The concentration of the PHC F4 fraction was 61 mg/kg in 2015. No PCB were detected from the shallow sample at DM-38 in 2015.

DM-41

Sampling location DM-41 is located downgradient of the Centre Lobe of the landfill, approximately 8 m southwest of the toe. The estimated elevation of this sampling point is 685.5 masl. As shown in Photo 412, the area is covered with sand, gravel and rock with sparse vegetation. The soils consisted of grey sand with stone.

The shallow sample at DM-41 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (171 mg/kg), lead (27.5 mg/kg), zinc (351 mg/kg), chromium (178 mg/kg) and arsenic (1.4 mg/kg) exceeded their background and baseline concentrations. In addition, the concentrations of copper and zinc exceeded their baseline concentrations plus 3σ (157 mg/kg and 254 mg/kg, respectively). The concentrations of all metals, with the exception of lead (34 mg/kg in 2014), were greater than the concentrations reported in 2014. The concentration of TPH (49 mg/kg) was less than the baseline concentration (138 mg/kg); however, the PHC F3 fraction concentration (43 mg/kg) exceeded the baseline concentrations (10 mg/kg). In 2014, PHC results were non-detectable. No PHC F4 fraction or PCB were detected from the shallow sample at DM-41 in 2015.

DM-42

Sampling location DM-42 is located downgradient of the Centre Lobe of the landfill, approximately 3 m west of the toe. The estimated elevation of this sampling point is 676.5 masl. As shown in Photo 416, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of brown sand with gravel and stone.

The shallow sample at DM-42 (0-15 cm) exhibited elevated concentrations of metals. The concentration of nickel (118 mg/kg) exceeded the baseline concentration (61 mg/kg) but was less than the background concentration (141 mg/kg). The concentrations of copper (95 mg/kg), cobalt (43.7 mg/kg), lead (10.5 mg/kg), zinc (173 mg/kg), chromium (151 mg/kg) and arsenic (3.2 mg/kg) exceeded their background and baseline concentrations. In addition, the concentration of cobalt exceeded the baseline concentration plus 3σ (37 mg/kg). Elevated metal concentrations were reported in 2014 at similar concentrations. No PHC or PCB were detected from the shallow sample at DM-42 in 2015.

The deep sample at DM-42 (40-50 cm) exhibited elevated concentrations of metals, at generally lower concentrations than those in the shallow sample. The concentration of cobalt (18.5 mg/kg) exceeded the baseline concentration (16 mg/kg) but was less than the background concentration (20 mg/kg). The concentrations of copper (98.7 mg/kg), zinc (152 mg/kg), chromium (191 mg/kg) and arsenic (1.8 mg/kg) exceeded their background and baseline concentrations. The concentrations of all metals were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-42 in 2015.

DM-43

Sampling location DM-43 is located downgradient of the West Lobe of the landfill, approximately 6 m north of the toe. The estimated elevation of this sampling point is 676 masl. As shown in Photo 417, the area is covered with sand, gravel and rock and is not vegetated. The soils consisted of grey sand with gravel and stone.

In the shallow sample at DM-43 (0-15 cm), the concentrations of zinc (79.8 mg/kg) and chromium (127 mg/kg) exceeded their background concentrations (70 mg/kg and 90 mg/kg, respectively) but were less than their baseline concentrations (115 mg/kg and 133 mg/kg, respectively). Elevated concentrations of metals were reported in 2014 at similar concentrations. No PHC or PCB were detected from the shallow sample at DM-43 in 2015.

A duplicate sample was collected at the deep DM-43 (20-30 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicated the original and duplicate sample results differ by less than 21% for all parameters, with the exception of lead, for which the results differ by approximately 52%.

In the deep sample at DM-43 (20-30 cm), the average concentrations of zinc (72 mg/kg) and chromium (112 mg/kg) exceeded their background concentrations (70 mg/kg and 90 mg/kg, respectively) but were less than their baseline concentrations (115 mg/kg and 133 mg/kg, respectively). Elevated concentrations of metals were reported in 2014 at similar concentrations. No PHC or PCB were detected from the deep sample at DM-43 in 2015.

DM-44

Sampling location DM-44 is located downgradient of the Centre Lobe of the landfill, approximately 3 m north of the toe. The estimated elevation of this sampling point is 676.5 masl. As shown in Photo 420, the area is covered with sand, gravel and rock and is not vegetated. The soils consisted of grey sand with gravel and stone.

The shallow sample at DM-44 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (244 mg/kg), lead (13.3 mg/kg), zinc (222 mg/kg), chromium (239 mg/kg) and arsenic (7 mg/kg) exceeded their background and baseline concentrations. In addition, the concentration of copper exceeded the baseline concentration plus 3σ (157 mg/kg). The concentration of most metals, including copper (110 mg/kg in 2014), were greater than the concentrations reported in 2014. No PHC or PCB were detected from the shallow sample at DM-44 in 2015.

DM-45

Sampling location DM-45 is located downgradient of the Centre Lobe of the landfill, immediately north of the toe. The estimated elevation of this sampling point is 678 masl. As shown in Photo 423, the area was largely snow covered at the time of sampling. The area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of brown sand with gravel and stone.

The shallow sample at DM-45 (0-15 cm) exhibited elevated concentrations of metals. The concentration of nickel (103 mg/kg) exceeded the baseline concentration (61 mg/kg) but was less than the background concentration (141 mg/kg). The concentrations of copper (141 mg/kg), cobalt (26.5 mg/kg), lead (11.5 mg/kg), zinc (158 mg/kg), chromium (178 mg/kg) and arsenic (1.7 mg/kg) exceeded their background and baseline concentrations. Elevated metal concentrations were reported in 2014 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-45 in 2015.

DM-46

Sampling location DM-46 is located downgradient of the Centre Lobe of the landfill, approximately 8 m north of the toe. The estimated elevation of this sampling point is 681.5 masl. As shown in Photo 426, the area is covered with sand, gravel and rock and is not vegetated. The soils consisted of reddish-brown sand with some gravel and stone.

A duplicate sample was collected at the shallow DM-43 (0-15 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicated the original and duplicate sample results differ by less than 28% for all parameters, with the exception of lead, for which the results differ by approximately 39%.

The shallow samples at DM-46 (0-15 cm) exhibited elevated concentrations of metals. The average concentrations of copper (122 mg/kg), lead (11 mg/kg), zinc (144 mg/kg), chromium (161 mg/kg) and arsenic (5 mg/kg) exceeded their background and baseline concentrations. The concentration of most metals, including copper (70 mg/kg in 2014), were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow samples at DM-46 in 2015.

The deep sample at DM-46 (40-50 cm) exhibited elevated concentrations of metals, at similar concentrations to those in the shallow sample. The concentrations of copper (139 mg/kg), lead (12.4 mg/kg), zinc (128 mg/kg), chromium (158 mg/kg) and arsenic (7.5 mg/kg) exceeded their background and baseline concentrations. Elevated metal concentrations were reported in 2014 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-46 in 2015.

DM-48

Sampling location DM-48 is located downgradient of the East Lobe of the landfill, immediately north of the toe. The estimated elevation of this sampling point is 681.5 masl. As shown in Photo 432, the area is largely covered with sand and gravel and is not vegetated. The soils consisted of grey sand with some gravel.

A duplicate sample was collected at the shallow DM-48 (0-15 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicated the original and duplicate sample results differ by less than 14% for all parameters.

The shallow samples at DM-48 (0-15 cm) exhibited elevated concentrations of metals. The average concentrations of copper (114 mg/kg), nickel (357 mg/kg), cobalt (51 mg/kg), lead (28 mg/kg), zinc (140 mg/kg), chromium (487 mg/kg) and arsenic (20 mg/kg) exceeded their background and baseline concentrations. In addition, the concentrations of nickel, cobalt, chromium and arsenic exceeded their baseline concentrations plus 3σ. The concentration of most metals, including nickel, cobalt and chromium, were greater than the concentrations reported in 2014. The average concentration of TPH (124 mg/kg) was less than the baseline concentration (138 mg/kg); however, the PHC F2 fraction (13 mg/kg) and PHC F3 fraction (108 mg/kg) concentrations exceeded their baseline concentrations (10 mg/kg and 10 mg/kg, respectively). The TPH concentration was greater than the concentration reported in 2014 (26 mg/kg). The average concentration of the PHC F4 fraction was 11 mg/kg in 2015. The concentration of PCB (0.05 mg/kg), exceeded the background concentration (0.0002 mg/kg) but was less than the baseline concentration (0.1 mg/kg). In 2014, PCB results were non-detectable.

The deep sample at DM-48 (40-50 cm) exhibited elevated concentrations of metals, at lower concentrations than those in the shallow sample. The concentrations of copper (152 mg/kg), nickel (221 mg/kg), cobalt (39.3 mg/kg), lead (16.8 mg/kg), zinc (131 mg/kg), chromium (311 mg/kg) and arsenic (14.8 mg/kg) exceeded their background and baseline concentrations. In addition, the concentrations of nickel, cobalt, chromium and arsenic exceeded their baseline concentrations plus 3σ. The concentration of all metals were greater than the concentrations reported in 2014. No PHC or PCB were detected from the deep sample at DM-48 in 2015.

DM-49

Sampling location DM-49 is located downgradient of the East Lobe of the landfill, immediately north of the toe. The estimated elevation of this sampling point is 682 masl. As shown in Photo 437, the area is largely covered with sand and gravel and is not vegetated. The soils consisted of brown sand with some gravel and stone.

A duplicate sample was collected at the shallow DM-49 (0-15 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicated the original and duplicate sample results differ by less than 15% for all parameters, with the exception of arsenic, PHC F2 fraction and PHC F3 fraction, for which the results differ by up to 92%.

The shallow samples at DM-49 (0-15 cm) exhibited elevated concentrations of metals. The average concentrations of nickel (82 mg/kg) and cobalt (18 mg/kg) exceeded their baseline concentrations (61 mg/kg and 16 mg/kg, respectively) but were less than their background concentrations (141 mg/kg and 20 mg/kg, respectively). The average concentrations of copper (107 mg/kg), lead (14 mg/kg), zinc (147 mg/kg), chromium (220 mg/kg) and arsenic (3 mg/kg) exceeded their background and baseline concentrations. The concentration of most metals were greater than the concentrations reported in 2014. The average concentration of TPH (143 mg/kg), PHC F2 fraction (77 mg/kg) and PHC F3 fraction (52 mg/kg) concentrations exceeded their baseline concentrations. The TPH concentration was less than the concentration reported in 2014 (249 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the shallow sample at DM-49 in 2015.

The deep sample at DM-49 (40-50 cm) exhibited elevated concentrations of metals, at generally lower concentrations than those in the shallow sample. The concentrations of copper (90.6 mg/kg), cobalt (20.5 mg/kg), lead (11.9 mg/kg), chromium (174 mg/kg) and arsenic (1.4 mg/kg) exceeded their background and baseline concentrations. The concentrations of most metals were greater than the concentrations were reported in 2014. The concentration of TPH (131 mg/kg) was less than the baseline concentration (138 mg/kg); however, the PHC F2 fraction (90 mg/kg) and PHC F3 fraction (37 mg/kg) concentrations exceeded the baseline concentrations (10 mg/kg and 10 mg/kg, respectively). In 2014, PHC results were non-detectable. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the deep sample at DM-49 in 2015.

Table 4-37: Soil Chemical Analysis Results – Upper Site West Landfill (West, Centre and East Lobes)

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**68**	**61**	**16**	**1.0**	**10**	**115**	**133**	**1.3**	**0.1**	**0.1**	**30**	**10**	**10**	**NA**
Baseline + 3σ		157	203	37	2.2	57	254	310	8.3	0.12	0.46	46	264	217	NA
Upgradient															
DM-35 (shallow) [1]															
DM-35 (deep) [2]															
DM-39 (0-15)	0-15	**169**	29.3	11.3	<0.5	**10.7**	**153**	**187**	**1.9**	<0.1	<0.05	<7	<4	<8	<6
DM-39 (40-50)	40-50	**111**	35	13	<0.5	8.4	**126**	**172**	**1.9**	<0.1	<0.05	<7	**48**	<8	<6
DM-40 (0-15)	0-15	**166**	39.7	10.6	<0.5	**13.7**	**216**	**618**	**5.2**	<0.1	<0.05	<7	<4	<8	<6
DM-40 (0-15) (Duplicate)	0-15	**166**	41	9.3	<0.5	8	**234**	**586**	**4**	<0.10	<0.05	<5	**14**	<8	<6
DM-40 (0-15) (Dup Avg)	0-15	**166**	40	10.0	<0.5	**11**	**225**	**602**	**5**	<0.1	<0.05	<6	9	<8	<6
DM-40 (deep) [2]															
DM-47 (0-15)	0-15	**111**	**80.8**	**17.6**	<0.5	**14.8**	**139**	**193**	**4.1**	<0.1	<0.05	**187**	**3000**	**129**	<6
DM-47 (40-50)	40-50	**95.8**	**66.2**	**21**	<0.5	**12.4**	**163**	**255**	**4**	<0.1	<0.05	<7	**79**	<8	<6
DM-50 (0-15)	0-15	**89.9**	51.5	11.5	<0.5	**12.2**	82.3	**154**	**2.6**	<0.1	<0.05	<7	<4	<8	<6
DM-50 (30-40)	30-40	**118**	55.6	13.2	<0.5	**13.8**	92.9	**186**	**4.2**	<0.1	<0.05	<7	<4	<8	<6
DM-51 (0-15)	0-15	48.3	60.6	11.9	<0.5	**25.6**	107	104	**1.9**	<0.1	<0.05	<7	<4	<8	<6

Table 4-37: Soil Chemical Analysis Results – Upper Site West Landfill (West, Centre and East Lobes)

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**68**	**61**	**16**	**1.0**	**10**	**115**	**133**	**1.3**	**0.1**	**0.1**	**30**	**10**	**10**	**NA**
Baseline + 3σ		157	203	37	2.2	57	254	310	8.3	0.12	0.46	46	264	217	NA
DM-51 (deep) [2]															
DM-52 (0-15)	0-15	56.8	**116**	**28.2**	<0.5	5.6	42.9	44.2	<1	<0.1	<0.05	<7	<4	<8	<6
DM-52 (deep) [2]															
Downgradient															
DM-31 (0-15)	0-15	**76.4**	28.8	11.3	<0.5	8.1	**150**	**170**	1	<0.1	<0.05	<7	<4	<8	<6
DM-31 (30-40)	30-40	61.5	32.9	12.3	<0.5	8.5	**138**	**165**	1.1	<0.1	<0.05	<7	<4	<8	<6
DM-32 (0-15)	0-15	**152**	46.9	15	<0.5	**50.8**	**138**	**282**	**3.1**	<0.1	<0.05	<7	<4	<8	<6
DM-32 (20-30)	20-30	**120**	36	11.6	<0.5	**26.2**	**117**	**223**	**2.3**	<0.1	<0.05	<7	<4	<8	<6
DM-33 (0-15)	0-15	35.4	47.8	12.3	<0.5	5.7	57.3	70.9	**1.5**	<0.1	<0.05	<7	<4	<8	<6
DM-33 (20-30)	20-30	36.1	33	10.2	<0.5	4.7	54.9	67.3	<1	<0.1	<0.05	<7	<4	<8	<6
DM-34 (0-15)	0-15	12.5	45.7	8.9	<0.5	5.1	30.7	26.4	<1	<0.1	<0.05	<7	<4	<8	<6
DM-34 (deep) [2]															
DM-34 (0-15) (Duplicate)	0-15	17	60	10	<0.5	5	41	30	<1	<0.10	<0.05	<5	<4	<8	<6
DM-34 (0-15) (Dup Avg)	0-15	15	53	9	<0.5	5	36	28	<1	<0.1	<0.05	<6	<4	<8	<6

Table 4-37: Soil Chemical Analysis Results – Upper Site West Landfill (West, Centre and East Lobes)

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**68**	**61**	**16**	**1.0**	**10**	**115**	**133**	**1.3**	**0.1**	**0.1**	**30**	**10**	**10**	**NA**
Baseline + 3σ		157	203	37	2.2	57	254	310	8.3	0.12	0.46	46	264	217	NA
DM-36 (shallow) [3]															
DM-36 (deep) [3]															
DM-37 (0-15)	0-15	55	35.3	12.3	<0.5	8.5	103	**137**	**1.9**	<0.1	<0.05	<7	<4	<8	<6
DM-37 (30-40)	30-40	31.6	39.8	12.7	<0.5	5.1	93	125	<1	<0.1	<0.05	<7	<4	<8	<6
DM-38 (0-15)	0-15	**92.3**	47.9	14.6	<0.5	**124**	**308**	91.9	**1.5**	<0.1	<0.05	<7	<4	**83**	61
DM-38 (deep) [2]															
DM-41 (0-15)	0-15	**171**	51.8	15.1	<0.5	**27.5**	**351**	**178**	**1.4**	<0.1	<0.05	<7	<4	**43**	<6
DM-41 (deep) [2]															
DM-42 (0-15)	0-15	**95**	**118**	**43.7**	0.6	**10.5**	**173**	**151**	**3.2**	<0.1	<0.05	<7	<4	<8	<6
DM-42 (40-50)	40-50	**98.7**	50.5	**18.5**	<0.5	8.5	**152**	**191**	**1.8**	<0.1	<0.05	<7	<4	<8	<6
DM-43 (0-15)	0-15	48.9	44.4	15.4	<0.5	5.9	79.8	127	1	<0.1	<0.05	<7	<4	<8	<6
DM-43 (20-30)	20-30	39.8	38.2	13.8	<0.5	5.1	73.3	119	1.1	<0.1	<0.05	<7	<4	<8	<6
DM-43 (20-30) (Duplicate)	20-30	37	34	11	<0.5	3	71	105	<1	<0.10	<0.05	<5	<4	<8	<6
DM-43 (20-30) (Dup Avg)	20-30	38	36	12	<0.5	4	72	112	1	<0.1	<0.05	<6	<4	<8	<6

Table 4-37: Soil Chemical Analysis Results – Upper Site West Landfill (West, Centre and East Lobes)

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**68**	**61**	**16**	**1.0**	**10**	**115**	**133**	**1.3**	**0.1**	**0.1**	**30**	**10**	**10**	**NA**
Baseline + 3σ		157	203	37	2.2	57	254	310	8.3	0.12	0.46	46	264	217	NA
DM-44 (0-15)	0-15	**244**	26.4	10.1	0.6	**13.3**	**222**	**239**	**7**	<0.1	<0.05	<7	<4	<8	<6
DM-44 (deep) [2]															
DM-45 (0-15)	0-15	**141**	**103**	**26.5**	<0.5	**11.5**	**158**	**178**	**1.7**	<0.1	<0.05	<7	<4	<8	<6
DM-45 (deep) [2]															
DM-46 (0-15)	0-15	**116**	58.4	15.9	<0.5	**13.4**	**139**	**162**	**5.1**	<0.1	<0.05	<7	<4	<8	<6
DM-46 (0-15) (Duplicate)	0-15	**128**	49	12	<0.5	9	**148**	**159**	**5**	<0.10	<0.05	<5	<4	<8	<6
DM-46 (0-15) (Dup Avg)	0-15	**122**	54	14	<0.5	**11**	**144**	**161**	**5**	<0.1	<0.05	<6	<4	<8	<6
DM-46 (40-50)	40-50	**139**	44.3	11.5	<0.5	**12.4**	**128**	**158**	**7.5**	<0.1	<0.05	<7	<4	<8	<6
DM-48 (0-15)	0-15	**115**	**344**	**52.8**	<0.5	**29.7**	**134**	**496**	**21**	<0.1	<0.05	<7	<4	**46**	<6
DM-48 (0-15) (Duplicate)	0-15	**113**	**369**	**48.9**	<0.5	**26**	**146**	**477**	**19**	<0.10	0.058	<5	**22**	**170**	16
DM-48 (0-15) (Dup Avg)	0-15	**114**	**357**	**51**	<0.5	**28**	**140**	**487**	**20**	<0.1	0.05	<6	**13**	**108**	11
DM-48 (40-50)	40-50	**152**	**221**	**39.3**	<0.5	**16.8**	**131**	**311**	**14.8**	<0.1	<0.05	<7	<4	<8	<6
DM-49 (0-15)	0-15	**105**	**75.9**	**18**	<0.5	**13.8**	**137**	**219**	**3.5**	<0.1	<0.05	<7	**92**	**75**	<6

Table 4-37: Soil Chemical Analysis Results – Upper Site West Landfill (West, Centre and East Lobes)

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.50	0.0002	NA	NA	NA	NA
Baseline Mean		**68**	**61**	**16**	**1.0**	**10**	**115**	**133**	**1.3**	**0.1**	**0.1**	**30**	**10**	**10**	**NA**
Baseline + 3σ		157	203	37	2.2	57	254	310	8.3	0.12	0.46	46	264	217	NA
DM-49 (0-15) (Duplicate)	0-15	**109**	**88**	**17.1**	<0.5	**15**	**157**	**220**	**2**	<0.10	<0.05	<5	**61**	**28**	<6
DM-49 (0-15) (Dup Avg)	0-15	**107**	**82**	**18**	<0.5	**14**	**147**	**220**	**3**	<0.1	<0.05	<6	**77**	**52**	<6
DM-49 (40-50)	40-50	**90.6**	**87.6**	**20.5**	<0.5	**11.9**	114	**174**	**1.4**	<0.1	<0.05	<7	**90**	**37**	<6

Notes:

NA: Not available.

Underlined values: Results exceed Background arithmetic mean.

Bold Values: Results exceed Baseline arithmetic mean.

1: The shallow sample at DM-35 was collected but the sample jars were broken in transit and unable to be tested.

2: The deep soil samples at DM-34, DM-35, DM-38, DM-40, DM-41, DM-44, DM-45, DM-51 and DM-52 could not be collected due to refusal on bedrock or frozen ground.

3: No sample could be collected at DM-36 due to frozen ground.

4.8.5 Conclusions and Overall Performance of the Upper Site West Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site West Landfill (West, Centre, Centre Lobe A and East Lobes). Some occasional self-armouring erosion and minor tension cracks were observed. The overall stability performance of these landfill areas was assessed as Acceptable.

Soil samples were collected at of 21 of 22 designated locations in 2015; at a number of locations, the deeper sample could not be collected due to refusal or frozen ground. Two soil samples (shallow and deep) were collected at 12 of the 21 locations sampled. Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected above the background/baseline arithmetic mean at a number of locations. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-40 (shallow sample), located upgradient of the Centre Lobe of the landfill, DM-41 (shallow sample), located downgradient of the Centre Lobe of the landfill and DM-48 (shallow sample), located downgradient of the East Lobe of the landfill. At these locations, the concentrations of most metals were greater than the concentrations reported in 2014. Similarly, at most other sampling locations, the concentrations of metals were greater than or similar to the concentrations reported in 2014.

Detectable concentrations of PHC were noted at DM-38, DM-39, DM-40, DM-41, DM-47, DM-48 and DM-49, at TPH concentrations ranging from 16 mg/kg to 3,316 mg/kg. The concentrations of TPH were highest in the sample at DM-47 (3,316 mg/kg); the TPH concentration exceeded the baseline concentration (138 mg/kg). The TPH concentration was greater than the concentration reported in 2014 (2,144 mg/kg). The average concentration of PCB (0.05 mg/kg) in the shallow samples at DM-48 exceeded the background concentration (0.0002 mg/kg) but was less than the baseline concentration (0.1 mg/kg). No PCB were detected at this location in 2014. No detectable concentrations of PHC or PCB were noted in any of the other samples in 2015.

Overall, it was noted that a number of the soil sampling results, notably at the downgradient sampling locations DM-41 and DM-48, were greater than in 2014 monitoring session. This may be reflective of an ongoing impact from the landfill.

4.8.6 Recommendations for Upper Site West Landfill

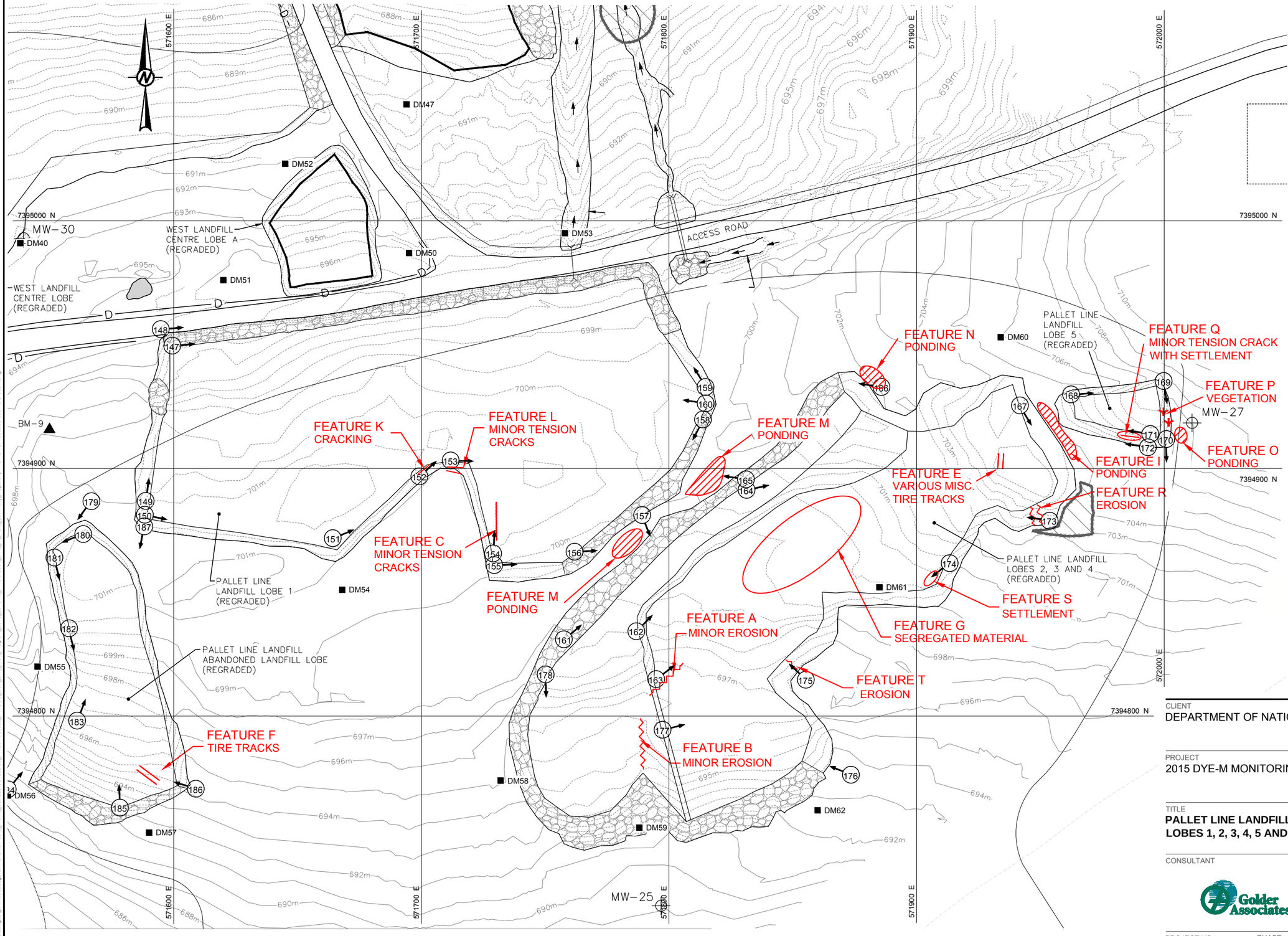
Whereas there are some notable elevated concentrations of the measured parameters, no modifications to the ongoing monitoring program at this landfill are currently recommended. Additional data is required to assess if the increases relate to impact from the landfill or reflect variations in natural conditions or sampling/analytical program influences. Careful review of the exceedances, notably at DM-40 and DM-47 following further sampling in 2016, is warranted.

4.9 Upper Site Pallet Line Landfill - Lobes 1 to 5, and Abandoned Landfill Lobe

4.9.1 Landfill Description

The Upper Site Pallet Line Landfill is located approximately 800 m west of the Station Area and on the southern side of the road from the West Landfill. The north end of Lobe 1 this landfill is upgradient (upslope) of the Centre, Centre A and East lobes the West Landfill. The Upper Site Pallet Line Landfill was created during DEW Line operations. The area was a flat sand and gravel pad (ESG 2002b). The Upper Site Pallet Line Landfill consists of multiple lobes (Lobes 1–5 and the Abandoned Lobe), which were regraded with clean fill in 2008 and 2009 during the remediation of DYE-M. The monitoring program consists of soil monitoring. Lobe 5 does not require monitoring. These regraded landfill areas cover approximately 44,000 m^2. Approximate sampling locations are provided in Figure DYE-M.10.

It is noted that monitoring locations DM-50 and DM-51 overlap between the Upper Site Pallet Line Landfill, and the West Landfill. Results from these monitoring locations were used in the evaluation of both landfills.



LEGEND:

- CRACKING (NTS)
- EROSION (NTS)
- SEEPAGE / PONDING (NTS)
- SETTLEMENT (NTS)
- VEGETATION (NTS)
- TIRE TRACKS (NTS)
- SOIL SAMPLING LOCATION
- PHOTOGRAPH LOCATION
- BODY OF WATER
- MONITORING WELL LOCATION
- PERMANENT BENCHMARK LOCATION
- REGRADED RIP RAP
- DRAINAGE

NOTE
GRID PROJECTION IS NAD83 ZONE 20N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 25 50
1:1,500 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
PALLET LINE LANDFILL
LOBES 1, 2, 3, 4, 5 AND ABANDONED LANDFILL LOBE

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.10

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada99_PROJ\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0001_DYE_M_Field_Summary_Report\ | File Name: 1530908-0001-BG-0021.dwg

4.9.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- The deep soil samples at DM-51, DM-54, DM-56 and DM-59 could not be collected due to refusal.

4.9.3 Visual Inspection

The Upper Site Pallet Line Landfill has multiple locations with observed settlement, erosion, cracking, vegetation and ponded water features. Table 4-38 presents a summary of observed visual inspection features and Table 4-39 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-40 is a log of photographs taken during the 2015 visual inspection.

Some new (Features K, L and Q) and previously noted (Feature C) minor tension cracks were observed in Lobes 1 and 5. Also, some new (Features R and T) and previously noted (Features A and B) self-armouring erosions were observed on the cover surface and slopes of Lobe 2. Occasional ponded water was observed between Lobe 1 and Lobe 2 (Features M and N) as well as at the toe of Lobe 5 (Features I and O). An isolated settlement (Feature S) was also observed on the southeast slope of Lobe 2. These features have no significant impact on the stability of the Upper Site Pallet Line Landfill.

The previously noted area of segregation (Feature G) on the surface of the lobe was considered as an insignificant feature. Tire tracks on the top surface of Lobes 2, 3, 4, 5 and the Abandoned Landfill Lobe (previously noted Features E and F) were observed. Isolated sparse vegetation (Feature P) was also observed in Lobe 5.

Table 4-38: Visual Inspection Checklist – Upper Site Pallet Line Landfill

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Upper Site Pallet Line Landfill
DATE OF INSPECTION: August 12, 2015
DATE OF PREVIOUS INSPECTION: August 10, 2014
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-38: Visual Inspection Checklist – Upper Site Pallet Line Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	Y	Feature S	Lobe 2 – southeast slope	571913	7394862	5	5	0.3	0.114%	Uneven ground, potential settlement (Acceptable)	New	174
Erosion	Y	Features A, B	Lobe 2 - internal slope	571795	7394815	20	10	-	0.911%	Minor self-armouring erosion (Acceptable)	Unchanged since previous observation	163
		Feature T	Lobe 2 – southeast slope	571843	7394827	15	0.5	-	0.034%	Self-armouring erosion (Acceptable)	New	175
		Feature R	Lobe 2 – southeast slope	571954	7394879	10	5	-	0.228%	Some minor erosion into boulders at toe (Acceptable)	New	173
Lateral Movement	N											
Frost Action	N											
Sloughing	N											

Table 4-38: Visual Inspection Checklist – Upper Site Pallet Line Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Cracking	Y	Feature K	Lobe 1 - south slope	571699	7394897	1	0.1	0.05	0.000%	Minor crack (Acceptable)	New	152
		Feature L	Lobe 1 - south slope	571712	7394903	2	2	-	0.019%	Series of minor cracks (Acceptable)	New	153
		Feature C	Lobe 1 - west slope of the south side extension	571729	7394866	3	0.03	0.02	0.000%	Minor crack (Acceptable)	Unchanged since previous observation	154
		Feature Q	Lobe 5, south slope	571991	7394911	3	0.1	0.05	0.032%	Minor tension crack and settlement (Acceptable)	New	172
Animal Burrows	N											
Vegetation	Y	Feature P	Lobe 5 - east slope	572001	7394912	2	2	-	0.426%	Sparse grass on slope	New	170
Staining	N											
Vegetation Stress	N											

Table 4-38: Visual Inspection Checklist – Upper Site Pallet Line Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Seepage or Ponded Water	Y	Feature M	Between Lobes 1 and 2	571789	7394881	20	5	-	0.473%	Ponded water (Acceptable)	New	157 and 165
		Feature N	Northeast corner			5	3	-	0.071%	Ponded water (Acceptable)	New	166
		Feature O	Lobe 5 - east toe	572001	7394912	10	2	-	2.128%	Ponded water (Acceptable)	New	170
		Feature I	Between Lobes 2 and 5	571942	7394925	25	3	-	0.342%	Ponded water on cover draining south (Acceptable)	Previously observed with tire tracks, Unchanged since previous observation	167
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	Y	Features E, F, G								Previously observed areas with rough/segregated material and tire tracks. Not considered significant. (Acceptable)	No change. Not documented in 2015.	

Landfill Area:

Pallet Line – Lobe 1 = 21,159 m^2; Pallet Line – Lobes 2,3 and 4 = 21,949 m^2; Pallet Line – Lobe 5 = 940 m^2.

Table 4-39: Preliminary Stability Assessment – Upper Site Pallet Line Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Isolated
Erosion	Acceptable	Occasional
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	Isolated
Sloughing	Acceptable	N/A
Cracking	Acceptable	Occasional
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	Isolated
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	Occasional
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	N/A
Overall Landfill Performance	**Acceptable**	

Table 4-40: Summary Table of Photographic Log – Upper Site Pallet Line Landfill

Photo	Description (file name)	Easting	Northing	Date
147	Lobe 1 – North crest and slope, facing east (ATT135_Photo1.jpg)	571599.3628	7394949.581	12-Aug-2015
148	Lobe 1 – North toe, facing east (ATT136_Photo1.jpg)	571594.7319	7394956.208	12-Aug-2015
149	Lobe 1 – West crest and slope, facing north from southwest (ATT137_Photo1.jpg)	571588.5212	7394879.769	12-Aug-2015
150	Lobe 1 – South slope and crest, facing east (ATT138_Photo1.jpg)	571588.5461	7394878.524	12-Aug-2015
151	Lobe 1 – South slope and crest, facing east (ATT139_Photo1.jpg)	571664.1686	7394871.809	12-Aug-2015
152	Lobe 1 – Feature K, crack on south slope (ATT141_Photo2.jpg)	571699.1675	7394896.825	12-Aug-2015
153	Lobe 1 – Feature L, minor cracks on south slope (ATT142_Photo1.jpg)	571711.811	7394903.194	12-Aug-2015
154	Lobe 1 – Feature C, crack along west slope of south side extension, facing north (ATT143_Photo1.jpg)	571728.9571	7394865.669	12-Aug-2015
155	Lobe 1 – South crest, facing east (ATT144_Photo1.jpg)	571729.3519	7394860.977	12-Aug-2015
156	Lobe 1 – Southeast slope and toe, facing east (ATT145_Photo1.jpg)	571761.8019	7394866.393	12-Aug-2015
157	Lobe 1 – Feature M, ponded water south toe, facing south towards Lobe 2 (ATT146_Photo1.jpg)	571789.1284	7394881.193	12-Aug-2015
158	Lobe 1 – Southeast slope, facing southwest (ATT147_Photo1.jpg)	571814.676	7394925.796	12-Aug-2015
159	Lobe 1 – East slope and crest, facing north from southeast corner (ATT148_Photo1.jpg)	571815.7966	7394926.067	12-Aug-2015
160	Lobe 1 – Cover surface, facing northwest from southeast corner (ATT149_Photo1.jpg)	571814.7823	7394926.245	12-Aug-2015
161	Lobe 2 – Northwest crest edge, facing northeast (ATT274_Photo1.jpg)	571757.5268	7394831.005	12-Aug-2015
162	Lobe 2 – Internal slope, facing north (ATT275_Photo1.jpg)	571786.7754	7394834.276	12-Aug-2015

Table 4-40: Summary Table of Photographic Log – Upper Site Pallet Line Landfill

Photo	Description (file name)	Easting	Northing	Date
163	Lobe 2 – Feature A, minor self-armouring erosion (ATT276_Photo1.jpg)	571794.781	7394814.969	12-Aug-2015
164	Lobe 2 – Northwest central, facing east (ATT277_Photo1.jpg)	571831.2571	7394891.342	12-Aug-2015
165	Lobe 2 – Feature M, ponded water between lobes 1 and 2 (ATT278_Photo1.jpg)	571831.0048	7394892.822	12-Aug-2015
166	Lobe 2 – Feature N, ponded water at toe in northeast corner (ATT279_Photo1.jpg)	571885.775	7394932.853	12-Aug-2015
167	Feature I ponded water on gravel cover draining south – Between Lobes 2 and 5 (ATT280_Photo1.jpg)	571941.7234	7394925.409	12-Aug-2015
168	Lobe 5 – North slope, facing east (ATT281_Photo1.jpg)	571962.3605	7394929.888	12-Aug-2015
169	Lobe 5 – East slope facing, south (ATT282_Photo1.jpg)	571999.7261	7394935.269	12-Aug-2015
170	Lobe 5 – sparse grass (Feature P) on slope and ponded water (Feature O) at east toe (ATT283_Photo1.jpg)	572000.7806	7394911.822	12-Aug-2015
171	Lobe 5 – Cover surface, facing west (ATT284_Photo1.jpg)	571994.5105	7394911.751	12-Aug-2015
172	Lobe 5 – Feature Q, minor tension crack and settlement – Lobe 5, south slope (ATT285_Photo1.jpg)	571991.1225	7394911.384	12-Aug-2015
173	Lobe 2 – Southeast slope and crest, facing southwest – Feature R, some minor erosion into boulders at toe (ATT286_Photo1.jpg)	571953.6899	7394878.903	12-Aug-2015
174	Lobe 2 – Feature S, uneven ground, potential settlement (ATT287_Photo1.jpg)	571913.2991	7394861.753	12-Aug-2015
175	Lobe 2 – Feature T, self-armouring erosion, facing north up southeast slope (ATT288_Photo1.jpg)	571843.2873	7394827.328	12-Aug-2015
176	Riprap along southeast toe and slope, facing northwest (ATT289_Photo1.jpg)	571873.4418	7394776.333	12-Aug-2015
177	Lobe 2 – Cover surface, facing east (ATT290_Photo1.jpg)	571797.3551	7394794.517	12-Aug-2015
178	Lobe 2 – South end facing south (ATT291_Photo1.jpg)	571750.1563	7394816.855	12-Aug-2015
179	Abandoned Lobe – North slope, facing southwest (ATT292_Photo1.jpg)	571566.7014	7394886.748	12-Aug-2015
180	Abandoned Lobe – North crest edge facing west (ATT293_Photo1.jpg)	571563.3896	7394873.503	12-Aug-2015
181	Abandoned Lobe – West crest edge facing south (ATT294_Photo1.jpg)	571551.7835	7394864.058	12-Aug-2015
182	Abandoned Lobe – West crest facing south (ATT295_Photo1.jpg)	571557.7069	7394835.459	12-Aug-2015
183	Abandoned Lobe – Cover surface facing north (ATT296_Photo1.jpg)	571560.9448	7394798.166	12-Aug-2015
184	Abandoned Lobe – Riprap on south toe facing northeast (ATT297_Photo1.jpg)	571532.9996	7394770.491	12-Aug-2015
185	Abandoned Lobe – South cover slope facing north – Some snow still on cover (ATT298_Photo1.jpg)	571578.2325	7394763.078	12-Aug-2015
186	Abandoned Lobe – southeast corner facing slope (ATT299_Photo1.jpg)	571608.8804	7394770.676	12-Aug-2015
187	Abandoned Lobe – East slope facing south (ATT300_Photo1.jpg)	571589.4293	7394878.287	12-Aug-2015

4.9.4 Soil Sampling

Table 4-40 presents a summary of analytical results for soil samples collected at the Upper Site Pallet Landfill. DM-60 represents an upgradient sampling location, whereas DM-50, DM-51, DM-53, DM-54, DM-55, DM-56, DM-57, DM-58, DM-59, DM-61 and DM-62 represent downgradient sampling locations. The deep soil samples at DM-51, DM-54, DM-56 and DM-59 could not be collected due to refusal. DM-50, DM-51 and DM-53 were considered upgradient locations historically, however, based on the topography, it is recommended these locations be re-classified as downgradient sampling locations.

DM-60

Sampling location DM-60 is located upgradient of the landfill, approximately 15 m north of the toe. The estimated elevation of this sampling point is 706 masl. As shown in Photo 331, the area is largely covered with sand and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at DM-60 (0-15 cm), the concentration of nickel (87.5 mg/kg) and cobalt (18.3 mg/kg) exceeded their baseline concentrations (75 mg/kg and 17 mg/kg, respectively) but were less than their background concentrations (141 mg/kg and 20 mg/kg, respectively). In addition, the concentration of arsenic (1.3 mg/kg) exceeded the background (1.0 mg/kg) and baseline (1.0 mg/kg) concentrations. The concentrations of all metals were slightly greater than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected in the shallow sample collected from DM-60 in 2015.

In the deep sample at DM-60 (40-50 cm), the concentration of nickel (101 mg/kg) exceeded the baseline concentration (75 mg/kg) but was less than the background concentration (141 mg/kg). In addition, the concentration of arsenic (1.2 mg/kg) exceeded the background (1.0 mg/kg) and baseline (1.0 mg/kg) concentrations. The concentrations of most metals, including nickel (78 mg/kg) and arsenic (1 mg/kg), were greater than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-60 in 2015.

DM-50

Sampling location DM-50 is located downgradient of Lobe 1 of the landfill, approximately 15 m north of the toe and north of the access road. The estimated elevation of this sampling point is 695 masl. As shown in Photo 438, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of brown sand with some gravel and stone.

The shallow sample at DM-50 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (89.9 mg/kg), lead (12.2 mg/kg), zinc (82.3 mg/kg), chromium (154 mg/kg) and arsenic (2.6 mg/kg) exceeded their background and baseline concentrations. The concentration of copper also exceeded the baseline concentration plus 3σ (88 mg/kg). The concentration of all metals, with the exception of zinc (82 mg/kg in 2014), were less than the concentrations reported in 2014. No PHC or PCB were detected from the shallow sample at DM-50 in 2015.

The deep sample at DM-50 (30-40 cm) exhibited elevated concentrations of metals, at higher concentrations than those in the shallow sample. The concentrations of copper (118 mg/kg), lead (13.8 mg/kg), zinc (92.9 mg/kg), chromium (186 mg/kg) and arsenic (4.2 mg/kg) exceeded their background and baseline concentrations. The concentrations of copper, chromium and arsenic also exceeded their baseline concentrations plus 3σ.

The concentration of all metals, with the exception of lead (10 mg/kg in 2014), were less than the concentrations reported in 2014. No PHC or PCB were detected from the deep sample at DM-50 in 2015.

DM-51

Sampling location DM-51 is located downgradient of Lobe 1 of the landfill, approximately 15 m north of the toe and north of the access road. The estimated elevation of this sampling point is 695 masl. As shown in Photo 441, the area is largely covered with sand and gravel and is not vegetated. The soils consisted of grey sand with some gravel and stone.

The shallow sample at DM-51 (0-15 cm) exhibited elevated concentrations of metals. The concentration of copper (48.3 mg/kg) exceeded the baseline concentration (37 mg/kg) but was less than the background concentration (60 mg/kg). In addition, the concentrations of lead (25.6 mg/kg), zinc (107 mg/kg), chromium (104 mg/kg) and arsenic (1.9 mg/kg) exceeded their background and baseline concentrations. The concentrations of all metals were greater than or similar to the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-51 in 2015.

DM-53

Sampling location DM-53 is located downgradient of Lobe 1 of the landfill, approximately 15 m north of the toe and north of the access road. The estimated elevation of this sampling point is 694 masl. As shown in Photo 313, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at DM-53 (0-15 cm), the concentration of chromium (79.8 mg/kg) exceeded the baseline concentration (72 mg/kg) but was less than the background concentration (90 mg/kg). In addition, the concentration of lead (11 mg/kg) exceeded the background (10 mg/kg) and baseline (10 mg/kg) concentrations. The concentrations of most metals were slightly less than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample collected at DM-53 in 2015.

The deep sample at DM-53 (40-50 cm) exhibited elevated concentrations of metals. The concentrations of copper (65.6 mg/kg), lead (17.8 mg/kg), zinc (113 mg/kg), chromium (155 mg/kg) and arsenic (1.7 mg/kg) exceeded their background and baseline concentrations. The concentration of arsenic was less than the concentration reported in 2014 (1.7 mg/kg). The concentrations of most other metals were greater than or similar to the concentrations reported in 2014. The concentration of TPH (99 mg/kg) was less than the baseline concentration (324 mg/kg); however, the PHC F2 fraction (13 mg/kg) and PHC F3 fraction (82 mg/kg) concentrations exceeded their baseline concentrations (10 mg/kg and 10 mg/kg, respectively). In 2014, PHC results were non-detectable. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the deep sample collected at DM-53 in 2015.

DM-54

Sampling location DM-54 is located downgradient of Lobe 1 of the landfill, approximately 10 m south of the toe. The estimated elevation of this sampling point is 699.5 masl. As shown in Photo 316, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of brown sand with gravel stone.

In the shallow sample at DM-54 (0-15 cm), the concentrations of lead (32.9 mg/kg) and arsenic (2.6 mg/kg) exceeded their background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.0 mg/kg, respectively) concentrations. The concentrations of lead and arsenic were greater than the concentrations reported in 2014 (22 mg/kg and 1.6 mg/kg, respectively). The concentrations of all other metals were less than or similar to the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-54 in 2015.

DM-55

Sampling location DM-55 is located downgradient of the Abandoned Landfill Lobe of the landfill, approximately 10 m west of the toe. The estimated elevation of this sampling point is 697 masl. As shown in Photo 319, the area consists of sand, rock and boulders and is not vegetated. The soils consisted of brown sand with some gravel and stone

In the shallow sample at DM-55 (0-15 cm), the concentrations of lead (23.1 mg/kg) and arsenic (5.6 mg/kg) exceeded their background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.0 mg/kg, respectively) concentrations. The concentration of arsenic also exceeded the baseline concentration plus 3σ (2.8 mg/kg). The concentration of arsenic was greater than the concentration reported in 2014 (2.4 mg/kg). The concentrations of all other metals, including lead (28 mg/kg in 2014), were less than the concentrations reported in 2014. No PHC or PCB were detected from the shallow sample at DM-55 in 2015.

In the deep sample at DM-55 (30-40 cm), the concentrations of lead (23.3 mg/kg) and arsenic (5.2 mg/kg) exceeded their background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.0 mg/kg, respectively) concentrations. The concentration of arsenic also exceeded the baseline concentration plus 3σ (2.8 mg/kg). The concentration of arsenic was greater less than the concentration reported in 2014 (2.4 mg/kg). The concentrations of all other metals, including lead (28 mg/kg in 2014), were less than or similar to the concentrations reported in 2014. No PHC or PCB were detected from the deep sample at DM-55 in 2015.

DM-56

Sampling location DM-56 is located downgradient of the Abandoned Landfill Lobe of the landfill, approximately 8 m southwest of the toe. The estimated elevation of this sampling point is 689 masl. As shown in Photo 322, the area was partially snow covered at the time of sampling. The area is largely covered with gravel and rock and is not vegetated. The soils consisted of dark brown sand with some gravel.

The shallow sample at DM-56 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (41.8 mg/kg), nickel (102 mg/kg) and cobalt (17.5 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentrations of lead (14.2 mg/kg) and arsenic (1.7 mg/kg) exceeded their background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.0 mg/kg, respectively) concentrations. Elevated concentrations of metals were reported in 2014 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-56 in 2015.

DM-57

Sampling location DM-57 is located downgradient of the Abandoned Landfill Lobe of the landfill, approximately 8 m south of the toe. The estimated elevation of this sampling point is 691 masl. As shown in Photo 325, the area consists of sand and gravel with some rocks and boulders and is not vegetated. The soils consisted of brown sand with stone.

In the shallow sample at DM-57 (0-15 cm), the concentration of nickel (81.9 mg/kg) exceeded the baseline concentration (75 mg/kg) but was less than the background concentration (141 mg/kg). In addition, the concentration of arsenic (5.6 mg/kg) exceeded the background (1.0 mg/kg) and baseline (1.0 mg/kg) concentrations. The concentrations of all metals, including nickel (83.5 mg/kg in 2014) and arsenic (1.25 mg/kg in 2014), were similar to the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-57 in 2015.

In the deep sample at DM-57 (40-50 cm), the concentration of nickel (86.3 mg/kg) exceeded the baseline concentration (75 mg/kg) but was less than the background concentration (141 mg/kg. In addition, the concentrations of lead (10.2 mg/kg) and arsenic (1.7 mg/kg) exceeded their background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.0 mg/kg, respectively) concentrations. The concentration of nickel was less than the concentration reported in 2014 (94 mg/kg). The concentrations of all other metals, including arsenic (1 mg/kg in 2014), were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-57 in 2015.

DM-58

Sampling location DM-58 is located downgradient of Lobes 2, 3 and 4 of the landfill, approximately 6 m west of the toe. The estimated elevation of this sampling point is 695 masl. As shown in Photo 327, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of brown sand with gravel and stone.

The shallow sample at DM-58 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (37.7 mg/kg), nickel (108 mg/kg) and cobalt (18.3 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of lead (12.8 mg/kg), zinc (85.5 mg/kg) and arsenic (2.6 mg/kg) exceeded their background and baseline concentrations. Elevated concentrations of metals were reported in 2014 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-58 in 2015.

A duplicate sample was collected at the deep DM-58 (40-50 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated relative percent difference (RPD) values indicated the original and duplicate sample results differ by less than 23% for all parameters, with the exception of arsenic, for which the difference was approximately 71%.

The deep samples at DM-58 (40-50 cm) exhibited elevated concentrations of metals, at similar concentrations to those in the shallow sample. The average concentrations of copper (40 mg/kg), nickel (97 mg/kg), cobalt (19 mg/kg) and chromium (75 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the average concentrations of lead (14 mg/kg), zinc (111 mg/kg) and arsenic (2 mg/kg) exceeded their background and baseline concentrations. The concentrations of all metals were greater than the

concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep samples at DM-58 in 2015.

DM-59

Sampling location DM-59 is located downgradient of Lobes 2, 3 and 4 of the landfill, at the south of the toe. The estimated elevation of this sampling point is 692 masl. As shown in Photo 328, the area was partially snow covered at the time of sampling. The area is consists of sand and gravel with some rock and is not vegetated. The soils consisted of a wet redish-brown sand with some gravel and stone.

In the shallow sample at DM-59 (0-15 cm), the concentration of nickel (119 mg/kg) exceeded the baseline concentration (75 mg/kg) but was less than the background concentration (141 mg/kg). In addition, the concentration of copper (71.5 mg/kg) and cobalt (25.4 mg/kg) exceeded their background (60 mg/kg and 20 mg/kg, respectively) and baseline (37 mg/kg and 17 mg/kg, respectively) concentrations. The concentrations of nickel, copper and cobalt were greater than the concentrations reported in 2014, whereas the other metals concentrations were less than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-59 in 2015.

DM-61

Sampling location DM-61 is located downgradient of Lobes 2, 3 and 4 of the landfill, at the east toe of the landfill. The estimated elevation of this sampling point is 700 masl. As shown in Photo 333, the area is largely covered with sand, gravel and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at DM-61 (0-15 cm), the concentration of lead (12.9 mg/kg) and arsenic (1.7 mg/kg) exceeded the background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.0 mg/kg, respectively) concentrations. The concentrations of lead and arsenic were greater than the concentrations reported in 2014, whereas the other metals concentrations were less than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-61 in 2015.

The deep sample at DM-61 (20-30 cm) exhibited elevated concentrations of metals. The concentrations of copper (54.4 mg/kg) and nickel (91.5 mg/kg) exceeded their baseline concentrations (37 mg/kg and 75 mg/kg, respectively) but were less than their background concentrations (60 mg/kg and 141 mg/kg). In addition, the average concentrations of cobalt (21.5 mg/kg), lead (10.1 mg/kg) and arsenic (1.5 mg/kg) exceeded their background and baseline concentrations. Elevated concentrations of metals were reported in 2014 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-61 in 2015.

DM-62

Sampling location DM-62 is located downgradient of Lobes 2, 3 and 4 of the landfill, approximately 6 m southeast of the toe. The estimated elevation of this sampling point is 693 masl. As shown in Photo 336, the area is largely covered with sand, gravel and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

The shallow sample at DM-62 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (49.7 mg/kg), nickel (99.2 mg/kg) and cobalt (18.2 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentrations of lead (11.8 mg/kg) and arsenic

(1.4 mg/kg) exceeded their background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.0 mg/kg, respectively) concentrations. Elevated concentrations of metals were similarly reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-62 in 2015.

The deep sample at DM-62 (20-30 cm) exhibited elevated concentrations of metals similar to those in the shallow sample. The concentrations of copper (57.1 mg/kg), nickel (98.6 mg/kg) and cobalt (18.6 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. The concentration of arsenic (1.0 mg/kg) was equal to the background (1.0 mg/kg) and baseline (1.0 mg/kg) concentrations. In addition, the concentration of lead (13 mg/kg) exceeded the background (10 mg/kg) and baseline (10 mg/kg) concentrations. The concentrations of all metals, with the exception of nickel (110 mg/kg in 2014), were greater than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-62 in 2015.

Table 4-41: Soil Chemical Analysis Results – Upper Site Pallet Line Landfill

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F3 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.5	0.002	NA	NA	NA	NA
Baseline Mean		**37**	**75**	**17**	**1.0**	**10**	**75**	**72**	**1.0**	**0.1**	**0.05**	**30**	**10**	**10**	**NA**
Baseline + 3σ		88	150	35	1.4	82	175	179	2.8	0.12	0.44	261	888	806	NA
Upgradient															
DM-60 (0-15)	0-15	27.1	**87.5**	**18.3**	<0.5	9.1	61	51.5	**1.3**	<0.1	<0.05	<7	<4	<8	<6
DM-60 (40-50)	40-50	25.3	**101**	16.9	<0.5	7	48.5	52.5	**1.2**	<0.1	<0.05	<7	<4	<8	<6
Downgradient															
DM-50 (0-15)	0-15	**89.9**	51.5	11.5	<0.5	**12.2**	**82.3**	**154**	**2.6**	<0.1	<0.05	<7	<4	<8	<6
DM-50 (30-40)	30-40	**118**	55.6	13.2	<0.5	**13.8**	**92.9**	**186**	**4.2**	<0.1	<0.05	<7	<4	<8	<6
DM-51 (0-15)	0-15	**48.3**	60.6	11.9	<0.5	**25.6**	**107**	**104**	**1.9**	<0.1	<0.05	<7	<4	<8	<6
DM-51 (deep) [1]															
DM-53 (0-15)	0-15	32	44.3	10	<0.5	**11**	68.2	**79.8**	1	<0.1	<0.05	<7	<4	<8	<6
DM-53 (40-50)	40-50	**65.6**	63.8	14.2	<0.5	**17.8**	**113**	**155**	**1.7**	<0.1	<0.05	<7	**13**	**82**	<6
DM-54 (0-15)	0-15	36.5	63.4	13.8	<0.5	**32.9**	65.2	54.4	**2.6**	<0.1	<0.05	<7	<4	<8	<6
DM-54 (deep) [1]															
DM-55 (0-15)	0-15	31.9	55.1	16.5	<0.5	**23.1**	67.4	54.8	**5.6**	<0.1	<0.05	<7	<4	<8	<6
DM-55 (30-40)	30-40	32	58.3	16.9	<0.5	**23.3**	69.7	58.7	**5.2**	<0.1	<0.05	<7	<4	<8	<6
DM-56 (0-15)	0-15	**41.8**	**102**	**17.5**	<0.5	**14.2**	55.9	67.8	**1.7**	<0.1	<0.05	<7	<4	<8	<6
DM-56 (deep) [1]															
DM-57 (0-15)	0-15	32.9	**81.9**	14.7	<0.5	9.7	62	62.6	**1.4**	<0.1	<0.05	<7	<4	<8	<6
DM-57 (40-50)	40-50	34.6	**86.3**	15.4	<0.5	**10.2**	64.3	66.9	**1.7**	<0.1	<0.05	<7	<4	<8	<6
DM-58 (0-15)	0-15	**37.7**	**108**	**18.6**	<0.5	**12.8**	**85.5**	63.1	**1.9**	<0.1	<0.05	<7	<4	<8	<6
DM-58 (40-50)	40-50	**37.7**	**94.2**	**18.3**	<0.5	**13.7**	**98.5**	71.3	**2.1**	<0.1	<0.05	<7	<4	<8	<6
DM-58 (40-50) (Duplicate)	40-50	**43**	**100**	**18.9**	<0.5	**15**	**124**	**79**	1	<0.10	<0.05	<5	<4	<8	<6
DM-58 (40-50) (Dup Avg)	40-50	**40**	**97**	**19**	<0.5	**14**	**111**	**75**	**2**	<0.1	<0.05	<6	<4	<8	<6
DM-59 (0-15)	0-15	**71.5**	**119**	**25.4**	<0.5	3.8	33.4	33.1	<1	<0.1	<0.05	<7	<4	<8	<6

Table 4-41: Soil Chemical Analysis Results – Upper Site Pallet Line Landfill

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F3 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.5	0.002	NA	NA	NA	NA
Baseline Mean		**37**	**75**	**17**	**1.0**	**10**	**75**	**72**	**1.0**	**0.1**	**0.05**	**30**	**10**	**10**	**NA**
Baseline + 3σ		88	150	35	1.4	82	175	179	2.8	0.12	0.44	261	888	806	NA
DM-59 (deep) [1]															
DM-61 (0-15)	0-15	30.7	54.8	14.2	<0.5	**12.9**	57.7	50.2	**1.7**	<0.1	<0.05	<7	<4	<8	<6
DM-61 (20-30)	20-30	**54.4**	**91.5**	**21.5**	<0.5	**10.1**	54.2	44.2	**1.5**	<0.1	<0.05	<7	<4	<8	<6
DM-62 (0-15)	0-15	**49.7**	**99.2**	**18.2**	<0.5	**11.8**	60.6	53.7	**1.4**	<0.1	<0.05	<7	<4	<8	<6
DM-62 (20-30)	20-30	**57.1**	**98.6**	**18.6**	<0.5	**13**	65.9	57.8	1	<0.1	<0.05	<7	<4	<8	<6

Notes:
NA: Not available
Underlined values: Results exceed Background arithmetic mean.
Bold Values: Results exceed Baseline arithmetic mean.
1: The deep soil samples at DM-51, DM-54, DM-56 and DM-59 could not be collected due to refusal

4.9.5 Conclusions and Overall Performance of the Upper Site Pallet Line Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site Pallet Line Landfill. Some self-armouring erosion, minor tension cracks and ponding of water along the toe of the landfill were observed. The overall stability performance of this landfill was assessed as Acceptable.

Soil samples were collected at all of the designated locations in 2015; two soil samples (shallow and deep) were collected at eight of the twelve locations sampled. Concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected above the background/baseline arithmetic mean at a number of locations. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-50 (deep sample), located downgradient of Lobe 1. At DM-50, the concentrations of most metals were less than the concentrations reported in 2014. At most other sampling locations, the concentrations of metals were greater than or similar to the concentrations reported in 2014. The concentrations of copper in the shallow sample at DM-50 and arsenic in the shallow and deep samples at DM-55 exceeded the baseline concentration plus 3σ.

The only detectable concentration of PHC was reported in the deep sample at DM-53. The concentration of TPH (99 mg/kg) was less than the baseline concentration (324 mg/kg); however, the PHC F2 fraction (13 mg/kg) and PHC F3 fraction (82 mg/kg) concentrations exceeded their baseline concentrations (10 mg/kg and 10 mg/kg, respectively). In 2014, PHC results were non-detectable. No detectable concentrations of PCB were noted in any of the soil samples in 2015.

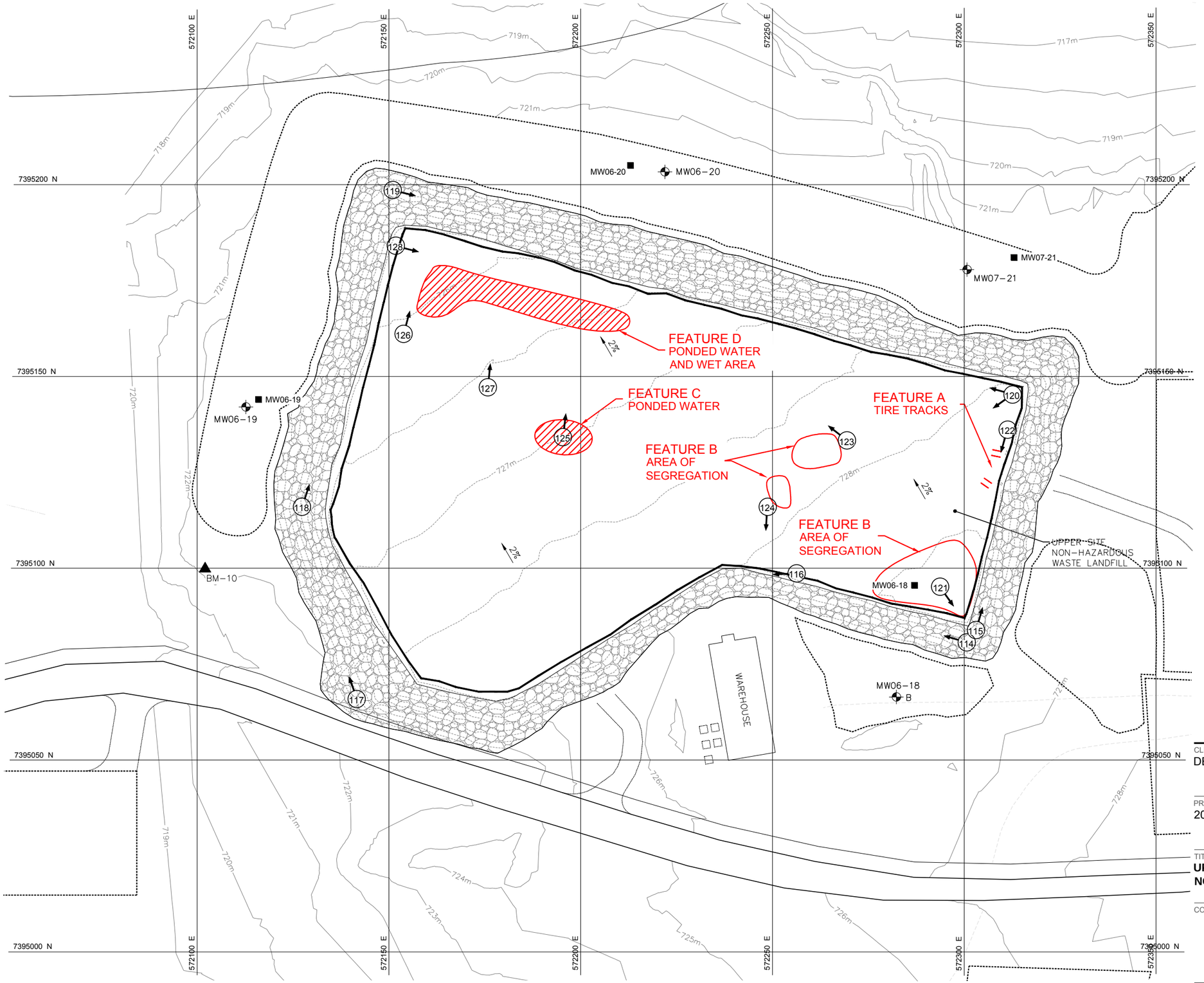
4.9.6 Recommendations for Upper Site Pallet Line Landfill

No modifications to the ongoing monitoring program at this landfill are recommended. Additional data is required to assess if the increases relate to impact from the landfill or reflect variations in natural conditions or sampling/analytical program influences.

4.10 Upper Site Non-hazardous Waste Landfill

4.10.1 Landfill Description

The Upper Site Non-hazardous Waste Landfill (NHWL) is located on the north side of the road leading to the Upper Site, adjacent to the NWS warehouse. The NHWL was built for the disposal of nonhazardous demolition materials and wastes generated during the cleanup operations at the upper site. The landfill covers an area approximately 21,100 m^2. Approximate sampling locations for soil and groundwater are provided in Figure DYE-M.11.



LEGEND:

- SEEPAGE / PONDING(NTS)
- SETTLEMENT (NTS)
- TIRE TRACKS (NTS)
- SOIL SAMPLING LOCATION
- PHOTOGRAPH LOCATION
- MONITORING WELL LOCATION BACKGROUND
- MONITORING WELL LOCATION
- PERMANENT BENCHMARK
- RIP RAP

NOTE
GRID PROJECTION IS NAD83 ZONE 20N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 25 50
1:1,000 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
UPPER SITE
NON-HAZARDOUS WASTE LANDFILL

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.11

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

Path: \\golder.gds\gal\Mississauga\SIM\Client\Public_Works_Canada\Canada99_PROJ\1530908_FWSSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0001_DYE_M_Field_Summary_Report | File Name: 1530908-0001-BG-0022.dwg

4.10.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- No soil sample or groundwater sample was taken at MW06-18 because the location was buried under a significant quantity of snow.
- The deep soil samples at MW06-19 and MW06-20 could not be collected due to refusal on bedrock or frozen ground.
- The groundwater sample at MW06-20 could not be collected because the well could not be opened.
- The groundwater sample at MW07-21 could not be collected because the groundwater in the well was frozen.

4.10.3 Visual Inspection

The Upper Site Non-Hazardous Waste Landfill has multiple locations with observed cover material segregation and ponded water features. Table 4-42 presents a summary of observed visual inspection features and Table 4-43 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-44 is a log of photographs taken during the 2015 visual inspection.

Areas with segregated cover material (Feature B) observed in 2015 were noted in the previous inspection report. Occasional ponded water was observed on the cover surface near the north crest (Features C and D). Tire tracks were observed near the east crest (previously noted Feature A). These features do not appear to be impacting the stability of the landfill.

Table 4-42: Visual Inspection Checklist – Upper Site Non-Hazardous Waste Landfill

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Upper Site Non-Hazardous Waste Landfill
DATE OF INSPECTION: August 10, 2015
DATE OF PREVIOUS INSPECTION: August 10, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-42: Visual Inspection Checklist – Upper Site Non-Hazardous Waste Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	Y	Feature B	Southeast corner of crest	572294	7395095	27	10		1.3%	Previously observed, no change (Acceptable)	Previously observed, no change	121
		Feature B	Cover surface	572269	7395133	10	10		0.5%	Area of segregation (Acceptable)	Previously observed, no change	123
		Feature B	Near warehouse	572249	7395116	5	10		0.2%	Area of segregation (Acceptable)	Previously observed, no change	124
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation	N											
Staining	N											
Vegetation Stress	N											

Table 4-42: Visual Inspection Checklist – Upper Site Non-Hazardous Waste Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Seepage or Ponded Water	Y	Feature C	Cover surface	572195	7395134	3	1		0.014%	Ponded water with segregated material (Acceptable)	New	125
		Feature D	Cover surface - along north crest	572157.1649	7395183.069	25	2		0.237%	Ponded water and wet area (Acceptable)	New	126,127,128
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	Y	MW06-18, 19, 20 and MW07-21								Monitoring wells intact		
Features of Note / Other Observations	Y	Feature A	East slope	572311	7395136	13	10		0.616%	Regraded area with tire tracks (Acceptable)	Previously observed, no change	122

Landfill Area = 21,108 m^2.

Table 4-43: Preliminary Stability Assessment – Upper Site Non-Hazardous Waste Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	N/A
Erosion	Acceptable	Occasional
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Acceptable	N/A
Cracking	Acceptable	N/A
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	N/A
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	Occasional
Debris and/or liner exposure	Acceptable	N/A
Other (Tire Track)	Acceptable	Isolated
Overall Landfill Performance	**Acceptable**	

Table 4-44: Summary Table of Photographic Log – Upper Site Non-Hazardous Waste Landfill

Photo	Description (file name)	Easting	Northing	Date
114	South slope facing west from southeast corner (ATT50_Photo1.jpg)	572301.4753	7395082.079	10-Aug-2015
115	East slope facing north from southeast corner (ATT51_Photo1.jpg)	572300.8759	7395082.732	10-Aug-2015
116	South slope, facing west from warehouse (ATT52_Photo2.jpg)	572256.2846	7395098.663	10-Aug-2015
117	Southwest slope facing northwest (ATT53_Photo1.jpg)	572141.5935	7395065.903	10-Aug-2015
118	West slope, facing north (ATT54_Photo1.jpg)	572127.2904	7395115.99	10-Aug-2015
119	North slope, facing east (ATT55_Photo1.jpg)	572150.9589	7395198.594	10-Aug-2015
120	Landfill crest surface facing west from east crest edge (ATT56_Photo1.jpg) (ATT57_Photo2.jpg)	572310.7808	7395132.748	10-Aug-2015
121	Feature B – previously noted as area of segregation in southeast corner of crest (ATT59_Photo1.jpg)	572293.7173	7395095.202	10-Aug-2015
122	Feature A – Regraded area of east slope with tire tracks – facing south (ATT60_Photo1.jpg)	572311.3038	7395136.125	10-Aug-2015
123	Feature B, area of segregation – facing north (ATT61_Photo1.jpg)	572269.408	7395133.317	10-Aug-2015
124	Feature B, area of segregation – facing south (ATT62_Photo1.jpg)	572248.7257	7395116.01	10-Aug-2015
125	Feature C – ponded water and segregated material on cover surface – facing north (ATT63_Photo1.jpg)	572195.3436	7395134.183	10-Aug-2015
126	Feature D – ponded water on cover surface near north crest and wet area (ATT64_Photo1.jpg)	572157.1649	7395183.069	10-Aug-2015
127	Feature D – ponded water and wet area along north crest, facing north (ATT65_Photo2.jpg)	572157.1649	7395183.069	10-Aug-2015
128	Feature D – ponded water and wet area along north crest – facing east (ATT66_Photo1.jpg)	572151.7662	7395184.08	10-Aug-2015

4.10.4 Soil Sampling

Table 4-44 presents a summary of analytical results for soil samples collected at the Upper Site Non-Hazardous Waste Landfill. MW06-18 represents an upgradient sampling location, whereas MW06-19, MW06-20 and MW07-21 represent downgradient sampling locations. As noted above no soil sample was taken at MW06-18 because the location was buried under snow, and therefore there is no upgradient result for 2015. The deep soil samples at MW06-19 and MW06-20 could not be collected due to refusal on bedrock or frozen ground.

MW06-19

Sampling location MW06-19 is located downgradient of the landfill, approximately 10 m west of the toe. The estimated elevation of this sampling point is 723 masl. As shown in Photo 471, the area is largely covered with sand, gravel and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at MW06-19 (0-20 cm), the concentration of nickel (82.8 mg/kg) exceeded the baseline concentration (65 mg/kg) but was less than the background concentration (141 mg/kg). The concentration of nickel was less than the baseline concentration plus 3σ (178 mg/kg). The concentrations of most metals, including nickel (87 mg/kg), were reported in 2014 at similar concentrations than those reported in 2014. No PHC or PCB were detected from the shallow sample at MW06-19 in 2015.

MW06-20

Sampling location MW06-20 is located downgradient of the landfill, approximately 15 m north of the toe. The estimated elevation of this sampling point is 722 masl. As shown in Photo 474, the area is largely covered with sand, gravel and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at MW06-20 (0-20 cm), the concentration of nickel (67.2 mg/kg) exceeded the baseline concentration (65 mg/kg) but was less than the background concentration (141 mg/kg). In addition, the concentration of arsenic (1.2 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentrations of most metals, including nickel (53 mg/kg in 2014) and arsenic (0.7 mg/kg in 2014), were greater than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW06-20 in 2015.

MW07-21

Sampling location MW07-21 is located downgradient of the landfill, approximately 15 m north of the toe. The estimated elevation of this sampling point is 722 masl. As shown in Photo 477, the area is largely covered with sand, gravel and rock and is not vegetated. The soils consisted of wet brown sand with some gravel.

In the shallow sample at MW07-21 (0-15 cm), the concentration of nickel (76 mg/kg) exceeded the baseline concentration (65 mg/kg) but was less than the background concentration (141 mg/kg). In addition, the concentration of arsenic (1.1 mg/kg) exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentrations of most metals, including nickel (49 mg/kg in 2014) and arsenic (0.56 mg/kg in 2014), were greater than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW07-21 in 2015.

The results of the deep sample at MW07-21 (30-40 cm) indicated that all parameters were less than the background and baseline values. The concentrations of metals were similar to those reported in 2014. No PHC or PCB were detected from the deep sample at MW07-21 in 2015.

Table 4-45: Soil Chemical Analysis Results - Upper Site Non-hazardous Waste Landfill

ID	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.00	0.50	0.002	NA	NA	NA	NA
Baseline Mean		**27**	**65**	**14**	**1.0**	**10**	**57**	**41**	**1.0**	**0.10**	**0.05**	**30**	**10**	**10**	**NA**
Baseline + 3σ		74	178	31	1.0	33	148	115	2.1	0.10	0.33	41	15	777	NA
Upgradient															
MW06-18 (shallow) [1]															
MW06-18 (deep) [1]															
Downgradient															
MW06-19 (0-20)	0-20	18.9	**82.8**	13.4	<0.5	7.6	37.9	36.2	<1	<0.1	<0.05	<7	<4	<8	<6
MW06-19 (deep) [2]															
MW06-20 (0-20)	0-20	23.3	**67.2**	11.9	<0.5	5.7	34.6	28.1	**1.2**	<0.1	<0.05	<7	<4	<8	<6
MW06-20 (deep) [2]															
MW07-21 (0-15)	0-15	25.8	**76**	14	<0.5	7.3	42.8	31.1	**1.1**	<0.1	<0.05	<7	<4	<8	<6
MW07-21 (30-40)	30-40	18.6	63.1	11	<0.5	5.7	30	23.6	<1	<0.1	<0.05	<7	<4	<8	<6

Notes:
NA: Not available
ID: Soil sample location ID.
Underlined values: Results exceed Background arithmetic mean.
Bold Values: Results exceed Baseline arithmetic mean.
1: No soil sample was taken at MW06-18 because the location was buried under a significant quantity of snow.
2: The deep soil samples at MW06-19 and MW06-20 could not be collected due to refusal on bedrock or frozen ground.

4.10.5 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-46 presents a summary of groundwater levels and analytical results for groundwater samples collected at the Upper Site Non-Hazardous Waste Landfill. As noted above no groundwater sample was taken at MW06-18 because the location was buried under snow, and therefore there is no upgradient result for 2015. The groundwater sample at MW06-20 could not be collected because the well could not be opened. The groundwater sample at MW07-21 could not be collected because the groundwater in the well was frozen.

MW06-19

The depth to groundwater measured at MW06-19 in 2015 was 1.04 m below grade. The groundwater results at MW06-19 indicated all parameters were less than the baseline values. No sample was collected at MW06-19 in 2014. No PHC or PCB were detected in the groundwater sample collected at MW06-19 in 2015.

Table 4-46: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Upper Site Non-hazardous Waste Landfill

ID	GW Depth BGS (m)	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F4 (mg/L)
Baseline Mean		**0.005**	**0.22**	**0.003**	**0.001**	**0.005**	**4.0**	**0.27**	**0.009**	**0.0004**	**0.003**	**0.05**	**0.50**	**1.0**	**NA**
Baseline + 3σ		0.52	0.59	0.13	0.005	0.28	21	0.79	0.039	0.0004	0.0053	0.05	0.50	1.00	NA
Upgradient															
MW06-18 [1]															
Downgradient															
MW06-19	1.04	0.0015	<0.001	<0.0005	<0.0001	<0.0001	0.201	<0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
MW06-20 [2]															
MW07-21 [3]															

Notes:
ID: Monitoring well location ID.
GW: Groundwater.
BGS: Below ground surface.
NA: Not available
Bold Values: Results exceed Baseline arithmetic mean.
1: No groundwater sample was taken at MW06-18 because the location was buried under snow, and therefore there is no upgradient result for 2015.
2: The groundwater sample at MW06-20 could not be collected because the well could not be opened.
3: The groundwater sample at MW07-21 could not be collected because the groundwater in the well was frozen.

4.10.6 Conclusions and Overall Performance of the Upper Site Non-hazardous Waste Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site Non-hazardous Waste Landfill. Some areas with cover material segregation, self-armouring erosion and ponding of water on the cover surface the landfill were observed. The overall stability performance of the landfill was assessed as Acceptable.

Soil samples were collected at three of four designated locations in 2015, however the deeper samples at the downgradient locations could not be collected due to frozen conditions; two soil samples (shallow and deep) were collected at MW07-21. The only upgradient sample, at MW06-18, could not be collected in 2015. Concentrations of nickel and arsenic were detected above the background/baseline arithmetic mean at two or more locations. It is noted that concentrations of the above noted metals were highest overall at the sample location MW06-19 (shallow sample), located downgradient of the west side of the landfill, and at MW07-21 (shallow sample), located downgradient of the north side of the landfill. The metal concentrations observed in the shallow sample at MW07-21 were higher than those reported in 2014, which was similarly the case for shallow sample at MW06-20. At MW06-19 and the deep sample at MW07-21, the metal concentrations were similar to those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the soil samples in 2015.

In 2015, a groundwater sample was collected from MW06-19, located west of the landfill. The groundwater results at MW06-19 indicated all parameters were less than the baseline values. A groundwater sample was not collected at this location in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

Based on the results, there does not appear to be significant impact to groundwater quality from the landfill at the soil sampling locations or monitoring wells adjacent to the landfill.

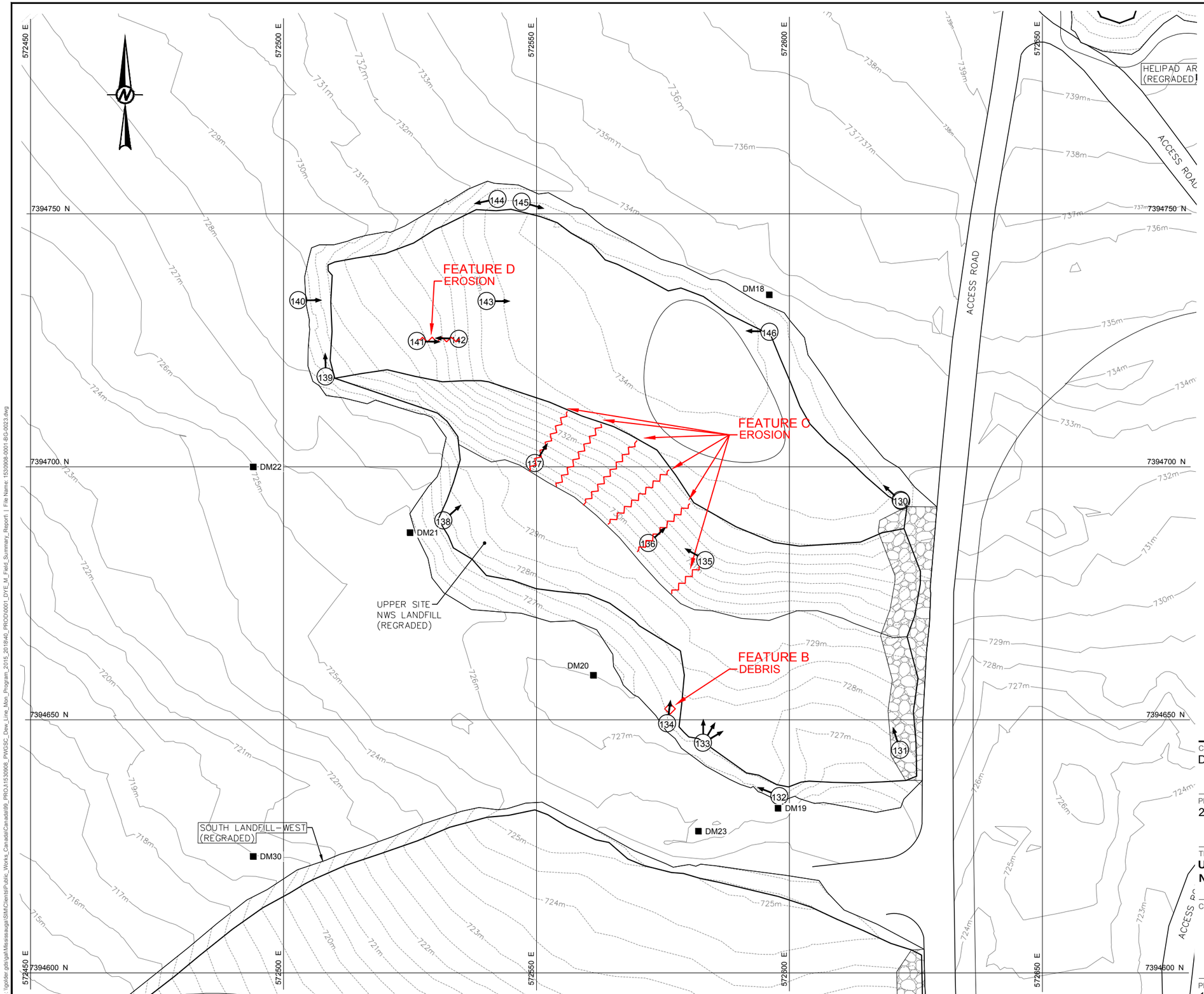
4.10.7 Recommendations for Upper Site Non-hazardous Waste Landfill

No modifications to the ongoing monitoring program at this landfill are recommended.

4.11 Upper Site NWS Landfill

4.11.1 Landfill Description

The Upper Site NWS Landfill is located southwest of the Station Area, on the west side of the road. The Upper Site NWS Landfill was created during DEW Line operations. The area around the landfill has very little vegetative cover (<20%) (ESG 2002b). The Upper Site NWS Landfill was regraded and covered with clean fill in 2008 during the remediation of DYE-M. The landfill area is approximately 9,200 m^2. Approximate soil sampling locations are provided in Figure DYE-M.12.



LEGEND:

- DEBRIS
- EROSION (NTS)
- SOIL SAMPLING LOCATION
- 48 PHOTOGRAPH LOCATION
- REGRADED RIP RAP

NOTE
GRID PROJECTION IS NAD83 ZONE 20N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
UPPER SITE
NWS LANDFILL

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.12

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada\99_PRO\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0001_DYE_M_Field_Summary_Report\ | File Name: 1530908-0001-BG-0023.dwg

4.11.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- The deep soil sample at DM-18 and DM-23 could not be collected due to refusal.
- No soil samples were taken at DM-19 and DM-21 due to frozen ground.

4.11.3 Visual Inspection

The Upper Site NWS Landfill exhibited multiple erosion features. Table 4-47 presents a summary of observed visual inspection features and Table 4-48 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-49 is a log of photographs taken during the 2015 visual inspection.

A new series of minor erosion channels were observed on the upper south slope (Feature C) exhibiting accumulation of fine materials at the bottom (previously noted as sedimentation). In addition, another erosion channel was noted on the cover surface (Feature D). A piece of deposited debris was noted off the south toe of the landfill (Feature B, previously noted). These features have no significant impact on the stability of the landfill.

Table 4-47: Visual Inspection Checklist – Upper Site NWS Landfill

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Upper Site NWS Landfill
DATE OF INSPECTION: August 11, 2015
DATE OF PREVIOUS INSPECTION: August 10, 2014
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-47: Visual Inspection Checklist – Upper Site NWS Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	Y	Feature C	Upper south slope	572583	7394682	40	15	0.02	6.6%	Minor erosion channel - total of 6 channels 2 to 10 m apart (Acceptable)	New	135, 136 and 137
		Feature D	West of cover surface	572526	7394725	9	0.2	0.02	0.02%	Minor erosion channel (Acceptable)	New	141 and 142
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation	N											
Staining	N											
Vegetation Stress	N											
Seepage or Ponded Water	N											
Debris and/or Liner Exposed	Y	Feature B	Lower south slope	572576	7394649	1	-	-	-	Debris, steel cable (Acceptable)	Previously observed	134

Table 4-47: Visual Inspection Checklist – Upper Site NWS Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	N											

Landfill Area = 9,145 m^2.

Table 4-48: Preliminary Stability Assessment - Upper Site NWS Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	N/A
Erosion	Acceptable	Occasional
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Acceptable	N/A
Cracking	Acceptable	N/A
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	N/A
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	N/A
Debris and/or liner exposure	Acceptable	Isolated
Other	Acceptable	N/A
Overall Landfill Performance	**Acceptable**	

Table 4-49: Summary Table of Photographic Log – Upper Site NWS Landfill

Photo	Description (file name)	Easting	Northing	Date
129	East slope along the road, facing south (ATT95_Photo1.jpg)	572622.0983	7394693.24	11-Aug-2015
130	Northeast slope and crest, facing northwest from northeast corner (ATT96_Photo1.jpg)	572621.9603	7394693.441	11-Aug-2015
131	Upper south slope, facing northwest from southeast corner (ATT97_Photo1.jpg)	572621.8153	7394644.09	11-Aug-2015
132	Lower south slope, facing west (ATT98_Photo1.jpg)	572597.9762	7394634.913	11-Aug-2015
133	Upper south slope, facing N from lower south crest (ATT99_Photo1.jpg) (ATT100_Photo2.jpg)	572582.8825	7394645.482	11-Aug-2015
134	Feature B, debris, steel cable, lower south slope, facing N (ATT101_Photo1.jpg)	572575.7868	7394649.31	11-Aug-2015
135	Feature C, minor erosion channel on upper south slope, facing west (ATT102_Photo1.jpg)	572583.3557	7394681.552	11-Aug-2015
136	Feature C, minor erosion channel on upper south slope, facing slope from toe (ATT103_Photo1.jpg)	572572.0704	7394684.935	11-Aug-2015
137	Feature C, minor erosion channel on upper south slope, facing slope from toe (ATT105_Photo2.jpg)	572549.6302	7394700.756	11-Aug-2015
138	Upper south slope and lower landfill surface, facing northeast from southwest corner (ATT106_Photo1.jpg)	572531.5682	7394689.408	11-Aug-2015
139	West slope, facing north from southwest corner (ATT107_Photo1.jpg)	572508.2954	7394717.846	11-Aug-2015
140	Cover surface, facing east from west toe (ATT108_Photo1.jpg)	572502.8863	7394732.945	11-Aug-2015
141	Feature D, minor (self-armouring) erosion channel on surface, facing east from west end – L 9 m, w 10-20 cm (ATT109_Photo1.jpg)	572526.3312	7394724.863	11-Aug-2015

Table 4-49: Summary Table of Photographic Log – Upper Site NWS Landfill

Photo	Description (file name)	Easting	Northing	Date
142	Feature D, minor (self-armouring) erosion channel on surface, facing west from east end (ATT110_Photo1.jpg)	572534.6047	7394725.285	11-Aug-2015
143	Landfill upper cover surface, facing east (ATT111_Photo1.jpg)	572540.0974	7394732.79	11-Aug-2015
144	Northwest slope and crest, facing southwest (ATT112_Photo1.jpg)	572542.2581	7394752.92	11-Aug-2015
145	Northeast slope and crest, facing southeast (ATT113_Photo1.jpg)	572547.0333	7394752.395	11-Aug-2015
146	Upper cover surface, facing west from northeast crest (ATT115_Photo1.jpg)	572596.0247	7394726.678	11-Aug-2015

4.11.4 Soil Sampling

Table 4-50 presents a summary of analytical results for soil samples collected at the Upper Site NWS Landfill. DM-18 represents an upgradient sampling location, whereas DM-19, DM-20, DM-21, DM-22 and DM-23 represent downgradient sampling locations. The deep soil sample at DM-18 and DM-23 could not be collected due to refusal. No soil samples were taken at DM-19 and DM-21 due to frozen ground.

DM-18

Sampling location DM-18 is located upgradient of the landfill, immediately north of the toe. The estimated elevation of this sampling point is 733.5 masl. As shown in Photo 371, the area was snow covered at the time of sampling. The area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of dark brown sand with some gravel.

The shallow sample at DM-18 (0-10 cm) exhibited elevated concentrations of metals. The concentration nickel (118 mg/kg) exceeded the baseline concentration (55 mg/kg) but was less than the background concentration (141 mg/kg). The concentrations of copper (66.7 mg/kg), cobalt (22.4 mg/kg), lead (16 mg/kg), chromium (131 mg/kg) and arsenic (4.4 mg/kg) exceeded their background and baseline concentrations. The concentrations of chromium and arsenic also exceeded their baseline concentration plus 3σ (126 mg/kg and 2.7 mg/kg, respectively). The concentrations of most metals were greater than the concentrations reported in 2014. No PHC or PCB were detected from the shallow sample at DM-18 in 2015.

DM-20

Sampling location DM-20 is located downgradient of the landfill, approximately 7 m northwest of the toe. The estimated elevation of this sampling point is 727 masl. As shown in Photo 374, the area was snow covered at the time of sampling. The area consists of gravel and rock with boulders and is not vegetated. The soils consisted of a yellow-brown sand with some gravel and stone.

The shallow sample at DM-20 (0-15 cm) exhibited elevated concentrations of metals. The concentration chromium (23.1 mg/kg) exceeded the baseline concentration (20 mg/kg) but was less than the background concentration (90 mg/kg). In addition, the concentrations of lead (11.2 mg/kg) and arsenic (1.9 mg/kg) exceeded the background (10 mg/kg and 1.0 mg/kg, respectively) and baseline (10 mg/kg and 1.0 mg/kg, respectively) concentrations. The concentrations of lead and arsenic were greater than the concentrations reported in 2014 (less than 10 mg/kg and 0.6 mg/kg, respectively). The concentration of all other metals were less than or similar to the concentrations

reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-20 in 2015.

In the deep sample at DM-20 (15-30 cm), the concentration chromium (20 mg/kg) was equal to the baseline concentration but was less than the background concentration (90 mg/kg). In addition, the concentrations of lead (10.5 mg/kg) exceeded the background (10 mg/kg) and baseline (10 mg/kg) concentrations. The concentration of lead was below than the concentration reported in 2014 (33 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-20 in 2015.

DM-22

Sampling location DM-22 is located downgradient of the landfill, approximately 6 m southwest of the toe. The estimated elevation of this sampling point is 725 masl. As shown in Photo 376, the area was snow covered at the time of sampling. The area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of dark brown sand with some gravel.

The shallow sample at DM-22 (0-15 cm) exhibited elevated concentrations of metals. The concentration copper (35.8 mg/kg), cobalt (15.6 mg/kg) and chromium (23.7 mg/kg) exceeded their baseline concentrations but were less than their background concentrations. In addition, the concentration of arsenic (1.9 mg/kg) exceeded the background (1.0 mg/kg) and baseline (1.0 mg/kg) concentrations. The concentrations of copper, cobalt and arsenic were greater than the concentrations reported in 2014, whereas the concentrations of chromium and other metals were lower than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-22 in 2015.

In the deep sample at DM-22 (40-50 cm), the concentrations of copper (54.1 mg/kg) and cobalt (19.3 mg/kg) exceeded their baseline concentration (25 mg/kg and 10 mg/kg, respectively) but were less than their background concentrations (60 mg/kg and 20 mg/kg, respectively). The concentrations of copper and cobalt were greater than the concentrations reported in 2014 (28 mg/kg and 8 mg/kg), whereas the concentrations of other metals were lower than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at DM-22 in 2015.

DM-23

Sampling location DM-23 is located downgradient of the landfill, approximately 13 m south of the toe. The estimated elevation of this sampling point is 726 masl. As shown in Photo 301, the area consists of sand, gravel and rock with boulders and is not vegetated. The soils consisted of brown sand with some gravel and stone.

The shallow sample results for DM-23 (0-20 cm) indicated that the concentration of chromium (35.5 mg/kg) exceeded the baseline concentration (20 mg/kg) but was less than the background concentration (90 mg/kg). In addition, the concentration of arsenic (1.1 mg/kg) slightly exceeded the baseline (1.0 mg/kg) and background (1.0 mg/kg) concentrations. The concentrations of most metals, including arsenic (1.3 mg/kg in 2014), were less than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-23 in 2015.

Table 4-50: Soil Chemical Analysis Results – Upper Site NWS Landfill

ID	Depth (m)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.5	0.0	N/A	N/A	N/A	NA
Baseline Mean		**25**	**55**	**10**	**1.0**	**10**	**63**	**20**	**1.0**	**0.10**	**0.10**	**10**	**4.0**	**9.0**	**NA**
Baseline + 3σ		70	266	23	1.3	35	155	126	2.7	0.10	0.56	10	34	39	NA
Upgradient															
DM-18 (0-10)	0-10	**66.7**	**118**	**22.4**	<0.5	**16**	58.1	**131**	**4.4**	<0.1	<0.05	<7	<4	<8	<0.6
DM-18 (deep) [1]															
Downgradient															
DM-19 (shallow) [2]															
DM-19 (deep) [2]															
DM-20 (0-15)	0-15	17.1	28.8	7.9	<0.5	**11.2**	48.2	**23.1**	**1.9**	<0.1	<0.05	<7	<4	<8	<0.6
DM-20 (15-30)	15-30	14.3	26.3	7.5	<0.5	**10.5**	43.7	20	<1	<0.1	<0.05	<7	<4	<8	<0.6
DM-21 (shallow) [2]															
DM-21 (deep) [2]															
DM-22 (0-15)	0-15	**35.8**	34	**15.6**	<0.5	9.5	43.1	**23.7**	**1.9**	<0.1	<0.05	<7	<4	<8	<0.6
DM-22 (40-50)	40-50	**54.1**	23.1	**19.3**	<0.5	5.9	28.8	13.9	<1	<0.1	<0.05	<7	<4	<8	<0.6
DM-23 (0-20)	0-20	17.1	52.1	9.9	<0.5	9.9	42.4	**35.5**	**1.1**	<0.1	<0.05	<7	<4	<8	<0.6
DM-23 (deep) [1]															

Notes:

NA: Not available

Underlined values: Results exceed Background arithmetic mean.

Bold Values: Results exceed Baseline arithmetic mean.

1: The deep soil sample at DM-18 and DM-23 could not be collected due to refusal.

2: No soil samples were taken at DM-19 and DM-21 due to frozen ground.

4.11.5 Conclusions and Overall Performance of the Upper Site NWS Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site NWS Landfill. Some erosion channels along the upper south slope of the landfill were observed. The overall stability performance of this landfill was assessed as Acceptable.

Soil samples were collected at four of five designated locations in 2015; two soil samples (shallow and deep) were collected at two of the four locations sampled. Concentrations of copper, nickel, cobalt, chromium and arsenic were detected above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-18 (shallow sample), located upgradient of the north side of the landfill. The concentrations of most metals at this location were greater than the concentrations reported in 2014. The concentrations of chromium and arsenic at this location exceeded their baseline concentration plus 3σ. At DM-20 and DM-22, it was noted that some metals were greater the concentrations reported in 2014, however, the majority of metals concentrations were less than the concentrations reported in 2014. The metal concentrations at DM-23 were generally lower than the concentrations reported in 2014. No detectable concentrations of PHC or PCB were noted in any of the samples in 2015.

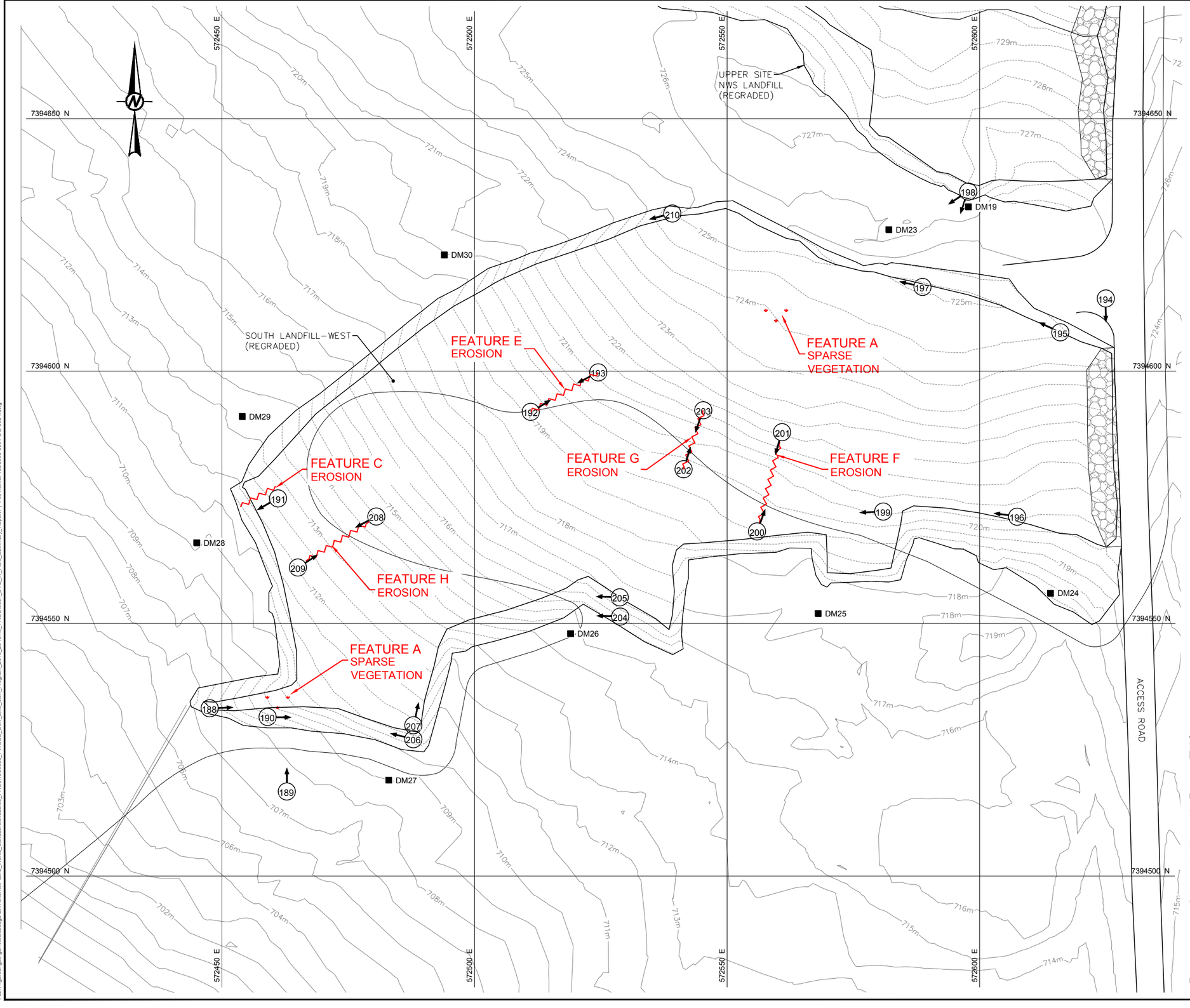
4.11.6 Recommendations for Upper Site NWS Landfill

No modifications to the ongoing monitoring program at this landfill are recommended.

4.12 Upper Site South Landfill West

4.12.1 Landfill Description

The Upper Site South Landfill West is located 60 m south and downgradient of the Upper Site NWS Landfill. The Upper Site South Landfill West was created during DEW Line operations. The landfill was regraded and covered with clean fill in 2008 during the remediation of DYE-M. The landfill covers an area approximately 11,700 m^2. Approximate soil sampling locations are provided in Figure DYE-M.13.



LEGEND:

- EROSION (NTS)
- SETTLEMENT (NTS)
- VEGETATION (NTS)
- SOIL SAMPLING LOCATION
- 48 PHOTOGRAPH LOCATION
- REGRADED RIP RAP

NOTE
GRID PROJECTION IS NAD83 ZONE 20N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
SOUTH LANDFILL WEST

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.13

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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4.12.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- No soil sample was taken at DM-19, DM-24, DM-25, DM-26 and DM-27 due to snow covered frozen ground.
- The deep soil sample at DM-23 could not be collected due to refusal.

4.12.3 Visual Inspection

Multiple locations with observed erosion and vegetation features are noted at the Upper Site South Landfill West. Table 4-51 presents a summary of observed visual inspection features and Table 4-52 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-53 is a log of photographs taken during the 2015 visual inspection.

Multiple new minor erosion channels (Features F and H) and self-armouring erosion (Features E and G) were observed on the cover surface. In addition, an accumulation of fine grained material was observed in a low area below self-armouring erosion (Feature C, previously noted). Some sparse vegetation was also observed on the cover surface (Feature A, previously observed). These features do not appear to be impacting the stability of the landfill.

Table 4-51: Visual Inspection Checklist – Upper Site South Landfill West

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Upper Site South Landfill West
DATE OF INSPECTION: August 11, 2015
DATE OF PREVIOUS INSPECTION: August 10, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 2
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-51: Visual Inspection Checklist – Upper Site South Landfill West

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	N											
Erosion	Y	Feature C	Cover surface	572461	7394575	1	0.3	0.1	0.00%	Accumulation of fines in a low area (Acceptable)	Previously observed, no change	191
		Feature E	Cover surface	572524	7394600	10	0.3	-	0.03%	Minor erosion self-armouring with accumulation of fines below (Acceptable)	New	192-193
		Feature F	Cover surface	572556	7394568	20	0.2	0.03	0.03%	Erosion channel from the middle of landfill towards south (Acceptable)	New	200-201
		Feature G	Cover surface	572541	7394581	14	0.2	0.02	0.02%	Self-armouring erosion (Acceptable)	New	202-203
		Feature H	Cover surface	572481	7394571	19	0.2	0.02	0.03%	Minor erosion channel (Acceptable)	New	208-209
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation	Y	Feature A	South slope	572459	7394532	1	1	-	0.01%	Sparse vegetation	Previously observed, no change	190
Staining	N											
Vegetation Stress	N											
Seepage or Ponded Water	N											

Table 4-51: Visual Inspection Checklist – Upper Site South Landfill West

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	N											

Landfill Area = 11,670 m^2.

Table 4-52: Preliminary Stability Assessment – Upper Site South Landfill West

Feature	Severity Rating	Extent
Settlement	Acceptable	N/A
Erosion	Acceptable	Occasional
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	Isolated
Sloughing	Acceptable	N/A
Cracking	Acceptable	N/A
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	Isolated
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	N/A
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	N/A
Overall Landfill Performance	**Acceptable**	

Table 4-53: Summary Table of Photographic Log – Upper Site South Landfill West

Photo	Description (file name)	Easting	Northing	Date
188	West slope and crest surface, facing east (ATT72_Photo1.jpg)	572447.5243	7394533.229	11-Aug-2015
189	South slope, facing north (ATT73_Photo1.jpg)	572462.8101	7394516.755	11-Aug-2015
190	Feature A, sparse vegetation on south slope, facing N (ATT74_Photo1.jpg)	572459.0097	7394531.505	11-Aug-2015
191	Feature C – accumulation of fines from erosion, facing west (ATT75_Photo1.jpg)	572461.064	7394574.791	11-Aug-2015
192	Feature E – minor self-armouring erosion, facing east (ATT76_Photo1.jpg)	572524.4696	7394599.746	11-Aug-2015
193	Feature E – minor self-armouring erosion, facing west (ATT77_Photo2.jpg)	572524.4696	7394599.746	11-Aug-2015
194	East slope facing south from northeast corner (ATT78_Photo1.jpg)	572624.9496	7394614.36	11-Aug-2015
195	North toe facing west from northeast corner – Snow and ice at the toe (ATT79_Photo1.jpg)	572615.9346	7394607.655	11-Aug-2015
196	South crest, facing west from southeast corner (ATT80_Photo1.jpg)	572607.394	7394571.168	11-Aug-2015
197	North crest, facing west (ATT81_Photo1.jpg)	572588.6534	7394616.657	11-Aug-2015
198	Overview, facing southwest (ATT82_Photo1.jpg)	572597.716	7394635.557	11-Aug-2015
199	South crest, facing west (ATT83_Photo1.jpg)	572580.8836	7394572.162	11-Aug-2015
200	Feature F, erosion channel, facing north from south crest edge (ATT84_Photo1.jpg)	572555.8953	7394568.251	11-Aug-2015

Table 4-53: Summary Table of Photographic Log – Upper Site South Landfill West

Photo	Description (file name)	Easting	Northing	Date
201	Feature F, erosion channel, facing south from north endpoint (ATT85_Photo1.jpg)	572560.8403	7394587.897	11-Aug-2015
202	Feature G, self-armouring erosion, facing north from south endpoint (ATT86_Photo1.jpg)	572541.3452	7394580.563	11-Aug-2015
203	Feature G, self-armouring erosion, north endpoint (ATT87_Photo1.jpg)	572545.2546	7394592.227	11-Aug-2015
204	South crest facing west (ATT88_Photo1.jpg)	572528.7077	7394555.195	11-Aug-2015
205	South crest facing west (ATT89_Photo2.jpg)	572528.7077	7394555.195	11-Aug-2015
206	South crest facing west (ATT90_Photo1.jpg)	572488.0419	7394529.369	11-Aug-2015
207	Cover surface, facing north from south end (ATT91_Photo1.jpg)	572487.8672	7394529.847	11-Aug-2015
208	Feature H, self-armouring erosion, facing west from east endpoint (ATT92_Photo1.jpg)	572480.5228	7394571.176	11-Aug-2015
209	Feature H, self-armouring erosion, facing east from west endpoint (ATT93_Photo1.jpg)	572465.0065	7394561.085	11-Aug-2015
210	North slope and crest, facing west (ATT94_Photo1.jpg)	572539.1363	7394631.19	11-Aug-2015

4.12.4 Soil Sampling

Table 4-54 presents a summary of analytical results for soil samples collected at the Upper Site South Landfill West. DM-19 and DM-23 represent upgradient sampling locations, whereas DM-24, DM-25, DM-26, DM-27, DM-28, DM-29 and DM-30 represent downgradient sampling locations. No soil sample was taken at DM-19, DM-24, DM-25, DM-26 and DM-27 due to snow covered frozen ground. The deep soil sample at DM-23 could not be collected due to refusal.

DM-23

Sampling location DM-23 is located upgradient of the landfill, approximately 8 m north of the toe. The estimated elevation of this sampling point is 726 masl. As shown in Photo 301, the area consists of sand, gravel and rock with boulders and is not vegetated. The soils consisted of brown sand with some gravel and stone.

In the shallow sample at DM-23 (0-20 cm), the concentration of nickel (52.1 mg/kg) exceeded the baseline concentration (42 mg/kg) but was less than the background concentration (141 mg/kg). The concentration of nickel was less than the baseline concentration plus 3σ (102 mg/kg). In addition, the concentration of arsenic (1.1 mg/kg) exceeded the background concentration (1.0 mg/kg) but was less than the baseline concentration (2.3 mg/kg). The concentrations of most metals, including arsenic (1.3 mg/kg in 2014), were less than those reported in 2014. No PHC or PCB were detected from the shallow sample at DM-23 in 2015.

DM-28

Sampling location DM-28 is located downgradient of the landfill, approximately 12 m west of the toe. The estimated elevation of this sampling point is 710 masl. As shown in Photo 380, the area is largely covered with gravel and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at DM-28 (0-15 cm), the concentrations of copper (28.8 mg/kg), nickel (55.5 mg/kg) and chromium (80.7 mg/kg) exceeded their baseline concentrations but were less than the background concentrations. In addition, the concentrations of zinc (77 mg/kg) and arsenic (2 mg/kg) exceeded their background concentrations (70 mg/kg and 1.0 mg/kg, respectively) but were less than their baseline concentrations (84 mg/kg and 2.3 mg/kg, respectively). The concentrations of most metals, including zinc (67 mg/kg in 2014) and arsenic (0.8 mg/kg in 2014) were less than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-28 in 2015.

In the deep sample at DM-28 (40-50 cm), the concentration of arsenic (1.5 mg/kg) exceeded the background concentration (1.0 mg/kg) but was less than the baseline concentration (2.3 mg/kg). The concentration of arsenic was greater than the concentration reported in 2014 (0.5 mg/kg). No PHC or PCB were detected from the deep sample at DM-28 in 2015.

DM-29

Sampling location DM-29 is located downgradient of the landfill, approximately 6 m north of the toe. The estimated elevation of this sampling point is 713.5 masl. As shown in Photo 305, the area is largely covered with gravel and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at DM-29 (0-20 cm), the concentrations of copper (26.8 mg/kg) and nickel (62.5 mg/kg) exceeded their baseline concentration (26 mg/kg and 42 mg/kg, respectively) but were less than their background concentrations (60 mg/kg and 141 mg/kg, respectively). In addition, the concentration of arsenic (1.3 mg/kg) exceeded the background concentration (1.0 mg/kg) but was less than the baseline concentration (2.3 mg/kg). The concentrations of all metals were greater than those reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at DM-29 in 2015.

In the deep sample at DM-29 (20-40 cm), the concentration of nickel (65.3 mg/kg) exceeded the baseline concentration (42 mg/kg) but was less than the background concentration (141 mg/kg). The concentration of nickel was less than the baseline concentration plus 3σ (102 mg/kg). In addition, the concentration of arsenic (1.4 mg/kg) exceeded the background concentration (1.0 mg/kg) but was less than the baseline concentration (2.3 mg/kg). The concentrations of all metals, including nickel (50 mg/kg in 2014) and arsenic (0.6 mg/kg in 2014), were greater than those reported in 2014. No PHC or PCB were detected from the deep sample at DM-29 in 2015.

DM-30

Sampling location DM-30 is located cross-gradient of the landfill, approximately 7 m north of the toe. The estimated elevation of this sampling point is 720 masl. As shown in Photo 383, the area is largely covered with gravel and rock and is not vegetated. The soils consisted of brown sand with gravel and stone.

In the shallow sample at DM-30 (0-15 cm), the concentration of nickel (44.9 mg/kg) exceeded the baseline concentration (42 mg/kg) but was less than the background concentration (141 mg/kg). The concentration of nickel was less than the baseline concentration plus 3σ (102 mg/kg). In addition, the concentration of arsenic (1.8 mg/kg) exceeded the background concentration (1.0 mg/kg) but was less than the baseline concentration (2.3 mg/kg). The concentration of all metals, including nickel (35 mg/kg in 2014) and arsenic (0.6 mg/kg in 2014), were greater than the concentrations reported in 2014. No PHC or PCB were detected from the shallow sample at DM-30 in 2015.

In the deep sample at DM-30 (20-30 cm), the concentration of arsenic (1.5 mg/kg) exceeded the background concentration (1.0 mg/kg) but was less than the baseline concentration (2.3 mg/kg). The concentrations of most metals, including arsenic (0.3 mg/kg in 2014), were greater than those observed in 2014. No PHC or PCB were detected from the deep sample at DM-30 in 2015.

Table 4-54: Soil Chemical Analysis Results – Upper Site South Landfill West

ID	Depth (m)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F3 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.50	0.002	NA	NA	NA	NA
Baseline Mean		**26**	**42**	**13**	**1.0**	**10**	**84**	**56**	**2.3**	**0.10**	**0.05**	**10**	**4.0**	**9.0**	**NA**
Baseline + 3σ		88	102	52	21	92	227	179	47	0.10	0.56	10	11	131	NA
Upgradient															
DM-19 (shallow) [1]															
DM-19 (deep) [1]															
DM-23 (0-20)	0-20	17.1	**52.1**	9.9	<0.5	9.9	42.4	35.5	1.1	<0.1	<0.05	<7	<4	<8	<6
DM-23 (deep) [2]															
Downgradient															
DM-24 (shallow) [1]															
DM-24 (deep) [1]															
DM-25 (shallow) [1]															
DM-25 (deep) [1]															
DM-26 (shallow) [1]															
DM-26 (deep) [1]															
DM-27 (shallow) [1]															
DM-27 (deep) [1]															
DM-28 (0-15)	0-15	**28.8**	**55.5**	12.9	<0.5	8.9	77	**80.7**	1.7	<0.1	<0.05	<7	<4	<8	<6
DM-28 (40-50)	40-50	25.6	30.6	11	<0.5	7.7	70	39.9	1.6	<0.1	<0.05	<7	<4	<8	<6
DM-29 (0-20)	0-20	**26.8**	**62.5**	11	<0.5	7.9	42.4	34.1	1.3	<0.1	<0.05	<7	<4	<8	<6
DM-29 (20-40)	20-40	22.9	**65.3**	11.1	<0.5	7.5	37.2	29.4	1.4	<0.1	<0.05	<7	<4	<8	<6
DM-30 (0-15)	0-15	23.2	**44.9**	10.5	<0.5	7.7	52	30.6	1.8	<0.1	<0.05	<7	<4	<8	<6
DM-30 (20-30)	20-30	20	40.3	10.1	<0.5	7.4	51	32.1	1.5	<0.1	<0.05	<7	<4	<8	<6

Notes:

NA: Not available

Underlined values: Results exceed Background arithmetic mean.

Bold Values: Results exceed Baseline arithmetic mean.

1: No soil sample was taken at DM-19, DM-24, DM-25, DM-26 and DM-27 due to snow covered frozen ground.

2: The deep soil sample at DM-23 could not be collected due to refusal.

4.12.5 Conclusions and Overall Performance of the Upper Site South Landfill West

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site South Landfill West. Some self-armouring erosion and minor erosion channels were observed on the cover surface. The overall stability performance of this landfill was assessed as Acceptable.

Soil samples were collected at four of nine designated locations in 2015; two soil samples (shallow and deep) were collected at three of the four locations sampled. Concentrations of copper, nickel, zinc, chromium and arsenic were detected above the background/baseline arithmetic mean. It is noted that concentrations of the above noted metals were highest overall at the sample location DM-28 (shallow sample), located downgradient of the west side of the landfill. The concentrations of most metals at this location were greater than the concentrations reported in 2014. At DM-29 and DM-30, the majority of metals concentrations were greater than the concentrations reported in 2014, whereas the metal concentrations at DM-23 were generally lower than the concentrations reported in 2014. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No detectable concentrations of PHC or PCB were noted in any of the samples in 2015.

4.12.6 Recommendations for Upper Site South Landfill West

No modifications to the ongoing monitoring program at this landfill are recommended.

4.13 Upper Site Helipad Landfill

4.13.1 Landfill Description

The Upper Site Helipad Landfill is located between the existing helipad and the south side of the station pad. It is a former landfill that was created during DEW Line operations. The Upper Site Helipad Landfill was regraded and covered with clean fill in 2008 during the remediation of DYE-M. The area of the regraded landfill is approximately 5,600 m^2. This landfill has not been monitored or inspected previously (i.e., 2015 was the first year of monitoring). Approximate soil sampling locations are provided in Figure DYE-M.14.

LEGEND:

- SETTLEMENT (NTS)
- ROUGH AREAS (NTS)
- TIRE TRACKS (NTS)
- SOIL SAMPLING LOCATION
- PHOTOGRAAPH LOCATION (48)

FEATURE A
SETTLEMENT

FEATURE B
ROUGH AREA

FEATURE C
SETTLEMENT

FEATURE D
TIRE TRACKS WITH
PONDED WATER

NOTE
GRID PROJECTION IS NAD83 ZONE 20N. ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY AECOM, PROJECT NO. 60323208 (0171-LANDFILL MONITORING), DATED MARCH 2015.

0 10 20
1:500 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 DYE-M MONITORING REPORT

TITLE
UPPER SITE
HELIPAD

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	DYE-M.14

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4.13.2 Summary of any Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- The deep soil sample at DM-11 could not be collected due to refusal.

4.13.3 Visual Inspection

Locations with observed minor settlement and cover material segregation features are noted at the Upper Site Helipad Landfill. Table 4-55 presents a summary of observed visual inspection features and Table 4-56 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-57 is a log of photographs taken during the 2015 visual inspection.

Some minor differential settlement (Features A and C) was observed on the cover surface. An area of cover material segregation and/or rough grading (Feature B) was observed at the southwest end of the landfill. A tire track with ponded water was also observed on the cover surface (Feature D). These features do not appear to be impacting the stability of the landfill.

Table 4-55: Visual Inspection Checklist – Upper Site Helipad Landfill

SITE NAME: DYE-M Cape Dyer
LANDFILL DESIGNATION: Upper Site Helipad Landfill
DATE OF INSPECTION: August 11, 2015
DATE OF PREVIOUS INSPECTION: Not previously inspected
INSPECTED BY: Darrin Johnson
REPORT PREPARED BY: Darrin Johnson
MONITORING EVENT NUMBER: 1
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Table 4-55: Visual Inspection Checklist – Upper Site Helipad Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	Y	Feature A	Cover surface	572730	7394834	8	6	0.3	0.86%	Differential settlement (Acceptable)	New	103 and 104
		Feature C	Cover surface	572675	7394823	3	3	0.3	0.16%	Settlement (Acceptable)	New	110
Erosion	Y	Feature B	South slope	572703	7394786	30	15		8.06%	Rough area (Acceptable)	New	107 and 108
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation	N											
Staining	N											
Vegetation Stress	N											
Seepage or Ponded Water	N											
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	Y	Feature D	Cover surface	572706	7394826	20	5	0.2	1.79%	Tire track with ponded water (Acceptable)	New	112

Landfill Area = 5,580 m^2.

Table 4-56: Preliminary Stability Assessment – Upper Site Helipad Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Isolated
Lateral Movement	Acceptable	N/A
Frost Action	Acceptable	N/A
Sloughing	Acceptable	N/A
Cracking	Acceptable	N/A
Animal Burrows	Acceptable	N/A
Vegetation establishment	Acceptable	N/A
Staining	Acceptable	N/A
Vegetation Stress	Acceptable	N/A
Seepage/Ponded Water	Acceptable	N/A
Debris and/or liner exposure	Acceptable	N/A
Other	Acceptable	Isolated
Overall Landfill Performance	**Acceptable**	

Table 4-57: Summary Table of Photographic Log – Upper Site Helipad Landfill

Photo	Description (file name)	Easting	Northing	Date
101	Northeast slope, facing northwest from south (ATT116_Photo1.jpg)	572757.6844	7394834.001	11-Aug-2015
102	Upper Site Helipad Landfill – Southeast slope, facing southwest (ATT117_Photo1.jpg)	572754.0297	7394832.287	11-Aug-2015
103	Feature A, differential settlement, facing south (ATT118_Photo1.jpg)	572726.4446	7394838.622	11-Aug-2015
104	Feature A, differential settlement, facing west (ATT119_Photo1.jpg)	572729.8667	7394834.345	11-Aug-2015
105	Landfill surface facing north from southeast crest edge (ATT120_Photo1.jpg)	572727.5418	7394802.612	11-Aug-2015
106	South slope, facing north (ATT122_Photo2.jpg) (ATT123_Photo3.jpg)	572697.602	7394766.304	11-Aug-2015
107	Feature B, rough area on south slope, facing northwest from southeast endpoint (ATT124_Photo1.jpg)	572703.0533	7394785.982	11-Aug-2015
108	Feature B, rough area on south slope, facing southeast from northwest endpoint (ATT125_Photo1.jpg)	572678.2266	7394800.067	11-Aug-2015
109	West slope, facing north from southwest corner (ATT126_Photo1.jpg)	572658.6827	7394791.578	11-Aug-2015
110	Feature C, settlement, facing east (ATT127_Photo1.jpg)	572675.2691	7394822.794	11-Aug-2015
111	Cover surface, facing east from west crest edge (ATT128_Photo1.jpg) (ATT129_Photo2.jpg) (ATT130_Photo3.jpg)	572670.0796	7394818.345	11-Aug-2015
112	Feature D, tire track with ponded water, facing southwest (ATT131_Photo1.jpg)	572706.4427	7394826.274	11-Aug-2015
113	Cover surface, facing south from north crest (ATT132_Photo1.jpg) (ATT133_Photo2.jpg) (ATT134_Photo3.jpg)	572711.3711	7394864.376	11-Aug-2015

4.13.4 Soil Sampling

Table 4-58 presents a summary of analytical results for soil samples collected at the Upper Site Helipad Landfill. DM-11 is a sampling location within the landfill footprint (cover), whereas DM-12, DM-13, DM-14, DM-15, DM-16 and DM-17 represent downgradient sampling locations. The deep soil sample at DM-11 could not be collected due to refusal.

DM-11

Sampling location DM-11 is located within the landfill footprint (cover), immediately north of an area with tire tracks and ponded water as shown in Photo 112. The estimated elevation of this sampling point is 743 masl. As shown in Photo 351, the area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of brown sand with some gravel and stone.

The shallow sample at DM-11 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of cobalt (20.8 mg/kg), lead (14.3 mg/kg) and arsenic (3.6 mg/kg) exceeded the background concentrations. No PHC or PCB were detected from the shallow sample at DM-11 in 2015.

DM-12

Sampling location DM-12 is located downgradient of the landfill, approximately 6 m northeast of the toe. The estimated elevation of this sampling point is 740 masl. As shown in Photo 354, the area is largely covered with sand and gravel and is not vegetated. The soils consisted of brown sand with some gravel.

The shallow sample at DM-12 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of lead (84.5 mg/kg), zinc (91.1 mg/kg), chromium (107 mg/kg) and arsenic (3.6 mg/kg) exceeded their background concentrations. The concentration of PCB (0.08 mg/kg) also exceeded the background concentration of 0.002 mg/kg. No PHC were detected from the shallow sample at DM-12 in 2015.

The deep sample at DM-12 (30-40 cm) exhibited elevated concentrations of metals, at lower concentrations than those in the shallow sample. The concentrations of lead (21.8 mg/kg), zinc (70.5 mg/kg) and arsenic (2.7 mg/kg) exceeded the background concentrations. An elevated TPH concentration of 81 mg/kg and PHC F3 fraction concentration of 75 mg/kg were observed in 2015. No PHC F4 fraction were detected from the deep sample at DM-12 in 2015. The concentration of PCB (0.35 mg/kg) also exceeded the background concentration of 0.002 mg/kg.

DM-13

Sampling location DM-13 is located downgradient of the landfill, approximately 6 m south of the toe. The estimated elevation of this sampling point is 737 masl. As shown in Photo 357, the area was partially snow covered at the time of sampling. The area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of grey sand with some gravel and stone.

In the shallow sample at DM-13 (0-15 cm), the concentration of lead (14.7 mg/kg) and arsenic (2.3 mg/kg) exceeded their background concentrations (10 mg/kg and 1.0 mg/kg, respectively). An elevated TPH concentration of 61 mg/kg and PHC F3 fraction concentration of 55 mg/kg were observed in 2015. No PHC F4 fraction or PCB were detected from the shallow sample at DM-13 in 2015.

In the deep sample at DM-13 (40-50 cm), the concentration of lead (11.6 mg/kg) and arsenic (2 mg/kg) exceeded their background concentrations (10 mg/kg and 1.0 mg/kg, respectively). No PHC or PCB were detected from the deep sample at DM-13 in 2015.

DM-14

Sampling location DM-14 is located downgradient of the landfill, immediately south of the toe. The estimated elevation of this sampling point is 736.5 masl. As shown in Photo 360, the area is largely covered with sand and gravel with some rocks and is not vegetated. The soils consisted of yellow-brown sand with some gravel and stone.

In the shallow sample at DM-14 (0-20 cm), the concentration of zinc (71.9 mg/kg) and arsenic (2.2 mg/kg) exceeded their background concentrations (70 mg/kg and 1.0 mg/kg, respectively). No PHC or PCB were detected from the shallow sample at DM-14 in 2015.

In the deep sample at DM-14 (20-40 cm), the concentration of arsenic (1.5 mg/kg) exceeded the background concentration (1.0 mg/kg). No PHC or PCB were detected from the deep sample at DM-14 in 2015.

DM-15

Sampling location DM-15 is located downgradient of the landfill, approximately 5 m south of the toe. The estimated elevation of this sampling point is 736.5 masl. As shown in Photo 363, the area is largely covered with sand, rock and boulders is not vegetated. The soils consisted of brown sand with some gravel and stone.

In the shallow sample at DM-15 (0-15 cm), the concentration of arsenic (3.7 mg/kg) exceeded the background concentration (1.0 mg/kg). No PHC or PCB were detected from the shallow sample at DM-15 in 2015.

In the deep sample at DM-15 (30-40 cm), the concentration of lead (10.6 mg/kg) and arsenic (1.9 mg/kg) exceeded their background concentrations (10 mg/kg and 1.0 mg/kg, respectively). No PHC or PCB were detected from the deep sample at DM-15 in 2015.

DM-16

Sampling location DM-16 is located downgradient of the landfill, approximately 7 m south of the toe. The estimated elevation of this sampling point is 738.5 masl. As shown in Photo 365, the area was partially snow covered at the time of sampling. The area consists of sand and gravel with some rocks and boulders and is not vegetated. The soils consisted of grey sand with some gravel.

In the shallow sample at DM-16 (0-15 cm), the concentration of zinc (75.2 mg/kg) and arsenic (2.4 mg/kg) exceeded their background concentrations (70 mg/kg and 1.0 mg/kg, respectively). No PHC or PCB were detected from the shallow sample at DM-16 in 2015.

In the deep sample at DM-16 (30-40 cm), the concentration of arsenic (2.1 mg/kg) exceeded the background concentration (1.0 mg/kg). No PHC or PCB were detected from the deep sample at DM-16 in 2015.

DM-17

Sampling location DM-17 is located downgradient of the landfill, immediately west of the toe. The estimated elevation of this sampling point is 740.5 masl. As shown in Photo 369, the area was partially snow covered at the time of sampling. The area consists of sand and gravel with some rocks and is not vegetated. The soils consisted of grey sand with some gravel and stone

The shallow sample at DM-17 (0-20 cm) exhibited elevated concentrations of metals. The concentrations of copper (125 mg/kg), lead (10.1 mg/kg), zinc (157 mg/kg) and arsenic (3.7 mg/kg) exceeded their background concentrations. No PHC or PCB were detected from the shallow sample at DM-17 in 2015.

A duplicate sample was collected at the deep DM-17 (20-40 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicate the original and duplicate sample results differ by less than 23% for all parameters.

The deep sample at DM-17 (20-40 cm) exhibited elevated concentrations of metals, at similar concentration to those in the shallow sample. The average concentrations of copper (180 mg/kg), zinc (123 mg/kg) and arsenic (2 mg/kg) exceeded their background concentrations. The average concentration of lead (10 mg/kg) was equal to the background concentration. No PHC or PCB were detected from the shallow samples at DM-17 in 2015.

Table 4-58: Soil Chemical Analysis Results - Upper Site Helipad Landfill

ID	Depth (m)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		60	141	20	1.0	10	70	90	1.0	0.50	0.002	NA	NA	NA	NA
Baseline Mean		**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Landfill Cover															
DM-11 (0-15)	0-15	58	79	20.8	<0.5	14.3	61.4	82.6	3.6	<0.1	<0.05	<7	<4	<8	<6
DM-11 (deep) [1]															
Downgradient															
DM-12 (0-15)	0-15	45.4	72.9	15.2	<0.5	84.5	91.1	107	4	<0.1	0.08	<7	<4	<8	<6
DM-12 (30-40)	30-40	39.6	86.9	14.4	<0.5	21.8	70.5	79.5	2.7	<0.1	0.35	<7	<4	75	<6
DM-13 (0-15)	0-15	24.5	52.4	11.8	<0.5	14.7	64.2	46.1	2.3	<0.1	<0.05	<7	<4	55	<6
DM-13 (40-50)	40-50	16.7	38.3	10.6	<0.5	11.6	62.8	28.3	2	<0.1	<0.05	<7	<4	<8	<6
DM-14 (0-20)	0-20	41.5	61	12.3	<0.5	9.1	71.9	39.6	2.2	<0.1	<0.05	<7	<4	<8	<6
DM-14 (20-40)	20-40	43.4	56.6	12	<0.5	8	65.7	30.5	1.5	<0.1	<0.05	<7	<4	<8	<6
DM-15 (0-15)	0-15	26.8	83	15	<0.5	9.9	47.4	42.6	3.7	<0.1	<0.05	<7	<4	<8	<6
DM-15 (30-40)	30-40	24.4	76.8	13.9	<0.5	10.6	46.8	42	1.9	<0.1	<0.05	<7	<4	<8	<6
DM-16 (0-15)	0-15	53.3	40.4	11.8	<0.5	8.5	75.2	29.5	2.4	<0.1	<0.05	<7	<4	<8	<6
DM-16 (30-40)	30-40	45.2	61.3	13.2	<0.5	8.1	64	37.3	2.1	<0.1	<0.05	<7	<4	<8	<6
DM-17 (0-20)	0-20	125	41.9	15.9	<0.5	10.1	157	20.7	3.7	<0.1	<0.05	<7	<4	<8	<6
DM-17 (20-40)	20-40	175	39.2	16.3	<0.5	9.5	113	18	3.2	<0.1	<0.05	<7	<4	<8	<6
DM-17 (20-40) (Duplicate)	20-40	185	49	15.1	<0.5	11	132	20	<1	<0.10	<0.05	<5	<4	<8	<6
DM-17 (20-40) (Dup Avg)	20-40	180	44	15.7	<0.5	10	123	19	2	<0.1	<0.05	<6	<4	<8	<6

Notes:
NA: Not available
Underlined values: Results exceed Background arithmetic mean.
Bold Values: Results exceed Baseline arithmetic mean.
1: The deep soil sample at DM-11 could not be collected due to refusal.

4.13.5 Conclusions and Overall Performance of the Upper Site Helipad Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Upper Site Helipad Landfill. Some minor settlement, rough grading and ponding of water in a tire track were observed in this landfill. The overall stability performance of the landfill was assessed as Acceptable.

Soil samples were collected at all designated locations in 2015; two soil samples (shallow and deep) were collected at six of the seven sampling locations. Concentrations of copper, cobalt, lead, zinc, chromium and arsenic were detected above the background mean at a number of sampling locations. It is noted that concentrations of the above noted metals were highest overall at the sample locations DM-12 (shallow sample), located cross-gradient of the northeast side of the landfill and DM-17 (shallow sample), located downgradient of the west side of the landfill..

Detectable concentrations of PHC were noted in the deep sample at DM-12 and the shallow sample at DM-13, at TPH concentrations ranging from 61 mg/kg to 81 mg/kg. Concentrations of PCB above the background concentration (0.002 mg/kg) were noted in the shallow sample at DM-12 (0.08 mg/kg) and the deep sample at DM-12 (0.35 mg/kg). No detectable concentrations of PCB or PHC were noted in any other sampling locations in 2015.

4.13.6 Recommendations for Upper Site Helipad Landfill

Because of the elevated concentrations of metals, PHC and PCB measured in some of the soil samples collected at this landfill, it is recommended that ongoing monitoring be continued at this landfill.

5.0 QA/QC RESULTS

This section contains the results of the QA/QC program described in Section 3.3. The results are described in terms of accuracy, reliability (blank analysis) and reproducibility (duplicate analysis).

The 2015 monitoring programs for the four DEW Line sites were all performed using a single deployment of Golder personnel and equipment and the standard operating procedures were consistent from site to site. The QA/QC analysis below contains both program-level and site-level discussions, where appropriate. The laboratory reports related to the site-level discussion are contained in Appendix C.

5.1 Hold Times

The generally accepted hold times for the parameters analyzed in this program are:

- Metals in soil: 180 days, metals in water 60 days;
- Mercury in soil and water is 28 days
- PCB in soil: 365 days and 7 days in water
- PHC-F1 in soil: 48 hours unpreserved, PHC-F1 in water: 7 days
- PHC F2-F4 in soil: 14 days, PHC F2-F4 in water: 7 days

At DYE-M, the soil and groundwater sampling was carried out from August 9 to 13, 2015 and the samples were sent from the site to the labs in several shipments. The correspondence between sampling dates and reception dates at the two labs is summarized in the following table.

Sample Date (2015)	Media Sampled s:soil gw:groundwater	Laboratory	Reception Dates (2015)	Total time in transit (days)	Hold Time Exceedances
August 9	s, gw	Paracel	August 17	8	Soil PHC-F1 gw (1 day)
August 10	s, gw	Paracel	August 17, 18	7-8	Soil PHC-F1 gw (1 day)
August 11	s	Paracel	August 18, 19	7-8	Soil PHC-F1 none
August 12, 13	gw	Paracel	August 19	6-7	none
August 12	s	Paracel	August 20	8	Soil PHC-F1
August 9	s, gw	AGAT	August 17	8	Soil PHC-F1 gw (1 day)
August 10	s	AGAT	August 19	9	Soil PHC-F1
August 11-12	s, gw	AGAT	August 18	6-7	Soil PHC-F1

Maximum hold times in soil were achieved for all parameters being analyzed except for PHC-F1, which was exceeded by 5-6 days due to its very short hold time of 48 hours. The very short hold time for unpreserved PHC-F1 in soil is a known issue but it has been decided to not preserve this parameter in order to maintain consistency with earlier data in the program.

The maximum hold time of 7 days for PCB, and PHC F1-F4 in water was exceeded by one day for the groundwater samples collected on August 9th and 10th. Given that the hold time for groundwater was exceeded by only one day, and the duplicate and original groundwater sample taken on August 9th had no concentrations of PCB or PHC F1-F4 above detection, the delay is not expected to have had a material effect on the reported results.

5.2 Accuracy

Accuracy is a measure of how close a measured value is to the true value. The accuracy of the laboratory data is generally evaluated by the laboratory through the use of matrix spikes or surrogate recoveries. For the DYE-M samples, Paracel performed a spike analysis on water and/or one on soil with every batch. Spike recovery for arsenic in one batch of two groundwater samples and zinc in one batch of 36 soil samples were outside of the acceptable range in one batch each, however the results of the batches were accepted on the basis that all the other QC met the acceptable data quantity objectives. AGAT also performed a matrix spike on DYE-M soil and water samples with every batch and all of their results were within their own data quality objectives. The labs' data quality objectives for PHC and PCB were 60-140% recovery, and 80-120% recovery for metals. Elevated MDL were sometimes required in water samples due to limited sample volume. This most often affected PCB, because that was the last bottle to be attempted to be filled in the field.

5.3 Reliability

Reliability is a measure of certainty that the concentrations reported by the labs are reliable indicators of field conditions and have not been affected other sources of contamination. The analysis of blanks provides a measure of reliability. Two sets of bottles of deionized water for Trip Blanks accompanied the team on the 2015 monitoring program; one from Paracel and one from AGAT. These bottles were not opened at the sites. The analytical reports from both labs indicate that no parameter was detected in the Trip Blanks at the end of the trip. The lab's internal QC blanks were also below detection limits for all parameters.

The Trip Blank and Field Blank sample results suggest that no outside sources of contamination have affected the reported lab results.

5.4 Reproducibility (Duplicate Analysis)

The reproducibility of lab results was measured through the testing of field duplicate samples. Duplicate soil samples were prepared in the field by mixing the soil in a stainless steel bowl and taking portions of soil and alternately filling the sample jars for the two labs. If a duplicate from the lower of the two sample intervals was being prepared, it was sometimes mixed at the bottom of the test pit.

The total number of original soil samples collected was 230, for which 22 duplicate soil samples were prepared and analyzed, providing a duplicate rate of approximately 10%. For groundwater, a total of 26 samples were collected and five duplicates were analyzed, which is a duplicate rate of more than 10%. The distribution of duplicate soil and groundwater samples over the four sites is provided in the table below.

Twelve soil duplicates and two groundwater duplicates were prepared at DYE-M.

Soil Samples and Duplicates

	DEW Line Site				Totals
	CAM-5	FOX-2	FOX-3	DYE-M	
Soil Samples Collected	27	38	40	125	230
Duplicate Soil Samples	3	3	4	12	22
Percent	11.1%	7.9%	10.0%	9.6%	9.6%

Groundwater Samples and Duplicates

	DEW Line Site				Totals
	CAM-5	FOX-2	FOX-3	DYE-M	
Monitoring Well Sampled	5	11	8	12	26
Duplicate Groundwater Samples	1	1	1	2	5
Percent	20.0%	9.1%	12.5%	16.7%	13.9%

To determine the precision of the original and duplicate sample results, the RPD was calculated according to the following equation:

$$RPD = \frac{|x_2 - x_1|}{\left(\frac{x_1 + x_2}{2}\right)} \times 100\%$$

Where, x_1 and x_2 are the original and duplicate concentrations of a given parameter in a pair. RPD can only be calculated if concentrations of given parameter are greater than the analytical method detection limits (MDL) in both the duplicate and original samples of the pair. Additionally, lower precision in the RPD calculation occurs when the reported concentrations are less than five (5) times the MDL. RPDs have been calculated wherever the concentrations of a parameter were five (5) times greater than the MDL in both the original and duplicate samples. Sample RPDs were calculated by taking the average of the parameter RPD for a given sample-duplicate pair, and a program-level RPD was calculated by taking the average of all sample RPD to arrive at a program-wide indication of repeatability.

The TOR sets a data quality objective (DQO) for the RPD in soil and groundwater between a sample and its duplicate of 30%. A discussion or the RPD for the program and at DYE-M is provided below.

5.4.1 Soil Samples

Organics and PCB

All of the duplicate pairs of soil samples in the program had PHC F1-F3 results which were below the detection limit and all PCB concentrations were below the detection limit. The precision of these results is therefore not a concern.

Metals

Program Level Interpretation

Mercury and cadmium were below detection limits for all 22 original and duplicate pairs in the program. RPD calculations were undertaken on the seven remaining metals (copper, nickel, cobalt, lead, zinc, chromium and arsenic) for the 22 pairs of duplicate soil samples. The program-level average RPD for the soil sample duplicate analysis was 18%, which slightly exceeded the specified data quality objective for inorganics of 15%.

Four of the 22 soil sample pairs in the program had a sample average RPD of over 30%; one of these was at DYE-M. Overall, the most frequent metals to exhibit a calculated RPD over 30% were zinc, lead and copper. The results for the samples analyzed by AGAT exhibited generally higher metals concentrations in 13 cases; Paracel's overall concentrations were higher in seven cases, and in two cases it was evenly spilt. There appears to be a bias in that results from AGAT were generally higher than those of Paracel.

Site Level Interpretation

From the 12 soil sample duplicates taken at DYE-M and 7 metals (excluding mercury and cadmium which were always below detection), there were 84 potential parameter pairs for RPD analysis. As shown in the table below, ten of the arsenic (As) concentrations were less than five times MDL, and three other potential metal parameter pairs had concentrations less than five times the MDL in the original or the duplicate. A total of 71 individual RPD were calculated. The individual RPD ranged from 0% to 39%. The RPD values were quite consistent across the 7 metal parameters. The average of the RPD over the 12 duplicate samples was just 11%, which met the data quality objective of less than 15%. Only two individual RPD were over 30%: DM-46 (0-15) (lead 39%) and DM-34 (0-15) (copper 31%). The table below shows the metals results and RPD calculations for DYE-M. It is concluded that the reproducibility of the soil sample results at DYE-M was acceptable.

Relative Percent Difference Analysis of Soil Data at DYE-M

Sample ID	Lab	Parameter Concentrations (mg/kg)								
		Cu	Ni	Co	Pb	Zn	Cr	As	Sample Average RPD	Any Over 30%?
MDL		<1	<1	<1	<1	<1	<1	<1		
DM-03 (40-50)	Paracel	29	28.9	8.1	3.9	32	51.1	1.3	4%	No
	AGAT	28	29	7.6	3	33	48	1		
RPD		4%	0%	6%		3%	6%			
DM-08 (0-15)	Paracel	22.5	29.6	9.9	10.5	48.1	58.3	1.3	8%	No
	AGAT	24	31	8.7	11	52	52	1		
RPD		6%	5%	13%	5%	8%	11%			
MW05-15 (0-15)	Paracel	35.5	44.8	14.1	4.9	55.2	92.8	1.7	11%	No
	AGAT	43	51	13.7	5	66	94	1		
RPD		19%	13%	3%		18%	1%			
MW 08-24 (0-15)	Paracel	28	51	13	13.6	52.1	72.8	1.2	13%	No
	AGAT	33	56	13.9	14	70	81	<1		
RPD		16%	9%	7%	3%	29%	11%			
DM-17 (20-40)	Paracel	175	39.2	16.3	9.5	113	18	3.2	13%	No
	AGAT	185	49	15.1	11	132	20	<1		
RPD		6%	22%	8%	15%	16%	11%			
DM-40 (0-15)	Paracel	166	39.7	10.6	13.7	216	618	5.2	14%	Yes (Pb)
	AGAT	166	41	9.3	8	234	586	4		
RPD		0%	3%	13%	53%	8%	5%			
DM-43 (20-30)	Paracel	39.8	38.2	13.8	5.1	73.3	119	1.1	11%	No
	AGAT	37	34	11	3	71	105	<1		
RPD		7%	12%	23%		3%	13%			
DM-46 (0-15)	Paracel	116	58.4	15.9	13.4	139	162	5.1	15%	No
	AGAT	128	49	12	9	148	159	5		
RPD		10%	18%	28%	39%	6%	2%	2%		
DM-48 (0-15)	Paracel	115	344	52.8	29.7	134	496	21	7%	No
	AGAT	113	369	48.9	26	146	477	19		
RPD		2%	7%	8%	13%	9%	4%	10%		
DM-49 (0-15)	Paracel	105	75.9	18	13.8	137	219	3.5	8%	No
	AGAT	109	88	17.1	15	157	220	2		
RPD		4%	15%	5%	8%	14%	0%			
DM-34 (0-15)	Paracel	12.5	45.7	8.9	5.1	30.7	26.4	<1	19%	Yes (Cu)
	AGAT	17	60	10	5	41	30	<1		
RPD		31%	27%	12%	2%	29%	13%			
DM-58 (40-50)	Paracel	37.7	94.2	18.3	13.7	98.5	71.3	2.1	11%	No
	AGAT	43	100	18.9	15	124	79	1		
RPD		13%	6%	3%	9%	23%	10%			
Concentration <5 x MDL									11% Overall average	

5.4.2 Groundwater Samples

Organics and PCB

All five of the duplicate pairs of groundwater samples in the program had PHC F1-F3 results which were below the detection limit and all PCB concentrations were below the detection limit. The precision of these results is therefore not a concern.

Metals

Program Level Interpretation

Given the five groundwater duplicate pairs and nine metals analyzed, there are 45 potential parameters pairs for duplicate analysis via RPD calculation (9 metals times 5 samples); however, only twenty of these parameter pairs had both parameters detected above the MDL, and only 16 had both parameters greater than five times the MDL and were therefore eligible for RPD analysis. Of the 16 parameter pairs eligible for MDL calculations, five were at the two groundwater duplicates taken at DYE-M.

The program-level average MDL for water analysis of metals (where both parameters were over five times the MDL) was 30%, which exceeds the data quality objective of 15%.

Site Level Interpretation

MW 05-05 and MW 05-13 were the monitoring wells at DYE-M where duplicate samples were collected. As shown in the table below, there were five groundwater parameter pairs for which the concentrations in the original and duplicate were both over 5 times the MDL. RPD were calculated on the five pairs and the results were RPD of 68%, 67%, 50%, 17% and 2% for an average of 41% which exceeds the data quality objective of 15%. The four higher RPD were from sample MW0505 and the 2% RPD was from MW 05-13. MW 05-05 was noted to produce turbid water, whereas MW 05-13 was noted to produce clear water. It is hypothesized that a reason for the higher than desirable RPD at MW 05-05 was due to turbidity and that limited purging was performed due to the very limited volume of groundwater available, with priority being given to obtaining the groundwater sample before all available groundwater was removed.

Relative Percent Difference Analysis of Groundwater Data at DYE-M

Sample ID	Lab	Cu	Ni	Co	Cd	Pb	Zn	Cr	As	Hg	Sample Average RPD	Any Over 30%?
MDL		**<0.0005**	**<0.001**	**<0.0005**	**<0.0001**	**<0.0001**	**<0.005**	**<0.001**	**<0.001**	**<0.0001**		
MW05-05	Paracel	0.0061	0.018	0.0026	<0.0005	0.0365	4.79	<0.005	<0.005	<0.0001	50%	Yes Cu, Ni, Pb, Zn
MW05-05 (Duplicate)	AGAT	0.003	0.009	0.001	0.00033	0.022	4.05	<0.002	<0.001	0.000017		
RPD		68%	67%			50%	17%					
MW 05-13	Paracel	<0.0005	0.002	<0.0005	<0.0001	0.0007	2.84	0.001	<0.001	<0.0001	2%	No
MW 05-13 (Duplicate)	AGAT	0.002	0.003	<0.001	0.0017	<0.001	2.9	<0.002	<0.001	<0.000016		
RPD							2%					
Concentration <5 x MDL												

Overall concentrations of metals were very low as evidenced by the fact that many of them were below the detection limit. The overall low metal concentrations and turbidity in the sample MW 05-05 appear to have resulted in the high MDL for this sample. Paracel qualified their results on this sample, stating that “sediment and/or particulates in this liquid sample required digestion for Total metals analysis which resulted in elevated detection limits. Nevertheless, the variation between a sample and its duplicate was never more than an order of magnitude.

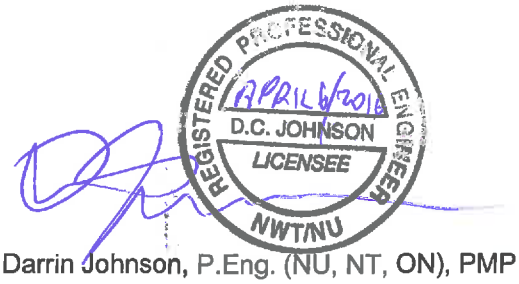
Report Signature Page

We trust that this Monitoring Report meets the Project requirements of DND. Please direct any questions to the undersigned.

GOLDER ASSOCIATES LTD.

Reza Moghaddam, Ph.D., P.Eng.
Geotechnical Engineer

Paul Dewaele, P.Eng. (NU, NT, ON)
Principal, Environmental Engineer



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DCJ/DNP/RM/JB/PDW

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APPENDIX A

Report Limitations

REPORT LIMITATIONS

This report has been prepared as an assessment of the environmental condition of the subject site. The monitoring program described in this report was conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practising under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

The assessment of environmental conditions at this Site has been made using the results of chemical analysis of soil and groundwater from a limited number of locations. The Site conditions between sampling locations have been inferred based on conditions observed at sampling locations. Subsurface conditions may vary from those encountered at the sample locations. Additional study, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of study. However, it is never possible, even with exhaustive sampling and testing, to dismiss the possibility that part of a Site may be contaminated and remain undetected. Visual inspection comments are based on observed conditions at the time of the inspection and may change with time.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibility of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on the information contained in this report.

The content of this report is based on information collected during our monitoring program, our present understanding of the Site conditions, and our professional judgement in light of such information at the time of writing this report. This report provides a professional opinion and therefore no warranty is expressed, implied, or made as to the conclusions and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change.

The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered, Golder Associates Ltd. should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

APPENDIX B

Field Records

Monitoring Well Sampling Logs

Thermistor Inspection Record Sheets

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 12 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Lower Sites Tier II Disposal Facility		
Thermistor Number:	**VT-1**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**14-Aug-14**	Last Date Event	**12-Aug-15**
*Coordinates and Elevation		N **7388321.9**	E **561880.9**	Elev	**336.3 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110005**	Nodal Points	13		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-08**		
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	0.9622	0.6482	9	0.8201	-4.1413
2	0.9302	-0.4151	10	0.8168	-4.2572
3	0.9041	-1.2870	11	0.8146	-4.3310
4	0.8821	-2.0261	12	0.8132	-4.3811
5	0.864	-2.6406	13	0.8126	-4.3996
6	0.8455	-3.2692			
7	0.8357	-3.6034			
8	0.8261	-3.9362			

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 12 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Lower Sites Tier II Disposal Facility
Thermistor Number:	**VT-2**	Inclination:	Vertical
Datalogger model no:		Datalogger cable download model:	
*Install Date:	**Unknown**	First Date Event	**14-Aug-14** Last Date Event **12-Aug-15**
*Coordinates and Elevation		N **7388235.5** E **561836.6**	Elev **339.4 m**
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial #	**7110052**	Nodal Points	8

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-08**		
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.2798	4.5103
2	1.0681	4.1285
3	1.0154	2.4011
4	0.9554	0.4214
5	0.9193	-0.7790
6	0.8878	-1.8357
7	0.8627	-2.6846
8	0.8266	-3.9179

Bead	Volts	Degrees C

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full - Date when full is 12/01/2017

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 12 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Lower Sites Tier II Disposal Facility
Thermistor Number:	**VT-3**	Inclination:	Vertical
Datalogger model no:		Datalogger cable download model:	
*Install Date:	**Unknown**	First Date Event	**14-Aug-14** Last Date Event **12-Aug-15**
*Coordinates and Elevation		N **7388281.8** E **561927.1**	Elev **339.4 m**
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial #	**Unknown**	Nodal Points 7	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-08**		
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.0889	4.8672
2	1.0537	3.6566
3	1.0012	1.9322
4	0.9465	0.1278
5	0.9162	-0.8835
6	0.8875	-1.8460
7	0.8621	-2.7053

Bead	Volts	Degrees C

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 12 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Lower Sites Tier II Disposal Facility
Thermistor Number:	**VT-4**	Inclination:	Vertical
Datalogger model no:		Datalogger cable download model:	
*Install Date:	**Unknown**	First Date Event	**14-Aug-14** Last Date Event **12-Aug-15**
*Coordinates and Elevation		N **7388184.4** E **561861.4**	Elev **340.4 m**
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial #	**7110054**	Nodal Points 12	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-08**		
Battery Levels	Main 11.34	Aux 13.50	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	1.0936	4.9594	9	0.8640	-2.6406
2	1.0865	4.7274	10	0.8564	-2.8972
3	1.0529	3.6291	11	0.8528	-3.0219
4	0.9952	1.7364	12	0.8473	-3.2093
5	0.9451	0.0797			
6	0.9143	-0.9447			
7	0.8931	-1.6560			
8	0.8780	-2.1652			

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 12 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Lower Sites Tier II Disposal Facility		
Thermistor Number:	**VT-BL**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**14-Aug-14**	Last Date Event	**12-Aug-15**
*Coordinates and Elevation		N **7388226.9**	E **561629.6**	Elev	**330.4 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110027**	Nodal Points	14		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-08**		
Battery Levels	Main 11.34	Aux 13.26	

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.3563	13.6727
2	1.3372	13.0292
3	Offline	N/A
4	1.1275	6.0698
5	Offline	N/A
6	1.006	2.8928
7	0.9356	-0.2347
8	0.8509	-3.0843

Bead	Volts	Degrees C
9	0.8322	-3.7264
10	0.8029	-4.7356
11	0.7818	-5.2276
12	0.7803	-5.5271
13	0.7783	-5.5968
14	0.7776	-5.6209

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 9 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Power House		
Thermistor Number:	**VT-5**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**13-Aug-14**	Last Date Event	**9-Aug-15**
*Coordinates and Elevation		N **7387478.1**	E **562757.9**	Elev	**368.0 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110024**	Nodal Points	11		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-08**		
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.1842	7.9284
2	1.2372	9.0781
3	1.213	8.8758
4	1.1019	5.2313
5	0.9999	1.8896
6	0.9391	-0.1205
7	0.9017	-1.3689
8	0.8705	-2.4181

Bead	Volts	Degrees C
9	0.8128	-3.0219
10	0.8242	-4.0019
11	0.8094	-4.5106

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 9 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Power House		
Thermistor Number:	**VT-6**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**13-Aug-14**	Last Date Event	**9-Aug-15**
*Coordinates and Elevation		N **7387454.4**	E **562755.9**	Elev	**369.5 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110025**	Nodal Points	10		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-08**		
Battery Levels	Main 11.34	Aux 13.50	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	2.4714	141.0008	9	0.8071	-4.5926
2	1.1219	5.8851	10	0.7968	-4.9506
3	1.0292	2.8517			
4	0.9451	0.0797			
5	0.8992	-1.5200			
6	0.87	-2.4362			
7	0.8504	-3.1026			
8	0.8303	-3.7893			

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 9 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Power House		
Thermistor Number:	**VT-7**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**13-Aug-14**	Last Date Event	**9-Aug-15**
*Coordinates and Elevation		N **7387448.9**	E **562789.8**	Elev	**367.6 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110026**	Nodal Points	10		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-08**		
Battery Levels	Main 11.34	Aux 13.63	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	1.0816	4.5677	9	0.8455	-3.2692
2	0.9709	0.9338	10	0.8449	-3.2901
3	0.9217	-0.7000			
4	0.9011	-1.3894			
5	0.8309	-3.7684			
6	0.8694	-2.4569			
7	0.8609	-2.7468			
8	0.8509	-3.0843			

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 10 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Upper Site Tier II Disposal Facility		
Thermistor Number:	**VT-8**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**13-Aug-14**	Last Date Event	**10-Aug-15**
*Coordinates and Elevation		N **7394615.5**	E **571051.5**	Elev	**645.4 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110057**	Nodal Points	15		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-10**		
Battery Levels	Main 11.34	Aux 13.14	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	1.1544	6.9493	9	0.8186	-4.1939
2	1.0609	3.8913	10	0.8000	-4.8339
3	1.0494	3.5142	11	0.7823	-5.4574
4	1.0055	2.0752	12	0.7752	-5.7068
5	0.9433	0.0214	13	0.7662	-6.0217
6	0.9035	-1.3075	14	0.7608	-6.2135
7	0.8700	-2.4362	15	0.7570	-6.3489
8	0.8401	-3.4544			

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 10 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Upper Site Tier II Disposal Facility		
Thermistor Number:	**VT-9**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**13-Aug-14**	Last Date Event	**10-Aug-15**
*Coordinates and Elevation		N **7394558.0**	E **571088.7**	Elev	**645.5 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110058**	Nodal Points	16		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-10**		
Battery Levels	Main 11.34	Aux 13.26	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	1.2421	9.8400	9	0.8961	-3.9362
2	1.1171	5.7279	10	0.8071	-4.5926
3	1.0579	3.7940	11	0.7903	-5.1770
4	1.0316	2.9318	12	0.7803	-5.5971
5	0.9706	0.9237	13	0.7703	-5.8789
6	0.915	0.9217	14	0.7643	-6.0892
7	0.8827	-2.0081	15	0.7631	-6.1324
8	0.8498	-3.1234	16	0.7585	-6.2974

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 10 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Upper Site Tier II Disposal Facility		
Thermistor Number:	**VT-10**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**13-Aug-14**	Last Date Event	**10-Aug-15**
*Coordinates and Elevation		N **7394609**	E **571121**	Elev	**648.2 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110059**	Nodal Points	10		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-10**		
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.0523	3.6092
2	1.0579	3.7940
3	0.9982	1.8343
4	0.9167	-0.8656
5	0.8729	-2.3380
6	0.837	-3.5616
7	0.8138	-4.3600
8	0.7908	-5.1583

Bead	Volts	Degrees C
9	0.7740	-5.7471
10	0.7594	-6.2019

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 10 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Upper Site Tier II Disposal Facility		
Thermistor Number:	**VT-11**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**13-Aug-14**	Last Date Event	**10-Aug-15**
*Coordinates and Elevation		N **7394655.5**	E **571132.2**	Elev	**648.9 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110051**	Nodal Points	12		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-10**		
Battery Levels	Main 11.34	Aux 13.75	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	1.2626	10.5197	9	0.8425	-3.3735
2	1.2511	10.1389	10	0.8462	-4.2756
3	1.0779	4.4479	11	0.7966	-4.9506
4	1.0537	3.6566	12	0.7840	-5.3959
5	1.263	2.7567			
6	0.9536	0.3607			
7	0.903	-1.3254			
8	0.8724	-2.3561			

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 10 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**DYE-M**	Landfill:	Upper Site Tier II Disposal Facility		
Thermistor Number:	**VT-BU**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**Unknown**	First Date Event	**13-Aug-14**	Last Date Event	**10-Aug-15**
*Coordinates and Elevation		N **7394470.7**	E **571142.6**	Elev	**636.90 m**
Length of Cable (m)		Cable Lead Above Ground (m)			
Datalogger Serial #	**7110028**	Nodal Points	14		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2012-09-10**		
Battery Levels	Main 11.34	Aux 13.50	

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.3224	12.5298
2	1.3491	13.4972
3	1.2992	11.7450
4	1.0295	2.8017
5	0.9554	0.4214
6	0.909	-1.1234
7	0.8798	-2.1059
8	0.8390	-3.4727

Bead	Volts	Degrees C
9	0.8108	-4.4630
10	0.7932	-5.0757
11	0.7852	-5.3558
12	0.7828	-5.4987
13	0.7817	-5.4789
14	0.7823	-5.4574

Battery Information

Batteries changed ? Yes [ ] No [x] Monitoring Year: 2015

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M | Landfill Name: Lower Powerhouse
Monitoring Well ID: MW05-05
Sample Number(s) include dups.: MW05-05 and MW05-05 Duplicate
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4, PCB
Date of Sampling Event: 9 August 2015 Time:3:30
Weather Rain, overcast, ~5C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Puddles present
Lock (condition, presence, model, manufacturer): Crown, working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	360	Diameter of well (cm):	4.4
Depth to top of screen (cm):	60	Length of screened section (cm):	190

Field Measurements

Measurement method (interface probe, tape, etc):	Interface probe
Well pipe height above ground (cm) (to top of pipe):	15
Static water level (cm) from top of pipe:	67
Static water level (cm) (below ground surface) calculated:	52
Measured well refusal depth (cm) (measured after sampling):	183

Thickness of water column (cm):	116	Static Volume of water in well (mL):	1764
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min

Well purged (Y/N):	Y	Recharge Rate:	High
Volume Purged (L) (note multiple purging events):	<100mL		

Parameter	Initial	Stablized	Final	Notes
pH	6.5			
Conductivity (mS/cm)	0.11			
Turbidity (NTU)	988			
Temperature (degC)	5.37			

Visual/olfactory observations:
Turbid water

Decontamination of sampling equipment

Type of decontamination fluid(s): Disposable tubing was used to sample each well.
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name: Lower Powerhouse
Monitoring Well ID: MW05-06
Sample Number(s) include dups.: MW05-06
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4, PCB
Date of Sampling Event: 9 August 2015 Time:2:15
Weather Light rain, overcast, ~5C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Standing water in casing pipe, no surface water for 30m, wet ground.
Lock (condition, presence, model, manufacturer): Crown, working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	360	Diameter of well (cm):	4.4
Depth to top of screen (cm):	60	Length of screened section (cm):	190

Field Measurements

Measurement method (interface probe, tape, etc):	Interface probe
Well pipe height above ground (cm) (to top of pipe):	45
Static water level (cm) from top of pipe:	110
Static water level (cm) (below ground surface) calculated:	65
Measured well refusal depth (cm) (measured after sampling):	155

Thickness of water column (cm):	45	Static Volume of water in well (mL):	684
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min

Well purged (Y/N):	Y	Recharge Rate:	High
Volume Purged (L) (note multiple purging events):	<100mL		

Parameter	Initial	Stablized	Final	Notes
pH	7.09			
Conductivity (mS/cm)	0.171			
Turbidity (NTU)	41.6			
Temperature (degC)	6.17			

Visual/olfactory observations:
No colour

Decontamination of sampling equipment

Type of decontamination fluid(s): Disposable tubing was used to sample each well.
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name:	DYE-M	Landfill Name:	Lower Powerhouse
Monitoring Well ID:	MW05-07		
Sample Number(s) include dups.:	-		
Bottles filled (by parameter type)	-		
Date of Sampling Event:	9 August 2015	Time:	2:07
Weather	Light rain, overcast, ~5C		
Names of Samplers	KR		

Description of well condition and surrounding ground conditions (note ponding of water):
Ponded water adjacent to well, no flowing water at surface.

Lock (condition, presence, model, manufacturer): Crown, not working, cut lock.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	360	Diameter of well (cm):	4.4
Depth to top of screen (cm):	60	Length of screened section (cm):	190

Field Measurements

Measurement method (interface probe, tape, etc):	Interface probe		
Well pipe height above ground (cm) (to top of pipe):			34
Static water level (cm) from top of pipe:			Frozen
Static water level (cm) (below ground surface) calculated:			N/A
Measured well refusal depth (cm) (measured after sampling):			142
Thickness of water column (cm):	N/A	Static Volume of water in well (mL):	N/A
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Recharge Rate:

Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH				
Conductivity (mS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations:
Turbid, no colour

Decontamination of sampling equipment

Type of decontamination fluid(s):

Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name:	DYE-M	Landfill Name:	Lower Powerhouse
Monitoring Well ID:	MW05-08		
Sample Number(s) include dups.:	MW05-08		
Bottles filled (by parameter type)	BTEX, Metals, Mercury, F2-F4, PCB		
Date of Sampling Event:	9 August 2015	Time:	1:37
Weather	Light rain, overcast, ~5C		
Names of Samplers	KR		

Description of well condition and surrounding ground conditions (note ponding of water):
ponded water adjacent to well, snow 10m to the north. Standing water in casing pipe.

Lock (condition, presence, model, manufacturer): Crown, working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	360	Diameter of well (cm):	4.4
Depth to top of screen (cm):	60	Length of screened section (cm):	190

Field Measurements

Measurement method (interface probe, tape, etc):	Interface probe
Well pipe height above ground (cm) (to top of pipe):	26
Static water level (cm) from top of pipe:	41
Static water level (cm) (below ground surface) calculated:	15
Measured well refusal depth (cm) (measured after sampling):	175

Thickness of water column (cm):	134	Static Volume of water in well (mL):	2038
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
Removed 800mL on August 9th, revisited on August 13th to sample.

Well purged (Y/N):	Y	Recharge Rate:	High
Volume Purged (L) (note multiple purging events):	600mL		

Parameter	Initial	Stablized	Final	Notes
pH	6.76		6.95	
Conductivity (mS/cm)	0.866		1.84	
Turbidity (NTU)	20.6		15.3	
Temperature (degC)	7.56		7.3	

Visual/olfactory observations:
Turbid, no colour

Decontamination of sampling equipment

Type of decontamination fluid(s):	Disposable tubing was used to sample each well.		
Number of washes:	N/A	Number of rinses:	N/A

Other relevant comments: August 13th, depth to water 44cm, depth to refusal 147

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW05-09 LNHWL
Sample Number(s) include dups.: -
Bottles filled (by parameter type) -
Date of Sampling Event: 9 August 2015 Time:11:05
Weather Light rain, overcast, ~5C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Flowing surface water adjacent to well casing.
Lock (condition, presence, model, manufacturer): Crown, not working, cut lock.

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 20
Static water level (cm) from top of pipe: Frozen
Static water level (cm) (below ground surface) calculated: N/A
Measured well refusal depth (cm) (measured after sampling): 197
Thickness of water column (cm): N/A Static Volume of water in well (mL): N/A
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Recharge Rate:
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH				
Conductivity (mS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations:
Turbid, no colour

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name: LNHWL
Monitoring Well ID: MW05-12
Sample Number(s) include dups.: MW05-12
Bottles filled (by parameter type) -
Date of Sampling Event: 9 August 2015 Time:11:00
Weather Clear skies, ~5C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
native soils; no standing water within 30m of well, low ground with water to the north.
Lock (condition, presence, model, manufacturer): Working

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 11
Static water level (cm) from top of pipe: 142
Static water level (cm) (below ground surface) calculated: 131
Measured well refusal depth (cm) (measured after sampling): 157
Thickness of water column (cm): 15 Static Volume of water in well (mL): 228
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
Removed 600mL on August 9th, revisited on August 13th to sample. No water, unable to sample

Well purged (Y/N): Y Recharge Rate: N/A
Volume Purged (L) (note multiple purging events): 600mL

Parameter	Initial	Stablized	Final	Notes
pH	6.9			
Conductivity (mS/cm)	0.025			
Turbidity (NTU)	208			
Temperature (degC)	12.04			

Visual/olfactory observations:
Turbid

Decontamination of sampling equipment

Type of decontamination fluid(s): Disposable tubing was used to sample each well.
Number of washes: N/A Number of rinses: N/A

Other relevant comments: August 13th, refusal at 157cm, no water, well frozen

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW05-13 Lower Tier 2
Sample Number(s) include dups.: MW05-13 and MW05-13 Duplicate
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4, PCB
Date of Sampling Event: 12 August 2015 Time: 1:10
Weather Overcast light rain.
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Casing has been dented, pipe in good condition, no standing water around casing. 10cm of water in casing.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 22
Static water level (cm) from top of pipe: 89
Static water level (cm) (below ground surface) calculated: 67
Measured well refusal depth (cm) (measured after sampling): 170
Thickness of water column (cm): 81 Static Volume of water in well (mL): 1232
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	7.13			
Conductivity (mS/cm)	0.125			
Turbidity (NTU)	3.8			
Temperature (degC)	7.3			

Visual/olfactory observations:
Clear

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW05-15 Lower Tier 2
Sample Number(s) include dups.: MW05-15
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4
Date of Sampling Event: 12 August 2015 Time: 2:55
Weather Clearing
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
No water in casing, no standing water adjacent to well.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 7
Static water level (cm) from top of pipe: 115
Static water level (cm) (below ground surface) calculated: 108
Measured well refusal depth (cm) (measured after sampling): 155
Thickness of water column (cm): 40 Static Volume of water in well (mL): 608
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	7.4			
Conductivity (mS/cm)	0.441			
Turbidity (NTU)	122			
Temperature (degC)	8.19			

Visual/olfactory observations:
Turbid no colour.

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW05-16 Lower Tier 2
Sample Number(s) include dups.: MW05-16
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4, PCB
Date of Sampling Event: 12 August 2015 Time: 3:45
Weather Partly cloudy
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Snow drift and ponded water between well and landfill. Casing is loose. Water in casing 5cm.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	360	Diameter of well (cm):	4.4
Depth to top of screen (cm):	60	Length of screened section (cm):	190

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			22
Static water level (cm) from top of pipe:			102
Static water level (cm) (below ground surface) calculated:			80
Measured well refusal depth (cm) (measured after sampling):			140
Thickness of water column (cm):	38	Static Volume of water in well (mL):	578
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	6.91			
Conductivity (mS/cm)	0.156			
Turbidity (NTU)	150			
Temperature (degC)	6.92			

Visual/olfactory observations:
clear

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW05-18 Upper NHWL
Sample Number(s) include dups.: -
Bottles filled (by parameter type) -
Date of Sampling Event: 10 August 2015 Time: 9:24
Weather Fog 0C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
1.1m of snow/ice. Unable to locate well.
Lock (condition, presence, model, manufacturer): Crown, working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc):
Well pipe height above ground (cm) (to top of pipe):
Static water level (cm) from top of pipe:
Static water level (cm) (below ground surface) calculated:
Measured well refusal depth (cm) (measured after sampling):
Thickness of water column (cm): Static Volume of water in well (mL):
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH				
Conductivity (mS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations:

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW06-19 Upper NHWL
Sample Number(s) include dups.: MW06-19
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4, PCB
Date of Sampling Event: 10 August 2015 Time:9:55
Weather Fog 0C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Dry soils, patches of snow, 3cm of water in casing pipe, rocky ground.
Lock (condition, presence, model, manufacturer): Crown, not locked.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	360	Diameter of well (cm):	4.4
Depth to top of screen (cm):	60	Length of screened section (cm):	190

Field Measurements

Measurement method (interface probe, tape, etc):	Interface probe		
Well pipe height above ground (cm) (to top of pipe):			38
Static water level (cm) from top of pipe:			142
Static water level (cm) (below ground surface) calculated:			104
Measured well refusal depth (cm) (measured after sampling):			161
Thickness of water column (cm):	19	Static Volume of water in well (mL):	289
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events): N/A

Parameter	Initial	Stablized	Final	Notes
pH	7.61			
Conductivity (mS/cm)	0.021			
Turbidity (NTU)	4.3			
Temperature (degC)	7.8			

Visual/olfactory observations:
Clear, no colour

Decontamination of sampling equipment

Type of decontamination fluid(s): Disposable tubing was used to sample each well.
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW06-20 Upper NHWL
Sample Number(s) include dups.: -
Bottles filled (by parameter type) -
Date of Sampling Event: 10 August 2015 Time: 9:49
Weather Fog 0C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Snow drifted at well casing, unable to open well pipe as casing is jamped against pipe, casing is dry.
Lock (condition, presence, model, manufacturer): Crown, working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc):
Well pipe height above ground (cm) (to top of pipe):
Static water level (cm) from top of pipe:
Static water level (cm) (below ground surface) calculated:
Measured well refusal depth (cm) (measured after sampling):
Thickness of water column (cm): Static Volume of water in well (mL):
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH				
Conductivity (mS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations:

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW07-21 Upper NHWL
Sample Number(s) include dups.: -
Bottles filled (by parameter type) -
Date of Sampling Event: 10 August 2015 Time: 9:40
Weather Fog 0C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Ice/snow and standing water adjacent to casing. 9cm of water in casing.
Lock (condition, presence, model, manufacturer): Crown, unlocked.

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 42
Static water level (cm) from top of pipe: Frozen
Static water level (cm) (below ground surface) calculated:
Measured well refusal depth (cm) (measured after sampling):
Thickness of water column (cm): Static Volume of water in well (mL):
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH				
Conductivity (mS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations:

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW07-22 Upper Tier 2
Sample Number(s) include dups.: MW07-22
Bottles filled (by parameter type) BTEX, Metals, Mercury, partial fill of F2-F4
Date of Sampling Event: 10 August 2015 Time:11:40\
Weather Cloudy ~8C light wind
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Gravel and sand with snow drifts in area. 40cm of water in casing
Lock (condition, presence, model, manufacturer): Crown, not working, cut.

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 50
Static water level (cm) from top of pipe: 207
Static water level (cm) (below ground surface) calculated: 157
Measured well refusal depth (cm) (measured after sampling): 218
Thickness of water column (cm): 11 Static Volume of water in well (mL): 167
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events): N/A

Parameter	Initial	Stablized	Final	Notes
pH	7.89			
Conductivity (mS/cm)	0.179			
Turbidity (NTU)	616			
Temperature (degC)	7.13			

Visual/olfactory observations:
Turbid, no colour

Decontamination of sampling equipment

Type of decontamination fluid(s): Disposable tubing was used to sample each well.
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW07-23 Upper Tier 2
Sample Number(s) include dups.: -
Bottles filled (by parameter type) -
Date of Sampling Event: 10 August 2015 Time: 12:00
Weather Cloudy ~8C light wind
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Drifted snow covers area; 40cm water in casing.
Lock (condition, presence, model, manufacturer): Crown, not working. Cut.

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 45
Static water level (cm) from top of pipe: Frozen
Static water level (cm) (below ground surface) calculated:
Measured well refusal depth (cm) (measured after sampling): 170
Thickness of water column (cm): Static Volume of water in well (mL):
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH				
Conductivity (mS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations:

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW08-24 Upper Tier 2
Sample Number(s) include dups.: MW08-24
Bottles filled (by parameter type) BTEX, Metals, Mercury, partial F2-F4.
Date of Sampling Event: 10 August 2015 Time: 1:00
Weather Partly sunny, 10C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Rocky, no standing water. 9cm of water in casing.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	360	Diameter of well (cm):	4.4
Depth to top of screen (cm):	60	Length of screened section (cm):	190

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			40
Static water level (cm) from top of pipe:			93
Static water level (cm) (below ground surface) calculated:			53
Measured well refusal depth (cm) (measured after sampling):			118
Thickness of water column (cm):	25	Static Volume of water in well (mL):	380
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	9.06			
Conductivity (mS/cm)	0.053			
Turbidity (NTU)	79.2			
Temperature (degC)	8.6			

Visual/olfactory observations:
Turbid, no colour

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW08-25 Upper Tier 2
Sample Number(s) include dups.: MW08-25
Bottles filled (by parameter type) BTEX, Metals.
Date of Sampling Event: 10 August 2015 Time: 1:30
Weather Overcast
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Snow drift between landfill and casing, no standing water in the vicinity. 10cm of water in casing.
Lock (condition, presence, model, manufacturer): Crown, not working. Cut.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	360	Diameter of well (cm):	4.4
Depth to top of screen (cm):	60	Length of screened section (cm):	190

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			40
Static water level (cm) from top of pipe:			93
Static water level (cm) (below ground surface) calculated:			53
Measured well refusal depth (cm) (measured after sampling):			118
Thickness of water column (cm):	25	Static Volume of water in well (mL):	380
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	8.59			
Conductivity (mS/cm)	0.225			
Turbidity (NTU)	41.1			
Temperature (degC)	5.89			

Visual/olfactory observations:
Turbid, no colour

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name: LNHWL
Monitoring Well ID: MW09-28
Sample Number(s) include dups.: MW09-28 (3 bottles filled)
Bottles filled (by parameter type) BTEX (x2) and Metals
Date of Sampling Event: 13 August 2015 Time:10:40
Weather Clear skies, ~5C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
wet area, soft ground, boot prints leave ponded water. Flowing surface water adjacent to well.
Lock (condition, presence, model, manufacturer): Not working, cut lock

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 20
Static water level (cm) from top of pipe: 63
Static water level (cm) (below ground surface) calculated: 43
Measured well refusal depth (cm) (measured after sampling): 101
Thickness of water column (cm): 38 Static Volume of water in well (mL): 578
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
Removed 500mL on August 9th, revisited on August 13th to sample. Low recharge, only able to fill 3 bottles

Well purged (Y/N): Y Recharge Rate: N/A
Volume Purged (L) (note multiple purging events): 500mL

Parameter	Initial	Stablized	Final	Notes
pH	7.01			
Conductivity (mS/cm)	0.269			
Turbidity (NTU)	-			
Temperature (degC)	11.9			

Visual/olfactory observations:
Turbid

Decontamination of sampling equipment

Type of decontamination fluid(s): Disposable tubing was used to sample each well.
Number of washes: N/A Number of rinses: N/A

Other relevant comments: August 13th, water level = 98cm, refusal at 101cm.

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW12-01 Lower Tier 2
Sample Number(s) include dups.: MW12-01
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4, PCB
Date of Sampling Event: 12 August 2015 Time: 2:20
Weather Clearing
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Water ponded adjacent to well, well in good condition.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	360	Diameter of well (cm):	4.4
Depth to top of screen (cm):	60	Length of screened section (cm):	190

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			41
Static water level (cm) from top of pipe:			98
Static water level (cm) (below ground surface) calculated:			57
Measured well refusal depth (cm) (measured after sampling):			197
Thickness of water column (cm):	99	Static Volume of water in well (mL):	1505
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	7.27			
Conductivity (mS/cm)	0.345			
Turbidity (NTU)	0			
Temperature (degC)	7.15			

Visual/olfactory observations:
Clear

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: DYE-M Landfill Name:
Monitoring Well ID: MW12-02 Upper Tier 2
Sample Number(s) include dups.: -
Bottles filled (by parameter type) -
Date of Sampling Event: 10 August 2015 Time: 2:00
Weather Partly sunny, 10C
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Snow drift, unable to locate well
Lock (condition, presence, model, manufacturer):

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 360 Diameter of well (cm): 4.4
Depth to top of screen (cm): 60 Length of screened section (cm): 190

Field Measurements

Measurement method (interface probe, tape, etc):
Well pipe height above ground (cm) (to top of pipe):
Static water level (cm) from top of pipe:
Static water level (cm) (below ground surface) calculated:
Measured well refusal depth (cm) (measured after sampling):
Thickness of water column (cm): Static Volume of water in well (mL):
Free product thickness (mm): Evidence of Sludge or siltation:

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH				
Conductivity (mS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations:
Turbid, no colour

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name:	Inspection Date: AUGUST 12, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-7		Landfill: Lower Sister Tire Fill	
Thermistor Number: VT-1		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 0711 0005		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 11.74		Aux 13.38

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	0.9622	0.6482
2	0.9302	-0.4151
3	0.9041	-1.2270
4	0.884	-2.0261
5	0.8640	-2.8406
6	0.8455	-3.6092
7	0.8357	-3.6034
8	0.8261	-3.9362

Bead	ohms	Degrees C
9	0.8201	-4.1413
10	0.8168	-4.2572
11	0.8146	-4.3310
12	0.8132	-4.3811
13	0.8126	-4.3996

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 100% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

12

ANNEX M: Thermistor Inspection Template

Inspector Name:	Inspection Date: August 9, 2017
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DVE-M		Landfill: Lower Site, Trench II	
Thermistor Number: VT2		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial # 07110052	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☐	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 (11.34)		Aux 12 (13.38)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0798	4.510
2	1.0681	4.128
3	1.0154	2.401
4	0.9554	0.4214
5	0.9193	-0.7790
6	0.8878	-1.8357
7	0.8627	-2.6846
8	0.8266	-3.9179

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

4 hr/n full Date when full 12/21/2017

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August Aug 12, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-M		Landfill: Tower Site, Tina II	
Thermistor Number: VT3		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial #	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☐ ✓	☐	
Cover	☐ ✓	☐	
Data Logger	☐ ✓	☐	
Cable	☐ ✓	☐	
Beads	☐ ✓	☐	
Lock condition	☐	☐ ✓	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 (11.34)	Aux 12 (best) 13.38	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0809	4.8072
2	1.0537	3.6566
3	1.0012	1.9322
4	0.9465	0.1278
5	0.9162	-0.8835
6	0.8875	-1.8460
7	0.8621	-2.7053
		~~39.20738~~

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name:	Inspection Date: AUGUST 17, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-1		Landfill: LOWER SITE, TIER I	
Thermistor Number: VT-4		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial # 07110054	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	
Battery Installation Date			
Battery Levels	Main 11.34	Aux 13.50	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0936	4.9594
2	1.0865	4.7274
3	1.0529	3.6291
4	0.9952	1.7384
5	0.9451	0.0797
6	0.9143	-0.9447
7	0.8931	-1.6560
8	0.8780	-2.1652

Bead	ohms	Degrees C
9	0.8640	-2.6406
10	0.8564	-2.8972
11	0.8528	-3.0219
12	0.8473	-3.2093
13	0.	
14		

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

40% FULL

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name:	Inspection Date: August 12, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: IDVE-P1		Landfill: Lower S. Je, Tier II	
Thermistor Number: VT		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial # 07112027	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	
Battery Installation Date			
Battery Levels	Main 9 (11.34)	Aux 12 (13.26)	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
	1.3560	13.6827
	1.3372	13.0292
	—	—
	1.1275	6.0698
	—	—
	1.0060	2.0928
	0.9356	−0.2349
	0.8509	−3.0843

Bead	ohms	Degrees C
	0.8322	−3.7264
	0.8029	−4.7355
	0.7869	−5.2276
	0.7653	−5.8271
	0.7783	−5.5968
	0.7776	−5.6209

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

40%, 5wk memory

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August 9, 2012
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: BVE-M		Landfill: Powell River	
Thermistor Number: TT5		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial # 0710024	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	Needs to be replaced
Battery Installation Date	8/9/2012		
Battery Levels	Main 9V	Aux 12V	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1842	7.9284
2	1.2372	9.0781
3	1.2130	8.8758
4	1.1019	5.2313
5	0.9999	1.8896
6	0.9391	-0.1205
7	0.9017	-1.3689
8	0.8705	-2.4181

Bead	ohms	Degrees C
9	0.8628	-3.0219
10	0.8512	-4.0019
11	0.8094	-4.5506

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory Percent Full 40%

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August Aug 9, 2012
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-M		Landfill: Power House	
Thermistor Number: T10		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N ✓	E ✓	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07110025		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	Needs to be replaced.
Battery Installation Date	8/9/2012		
Battery Levels	Main 9V	Aux 12V	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	2.4714	141.0028
2	1.1219	5.8651
3	1.0292	2.8517
4	0.9451	0.0797
5	0.8942	-1.5200
6	0.8700	-2.4362
7	0.8504	-3.1026
8	0.8303	-3.7893

Bead	ohms	Degrees C
9	0.8071	-4.5926
10	0.7968	-4.9506

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

10 Beads were working.

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Noghadam	Inspection Date: August Aug 9, 2016
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYEM		Landfill: Power House	
Thermistor Number: VT 2		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial #		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	Needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 next 11.34		Aux 12 13.63

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0816	4.5677
2	0.9709	0.9338
3	0.9217	-0.7000
4	0.9011	-1.3894
5	0.8309	-3.7684
6	0.8694	-2.4267
7	0.8609	-2.7448
8	0.8504	-3.0843

Bead	ohms	Degrees C
9	0.8455	-3.2592
10	0.8449	-3.2901

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000 VT-8

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghadam	Inspection Date: August 19, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-M		Landfill: Dye Site Tier II Disposal Area	
Thermistor Number: VT-8		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial #	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced

Battery Installation Date

Battery Levels Main 9 (lost 11.34) Aux 12 (13.14 (2 out))

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1		6.9493
2		3.8913
3		3.5142
4		2.0752
5		0.0214
6		-1.3075
7		-2.4362
8		-3.4544

Bead	ohms	Degrees C
9		-4.1938
10		-4.8391
11		-5.4574
12		-5.7068
13		-6.0217
14		-6.2135
15		-6.3489

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Fo4H 4%

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

VT-9

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza moghaddam	Inspection Date: August Aug 10, 2016
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-M		Landfill: Upper site tier II disposal facility	
Thermistor Number: VT-9		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial # 07110058	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☐	☐	
Cover	☐	☐	
Data Logger	☑	☐	
Cable	☐	☐	
Beads	☑	☐	
Lock condition	☐	☑	ready to be replaced
Battery Installation Date			
Battery Levels	Main (11.34) 9V	Aux	12V dest 13.26

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2421	9.8400
2	1.1171	5.7279
3	1.0079	3.7940
4	1.0316	2.9318
5	0.9706	0.9237
6	0.9730	0.9217
7	0.8827	-2.0381
8	0.8498	-3.1234

Bead	ohms	Degrees C
9	0.8261	-3.9362
10	0.8071	-4.5926
11	0.7903	-5.1770
12	0.7803	-5.5271
13	0.7708	-5.8589
14	0.7643	-6.0892
15	0.7631	-6.1324
16	0.7585	-6.2934

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August Aug 10/2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: ~~Cond~~ DYE-T		Landfill: Upper Site Tier ☐ Disposal	
Thermistor Number: √ T-10		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial # 0711005	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9		Aux 12
	Sept 11.34		13.38

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0523	3.6092
2	1.0579	3.7940
3	0.9982	1.8743
4	0.9167	-0.8656
5	0.8729	-2.3786
6	0.8370	-3.5616
7	0.8138	-4.3600
8	0.7908	-5.1583

Bead	ohms	Degrees C
9	0.7740	-5.7471
10	0.7594	-6.2819

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000 VT-11

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August Aug 16, 2021
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-M		Landfill: Upper Tier II	
Thermistor Number: VT-11		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	✓ N	✓ E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07110051		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☐	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 V Post 11.34		Aux 12 V Post 13.75

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2686	10.5197
2	1.2511	10.1389
3	1.0779	4.4479
4	1.0537	3.6586
5	1.0263	2.7567
6	0.9536	0.3607
7	0.9030	-1.3254
8	0.8724	-2.3586

Bead	ohms	Degrees C
9	0.8425	-3.3735
10	0.8062	-4.2254
11	0.7986	-4.4954
12	0.7840	-5.3959

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000 VT-BU

ANNEX M: Thermistor Inspection Template

Inspector Name: Petra Magnusdom	Inspection Date: August Aug 10/2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYME-M		Landfill:	
Thermistor Number: VT-BU		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 0711028		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 (4.324)		Aux 12 (13.50)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.3224	12.5248
2	1.3491	13.4372
3	1.2992	11.7450
4	1.0295	2.8617
5	0.9554	0.4214
6	0.9090	-1.1234
7	0.8798	-2.1099
8	0.8796	-3.4727

Bead	ohms	Degrees C
9	0.8108	-4.4630
10	0.7932	-5.0757
11	0.7852	-5.3558
12	0.7828	-5.4387
13	0.7817	-5.4789
14	0.7823	-5.4574

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DNEM Landfill Name: Lower Powerhouse

Monitoring Well ID: BMW 05-08

Sample Number(s) include dups.:

Bottles filled (by parameter type): ALL

Date of Sampling Event: AUGUST 9 Time: 1:37

Weather: Light Rain / overcast

Names of Samplers: KR.

Description of Well Condition and Surrounding ground conditions (note ponding of water): ponded water adjacent to well. snow 10m north. water in casing.

Lock (condition, presence, model, manufacturer): combo working

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP.

Well pipe height above ground (cm) (to top of pipe)= 26 cm

Static water level (cm) from top of pipe = 41 cm. Aug 13: 44

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 175 cm. 147

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: low flow pump (Peristaltic)

Well purged (Y/N): Y Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable): 800 mL Purged revisited aug 13

Parameter	Initial	Stabilized	Final Aug 13	Notes (if not stabilized)
pH	6.76		~~6.75~~ 9.66	
Conductivity (uS/cm)	0.866		1.84	
Turbidity (NTU)	20.6		15.3	
Temperature (degC)	7.56		7.3	

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): turbid no colour

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE-M Landfill Name: LNHWL

Monitoring Well ID: MW-05-12

Sample Number(s) include dups.:

Bottles filled (by parameter type):

Date of Sampling Event: AUGUST 9/2015 Time:

Weather:

Names of Samplers:

Description of Well Condition and Surrounding ground conditions (note ponding of water): native soils; no standing water within 30m, low ground to the north.

Lock (condition, presence, model, manufacturer): working lock

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP

Well pipe height above ground (cm) (to top of pipe)= 11cm

Static water level (cm) from top of pipe = 142cm

Static water level (cm) (below ground surface) calculated = 131cm

Measured well refusal depth (cm) (measure after sampling)= 157cm

Thickness of water column (cm)= 20cm Static volume of water in well (mL)=

Free product thickness (mm)= N/A Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Y Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable): 600mL purged

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	6.9			
Conductivity (uS/cm)	0.025			
Turbidity (NTU)	268			
Temperature (degC)	12.04			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...):

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments: Revisited Aug 13, no water, unable to sample.

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE-M ~~MW09-28~~ Landfill Name: LNHWL

Monitoring Well ID: MW09-28

Sample Number(s) include dups.:

Bottles filled (by parameter type): Btex x2 & Metals

Date of Sampling Event: AUGUST 9/2015 Time: 10:40

Weather: Clear

Names of Samplers: KR.

Description of Well Condition and Surrounding ground conditions (note ponding of water): wet area; boot prints leave ponded water. Surface water stream northwest ~~drains south~~

Lock (condition, presence, model, manufacturer): Key doesn't turn → cut lock.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): interface probe

Well pipe height above ground (cm) (to top of pipe)=	20cm	Aug 13
Static water level (cm) from top of pipe =	63cm	98cm
Static water level (cm) (below ground surface) calculated =	43cm.	$
Measured well refusal depth (cm) (measure after sampling)=	101cm	101cm

Thickness of water column (cm)= 58cm. Static volume of water in well (mL)= 881

Free product thickness (mm)= N/A Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: Horiba calibrated with autocal solution 10/5cm

Well purged (Y/N): Y Recharge Rate: low only fill 2 btex and 1 metals bottle 4 days ~~out~~ to recharge.

Volume Purged (L) (note multiple purging events if applicable): 500mL Removed; unable to sample on Aug 9

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	7.01			
Conductivity (uS/cm)	0.269			
Turbidity (NTU)	~~Err~~			
Temperature (degC)	11.9			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): _____

Decontamination of sampling equipment

Type of decontamination fluid (s): Disposable tubing was used at all wells

Number washes: N/A Number rinses: N/A

Other Relevant Comments: Revisited Aug 13 to sample.

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE-14 Landfill Name: Lower Powerhouse.

Monitoring Well ID: MW05-06

Sample Number(s) include dups.:

Bottles filled (by parameter type): FL, Mer, Inorganics, F2-F4, PCB.

Date of Sampling Event: AUGUST 9/2015 Time: 2:15

Weather: Light rain/overcast.

Names of Samplers: KR.

Description of Well Condition and Surrounding ground conditions (note ponding of water): water between casing and well pipe. no surface water for 30m. out ground.

Lock (condition, presence, model, manufacturer): working lock.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP

Well pipe height above ground (cm) (to top of pipe)=

Static water level (cm) from top of pipe = 110 cm

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 155cm

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: Peristaltic pump <0.1 L/min.

Well purged (Y/N): Y Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable): 400mL purged.

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	7.09			
Conductivity (uS/cm)	0.171			
Turbidity (NTU)	999			
Temperature (degC)	6.17			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...):

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: - Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE-M Landfill Name: Lower Powerhouse Landfill

Monitoring Well ID: MW05-07

Sample Number(s) include dups.:

Bottles filled (by parameter type):

Date of Sampling Event: AUGUST 9/2015 Time: 2:07

Weather: Light Rain

Names of Samplers: KR.

Description of Well Condition and Surrounding ground conditions (note ponding of water): Ponded water (puddles) no moving water

Lock (condition, presence, model, manufacturer):

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP.

Well pipe height above ground (cm) (to top of pipe)= 34cm.

Static water level (cm) from top of pipe = ~~Dry~~ ← Frozen

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 142cm.

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable):

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH				
Conductivity (uS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation…):

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE-M. Landfill Name: Powerhouse.

Monitoring Well ID: MW0805

Sample Number(s) include dups.: duplicate here to AGAT.

Bottles filled (by parameter type): F1, Inorganics, F2-F4, PCB + Dup

Date of Sampling Event: AUGUST 9/2015 Time: 3:30

Weather: Rain

Names of Samplers: KR.

Description of Well Condition and Surrounding ground conditions (note ponding of water): Puddles present, heavy rain.

Lock (condition, presence, model, manufacturer): Crown; watling

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): _____

Well pipe height above ground (cm) (to top of pipe)= 15cm.

Static water level (cm) from top of pipe = 67cm.

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= 183.

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic.

Well purged (Y/N): Y Recharge Rate: _____

Volume Purged (L) (note multiple purging events if applicable): 200mL.

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	6.5			
Conductivity (uS/cm)	0.11			
Turbidity (NTU)	988			
Temperature (degC)	5.37			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): turbid water

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: OVE-M Landfill Name: Upper NHWL

Monitoring Well ID: MW06-18

Sample Number(s) include dups.: None

Bottles filled (by parameter type): None

Date of Sampling Event: AUGUST Time: 9:24

Weather: Foggy

Names of Samplers:

Description of Well Condition and Surrounding ground conditions (note ponding of water):

1.1m of snow/ice dug until refusal of ice. unable to locate well wet hole.

Lock (condition, presence, model, manufacturer): Images 0785 / 0786.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc):

Well pipe height above ground (cm) (to top of pipe)=

Static water level (cm) from top of pipe =

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)=

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable):

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH				
Conductivity (uS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...):

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE M Landfill Name: _____

Monitoring Well ID: ~~MW 21-07~~ 07-21

Sample Number(s) include dups.: None

Bottles filled (by parameter type): None

Date of Sampling Event: AUGUST 10 Time: 9:40

Weather: fog / scattered cloud

Names of Samplers: KR

Description of Well Condition and Surrounding ground conditions (note ponding of water): Ice/snow standing water adjacent to casing. 9cm of water in casing.

Lock (condition, presence, model, manufacturer): crown, unlocked. images 0787 - 0788 - 0789.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP.

Well pipe height above ground (cm) (to top of pipe)= 47cm

Static water level (cm) from top of pipe = frozen.

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= 142cm

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: _____

Well purged (Y/N): _____ Recharge Rate: _____

Volume Purged (L) (note multiple purging events if applicable): _____

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH				
Conductivity (uS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): _____

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE M Landfill Name: _____

Monitoring Well ID: MW 06 20

Sample Number(s) include dups.: none

Bottles filled (by parameter type): none.

Date of Sampling Event: AUGUST 10/2015 Time: 9:49

Weather: same.

Names of Samplers: KR. Ricky Nookiguak. (all KR + RN)

Description of Well Condition and Surrounding ground conditions (note ponding of water): snow drift at well casing. unable to open pipe, casing jambed against pipe. casing is dry.

Lock (condition, presence, model, manufacturer): crown. MASTER LOCK 0923 - 0790.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): Tape.

Well pipe height above ground (cm) (to top of pipe)= _____

Static water level (cm) from top of pipe = _____

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= _____

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: _____

Well purged (Y/N): _____ Recharge Rate: _____

Volume Purged (L) (note multiple purging events if applicable): _____

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH				
Conductivity (uS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): _____

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE-M Landfill Name: _____

Monitoring Well ID: MW06-19

Sample Number(s) include dups.: F1, Inorganics, F2-F4, PCB

Bottles filled (by parameter type): _____

Date of Sampling Event: AUGUST 10/2015 Time: 9:55

Weather: same

Names of Samplers: KR RN

Description of Well Condition and Surrounding ground conditions (note ponding of water): dry soils, patches of snow. 3cm of water in casing pipe. rocky

Lock (condition, presence, model, manufacturer): crown not locked.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP

Well pipe height above ground (cm) (to top of pipe)= 38cm.

Static water level (cm) from top of pipe = 142

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= 161

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic.

Well purged (Y/N): Y Recharge Rate: good.

Volume Purged (L) (note multiple purging events if applicable): removed 400mL

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	7.61			
Conductivity (uS/cm)	0.021			
Turbidity (NTU)	4.3			
Temperature (degC)	7.8			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear; no colour.

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE M Landfill Name: Upper Tier 2

Monitoring Well ID: MW0722

Sample Number(s) include dups.: F1, Inorganics, partial fill F2-F4

Bottles filled (by parameter type):

Date of Sampling Event: AUGUST 10/2015 Time: 11:40

Weather: cloudy ~ 8°C. light wind.

Names of Samplers: RN/RR

Description of Well Condition and Surrounding ground conditions (note ponding of water): Boulders adjacent to well casing. Surrounding area flat road like. gravel & sand small puddles and drifted snow in area.

Lock (condition, presence, model, manufacturer): Crown unable to open.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP

Well pipe height above ground (cm) (to top of pipe)= 50cm (40 water in casing)

Static water level (cm) from top of pipe = 207

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= 218

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic.

Well purged (Y/N): Y Recharge Rate: very low <0.05L/min.

Volume Purged (L) (note multiple purging events if applicable): 40mL Purged.

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	7.89			
Conductivity (uS/cm)	0.179			
Turbidity (NTU)	616.			
Temperature (degC)	7.13			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): turbid water. no colour.

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE M Landfill Name: _____

Monitoring Well ID: MW 07 23

Sample Number(s) include dups.: _____

Bottles filled (by parameter type): _____

Date of Sampling Event: AUGUST 10/2015 Time: 12:00

Weather: _____

Names of Samplers: KR

Description of Well Condition and Surrounding ground conditions (note ponding of water): Drifted Snow covers area

Lock (condition, presence, model, manufacturer): Crown broken

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): _____

Well pipe height above ground (cm) (to top of pipe)= 45cm 40cm water in casing

Static water level (cm) from top of pipe = ~~DRY~~ Frozen

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= 170

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: _____

Well purged (Y/N): _____ Recharge Rate: _____

Volume Purged (L) (note multiple purging events if applicable): _____

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH				
Conductivity (uS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): _____

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYEM Landfill Name:

Monitoring Well ID: MW0825

Sample Number(s) include dups.: FI, [illegible]

Bottles filled (by parameter type):

Date of Sampling Event: AUGUST 10/2015 Time: 1330

Weather: Overcast

Names of Samplers: KR, Kathy

Description of Well Condition and Surrounding ground conditions (note ponding of water): snow dirt between landfill and well no standing water in the vicinity

Lock (condition, presence, model, manufacturer):

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP

Well pipe height above ground (cm) (to top of pipe)= 40, in 40cm of water)

Static water level (cm) from top of pipe = 93 cm

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 118cm

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic

Well purged (Y/N): Y Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable): 40 L.

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	8.59			
Conductivity (uS/cm)	0.225			
Turbidity (NTU)	41.1			
Temperature (degC)	5.89			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): turbidity

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYEM Landfill Name:

Monitoring Well ID: MW0824

Sample Number(s) include dups.: F1, inorganics, partial F2-F1.

Bottles filled (by parameter type):

Date of Sampling Event: AUGUST 10 2015 Time: 1pm

Weather: partly sunny ~10°C

Names of Samplers: KR JRN

Description of Well Condition and Surrounding ground conditions (note ponding of water): Rocky. no standing water, images.

Lock (condition, presence, model, manufacturer):

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc):

Well pipe height above ground (cm) (to top of pipe)= 27cm (9cm water in casing)

Static water level (cm) from top of pipe = 134

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 150

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic.

Well purged (Y/N): Y Recharge Rate: very low / none.

Volume Purged (L) (note multiple purging events if applicable): 40mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	9.06			
Conductivity (uS/cm)	0.053			
Turbidity (NTU)	79.2			
Temperature (degC)	8.66°C			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): Turbid, no colour.

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE M Landfill Name: _____

Monitoring Well ID: MW12-02

Sample Number(s) include dups.: _____

Bottles filled (by parameter type): _____

Date of Sampling Event: AUGUST 10/2015 Time: 2 pm

Weather: _____

Names of Samplers: KR

Description of Well Condition and Surrounding ground conditions (note ponding of water): _____

Snow drift 0930: jog to 0835

Lock (condition, presence, model, manufacturer): _____

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): _____

Well pipe height above ground (cm) (to top of pipe)= _____

Static water level (cm) from top of pipe = _____

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= _____

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: _____

Well purged (Y/N): _____ Recharge Rate: _____

Volume Purged (L) (note multiple purging events if applicable): _____

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH				
Conductivity (uS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): _____

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE M Landfill Name: Lower Toer 2.

Monitoring Well ID: MW05-13

Sample Number(s) include dups.: All + dupes All

Bottles filled (by parameter type):

Date of Sampling Event: AUGUST 12/2015 Time: 1:10pm.

Weather: Overcast light rain

Names of Samplers: ICR.

Description of Well Condition and Surrounding ground conditions (note ponding of water): casing has been dented by large boulder, pipe in good condition, no standing water

Lock (condition, presence, model, manufacturer): crown, working.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP

Well pipe height above ground (cm) (to top of pipe)= 22cm (10cm water in casing)

Static water level (cm) from top of pipe =

Static water level (cm) (below ground surface) calculated = ~~89~~ cm

Measured well refusal depth (cm) (measure after sampling)= 170 cm

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic.

Well purged (Y/N): 40 mL Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable):

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	7.13			
Conductivity (uS/cm)	0.125			
Turbidity (NTU)	3.8			
Temperature (degC)	7.3			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYEM Landfill Name:

Monitoring Well ID: MW12-01

Sample Number(s) include dups.:

Bottles filled (by parameter type): All

Date of Sampling Event: AUGUST 12 Time: 2:20

Weather: partially overcast / clearing

Names of Samplers: KR

Description of Well Condition and Surrounding ground conditions (note ponding of water): water ponded adjacent to well. Well in good condition.

Lock (condition, presence, model, manufacturer): crown, working

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP

Well pipe height above ground (cm) (to top of pipe)= 41cm.

Static water level (cm) from top of pipe = 98cm

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 197cm

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic.

Well purged (Y/N): 40mL. Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable):

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	7.27			
Conductivity (uS/cm)	0.343			
Turbidity (NTU)	0.0			
Temperature (degC)	7.15			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DVEM Landfill Name: _____

Monitoring Well ID: MW05-15

Sample Number(s) include dups.: _____

Bottles filled (by parameter type): all bottles. except PCB

Date of Sampling Event: August 12 Time: 2:55

Weather: overcast / clearing.

Names of Samplers: KR

Description of Well Condition and Surrounding ground conditions (note ponding of water): no water in casing; no standing water.

Lock (condition, presence, model, manufacturer): crown / good.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): _____

Well pipe height above ground (cm) (to top of pipe)= 7cm.

Static water level (cm) from top of pipe = 115

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= 155

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic.

Well purged (Y/N): 40mL. Recharge Rate: _____

Volume Purged (L) (note multiple purging events if applicable): _____

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	7.4			
Conductivity (uS/cm)	0.441			
Turbidity (NTU)	122			
Temperature (degC)	8.19			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): turbid; no colour.

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE M. Landfill Name: lower Tier 2

Monitoring Well ID: MW 05-16

Sample Number(s) include dups.:

Bottles filled (by parameter type): all

Date of Sampling Event: AUGUST 17 / 2015 Time: 3:45

Weather: partly cloudy.

Names of Samplers: K.R.

Description of Well Condition and Surrounding ground conditions (note ponding of water): snow drift and ponded water between wall and landfill

Lock (condition, presence, model, manufacturer): crown, good. casing is loose

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc):

Well pipe height above ground (cm) (to top of pipe)= 22. wet beside casing (1-5 cm water)

Static water level (cm) from top of pipe = 102

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 140

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic

Well purged (Y/N): Y Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable): 40mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	6.91			
Conductivity (uS/cm)	0.156			
Turbidity (NTU)	150			
Temperature (degC)	6.92			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: DYE-M. Landfill Name: LNHWL

Monitoring Well ID: MW05-09.

Sample Number(s) include dups.:

Bottles filled (by parameter type):

Date of Sampling Event: AUGUST 9 2015 Time: 11:05

Weather:

Names of Samplers: KR.

Description of Well Condition and Surrounding ground conditions (note ponding of water): water adjacent at surface. flowing north

Lock (condition, presence, model, manufacturer): cut lock.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): TP

Well pipe height above ground (cm) (to top of pipe)= 20cm

Static water level (cm) from top of pipe = no water. ← frozen

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 197cm.

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable):

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH				
Conductivity (uS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...):

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

SITE NAME: _____

RECORD OF SAMPLING

DAT
SAMPLER NAME: Ang

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
DYE M UPPER South West	DM30 0-15	0-15	Watery sand + gravel	20W 0572494 7394623		724m	✓	✓
"	DM30 20-30	20-30	"	"		"	✓	✓
"	DM28 0-15	0-15	rocky large cobbles gravel/sand dry	20W 0572445 7	394566	714	✓	✓
"	DM28 40-50	40-50	"	"	"	"	✓	✓
upper NWS	DM19		upper NWS snow drifted	no sample ice		refusal	under drift at 15cm	
upper nws	DM 22	0-15 40-50	watery; till with gravel over dark sand (volcanic)	20W 0572494 7394700		727	✓	✓
	DM 18	0-10	Sandy gravel	20W	0572596 7394734	741	✓	✓
helipad	DM 16	0-15 30-40	gravelly sand	20W 0572681 7394777		746	✓	✓
"	DM 15	0-15 30-40	gravelly sand dry	20W 0572710 7394762		740	✓	✓
	DM 13	0-15 40-50	"	20W 0572757 7394846		745	✓	✓

Fig. 1

RECORD OF SOIL SAMPLING

SAMPLER NAME: DATE:

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Helipad	DM12	0-15 30-40	~~Sandy~~ refusal at large rocks. gravelly is road	20 W	0572755 7394845	741	✓	✓
	DM11	0-15 hard pack	sandy gravel road	20 W	0572706 7394826	747	✓	✓
upper Pallet	DM60	0-15 40-50	sandy gravel	20 W 05	71954 7394953	705	✓	✓
	DM61	0-15 29-30	sandy gravel w/ cobbles	20 W 05 7394852	71885	701	✓	✓
	DM62	0-15 20-30	Sandy gravel	20 05	71860 7394762	695	✓	✓
	DM59	0-15 frozen refusal	wet cobbles w/ sand.	20 057	1788 7394755	696	✓	✓
	DM58 up upe.	0-15 40-50	sandy gravel.	20 057	1732 7394774	696	✓	✓
	DM54	0-15 refusal at 20 rock	Sandy gravel w/ rocks.	20 W 05 7394	71668 851	701	✓	✓
	DM56	0-15 refusal at 20 rock	11	20 W05 73	71533 94768	693	✓	✓
	DM55	0-15 30-40	sand & cobbles	20 W 05	71545 7394920	702	✓	✓

B

SITE NAME: [illegible]

RECORD OF SAMPLING

DATE:
SAMPLER NAME:

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
upper pallet	DM 53	0-15 40-50	sand with cobbles.	20W 0571758	7394995	700	✓	✓
upper west lf	DM.51	0-15 refusal at 20	Sandy gravel Rocks hard pack	20W 0571620	7394976	701	✓	✓
	DM52	0-15 refusal ice 15	rocks w/ sand	20W 0571645	7395023	699	✓	✓
	DM47	0-15 40-50	rock w/sand strong fuel odour	20W 0571694	7395047	697	✓	✓
	DM41	0-15 rocky refusal @20	rocky w/sand.	~~20W 0571437~~ 20W 0571440	7394998	690	✓	✓
	DM35	0-15 rocky refusal @ 20	wet sandy trail road, surface water catch basin nearby.	20W 0571364	7394933	683	✓	✓
	DM36	snow drift ice	no sample	20W 0571268	7394927	674	✓	✓
	DM~~37~~ 37	0-15 30-40	rocky with sand.	20W 0571199	7394921	665	✓	✓
	DM 32	0-15 20-30	sandy gravel some silt	20W 0571095	7394899	657	✓	✓
	DM33		sandy gravel w/ rocks	20W 0571069	7394959	659	✓	✓

C

RECORD OF SOIL SAMPLING

SAMPLER NAME/DATE: E — Aug 11/15

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
	DM38	0-15	sandy	20W 0571240	7395057		✓	✓
	DM49	0-15 dupe 40-50	sandy with large rocks and silt. fuel odour	20W 0571735	7395115	687	✓	✓
	DM48	0-15 dupe 40-50	silty sand w/ coarse gravel & debris.	20W 0571666	7395127	687	✓	✓
	DM46	0-15 dupe 40-50	sandy gravel	20W 0571622	7395112	685	✓	✓
	DM45	0-15 Frozen refusal	rock and sand. (under snow drift)	20W 0571552	7395117	685	✓	✓
	DM44	0-15 frozen refus	rock and sand. (snow drift)	20W 0571481	7395111	685	✓	✓
	DM43	0-15 ~~20-30~~ dupe	gravel	20W 0571424	7395085	684	✓	✓
	DM42	0-15 40-50	sand and rock.	20W 0571388	7395042	682	✓	✓
	DM39	0-15 40-50	gravelly sand	20W 0571358	7395044	677	✓	✓
	DM40	0-15 dupe	sandy gravel.	20W 0571538	7394991	695	✓	✓

Aug 12

SITE NAME: [illegible]

RECORD OF [illegible] SAMPLING

DAT
SAMPLER NAME: [illegible]

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
[illegible]	DM27	no sample	snow	10W	0572483 7394519			
[illegible]	DM24	no sample	snow	20W	0572614 7394556			
[illegible]	DM25	"		20W	0572563 7394552			
[illegible]	DM21	"		20W	0572525 7394687			
[illegible]	DM26	"		20W	0572519 7394548			
Aug 12	MW05-13	0-15 20-30	coarse rock w/ sand & gravel	20W	0561967 7388341	337	✓	✓
Aug 12	MW12-01	0-15 20-30 refusal @ rock, slumping from water.	silty sand wet.	20W	05 61892 7388363	340	✓	✓
Aug 12	MW05 15	0-15 dupe 30-40	silty sand wet slughy.	20W	0561790 7388319	332	✓	✓
Aug 12	MW05-16	0-15 40-57	silty sand wet	20W	0561875 7388149.	342	✓	✓
Aug 12	DM-08	0-15 dupe	sandy gravel hard pack refusal at 15	20W	0561453 7388944	294	✓	✓

RECORD OF SOIL SAMPLING

SAMPLER NAME(S): [illegible]

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Aug'12	DM 09	0-15 refusal at 15	Sandy gravel hard pack	20 W 0561462	7388903	298	✓	✓
Aug'12	DM10	0-15 refusal at 15	Sandy gravel hard pack	20 W 0561425	7388886	294	✓	✓
Aug'12	DM07	0-15 40-50	dry silty sand tundra underlain	20 W 0561375	7388951	299	✓	✓
Lower foundation	DM-04	0-15 40-50	dry silty sand.	20 W 0562759	7387533	367	✓	✓
Lower foundation	DM-05	0-15 40-50	moist silty sand	20 W 0562710	7387573	356	✓	✓
	DM-06	0-15 40-50	moist silty sand.	20 W 0562761	7387621	366	✓	✓
	End of	Cape Dyer		DYE-M				

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name:	Inspection Date: August 12, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-TP		Landfill: Lower Sister Tine 1	
Thermistor Number: VT-1		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial # 0711 0005	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 11.34		Aux 12 13.38

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	0.9622	0.6482
2	0.9302	-0.4151
3	0.9041	-1.2270
4	0.884	-2.0261
5	0.8640	-2.6406
6	0.8455	-3.2692
7	0.8357	-3.6034
8	0.8261	-3.9362

Bead	ohms	Degrees C
9	0.8201	-4.1413
10	0.8168	-4.2572
11	0.8146	-4.3310
12	0.8132	-4.3811
13	0.8126	-4.3996

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 10% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name:	Inspection Date: August 12, 2017
Inspector Signature / Prepared By:	

Thermistor Information (*Some information can be pre-populated from thermistor logs)

Site Name: DYE-M		Landfill: Lower Site, Tier II	
Thermistor Number: VT2		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07110052		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☐	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 (11.34)		Aux 12 (13.38)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.8798	4.5103
2	1.0681	4.1285
3	1.0154	2.4011
4	0.9554	0.4214
5	0.9193	-0.7770
6	0.8879	-1.8357
7	0.8627	-2.6846
8	0.8266	-3.9179

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

4hr/n Full Date when full 12/11/2017

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August Aug 12, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-M		Landfill: Tower Site, Tire II	
Thermistor Number: VT3		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial #		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9	Aux 12	
	11.34	(best) 13.38	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0889	4.8672
2	1.0537	3.6566
3	1.0012	1.9322
4	0.9865	0.1278
5	0.9762	-0.8835
6	0.9675	-1.8460
7	0.9621	-2.7053
	~~3.8720738~~	

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name:	Inspection Date: August 17, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-T1		Landfill: Lower Site, Tier I	
Thermistor Number: VT-4		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07H0054		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	
Battery Installation Date			
Battery Levels	Main 11.54		Aux 13.50

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0936	4.9594
2	1.0865	4.7274
3	1.0529	3.6291
4	0.9952	1.7364
5	0.9451	0.0797
6	0.9143	-0.9447
7	0.8931	-1.6560
8	0.8780	-2.1652

Bead	ohms	Degrees C
9	0.8640	-2.6406
10	0.8564	-2.8972
11	0.8528	-3.0219
12	0.8473	-3.2093
13	0.	
14		

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

40% Full,

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name:	Inspection Date: August 12, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-M		Landfill: Lower S. Je, Tier II	
Thermistor Number: VT-04		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07110027		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	
Battery Installation Date			
Battery Levels	Main 9 (11.34)		Aux 12 (13.26)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
	1.3560	13.6827
	1.3372	13.0292
	—	—
	1.1275	6.0698
	—	—
	1.0060	2.0978
	0.9356	-0.2347
	0.8509	-3.0643

Bead	ohms	Degrees C
	0.8327	-3.7264
	0.8329	-4.7355
	0.7819	-5.2776
	0.7803	-5.5271
	0.7783	-5.5968
	0.7776	-5.6209

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year: _____

Battery model number installed: _____

Expected battery life (years): _____

Datalogger Programming (Describe programming completed; beads and frequency)

40% Full memory

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August 29, 2012
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: BVE-M		Landfill: Pb wet/hoyle	
Thermistor Number: TT5		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 0711024		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	~~Beads to be replaced~~
Battery Installation Date	8/9/2012		
Battery Levels	Main 9V	Aux 12V	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1842	7.9284
2	1.2372	9.0781
3	1.2130	8.9758
4	1.1019	5.2313
5	0.9999	1.8896
6	0.9391	-0.1205
7	0.9017	-1.3689
8	0.8705	-2.4181

Bead	ohms	Degrees C
9	0.8528	-3.0219
10	0.8442	-4.0019
11	0.8094	-4.5506

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory Percent Full 40%

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August Aug 9, 2012
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DVF-MT6		Landfill: Powerhouse	
Thermistor Number:		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N ✓	E ✓	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07110025		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	Needs to be replaced.
Battery Installation Date	8/9/2012		
Battery Levels	Main 9V	Aux 12V	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	2.4714	141.0088
2	1.1219	5.8651
3	1.0292	2.8517
4	0.9451	0.0797
5	0.8992	-1.5200
6	0.8701	-2.4362
7	0.8504	-3.1026
8	0.8303	-3.7493

Bead	ohms	Degrees C
9	0.8071	-4.5026
10	0.7906	-4.9506

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

10 Beads were working.

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Noghaddam	Inspection Date: August Aug 9, 2016
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYEM		Landfill: Power House	
Thermistor Number: VT 7		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial #		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	Needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 next 11.34		Aux 12 13.63

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0816	4.5677
2	0.9709	0.9338
3	0.9217	-0.7000
4	0.9011	-1.3894
5	0.8309	-3.7688
6	0.8694	-2.4267
7	0.8609	-2.7438
8	0.8509	-3.0843

Bead	ohms	Degrees C
9	0.8435	-3.1602
10	0.8449	-3.2901

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000 VT-8

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghadam	Inspection Date: August August 12, 2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-M		Landfill: Open Site Tier II Disposal Area	
Thermistor Number: VT-8		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)		
Datalogger Serial #	Nodal Points		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 (post 11.34)		Aux 12 (13.14 post)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1		6.9493
2		3.8913
3		3.5142
4		2.8752
5		0.2214
6		-1.3075
7		-2.4362
8		-3.4544

Bead	ohms	Degrees C
9		-4.1938
10		-4.8391
11		-5.4574
12		-5.7068
13		-6.0217
14		-6.2135
15		-6.3489

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Fo4 4 of

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

VT-9

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August Aug 10, 20
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE-11		Landfill: Upper Site tier II disposal Facility	
Thermistor Number: VT-9		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07110058		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	ready to be replaced
Battery Installation Date			
Battery Levels	Main (11.34) 9V	Aux	12V
			Dest 13.26

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2421	9.8400
2	1.1171	5.7279
3	1.0179	3.7990
4	1.0316	2.9318
5	0.9706	0.9237
6	0.9650	0.9217
7	0.8827	-2.0081
8	0.8498	-3.1234

Bead	ohms	Degrees C
9	0.8261	-3.9362
10	0.8071	-4.5926
11	0.7903	-5.1770
12	0.7803	-5.5271
13	0.7708	-5.8[illegible]
14	0.7643	-6.0892
15	0.7581	-6.1324
16	0.7581	-6.2[illegible]

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza moghaddam	Inspection Date: August Aug 10/2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: ~~DYE-M~~ DYE-M		Landfill: Upper Site Tier 1 Disposal	
Thermistor Number: V T-10		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 0711005		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9		Aux 12
	Aug 11.34		13.38

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0523	3.6092
2	1.0579	3.7940
3	0.9982	1.8743
4	0.9167	-0.8656
5	0.8729	-2.3786
6	0.8370	-3.5616
7	0.8138	-4.3603
8	0.7908	-5.1583

Bead	ohms	Degrees C
9	0.7740	-5.7471
10	0.7594	-6.2419

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000 VT_11

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: August Aug 10, 2011
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYE_11		Landfill: Upper Tier II	
Thermistor Number: VT_11		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	✓ N	✓ E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07110051		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☐	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 V Post 11.34		Aux 12 V Post 13.75

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2626	10.5197
2	1.2511	10.1389
3	1.0779	4.4479
4	1.0537	3.6586
6	1.0263	2.7567
6	0.9536	0.3607
7	0.9030	-1.3254
8	0.8724	-2.3586

Bead	ohms	Degrees C
9	0.8825	-3.3735
10	0.8802	-4.2254
11	0.7906	-4.9504
12	0.7840	-5.3959

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 40% Full

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000 VT-BU

ANNEX M: Thermistor Inspection Template

Inspector Name: Petra Magnusson	Inspection Date: August Aug 10/2015
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: DYKE-M		Landfill:	
Thermistor Number: VT-BU		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 0711 0028		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 9 (11.34)	Aux 12 (13.50)	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.3224	12.5298
2	1.3491	13.4372
3	1.2992	11.7450
4	1.0295	2.8617
5	0.9554	0.4214
6	0.9090	-1.1234
7	0.8798	-2.1059
8	0.8796	-3.4727

Bead	ohms	Degrees C
9	0.8108	-4.4630
10	0.7932	-5.0754
11	0.7852	-5.3558
12	0.7828	-5.4387
13	0.7817	-5.4789
14	0.7823	-5.4574

Battery Information

Batteries changed ? Yes ☐ No ☑ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Memory 10% Full

Observations and Proposed Maintenance

APPENDIX C

Laboratory Data

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Page 1 of 3

Client: Golder Associates Ltd.
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, Ontario K2H 5B7
Telephone: 613-592-9600

Project: Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
PO #: Email address: Nicole_macdonald@golder.com
Email: Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number:

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: PHC-F1	Quote 15-304 Inorganics + Metals	PHC F2-F4	PCB
1	MW05-05	GWater	-	6	Aug 9/15	3:30	✓	✓	✓	✓
2	MW05-06	GWater	-	6	Aug 9/15	2:45	✓	✓	✓	✓
3	~~LNHWL~~ MW09-28 (0-15)	Soil	-	2	Aug 9/15	10:10	✓	✓	✓	✓
4	DM MW09-28 (40-50)	"	-	2	"	10:10	✓	✓	✓	✓
5	DM MW05-09 (0-15)	"	-	2	"	11:15	✓	✓	✓	✓
6	DM MW05-09 (40-50)	"	-	2	"	11:10	✓	✓	✓	✓
7	DM MW05-12 (0-15)	"	-	2	"	11:40	✓	✓	✓	✓
8	DM MW05-12 (40-50)	"	-	2	"	11:40	✓	✓	✓	✓
9	DM MW09-26 (0-20)	"	-	2	"	12:20	✓	✓	✓	✓
10	DM MW09-27 (0-15)	"	-	2	"	12:45	✓	✓	✓	✓

Comments: LNHWL landfill
may be past holding times but please analyze anyway

Method of Delivery: Walk-in

Relinquished By (Sign):	Received by Driver/Depot: Nicole MacDonald	Received at Lab:	Verified By:
Relinquished By (Print): D. Plender	Date/Time: Aug 14/15	Date/Time:	Date/Time:
Date/Time: Aug 10 2015	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

Kevin Coll
Aug 17/15 3:57

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Page 2 of 3

Golder Associates Ltd.
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHC F1	Grain size 15-304 Metals + hexavalent chromium	PHC F2-F4	PCB							
1	DM MW09-27 (30-40)	Soil	—	2	Aug 9/15	12:45	✓	✓	✓	✓							
2	~~Poor Rec #~~ MW05-08 (0-15)	"	—	2	"	1:40	✓	✓	✓	✓							
3	DM MW 05-08 (40-50)	"	—	2	"	1:45	✓	✓	✓	✓							
4	DM MW 05-07 (0-15)	"	—	2	"	~~1~~2:20	✓	✓	✓	✓							
5	DM MW 05-07 (15-30)	"	—	2	"	2:20	✓	✓	✓	✓							
6	DM MW05-06 (0-15)	"	—	2	"	2:45	✓	✓	✓	✓							
7	DM MW05-06 (40-50)	"	—	2	"	2:45	✓	✓	✓	✓							
8	DM MW05-05 (0-15)	"	—	2	"	—	✓	✓	✓	✓							
9	DM MW05-05 (40-50)	"	—	2	"	—	✓	✓	✓	✓							
10					"												

Comments: Powerhouse landfill
may be past holding times but please analyze anyway

Method of Delivery: walk-in

Relinquished By (Sign):	Received by Driver/Depot: Nicole MacDonald	Received at Lab:	Verified By:
Relinquished By (Print): D. Plendl	Date/Time: Aug 14/15	Date/Time:	Date/Time:
Date/Time: Aug 10 2015	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

Karen Gill
Aug 17/15 3:57

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Client Na
Contact N
Address:
Telephon

Golder Associates Ltd.
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Pro
Qu
PO
Em

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day
[ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHC F1	Guide 15-304 Metals + mercury	PHC F2-F4	PCB							
1	~~Lower X-Roads~~ DM-01 (0-15)	soil	—	2	Aug 9/15	—	✓	✓	✓	✓							
2	DM-01 (30-50)	"	—	2	"	—	✓	✓	✓	✓							
3	DM-02 (0-15)	"	—	2	"	—	✓	✓	✓	✓							
4	DM-02 (15-30)	"	—	2	"	—	✓	✓	✓	✓							
5	DM-03 (0-15)	"	—	2	"	—	✓	✓	✓	✓							
6	DM-03 (40-50)	"	—	2	"	—	✓	✓	✓	✓							
7																	
8																	
9																	
10																	

Comments: Lower X-Roads
may be past holding times but please analyze anyway

Method of Delivery: Walk-in

Relinquished By (Sign): D Plaskett	Received by Driver/Depot: Nicole MacDonald	Received at Lab:	Verified By:
Relinquished By (Print): D Plaskett	Date/Time: Aug 14/15	Date/Time:	Date/Time:
Date/Time: Aug 14 2015	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

Karen Cull
Aug 17/15 3:57

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Client Name: Golder Associates Ltd.
Contact Name: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, ON
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304 DEW Line Landfill Monitoring
PO #
Email Address: nicole_macdonald@golder.com
damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Quote 15-304						
1	MW 05-13	GW		6	Aug 12/15	13:10								X						
2	MW 12-01	GW		6	"	14:20								X						
3	MW 05-16	GW		6	"	15:45								X						
4	MW 05-15 *	GW		5	"	14:55								X						
5	MW 09-28 *	GW		2	Aug 13/15	—								X						
6	MW 05-08	GW		6	"	—								X						
7																				
8																				
9																				
10																				

Comments: * for reduced sample volume, possible to analyze for all anyway? (no preservatives in bottles) if not, prioritize: F1, inorganics/metals, F2-F4, PCBs

Method of Delivery:

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time:	Date/Time:	Date/Time:
Date/Time: Aug 19/15 11:30.	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

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Client Name: Golder Associates Ltd.	Project Reference: 1530908
Contact Name: Nicole MacDonald	Quote # 15-304 Golder DEW Line
Address: 1931 Robertson Road, Ottawa, ON K2H 5B7	PO #
Telephone: 613 592 9600	Email Address: nicole_macdonald@golder.com damn_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day

Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Quote 15-304						
1	DM-50 (0-15)	S		2	Aug 11/15	—								X						
2	DM-50 (30-40) *	S		2		14:45								X						
3	DM-51 (0-15)	S		2		—								X						
4	DM-53 (0-15)	S		2		—								X						
5	DM-53 (40-50)	S		2		—								X						
6	DM-56 (0-15) *	S		2		—								X						
7	DM-54 (0-15)	S		2		—								X						
8	DM-57 (0-15)	S		2		13:50								X						
9	DM-57 (40-50)	S		2		13:50								X						
10	DM-58 (0-15) *	S		2		—								X						

Comments: * may have broken glass

Method of Delivery: Walk-in

Relinquished By (Sign): D. Plenderleith	Received by Driver/Depot: Nicole MacDonald	Received at Lab:	Verified By:
Relinquished By (Print): Don Plenderleith	Date/Time: Aug 17/15	Date/Time:	Date/Time:
Date/Time: Aug 18/15	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

Kaun Gill Aug 18/15 4:29

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Client Name: Golder Associates Ltd.
Contact Name: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, ON K2H 5B7
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304 Golder DEW Line
PO #
Email Address: nicole_macdonald@golder.com
damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number:

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Quote 15-304						
1	DM-58 (40-50)	S		2	Aug 11/15	—								X						
2	DM-59 (0-15)	S		2		—								X						
3	DM-62 (0-15)	S		2		—								X						
4	DM-14 (0-20)	S		2		10:10								X						
5	DM-14 (20-40)	S		2		10:10								X						
6	DM-62 (20-30)	S		2		—								X						
7	DM-61 (0-15) *	S		2		—								X						
8	DM-61 (20-30) *	S		2		—								X						
9	DM-60 (0-15)	S		2		—								X						
10	DM-60 (40-50)	S		2		—								X						

Comments: *may have broken glass

Method of Delivery: Walk-in

Relinquished By (Sign): D. Plenderleith	Received by Driver/Depot: Nicole MacDonald	Received at Lab:	Verified By:
Relinquished By (Print): Don Plenderleith	Date/Time: Aug 17/15	Date/Time:	Date/Time:
Date/Time: Aug 17/15	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

Karen Gill
Aug 18/15 4:29

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Client Name:
Contac
Addres
Teleph

Golder Associates Ltd.
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Pro
Qu
PO
En

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	F1	Inorganics (S/metals (advote)	F2-F4	PCB							
1	MW06-19	GW		6	Aug 10	9:55	✓	✓	✓	✓							
2	MW07-22	GW		5	Aug 10	11:40	✓	✓	✓	✓	low volume, try to analyze all						
3	MW08-25	GW		4	Aug 10	13:30	✓	✓	✓	✓	low volume, try to analyze all						
4	MW08-24	GW		5	Aug 10	13:00	✓	✓	✓	✓	low volume, try to analyze all						
5	DM-30 (0-15)	S		2	Aug 10	16:00	✓	✓	✓	✓							
6	DM-30 (20-30)	S		2	"	16:00	✓	✓	✓	✓							
7	DM-28 (0-15)	S		2	"	—	✓	✓	✓	✓							
8	DM-28 (40-50) *	S		2	"	16:25	✓	✓	✓	✓							
9	DM-23 (0-20) *	S		2	"	16:00	✓	✓	✓	✓							
10	DM-29 (0-20)	S		2	"	16:30	✓	✓	✓	✓							

Comments:
* Repackaged because of broken glass
For low sample volume, prioritize: F1, inorganic/metals, F2-F4, PCBs. // May exceed holding time but please analyze anyway

Method of Delivery: Walk-in

Relinquished By (Sign): Dan Plenderleith	Received by Driver/Depot: Nicole MacDonald	Received at Lab:	Verified By:
Relinquished By (Print): Don Plenderleith	Date/Time: Aug 17/15	Date/Time:	Date/Time:
Date/Time: Aug 10/15	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

Karen Aul
Aug 15/15 4:29

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Client N:
Contact
Address:
Telephor

Golder Associates Ltd.
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Project P
Quote #
PO #
Email A

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number:

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: PHC F1	Inorganics/Metals (Aqua Regia)	PHC F2-F4	PCB							
✓ 1	DM-29 (20-40)	S		2	Aug 10	16:20	✓	✓	✓	✓							
✓ 2	MW 06-19 (0-20)	S		2	"	10:45	✓	✓	✓	✓							
✓ 3	MW 06-20 (0-20)	S		2	"	10:25	✓	✓	✓	✓							
✓ 4	MW 07-21 (0-15)	S		2	"	—	✓	✓	–	✓							
✓ 5	MW 07-21 (30-40)	S		2	"	9:50	✓	✓	✓	–							
✓ 6	MW 07-22 (0-15)	S		2	"	12:00	✓	✓	✓	✓							
✓ 7	MW 07-22 (15-30)	S		2	"	12:00	✓	✓	✓	✓							
✓ 8	MW 07-23 (0-25)	S		2	"	12:30	✓	✓	✓	✓							
9	MW 08-24 (0-15)	S		2	"	13:05	✓	✓	✓	✓							
10	MW 08-25 (0-15)	S		2	"	13:30	✓	✓	✓	✓							

Comments: may exceed holding time but please analyze anyway.

Method of Delivery: Walk-in

Relinquished By (Sign):	Received by Driver/Depot: Nicole Crawford-MacDonald	Received at Lab:	Verified By:
Relinquished By (Print): D. Plenderleith	Date/Time: Aug 17/15	Date/Time:	Date/Time:
Date/Time: Aug 10, 2015	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

Karen Cyfl
Aug 18/15 4:29

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Client Name: Golder Associates Ltd.
Contact Name: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, ON
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304 DEW Line
PO #
Email Address: nicole-macdonald@golder.com
damn-johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: **S** (Soil/Sed.) **GW** (Ground Water) **SW** (Surface Water) **SS** (Storm/Sanitary Sewer) **P** (Paint) **A** (Air) **O** (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Dup DM-30						
1	DM-34 (0-15)	S		2	Aug 11/15	17:20								X						
2	DM-31 (0-15)	S		4		16:30								X						
3	DM-31 (30-40)	S		2		16:40								X						
4	DM-52 (0-15)	S		2		—								X						
5	DM-55 (0-15)	S		2		—								X						
6	DM-55 (30-40)	S		2		—								X						
7	DM-38 (0-15)	S		2		—								X						
8	DM-33 (0-15)	S		2		—								X						
9	DM-33 (20-30)	S		2		—								X						
10	DM-32 (0-15)	S		2		—								X						

Comments: past hold time for F1 but please analyze anyway

Method of Delivery:

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time:	Date/Time:	Date/Time:
Date/Time: Aug 19/15 12:30	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

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Page 2 of 2

Client Name: Golder Associates Ltd	Project Reference: 1530908
Contact Name: Nicole MacDonald	Quote # 15-304 DEW Line
Address: 1931 Robertson Road, Ottawa, ON	PO #
Telephone:	Email Address: nicole_macdonald@golder.com, damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day

Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table ___ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Quote 15-304						
1	DM-32 (20-30)	S		2	Aug 11/15	—								X						
2	DM-37 (30-40)	S		2		—								X						
3	DM-37 (0-15)	S		2		—								X						
4	DM-41 (0-15)	S		2		—								X						
5	DM-47 (0-15) *	S		2		—								X						
6	DM-47 (40-50)	S		2		—								X						
7																				
8																				
9																				
10																				

Comments: * may have broken glass inside (re-jarred)
past hold time for F1 but please analyze anyway

Method of Delivery:

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time:	Date/Time:	Date/Time:
Date/Time: Aug 19/15 12:30	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

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Page 1 of 5

Client Name: Golder Associates Ltd.
Contact Name: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304
PO #
Email Address: nicole_macdonald@golder.com
damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table ___ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	QUOTE 15-304
1	DM-39 (0-15)	S		2	Aug 12/15	—								X
2	DM-39 (40-50)													X
3	DM-40 (0-15)													X
4	DM-42 (0-15)													X
5	DM-42 (40-50)													X
6	DM-43 (0-15)													X
7	DM-43 (20-30)													X
8	DM-44 (0-15)													X
9	DM-45 (0-15)													X
10	DM-46 (0-15)	↓		↓	↓	↓								X

Comments:

Method of Delivery:

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time:	Date/Time:	Date/Time:
Date/Time: Aug 20/15 18:45	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

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Client Name: Golder Associates Ltd	Project Reference: 1530908
Contact Name: Nicole MacDonald	Quote # 15-304
Address: 1931 Robertson Rd, Ottawa	PO #
Telephone: 613 592 9600	Email Address: nicole_macdonald@golder.com damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304
1	DM-11 (0-15)	S		2	Aug11/15	—								X
2	DM-12 (0-15)													X
3	DM-12 (30-40)													X
4	DM-13 (0-15)													X
5	DM-13 (40-50)													X
6	DM-15 (0-15)													X
7	DM-15 (30-40)													X
8	DM-16 (0-15)													X
9	DM-16 (30-40)			3										X
10	DM-18 (0-10)			2										X

Comments:

Method of Delivery:

Relinquished By (Sign): Received	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time:	Date/Time:	Date/Time:
Date/Time: Aug 20/15 18:45	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By:

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Page 3 of 5

Client Name: Golder Associates Ltd
Contact Name: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304
PO #
Email Address: nicole_macdonald@golder.com
damn_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: **S** (Soil/Sed.) **GW** (Ground Water) **SW** (Surface Water) **SS** (Storm/Sanitary Sewer) **P** (Paint) **A** (Air) **O** (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304
1	DM-22 (0-15)	S		2	Aug 11/15	—								X
2	DM-22 (40-50)				Aug 11/15	—								X
3	DM-17 (0-20)				Aug 11/15	—								X
4	DM-17 (20-40)				Aug 11/15	—								X
5	DM-20 (0-15)				Aug 11/15	—								X
6	DM-20 (15-30)				Aug 11/15	—								X
7	DM-06 (0-15)				Aug 13/15	—								X
8	DM-06 (40-50)					—								X
9	DM-04 (0-15)					—								X
10	DM-04 (40-50)					—								X

Comments:

Method of Delivery:

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time:	Date/Time:	Date/Time:
Date/Time: Aug 20/15 18:45	Temperature: _____ °C	Temperature: _____ °C	pH Verified [ ] By: _____

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Client Name: Golder Associates Ltd
Contact Name: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304
PO #
Email Address: nicole_macdonald@golder.com
damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: **S** (Soil/Sed.) **GW** (Ground Water) **SW** (Surface Water) **SS** (Storm/Sanitary Sewer) **P** (Paint) **A** (Air) **O** (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304						
1	DM-46 (40-50)	S		2	Aug 12/15	—								X						
2	DM-48 (0-15)													X						
3	DM-48 (40-50)													X						
4	DM-49 (40-50)													X						
5	MW05-13 (0-15)													X						
6	MW 05-13 (20-30)													X						
7	MW 12-01 (0-15)													X						
8	MW 12-01 (20-30)													X						
9	MW 05-16 (0-15)													X						
10	MW05-16 (40-50) *	↓		↓	↓	↓								X						

Comments: *does not match jars, will check and confirm

Method of Delivery:

Relinquished By (Sign): [signature]
Relinquished By (Print): Nicole MacDonald
Date/Time: Aug 20/15 18:45

Received by Driver/Depot:
Date/Time:
Temperature: _____ °C

Received at Lab:
Date/Time:
Temperature: _____ °C

Verified By:
Date/Time:
pH Verified [ ] By: _____

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Client Name: Golder Associates Ltd.
Contact Name: Nicole MacDonald
Address: 1931 Robertson Rd, Ottawa
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304
PO #
Email Address: nicole_macdonald@golder.com
damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	9007e 15-304						
1	DM-09 (0-15)	S		2	Aug 12/15	—								X						
2	DM-10 (0-15)	S		2		—								X						
3	DM-08 (0-15)	S		2		—								X						
4	DM-07 (0-15)	S		2		—								X						
5	DM-07 (40-50)	S		2		—								X						
6	MW05-15 (0-15)	S		2		—								X						
7	MW05-15 (20-30) *	S		2		—								X						
8	DM-05 (0-15)	S		2	Aug 13/15	—								X						
9																				
10	MW09-28	GW		1	Aug 13/15	—								X	additional	bottle	found			

Comments: * does not match jars, will check and confirm

Method of Delivery:

Relinquished By (Sign): NMacDonald.	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time:	Date/Time:	Date/Time:
Date/Time: Aug 20/15 18:45	Temperature: _____ °C	Temperature: _____ °C	pH Verified [ ] By: _____

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Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Nicole MacDonald

Client PO:
Project: Dew Lines Sites Landfill Monitoring
Custody: 22982/81/80

Report Date: 21-Aug-2015
Order Date: 17-Aug-2015

Order #: 1534066

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1534066-01	MW0505
1534066-02	MW0506

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Mercury by CVAA	EPA 245.1 - Cold Vapour AA	18-Aug-15	19-Aug-15
Metals, ICP-MS	EPA 200.8 - ICP-MS	18-Aug-15	18-Aug-15
PCBs, total	EPA 608 - GC-ECD	18-Aug-15	18-Aug-15
PHC F1	CWS Tier 1 - P&T GC-FID	18-Aug-15	19-Aug-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	18-Aug-15	18-Aug-15

Certificate of Analysis

Report Date: 21-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:17-Aug-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	MW0505	MW0506	-	-
	Sample Date:	09-Aug-15	09-Aug-15	-	-
	Sample ID:	1534066-01	1534066-02	-	-
	MDL/Units	Water	Water	-	-
Metals					
Mercury	0.1 ug/L	<0.1	<0.1	-	-
Arsenic	1 ug/L	<5 [3]	<5 [3]	-	-
Cadmium	0.1 ug/L	<0.5 [3]	<0.5 [3]	-	-
Chromium	1 ug/L	<5 [3]	<5 [3]	-	-
Cobalt	0.5 ug/L	2.6	<2.5 [3]	-	-
Copper	0.5 ug/L	6.1	9.7	-	-
Lead	0.1 ug/L	36.5	<0.5 [3]	-	-
Nickel	1 ug/L	18	9	-	-
Zinc	5 ug/L	4790	15100	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25 [2]	<25 [2]	-	-
F2 PHCs (C10-C16)	100 ug/L	<100 [2]	<100 [2]	-	-
F3 PHCs (C16-C34)	100 ug/L	<100 [2]	<100 [2]	-	-
F4 PHCs (C34-C50)	100 ug/L	<100 [2]	<100 [2]	-	-
PCBs					
PCBs, total	0.05 ug/L	<0.05	<0.10 [1]	-	-
Decachlorobiphenyl	Surrogate	131%	134% [1]	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Mercury	ND	0.1	ug/L						
Arsenic	ND	1	ug/L						
Cadmium	ND	0.1	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Lead	ND	0.1	ug/L						
Nickel	ND	1	ug/L						
Zinc	ND	5	ug/L						
PCBs									
PCBs, total	ND	0.05	ug/L						
Surrogate: Decachlorobiphenyl	*0.281*		*ug/L*		*112*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Metals									
Mercury	ND	0.1	ug/L	ND				20	
Arsenic	ND	1	ug/L	ND			0.0	20	
Cadmium	ND	0.1	ug/L	0.11			0.0	20	
Chromium	2.6	1	ug/L	2.4			10.9	20	
Cobalt	ND	0.5	ug/L	ND			0.0	20	
Copper	0.85	0.5	ug/L	0.92			8.8	20	
Lead	0.40	0.1	ug/L	ND			0.0	20	
Nickel	1.8	1	ug/L	2.0			12.2	20	
Zinc	ND	5	ug/L	ND			0.0	20	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2020	25	ug/L	ND	101	68-117			
F2 PHCs (C10-C16)	1680	100	ug/L	ND	93.3	60-140			
F3 PHCs (C16-C34)	3060	100	ug/L	ND	82.3	60-140			
F4 PHCs (C34-C50)	1660	100	ug/L	ND	66.9	60-140			
Metals									
Mercury	2.92	0.1	ug/L	ND	97.5	78-137			
Arsenic	72.5		ug/L	0.5	144	80-120			QM-07
Cadmium	50.4		ug/L	0.11	101	80-120			
Chromium	50.4		ug/L	2.4	96.1	80-120			
Cobalt	46.6		ug/L	0.17	92.9	80-120			
Copper	47.9		ug/L	0.92	94.0	80-120			
Lead	49.1		ug/L	ND	98.3	80-120			
Nickel	48.2		ug/L	2.0	92.4	80-120			
Zinc	58		ug/L	3	112	80-120			
PCBs									
PCBs, total	1.05	0.05	ug/L	ND	105	60-140			
Surrogate: Decachlorobiphenyl	*0.335*		*ug/L*		*134*	*60-140*			

Qualifier Notes:

Sample Qualifiers :

1 : Elevated Reporting Limits due to limited sample volume.

2 : Holding time had been exceeded upon sample receipt.

3 : Sediment and/or particulates in this liquid sample required digestion for Total metals analysis, which resulted in elevated detection limits.

QC Qualifiers :

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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№ 22982

Page 1 of 3

Client: Golder Associates Ltd.
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, Ontario K2H 5B7
Telephone: 613-592-9600

Project: Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Fax: Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: [ ] Other:

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: Water-1534066 Soil-1534068

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: PHC-F1	Routine 15 Ion Inorganics + Metals	PHC F2-F4	RCB								
1	MW05-05	Gwater	-	6	Aug 9/15	3:30	✓	✓	✓	✓								
2	MW05-06	Gwater	-	6	Aug 9/15	2:45	✓	✓	✓	✓								
3	~~LNHWL~~ MW09-28 (0-15)	Soil	-	2	Aug 9/15	10:10	✓	✓	✓	✓					-60mL + 250 mL			
4	DM MW09-28 (40-50)	"	-	2	"	10:10	✓	✓	✓	✓								
5	DM MW05-09 (0-15)	"	-	2	"	11:15	✓	✓	✓	✓								
6	DM MW05-09 (40-50)	"	-	2	"	11:10	✓	✓	✓	✓								
7	DM MW05-12 (0-15)	"	-	2	"	11:40	✓	✓	✓	✓								
8	DM MW05-12 (40-50)	"	-	2	"	11:40	✓	✓	✓	✓								
9	DM MW09-26 (0-20)	"	-	2	"	12:20	✓	✓	✓	✓								
10	DM MW09-27 (0-15)	"	-	2	"	12:45	✓	✓	✓	✓								

Comments: LNHWL landfill
may be past holding times but please analyze anyway

Method of Delivery: walk-in

Relinquished By (Sign):	Received by Driver/Depot: Nicole MacDonald	Received at Lab: SURREPORT DORMAI	Verified By: O. Chelebos
Relinquished By (Print):	Date/Time: Aug 14/15	Date/Time: Aug 17/15 05:25	Date/Time: Aug 17/15 5:25
Date/Time:	Temperature: 7.8 °C	Temperature: 14.4°C	pH Verified [ ] By:

Chain of Custody (Blank) - Rev 0.3 Oct. 2014

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Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Nicole MacDonald

Client PO:
Project: Dew Lines Sites Landfill Monitoring
Custody: 22982/81/80

Report Date: 21-Aug-2015
Order Date: 17-Aug-2015

Order #: 1534068

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1534068-01	MW09-28 (0-15)
1534068-02	DM MW09-28 (40-50)
1534068-03	DM MW05-09 (0-15)
1534068-04	DM MW05-09 (40-50)
1534068-05	DM MW05-12 (0-15)
1534068-06	DM MW05-12 (40-50)
1534068-07	DM MW09-26 (0-20)
1534068-08	DM MW09-27 (0-15)
1534068-09	DM MW09-27 (30-40)
1534068-10	MW05-08 (0-15)
1534068-11	DM MW05-08 (40-50)
1534068-12	DM MW05-07 (0-15)
1534068-13	DM MW05-07 (15-30)
1534068-14	DM MW05-06 (0-15)
1534068-15	DM MW05-06 (40-50)
1534068-16	DM MW05-05 (0-15)
1534068-17	DM MW05-05 (4-50)
1534068-18	DM-01 (0-15)
1534068-19	DM-01 (40-50)
1534068-20	DM-02 (0-15)
1534068-21	DM-02 (15-30)
1534068-22	DM-03 (0-15)
1534068-23	DM-03 (40-50)

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Report Date: 21-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:17-Aug-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME-SQG: Metals by ICP-OES	based on MOE E3470, ICP-OES	21-Aug-15	21-Aug-15
Mercury by CVAA	EPA 7471B - CVAA, digestion	21-Aug-15	21-Aug-15
PCBs, total	SW846 8082A - GC-ECD	18-Aug-15	20-Aug-15
PHC F1	CWS Tier 1 - P&T GC-FID	18-Aug-15	21-Aug-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	19-Aug-15	20-Aug-15
Solids, %	Gravimetric, calculation	20-Aug-15	20-Aug-15

Certificate of Analysis

Report Date: 21-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:17-Aug-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	MW09-28 (0-15)	DM MW09-28 (40-50)	DM MW05-09 (0-15)	DM MW05-09 (40-50)
	Sample Date:	09-Aug-15	09-Aug-15	09-Aug-15	09-Aug-15
	Sample ID:	1534068-01	1534068-02	1534068-03	1534068-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.4	90.5	84.5	90.7
Metals					
Arsenic	1.0 ug/g dry	1.9	<1.0	1.4	1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	76.0	69.4	62.1	58.7
Cobalt	1.0 ug/g dry	10.9	9.5	7.6	8.7
Copper	1.0 ug/g dry	36.9	33.6	38.3	31.0
Lead	1.0 ug/g dry	14.7	11.8	12.5	23.7
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	38.6	32.8	34.4	32.0
Zinc	1.0 ug/g dry	54.4	48.3	48.9	52.3
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	52	42
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	0.09
Decachlorobiphenyl	Surrogate	106%	114%	110%	113%

Certificate of Analysis

Report Date: 21-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:17-Aug-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	DM MW05-12 (0-15)	DM MW05-12 (40-50)	DM MW09-26 (0-20)	DM MW09-27 (0-15)
	Sample Date:	09-Aug-15	09-Aug-15	09-Aug-15	09-Aug-15
	Sample ID:	1534068-05	1534068-06	1534068-07	1534068-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.1	89.5	88.5	89.9
Metals					
Arsenic	1.0 ug/g dry	1.0	1.2	1.4	2.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	77.2	75.0	67.2	65.6
Cobalt	1.0 ug/g dry	11.2	10.8	9.8	9.3
Copper	1.0 ug/g dry	31.3	30.8	24.8	28.9
Lead	1.0 ug/g dry	6.8	8.0	4.9	7.5
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	40.1	39.6	34.8	34.3
Zinc	1.0 ug/g dry	50.6	51.3	40.7	43.2
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	114%	111%	120%	116%

Certificate of Analysis

Report Date: 21-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:17-Aug-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	DM MW09-27 (30-40)	MW05-08 (0-15)	DM MW05-08 (40-50)	DM MW05-07 (0-15)
	Sample Date:	09-Aug-15	09-Aug-15	09-Aug-15	09-Aug-15
	Sample ID:	1534068-09	1534068-10	1534068-11	1534068-12
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	88.3	85.9	89.5	85.8
Metals					
Arsenic	1.0 ug/g dry	1.4	1.8	<1.0	2.3
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	63.6	68.2	57.3	64.0
Cobalt	1.0 ug/g dry	9.1	9.3	8.6	9.2
Copper	1.0 ug/g dry	27.1	32.9	25.3	29.8
Lead	1.0 ug/g dry	6.1	17.0	8.7	14.8
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	32.9	34.5	30.7	33.1
Zinc	1.0 ug/g dry	40.4	53.9	39.1	48.8
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	30	109	59	101
F4 PHCs (C34-C50)	6 ug/g dry	<6	15	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	0.24	<0.05	0.10
Decachlorobiphenyl	Surrogate	116%	117%	98.7%	115%

Certificate of Analysis

Report Date: 21-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:17-Aug-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	DM MW05-07 (15-30)	DM MW05-06 (0-15)	DM MW05-06 (40-50)	DM MW05-05 (0-15)
	Sample Date:	09-Aug-15	09-Aug-15	09-Aug-15	09-Aug-15
	Sample ID:	1534068-13	1534068-14	1534068-15	1534068-16
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.6	86.7	86.6	88.3
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	34.8	38.5	38.9	69.0
Cobalt	1.0 ug/g dry	5.1	5.7	6.0	9.4
Copper	1.0 ug/g dry	12.9	15.4	15.5	31.2
Lead	1.0 ug/g dry	4.3	3.0	3.0	27.9
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	18.6	20.4	21.7	34.2
Zinc	1.0 ug/g dry	22.6	23.4	24.2	53.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	0.09
Decachlorobiphenyl	Surrogate	117%	119%	120%	116%

Certificate of Analysis

Report Date: 21-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:17-Aug-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	DM MW05-05 (4-50)	DM-01 (0-15)	DM-01 (40-50)	DM-02 (0-15)
	Sample Date:	09-Aug-15	09-Aug-15	09-Aug-15	09-Aug-15
	Sample ID:	1534068-17	1534068-18	1534068-19	1534068-20
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	83.1	89.0	87.9	85.1
Metals					
Arsenic	1.0 ug/g dry	1.2	1.2	1.3	1.4
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	62.0	53.7	51.1	67.5
Cobalt	1.0 ug/g dry	8.4	8.2	7.9	9.9
Copper	1.0 ug/g dry	27.2	24.2	20.9	31.7
Lead	1.0 ug/g dry	14.4	5.1	4.2	8.1
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	31.1	30.1	29.5	35.8
Zinc	1.0 ug/g dry	43.4	32.2	28.9	43.8
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	43	65	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	63	10	<8	35
F4 PHCs (C34-C50)	6 ug/g dry	10	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	0.11	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	101%	103%	113%	124%

Certificate of Analysis

Report Date: 21-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:17-Aug-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	DM-02 (15-30)	DM-03 (0-15)	DM-03 (40-50)	-
	Sample Date:	09-Aug-15	09-Aug-15	09-Aug-15	-
	Sample ID:	1534068-21	1534068-22	1534068-23	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	87.2	84.3	88.6	-
Metals					
Arsenic	1.0 ug/g dry	1.3	1.2	1.3	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Chromium	1.0 ug/g dry	64.7	47.8	51.1	-
Cobalt	1.0 ug/g dry	9.1	7.7	8.1	-
Copper	1.0 ug/g dry	31.3	26.6	29.0	-
Lead	1.0 ug/g dry	6.1	3.1	3.9	-
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	-
Nickel	1.0 ug/g dry	34.1	27.7	28.9	-
Zinc	1.0 ug/g dry	40.0	29.4	32.0	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	39	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	57	41	28	-
F4 PHCs (C34-C50)	6 ug/g dry	10	8	6	-
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Decachlorobiphenyl	Surrogate	124%	122%	117%	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Arsenic	ND	1.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	1.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	1.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Nickel	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.126*		*ug/g*		*126*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	65600	80	ug/g dry	70000			6.4	30	
F3 PHCs (C16-C34)	35100	160	ug/g dry	37200			5.7	30	
F4 PHCs (C34-C50)	ND	120	ug/g dry	ND				30	
Metals									
Arsenic	1.69	1.0	ug/g dry	1.90			12.0	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	74.6	1.0	ug/g dry	76.0			1.9	30	
Cobalt	11.3	1.0	ug/g dry	10.9			3.6	30	
Copper	37.5	1.0	ug/g dry	36.9			1.6	30	
Lead	14.0	1.0	ug/g dry	14.7			5.1	30	
Mercury	ND	0.1	ug/g dry	ND			0.0	35	
Nickel	39.6	1.0	ug/g dry	38.6			2.5	30	
Zinc	54.2	1.0	ug/g dry	54.4			0.3	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				40	
Surrogate: Decachlorobiphenyl	*0.118*		*ug/g dry*	*ND*	*105*	*60-140*			
Physical Characteristics									
% Solids	84.5	0.1	% by Wt.	84.8			0.3	25	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	201	7	ug/g	ND	101	80-120			
F2 PHCs (C10-C16)	98	4	ug/g	ND	98.7	60-140			
F3 PHCs (C16-C34)	287	8	ug/g	ND	139	60-140			
F4 PHCs (C34-C50)	161	6	ug/g	ND	117	60-140			
Metals									
Arsenic	283		ug/L	38.0	97.9	70-130			
Cadmium	228		ug/L	1.02	90.7	70-130			
Chromium	1740		ug/L	1520	89.3	70-130			
Cobalt	437		ug/L	217	88.0	70-130			
Copper	955		ug/L	739	86.6	70-130			
Lead	504		ug/L	295	83.7	70-130			
Mercury	1.64	0.1	ug/g	ND	109	72-128			
Nickel	978		ug/L	772	82.5	70-130			
Zinc	1290		ug/L	1090	80.9	70-130			
PCBs									
PCBs, total	0.578	0.05	ug/g	ND	129	60-140			
Surrogate: Decachlorobiphenyl	*0.117*		*ug/g*		*105*	*60-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Chain of Custody
(Lab Use Only)
№ 22982

Page 1 of 3

Client: Golder Associates Ltd.
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, Ontario K2H 5B7
Telephone: 613-592-9600

Project: Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number:
Water - 1534066
Soil - 1534068

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: PHC-F1	Quote 15-304 Inorganics Metals	PHC F2-F4	PCB							
1	MW05-05	Gwater	-	6	Aug 9/15	3:30	✓	✓	✓	✓							
2	MW05-06	Gwater	-	6	Aug 9/15	2:45	✓	✓	✓	✓							
3	~~LNHWL~~ MW09-28 (0-15)	Soil	-	2	Aug 9/15	10:10	✓	✓	✓	✓		60mL + 250mL					
4	DM MW09-28 (40-50)	"	-	2	"	10:10	✓	✓	✓	✓							
5	DM MW05-09 (0-15)	"	-	2	"	11:15	✓	✓	✓	✓							
6	DM MW05-09 (40-50)	"	-	2	"	11:10	✓	✓	✓	✓							
7	DM MW05-12 (0-15)	"	-	2	"	11:40	✓	✓	✓	✓							
8	DM MW05-12 (40-50)	"	-	2	"	11:40	✓	✓	✓	✓							
9	DM MW09-26 (0-20)	"	-	2	"	12:20	✓	✓	✓	✓							
10	DM MW09-27 (0-15)	"	-	2	"	12:45	✓	✓	✓	✓							

Comments: LNHWL landfill
may be past holding times but please analyze anyway

Method of Delivery: Walk-in

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
D. Plenderleith	Nicole MacDonald	SUNREPORT DORMAN	O. Chaleboo
Relinquished By (Print): D. Plenderleith	Date/Time: Aug 14/15	Date/Time: AUG 17 2015 05:25	Date/Time: AUG 17/15 5:43
Date/Time: Aug 10 2015	Temperature: 7.8 °C	Temperature: 14.9 °C	pH Verified [ ] By:

Kevin Call
Aug 17/15 3:57

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Page 2 of 3

Client Na
Contact N: Golder Associates Ltd.
Nicole MacDonald
Address: 1931 Robertson Road
Ottawa, Ontario K2H 5B7
Telephon: 613-592-9600

Pro
Qu
PO
Em: Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1534008

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHC F1	quote 15-304 Metals + inorganics	PHC F2-F4	PCB							
1	DM MW09-27 (30-40)	Soil	-	2	Aug 9/15	12:45	✓	✓	✓	✓							- 60mL + 250mL -
2	~~Powerhouse~~ MW05-08 (0-15)	"	-	2	"	1:40	✓	✓	✓	✓							
3	DM MW 05-08 (40-50)	"	-	2	"	1:45	✓	✓	✓	✓							
4	DM MW 05-07 (0-15)	"	-	2	"	12:20	✓	✓	✓	✓							
5	DM MW 05-07 (15-30)	"	-	2	"	2:20	✓	✓	✓	✓							
6	DM MW05-06 (0-15)	"	-	2	"	2:45	✓	✓	✓	✓							
7	DM MW05-06 (40-50)	"	-	2	"	2:45	✓	✓	✓	✓							
8	DM MW05-05 (0-15)	"	-	2	"	—	✓	✓	✓	✓							
9	DM MW05-05 (40-50)	"	-	2	"	—	✓	✓	✓	✓							
10					"												

Comments: Powerhouse landfill. MW09-27(30-40) labelled as (40-50) on COC, kept as (30-40), MW 05-05 (0-15) kept both as (40-50) as per COC or labelled walk-in may be past holding times but please analyze anyway

Method of Delivery:

Relinquished By (Sign):	Received by Driver/Depot: Nicole MacDonald	Received at Lab: SUNDEPORII DOUMAI	Verified By: D. Choiceboos
Relinquished By (Print): D. Plenderleith	Date/Time: Aug 14/15	Date/Time: AUG 17, 2015 05:30	Date/Time: Aug 17/15 5:43
Date/Time: Aug 10 2015	Temperature: 7.8 °C	Temperature: 4.9 °C	pH Verified [ ] By: NA

Karen Gill
Aug 17/15 3:57

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Page 3 of 3

Golder Associates Ltd.
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1534068

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: PHC F1	Quote 15-304 Metals	PHC F2-F4	PCB							
1	~~Lower X-Roads~~ DM-01 (0-15)	soil	—	2	Aug 9/15	—	✓	✓	✓	✓							
2	DM-01 (40-50)	"	—	2	"	—	✓	✓	✓	✓							
3	DM-02 (0-15)	"	—	2	"	—	✓	✓	✓	✓							
4	DM-02 (15-30)	"	—	2	"	—	✓	✓	✓	✓							
5	DM-03 (0-15)	"	—	2	"	—	✓	✓	✓	✓							
6	DM-03 (40-50)	"	—	2	"	—	✓	✓	✓	✓							
7																	
8																	
9																	
10																	

Required Analyses: ~60 mL + 250 mL

Comments: Lower X-Roads
may be past holding times but please analyze anyway

Method of Delivery: Walk-in

Relinquished By (Sign): D Plenderleith	Received by Driver/Depot: Nicole MacDonald	Received at Lab: SUNEEPORN DOMMA	Verified By: D. Charlebois
Relinquished By (Print): D Plenderleith	Date/Time: Aug 14/15	Date/Time: AUG 17, 2015 05:25	Date/Time: AUG 17/15 5:43
Date/Time: Aug 14 2015	Temperature: 7.8 °C	Temperature: 14.9 °C	pH Verified [ ] By:

Kaun Cull
Aug 17/15. 3:57

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Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Nicole MacDonald

Client PO:
Project: 1530908
Custody: 102393/94,22983/84

Report Date: 25-Aug-2015
Order Date: 18-Aug-2015

Order #: 1534169

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1534169-01	DM-50 (0-15)
1534169-02	DM-50 (30-40)
1534169-03	DM-51 (0-15)
1534169-04	DM-53 (0-15)
1534169-05	DM-53 (40-50)
1534169-06	DM-56 (0-15)
1534169-07	DM-54 (0-15)
1534169-08	DM-57 (0-15)
1534169-09	DM-57 (40-50)
1534169-10	DM-58 (0-15)
1534169-11	DM-58 (40-50)
1534169-12	DM-59 (0-15)
1534169-13	DM-62 (0-15)
1534169-14	DM-14 (0-20)
1534169-15	DM-14 (20-40)
1534169-16	DM-62 (20-30)
1534169-17	DM-61 (0-15)
1534169-18	DM-61 (20-30)
1534169-19	DM-60 (0-15)
1534169-20	DM-60 (40-50)
1534169-21	DM-30 (0-15)
1534169-22	DM-30 (20-30)
1534169-23	DM-28 (0-15)
1534169-24	DM-28 (40-50)
1534169-25	DM-23 (0-20)
1534169-26	DM-29 (0-20)
1534169-27	DM-29 (20-40)
1534169-28	MW 06-19 (0-20)
1534169-29	MW 06-20 (0-20)
1534169-30	MW 07-21 (0-15)

Approved By:

Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

1534169-31	MW 07-21 (30-40)
1534169-32	MW 07-22 (0-15)
1534169-33	MW 07-22 (15-30)
1534169-34	MW 07-23 (0-25)
1534169-35	MW 08-24 (0-15)
1534169-36	MW 08-25 (0-15)

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME-SQG: Metals by ICP-OES	based on MOE E3470, ICP-OES	24-Aug-15	24-Aug-15
Mercury by CVAA	EPA 7471B - CVAA, digestion	24-Aug-15	24-Aug-15
PCBs, total	SW846 8082A - GC-ECD	20-Aug-15	22-Aug-15
PHC F1	CWS Tier 1 - P&T GC-FID	20-Aug-15	21-Aug-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	21-Aug-15	22-Aug-15
Solids, %	Gravimetric, calculation	20-Aug-15	20-Aug-15

Certificate of Analysis

Client: **Golder Associates Ltd. (Ottawa)**

Client PO:

Report Date: 25-Aug-2015
Order Date:18-Aug-2015
Project Description: 1530908

	Client ID:	DM-50 (0-15)	DM-50 (30-40)	DM-51 (0-15)	DM-53 (0-15)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534169-01	1534169-02	1534169-03	1534169-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	91.1	90.3	89.8	90.1
Metals					
Arsenic	1.0 ug/g dry	2.6	4.2	1.9	1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	154	186	104	79.8
Cobalt	1.0 ug/g dry	11.5	13.2	11.9	10.0
Copper	1.0 ug/g dry	89.9	118	48.3	32.0
Lead	1.0 ug/g dry	12.2	13.8	25.6	11.0
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	51.5	55.6	60.6	44.3
Zinc	1.0 ug/g dry	82.3	92.9	107	68.2
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	99.3%	102%	102%	106%

Certificate of Analysis

Client: **Golder Associates Ltd. (Ottawa)**

Client PO:

Report Date: 25-Aug-2015
Order Date:18-Aug-2015
Project Description: 1530908

	Client ID:	DM-53 (40-50)	DM-56 (0-15)	DM-54 (0-15)	DM-57 (0-15)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534169-05	1534169-06	1534169-07	1534169-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.8	92.5	92.0	89.9
Metals					
Arsenic	1.0 ug/g dry	1.7	1.7	2.6	1.4
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	155	67.8	54.4	62.6
Cobalt	1.0 ug/g dry	14.2	17.5	13.8	14.7
Copper	1.0 ug/g dry	65.6	41.8	36.5	32.9
Lead	1.0 ug/g dry	17.8	14.2	32.9	9.7
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	63.8	102	63.4	81.9
Zinc	1.0 ug/g dry	113	55.9	65.2	62.0
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	13	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	82	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	99.8%	107%	103%	93.3%

Certificate of Analysis

Report Date: 25-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:18-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-57 (40-50)	DM-58 (0-15)	DM-58 (40-50)	DM-59 (0-15)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534169-09	1534169-10	1534169-11	1534169-12
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	91.7	91.3	93.9	89.6
Metals					
Arsenic	1.0 ug/g dry	1.7	1.9	2.1	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	66.9	63.1	71.3	33.1
Cobalt	1.0 ug/g dry	15.4	18.6	18.3	25.4
Copper	1.0 ug/g dry	34.6	37.7	37.7	71.5
Lead	1.0 ug/g dry	10.2	12.8	13.7	3.8
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	86.3	108	94.2	119
Zinc	1.0 ug/g dry	64.3	85.5	98.5	33.4
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	96.9%	113%	91.2%	106%

Certificate of Analysis

Client: **Golder Associates Ltd. (Ottawa)**

Client PO:

Report Date: 25-Aug-2015
Order Date:18-Aug-2015
Project Description: 1530908

	Client ID:	DM-62 (0-15)	DM-14 (0-20)	DM-14 (20-40)	DM-62 (20-30)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534169-13	1534169-14	1534169-15	1534169-16
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	90.8	96.1	95.6	90.7
Metals					
Arsenic	1.0 ug/g dry	1.4	2.2	1.5	1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	53.7	39.6	30.5	57.8
Cobalt	1.0 ug/g dry	18.2	12.3	12.0	18.6
Copper	1.0 ug/g dry	49.7	41.5	43.4	57.1
Lead	1.0 ug/g dry	11.8	9.1	8.0	13.0
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	99.2	61.0	56.6	98.6
Zinc	1.0 ug/g dry	60.6	71.9	65.7	65.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	103%	110%	70.5%	104%

Certificate of Analysis

Report Date: 25-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:18-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-61 (0-15)	DM-61 (20-30)	DM-60 (0-15)	DM-60 (40-50)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534169-17	1534169-18	1534169-19	1534169-20
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	91.4	91.5	90.6	95.5
Metals					
Arsenic	1.0 ug/g dry	1.7	1.5	1.3	1.2
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	50.2	44.2	51.5	52.5
Cobalt	1.0 ug/g dry	14.2	21.5	18.3	16.9
Copper	1.0 ug/g dry	30.7	54.4	27.1	25.3
Lead	1.0 ug/g dry	12.9	10.1	9.1	7.0
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	54.8	91.5	87.5	101
Zinc	1.0 ug/g dry	57.7	54.2	61.0	48.5
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	113%	79.6%	112%	108%

Certificate of Analysis

Report Date: 25-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:18-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-30 (0-15)	DM-30 (20-30)	DM-28 (0-15)	DM-28 (40-50)
	Sample Date:	10-Aug-15	10-Aug-15	10-Aug-15	10-Aug-15
	Sample ID:	1534169-21	1534169-22	1534169-23	1534169-24
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	88.2	88.8	92.2	89.3
Metals					
Arsenic	1.0 ug/g dry	1.8	1.5	1.7	1.6
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	30.6	32.1	80.7	39.9
Cobalt	1.0 ug/g dry	10.5	10.1	12.9	11.0
Copper	1.0 ug/g dry	23.2	20.0	28.8	25.6
Lead	1.0 ug/g dry	7.7	7.4	8.9	7.7
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	44.9	40.3	55.5	30.6
Zinc	1.0 ug/g dry	52.0	51.0	77.0	70.0
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	109%	98.5%	110%	95.6%

Certificate of Analysis

Client: **Golder Associates Ltd. (Ottawa)**

Client PO:

Report Date: 25-Aug-2015
Order Date:18-Aug-2015
Project Description: 1530908

	Client ID:	DM-23 (0-20)	DM-29 (0-20)	DM-29 (20-40)	MW 06-19 (0-20)
	Sample Date:	10-Aug-15	10-Aug-15	10-Aug-15	10-Aug-15
	Sample ID:	1534169-25	1534169-26	1534169-27	1534169-28
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	92.5	94.5	95.7	89.6
Metals					
Arsenic	1.0 ug/g dry	1.1	1.3	1.4	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	35.5	34.1	29.4	36.2
Cobalt	1.0 ug/g dry	9.9	11.0	11.1	13.4
Copper	1.0 ug/g dry	17.1	26.8	22.9	18.9
Lead	1.0 ug/g dry	9.9	7.9	7.5	7.6
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	52.1	62.5	65.3	82.8
Zinc	1.0 ug/g dry	42.4	42.4	37.2	37.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	109%	115%	110%	117%

Certificate of Analysis

Report Date: 25-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:18-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	MW 06-20 (0-20)	MW 07-21 (0-15)	MW 07-21 (30-40)	MW 07-22 (0-15)
	Sample Date:	10-Aug-15	10-Aug-15	10-Aug-15	10-Aug-15
	Sample ID:	1534169-29	1534169-30	1534169-31	1534169-32
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	91.9	89.9	90.5	87.8
Metals					
Arsenic	1.0 ug/g dry	1.2	1.1	<1.0	3.5
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	28.1	31.1	23.6	112
Cobalt	1.0 ug/g dry	11.9	14.0	11.0	14.4
Copper	1.0 ug/g dry	23.3	25.8	18.6	71.6
Lead	1.0 ug/g dry	5.7	7.3	5.7	10.6
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	67.2	76.0	63.1	57.8
Zinc	1.0 ug/g dry	34.6	42.8	30.0	98.3
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	109%	123%	120%	121%

Certificate of Analysis

Report Date: 25-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:18-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	MW 07-22 (15-30)	MW 07-23 (0-25)	MW 08-24 (0-15)	MW 08-25 (0-15)
	Sample Date:	10-Aug-15	10-Aug-15	10-Aug-15	10-Aug-15
	Sample ID:	1534169-33	1534169-34	1534169-35	1534169-36
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	91.1	93.0	91.4	89.0
Metals					
Arsenic	1.0 ug/g dry	3.9	3.3	1.2	2.9
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	142	49.1	72.8	176
Cobalt	1.0 ug/g dry	15.9	15.9	13.0	22.0
Copper	1.0 ug/g dry	59.2	71.9	28.0	65.2
Lead	1.0 ug/g dry	18.4	7.4	13.6	41.3
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	76.0	86.0	51.0	82.7
Zinc	1.0 ug/g dry	89.6	37.8	52.1	133
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	120%	125%	122%	121%

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Arsenic	ND	1.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	1.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	1.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Nickel	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.0957*		*ug/g*		*95.7*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Metals									
Arsenic	3.71	1.0	ug/g dry	2.79			28.4	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	26.7	1.0	ug/g dry	27.4			2.6	30	
Cobalt	8.45	1.0	ug/g dry	8.64			2.2	30	
Copper	19.0	1.0	ug/g dry	19.8			4.3	30	
Lead	11.2	1.0	ug/g dry	12.7			12.2	30	
Mercury	ND	0.1	ug/g dry	ND				35	
Nickel	17.9	1.0	ug/g dry	18.6			3.6	30	
Zinc	35.8	1.0	ug/g dry	36.8			2.8	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				40	
Surrogate: Decachlorobiphenyl	*0.104*		*ug/g dry*	*ND*	*95.2*	*60-140*			
Physical Characteristics									
% Solids	84.5	0.1	% by Wt.	84.8			0.3	25	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	188	7	ug/g	ND	94.1	80-120			
F2 PHCs (C10-C16)	107	4	ug/g	ND	109	60-140			
F3 PHCs (C16-C34)	219	8	ug/g	ND	108	60-140			
F4 PHCs (C34-C50)	164	6	ug/g	ND	121	60-140			
Metals									
Arsenic	328		ug/L	55.8	109	70-130			
Cadmium	234		ug/L	1.85	92.8	70-130			
Chromium	744		ug/L	549	78.2	70-130			
Cobalt	382		ug/L	173	83.8	70-130			
Copper	602		ug/L	396	82.6	70-130			
Lead	452		ug/L	254	79.3	70-130			
Mercury	1.22	0.1	ug/g	ND	81.6	72-128			
Nickel	566		ug/L	372	77.6	70-130			
Zinc	899		ug/L	735	65.5	70-130			QM-07
PCBs									
PCBs, total	0.509	0.05	ug/g	ND	116	60-140			
Surrogate: Decachlorobiphenyl	*0.108*		*ug/g*		*98.8*	*60-140*			

Qualifier Notes:

QC Qualifiers :

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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№ 102393

Page 1 of 4

Client Name: Golder Associates Ltd.	Project Reference: 1530908	TAT: [✓] Regular [ ] 3 Day	
Contact Name: Nicole MacDonald	Quote # 15-304 Golder DEW Line	[ ] 2 Day [ ] 1 Day	
Address: 1931 Robertson Road, Ottawa, ON K2H 5B7	PO #	Date Required:	
Telephone: 613 592 9600	Email Address: nicole_macdonald@golder.com damin_johnson@golder.com		

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1534169

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Required Analyses: Quote 15-304	
1	DM-50 (0-15)	S		2	Aug 11/15	-								X	~60ml+250 ml~
2	DM-50 (30-40) *	S		2		14:45								X	
3	DM-51 (0-15)	S		2		-								X	
4	DM-53 (0-15)	S		2		-								X	
5	DM-53 (40-50)	S		2		-								X	
6	DM-56 (0-15) *	S		2		-								X	
7	DM-54 (0-15)	S		2		-								X	
8	DM-57 (0-15)	S		2		13:50								X	
9	DM-57 (40-50)	S		2		13:50								X	
10	DM-58 (0-15) *	S		2		-								X	

Comments: * may have broken glass

Method of Delivery: Walk-in

Relinquished By (Sign): D. Plenderleith	Received by Driver/Depot: Nicole MacDonald	Received at Lab: O. Chalebois	Verified By: O. Chalebois
Relinquished By (Print): Don Plenderleith	Date/Time: Aug 17/15	Date/Time: Aug 19/15 11:10	Date/Time: Aug 19/15 12:12
Date/Time: Aug 18/15	Temperature: 15.3 °C	Temperature: 5.2 °C	pH Verified [ ] By: NA

Kaun Gill
Aug 18/15 4:29

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Client Name: Golder Associates Ltd.	Project Reference: 1530908	TAT: [✓] Regular [ ] 3 Day	
Contact Name: Nicole MacDonald	Quote # 15-304 Golder DEW Line	[ ] 2 Day [ ] 1 Day	
Address: 1931 Robertson Road, Ottawa, ON K2H 5B7	PO #	Date Required:	
Telephone: 613 592 9600	Email Address: nicole_macdonald@golder.com damin_johnson@golder.com		

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1534169

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Quote 15-304					
1	DM-58 (40-50)	S		2	Aug 11/15	—								X	60ml + 250ml				
2	DM-59 (0-15)	S		2		—								X					
3	DM-62 (0-15)	S		2		—								X					
4	DM-14 (0-20)	S		2		10:10								X					
5	DM-14 (20-40)	S		2		10:10								X					
6	DM-62 (20-30)	S		2		—								X					
7	DM-61 (0-15) *	S		2		—								X					
8	DM-61 (20-30) *	S		2		—								X	120ml + 250ml				
9	DM-60 (0-15)	S		2		—								X	60ml + 250ml				
10	DM-60 (40-50)	S		2		—								X					

Comments: *may have broken glass

Method of Delivery: Walk-in

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
D. Plenderleith	Nicole MacDonald	D. Chaebos	D. Chaebos
Relinquished By (Print): Don Plenderleith	Date/Time: Aug 17/15	Date/Time: Aug 19/15 11:10	Date/Time: Aug 19/15 12:12
Date/Time: Aug 18/15	Temperature: 13.3°C	Temperature: 5.2°C	pH Verified [✓] By: NP

Karen Gill
Aug 18/15 4:29

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Page 3 of 4

Client: Golder Associates Ltd.
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, Ontario K2H 5B7
Telephone: 613-592-9600

Project: Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
PO: Email address: Nicole_macdonald@golder.com
Email: Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: [ ] Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number:
Water - 1534176
Soil - 1534169

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: F1	Inorganics/Metals (aqueous)	F2-F4	PCBs	
1	MW06-19	GW		6	Aug 10	9:55	✓	✓	✓	✓	
2	MW07-22	GW		5	Aug 10	11:40	✓	✓	✓	✓	low volume, try to analyze all
3	MW08-25 *	GW		4	Aug 10	13:30	✓	✓	✓	✓	low volume, try to analyze all
4	MW08-24	GW		5	Aug 10	13:00	✓	✓	✓	✓	low volume, try to analyze all
5	DM-30 (0-15)	S		2	Aug 10	16:00	✓	✓	✓	✓	-60mL +250mL
6	DM-30 (20-30)	S		2	"	16:00	✓	✓	✓	✓	
7	DM-28 (0-15)	S		2	"	—	✓	✓	✓	✓	
8	DM-28 (40-50) *	S		2	"	16:25	✓	✓	✓	✓	
9	DM-23 (0-20) *	S		2	"	16:00	✓	✓	✓	✓	
10	DM-29 (0-20)	S		2	"	16:30	✓	✓	✓	✓	

Comments:
* Repackaged because of broken glass
For low sample volume, prioritize: F1, inorganic/metals, F2-F4, PCBs. // may exceed holding time but please analyze anyway

Method of Delivery: Walk-in

Relinquished By (Sign): Don Plenderleith
Relinquished By (Print): Don Plenderleith
Date/Time: Aug 10/15

Received by Driver/Depot: Nicole MacDonald
Date/Time: Aug 17/15
Temperature: 13.3 °C

Received at Lab: D. Charlebois
Date/Time: Aug 19/15 11:10
Temperature: 5.2 °C

Verified By: D. Charlebois
Date/Time: Aug 19/15 12:12
pH Verified [✓] By: AM

Karen Ault
Aug 18/15 4:29

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Page 4 of 4

Client N:

Contact / Address / Telepho: **Golder Associates Ltd.**
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Projec:
Quote:
PO #:
Email:

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1534167

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: PHC F1	Inorgans (metals equote)	PHC F2-F4	PCB							
1	DM-29 (20-40)	S		2	Aug 10	16:20	✓	✓	✓	✓				-60mL+250mL-			
2	MW 06-19 (0-20)	S		2	"	10:45	✓	✓	✓	✓							
3	MW 06-20 (0-20)	S		2	"	10:25	✓	✓	✓	✓							
4	MW 07-21 (0-15)	S		2	"	—	✓	✓	✓	✓							
5	MW 07-21 (30-40)	S		2	"	9:50	✓	✓	✓	✓							
6	MW 07-22 (0-15)	S		2	"	12:00	✓	✓	✓	✓							
7	MW 07-22 (15-30)	S		2	"	12:00	✓	✓	✓	✓							
8	MW 07-23 (0-25)	S		2	"	12:30	✓	✓	✓	✓							
9	MW 08-24 (0-15)	S		2	"	13:05	✓	✓	✓	✓							
10	MW 08-25 (0-15)	S		2	"	13:30	✓	✓	✓	✓				✓			

Comments: may exceed holding time but please analyze anyway.

Method of Delivery: Walk-in

Relinquished By (Sign): Don Plenderleith	Received by Driver/Depot: Nicole Mawdsley. MacDonald	Received at Lab: D Charlebois	Verified By: D Charlebois
Relinquished By (Print): D. Plenderleith	Date/Time: Aug 17/15	Date/Time: Aug 19/15 11:10	Date/Time: Aug 19/15 12:12
Date/Time: Aug 10, 2015	Temperature: 13.3 °C	Temperature: 5.2 °C	pH Verified [ ] By:

Karen Gill
Aug 18/15 4:29

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Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Nicole MacDonald

Client PO:
Project: 1530908
Custody: 22983

Report Date: 25-Aug-2015
Order Date: 18-Aug-2015

Order #: 1534176

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1534176-01	MW06-19
1534176-02	MW07-22
1534176-03	MW08-25
1534176-04	MW08-24

Approved By:

Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Mercury by CVAA	EPA 245.1 - Cold Vapour AA	24-Aug-15	24-Aug-15
Metals, ICP-MS	EPA 200.8 - ICP-MS	19-Aug-15	19-Aug-15
PCBs, total	EPA 608 - GC-ECD	24-Aug-15	24-Aug-15
PHC F1	CWS Tier 1 - P&T GC-FID	20-Aug-15	20-Aug-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	20-Aug-15	20-Aug-15

Certificate of Analysis

Report Date: 25-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:18-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	MW06-19	MW07-22	MW08-25	MW08-24
	Sample Date:	10-Aug-15	10-Aug-15	10-Aug-15	10-Aug-15
	Sample ID:	1534176-01	1534176-02	1534176-03	1534176-04
	MDL/Units	Water	Water	Water	Water
Metals					
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Arsenic	1 ug/L	<1	1	<1	<1
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Chromium	1 ug/L	<1	4	10	12
Cobalt	0.5 ug/L	<0.5	0.9	2.3	2.3
Copper	0.5 ug/L	1.5	6.2	12.1	24.2
Lead	0.1 ug/L	<0.1	5.2	3.4	2.4
Nickel	1 ug/L	<1	4	27	31
Zinc	5 ug/L	201	72	939	379
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25 [2]	<25 [2]	<25 [2]	<25 [2]
F2 PHCs (C10-C16)	100 ug/L	<100 [2]	<100 [2]	<286 [1] [2]	<177 [1] [2]
F3 PHCs (C16-C34)	100 ug/L	<100 [2]	<100 [2]	<286 [1] [2]	<177 [1] [2]
F4 PHCs (C34-C50)	100 ug/L	<100 [2]	<100 [2]	<286 [1] [2]	<177 [1] [2]
PCBs					
PCBs, total	0.05 ug/L	<0.05	-	-	-
Decachlorobiphenyl	Surrogate	72.5%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Mercury	ND	0.1	ug/L						
Arsenic	ND	1	ug/L						
Cadmium	ND	0.1	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Lead	ND	0.1	ug/L						
Nickel	ND	1	ug/L						
Zinc	ND	5	ug/L						
PCBs									
PCBs, total	ND	0.05	ug/L						
Surrogate: Decachlorobiphenyl	*0.351*		*ug/L*		*70.3*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Metals									
Mercury	ND	0.1	ug/L	ND				20	
Arsenic	ND	1	ug/L	ND				20	
Cadmium	ND	0.1	ug/L	ND			0.0	20	
Chromium	ND	1	ug/L	ND				20	
Cobalt	ND	0.5	ug/L	ND			0.0	20	
Copper	1.01	0.5	ug/L	ND			0.0	20	
Lead	ND	0.1	ug/L	ND				20	
Nickel	ND	1	ug/L	ND				20	
Zinc	ND	5	ug/L	ND				20	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2030	25	ug/L	ND	102	68-117			
F2 PHCs (C10-C16)	2060	100	ug/L	ND	114	60-140			
F3 PHCs (C16-C34)	3710	100	ug/L	ND	99.8	60-140			
F4 PHCs (C34-C50)	2180	100	ug/L	ND	87.9	60-140			
Metals									
Mercury	3.07	0.1	ug/L	ND	102	78-137			
Arsenic	51.7		ug/L	ND	103	80-120			
Cadmium	49.8		ug/L	ND	99.6	80-120			
Chromium	48.9		ug/L	ND	97.8	80-120			
Cobalt	48.7		ug/L	ND	97.4	80-120			
Copper	38.0		ug/L	0.48	75.0	80-120			
Lead	47.7		ug/L	ND	95.5	80-120			
Nickel	49.8		ug/L	ND	99.7	80-120			
Zinc	53		ug/L	ND	107	80-120			
PCBs									
PCBs, total	0.988	0.05	ug/L	ND	98.8	60-140			
Surrogate: Decachlorobiphenyl	*0.361*		*ug/L*		*72.2*	*60-140*			

Qualifier Notes:

Login Qualifiers :

Sample - One or more parameter received past hold time -
Applies to samples: MW06-19, MW07-22, MW08-25, MW08-24

Sample - Insufficient volume - Subsample from unpreserved bottles for PHC bottle
Applies to samples: MW08-24

Sample - Insufficient volume - Subsample from unpreserved bottles mercury and metals for PHC bottle
Applies to samples: MW08-25

Sample - Insufficient volume - Subsample from unpreserved mercury and metals bottles for PHC bottle
Applies to samples: MW07-22

Sample - Not field filtered - Metals/Mercury
Applies to samples: MW06-19, MW07-22, MW08-25, MW08-24

Sample preserved upon receipt at the lab.
Applies to samples: MW06-19, MW07-22, MW08-25, MW08-24

Sample Qualifiers :

1 : Elevated Reporting Limits due to limited sample volume.

2 : Holding time had been exceeded upon sample receipt.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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№ 22983

Page 3 of 4

Client: Golder Associates Ltd.
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, Ontario K2H 5B7
Telephone: 613-592-9600

Project: Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
PO:
Email: Nicole_macdonald@golder.com; Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: [ ] Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number:
Water - 1534176
Soil - 1534169

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: F1	Inorganics/Metals (aqueous only)	F2-F4	PCBs	
1	MW06-19	GW		6	Aug 10	9:55	✓	✓	✓	✓	
2	MW07-22	GW		5	Aug 10	11:40	✓	✓	✓	✓	low volume, try to analyze all
3	MW08-25 *	GW		4	Aug 10	13:30	✓	✓	✓	✓	low volume, try to analyze all
4	MW08-24	GW		5	Aug 10	13:00	✓	✓	✓	✓	low volume, try to analyze all
5	DM-30 (0-15)	S		2	Aug 10	16:00	✓	✓	✓	✓	-60mL +250mL
6	DM-30 (20-35)	S		2	"	16:00	✓	✓	✓	✓	
7	DM-28 (0-15)	S		2	"	—	✓	✓	✓	✓	
8	DM-28 (40-50) *	S		2	"	16:25	✓	✓	✓	✓	
9	DM-23 (0-20) *	S		2	"	16:00	✓	✓	✓	✓	
10	DM-21 (0-20)	S		2	"	16:30	✓	✓	✓	✓	

Comments:
* Biological because of bottle top
For low sample volume, prioritize: F1, inorganic/metals, F2-F4, PCBs // may exceed holding time but please analyze anyway

Method of Delivery: Walk-in

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Don Plenderleith	Nicole MacDonald	D. Charlebois	D. Charlebois
Relinquished By (Print): Don Plenderleith	Date/Time: Aug 17/15	Date/Time: Aug 19/15 11:10	Date/Time: Aug 19/15 12:12
Date/Time: Aug 10/15	Temperature: 13.3°C	Temperature: 5.2°C	pH Verified [N] By: NA

Rush Aug 18/15 4:31

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Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Nicole MacDonald

Client PO:
Project: 1530908
Custody: 102396/97

Report Date: 25-Aug-2015
Order Date: 19-Aug-2015

Order #: 1534210

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1534210-01	DM-34 (0-15)
1534210-02	DM-31 (0-15)
1534210-03	DM-31 (30-40)
1534210-04	DM-52 (0-15)
1534210-05	DM-55 (0-15)
1534210-06	DM-55 (30-40)
1534210-07	DM-38 (0-15)
1534210-08	DM-33 (0-15)
1534210-09	DM-33 (20-30)
1534210-10	DM-32 (0-15)
1534210-11	DM-32 (20-30)
1534210-12	DM-37 (30-40)
1534210-13	DM-37 (0-15)
1534210-14	DM-41 (0-15)
1534210-15	DM-47 (0-15)
1534210-16	DM-47 (40-50)

Approved By:

Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME-SQG: Metals by ICP-OES	based on MOE E3470, ICP-OES	25-Aug-15	25-Aug-15
Mercury by CVAA	EPA 7471B - CVAA, digestion	25-Aug-15	25-Aug-15
PCBs, total	SW846 8082A - GC-ECD	20-Aug-15	24-Aug-15
PHC F1	CWS Tier 1 - P&T GC-FID	20-Aug-15	24-Aug-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	22-Aug-15	23-Aug-15
Solids, %	Gravimetric, calculation	21-Aug-15	21-Aug-15

Certificate of Analysis

Client: **Golder Associates Ltd. (Ottawa)**

Client PO:

Report Date: 25-Aug-2015
Order Date:19-Aug-2015
Project Description: 1530908

	Client ID:	DM-34 (0-15)	DM-31 (0-15)	DM-31 (30-40)	DM-52 (0-15)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534210-01	1534210-02	1534210-03	1534210-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	95.2	91.0	90.0	87.2
Metals					
Arsenic	1.0 ug/g dry	<1.0	1.0	1.1	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	26.4	170	165	44.2
Cobalt	1.0 ug/g dry	8.9	11.3	12.3	28.2
Copper	1.0 ug/g dry	12.5	76.4	61.5	56.8
Lead	1.0 ug/g dry	5.1	8.1	8.5	5.6
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	45.7	28.8	32.9	116
Zinc	1.0 ug/g dry	30.7	150	138	42.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	70.8%	121%	78.4%	109%

Certificate of Analysis

Client: **Golder Associates Ltd. (Ottawa)**

Client PO:

Report Date: 25-Aug-2015
Order Date:19-Aug-2015
Project Description: 1530908

	Client ID:	DM-55 (0-15)	DM-55 (30-40)	DM-38 (0-15)	DM-33 (0-15)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534210-05	1534210-06	1534210-07	1534210-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.5	89.5	91.4	93.2
Metals					
Arsenic	1.0 ug/g dry	5.6	5.2	1.5	1.5
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	54.8	58.7	91.9	70.9
Cobalt	1.0 ug/g dry	16.5	16.9	14.6	12.3
Copper	1.0 ug/g dry	31.9	32.0	92.3	35.4
Lead	1.0 ug/g dry	23.1	23.3	124	5.7
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	55.1	58.3	47.9	47.8
Zinc	1.0 ug/g dry	67.4	69.7	308	57.3
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	83	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	61	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	114%	104%	116%	111%

Certificate of Analysis

Client: **Golder Associates Ltd. (Ottawa)**

Client PO:

Report Date: 25-Aug-2015
Order Date:19-Aug-2015
Project Description: 1530908

	Client ID:	DM-33 (20-30)	DM-32 (0-15)	DM-32 (20-30)	DM-37 (30-40)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534210-09	1534210-10	1534210-11	1534210-12
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	95.3	84.0	88.0	94.0
Metals					
Arsenic	1.0 ug/g dry	<1.0	3.1	2.3	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	67.3	282	223	125
Cobalt	1.0 ug/g dry	10.2	15.0	11.6	12.7
Copper	1.0 ug/g dry	36.1	152	120	31.6
Lead	1.0 ug/g dry	4.7	50.8	26.2	5.1
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	33.0	46.9	36.0	39.8
Zinc	1.0 ug/g dry	54.9	138	117	93.0
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	105%	112%	122%	123%

Certificate of Analysis

Report Date: 25-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:19-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-37 (0-15)	DM-41 (0-15)	DM-47 (0-15)	DM-47 (40-50)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534210-13	1534210-14	1534210-15	1534210-16
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	91.8	89.6	83.9	85.9
Metals					
Arsenic	1.0 ug/g dry	1.9	1.4	4.1	4.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	137	178	193	255
Cobalt	1.0 ug/g dry	12.3	15.1	17.6	21.0
Copper	1.0 ug/g dry	55.0	171	111	95.8
Lead	1.0 ug/g dry	8.5	27.5	14.8	12.4
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	35.3	51.8	80.8	66.2
Zinc	1.0 ug/g dry	103	351	139	163
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	187	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	3000	79
F3 PHCs (C16-C34)	8 ug/g dry	<8	43	129	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	116%	116%	119%	120%

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Arsenic	ND	1.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	1.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	1.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Nickel	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.113*		*ug/g*		*113*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Metals									
Arsenic	1.28	1.0	ug/g dry	ND			0.0	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	26.4	1.0	ug/g dry	26.4			0.2	30	
Cobalt	9.58	1.0	ug/g dry	8.89			7.5	30	
Copper	11.8	1.0	ug/g dry	12.5			5.2	30	
Lead	4.78	1.0	ug/g dry	5.05			5.6	30	
Mercury	ND	0.1	ug/g dry	ND			0.0	35	
Nickel	46.7	1.0	ug/g dry	45.7			2.2	30	
Zinc	31.9	1.0	ug/g dry	30.7			3.8	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				40	
Surrogate: Decachlorobiphenyl	*0.115*		*ug/g dry*	*ND*	*102*	*60-140*			
Physical Characteristics									
% Solids	69.3	0.1	% by Wt.	68.8			0.8	25	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	188	7	ug/g	ND	94.1	80-120			
F2 PHCs (C10-C16)	102	4	ug/g	ND	111	60-140			
F3 PHCs (C16-C34)	214	8	ug/g	ND	113	60-140			
F4 PHCs (C34-C50)	161	6	ug/g	ND	127	60-140			
Metals									
Arsenic	285		ug/L	13.1	109	70-130			
Cadmium	259		ug/L	0.58	103	70-130			
Chromium	760		ug/L	527	93.1	70-130			
Cobalt	427		ug/L	178	99.8	70-130			
Copper	473		ug/L	250	89.4	70-130			
Lead	322		ug/L	101	88.3	70-130			
Mercury	1.46	0.1	ug/g	ND	97.5	72-128			
Nickel	1090		ug/L	914	71.9	70-130			
Zinc	798		ug/L	613	74.0	70-130			
PCBs									
PCBs, total	0.580	0.05	ug/g	ND	128	60-140			
Surrogate: Decachlorobiphenyl	*0.132*		*ug/g*		*116*	*60-140*			

Qualifier Notes:

Login Qualifiers :

Sample - Bottle broken in transit - re-jarred may have broken glass inside

Applies to samples: DM-47 (0-15)

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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№ 102396

Page 1 of 2

Client Name: Golder Associates Ltd.
Contact Name: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, ON
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304 DEW Line
PO #
Email Address: nicole-macdonald@golder.com
damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1534210

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Dup EMS						
1	DM-34 (0-15)	S		2	Aug11/15	17:20								X	60mL+250mL-					
2	DM-31 (0-15)	S		4		16:30								X	2x60mL+2x250mL-					
3	DM-31 (30-40)	S		2		16:40								X	60mL+250mL-					
4	DM-52 (0-15)	S		2		-								X						
5	DM-55 (0-15)	S		2		-								X						
6	DM-55 (30-40)	S		2		-								X						
7	DM-38 (0-15)	S		2		-								X						
8	DM-33 (0-15)	S		2		-								X						
9	DM-33 (20-30)	S		2		-								X						
10	DM-32 (0-15)	S		2		-								X						

Comments: past hold time for F1 but please analyze anyway

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab: SUNDEEPKN DOKMA	Verified By: D.Charlebois
Relinquished By (Print): Nicole MacDonald	Date/Time: 19/08/15 12:59pm	Date/Time: AUG19,2015 02.46	Date/Time: Aug19/15 4:14
Date/Time: Aug 11/15 12:30	Temperature: ____ °C	Temperature: 13.9 °C	pH Verified [ ] By: NA

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Chain of Custody
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№ 102397

Page 2 of 2

Client Name: Golder Associates Ltd	Project Reference: 1530908	TAT: ✓ Regular [ ] 3 Day
Contact Name: Nicole MacDonald	Quote # 15-304 DEW Line	[ ] 2 Day [ ] 1 Day
Address: 1931 Robertson Road, Ottawa, ON	PO #	Date Required:
Telephone:	Email Address: nicole_macdonald@golder.com damn_johnson@golder.com	

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1534210

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Quote 15-304					
1	DM-32 (20-30)	S		2	Aug11/15	—								X	60ml+250ml				
2	DM-37 (30-40)	S		2	↓	—								X	↓				
3	DM-37 (0-15)	S		2	↓	—								X	↓				
4	DM-41 (0-15)	S		2	↓	—								X	↓				
5	DM-47 (0-15) *	S		2	↓	—								X	↓				
6	DM-47 (40-50)	S		2	↓	—								X	↓				
7																			
8																			
9																			
10																			

Comments: * may have broken glass inside (re-jarred)
past hold time for F1 but please analyze anyway

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:
Relinquished By (Print): Nicole MacDonald	Date/Time: 19/08/15 12:59	Date/Time: Aug 19, 2015 02:46
Date/Time: Aug 19/15 12:30.	Temperature: ___ °C	Temperature: 13.1 °C

Verified By: O. Chalebos
Date/Time: 19/15 4:14
pH Verified [ ] By: N/A

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Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Nicole MacDonald

Client PO:
Project: 1530908
Custody: 102395

Report Date: 25-Aug-2015
Order Date: 19-Aug-2015

Order #: 1534212

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1534212-01	MW 05-13
1534212-02	MW12-01
1534212-03	MW05-16
1534212-04	MW05-15
1534212-05	MW 09-28
1534212-06	MW 05-08

Approved By:

Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Mercury by CVAA	EPA 245.1 - Cold Vapour AA	25-Aug-15	25-Aug-15
Metals, ICP-MS	EPA 200.8 - ICP-MS	25-Aug-15	25-Aug-15
PCBs, total	EPA 608 - GC-ECD	24-Aug-15	24-Aug-15
PHC F1	CWS Tier 1 - P&T GC-FID	20-Aug-15	21-Aug-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	20-Aug-15	21-Aug-15

Certificate of Analysis

Report Date: 25-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:19-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	MW 05-13	MW12-01	MW05-16	MW05-15
	Sample Date:	12-Aug-15	12-Aug-15	12-Aug-15	12-Aug-15
	Sample ID:	1534212-01	1534212-02	1534212-03	1534212-04
	MDL/Units	Water	Water	Water	Water
Metals					
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Arsenic	1 ug/L	<1	<1	<1	<1
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	0.1
Chromium	1 ug/L	1	<1	<1	<1
Cobalt	0.5 ug/L	<0.5	1.8	<0.5	1.2
Copper	0.5 ug/L	<0.5	0.5	1.3	1.7
Lead	0.1 ug/L	0.7	<0.1	2.0	2.2
Nickel	1 ug/L	2	20	2	10
Zinc	5 ug/L	2840	18	4960	18700
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25 [2]	<25 [2]	<25 [2]	<25 [2]
F2 PHCs (C10-C16)	100 ug/L	<100 [2]	<100 [2]	<100 [2]	<100 [2]
F3 PHCs (C16-C34)	100 ug/L	<100 [2]	<100 [2]	<100 [2]	<100 [2]
F4 PHCs (C34-C50)	100 ug/L	<100 [2]	<100 [2]	<100 [2]	<100 [2]
PCBs					
PCBs, total	0.05 ug/L	<0.05	<0.05	<0.05	-
Decachlorobiphenyl	Surrogate	73.5%	74.0%	71.5%	-

Certificate of Analysis

Report Date: 25-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:19-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	MW 09-28	MW 05-08	-	-
	Sample Date:	13-Aug-15	13-Aug-15	-	-
	Sample ID:	1534212-05	1534212-06	-	-
	MDL/Units	Water	Water	-	-
Metals					
Mercury	0.1 ug/L	<0.1	<0.1	-	-
Arsenic	1 ug/L	<1	<1	-	-
Cadmium	0.1 ug/L	<0.1	0.5	-	-
Chromium	1 ug/L	15	1	-	-
Cobalt	0.5 ug/L	0.9	1.1	-	-
Copper	0.5 ug/L	29.2	<0.5	-	-
Lead	0.1 ug/L	3.0	0.6	-	-
Nickel	1 ug/L	24	16	-	-
Zinc	5 ug/L	1340	12100	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25 [2]	<25 [2]	-	-
F2 PHCs (C10-C16)	100 ug/L	-	<100	-	-
F3 PHCs (C16-C34)	100 ug/L	-	<100	-	-
F4 PHCs (C34-C50)	100 ug/L	-	<100	-	-
PCBs					
PCBs, total	0.05 ug/L	-	<0.10 [1]	-	-
Decachlorobiphenyl	Surrogate	-	74.4%	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Mercury	ND	0.1	ug/L						
Arsenic	ND	1	ug/L						
Cadmium	ND	0.1	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Lead	ND	0.1	ug/L						
Nickel	ND	1	ug/L						
Zinc	ND	5	ug/L						
PCBs									
PCBs, total	ND	0.05	ug/L						
Surrogate: Decachlorobiphenyl	*0.351*		*ug/L*		*70.3*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Metals									
Mercury	ND	0.1	ug/L	ND			0.0	20	
Arsenic	ND	1	ug/L	ND			0.0	20	
Cadmium	ND	0.1	ug/L	ND			0.0	20	
Chromium	ND	1	ug/L	ND			0.0	20	
Cobalt	ND	0.5	ug/L	ND			0.0	20	
Copper	ND	0.5	ug/L	ND				20	
Lead	ND	0.1	ug/L	ND				20	
Nickel	ND	1	ug/L	ND			0.0	20	
Zinc	11	5	ug/L	10			7.1	20	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2030	25	ug/L	ND	102	68-117			
F2 PHCs (C10-C16)	2060	100	ug/L	ND	114	60-140			
F3 PHCs (C16-C34)	3710	100	ug/L	ND	99.8	60-140			
F4 PHCs (C34-C50)	2180	100	ug/L	ND	87.9	60-140			
Metals									
Mercury	3.11	0.1	ug/L	ND	104	78-137			
Arsenic	49.7		ug/L	0.6	98.2	80-120			
Cadmium	45.8		ug/L	0.006	91.6	80-120			
Chromium	47.9		ug/L	0.07	95.6	80-120			
Cobalt	46.2		ug/L	0.05	92.3	80-120			
Copper	44.3		ug/L	ND	88.5	80-120			
Lead	43.4		ug/L	ND	86.8	80-120			
Nickel	46.2		ug/L	0.5	91.3	80-120			
Zinc	57		ug/L	10	93.5	80-120			
PCBs									
PCBs, total	0.988	0.05	ug/L	ND	98.8	60-140			
Surrogate: Decachlorobiphenyl	*0.361*		*ug/L*		*72.2*	*60-140*			

Qualifier Notes:

Login Qualifiers :

Sample - Insufficient volume - Half empty PCB bottle

Applies to samples: MW 05-08

Sample Qualifiers :

1 : Elevated Reporting Limits due to limited sample volume.

2 : Holding time had been exceeded upon sample receipt.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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(Lab Use Only)
Nº 102395

Page 1 of 1

Client Name: Golder Associates Ltd.
Contact Name: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, ON
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304 DEW Line Landfill Monitoring
PO #
Email Address: nicole_macdonald@golder.com
damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1534212

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	@Quote 15-304						
1	MW 05-13	GW		6	Aug 12/15	13:10								X						
2	MW 12-01	GW		6	"	14:20								X						
3	MW 05-16	GW		6	"	15:45								X						
4	MW 05-15 *	GW		5	"	14:55								X	No PCB's.					
5	MW 09-28 *	GW		2	Aug 13/15	—								X	- Only VOC's.					
6	MW 05-08	GW		6	"	—								X	Raised detection limit for PCB's.					
7																				
8	For samples MW 09-28, analyze for F1 first, then metals																			
9	and mercury. Not enough sample for PCBs or F2-F4.																			
10	Confirmed with Nicole.																			

Comments: * for reduced sample volume, possible to analyze for all anyway? (no preservatives in bottles)
if not, prioritize: F1, inorganics/metals, F2-F4, PCBs

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
	T. Clouse	SUNREPORN DAKMAI	D. Charlebois
Relinquished By (Print): Nicole MacDonald	Date/Time: 19/08/15 12:59PM	Date/Time: AUG 19, 2015 08:46	Date/Time: AUG 20/15 3:08
Date/Time: Aug 19/15 11:30.	Temperature: ____ °C	Temperature: 19.9 °C	pH Verified [ ] By: DC

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Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Nicole MacDonald

Client PO:
Project: 1530908
Custody: 102398/99/400/01/03

Report Date: 27-Aug-2015
Order Date: 21-Aug-2015

Order #: 1534376

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1534376-01	DM-39 (0-15)
1534376-02	DM-39 (40-50)
1534376-03	DM-40 (0-15)
1534376-04	DM-42 (0-15)
1534376-05	DM-42 (40-50)
1534376-06	DM-43 (0-15)
1534376-07	DM-43 (20-30)
1534376-08	DM-44 (0-15)
1534376-09	DM-45 (0-15)
1534376-10	DM-46 (0-15)
1534376-11	DM-11 (0-15)
1534376-12	DM-12 (0-15)
1534376-13	DM-12 (30-40)
1534376-14	DM-13 (0-15)
1534376-15	DM-13 (40-50)
1534376-16	DM-15 (0-15)
1534376-17	DM-15 (30-40)
1534376-18	DM-16 (0-15)
1534376-19	DM-16 (30-40)
1534376-20	DM-18 (0-10)
1534376-21	DM-22 (0-15)
1534376-22	DM-22 (40-50)
1534376-23	DM-17 (0-20)
1534376-24	DM-17 (20-40)
1534376-25	DM-20 (0-15)
1534376-26	DM-20 (15-30)
1534376-27	DM-06 (40-50)
1534376-28	DM-04 (0-15)
1534376-29	DM-04 (40-50)
1534376-30	DM-46 (40-50)

Approved By:

Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

1534376-31	DM-48 (0-15)
1534376-32	DM-48 (40-50)
1534376-33	DM-49 (40-50)
1534376-34	MW 05-13 (0-15)
1534376-35	MW 05-13 (20-30)
1534376-36	MW 12-01 (0-15)
1534376-37	MW 12-01 (20-30)
1534376-38	MW 05-16 (0-15)
1534376-39	MW 05-16 (40-50)
1534376-40	DM-09 (0-15)
1534376-41	DM-10 (0-15)
1534376-42	DM-08 (0-15)
1534376-43	DM-07 (0-15)
1534376-44	DM-07 (40-50)
1534376-45	MW05-15 (0-15)
1534376-46	MW05-15 (30-40)
1534376-47	DM-05 (0-15)
1534376-48	DM-06 (0-15)
1534376-49	DM-05 (40-50)
1534376-50	DM-49 (0-15)

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME-SQG: Metals by ICP-OES	based on MOE E3470, ICP-OES	26-Aug-15	26-Aug-15
Mercury by CVAA	EPA 7471B - CVAA, digestion	26-Aug-15	26-Aug-15
PCBs, total	SW846 8082A - GC-ECD	21-Aug-15	26-Aug-15
PHC F1	CWS Tier 1 - P&T GC-FID	21-Aug-15	27-Aug-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	24-Aug-15	25-Aug-15
Solids, %	Gravimetric, calculation	24-Aug-15	24-Aug-15

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-39 (0-15)	DM-39 (40-50)	DM-40 (0-15)	DM-42 (0-15)
	Sample Date:	12-Aug-15	12-Aug-15	12-Aug-15	12-Aug-15
	Sample ID:	1534376-01	1534376-02	1534376-03	1534376-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	84.3	83.8	83.0	79.3
Metals					
Arsenic	1.0 ug/g dry	1.9	1.9	5.2	3.2
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	0.6
Chromium	1.0 ug/g dry	187	172	618	151
Cobalt	1.0 ug/g dry	11.3	13.0	10.6	43.7
Copper	1.0 ug/g dry	169	111	166	95.0
Lead	1.0 ug/g dry	10.7	8.4	13.7	10.5
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	29.3	35.0	39.7	118
Zinc	1.0 ug/g dry	153	126	216	173
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7 [2]	<7 [2]
F2 PHCs (C10-C16)	4 ug/g dry	<4	48	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	124%	123%	132%	120%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-42 (40-50)	DM-43 (0-15)	DM-43 (20-30)	DM-44 (0-15)
	Sample Date:	12-Aug-15	12-Aug-15	12-Aug-15	12-Aug-15
	Sample ID:	1534376-05	1534376-06	1534376-07	1534376-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	82.7	91.5	90.3	87.7
Metals					
Arsenic	1.0 ug/g dry	1.8	1.0	1.1	7.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	0.6
Chromium	1.0 ug/g dry	191	127	119	239
Cobalt	1.0 ug/g dry	18.5	15.4	13.8	10.1
Copper	1.0 ug/g dry	98.7	48.9	39.8	244
Lead	1.0 ug/g dry	8.5	5.9	5.1	13.3
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	50.5	44.4	38.2	26.4
Zinc	1.0 ug/g dry	152	79.8	73.3	222
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7 [2]	<7 [2]
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	122%	112%	133%	133%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-45 (0-15)	DM-46 (0-15)	DM-11 (0-15)	DM-12 (0-15)
	Sample Date:	12-Aug-15	12-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534376-09	1534376-10	1534376-11	1534376-12
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	84.3	84.2	80.9	86.2
Metals					
Arsenic	1.0 ug/g dry	1.7	5.1	3.6	4.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	178	162	82.6	107
Cobalt	1.0 ug/g dry	26.5	15.9	20.8	15.2
Copper	1.0 ug/g dry	141	116	58.0	45.4
Lead	1.0 ug/g dry	11.5	13.4	14.3	84.5
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	103	58.4	79.0	72.9
Zinc	1.0 ug/g dry	158	139	61.4	91.1
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7 [2]	<7 [2]
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	0.08
Decachlorobiphenyl	Surrogate	136%	120%	131%	128%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-12 (30-40)	DM-13 (0-15)	DM-13 (40-50)	DM-15 (0-15)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534376-13	1534376-14	1534376-15	1534376-16
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	86.0	91.0	89.9	92.7
Metals					
Arsenic	1.0 ug/g dry	2.7	2.3	2.0	3.7
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	79.5	46.1	28.3	42.6
Cobalt	1.0 ug/g dry	14.4	11.8	10.6	15.0
Copper	1.0 ug/g dry	39.6	24.5	16.7	26.8
Lead	1.0 ug/g dry	21.8	14.7	11.6	9.9
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	86.9	52.4	38.3	83.0
Zinc	1.0 ug/g dry	70.5	64.2	62.8	47.4
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7 [2]	<7 [2]
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	75	55	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	0.35	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	68.8%	129%	122%	80.1%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-15 (30-40)	DM-16 (0-15)	DM-16 (30-40)	DM-18 (0-10)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534376-17	1534376-18	1534376-19	1534376-20
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	92.0	90.6	92.2	87.3
Metals					
Arsenic	1.0 ug/g dry	1.9	2.4	2.1	4.4
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	42.0	29.5	37.3	131
Cobalt	1.0 ug/g dry	13.9	11.8	13.2	22.4
Copper	1.0 ug/g dry	24.4	53.3	45.2	66.7
Lead	1.0 ug/g dry	10.6	8.5	8.1	16.0
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	76.8	40.4	61.3	118
Zinc	1.0 ug/g dry	46.8	75.2	64.0	58.1
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7 [2]	<7 [2]
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	134%	132%	124%	120%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-22 (0-15)	DM-22 (40-50)	DM-17 (0-20)	DM-17 (20-40)
	Sample Date:	11-Aug-15	11-Aug-15	11-Aug-15	11-Aug-15
	Sample ID:	1534376-21	1534376-22	1534376-23	1534376-24
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.0	88.1	82.1	85.5
Metals					
Arsenic	1.0 ug/g dry	1.9	<1.0	3.7	3.2
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	23.7	13.9	20.7	18.0
Cobalt	1.0 ug/g dry	15.6	19.3	15.9	16.3
Copper	1.0 ug/g dry	35.8	54.1	125	175
Lead	1.0 ug/g dry	9.5	5.9	10.1	9.5
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	34.0	23.1	41.9	39.2
Zinc	1.0 ug/g dry	43.1	28.8	157	113
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7 [2]	<7 [2]
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	121%	94.2%	121%	126%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-20 (0-15)	DM-20 (15-30)	DM-06 (40-50)	DM-04 (0-15)
	Sample Date:	11-Aug-15	11-Aug-15	13-Aug-15	13-Aug-15
	Sample ID:	1534376-25	1534376-26	1534376-27	1534376-28
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	88.4	92.3	87.5	86.7
Metals					
Arsenic	1.0 ug/g dry	1.9	<1.0	1.7	1.2
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	23.1	20.0	59.3	61.3
Cobalt	1.0 ug/g dry	7.9	7.5	8.9	9.3
Copper	1.0 ug/g dry	17.1	14.3	27.8	25.3
Lead	1.0 ug/g dry	11.2	10.5	3.4	9.1
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	28.8	26.3	30.8	31.2
Zinc	1.0 ug/g dry	48.2	43.7	38.3	41.6
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	38
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	30
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	0.09
Decachlorobiphenyl	Surrogate	125%	126%	116%	129%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-04 (40-50)	DM-46 (40-50)	DM-48 (0-15)	DM-48 (40-50)
	Sample Date:	13-Aug-15	12-Aug-15	12-Aug-15	12-Aug-15
	Sample ID:	1534376-29	1534376-30	1534376-31	1534376-32
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.5	83.9	84.0	84.1
Metals					
Arsenic	1.0 ug/g dry	<1.0	7.5	21.0	14.8
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	49.3	158	496	311
Cobalt	1.0 ug/g dry	7.4	11.5	52.8	39.3
Copper	1.0 ug/g dry	18.5	139	115	152
Lead	1.0 ug/g dry	6.8	12.4	29.7	16.8
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	24.8	44.3	344	221
Zinc	1.0 ug/g dry	31.4	128	134	131
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7 [1]	<7 [1]	<7 [1]
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	28	<8	46	<8
F4 PHCs (C34-C50)	6 ug/g dry	18	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	109%	109%	61.6%	75.3%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-49 (40-50)	MW 05-13 (0-15)	MW 05-13 (20-30)	MW 12-01 (0-15)
	Sample Date:	12-Aug-15	12-Aug-15	12-Aug-15	12-Aug-15
	Sample ID:	1534376-33	1534376-34	1534376-35	1534376-36
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	86.6	84.9	87.7	85.4
Metals					
Arsenic	1.0 ug/g dry	1.4	1.3	<1.0	1.5
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	174	60.4	56.3	69.0
Cobalt	1.0 ug/g dry	20.5	8.9	8.6	9.6
Copper	1.0 ug/g dry	90.6	21.8	20.8	27.7
Lead	1.0 ug/g dry	11.9	3.7	3.5	4.4
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	87.6	33.7	30.7	32.8
Zinc	1.0 ug/g dry	114	35.9	33.6	42.0
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [1]	<7 [1]	<7 [1]	<7 [2]
F2 PHCs (C10-C16)	4 ug/g dry	90	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	37	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	79.0%	84.0%	112%	92.0%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	MW 12-01 (20-30)	MW 05-16 (0-15)	MW 05-16 (40-50)	DM-09 (0-15)
	Sample Date:	12-Aug-15	12-Aug-15	12-Aug-15	12-Aug-15
	Sample ID:	1534376-37	1534376-38	1534376-39	1534376-40
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	87.2	83.1	86.5	89.4
Metals					
Arsenic	1.0 ug/g dry	1.0	1.6	1.4	1.8
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	70.5	88.1	90.7	107
Cobalt	1.0 ug/g dry	10.0	12.4	13.2	19.0
Copper	1.0 ug/g dry	27.5	34.6	33.1	40.5
Lead	1.0 ug/g dry	4.7	5.5	5.4	9.7
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	32.3	41.5	41.3	53.7
Zinc	1.0 ug/g dry	42.0	51.0	52.0	70.1
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7 [2]	<7 [2]
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	108%	72.0%	70.0%	70.0%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-10 (0-15)	DM-08 (0-15)	DM-07 (0-15)	DM-07 (40-50)
	Sample Date:	12-Aug-15	12-Aug-15	12-Aug-15	12-Aug-15
	Sample ID:	1534376-41	1534376-42	1534376-43	1534376-44
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	90.6	89.1	88.5	86.3
Metals					
Arsenic	1.0 ug/g dry	1.7	1.3	1.2	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	74.7	58.3	68.3	67.0
Cobalt	1.0 ug/g dry	14.5	9.9	11.3	11.2
Copper	1.0 ug/g dry	30.8	22.5	23.5	23.8
Lead	1.0 ug/g dry	8.9	10.5	3.8	4.9
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	39.2	29.6	37.0	37.6
Zinc	1.0 ug/g dry	55.7	48.1	39.5	38.7
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7 [2]	<7 [2]
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	121%	136%	118%	95.6%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	MW05-15 (0-15)	MW05-15 (30-40)	DM-05 (0-15)	DM-06 (0-15)
	Sample Date:	12-Aug-15	12-Aug-15	13-Aug-15	13-Aug-15
	Sample ID:	1534376-45	1534376-46	1534376-47	1534376-48
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	85.1	87.5	84.7	87.9
Metals					
Arsenic	1.0 ug/g dry	1.7	1.6	2.1	2.2
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	92.8	88.9	67.0	71.8
Cobalt	1.0 ug/g dry	14.1	13.2	9.9	11.1
Copper	1.0 ug/g dry	35.5	34.1	27.8	29.7
Lead	1.0 ug/g dry	4.9	5.2	3.6	4.6
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	44.8	42.5	34.2	36.3
Zinc	1.0 ug/g dry	55.2	53.3	38.5	42.4
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7 [2]	<7 [2]	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	139%	138%	115%	130%

Certificate of Analysis

Report Date: 27-Aug-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:21-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	DM-05 (40-50)	DM-49 (0-15)	-	-
	Sample Date:	13-Aug-15	12-Aug-15	-	-
	Sample ID:	1534376-49	1534376-50	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	85.0	82.6	-	-
Metals					
Arsenic	1.0 ug/g dry	<1.0	3.5	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	1.0 ug/g dry	45.0	219	-	-
Cobalt	1.0 ug/g dry	6.9	18.0	-	-
Copper	1.0 ug/g dry	17.4	105	-	-
Lead	1.0 ug/g dry	2.4	13.8	-	-
Mercury	0.1 ug/g dry	<0.1	<0.1	-	-
Nickel	1.0 ug/g dry	23.6	75.9	-	-
Zinc	1.0 ug/g dry	24.8	137	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7 [2]	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	92	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	75	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	-	-
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	-	-
Decachlorobiphenyl	Surrogate	132%	130%	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Arsenic	ND	1.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	1.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	1.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Nickel	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.110*		*ug/g*		*110*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	53	8	ug/g dry	ND			0.0	30	QR-01
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Metals									
Arsenic	ND	1.0	ug/g dry	1.94			0.0	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	178	1.0	ug/g dry	187			4.6	30	
Cobalt	10.9	1.0	ug/g dry	11.3			3.7	30	
Copper	164	1.0	ug/g dry	169			3.1	30	
Lead	11.5	1.0	ug/g dry	10.7			6.9	30	
Mercury	ND	0.1	ug/g dry	ND			0.0	35	
Nickel	28.5	1.0	ug/g dry	29.3			2.6	30	
Zinc	146	1.0	ug/g dry	153			4.6	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				40	
Surrogate: Decachlorobiphenyl	*0.132*		*ug/g dry*	*ND*	*111*	*60-140*			
Physical Characteristics									
% Solids	90.6	0.1	% by Wt.	89.0			1.9	25	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	180	7	ug/g	ND	90.2	80-120			
F2 PHCs (C10-C16)	121	4	ug/g	ND	110	60-140			
F3 PHCs (C16-C34)	230	8	ug/g	ND	102	60-140			
F4 PHCs (C34-C50)	176	6	ug/g	ND	117	60-140			
Metals									
Arsenic	299		ug/L	38.8	104	70-130			
Cadmium	242		ug/L	7.32	93.7	70-130			
Chromium	870		ug/L	566	122	70-130			
Cobalt	450		ug/L	226	89.5	70-130			
Copper	599		ug/L	334	106	70-130			
Lead	429		ug/L	214	85.9	70-130			
Mercury	1.51	0.1	ug/g	ND	101	72-128			
Nickel	777		ug/L	586	76.5	70-130			
Zinc	1500		ug/L	1260	96.9	70-130			
PCBs									
PCBs, total	0.572	0.05	ug/g	ND	121	60-140			
Surrogate: Decachlorobiphenyl	*0.130*		*ug/g*		*110*	*60-140*			

Qualifier Notes:

Sample Qualifiers :

1 : Elevated detection limit due to dilution required because of high target analyte concentration.

2 : Holding time had been exceeded upon sample receipt.

QC Qualifiers :

QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody
(Lab Use Only)
№ 102398

Page 1 of 5

Client Name: Golder Associates Ltd.
Project Reference: 1530908
Contact Name: Nicole Macdonald
Quote # 15-304
Address: 1931 Robertson Road, Ottawa
PO #
Email Address: nicole_macdonald@golder.com damin_johnson@golder.com
Telephone: 613 592 9600

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1534376

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Quote 15-304						
1	DM-39 (0-15)	S		2	Aug 12/15	—								X						60ml + 250ml.
2	DM-39 (40-50)													X						
3	DM-40 (0-15)													X						
4	DM-42 (0-15)													X						
5	DM-42 (40-50)													X						
6	DM-43 (0-15)													X						
7	DM-43 (20-30)													X						
8	DM-44 (0-15)													X						
9	DM-45 (0-15)													X						
10	DM-46 (0-15)													X						

Comments: Received extra samples: DM-05(40+50); DM-49(0-15), add as per Nicole.

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:
Relinquished By (Print): Nicole Macdonald	Date/Time: 21/08/15 12:54pm	Date/Time: Aug 21/2015 09:50
Date/Time: Aug 20/15 18:45	Temperature: _____ °C	Temperature: 10.5 °C

Verified By: D. Charbois
Date/Time: Aug 21/15 4:17
pH Verified: [ ] By: NA

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e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody
(Lab Use Only)
№ 102399

Client Name: Golder Associates Ltd	Project Reference: 1530908	TAT: [✓] Regular [ ] 3 Day
Contact Name: Nicole MacDonald	Quote # 15-304	[ ] 2 Day [ ] 1 Day
Address: 1931 Robertson Rd, Ottawa	PO #	Date Required:
Telephone: 613 592 9600	Email Address: nicole_macdonald@golder.com damin_johnson@golder.com	

Criteria: [ ] O. Reg. 153/04 (As Amended) Table ___ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1534376

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304					
1	DM-11 (0-15)	S		2	Aug11/15	-								X		60ml	250ml		
2	DM-12 (0-15)													X					
3	DM-12 (30-40)N													X					
4	DM-13 (0-15)													X					
5	DM-13 (40-50)													X					
6	DM-15 (0-15)													X					
7	DM-15 (30-40)													X					
8	DM-16 (0-15)													X					
9	DM-16 (30-40)			3										X		2x 60ml	250ml		
10	DM-18 (0-10)			2										X		60ml	250ml		

Comments:

Method of Delivery: Parcel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time: 21/08/15 12:54	Date/Time: AUG 21 2015 02:50	Date/Time: AUG 21/15 4:17
Date/Time: Aug 20/15 18:45	Temperature: ___ °C	Temperature: 11.3 °C	pH Verified [ ] By:

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Chain of Custody
(Lab Use Only)
№ 102400

Page 3 of 5

Client Name: Golder Associates Ltd	Project Reference: 1530908	TAT: [✓] Regular [ ] 3 Day
Contact Name: Nicole MacDonald	Quote # 15-304	[ ] 2 Day [ ] 1 Day
Address: 1931 Robertson Road, Ottawa	PO #	Date Required:
Telephone: 613 592 9600	Email Address: nicole_macdonald@golder.com damn_johnson@golder.com	

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1534576

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOC's	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304						
1	DM-22 (0-15)	S		2	Aug 11/15	—								X	60 mL	250 mL				
2	DM-22 (40-50)	↓		↓	Aug 11/15	—								X						
3	DM-17 (0-20)				Aug 11/15	—								X						
4	DM-17 (20-40)				Aug 11/15	—								X						
5	DM-20 (0-15)				Aug 11/15	—								X						
6	DM-20 (15-30)				Aug 11/15	—								X						
7	DM-06 (0-15)				Aug 13/15	—								X						
8	DM-06 (40-50)				↓	—								X						
9	DM-04 (0-15)					—								X						
10	DM-04 (40-50)	↓		↓	↓	—								X				↓		

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time: 21/08/15 12:54pm	Date/Time: AUG 21, 2015 02:50	Date/Time: Aug 21 15 4:17
Date/Time: Aug 20/15 18:45	Temperature: ___ °C	Temperature: 10.5 °C	pH Verified [ ] By:

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Chain of Custody
(Lab Use Only)
№ 102401

Page 4 of 5

Client Name: Golder Associates Ltd	Project Reference: 1530908	TAT: [✓] Regular [ ] 3 Day
Contact Name: Nicole MacDonald	Quote # 15-304	[ ] 2 Day [ ] 1 Day
Address: 1931 Robertson Road, Ottawa	PO #	Date Required:
Telephone: 6135929600	Email Address: nicole_macdonald@golder.com damin_johnson@golder.com	

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1534576

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304						
1	DM-46 (40-50)	S		2	Aug12/15	-								X			-60mL	+250mL		
2	DM-48 (0-15)													X						
3	DM-48 (40-50)													X						
4	DM-49 (40-50)													X						
5	MW05-13 (0-15)													X						
6	MW 05-13 (20-30)													X						
7	MW 12-01 (0-15)													X						
8	MW 12-01 (20-30)													X						
9	MW 05-16 (0-15)													X						
10	MW05-16 (40-50) * *													X						

Comments: *does not match jars, will check and confirm
> says 30-50 should read 40-50 as per Nicole.

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: T. Louse	Received at Lab: SUNGEPORN DOLCMAI	Verified By: D. Charlebois
Relinquished By (Print): Nicole MacDonald	Date/Time: 21/08/15 12:54pm	Date/Time: AUG 21, 2015 02:50	Date/Time: Aug 21/15 4:17
Date/Time: Aug 20/15 18:45	Temperature: ___ °C	Temperature: 10.5 °C	pH Verified [ ] By: N/A

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Chain of Custody
(Lab Use Only)
№ 102403

Page 5 of 5

Client Name: Golder Associates Ltd.
Contact Name: Nicole MacDonald
Address: 1931 Robertson Rd, Ottawa
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304
PO #
Email Address: nicole_macdonald@golder.com
damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1534576

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	9307 2 15-304						
1	DM-09 (0-15)	S		2	Aug 12/15	—								X		60ml	250	ml		
2	DM-10 (0-15)	S		2		—								X						
3	DM-08 (0-15)	S		2		—								X						
4	DM-07 (0-15)	S		2		—								X						
5	DM-07 (40-50)	S		2		—								X						
6	MW05-15 (0-15)	S		2		—								X						
7	MW05-15 (20-30)/*	S		2		—								X						
8	DM-05 (0-15)	S		2	Aug 13/15	—								X						
9																				
10	MW09-28	GW		1	Aug 13/15	—								X	additional bottle found					

Comments: * does not match jars; will check and confirm SCH 30-40 (should be 30-40 as per Nicole); Extra samples DM-05 (40-50), DM-09 (0-15)

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: T. DEROUSE	Received at Lab: SYNDPIRN DOKMAI	Verified By: D Charlebois
Relinquished By (Print): Nicole MacDonald	Date/Time: 21/08/15 12:54 pm	Date/Time: Aug 21, 2015 02:50	Date/Time: AUG 21/15 4:17
Date/Time: Aug 20/15 18:45	Temperature: ___ °C	Temperature: 0.3 °C	pH Verified [ ] By:

AGAT Laboratories

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Mississauga, Ontario L4Z 1Y2
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www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only

Work Order #:

Cooler Quantity:

Arrival Temperatures:

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: Golder Associates
Contact: 1931 Robertson Rd
Address: Ottawa
Phone: 613 592 9600 Fax:
Reports to be sent to:
1. Email: Nicole_MacDonald@golder.com
2. Email: Darrin_Johnson@golder.com

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☑ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: DEW Line Site
Site Location: DYG-M
Sampled By: DHP / KR
AGAT Quote #: 69566 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company: Golder
Contact: Dan Plenderleith
Address:
Email: dplenderleith@golder.com

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ CN^- ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use									
MW05-05	Aug 9/15	3:30	7	Water	As per quote	✓				✓			✓							✓							See quote 69566			
DM-03 (40-50)	"	—	3	Soil		✓				✓			✓							✓										
* samples past hold time but please analyze anyway																														

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time	
D. Plenderleith D. Plenderleith	Aug 10 15		Nicole MacDonald	Aug 14/15		Page 1 of 1
Nicole MacDonald Nicole MacDonald	Aug 17/15	12:00				№ T 003901

AGAT Laboratories

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www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: Golder Associates
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa
Phone: 613 592 9600 Fax: 613 592 9601
Reports to be sent to:
1. Email: nicole_macdonald@golder.com
2. Email: darrin_johnson@golder.com

Project Information:

Project: DEW Line Landfill Monitoring
Site Location: DYE-M
Sampled By: DHP/KR
AGAT Quote #: 69566
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company: Golder Associates Ltd.
Contact: Don Plenderleith
Address:
Email: dplenderleith@golder.com

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☑ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Laboratory Use Only

Work Order #: ____
Cooler Quantity: ____
Arrival Temperatures: ____ | ____ | ____
____ | ____ | ____
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes: ____

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply): ____
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics (quote)	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
~~Aug10/15~~		~~3~~	~~S~~	quote	X			X		X		X			~~X~~				
DM-17 (20-40)	Aug11/15	—	3	S		X				X			X			X			
DM-34 (0-15)	Aug11/15	—	3	S	69566	X				X			X			X			
DM-58 (40-50)	Aug11/15	—	3	S		X				X			X			X			

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Nicole MacDonald	Aug 17/15	20:00			
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

N°: T000661

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www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only

Work Order #:

Cooler Quantity:

Arrival Temperatures:

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: Golder Associates
Contact: Nicole MacDonald
Address: 1931 Robertson Road
Phone: 613 592 9600 Fax: 613 592 9601

Reports to be sent to:

1. Email: nicole_macdonald@golder.com
2. Email: darrin_johnson@golder.com

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☑ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: DEW Line Landfill Monitoring
Site Location: DYE-M
Sampled By: KR
AGAT Quote #: 69566

Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company: Golder Associates Ltd
Contact: Don Plenderleith
Address:
Email: dplenderleith@golder.com

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics (quote)	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
DM-40 (0-15)	Aug 12/15		3	S		X				X			X				X		
DM-43 (20-30)		—	3	S															
DM-46 (0-15)			3	S	quote														
DM-48 (0-15)			3	S	69566														
DM-49 (0-15)		—	3	S															
MW05-15 (0-15)		"	3	S															
DM-08 (0-15)		"	3	S															
MW05-13		—	7	GW															

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Nicole MacDonald	Aug 17/15	20:00			

Page 2 of 2

Nº: T000662

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www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: Golder Associates
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa
Phone: 613 592 9600 Fax: 613 592 9601
Reports to be sent to:
1. Email: nicole_macdonald@golder.com
2. Email: darrin_johnson@golder.com

Project Information:

Project: DEW Line Landfill Monitoring
Site Location: DYE-M
Sampled By: DHP/KR
AGAT Quote #: 69566
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐
Company:
Contact: Don Plenderleith
Address:
Email: dplenderleith@golder.com

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☑ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Is this submission for a **Record of Site Condition**? ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Laboratory Use Only

Work Order #: ____
Cooler Quantity: ____
Arrival Temperatures: ____ | ____ | ____
____ | ____ | ____
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: ____

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply): ____
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	
MW 08-24 (0-15)	Aug 10/15	13:05	2	S	may be past hold time but please analyze anyway															X Quote 69566

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Nicole MacDonald	Aug 18/15	18:30			
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1
N°: T000663

AGAT Laboratories

5835 COOPERS AVENUE
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http://www.agatlabs.com

CLIENT NAME: **GOLDER ASSOCIATES LTD**
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: **Nicole MacDonald**

PROJECT: **DEW Line Landfill Monitoring**

AGAT WORK ORDER: **15Z009129**

SOIL ANALYSIS REVIEWED BY: **Anthony Dapaah, PhD (Chem), Inorganic Lab Manager**

TRACE ORGANICS REVIEWED BY: **Inga Kuzmina, Trace Organics Lab Manager**

WATER ANALYSIS REVIEWED BY: **Anthony Dapaah, PhD (Chem), Inorganic Lab Manager**

DATE REPORTED: **Nov 13, 2015**

PAGES (INCLUDING COVER): **14**

VERSION*: **2**

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

VERSION 2:Nov 13, 2015

The RDL for zinc has been revised to comply with the required regulatory standards.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested and to all the items tested
All reportable information as specified by ISO 17025:2005 is available from AGAT Laboratories upon request

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

Metals Scan (Soil) (incl. Hg)

DATE RECEIVED: 2015-08-18

DATE REPORTED: 2015-11-13

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: DM-17 (20-40) SAMPLE TYPE: Soil DATE SAMPLED: 8/11/2015 6878918	DM-34 (0-15) Soil 8/11/2015 6879007	DM-58 (40-50) Soil 8/11/2015 6879010	DM-40 (0-15) Soil 8/12/2015 6879013	DM-43 (20-30) Soil 8/12/2015 6879016	DM-46 (0-15) Soil 8/12/2015 6879044	DM-48 (0-15) Soil 8/12/2015 6879047	DM-49 (0-15) Soil 8/12/2015 6879050
Arsenic	µg/g		1	<1	<1	1	4	<1	5	19	2
Cadmium	µg/g		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cobalt	µg/g		0.5	15.1	10.0	18.9	9.3	11.0	12.0	48.9	17.1
Chromium	µg/g		2	20	30	79	586	105	159	477	220
Copper	µg/g		1	185	17	43	166	37	128	113	109
Lead	µg/g		1	11	5	15	8	3	9	26	15
Mercury	µg/g		0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	µg/g		1	49	60	100	41	34	49	369	88
Zinc	µg/g		2	132	41	124	234	71	148	146	157

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: MW05-15 (0-15) SAMPLE TYPE: Soil DATE SAMPLED: 8/12/2015 6879053	DM-08 (0-15) Soil 8/12/2015 6879056
Arsenic	µg/g		1	1	1
Cadmium	µg/g		0.5	<0.5	<0.5
Cobalt	µg/g		0.5	13.7	8.7
Chromium	µg/g		2	94	52
Copper	µg/g		1	43	24
Lead	µg/g		1	5	11
Mercury	µg/g		0.10	<0.10	<0.10
Nickel	µg/g		1	51	31
Zinc	µg/g		2	66	52

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6878918-6879056 Nov 13, 2015

The RDL for zinc has been revised to comply with the required regulatory standards.

Certified By:

Results relate only to the items tested and to all the items tested

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

O. Reg 153 Petroleum Hydrocarbon F1 - F4 (-BTEX) - Water

DATE RECEIVED: 2015-08-18

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW05-13
		SAMPLE TYPE:		Water
		DATE SAMPLED:		8/12/2015
Parameter	Unit	G / S	RDL	6879066
C6 - C10 (F1)	µg/L		25	<25
C6 - C10 (F1 minus BTEX)	µg/L		25	<25
C>10 - C16 (F2)	µg/L		100	<100
C>16 - C34 (F3)	µg/L		100	<100
C>34 - C50 (F4)	µg/L		100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6879066

The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
Total C6-C50 results are corrected for BTEX and PAH contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.

Certified By:

Results relate only to the items tested and to all the items tested

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Certificate of Analysis

AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) (-BTEX) - Soil

DATE RECEIVED: 2015-08-18

DATE REPORTED: 2015-11-13

Parameter	Unit	G / S	RDL	DM-17 (20-40) Soil 8/11/2015 6878918	DM-34 (0-15) Soil 8/11/2015 6879007	DM-58 (40-50) Soil 8/11/2015 6879010	DM-40 (0-15) Soil 8/12/2015 6879013	DM-43 (20-30) Soil 8/12/2015 6879016	DM-46 (0-15) Soil 8/12/2015 6879044	DM-48 (0-15) Soil 8/12/2015 6879047	DM-49 (0-15) Soil 8/12/2015 6879050
SAMPLE DESCRIPTION:											
SAMPLE TYPE:											
DATE SAMPLED:											
C6 - C10 (F1)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
C6 - C10 (F1 minus BTEX)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
C>10 - C16 (F2)	µg/g		4	<4	<4	<4	14	<4	<4	22	61
C>16 - C34 (F3)	µg/g		8	<8	<8	<8	<8	<8	<8	170	28
C>34 - C50 (F4)	µg/g		6	<6	<6	<6	<6	<6	<6	16	<6
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	15.4	4.3	5.9	15.2	3.4	11.5	12.0	13.8

Parameter	Unit	G / S	RDL	MW05-15 (0-15) Soil 8/12/2015 6879053	DM-08 (0-15) Soil 8/12/2015 6879056
SAMPLE DESCRIPTION:					
SAMPLE TYPE:					
DATE SAMPLED:					
C6 - C10 (F1)	µg/g		5	<5	<5
C6 - C10 (F1 minus BTEX)	µg/g		5	<5	<5
C>10 - C16 (F2)	µg/g		4	<4	<4
C>16 - C34 (F3)	µg/g		8	<8	13
C>34 - C50 (F4)	µg/g		6	<6	<6
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA
Moisture Content	%		0.1	8.8	6.9

Certified By:

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AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) (-BTEX) - Soil

DATE RECEIVED: 2015-08-18

DATE REPORTED: 2015-11-13

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6878918-6879056 Results are based on sample dry weight.The soil sample was prepared in the lab using the Methanol extraction technique. The sample was not field preserved with methanol and an Encore was not provided for analysis.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.

Certified By:

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AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

PCBs (Aroclors) - Soil

DATE RECEIVED: 2015-08-18

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		DM-17 (20-40)	DM-34 (0-15)	DM-58 (40-50)	DM-40 (0-15)	DM-43 (20-30)	DM-46 (0-15)	DM-48 (0-15)	DM-49 (0-15)
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/11/2015	8/11/2015	8/11/2015	8/12/2015	8/12/2015	8/12/2015	8/12/2015	8/12/2015
Parameter	**Unit**	**G / S**	**RDL**	**6878918**	**6879007**	**6879010**	**6879013**	**6879016**	**6879044**	**6879047**	**6879050**
Aroclor 1242	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1248	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.058	<0.05
Aroclor 1260	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PCBs	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.058	<0.05
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	60-130		108	96	112	88	120	108	104	120

		SAMPLE DESCRIPTION:		MW05-15 (0-15)	DM-08 (0-15)
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		8/12/2015	8/12/2015
Parameter	**Unit**	**G / S**	**RDL**	**6879053**	**6879056**
Aroclor 1242	µg/g		0.05	<0.05	<0.05
Aroclor 1248	µg/g		0.05	<0.05	<0.05
Aroclor 1254	µg/g		0.05	<0.05	<0.05
Aroclor 1260	µg/g		0.05	<0.05	<0.05
PCBs	µg/g		0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**			
Decachlorobiphenyl	%	60-130		68	124

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6878918-6879056 Results are based on the dry weight of soil extracted.

Certified By:

Results relate only to the items tested and to all the items tested

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

PCBs (water) (Aroclors)

DATE RECEIVED: 2015-08-18

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW05-13
		SAMPLE TYPE:		Water
		DATE SAMPLED:		8/12/2015
Parameter	**Unit**	**G / S**	**RDL**	**6879066**
Aroclor 1242	µg/L		0.05	<0.05
Aroclor 1248	µg/L		0.05	<0.05
Aroclor 1254	µg/L		0.05	<0.05
Aroclor 1260	µg/L		0.05	<0.05
PCBs	µg/L		0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**		
Decachlorobiphenyl	%	60-130		124

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

Results relate only to the items tested and to all the items tested

AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

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http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

Metals - CCME Metals - (Water) - mg/L (incl. Hg)

DATE RECEIVED: 2015-08-18

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW05-13
		SAMPLE TYPE:		Water
		DATE SAMPLED:		8/12/2015
Parameter	Unit	G / S	RDL	6879066
Arsenic	mg/L		0.001	<0.001
Cadmium	mg/L		0.00002	0.0017
Chromium	mg/L		0.002	<0.002
Cobalt	mg/L		0.001	<0.001
Copper	mg/L		0.002	0.002
Lead	mg/L		0.001	<0.001
Mercury	mg/L		0.000016	<0.000016
Nickel	mg/L		0.003	0.003
Zinc	mg/L		0.005	2.90

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals Scan (Soil) (incl. Hg)															
Arsenic	6879050	6879050	2	2	0.0%	< 1	108%	70%	130%	87%	80%	120%	93%	70%	130%
Cadmium	6879050	6879050	<0.5	<0.5	0.0%	< 0.5	100%	70%	130%	102%	80%	120%	100%	70%	130%
Cobalt	6879050	6879050	17.1	16.9	1.2%	< 0.5	93%	70%	130%	97%	80%	120%	97%	70%	130%
Chromium	6879050	6879050	220	215	2.3%	< 2	85%	70%	130%	97%	80%	120%	100%	70%	130%
Copper	6879050	6879050	109	109	0.0%	< 1	90%	70%	130%	100%	80%	120%	96%	70%	130%
Lead	6879050	6879050	15	12	22.2%	< 1	101%	70%	130%	100%	80%	120%	97%	70%	130%
Mercury	6879050	6879050	<0.10	<0.10	0.0%	< 0.10	100%	70%	130%	95%	80%	120%	94%	70%	130%
Nickel	6879050	6879050	88	86	2.3%	< 1	95%	70%	130%	96%	80%	120%	98%	70%	130%
Zinc	6879050	6879050	157	155	1.3%	< 2	100%	70%	130%	99%	80%	120%	93%	70%	130%

Certified By:

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) (-BTEX) - Soil															
C6 - C10 (F1)	6885032		< 5	< 5	0.0%	< 5	82%	70%	130%	86%	70%	130%	79%	70%	130%
C>10 - C16 (F2)	6867004		< 4	< 4	0.0%	< 4	104%	70%	130%	82%	70%	130%	88%	70%	130%
C>16 - C34 (F3)	6867004		< 8	< 8	0.0%	< 8	106%	70%	130%	101%	70%	130%	102%	70%	130%
C>34 - C50 (F4)	6867004		< 6	< 6	0.0%	< 6	88%	70%	130%	85%	70%	130%	73%	70%	130%
PCBs (Aroclors) - Soil															
Aroclor 1242	6879056		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1248	6879056		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1254	6879056		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1260	6879056		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
PCBs	6879056		< 0.05	< 0.05	0.0%	< 0.05	116%	60%	140%	90%	60%	140%	79%	60%	140%
O. Reg 153 Petroleum Hydrocarbon F1 - F4 (-BTEX) - Water															
C6 - C10 (F1)	6884967		< 25	< 25	0.0%	< 25	85%	60%	130%	86%	60%	130%	78%	60%	130%
C>10 - C16 (F2)	1	TW	<100	<100	0.0%	< 100	85%	70%	130%	75%	70%	130%	80%	70%	130%
C>16 - C34 (F3)		TW	< 100	< 100	0.0%	< 100	104%	70%	130%	116%	70%	130%	98%	70%	130%
C>34 - C50 (F4)		TW	< 100	< 100	0.0%	< 100	90%	70%	130%	112%	70%	130%	104%	70%	130%

Comments: TW: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.

PCBs (water) (Aroclors)															
Aroclor 1242	1	TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1248	1	TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1254	1	TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1260	1	TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
PCBs	1	TW	< 0.05	< 0.05	0.0%	< 0.05	123%	60%	140%	113%	60%	140%	109%	60%	140%

Comments: TW: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.

Certified By:

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Results relate only to the items tested and to all the items tested

AGAT Laboratories
5835 COOPERS AVENUE
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TEL (905)712-5100
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http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals - CCME Metals - (Water) - mg/L (incl. Hg)															
Arsenic	6879066	6879066	<0.001	<0.001	0.0%	< 0.001	100%	90%	110%	98%	90%	110%	98%	70%	130%
Cadmium	6879066	6879066	0.001	0.001	0.0%	< 0.00002	100%	90%	110%	108%	90%	110%	109%	70%	130%
Chromium	6879066	6879066	<0.002	<0.002	0.0%	< 0.002	100%	90%	110%	99%	90%	110%	94%	70%	130%
Cobalt	6879066	6879066	<0.001	<0.001	0.0%	< 0.001	105%	90%	110%	103%	90%	110%	98%	70%	130%
Copper	6879066	6879066	0.002	0.002	0.0%	< 0.002	101%	90%	110%	100%	90%	110%	89%	70%	130%
Lead	6879066	6879066	<0.001	<0.001	0.0%	< 0.001	100%	90%	110%	94%	90%	110%	89%	70%	130%
Mercury	6878508		<0.	<0.	0.0%	< 0.000016	97%	90%	110%	96%	90%	110%	95%	80%	120%
Nickel	6879066	6879066	0.003	0.003	0.0%	< 0.003	108%	90%	110%	105%	90%	110%	98%	70%	130%
Zinc	6879066	6879066	2.90	2.88	0.7%	< 0.005	100%	90%	110%	100%	90%	110%	103%	70%	130%

Comments: .

Certified By:

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z009129

PROJECT: DEW Line Landfill Monitoring

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Trace Organics Analysis			
C6 - C10 (F1)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C6 - C10 (F1 minus BTEX)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C>10 - C16 (F2)	VOL-91-5010	MOE PHC E3421	GC / FID
C>16 - C34 (F3)	VOL-91-5010	MOE PHC E3421	GC / FID
C>34 - C50 (F4)	VOL-91-5010	MOE PHC E3421	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE
C6 - C10 (F1)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P &T GC / FID
C6 - C10 (F1 minus BTEX)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P & T GC / FID
C>10 - C16 (F2)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>16 - C34 (F3)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>34 - C50 (F4)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	GRAVIMETRIC ANALYSIS
Moisture Content	VOL-91-5009	CCME Tier 1 Method, SW846 5035,8015	GC / FID
Aroclor 1242	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1248	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1254	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1260	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
PCBs	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1242	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1248	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1254	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1260	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Water Analysis			
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW-846 7470 & 245.1	CVAAS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

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AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: Golder Associates
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa
Phone: 613 592 9600 Fax: 613 592 9601
Reports to be sent to:
1. Email: nicole_macdonald@golder.com
2. Email: damin_johnson@golder.com

Project Information:

Project: DEW Line Landfill Monitoring
Site Location: DYE-M
Sampled By: DHP/KR
AGAT Quote #: 69566
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company: Golder Associates Ltd.
Contact: Don Plenderleith
Address:
Email: dplenderleith@golder.com

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☑ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Laboratory Use Only

Work Order #: 15Z009129 1bh
Cooler Quantity:
Arrival Temperatures: 9.6 | 8.9 | 8.8
Custody Seal Intact: ☐ Yes ☐ No ☑ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics (quote)	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ NO_2/NO_3 ☐ Total N ☑ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
~~Aug10/15~~			~~3~~	~~S~~	quote	X				X			X			X			
DM-17 (20-40)	Aug11/15	—	3	S		X				X			X			X			
DM-34 (0-15)	Aug11/15	—	3	S	69566	X				X			X			X			
DM-58 (40-50)	Aug11/15	—	3	S		X				X			X			X			

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Nicole MacDonald	Aug 17/15	20:00	Jeff Jones	18Aug/15	07:15
			Shaunn	Aug 19/15	9:55

Page 1 of 2
№: T000661

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AGAT Laboratories

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: Golder Associates
Contact: Nicole MacDonald
Address: 1931 Robertson Road
Phone: 613 592 9600 Fax: 613 592 9601
Reports to be sent to:
1. Email: nicole_macdonald@golder.com
2. Email: darrin_johnson@golder.com

Project Information:

Project: DEW Line Landfill Monitoring
Site Location: DYE-M
Sampled By: KR
AGAT Quote #: 69566
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company: Golder Associates Ltd
Contact: Don Plenderleith
Address:
Email: dplenderleith@golder.com

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☑ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures: 9.5 | 9.6 | 9.5
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics (quote)	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☑ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
DM-40 (0-15)	Aug 12/15		3	S		X				X			X				X		
DM-43 (20-30)		—	3	S															
DM-46 (0-15)			3	S	quote														
DM-48 (0-15)			3	S	69566														
DM-49 (0-15)		—	3	S															
MW05-15 (0-15)		"	3	S															
DM-08 (0-15)		"	3	S															
MW05-13		—	7	GW															

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Nicole MacDonald	Aug 17/15	20:00	JLH Jones	18/8/15	07:5
			Shamn	Aug 19/15	9:55

Page 2 of 2
N°: T000662

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Page 14 of 14

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Nicole MacDonald

PROJECT: DEW Line Landfill Monitoring

AGAT WORK ORDER: 15Z009791

SOIL ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Nov 13, 2015

PAGES (INCLUDING COVER): 8

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

VERSION 2:Nov 13, 2015

The RDL for zinc has been revised to comply with the required regulatory standards.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested and to all the items tested
All reportable information as specified by ISO 17025:2005 is available from AGAT Laboratories upon request

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Certificate of Analysis

AGAT WORK ORDER: 15Z009791

PROJECT: DEW Line Landfill Monitoring

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:DYE-M

SAMPLED BY:DHP/KR

Metals Scan (Soil) (incl. Hg)

DATE RECEIVED: 2015-08-19

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW 08-24 (0-15)
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		8/10/2015
Parameter	Unit	G / S	RDL	6887459
Arsenic	µg/g		1	<1
Cadmium	µg/g		0.5	<0.5
Cobalt	µg/g		0.5	13.9
Chromium	µg/g		2	81
Copper	µg/g		1	33
Lead	µg/g		1	14
Mercury	µg/g		0.10	<0.10
Nickel	µg/g		1	56
Zinc	µg/g		2	70

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6887459 The RDL for zinc has been revised to comply with the required regulatory standards.

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 15Z009791

PROJECT: DEW Line Landfill Monitoring

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:DYE-M

SAMPLED BY:DHP/KR

O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) in Soil

DATE RECEIVED: 2015-08-19

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW 08-24 (0-15)
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		8/10/2015
Parameter	Unit	G / S	RDL	6887459
Benzene	µg/g		0.02	<0.02
Toluene	µg/g		0.08	<0.08
Ethylbenzene	µg/g		0.05	1.3
Xylene Mixture (Total)	µg/g		0.05	2.4
C6 - C10 (F1)	µg/g		5	35
C6 - C10 (F1 minus BTEX)	µg/g		5	31
C>10 - C16 (F2)	µg/g		10	<10
C>16 - C34 (F3)	µg/g		50	<50
C>34 - C50 (F4)	µg/g		50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA
Moisture Content	%		0.1	20.0

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6887459 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Quality Control Data is available upon request.

Certified By:

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AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15Z009791

PROJECT: DEW Line Landfill Monitoring

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:DYE-M

SAMPLED BY:DHP/KR

PCBs (Aroclors) - Soil

DATE RECEIVED: 2015-08-19

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW 08-24 (0-15)
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		8/10/2015
Parameter	Unit	G / S	RDL	6887459
Aroclor 1242	µg/g		0.1	<0.1
Aroclor 1248	µg/g		0.1	<0.1
Aroclor 1254	µg/g		0.1	<0.1
Aroclor 1260	µg/g		0.1	<0.1
PCBs	µg/g		0.1	<0.1
Moisture Content	%		0.1	20.0
Surrogate	Unit	Acceptable Limits		
Decachlorobiphenyl	%	60-130		108

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6887459 Results are based on the dry weight of soil extracted.

Certified By:

Results relate only to the items tested and to all the items tested

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: DEW Line Landfill Monitoring
SAMPLING SITE:DYE-M

AGAT WORK ORDER: 15Z009791
ATTENTION TO: Nicole MacDonald
SAMPLED BY:DHP/KR

Soil Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals Scan (Soil) (incl. Hg)															
Arsenic	6886510		14	13	7.4%	< 1	106%	70%	130%	87%	80%	120%	88%	70%	130%
Cadmium	6886510		<0.5	<0.5	0.0%	< 0.5	103%	70%	130%	101%	80%	120%	103%	70%	130%
Cobalt	6886510		6.3	6.3	0.0%	< 0.5	94%	70%	130%	102%	80%	120%	97%	70%	130%
Chromium	6886510		26	25	3.9%	< 2	89%	70%	130%	106%	80%	120%	100%	70%	130%
Copper	6886510		35	35	0.0%	< 1	93%	70%	130%	108%	80%	120%	102%	70%	130%
Lead	6886510		23	23	0.0%	< 1	99%	70%	130%	96%	80%	120%	87%	70%	130%
Mercury	6886510		0.17	0.16	6.1%	< 0.10	106%	70%	130%	89%	80%	120%	89%	70%	130%
Nickel	6886510		13	13	0.0%	< 1	94%	70%	130%	102%	80%	120%	94%	70%	130%
Zinc	6886510		177	176	0.6%	< 2	98%	70%	130%	108%	80%	120%	106%	70%	130%

Certified By:

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AGAT Laboratories

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: DEW Line Landfill Monitoring
SAMPLING SITE:DYE-M

AGAT WORK ORDER: 15Z009791
ATTENTION TO: Nicole MacDonald
SAMPLED BY:DHP/KR

Trace Organics Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) in Soil															
Benzene	6885048		< 0.02	< 0.02	0.0%	< 0.02	109%	60%	130%	112%	60%	130%	100%	60%	130%
Toluene	6885048		< 0.08	< 0.08	0.0%	< 0.08	114%	60%	130%	114%	60%	130%	104%	60%	130%
Ethylbenzene	6885048		< 0.05	< 0.05	0.0%	< 0.05	111%	60%	130%	115%	60%	130%	103%	60%	130%
Xylene Mixture (Total)	6885048		< 0.05	< 0.05	0.0%	< 0.05	111%	60%	130%	115%	60%	130%	104%	60%	130%
C6 - C10 (F1)	6885048		< 5	< 5	0.0%	< 5	83%	60%	130%	86%	60%	130%	72%	60%	130%
C>10 - C16 (F2)	6880985		< 10	< 10	0.0%	< 10	108%	70%	130%	98%	70%	130%	77%	70%	130%
C>16 - C34 (F3)	6880985		< 50	< 50	0.0%	< 50	98%	70%	130%	102%	70%	130%	100%	70%	130%
C>34 - C50 (F4)	6880985		< 50	< 50	0.0%	< 50	98%	70%	130%	96%	70%	130%	96%	70%	130%
PCBs (Aroclors) - Soil															
Aroclor 1242	6885277		< 0.1	< 0.1	0.0%	< 0.1	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1248	6885277		< 0.1	< 0.1	0.0%	< 0.1	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1254	6885277		< 0.1	< 0.1	0.0%	< 0.1	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1260	6885277		< 0.1	< 0.1	0.0%	< 0.1	NA	60%	130%	NA	60%	130%	NA	60%	130%
PCBs	6885277		< 0.1	< 0.1	0.0%	< 0.1	117%	60%	140%	88%	60%	140%	92%	60%	140%

Certified By:

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z009791

PROJECT: DEW Line Landfill Monitoring

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:DYE-M

SAMPLED BY:DHP/KR

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Trace Organics Analysis			
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture (Total)	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
C6 - C10 (F1)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
C6 - C10 (F1 minus BTEX)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
C>10 - C16 (F2)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
C>16 - C34 (F3)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
C>34 - C50 (F4)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL - 5012	CCME Tier 1 Method	GRAVIMETRIC ANALYSIS
Moisture Content	VOL-91-5009	CCME Tier 1 Method	Balance
Aroclor 1242	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1248	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1254	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1260	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
PCBs	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Moisture Content		MOE E3139	BALANCE
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD

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AGAT Laboratories
5835 Coopers Avenue
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www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: Golder Associates
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa
Phone: 613 592 9600 Fax: 613 592 9601
Reports to be sent to:
1. Email: nicole_macdonald@golder.com
2. Email: darrin_johnson@golder.com

Project Information:

Project: DEW Line Landfill Monitoring
Site Location: DYE-M
Sampled By: DHP/KR
AGAT Quote #: 69566
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact: Don Plenderleith
Address:
Email: dplenderleith@golder.com

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☑ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Laboratory Use Only

Work Order #: 1SZ009791
Cooler Quantity:
Arrival Temperatures: 9.7 | 9.3 | 8.9
Custody Seal Intact: ☐ Yes ☐ No ☑ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	Quote 69566
MW 08-24 (0-15)	Aug 10/15	13:05	2	S	may be past hold time but please analyze anyway															X

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Nicole MacDonald	Aug 18/15	18:30	Jeff Jans	19/Aug/15	7:50
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
			Shaemin Aug 2015	9:35	

Page 1 of 1
N°: T000663

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Nicole Macdonald

PROJECT: DEW Line Site

AGAT WORK ORDER: 15T008576

SOIL ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

TRACE ORGANICS REVIEWED BY: Inga Kuzmina, Trace Organics Lab Manager

WATER ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

DATE REPORTED: Nov 13, 2015

PAGES (INCLUDING COVER): 12

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

VERSION 2:Nov 13, 2015

The RDL for zinc has been revised to comply with the required regulatory standards.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested and to all the items tested
All reportable information as specified by ISO 17025:2005 is available from AGAT Laboratories upon request

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

Metals Scan (Soil) (incl. Hg)

DATE RECEIVED: 2015-08-17

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		DM-03 (40-50)
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		8/9/2015
Parameter	Unit	G / S	RDL	6876143
Arsenic	µg/g		1	1
Cadmium	µg/g		0.5	<0.5
Cobalt	µg/g		0.5	7.6
Chromium	µg/g		2	48
Copper	µg/g		1	28
Lead	µg/g		1	3
Mercury	µg/g		0.10	<0.10
Nickel	µg/g		1	29
Zinc	µg/g		2	33

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6876143 Nov 13, 2015

The RDL for zinc has been revised to comply with the required regulatory standards.

Certified By:

Results relate only to the items tested and to all the items tested

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

O. Reg 153 Petroleum Hydrocarbon F1 - F4 (-BTEX) - Water

DATE RECEIVED: 2015-08-17

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW0505
		SAMPLE TYPE:		Water
		DATE SAMPLED:		8/9/2015
Parameter	Unit	G / S	RDL	6876107
C6 - C10 (F1)	µg/L		25	<25
C6 - C10 (F1 minus BTEX)	µg/L		25	<25
C>10 - C16 (F2)	µg/L		100	<100
C>16 - C34 (F3)	µg/L		100	<100
C>34 - C50 (F4)	µg/L		100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6876107 The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
Total C6-C50 results are corrected for BTEX and PAH contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.

Certified By:

Results relate only to the items tested and to all the items tested

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Certificate of Analysis

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) (-BTEX) - Soil

DATE RECEIVED: 2015-08-17

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		DM-03 (40-50)
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		8/9/2015
Parameter	Unit	G / S	RDL	6876143
C6 - C10 (F1)	µg/g		5	<5
C6 - C10 (F1 minus BTEX)	µg/g		5	<5
C>10 - C16 (F2)	µg/g		4	<4
C>16 - C34 (F3)	µg/g		8	<8
C>34 - C50 (F4)	µg/g		6	<6
Gravimetric Heavy Hydrocarbons	µg/g		50	NA
Moisture Content	%		0.1	10.5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6876143 Results are based on sample dry weight.The soil sample was prepared in the lab using the Methanol extraction technique. The sample was not field preserved with methanol and an Encore was not provided for analysis.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.

Certified By:

Results relate only to the items tested and to all the items tested

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Certificate of Analysis

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

PCBs (Aroclors) - Soil

DATE RECEIVED: 2015-08-17

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		DM-03 (40-50)
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		8/9/2015
Parameter	Unit	G / S	RDL	6876143
Aroclor 1242	µg/g		0.05	<0.05
Aroclor 1248	µg/g		0.05	<0.05
Aroclor 1254	µg/g		0.05	<0.05
Aroclor 1260	µg/g		0.05	<0.05
PCBs	µg/g		0.05	<0.05
Surrogate	Unit	Acceptable Limits		
Decachlorobiphenyl	%	60-130		84

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6876143 Results are based on the dry weight of soil extracted.

Certified By:

Results relate only to the items tested and to all the items tested

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Certificate of Analysis

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

PCBs (water) (Aroclors)

DATE RECEIVED: 2015-08-17

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW0505
		SAMPLE TYPE:		Water
		DATE SAMPLED:		8/9/2015
Parameter	Unit	G / S	RDL	6876107
Aroclor 1242	µg/L		0.05	<0.05
Aroclor 1248	µg/L		0.05	<0.05
Aroclor 1254	µg/L		0.05	<0.05
Aroclor 1260	µg/L		0.05	<0.05
PCBs	µg/L		0.05	<0.05
Surrogate	Unit	Acceptable Limits		
Decachlorobiphenyl	%	60-130		80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

CCME Metals - (Water) (incl. Hg)

DATE RECEIVED: 2015-08-17

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW0505
		SAMPLE TYPE:		Water
		DATE SAMPLED:		8/9/2015
Parameter	Unit	G / S	RDL	6876107
Arsenic	mg/L		0.001	<0.001
Cadmium	mg/L		0.00002	0.00033
Chromium	mg/L		0.002	<0.002
Cobalt	mg/L		0.001	0.001
Copper	mg/L		0.002	0.003
Lead	mg/L		0.001	0.022
Mercury	mg/L		0.000016	0.000017
Nickel	mg/L		0.003	0.009
Zinc	mg/L		0.005	4.05

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals Scan (Soil) (incl. Hg)															
Arsenic	6876369		2	3	NA	< 1	100%	70%	130%	84%	80%	120%	85%	70%	130%
Cadmium	6876369		<0.5	<0.5	0.0%	< 0.5	99%	70%	130%	102%	80%	120%	97%	70%	130%
Cobalt	6876369		5.3	5.6	5.5%	< 0.5	86%	70%	130%	96%	80%	120%	91%	70%	130%
Chromium	6876369		12	12	0.0%	< 2	79%	70%	130%	99%	80%	120%	94%	70%	130%
Copper	6876369		10	11	9.5%	< 1	85%	70%	130%	95%	80%	120%	89%	70%	130%
Lead	6876369		8	9	11.8%	< 1	90%	70%	130%	90%	80%	120%	87%	70%	130%
Mercury	6876369		<0.10	<0.10	0.0%	< 0.10	100%	70%	130%	96%	80%	120%	94%	70%	130%
Nickel	6876369		11	11	0.0%	< 1	92%	70%	130%	97%	80%	120%	91%	70%	130%
Zinc	6876369		28	30	6.9%	< 2	92%	70%	130%	96%	80%	120%	90%	70%	130%

Comments: NA Signifies Not Applicable.
RPD Qualifier for Arsenic: As the average value for the sample and a duplicate is less than 5X RDL, lab's RPD acceptance criteria is not applicable.

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http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg 153 Petroleum Hydrocarbon F1 - F4 (-BTEX) - Water															
C6 - C10 (F1)	6875872		26	31	17.5%	< 25	104%	60%	130%	104%	60%	130%	89%	60%	130%
C>10 - C16 (F2)		TW	< 100	< 100	0.0%	< 100	101%	70%	130%	71%	70%	130%	80%	70%	130%
C>16 - C34 (F3)		TW	< 100	< 100	0.0%	< 100	106%	70%	130%	103%	70%	130%	78%	70%	130%
C>34 - C50 (F4)		TW	< 100	< 100	0.0%	< 100	88%	70%	130%	95%	70%	130%	80%	70%	130%
Comments: TW: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.															
O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) (-BTEX) - Soil															
C6 - C10 (F1)	6875161		< 5	< 5	0.0%	< 5	80%	70%	130%	93%	70%	130%	77%	70%	130%
C>10 - C16 (F2)	6876356		< 4	< 4	0.0%	< 4	104%	70%	130%	82%	70%	130%	88%	70%	130%
C>16 - C34 (F3)	6876356		< 8	< 8	0.0%	< 8	106%	70%	130%	101%	70%	130%	102%	70%	130%
C>34 - C50 (F4)	6876356		< 6	< 6	0.0%	< 6	88%	70%	130%	85%	70%	130%	73%	70%	130%
PCBs (water) (Aroclors)															
Aroclor 1242		TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1248		TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1254		TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1260		TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
PCBs		TW	< 0.05	< 0.05	0.0%	< 0.05	124%	60%	140%	124%	60%	140%	104%	60%	140%
Comments: TW:Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.															
PCBs (Aroclors) - Soil															
Aroclor 1242	6862099		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1248	6862099		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1254	6862099		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1260	6862099		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
PCBs	6862099		< 0.05	< 0.05	0.0%	< 0.05	124%	60%	140%	107%	60%	140%	106%	60%	140%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
CCME Metals - (Water) (incl. Hg)															
Arsenic	6866801		0.003	0.003	0.0%	< 0.001	107%	90%	110%	104%	90%	110%	106%	70%	130%
Cadmium	6866801		0.00007	0.00006	15.4%	< 0.00002	104%	90%	110%	103%	90%	110%	107%	70%	130%
Chromium	6866801		<0.002	<0.002	0.0%	< 0.002	105%	90%	110%	108%	90%	110%	100%	70%	130%
Cobalt	6866801		<0.001	<0.001	0.0%	< 0.001	107%	90%	110%	107%	90%	110%	104%	70%	130%
Copper	6866801		<0.002	<0.002	0.0%	< 0.002	103%	90%	110%	106%	90%	110%	94%	70%	130%
Lead	6866801		<0.001	<0.001	0.0%	< 0.001	107%	90%	110%	105%	90%	110%	99%	70%	130%
Mercury	6878508		<0.	<0.	0.0%	< 0.0001	97%	90%	110%	96%	90%	110%	95%	80%	120%
Nickel	6866801		<0.003	<0.003	0.0%	< 0.003	104%	90%	110%	107%	90%	110%	97%	70%	130%
Zinc	6866801		<0.005	<0.005	0.0%	< 0.005	110%	90%	110%	108%	90%	110%	108%	70%	130%

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15T008576

PROJECT: DEW Line Site

ATTENTION TO: Nicole Macdonald

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Trace Organics Analysis			
C6 - C10 (F1)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C6 - C10 (F1 minus BTEX)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C>10 - C16 (F2)	VOL-91-5010	MOE PHC E3421	GC / FID
C>16 - C34 (F3)	VOL-91-5010	MOE PHC E3421	GC / FID
C>34 - C50 (F4)	VOL-91-5010	MOE PHC E3421	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE
C6 - C10 (F1)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P &T GC / FID
C6 - C10 (F1 minus BTEX)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P & T GC / FID
C>10 - C16 (F2)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>16 - C34 (F3)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>34 - C50 (F4)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	GRAVIMETRIC ANALYSIS
Moisture Content	VOL-91-5009	CCME Tier 1 Method, SW846 5035,8015	GC / FID
Aroclor 1242	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1248	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1254	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1260	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
PCBs	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1242	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1248	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1254	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1260	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Water Analysis			
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW-846 7470 & 245.1	CVAAS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

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16

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only

Work Order #: 1ST008570

Cooler Quantity:

Arrival Temperatures: 7.4 | 7.5 | 7.3
6.0 | 5.4 | 5.1

Custody Seal Intact: ☐ Yes ☐ No ☒ N/A

Notes:

Report Information:

Company: Golder Associates
Contact: 1931 Robertson Rd
Address: Ottawa

Phone: 613 592 9600 Fax:

Reports to be sent to:
1. Email: Nicole_MacDonald@golder.com
2. Email: Darrin_Johnson@golder.com

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ (Indicate One)
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture (Check One)
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm

Region ____ (Indicate One)

☐ Regulation 558
☑ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other ____ (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: DEW Line Site
Site Location: DYG-M.
Sampled By: DNP / ICR
AGAT Quote #: 69566 PO:

Please note: If quotation number is not provided, client will be billed full price for analysis

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company: Golder
Contact: Don Plenderleith
Address:
Email: dplenderleith@golder.com

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐ B-HWS ☐ Cr ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☑ Hg ☐ pH ☐ SAR | Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2 | Volatiles: ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | | |

DYE-M -Lower Site Tier II Disposal Facility - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic mean						43	38	12	1.0	10	84	94	1.0	0.50	0.0002				N/A
Baseline Data - Arithmetic mean						**28**	**38**	**12**	**1.0**	**10**	**47**	**72**	**1.0**	**0.10**	**0.050**	**10**	**4**	**15**	**25**
Baseline Data - Standard Deviation						8.2	8.5	2.8	0.00	0.0	10	16	0.57	0.0	0.012	0.0	4.8	13	13
Baseline Data mean + 3xStandard Deviation						52	64	20	1.0	10	79	120	2.7	0.10	0.086	10	18	55	65
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
DEW Line Cleanup Tier II Criteria & Hydrocarbon Action Level						*100*	*100*	*50*	*5*	*500*	*500*	*250*	*30*	*2.0*	*5*				*2500*
Monitoring Data																**TPH Sum will appear when F1, F2 and F3 fractions are entered.**			
Upgradient																			
	BMW #05-16 surface																		
14-8455	BMW 05-16	2014	Year 1	Phase I	5-10	24	**44**	9.8	<1.0	<10	**51**	**86**	**1.0**	<0.010	<0.010	<10	<10	<10	15
MW 05-16 (0-15)	BMW 05-16	2015	Year 2	Phase I	0-15	**34.6**	**41.5**	**12.4**	<0.5	5.5	**51**	**88.1**	**1.6**	<0.1	<0.05	<7	<4	<8	10
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	BMW #05-16 depth																		
14-8457	BMW 05-16	2014	Year 1	Phase I	45-50	**33**	**52**	11	<1.0	<10	**69**	**95**	**1.7**	<0.010	<0.010	<10	<10	<10	15
MW 05-16 (40-50)	BMW 05-16	2015	Year 2	Phase I	40-50	**33.1**	**41.3**	**13.2**	<0.5	5.4	**52**	**90.7**	**1.4**	<0.1	<0.05	<7	<4	<8	10
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M -Lower Site Tier II Disposal Facility - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			
	MW #05-13 surface																		
14-8464	MW 05-13	2014	Year 1	Phase I	5-10	14	26	5.4	<1.0	<10	30	49	0.9	<0.010	<0.010	<10	<10	<10	15
MW 05-13 (0-15)	MW 05-13	2015	Year 2	Phase I	0-15	21.8	33.7	8.9	<0.5	3.7	35.9	60.4	**1.3**	<0.1	<0.05	<7	<4	<8	10
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW #05-13 depth																		
14-8465	MW 05-13	2014	Year 1	Phase I	45-50	15	30	6.6	<1.0	<10	36	54	0.9	<0.010	<0.010	<10	<10	<10	15
MW 05-13 (20-30)	MW 05-13	2015	Year 2	Phase I	20-30	20.8	30.7	8.6	<0.5	3.5	33.6	56.3	<1	<0.1	<0.05	<7	<4	<8	10
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M -Lower Site Tier II Disposal Facility - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW #05-15 surface																		
14-8458	MW 05-15	2014	Year 1	Phase I	5-10	25	**44**	10	<1.0	<10	**55**	**91**	**1.5**	<0.010	<0.010	<10	<10	<10	15
MW05-15 (0-15) (Dup A	MW 05-15	2015	Year 2	Phase I	0-15	**39**	**48**	**13.9**	<0.5	5	**61**	**93**	**1**	<0.1	<0.05	<6	<4	<8	9
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW #05-15 depth																		
14-8460/61	MW 05-15	2014	Year 1	Phase I	45-50	25	**41**	9.1	<1.0	<10	**49**	**76**	**1.7**	<0.010	<0.010	<10	<10	<10	15
MW05-15 (30-40)	MW 05-15	2015	Year 2	Phase I	30-40	**34.1**	**42.5**	**13.2**	<0.5	5.2	**53.3**	**88.9**	**1.6**	<0.1	<0.05	<7	<4	<8	10
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M -Lower Site Tier II Disposal Facility - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW #12-01 surface																		
14-8462	MW 12-01	2014	Year 1	Phase I	5-10	14	24	5.7	<1.0	<10	33	51	0.8	<0.010	<0.010	<10	<10	<10	15
MW 12-01 (0-15)	MW 12-01	2015	Year 2	Phase I	0-15	**27.7**	32.8	9.6	<0.5	4.4	42	69	**1.5**	<0.1	<0.05	<7	<4	<8	10
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW #12-01 depth																		
14-8463	MW 12-01	2014	Year 1	Phase I	40-45	25	**39**	8.1	<1.0	<10	47	69	**1.2**	<0.010	<0.010	<10	<10	<10	15
MW 12-01 (20-30)	MW 12-01	2015	Year 2	Phase I	20-30	27.5	32.3	10	<0.5	4.7	42	70.5	**1**	<0.1	<0.05	<7	<4	<8	10
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

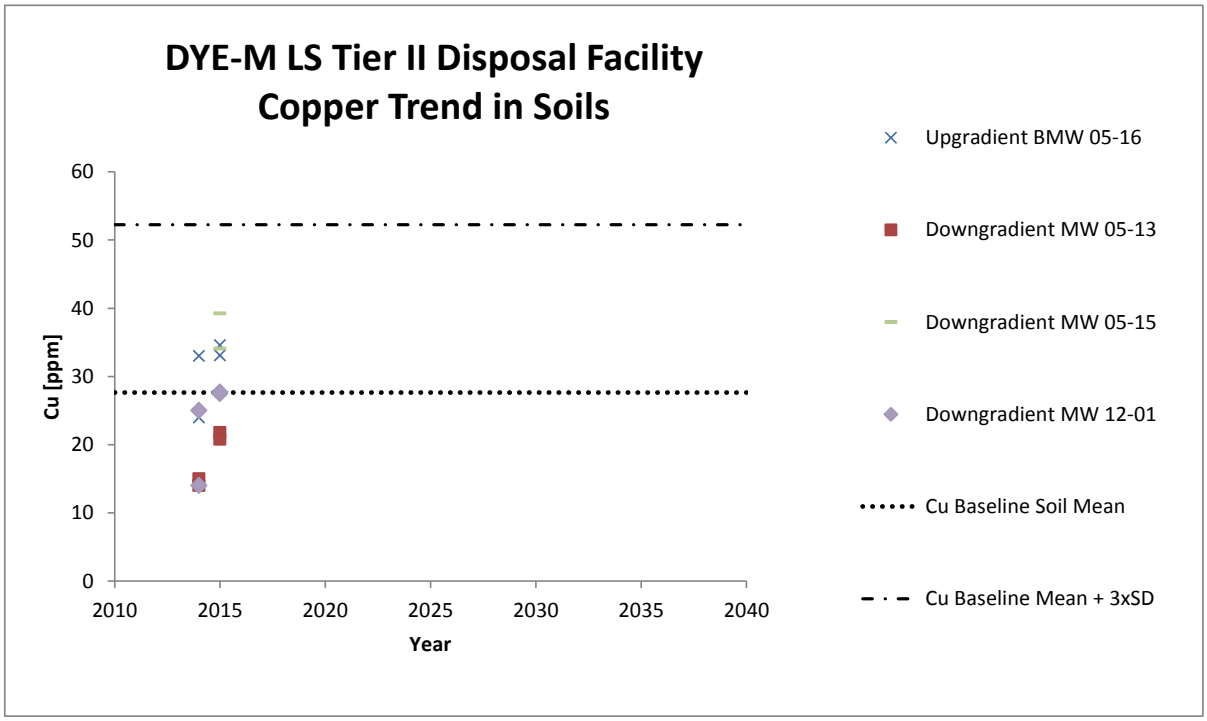
Legend

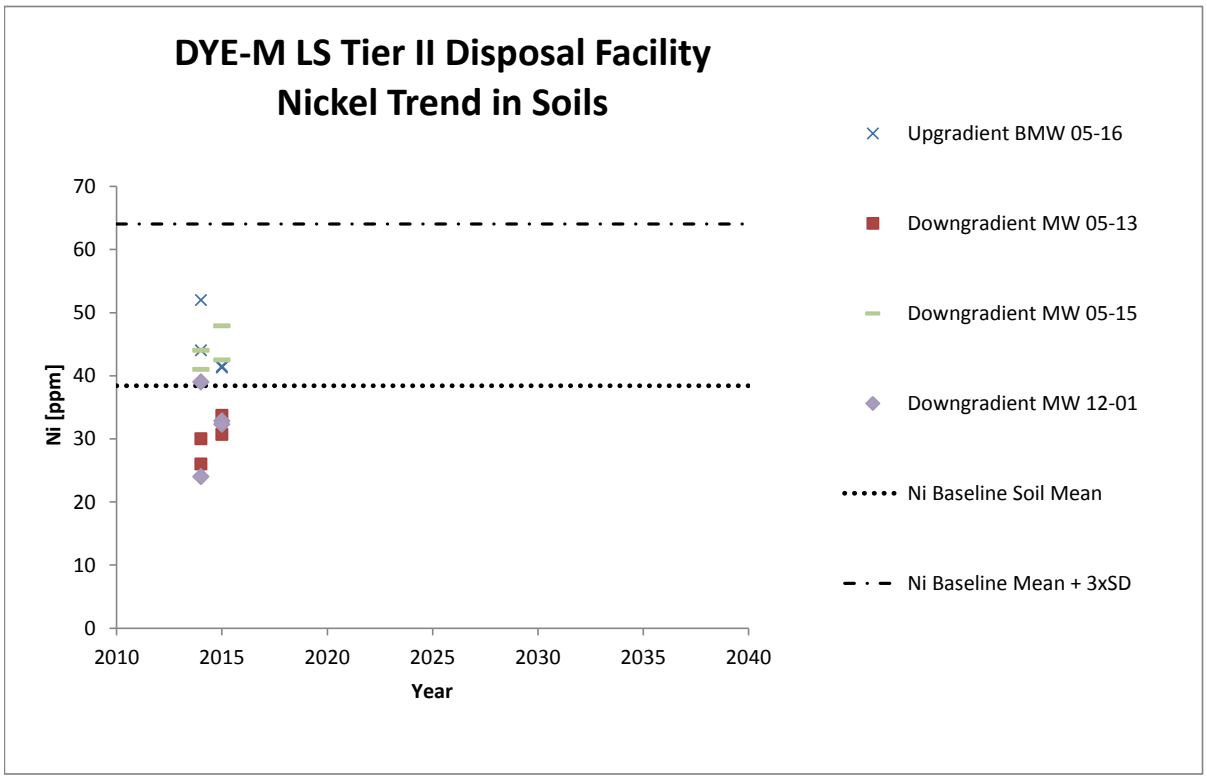
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

DYE-M Lower Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

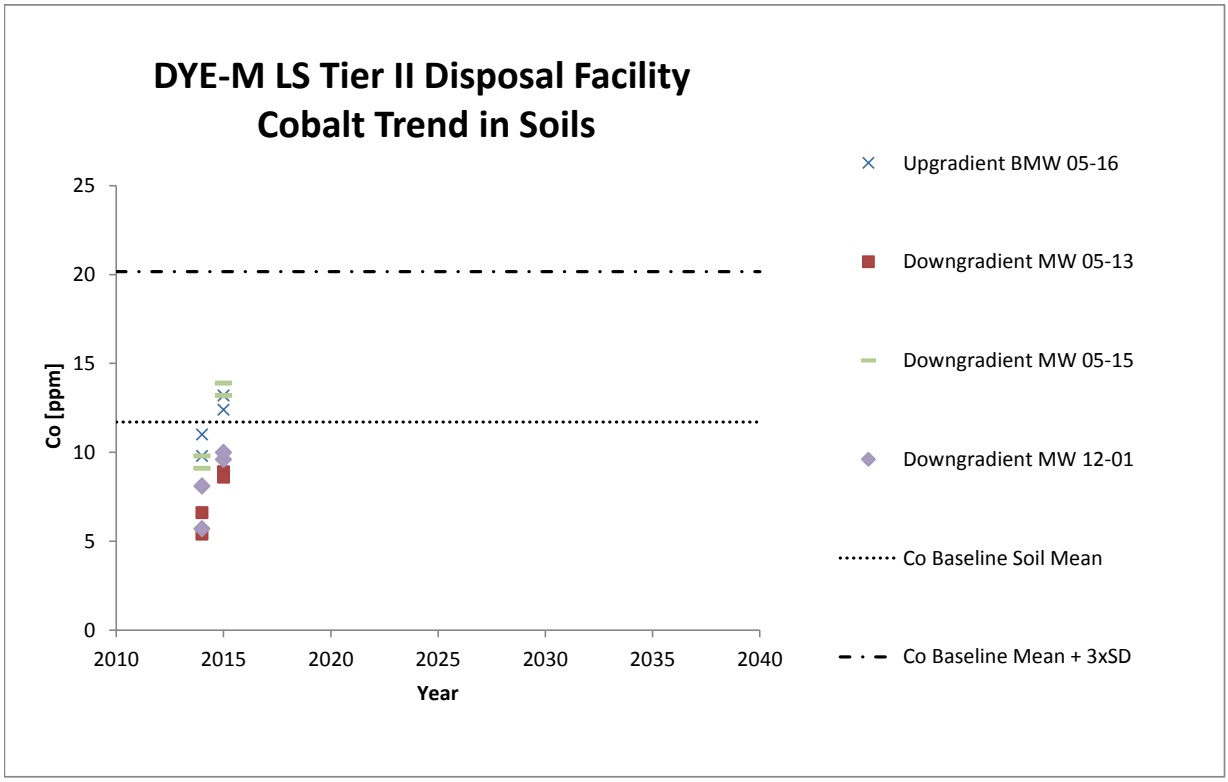
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

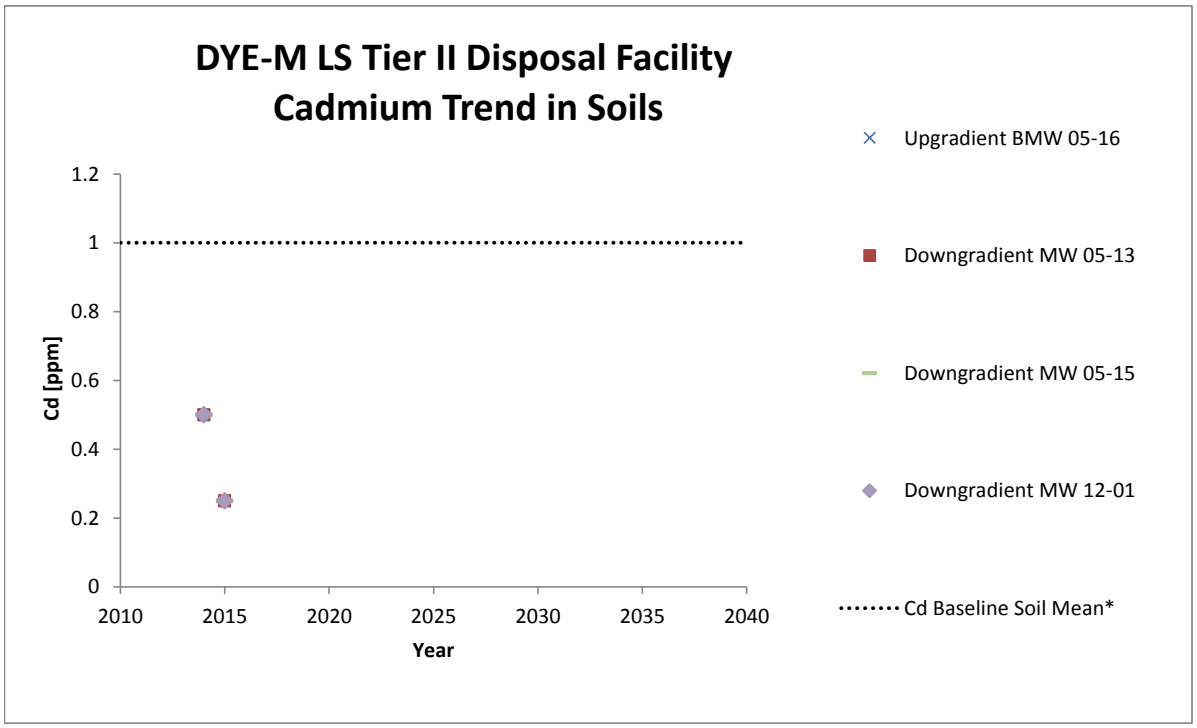
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





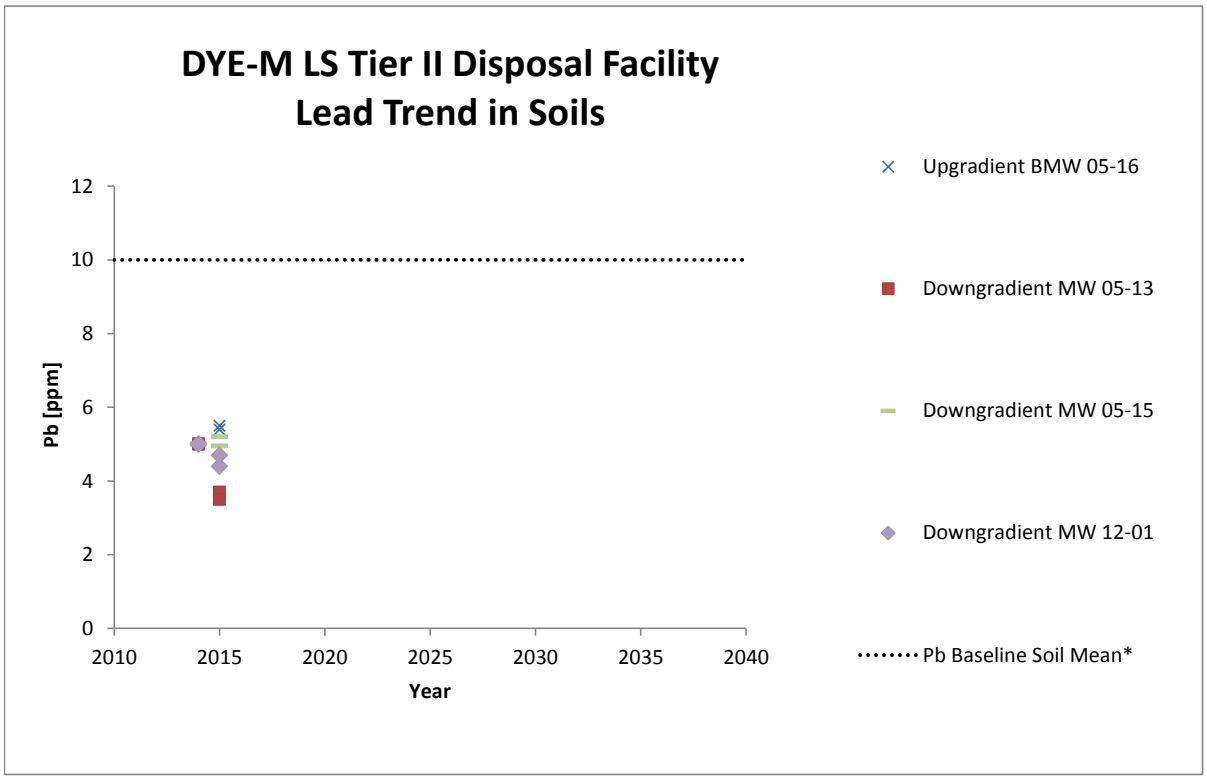
DYE-M Lower Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



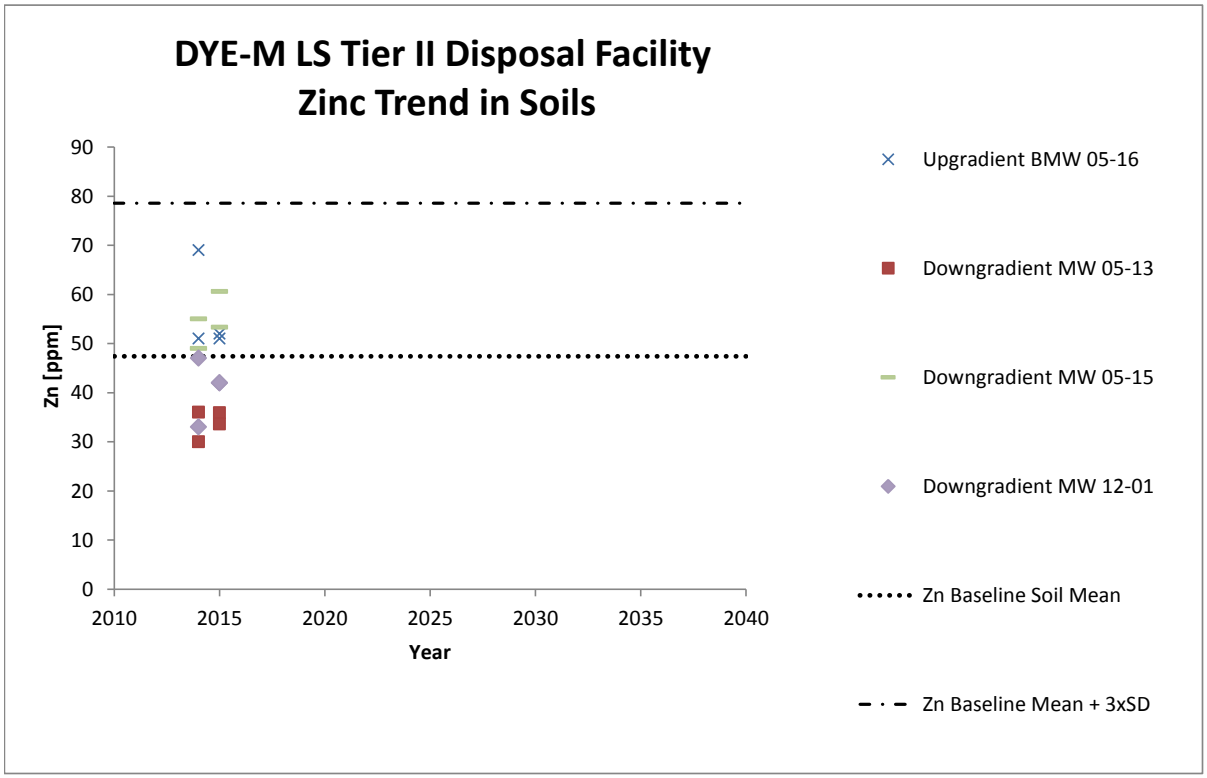


*Cd Baseline Mean is equal to the baseline detection limit.
Cd Baseline SD = 0

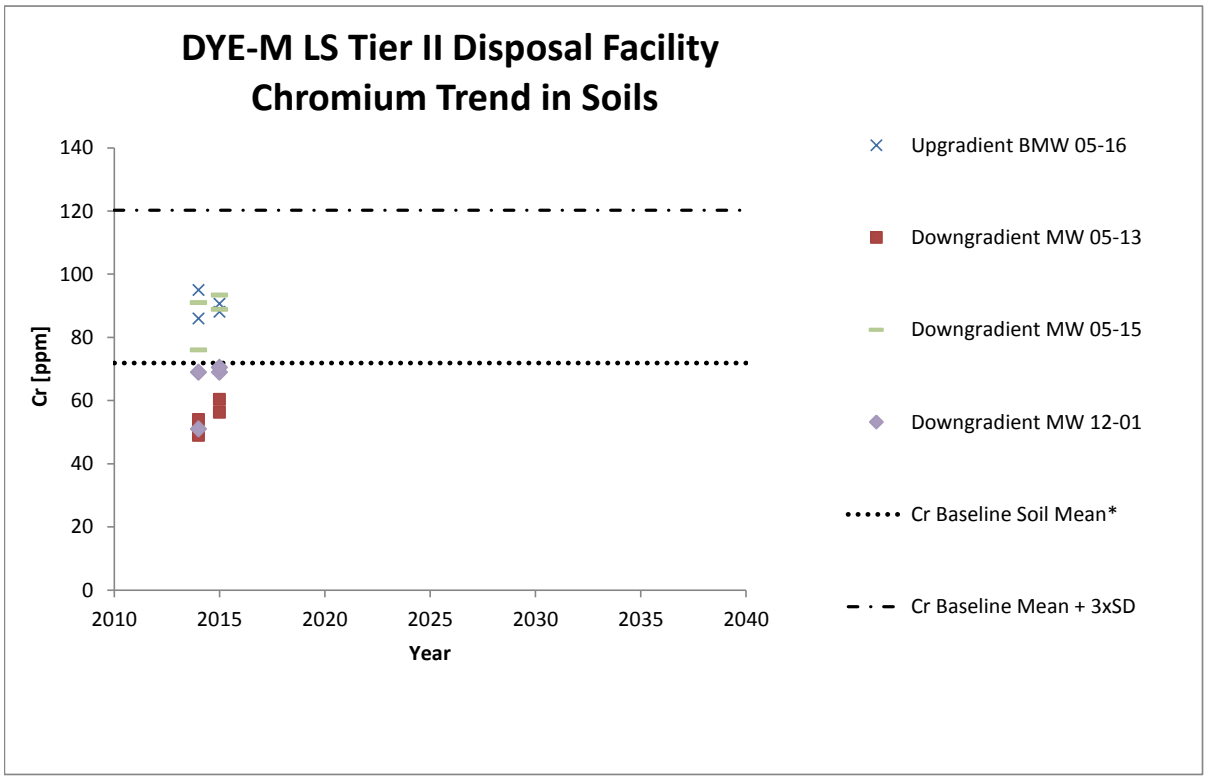
DYE-M Lower Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



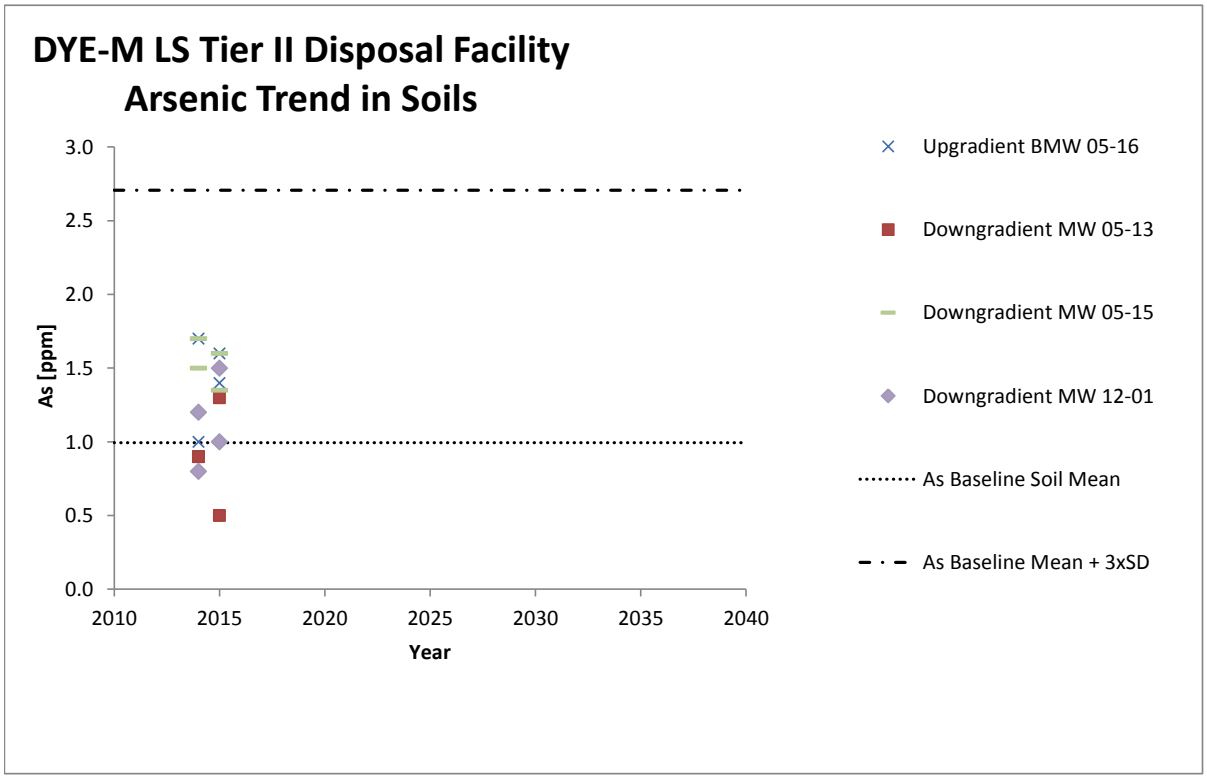
*Pb Baseline Mean is equal to the baseline detection limit.
Pb Baseline SD = 0



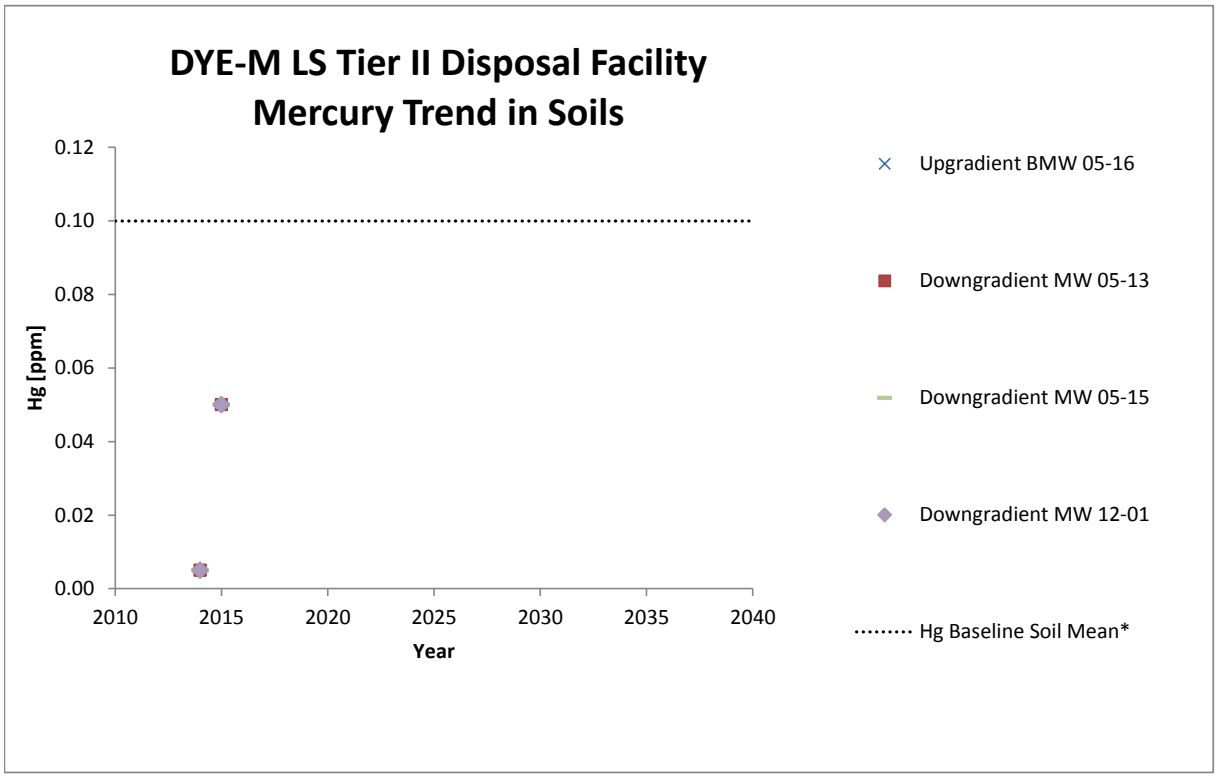
DYE-M Lower Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



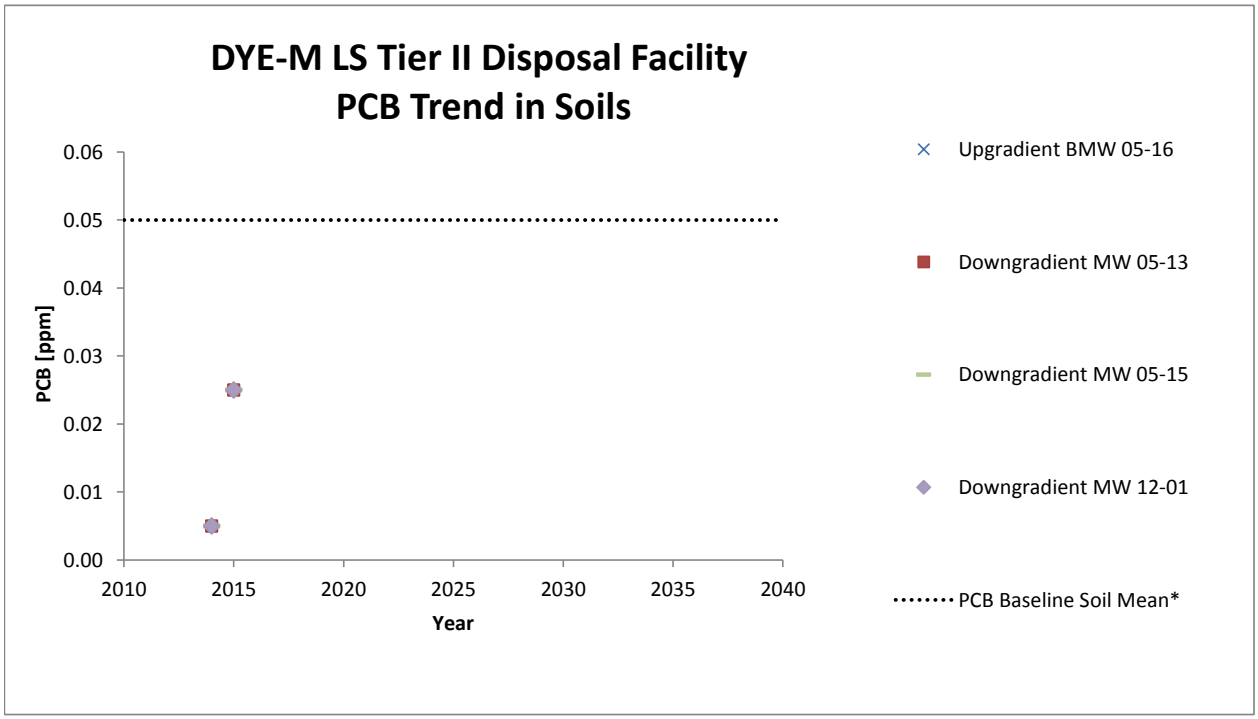
*Cr Baseline Mean is equal to the baseline detection limit.



DYE-M Lower Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

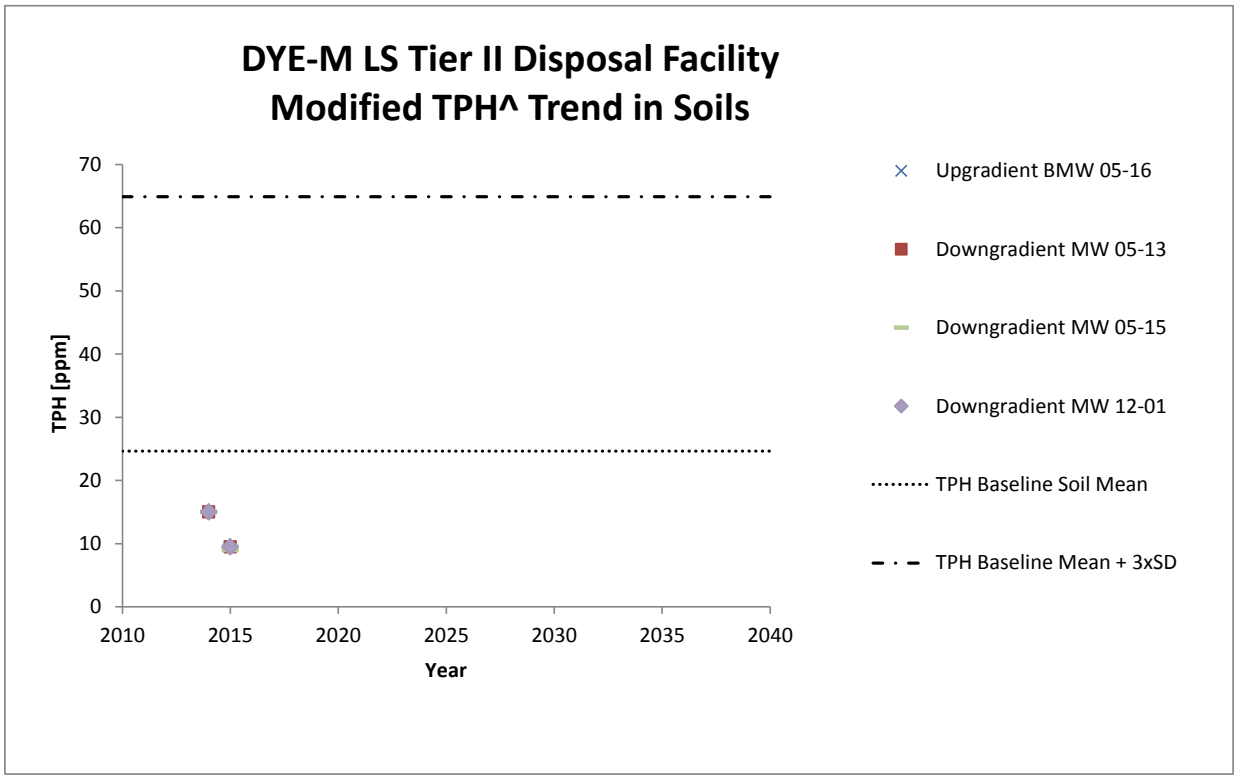


*Hg Baseline Mean is equal to the baseline detection limit.



*PCB Baseline Mean is equal to the baseline detection limit.
*PCB SD=0

DYE-M Lower Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M LS Tier II Disposal Facility - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Baseline Data																		
Upgradient:																		
07-30674	BMW05-16	2007			0.024	0.0730	0.004	<0.0010	<0.010	0.9	0.103	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
08-9734	BMW05-16	2008			0.180	0.3100	0.041	<0.0010	0.013	1.4	0.540	0.004	<0.00040	0.000040	<0.050	<0.50	<1.0	0.8
11-12205	BMW05-16	2011			<0.0050	0.0102	<0.0030	<0.0010	<0.010	10	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
12-34983	BMW05-16	2012			<0.0050	0.0070	<0.0030	<0.0010	<0.0050	14	0.120	0.002	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13- All wells were dry in 2013		2013																
Downgradient:																		
07-30670/71	MW05-13	2007			0.016	0.048	0.004	<0.0010	<0.010	0.93	0.051	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
07-30673	MW05-14	2007			0.043	0.23	0.011	<0.0010	<0.010	2.6	0.30	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
07-30672	MW05-15	2007			0.100	0.14	0.0240	<0.0010	<0.010	0.9	0.190	0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
08-9733	MW05-13	2008			0.090	0.23	0.021	<0.0010	0.021	0.4	0.410	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
08-9732	MW05-14	2008			0.020	0.19	0.0050	<0.0010	<0.010	3.6	0.350	<0.0030	<0.00040	0.00002	<0.050	<0.50	<1.0	0.8
08-9731	MW05-15	2008			0.065	0.36	0.020	<0.0010	<0.010	0.48	0.800	<0.0030	<0.00040	0.00070	<0.050	<0.50	<1.0	0.8
09-21563	MW05-13	2009			0.028	0.06	0.0065	<0.0010	<0.010	2.5	0.088	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
09-21562	MW05-15	2009			0.120	0.29	0.035	0.0014	0.015	0.58	0.530	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12204	MW05-13	2011			<0.0050	<0.0050	<0.0030	<0.0010	<0.010	2.3	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12203	MW05-15	2011			<0.0050	<0.0050	<0.0030	<0.0010	<0.010	6.6	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
12-34979	MW05-13	2012			<0.0050	0.006	<0.0030	<0.0010	<0.0050	1.4	0.170	0.0020	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
12-34980/81	MW05-15	2012			<0.0050	0.011	<0.0030	<0.0010	<0.0050	4.8	0.190	0.005	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
12-34982	MW12-01	2012			<0.0050	0.0110	<0.0030	<0.0010	<0.0050	0.05	0.370	0.0030	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13- All wells were dry in 2013		2013																
	N value				17	17	17	17	17	17	17	17	17	17	17	17	17	17
	Arithmetic Mean				**0.07**	**0.19**	**0.017**	**0.001**	**0.008**	**3.1**	**0.30**	**0.002**	**0.0002**	**0.0004**	**0.025**	**0.25**	**0.50**	**0.25**
	Arithmetic Mean Corrected for Detection Limits				**0.07**	**0.19**	**0.017**	**0.001**	**0.010**	**3.1**	**0.30**	**0.003**	**0.0004**	**0.003**	**0.050**	**0.50**	**1.0**	**0.50**
	Standard Deviation				0.054	0.11	0.013	0.0003	0.006	3.8	0.21	0.0009	0.0	0.0	0.0	0.0	0.0	0.0
	Arithmetic Mean + 3xStandard Deviation				0.23	0.52	0.057	0.0019	0.027	15	0.94	0.0058	0.0004	0.0049	0.050	0.50	1.0	0.25
	Detection Limit				0.005	0.005	0.003	0.001	0.010	0.010	0.005	0.003	0.0004	0.003	0.050	0.50	1.0	1.0
Monitoring Data																		
Upgradient - BMW 05-16																		
Not sampled - well dry/ frozen at depth	BMW 05-16	2014	Year 1	Phase I														#N/A
MW05-16	BMW 05-16	2015	Year 2	Phase I	0.0013	0.002	<0.0005	<0.0001	0.002	**4.96**	<0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	0.1
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.

DYE-M LS Tier II Disposal Facility - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Downgradient - MW 05-13																		
Not sampled - well dry/ frozen at depth	MW 05-13	2014	Year 1	Phase I														#N/A
MW05-13 (Dup Avg)	MW 05-13	2015	Year 2	Phase I	0.001	0.0025	<0.001	0.001	0.001	2.9	0.002	<0.001	<0.0001	<0.0001	<0.025	<0.1	<0.1	0.1
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 05-15																		
Not sampled - well dry/ frozen at depth	MW 05-15	2014	Year 1	Phase I														#N/A
MW05-15	MW 05-15	2015	Year 2	Phase I	0.0017	0.01	0.0012	0.0001	0.0022	**18.7**	<0.001	<0.001	<0.0001		<0.025	<0.1	<0.1	0.1
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 12-01 (replaces MW-14)																		
14-8185*	MW12-01	2014	Year 1	Phase I	<0.0010	0.013	0.00037	<0.000090	<0.00050	<0.0030	<0.00050	<0.0010	<0.00010		<0.025	<0.10	<0.25	0.2
MW12-01	MW12-01	2015	Year 2	Phase I	0.0005	0.02	0.0018	<0.0001	<0.0001	0.018	<0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	0.1
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

N/S - Sample or measurements not taken

blue highlight indicates dissolved metals. Total metal results are not highlighted.

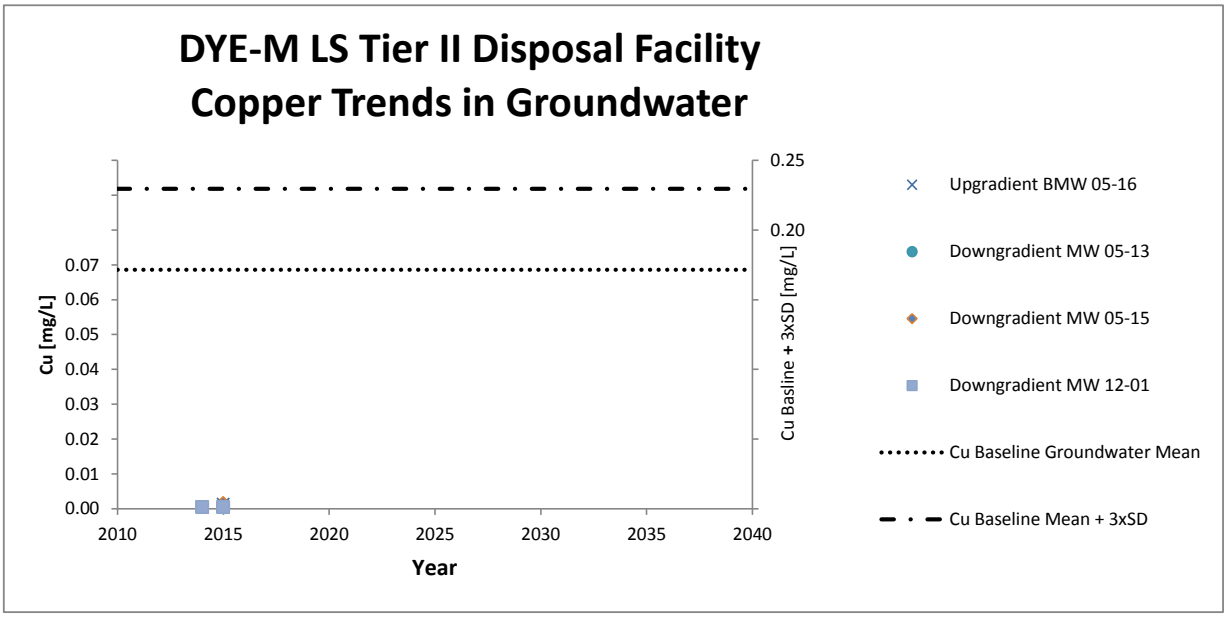
Dissolved metal results have not been included in the Baseline Arithmetic Mean

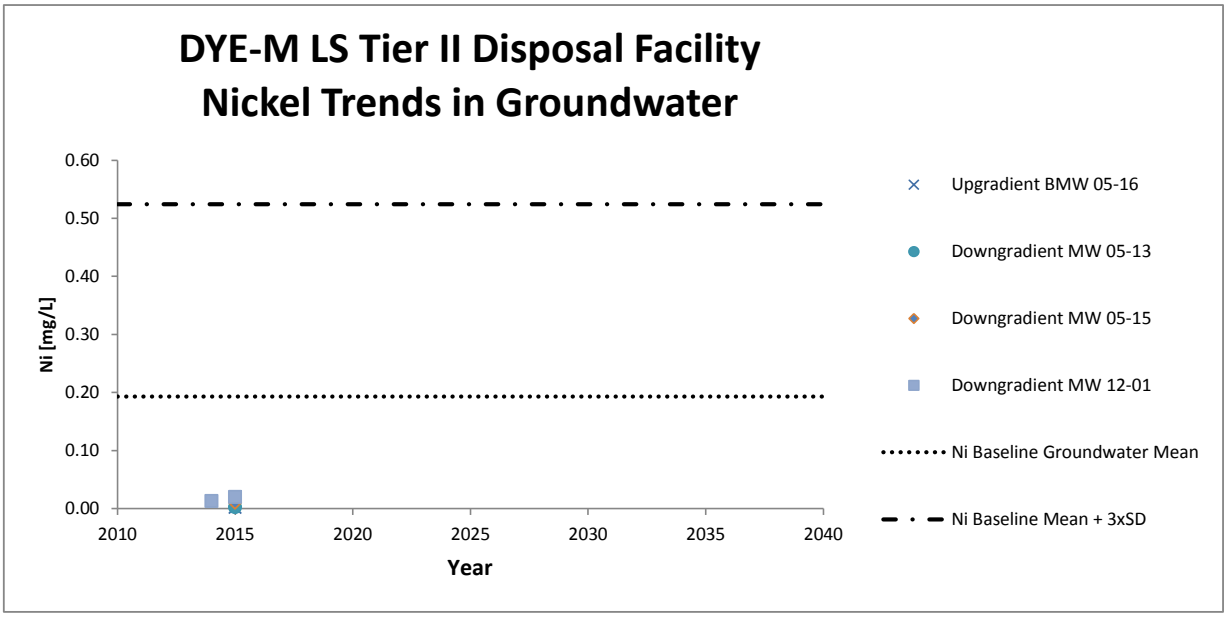
* insufficient volume to analyze for PCBs in 2014

MW-14 baseline well was damaged in 2009, replaced in 2012 by MW 12-01

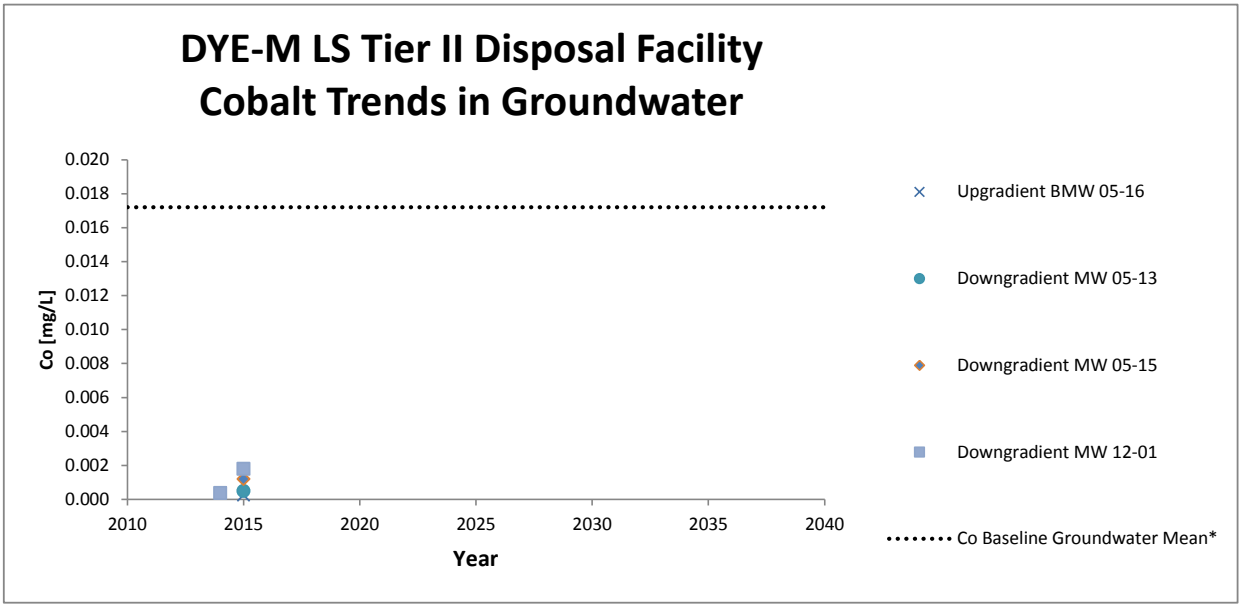
DYE-M LS Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

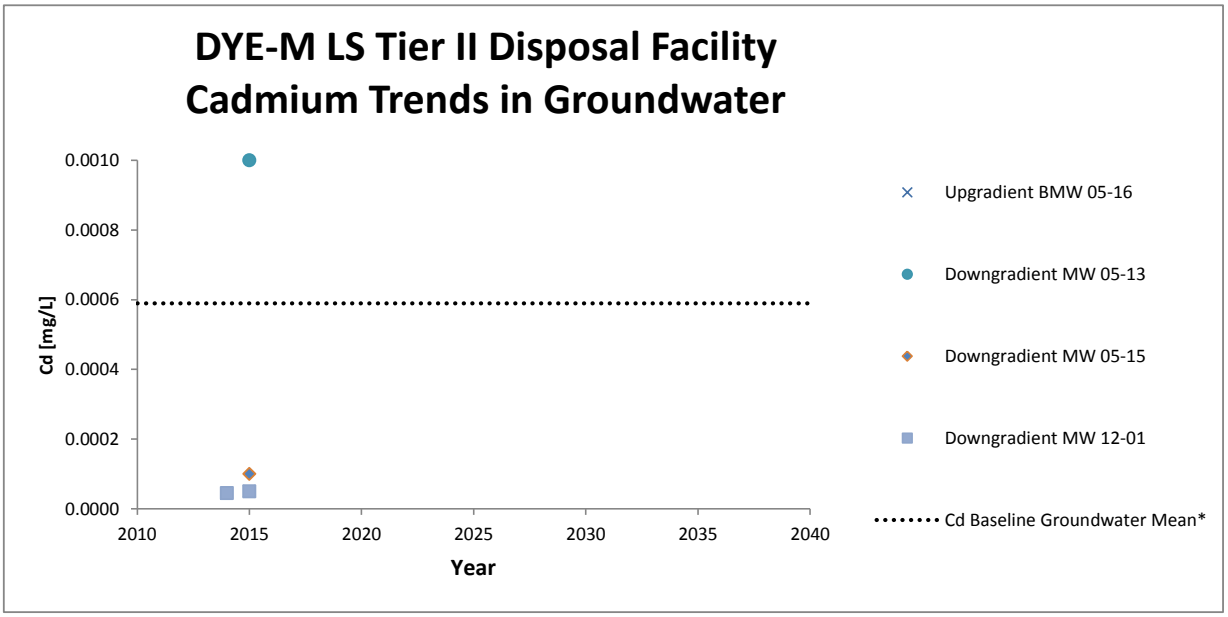




DYE-M LS Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

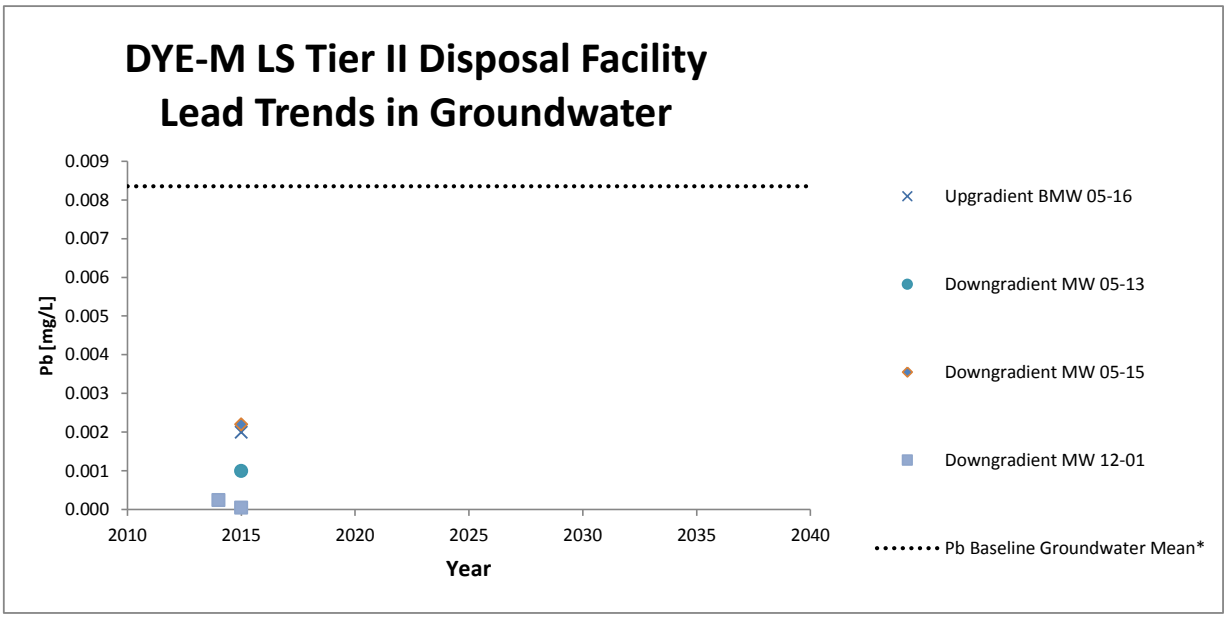


*Co Baseline Mean is equal to the baseline detection limit.
*Co Baseline Mean + 3xSD = 0

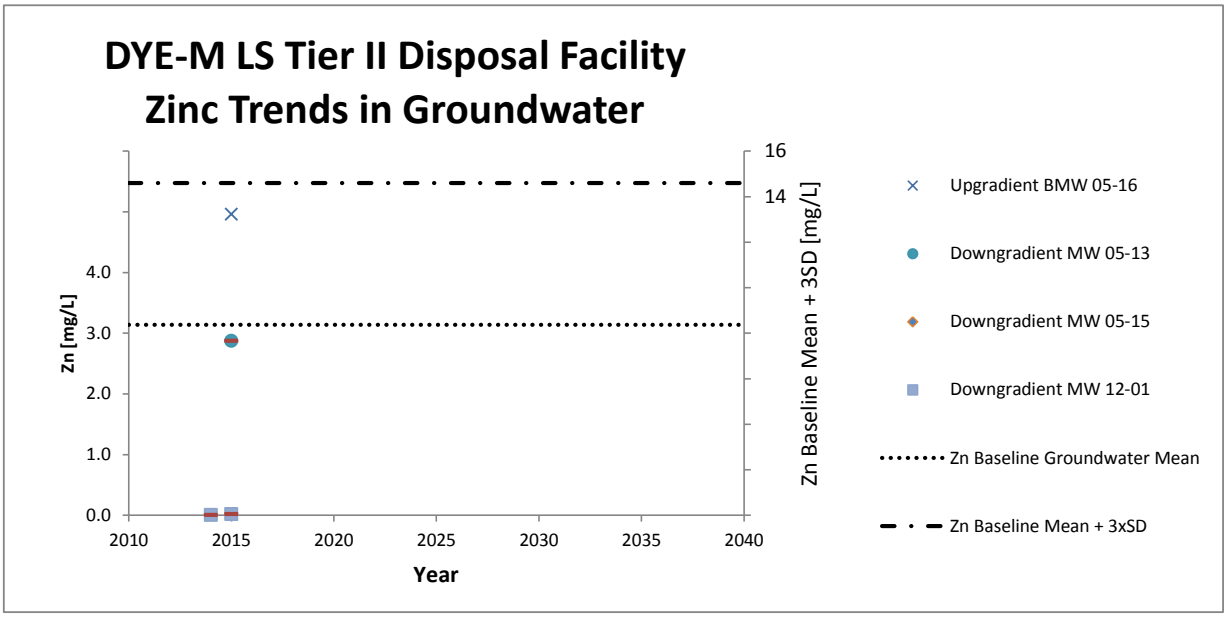


*Cd Baseline Mean is equal to the baseline detection limit.
*Cd Baseline Mean SD = 0

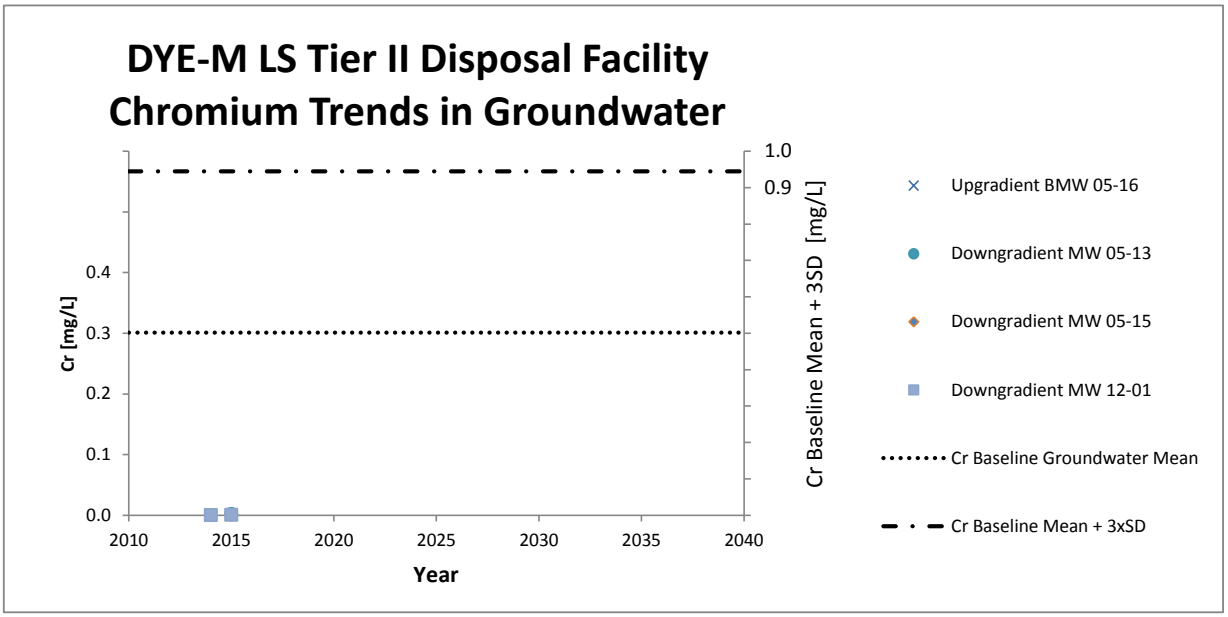
DYE-M LS Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

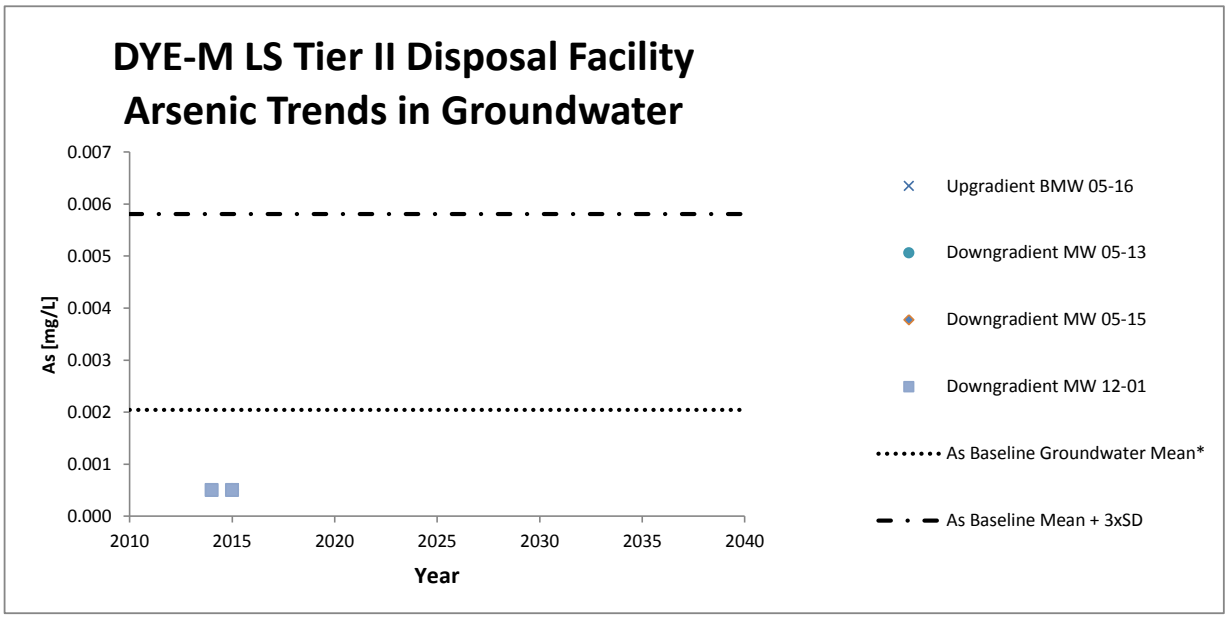


*Pb Baseline Mean is equal to the baseline detection limit.
*Pb Baseline SD=0



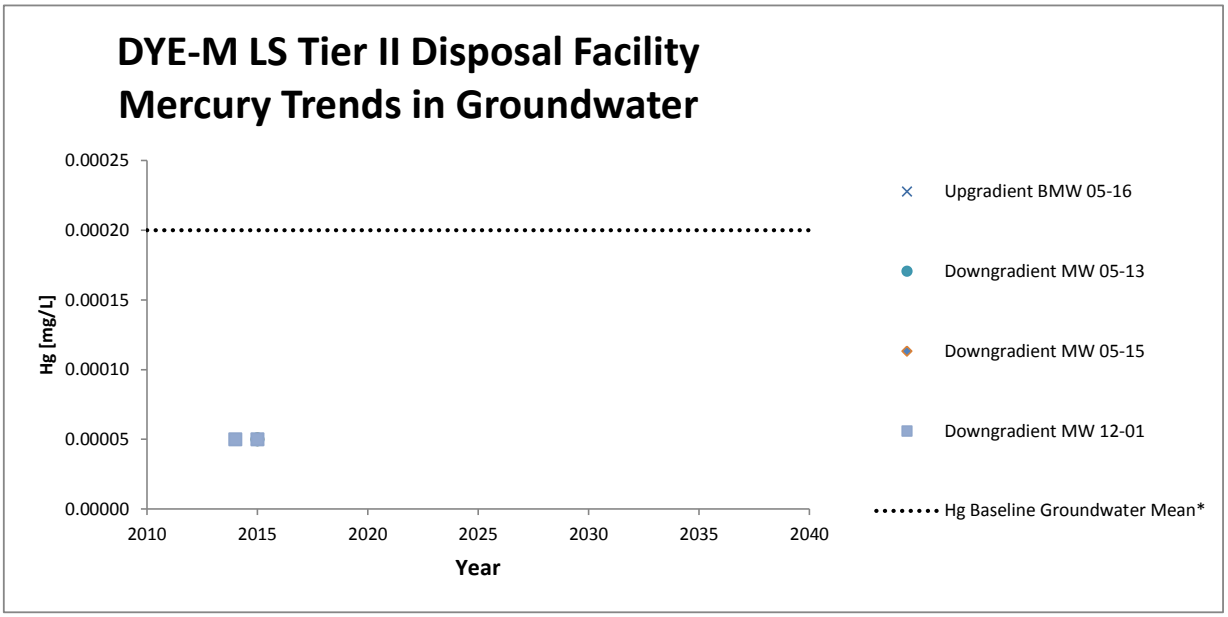
DYE-M LS Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



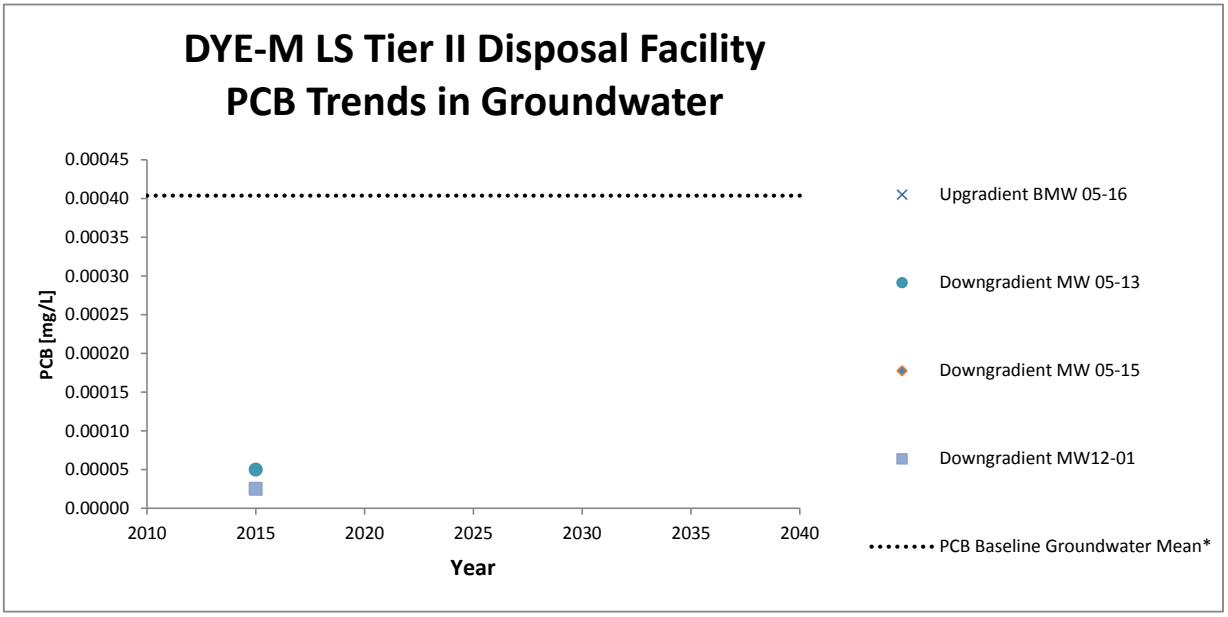


*As Baseline Mean is equal to the baseline detection limit.

DYE-M LS Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

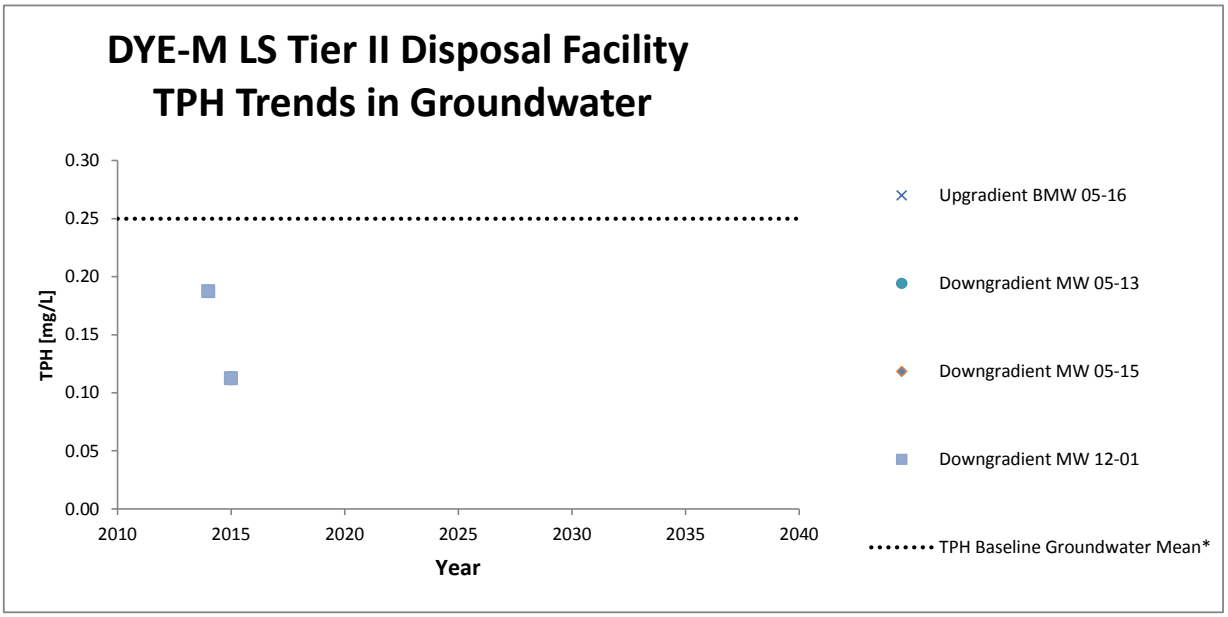


*Hg Baseline Mean is equal to the baseline detection limit.
*Hg Baseline SD = 0



*PCB Baseline Mean is equal to the baseline detection limit.
*PCB Baseline SD = 0

DYE-M LS Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



*TPH Baseline Mean is equal to the baseline detection limit.
*TPH Baseline Mean SD = 0

DYE-M LS Non Hazardous Waste Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic Mean						43	38	12	1.0	10	84	94	1.0	0.50	0.0002				N/A
Baseline Data - Arithmetic Mean						**27**	**35**	**10**	**1.0**	**10**	**54**	**69**	**1.1**	**0.10**	**0.05**	**10**	**16**	**36**	**59**
Baseline Data - Standard Deviation						7.5	5.0	2.1	0	5.7	27	12	0.8	0	0.11	11	73	72	116
Baseline Data Mean + 3xStandard Deviation						49	50	17	1.0	27	135	105	3.6	0.10	0.37	43	234	251	406
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
DEW Line Cleanup Tier II Criteria & Hydrocarbon Action Level						*100*	*100*	*50*	*5*	*500*	*500*	*250*	*30*	*2*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	MW BMW 09-26 surface																		
14-8252	BMW09-26	2014	Year 1	Phase I	5-10	25	**41**	9.5	<1.0	<10	46	**75**	**1.2**	<0.010	<0.010	<10	<10	<10	15
DM MW09-26 (0-20)	BMW09-26	2015	Year 3	Phase I	0-20	24.8	34.8	9.8	<0.5	4.9	40.7	67.2	**1.4**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW BMW 09-26 depth																		
14-8253	BMW09-26	2014	Year 1	Phase I	45-50	21	34	8	<1.0	<10	42	63	0.9	<0.010	<0.010	<10	11	<10	21
Not sampled, refusal	BMW09-26	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Non Hazardous Waste Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			
	MW 05-09 surface																		
14-8243	MW 05-09	2014	Year 1	Phase I	5-10	**44**	**50**	**11**	<1.0	**15**	**72**	**92**	**2.4**	0.012	0.018	<10	<10	<10	15
DM MW05-09 (0-15)	MW 05-09	2015	Year 3	Phase I	0-15	**38.3**	34.4	7.6	<0.5	**12.5**	48.9	62.1	**1.4**	<0.1	<0.05	<7	<4	**52**	57.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 05-09 depth																		
14-8244	MW 05-09	2014	Year 1	Phase I	45-50	**27**	**38**	9.4	<1.0	<10	47	**75**	**1.4**	<0.010	0.018	<10	<10	<10	15
DM MW05-09 (40-50)	MW 05-09	2015	Year 3	Phase I	40-50	**31**	32	8.7	<0.5	**23.7**	52.3	58.7	1	<0.1	**0.09**	<7	<4	**42**	47.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 05-12 surface																		
14-8240/41	MW 05-12	2014	Year 1	Phase I	5-10	**44**	**47**	**12**	<1.0	**53**	**81**	**89**	**1.5**	0.013	**0.3**	<10	<10	<10	15
DM MW05-12 (0-15)	MW 05-12	2015	Year 3	Phase I	0-15	**31.3**	**40.1**	**11.2**	<0.5	6.8	50.6	**77.2**	1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Non Hazardous Waste Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW 05-12 depth																		
14-8242	MW 05-12	2014	Year 1	Phase I	35-45	**35**	**45**	**11**	<1.0	**13**	**71**	**84**	**3.2**	<0.010	**0.12**	<10	<10	<10	15
DM MW05-12 (40-50)	MW 05-12	2015	Year 3	Phase I		**30.8**	**39.6**	**10.8**	<0.5	8	51.3	**75**	**1.2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 09-27 surface																		
14-8248	MW 09-27	2014	Year 1	Phase I	5-10	**34**	**45**	**11**	<1.0	<10	**60**	**82**	**2**	<0.010	0.04	<10	<10	<10	15
DM MW09-27 (0-15)	MW 09-27	2015	Year 3	Phase I	0-15	**28.9**	34.3	9.3	<0.5	7.5	43.2	65.6	**2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 09-27 depth																		
14-8250/51	MW 09-27	2014	Year 1	Phase I	45-50	20	31	7	<1.0	<10	35	54	0.7	<0.010	<0.010	<10	<10	<10	15
DM MW09-27 (30-40)	MW 09-27	2015	Year 3	Phase I	30-40	**27.1**	32.9	9.1	<0.5	6.1	40.4	63.6	**1.4**	<0.1	<0.05	<7	<4	30	35.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Non Hazardous Waste Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW 09-28 surface																		
14-8245	MW 09-28	2014	Year 1	Phase I	5-10	**43**	**43**	**11**	<1.0	**14**	**64**	**86**	**1.6**	0.015	**0.16**	<10	<10	<10	15
MW09-28 (0-15)	MW 09-28	2015	Year 3	Phase I	0-15	**36.9**	**38.6**	**10.9**	<0.5	**14.7**	54.4	**76**	**1.9**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 09-28 depth																		
14-8247	MW 09-28	2014	Year 1	Phase I	45-50	**42**	**42**	10	<1.0	**15**	**64**	**81**	**2.1**	0.013	0.032	<10	<10	<10	15
DM MW09-28 (40-50)	MW 09-28	2015	Year 3	Phase I	40-50	**33.6**	32.8	9.5	<0.5	**11.8**	48.3	**69.4**	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

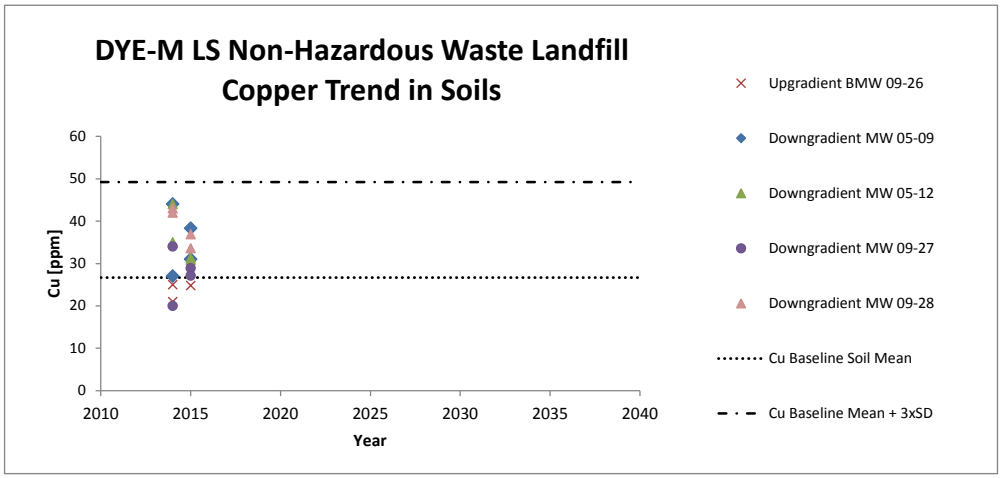
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

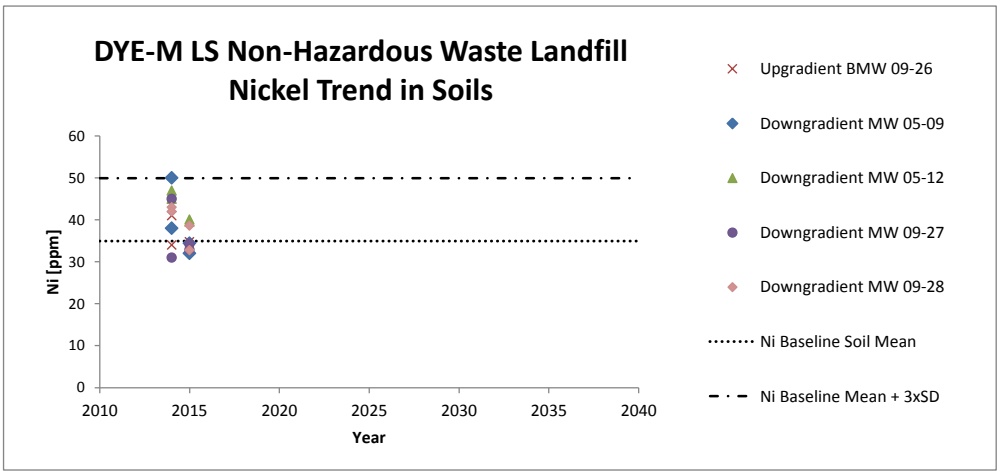
Legend	
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

DYE-M LS Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

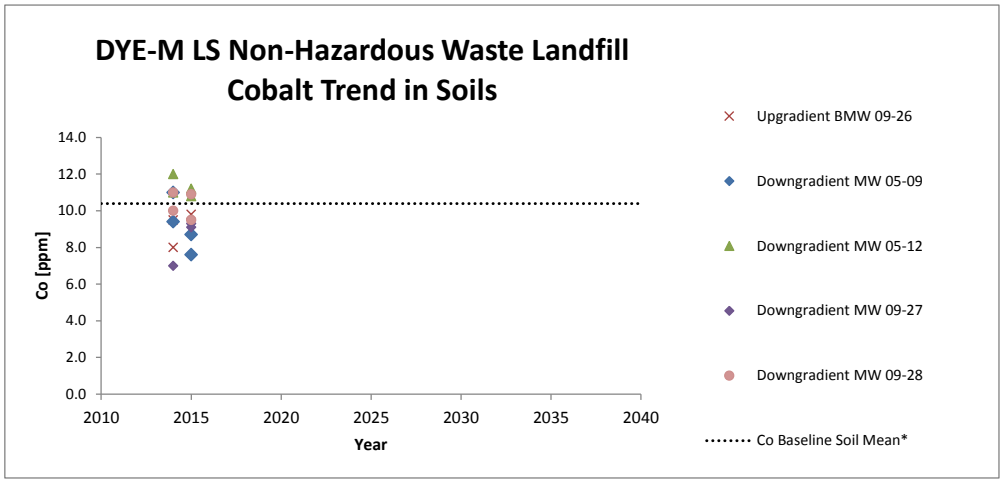




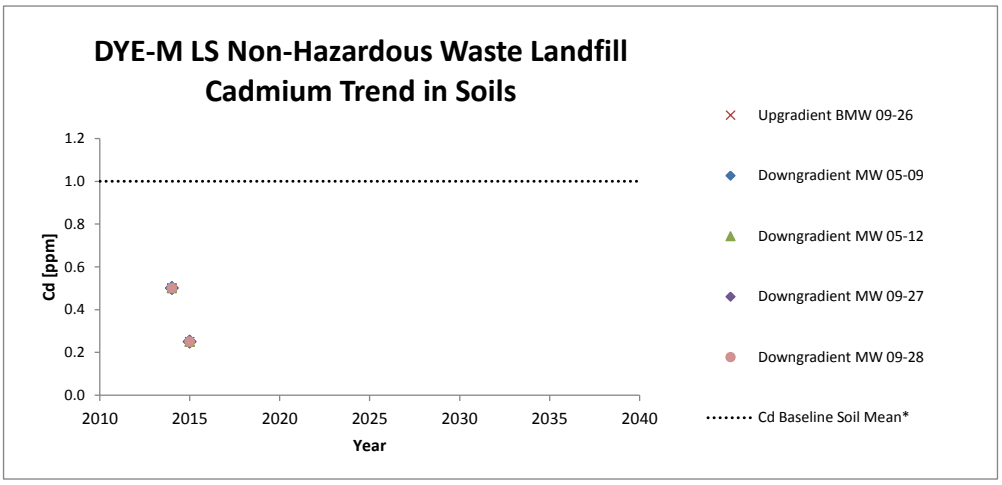
DYE-M LS Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Co Baseline Arithmetic Mean is equal to the baseline detection limit.
*Co Baseline SD = 0



*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.
*Cd Baseline SD = 0

DYE-M LS Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

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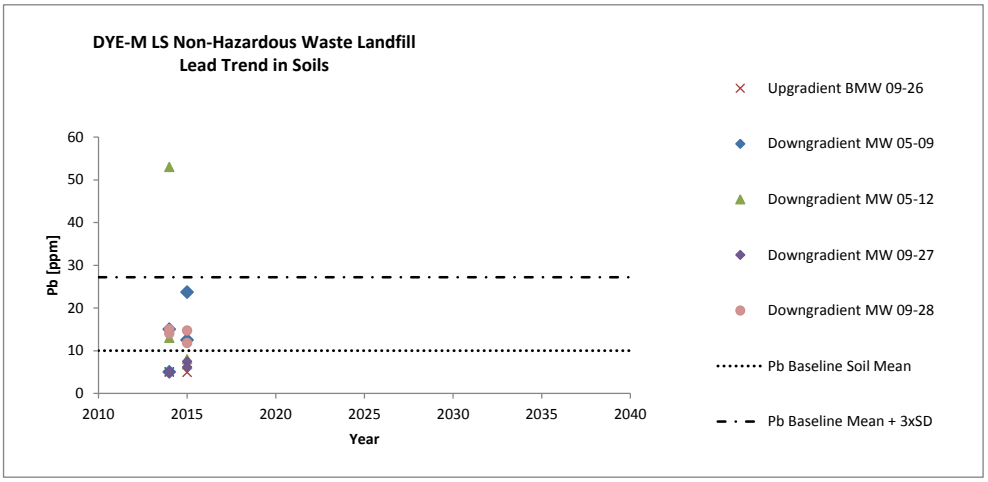
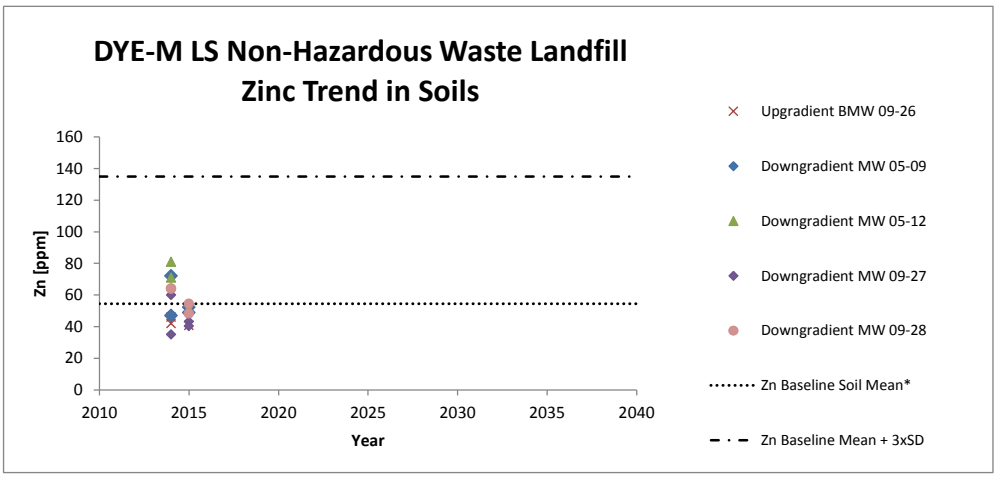


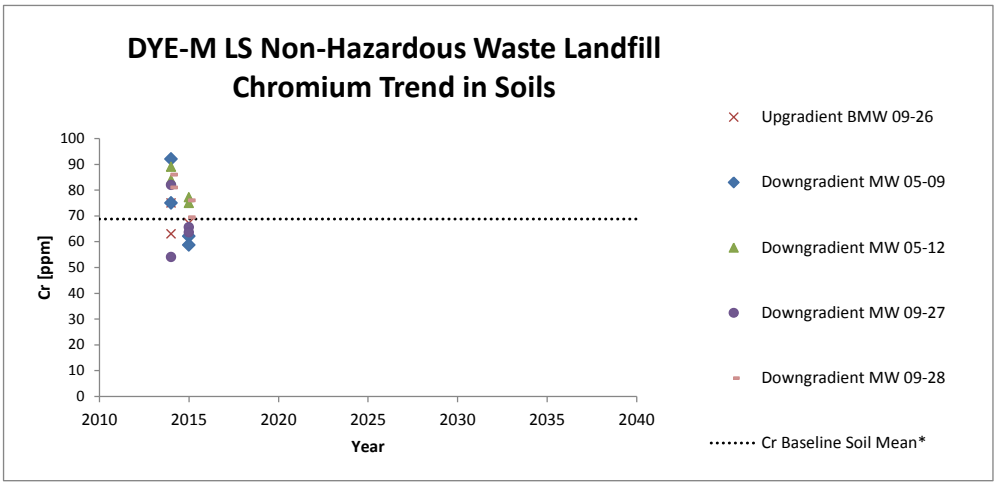


*Zn Baseline Arithmetic Mean is equal to the baseline detection limit.

DYE-M LS Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

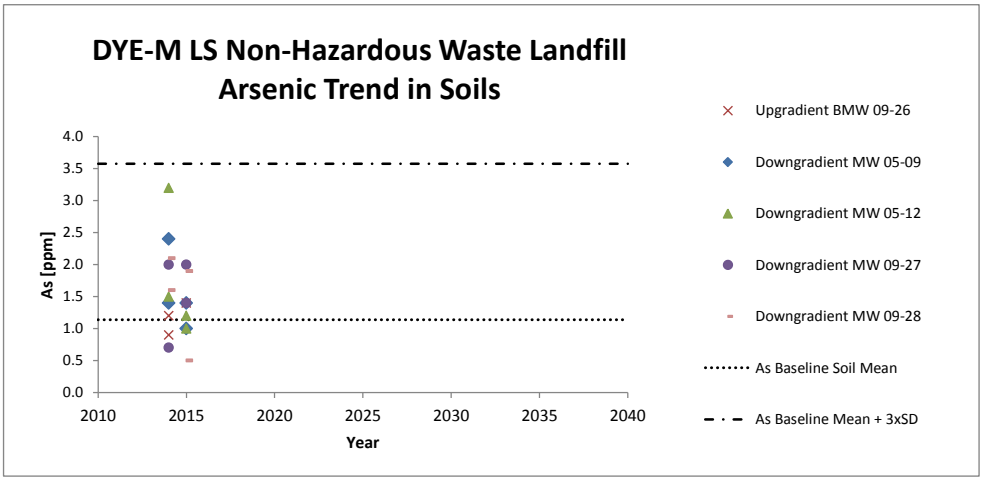
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Cr Baseline Arithmetic Mean is equal to the baseline detection limit.

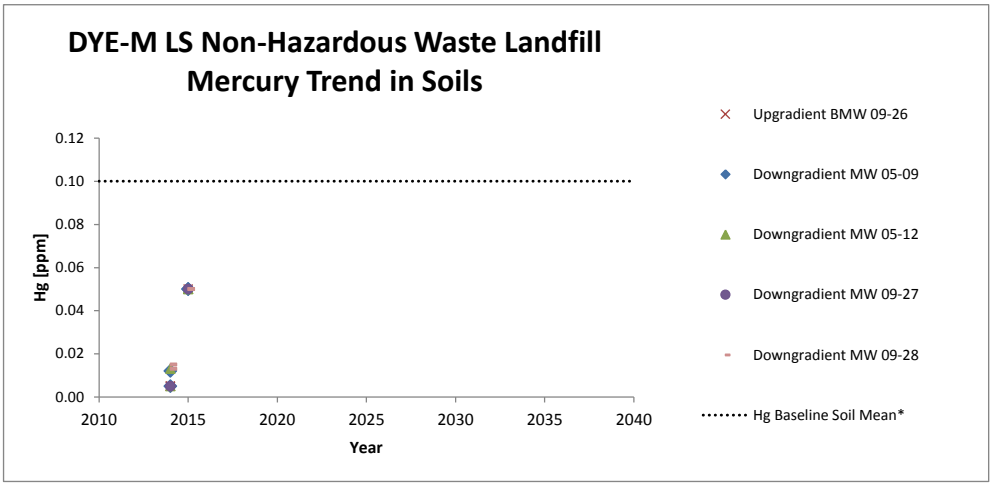
*Cr Baseline Mean + 3xSD = 0



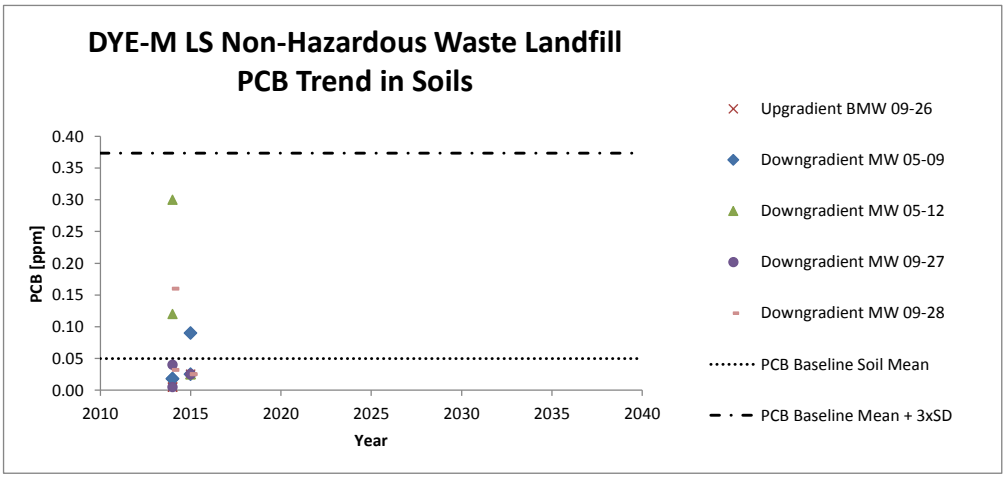
DYE-M LS Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



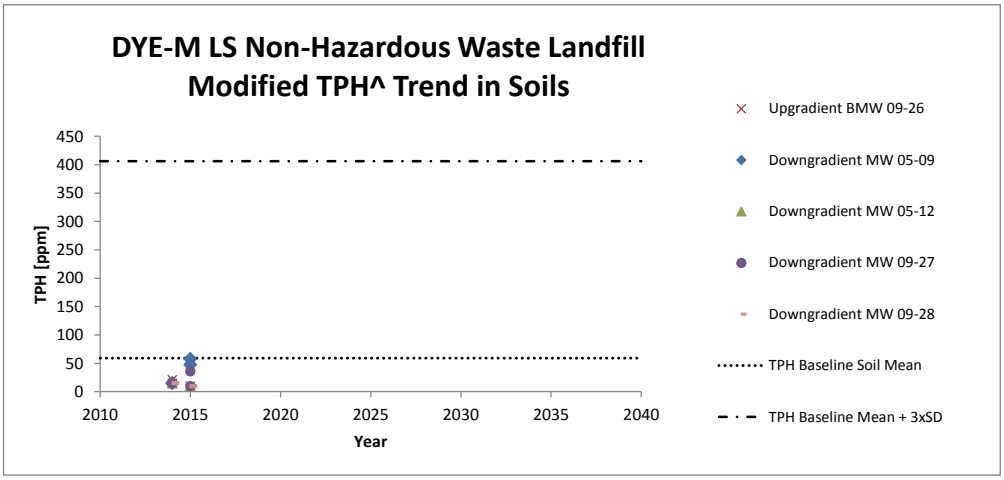
*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.
Hg Baseline SD = 0



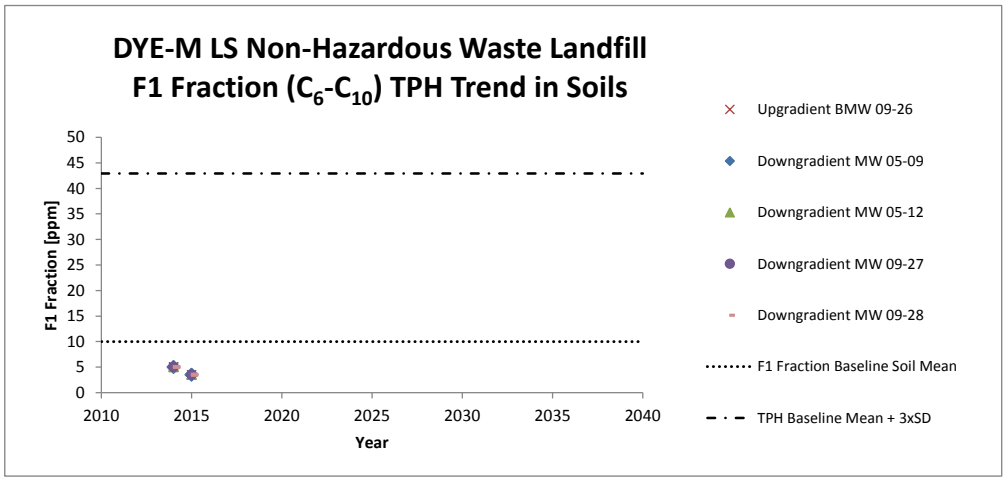
DYE-M LS Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



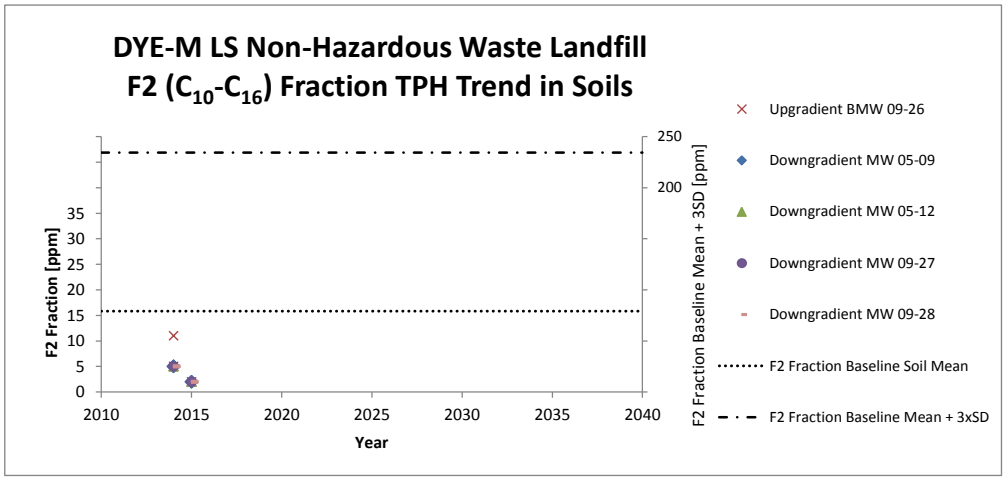
^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

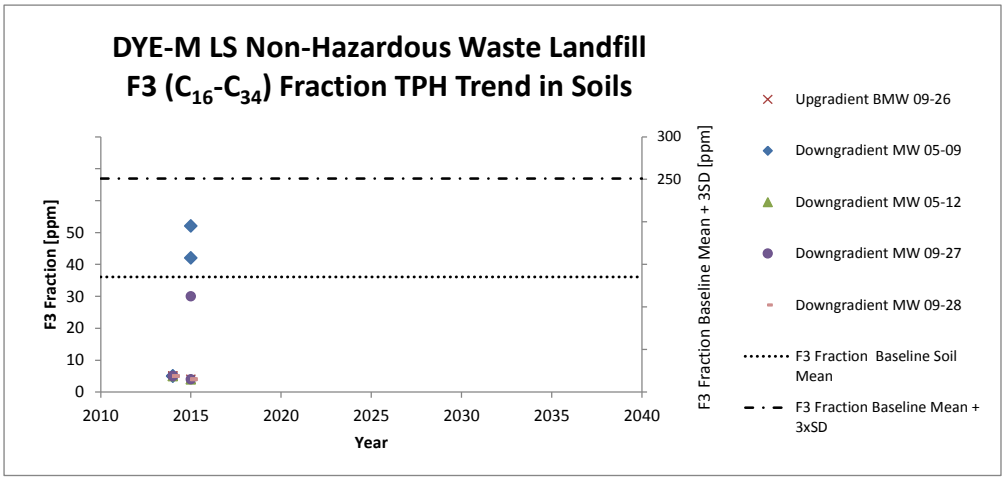


DYE-M LS Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





DYE-M LS Non-Hazardous Waste Landfill - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Baseline Data																		
Upgradient:																		
07-30666	BMW 05-11	2007			0.010	0.08	<0.0030	<0.0010	<0.010	0.66	0.12	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
08-9735	BMW 05-11	2008			0.023	0.21	0.004	<0.0010	<0.010	0.39	0.37	<0.0030	<0.00040	0.001100	<0.050	<0.50	<1.0	0.8
11-12194	BMW09-26	2011			0.007	<0.0050	<0.0030	<0.0010	<0.010	3.2	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
12-34993	BMW09-26	2012			0.016	0.0160	<0.0030	<0.0010	<0.0050	11	0.24	0.002	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13-29582	BMW09-26	2013			0.010	0.0805	<0.0030	<0.0010	<0.0050	3.9	0.10	0.001	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
Downgradient:																		
07-30668	MW 05-09	2007			0.026	0.14	0.005	<0.0010	0.021	2.9	0.22	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
07-30667	MW 05-10	2007			0.012	0.14	<0.0030	<0.0010	<0.010	0.05	0.30	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
07-30669	MW 05-12	2007			0.016	0.057	0.0039	<0.0010	<0.010	2.0	0.088	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
08-9738	MW 05-09	2008			0.012	0.089	<0.0030	<0.0010	<0.010	1.6	0.16	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
08-9736/37	MW 05-10	2008			0.031	0.140	0.005	<0.0010	<0.010	0.1	0.26	<0.0030	<0.00040	0.000430	<0.050	<0.50	<1.0	0.8
09-21641	MW 05-09	2009			0.039	0.056	0.010	<0.0010	0.048	1.0	0.10	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12188	MW05-09	2011			<0.0050	0.042	<0.0030	<0.0010	<0.010	15	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12193	MW05-12	2011			<0.0050	0.007	<0.0030	<0.0010	<0.010	6.4	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12210/11	MW09-27	2011			<0.0050	<0.0050	<0.0030	<0.0010	<0.010	0.5	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12206	MW09-28	2011			0.024	0.007	<0.0030	<0.0010	<0.010	1.1	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
12-34989	MW05-09	2012			<0.0050	0.0140	<0.0030	<0.0010	<0.0050	7.2	0.086	0.001	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
12-34988	MW05-12	2012			<0.0050	0.006	<0.0030	<0.0010	<0.0050	8.5	0.18	0.003	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
12-34991/92	MW09-27	2012			<0.0050	0.0240	<0.0030	<0.0010	<0.0050	1.1	0.45	0.0080	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
12-34990	MW09-28	2012			<0.0050	0.034	<0.0030	<0.0010	<0.0050	0.53	0.42	0.0050	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13-29584	MW05-09	2013			<0.0050	0.042	<0.0030	<0.0010	<0.0050	23	0.032	0.0014	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13-29580/81	MW09-27	2013			<0.0050	0.026	<0.0030	<0.0010	<0.0050	1.8	0.210	0.004	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13-29583	MW09-28	2013			0.008	0.0299	<0.0030	<0.0010	<0.0050	0.55	0.11	0.0015	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
		N value			22	22	22	22	22	22	22	22	22	22	22	22	22	22
	Arithmetic Mean				**0.021**	**0.11**	**0.004**	**0.001**	**0.012**	**4.2**	**0.20**	**0.002**	**0.0002**	**0.0007**	**0.025**	**0.25**	**0.50**	**0.25**
Arithmetic Mean Corrected for Detection Limits					**0.021**	**0.11**	**0.003**	**0.001**	**0.010**	**4.2**	**0.20**	**0.003**	**0.0004**	**0.003**	**0.050**	**0.5**	**1.0**	**1.00**
	Standard Deviation				0.010	0.053	0.0	0.0	0.0	5.7	0.12	0.0016	0.0	0.0	0.0	0.0	0.0	0.0
Arithmetic Mean + 3xStandard Deviation					0.052	0.27	0.012	0.001	0.057	21	0.57	0.008	0.0004	0.005	0.050	0.50	1.00	1.00
	Detection Limit				0.005	0.005	0.003	0.001	0.010	0.010	0.005	0.003	0.0004	0.003	0.050	0.5	1.0	1.0

DYE-M LS Non-Hazardous Waste Landfill - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Monitoring Data																		**Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.**
Upgradient - BMW- 09-26																		
14-8188	BMW09-26	2014	Year 1	Phase I	0.0029	0.096	0.001	0.00024	<0.00050	0.55	<0.00050	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.19
Not sampled - dry	BMW09-26	2015	Year 2	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 05-09																		
Not sampled - dry	MW 05-09	2014	Year 1	Phase I														#N/A
Not sampled - dry	MW 05-09	2015	Year 2	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

DYE-M LS Non-Hazardous Waste Landfill - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Downgradient - MW 05-12																		
Not sampled - dry	MW 05-12	2014	Year 1	Phase I														#N/A
Not sampled - dry	MW 05-12	2015	Year 2	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 09-27																		
14-8186	MW09-27	2014	Year 1	Phase I	<0.0010	0.023	0.00034	<0.000090	<0.00050	0.0045	<0.00050	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.2
14-8187ǂ	MW09-27	2014	Year 1	Phase I	**0.086**	**0.180**	**0.013**	<0.0010	0.005	0.47	**1.8**	0.003	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
Not sampled - dry	MW09-27	2015	Year 2	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 09-28																		
Not sampled - dry	MW 09-28	2014	Year 1	Phase I														#N/A
MW09-28	MW 09-28	2015	Year 2	Phase I	**0.0292**	0.024	0.0009	<0.0001	0.003	1.34	0.015	<0.001	<0.0001		<0.025			#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

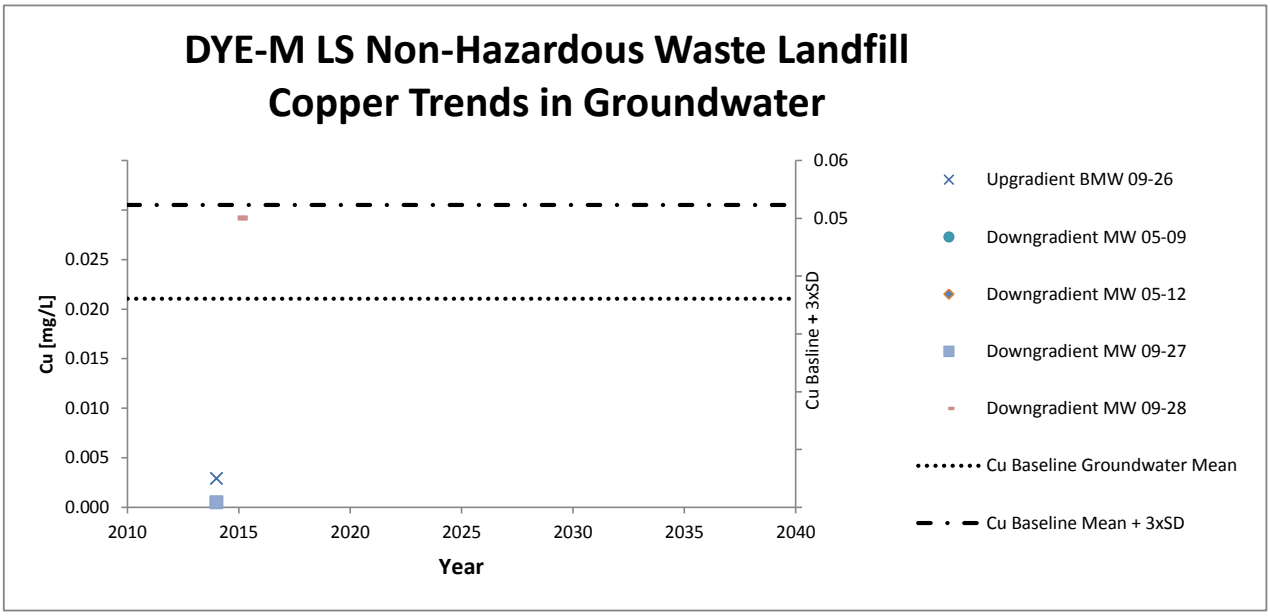
ǂ sample analyzed for total metals as an interlab sample

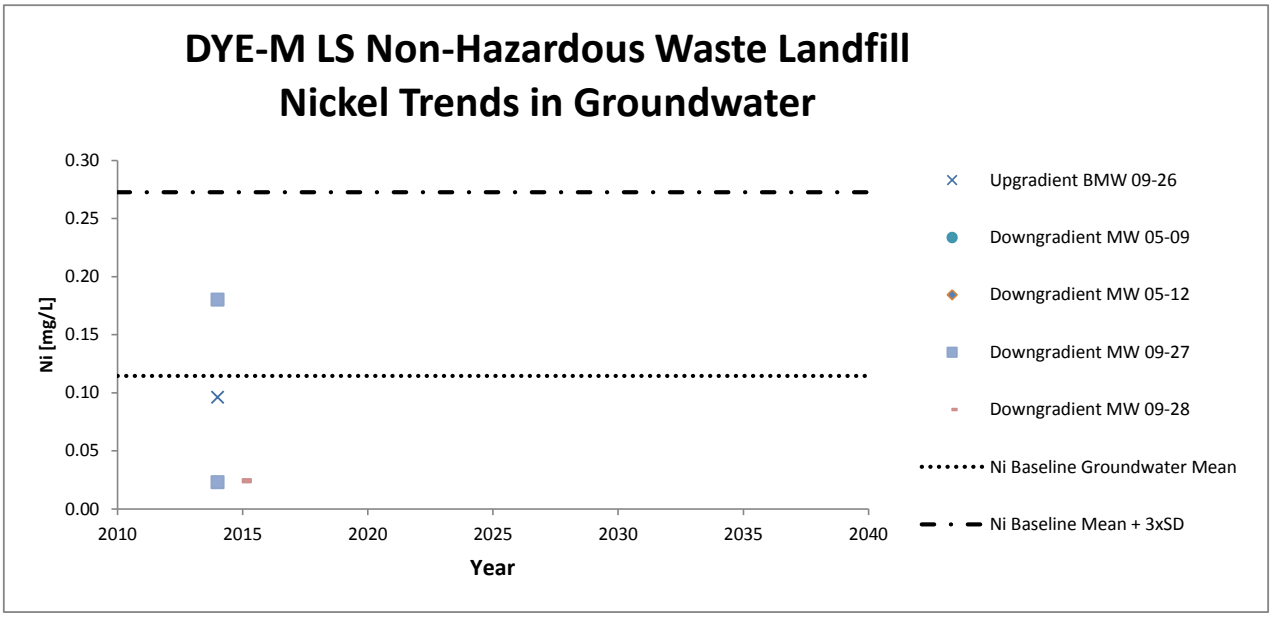
blue highlight indicates dissolved metal results. No highlight indicates total metals.

Dissolved metal results have not been included in the Baseline Arithmetic Mean

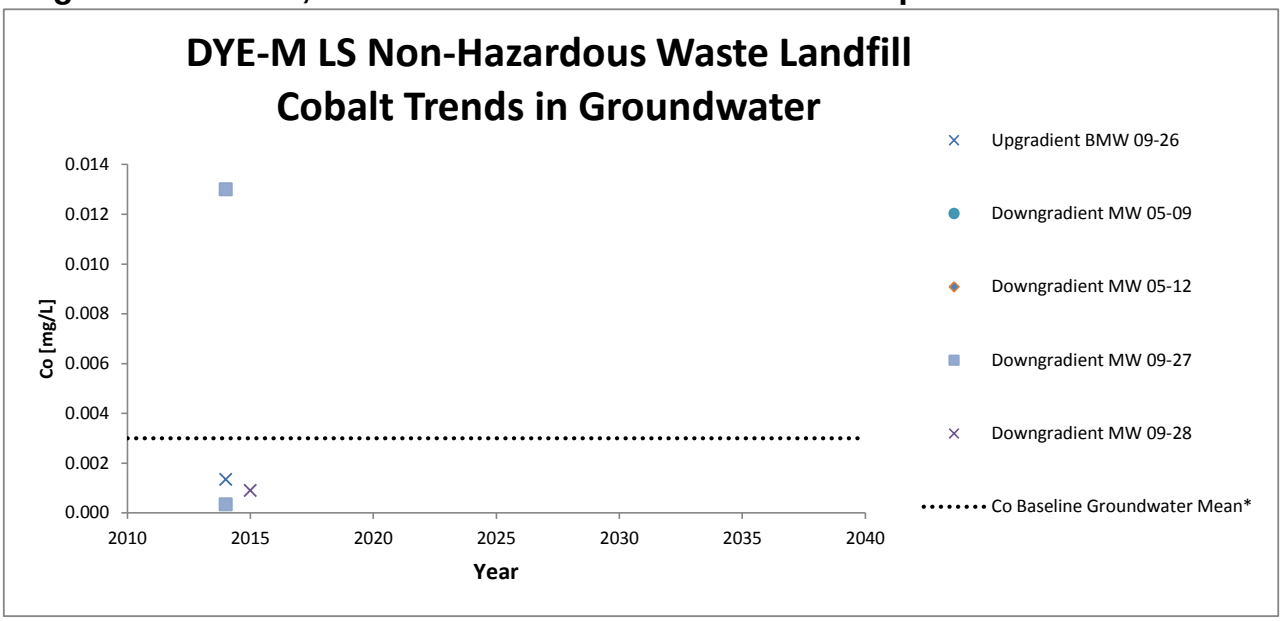
DYE-M LS Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

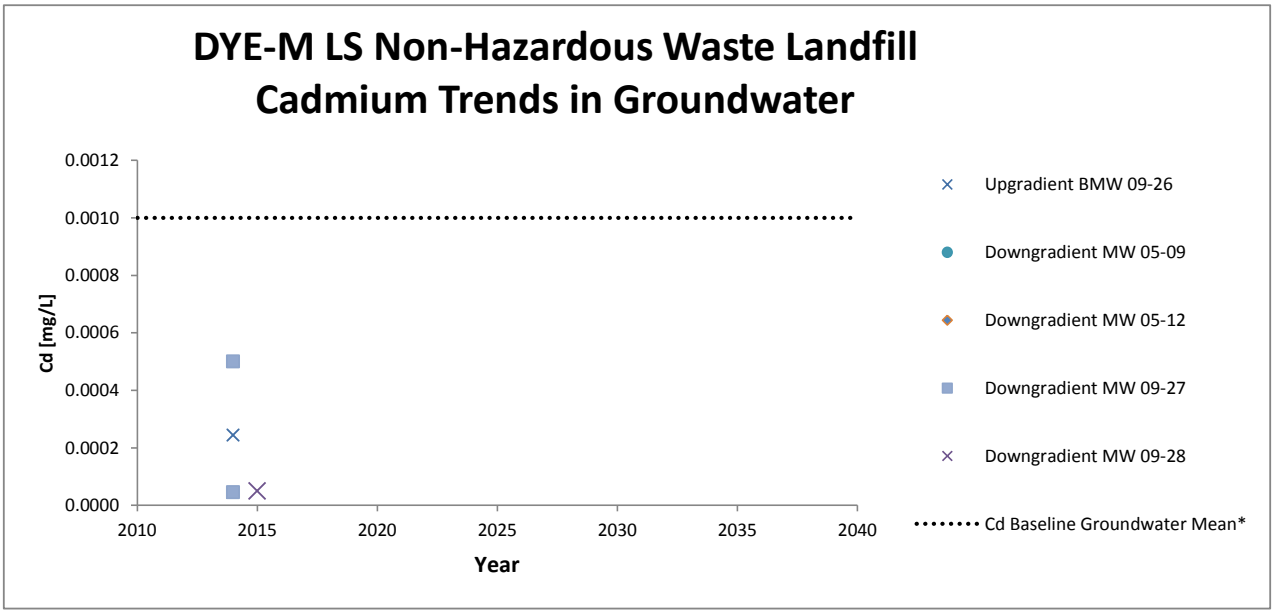




DYE-M LS Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

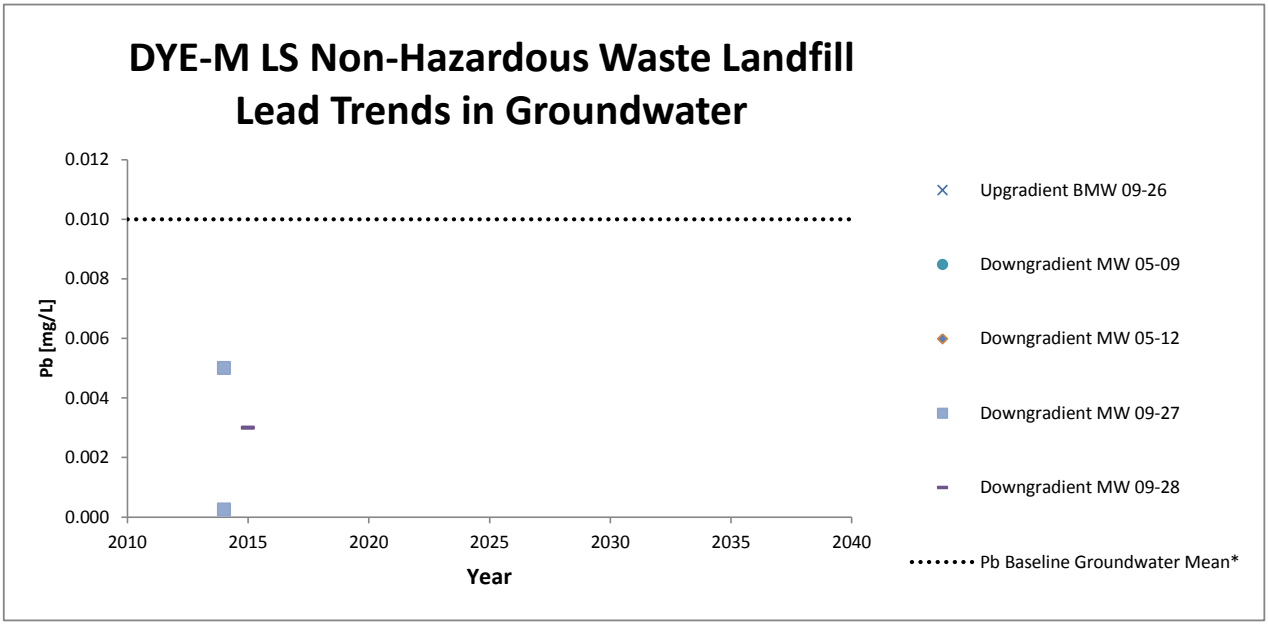


*Co Baseline Mean is equal to the baseline detection limit.
*Co SD = 0

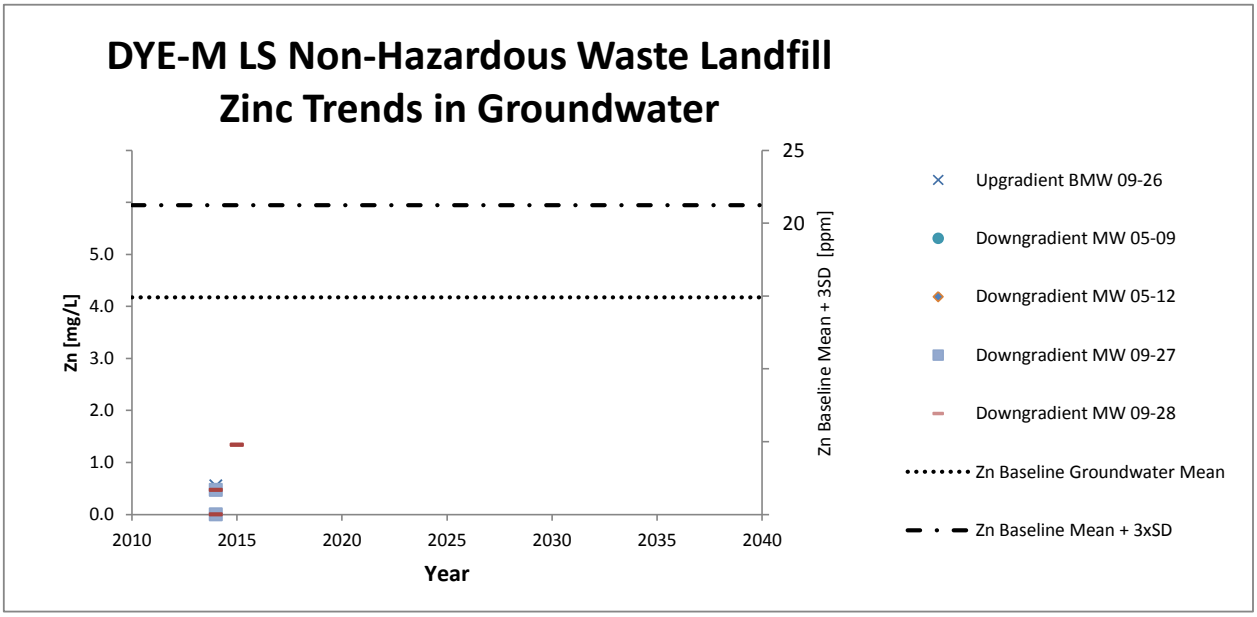


*Cd Baseline Mean is equal to the baseline detection limit.
*Cd Baseline Mean SD = 0

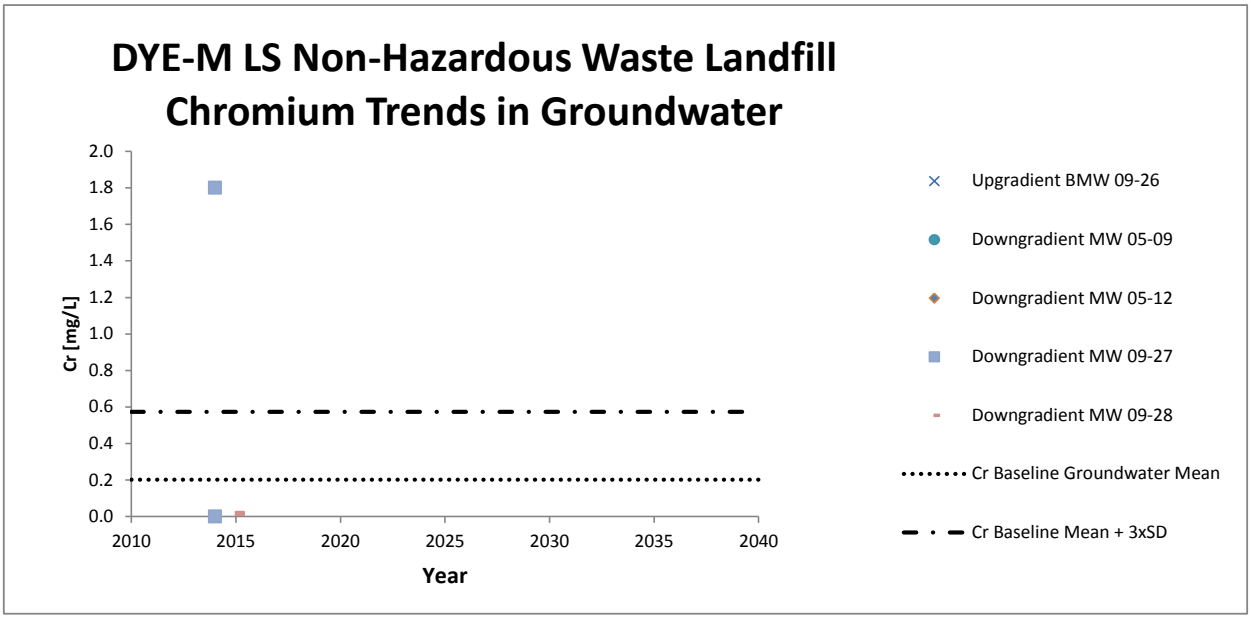
DYE-M LS Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

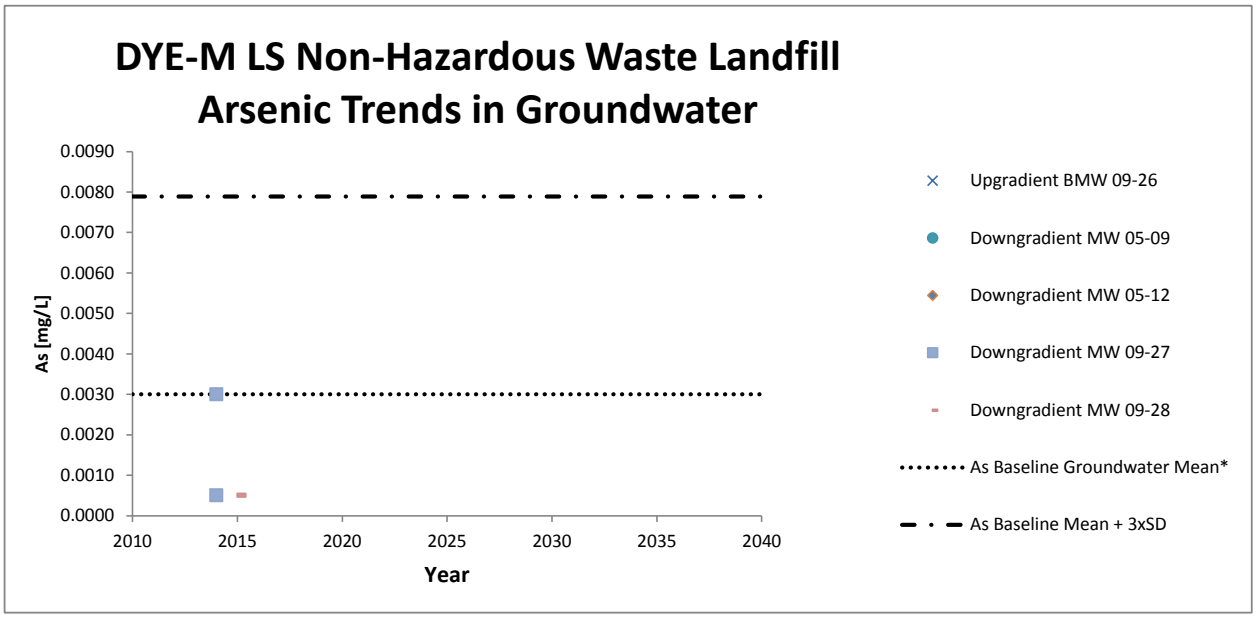


*Pb Baseline Mean is equal to the baseline detection limit.
*Pb Baseline SD=0



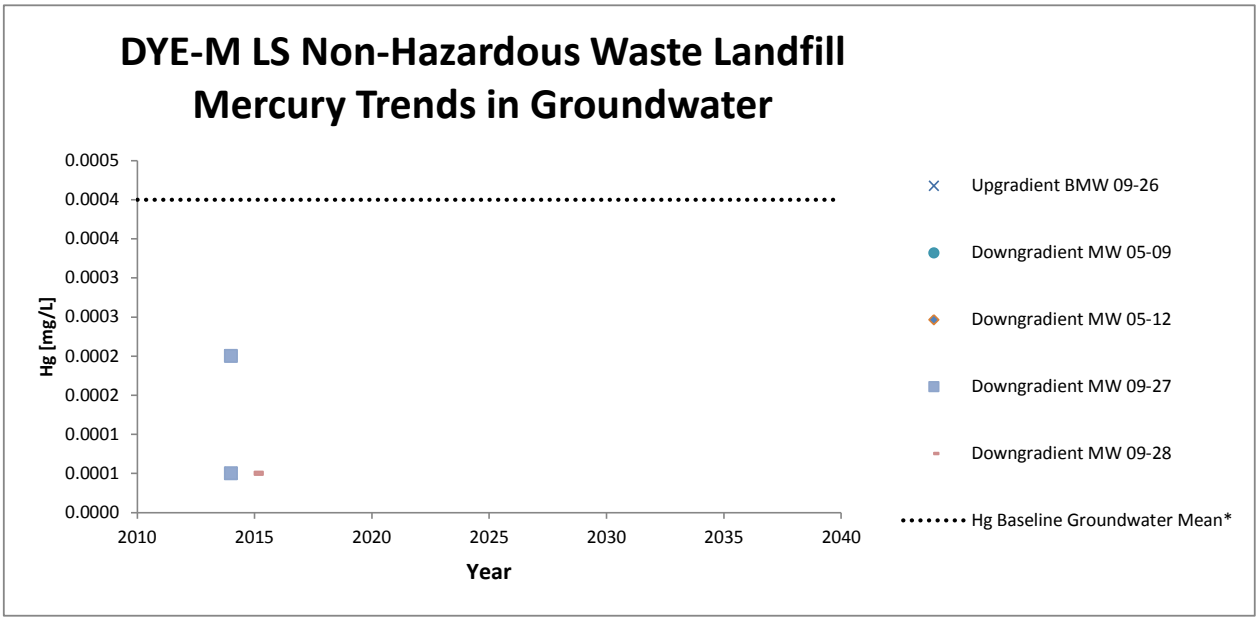
DYE-M LS Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



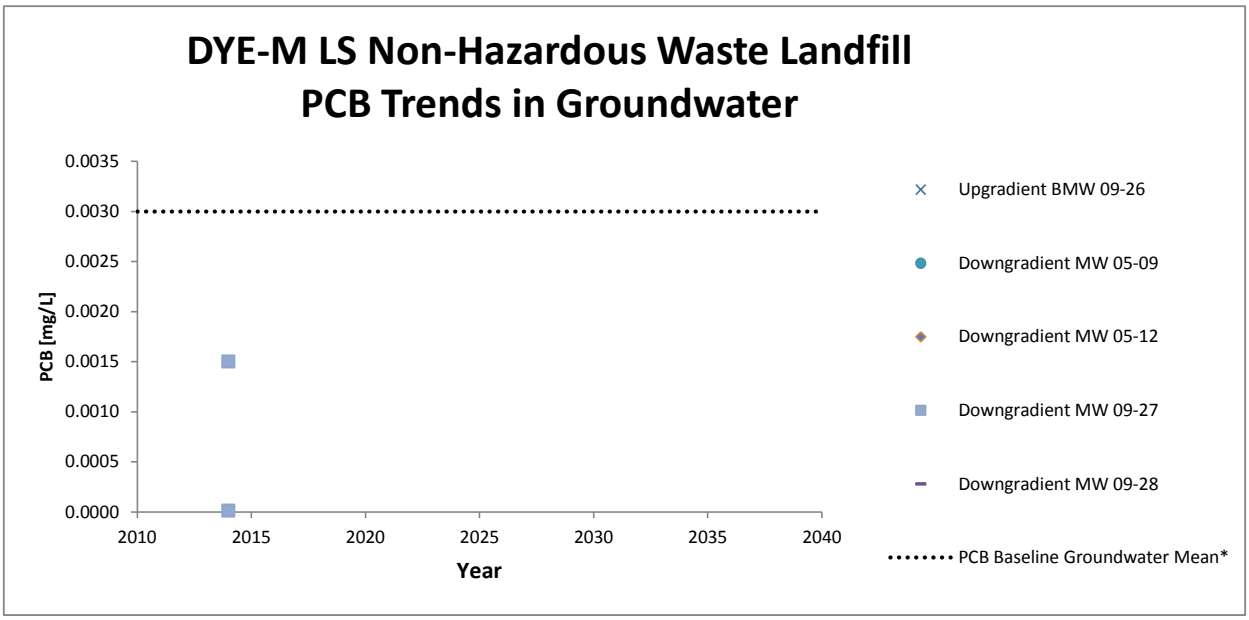


*As Baseline Mean is equal to the baseline detection limit.

DYE-M LS Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

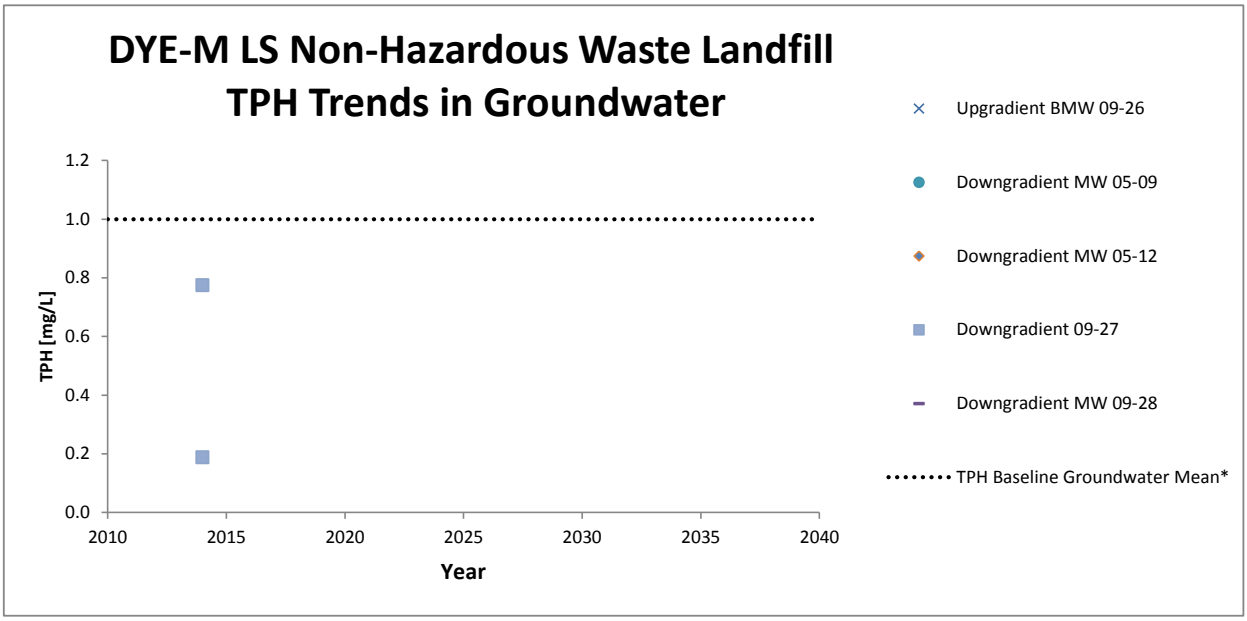


*Hg Baseline Mean is equal to the baseline detection limit.
*Hg Baseline SD = 0



*PCB Baseline Mean is equal to the baseline detection limit.
*PCB Baseline SD = 0

DYE-M LS Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



*TPH Baseline Mean is equal to the baseline detection limit.
*TPH Baseline Mean SD = 0

DYE-M LS Powerhouse Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic Mean						43	38	12	1.0	10	84	94	1.0	0.50	0.005				N/A
Baseline Data - Arithmetic Mean						**27**	**34**	**10**	**1.0**	**10**	**55**	**64**	**1.2**	**0.10**	**0.17**	**10**	**32**	**44**	**194**
Baseline Data - Standard Deviation						9	9	2.8	0.0	3.5	26	13	0.80	0.000	0.20	2.6	90	37	372
Baseline Data Mean + 3xStandard Deviation						55	62	19	1.0	20	132	104	3.6	0.10	0.78	18	302	156	1311
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
DEW Line Cleanup Tier II Criteria & Hydrocarbon Action Level						*100*	*100*	*50*	*5*	*500*	*500*	*250*	*30*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	BMW 05-08 surface																		
14-8475	BMW 05-08	2014	Year 1	Phase I	5-10	24	31	7.8	<1.0	<10	48	56	1.2	0.011	**0.46**	<10	<10	21	31
MW05-08 (0-15)	BMW 05-08	2015	Year 2	Phase I	0-15	**32.9**	**34.5**	9.3	<0.5	**17**	53.9	**68.2**	**1.8**	<0.1	**0.24**	<7	<4	**109**	114.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	BMW 05-08 depth																		
14-8477	BMW 05-08	2014	Year 1	Phase I	40-45	18	29	7.1	<1.0	<10	33	52	0.8	<0.010	<0.010	<10	<10	<10	15
DM MW05-08 (40-50)	BMW 05-08	2015	Year 2	Phase I	40-50	25.3	30.7	8.6	<0.5	8.7	39.1	57.3	<1	<0.1	<0.05	<7	<4	**59**	64.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Powerhouse Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			
	MW 05-05 surface																		
14-8467	MW 05-05	2014	Year 1	Phase I	5-10	**69**	**99**	**22**	<1.0	<10	**140**	**130**	**4.3**	<0.010	<0.010	<10	<10	<10	15
DM MW05-05 (0-15)	MW 05-05	2015	Year 2	Phase I	0-15	**31.2**	34.2	9.4	<0.5	**27.9**	53.9	**69**	1	<0.1	0.09	<7	<4	<8	9.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 05-05 depth																		
14-8468	MW 05-05	2014	Year 1	Phase I	40-45	21	**39**	8.1	<1.0	<10	50	**83**	**1.3**	<0.010	0.013	<10	<10	<10	15
DM MW05-05 (40-50)	MW 05-05	2015	Year 2	Phase I	40-50	**27.2**	31.1	8.4	<0.5	**14.4**	43.4	62	1.2	<0.1	0.11	<7	**43**	**63**	109.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Powerhouse Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW 05-06 surface																		
14-8470/71	MW 05-06	2014	Year 1	Phase I	5-10	24	**36**	7.2	<1.0	**29**	52	**76**	**1.6**	<0.010	0.068	<10	<10	14	24
DM MW05-06 (0-15)	MW 05-06	2015	Year 2	Phase I	0-15	15.4	20.4	5.7	<0.5	3	23.4	38.5	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 05-06 depth																		
14-8472	MW 05-06	2014	Year 1	Phase I	35-40	25	**40**	7.6	<1.0	<10	52	**72**	1.2	<0.010	<0.010	**14**	**2000**	**50**	**2064**
DM MW05-06 (40-50)	MW 05-06	2015	Year 2	Phase I	40-50	15.5	21.7	6	<0.5	3	24.2	38.9	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Powerhouse Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW 05-07 surface																		
14-8473	MW 05-07	2014	Year 1	Phase I	5-10	19	28	7.2	<1.0	<10	40	53	1.1	<0.010	<0.010	<10	<10	<10	15
DM MW05-07 (0-15)	MW 05-07	2015	Year 2	Phase I	0-15	**29.8**	33.1	9.2	<0.5	**14.8**	48.8	64	**2.3**	<0.1	0.1	<7	<4	**101**	106.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 05-07 depth																		
14-8474	MW 05-07	2014	Year 1	Phase I	45-50	19	30	7.3	<1.0	<10	37	55	1.2	<0.010	<0.010	**51**	**2800**	**130**	*2981*
DM MW05-07 (15-30)	MW 05-07	2015	Year 2	Phase I	15-30	12.9	18.6	5.1	<0.5	4.3	22.6	34.8	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

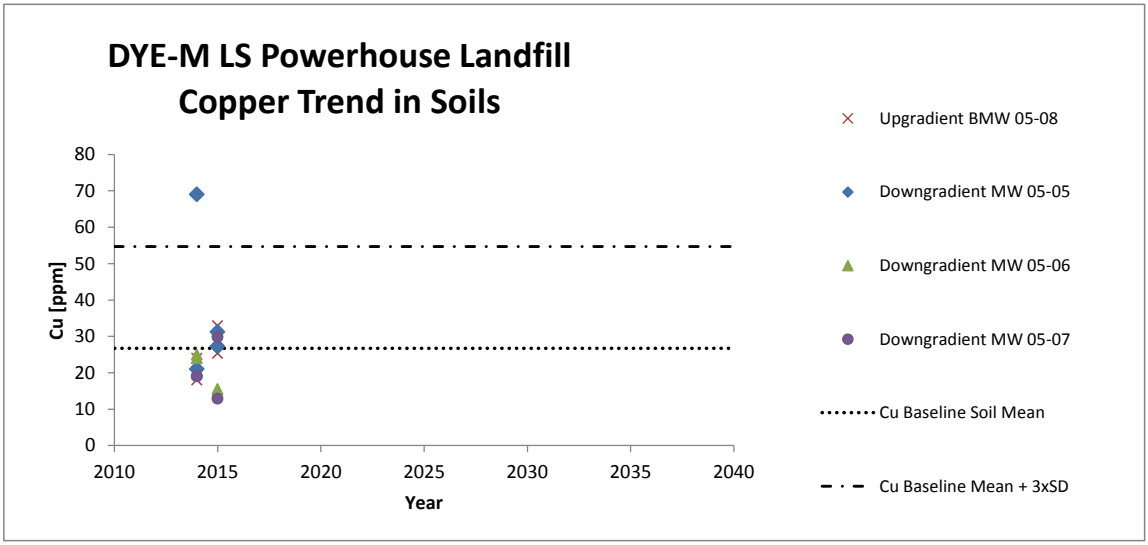
Legend

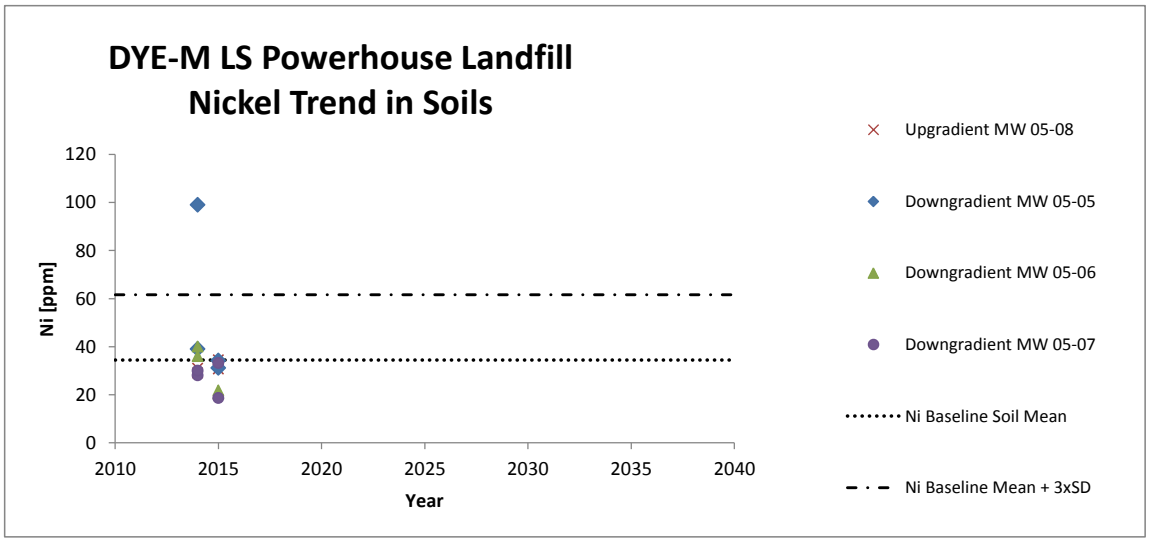
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

DYE-M LS Powerhouse Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

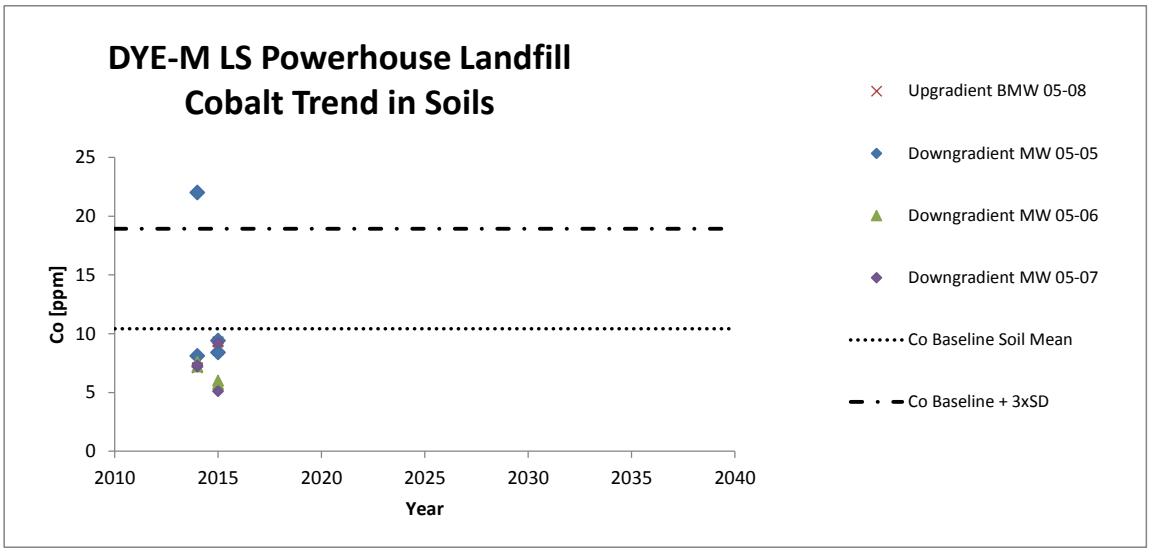
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

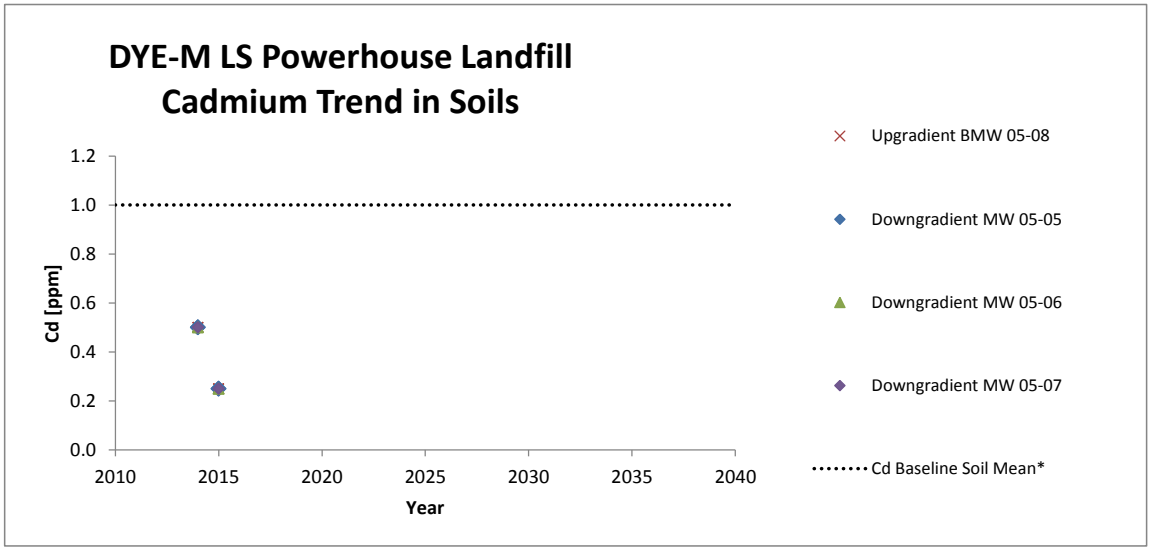
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





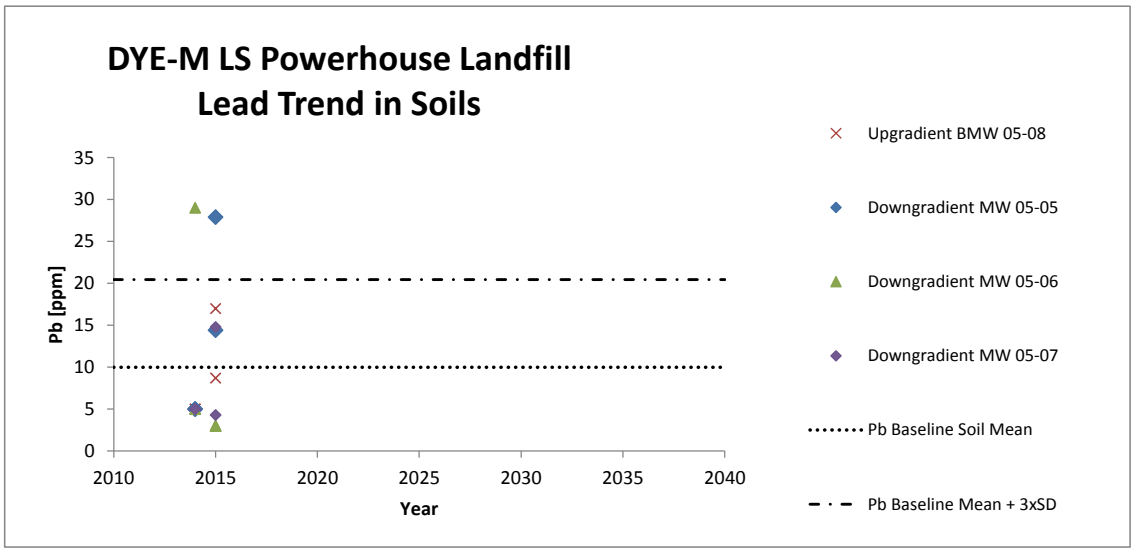
DYE-M LS Powerhouse Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



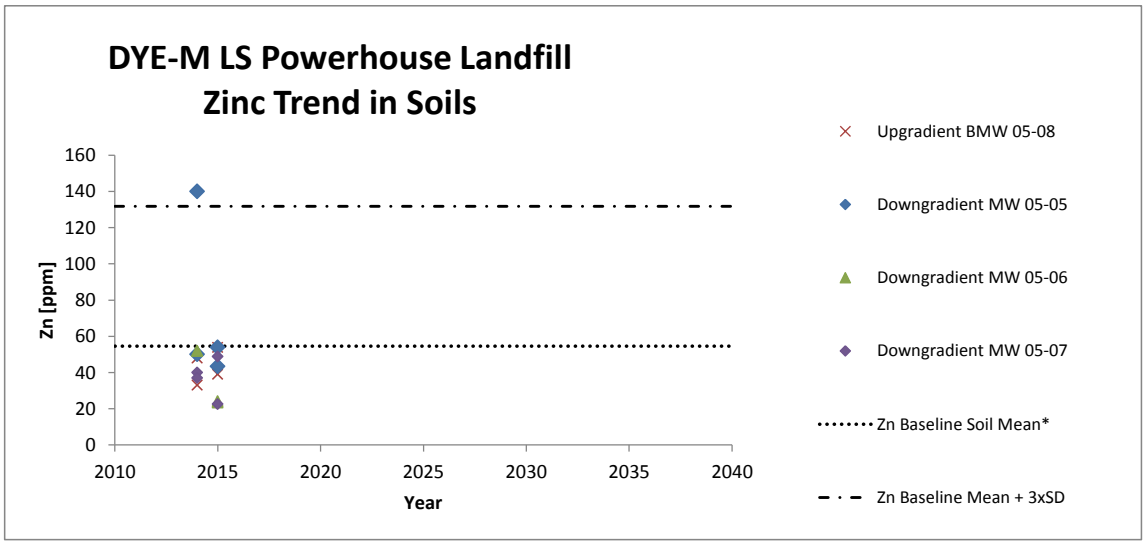


*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.
*Cd Baseline SD = 0

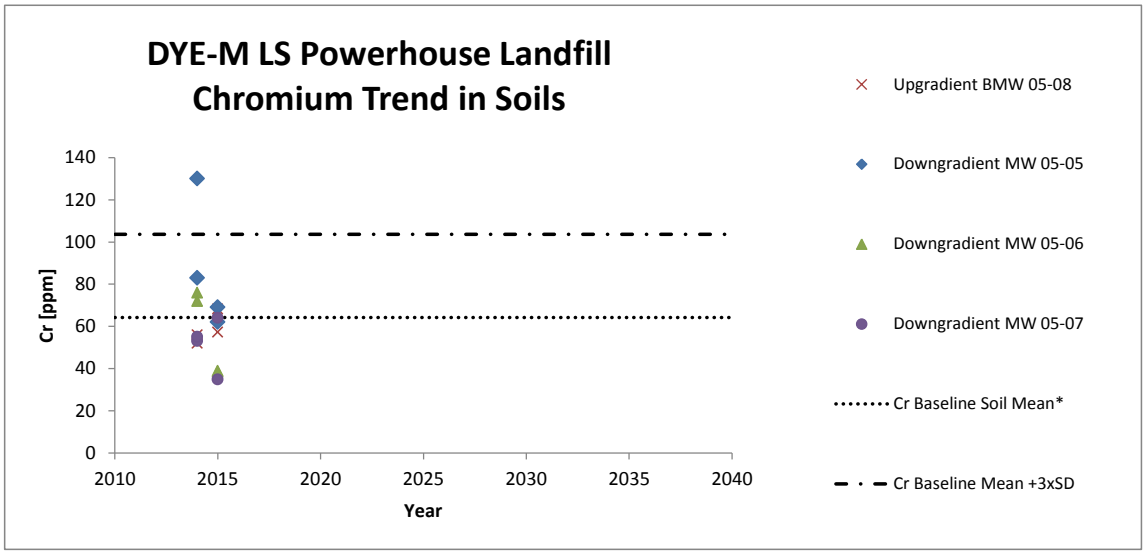
DYE-M LS Powerhouse Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

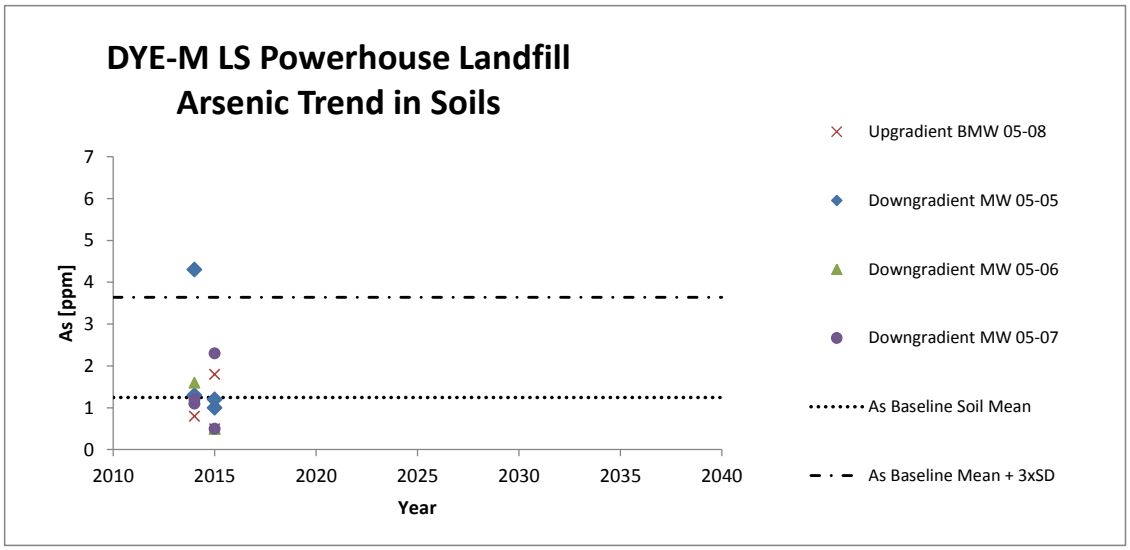


Pb Baseline Arithmetic Mean is equal to the detection limit.

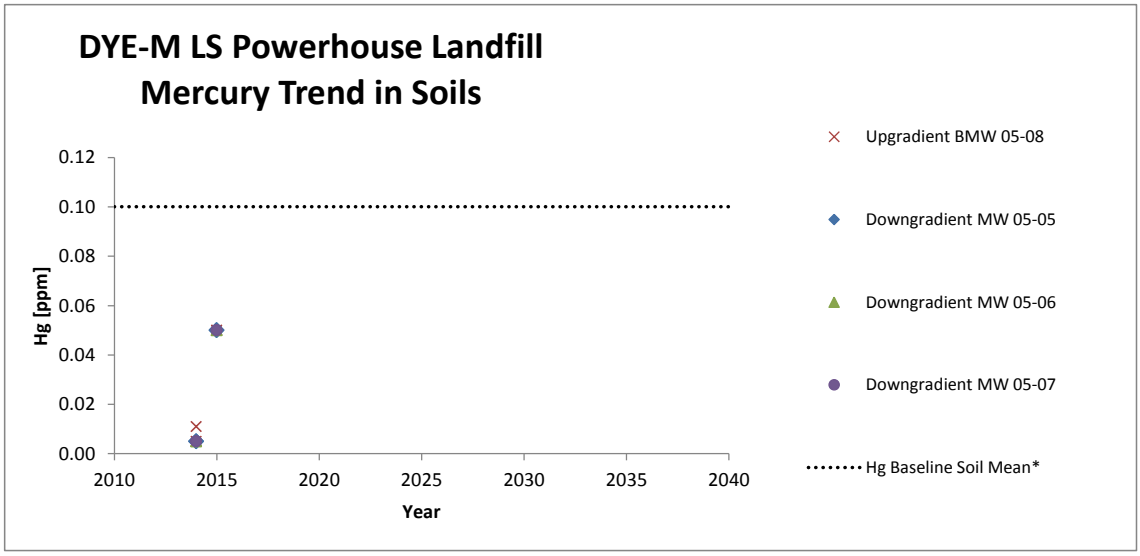


DYE-M LS Powerhouse Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

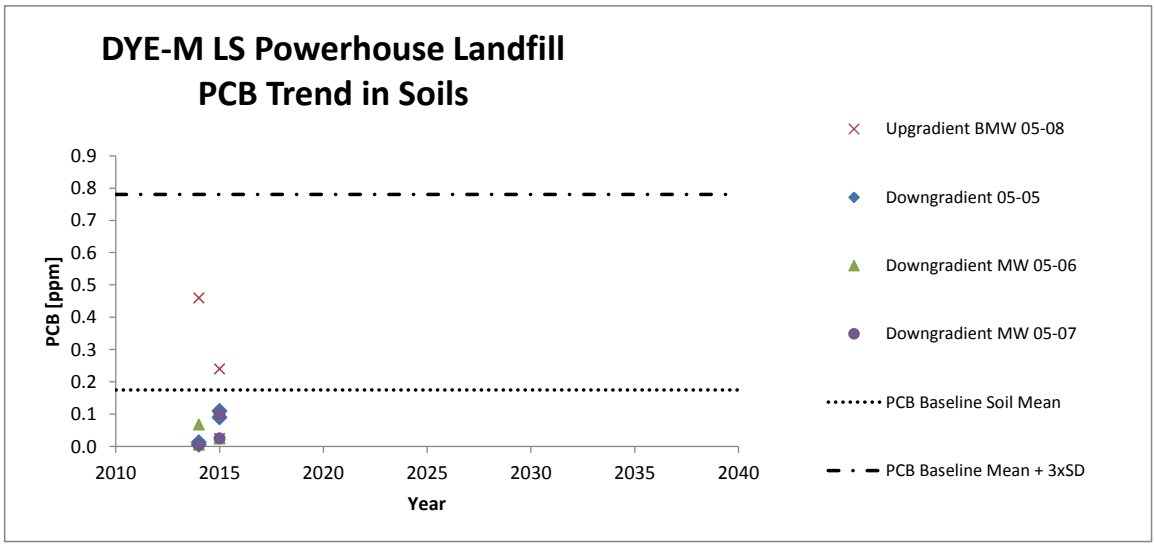




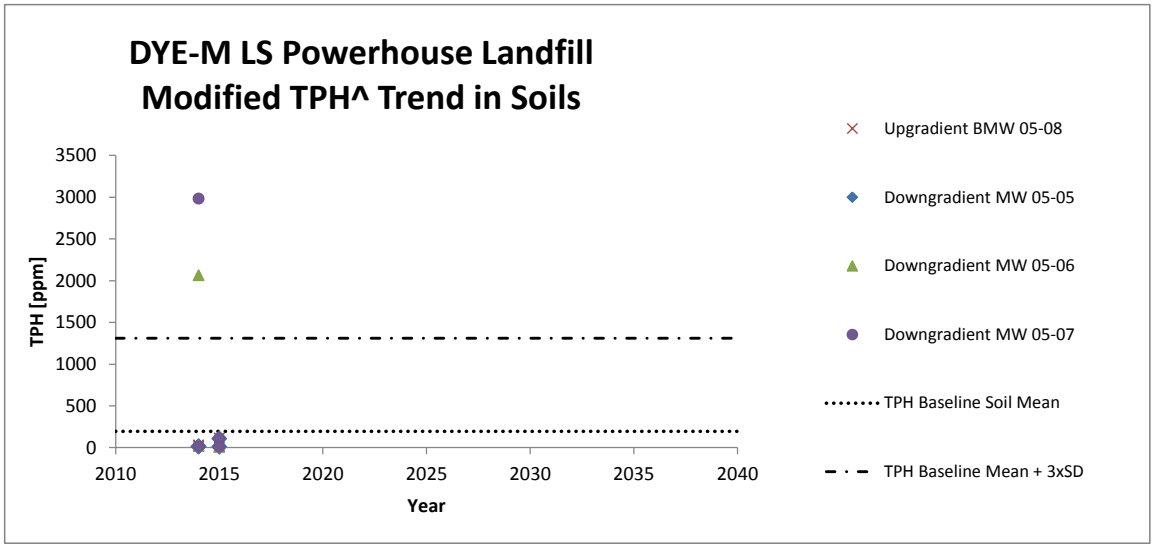
DYE-M LS Powerhouse Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.
Hg Baseline SD = 0



DYE-M LS Powerhouse Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M LS Powerhouse - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Baseline Data																		
Upgradient:																		
11-12214	BMW05-08	2011			0.006	0.0061	<0.0030	<0.0010	<0.010	12	<0.0050	0.003	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
12-34995	BMW05-08	2012			<0.0050	0.0089	<0.0030	<0.0010	<0.0050	5.3	0.099	0.004	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
All wells were dry in 2013		2013																
Downgradient:																		
12-34998	MW05-05	2012			0.005	0.009	<0.0030	<0.0010	<0.0050	1.4	0.12	0.006	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
12-34997	MW05-06	2012			<0.0050	<0.0050	<0.0030	<0.0010	<0.0050	3.5	0.09	0.003	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
12-34996	MW05-07	2012			<0.0050	0.006	<0.0030	<0.0010	<0.0050	2.6	0.05	<0.0010	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
All wells were dry in 2013		2013																0.0
	N value				5	5	5	5	5	5	5	5	5	5	5	5	5	6
	Arithmetic Mean									**4.9**	**0.09**	**0.003**	**0.0002**	**0.00**	**0.03**	**0.25**	**0.50**	**0.25**
	Arithmetic Mean Adjusted for Detection Limits									**4.9**	**0.09**	**0.003**	**0.0004**	**0.003**	**0.05**	**0.50**	**1.0**	**1.0**
	Standard Deviation									4.1	0.028	0.0020	0.0	0.0	0.0	0.0	0.0	0.0
	Arithmetic Mean + 3xStandard Deviation									17	0.18	0.0096	0.00020	0.0032	0.025	0.25	0.50	0.25
	Detection Limit				0.0050	0.005	0.0030	0.0010	0.010	0.0100	0.0050	0.003	0.0004	0.0030	0.050	0.50	1.0	1.0
Monitoring Data																		**Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.**
Upgradient - BMW 05-08																		
Not sampled - well dry	BMW 05-08	2014	Year 1	Phase I														#N/A
MW 05-08	BMW 05-08	2015	Year 2	Phase I	<0.0005	0.016	0.0011	0.0005	0.0006	**12.1**	0.001	<0.001	<0.0001	<0.0001	<0.025	<0.1	<0.1	0.1
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

DYE-M LS Powerhouse - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Downgradient - MW 05-05																		
Not sampled - well dry	MW 05-05	2014	Year 1	Phase I														#N/A
MW0505 (Dup Avg)	MW 05-05	2015	Year 2	Phase I	0.005	0.014	0.002	0.0004	0.029	4.42	<0.004	<0.003	0.00006	<0.00005	<0.025	<0.1	<0.1	0.1
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 05-06																		
Not sampled - well dry	MW 05-06	2014	Year 1	Phase I														#N/A
MW0506	MW 05-06	2015	Year 2	Phase I	0.0097	0.009	<0.0025	<0.0005	<0.0005	**15.1**	<0.005	<0.005	<0.0001	<0.0001	<0.025	<0.1	<0.1	0.1
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 05-07																		
Not sampled - well dry	MW 05-07	2014	Year 1	Phase I														#N/A
Not sampled - well dry	MW 05-07	2015	Year 2	Phase I														#N/A
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A

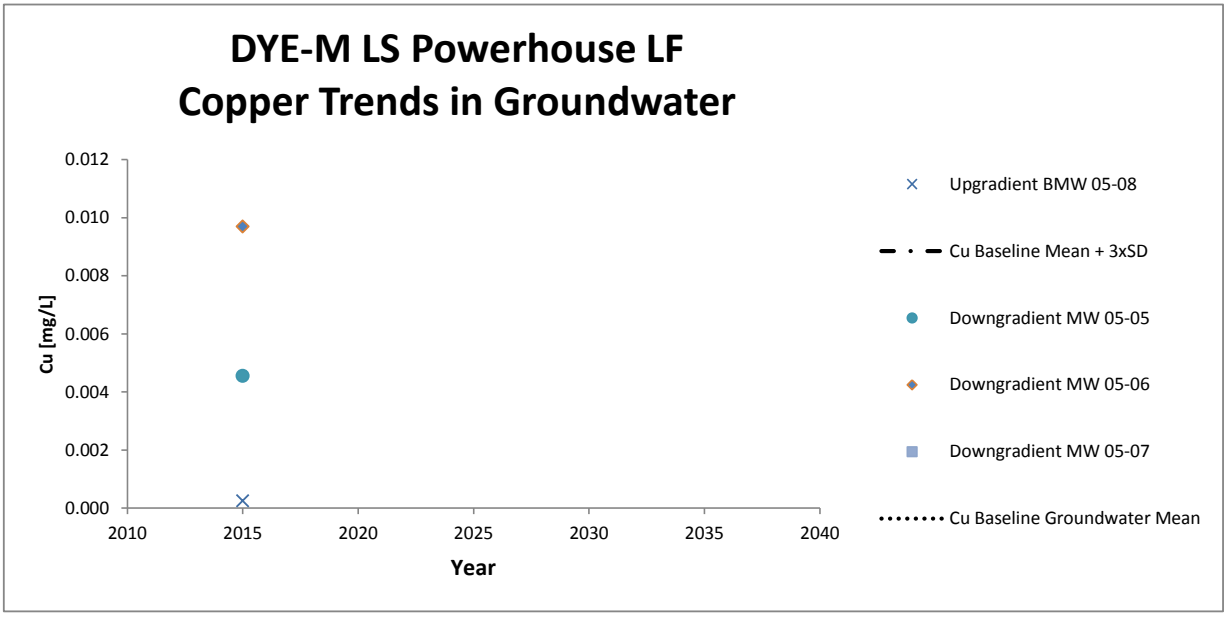
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

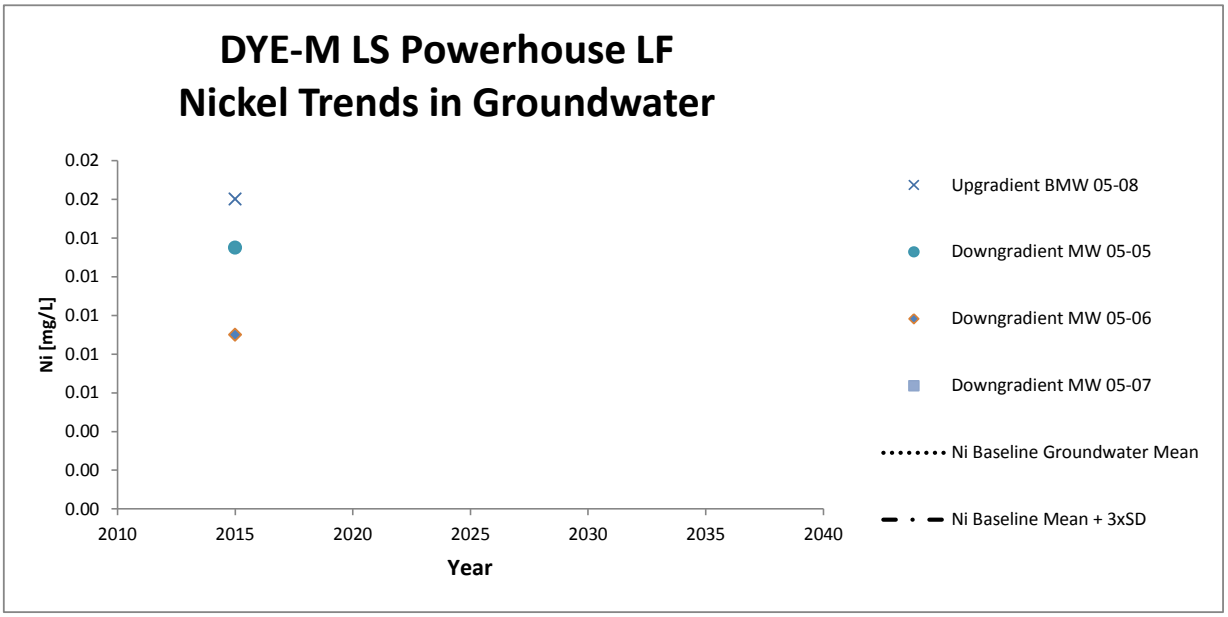
blue highlight indicates dissolved metal results. No highlight indicates total metals.

Dissolved metal results have not been included in the Baseline Arithmetic Mean

DYE-M LS Powerhouse LF Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

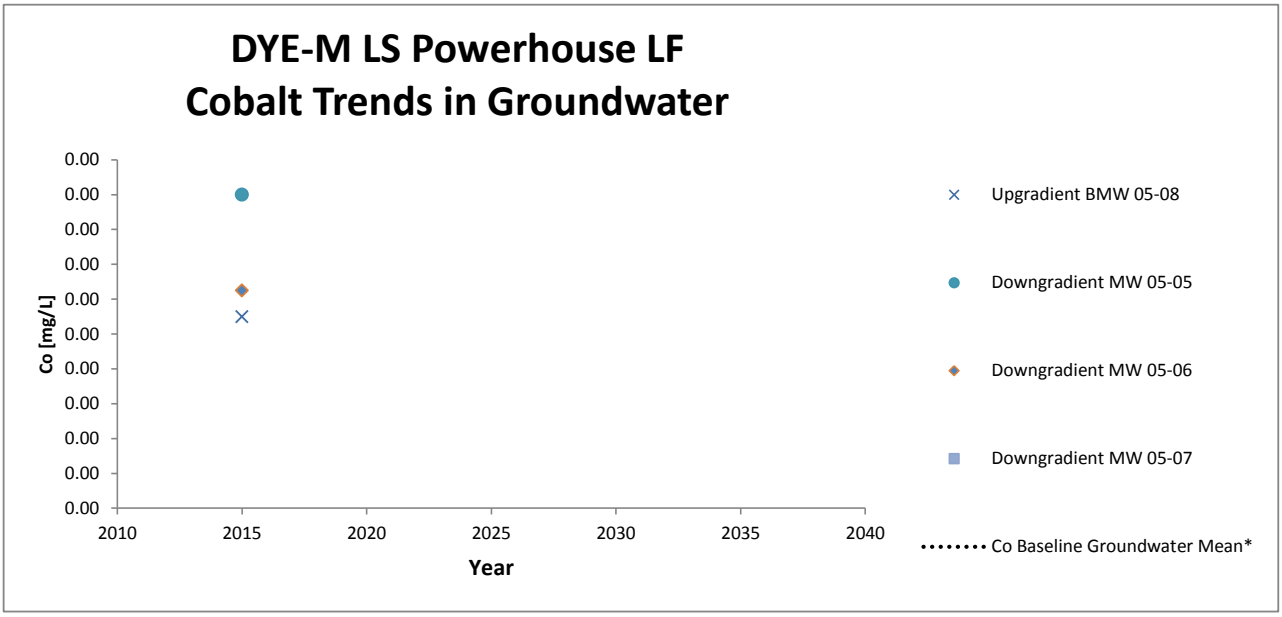
Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

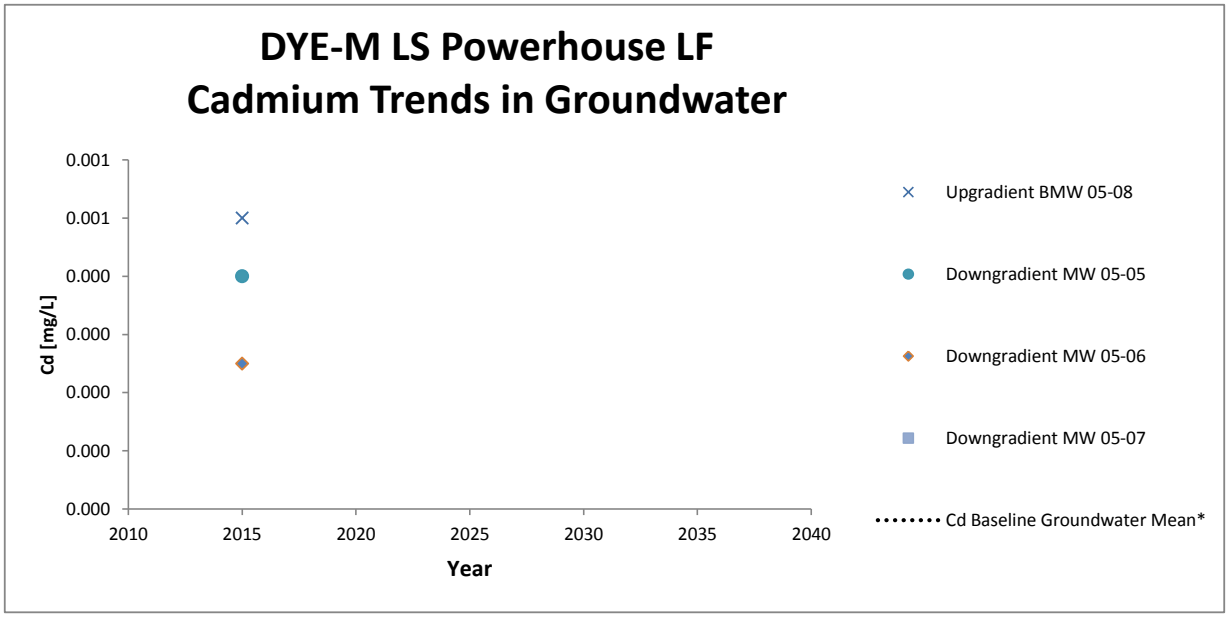




DYE-M LS Powerhouse LF Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

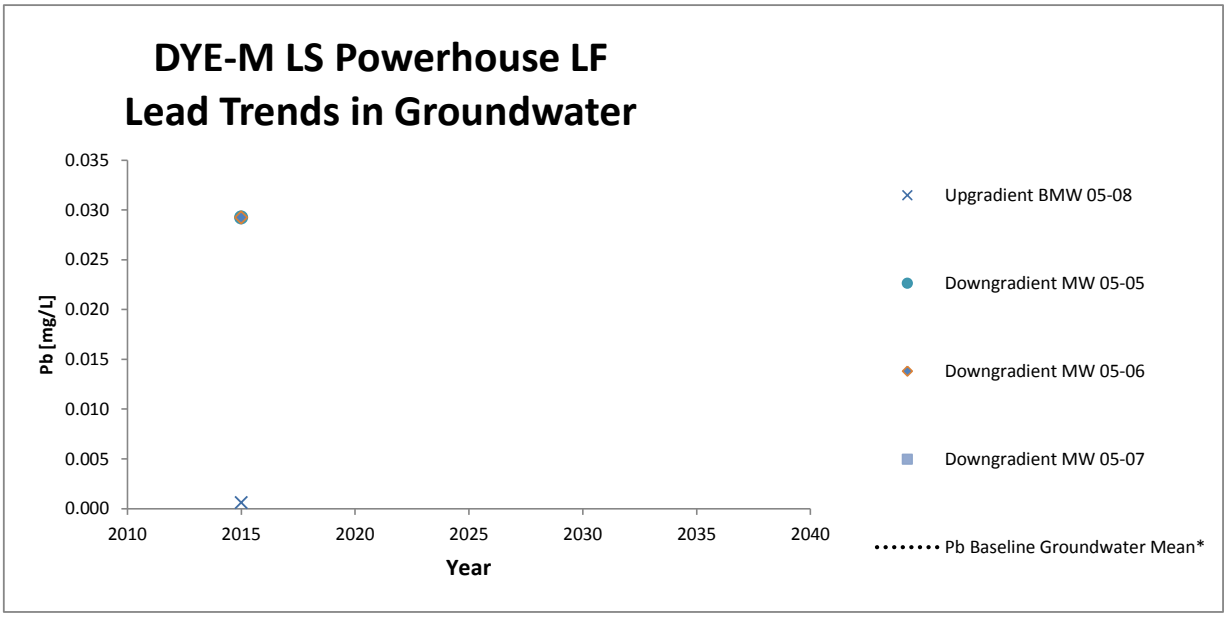
Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

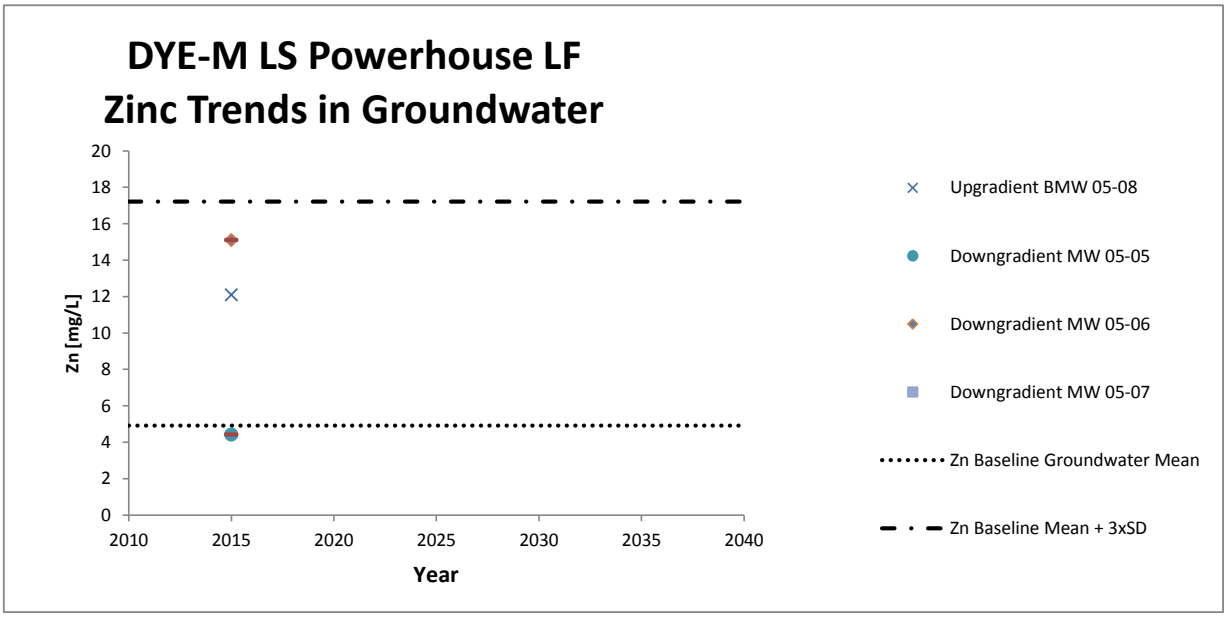




DYE-M LS Powerhouse LF Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

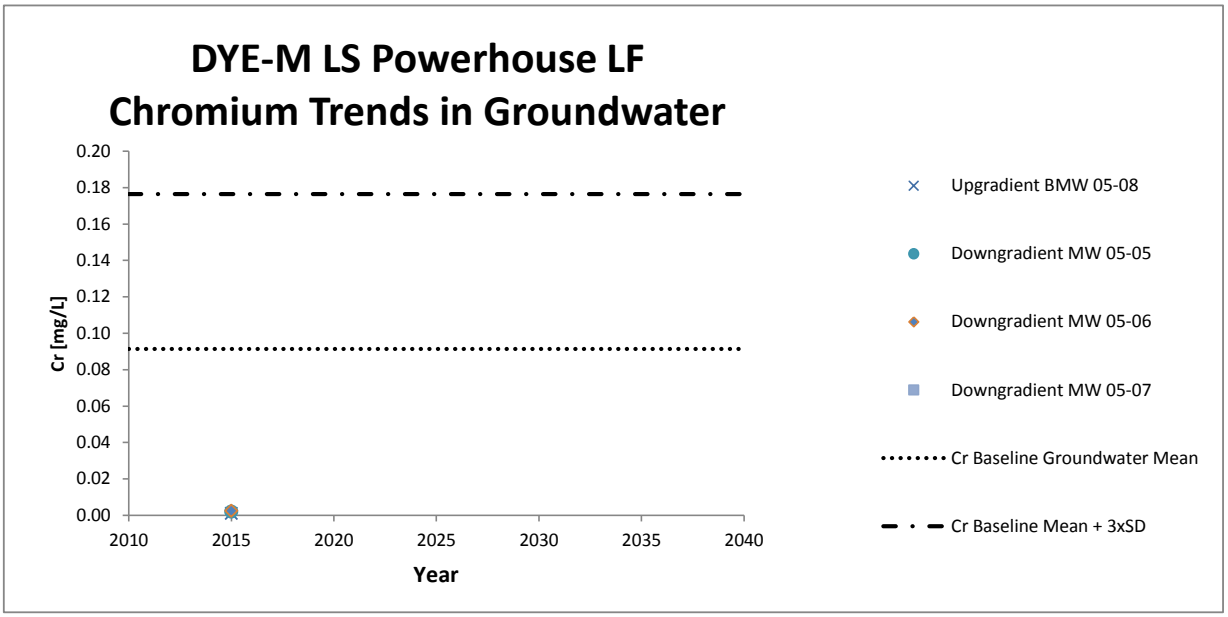
Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

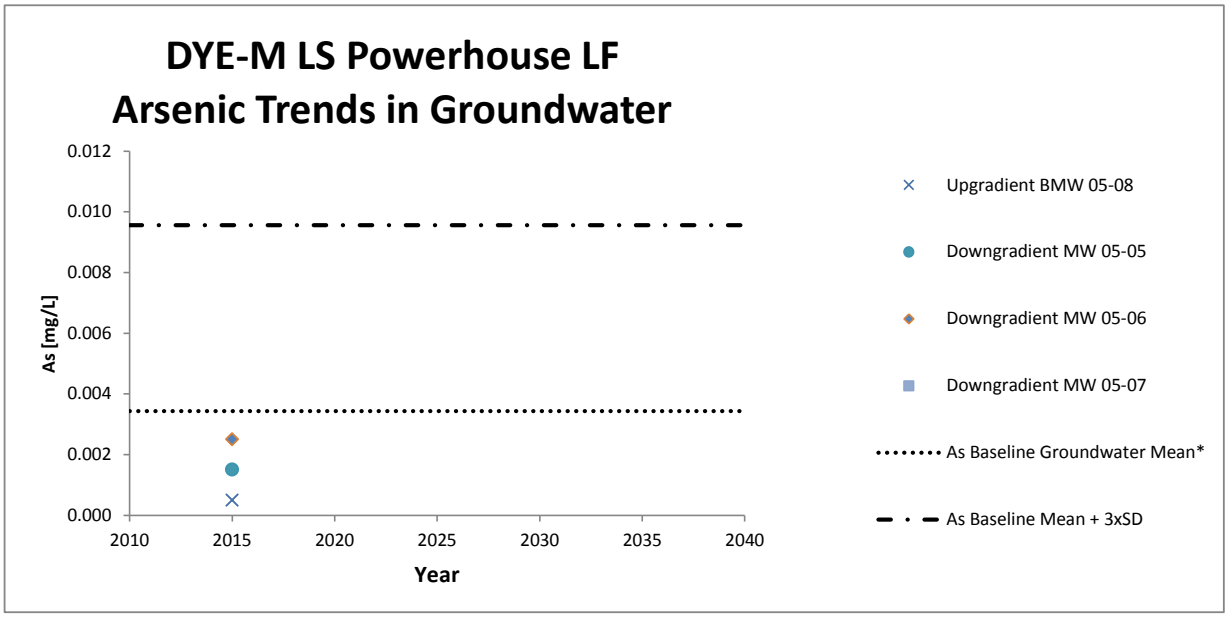




DYE-M LS Powerhouse LF Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

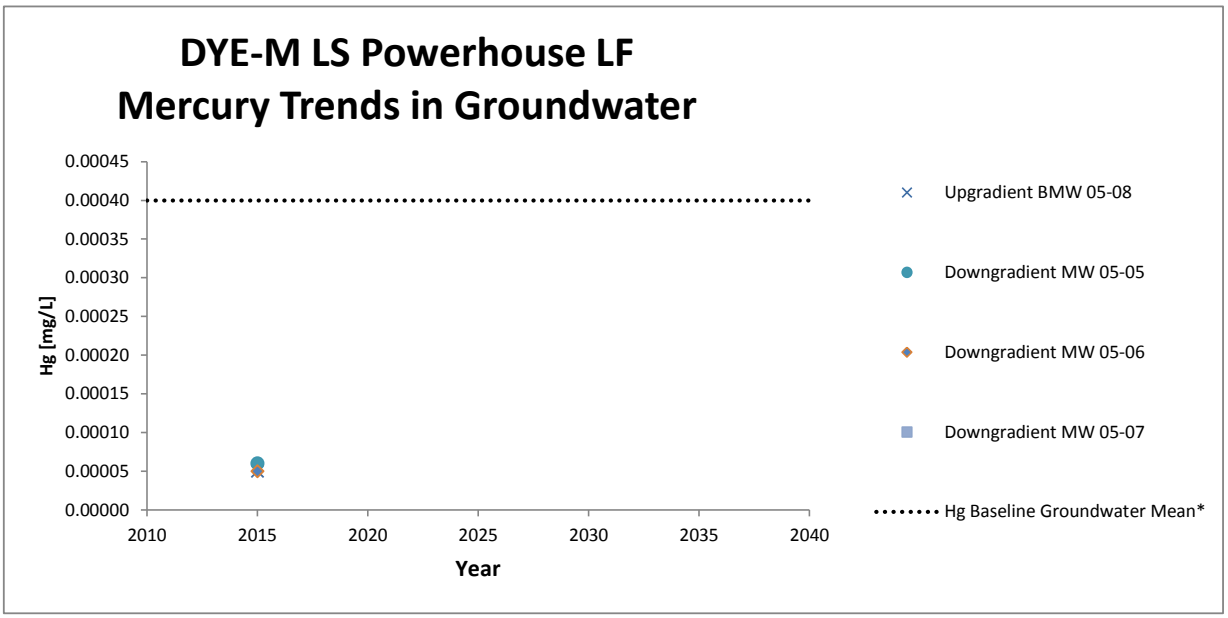
Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



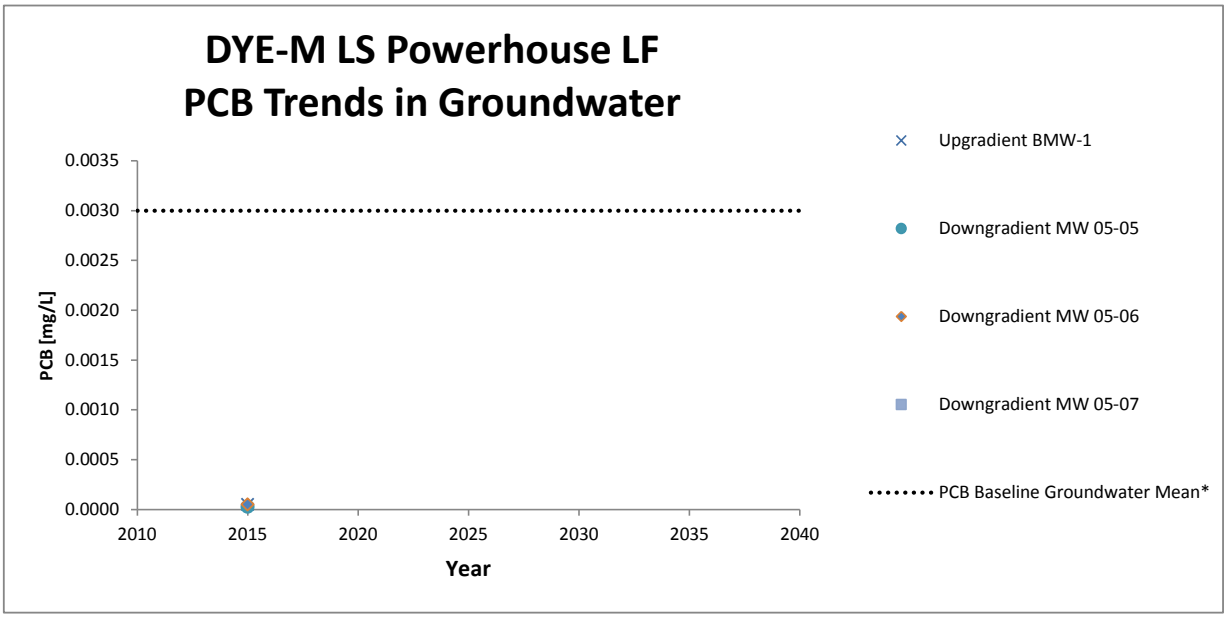


DYE-M LS Powerhouse LF Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



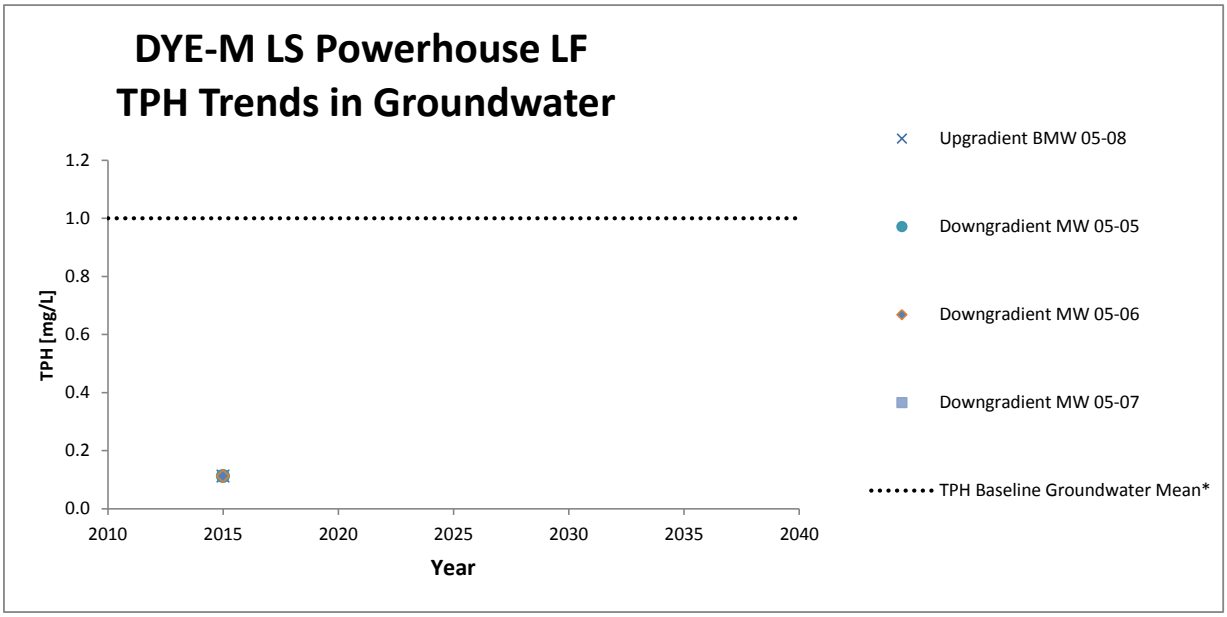
*Hg Baseline Mean is equal to the baseline detection limit.
*Hg Baseline SD = 0



*PCB Baseline Mean is equal to the baseline detection limit.
*PCB Baseline SD = 0

DYE-M LS Powerhouse LF Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*TPH Baseline Mean is equal to the baseline detection limit.
*TPH Baseline Mean SD = 0

DYE-M LS Crossroads Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic Mean						43	38	12	1.0	10	84	94	1.00	0.50	0.0002	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mean						**30**	**38**	**11**	**1.0**	**10**	**47**	**69**	**1.0**	**0.10**	**0.10**	**5.0**	**10**	**22**	**70**
Baseline Data - Standard Deviation						7.4	7.8	2.5	0.0	2.9	8.0	12	0.82	0.0	0.020	0.0	17	21	190
Baseline Data Mean + 3xStandard Deviation						52	61	19	1.0	19	71	106	3.4	0.10	0.16	5.0	60	85	641
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
DEW Line Cleanup Tier II Criteria & Hydrocarbon Action Level						*100*	*100*	*50*	*5*	*500*	*500*	*250*	*30*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	DM-1 surface																		
14-8330/31	DM-1	2014	Year 1	Phase I	5-10	26	36	8.0	<1.0	<10	39	66	**1.2**	<0.01	<0.010	<10	<10	<10	15
DM-01 (0-15)	DM-1	2015	Year 3	Phase I	0-15	24.2	30.1	8.2	<0.5	5.1	32.2	53.7	**1.2**	<0.1	<0.05	<7	**65**	10	**78.5**
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-1 depth																		
14-8332	DM-1	2014	Year 1	Phase I	45-50	23	36	7.8	<1.0	<10	34	61	**3.3**	<0.01	<0.010	<10	<10	<10	15
DM-01 (40-50)	DM-1	2015	Year 3	Phase I	40-50	20.9	29.5	7.9	<0.5	4.2	28.9	51.1	**1.3**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Crossroads Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			
	DM-2 surface																		
14-8333	DM-2	2014	Year 1	Phase I	5-10	**33**	**41**	9.6	<1.0	<10	**49**	**80**	**1.6**	<0.01	<0.010	<10	<10	<10	15
DM-02 (0-15)	DM-2	2015	Year 3	Phase I	0-15	**31.7**	35.8	9.9	<0.5	8.1	43.8	67.5	**1.4**	<0.1	<0.05	<7	<4	**35**	40.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-2 depth																		
14-8334	DM-2	2014	Year 1	Phase I	45-50	**42**	**45**	11	<1.0	**11**	**54**	**94**	**1.6**	<0.01	<0.010	<10	**56**	<10	66
DM-02 (15-30)	DM-2	2015	Year 3	Phase I	15-30	**31.3**	34.1	9.1	<0.5	6.1	40	64.7	**1.3**	<0.1	<0.05	<7	**39**	**57**	**99.5**
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Crossroads Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-3 surface																		
14-8335	DM-3	2014	Year 1	Phase I	5-10	28	35	8.6	<1.0	<10	41	68	**1.4**	<0.01	<0.010	<10	<10	<10	15
DM-03 (0-15)	DM-3	2015	Year 3	Phase I	0-15	26.6	27.7	7.7	<0.5	3.1	29.4	47.8	**1.2**	<0.1	<0.05	<7	<4	**41**	46.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-3 depth																		
14-8337	DM-3	2014	Year 1	Phase I	45-50	21	28	7.2	<1.0	<10	31	59	0.9	<0.01	<0.010	<10	<10	<10	15
DM-03 (40-50) (Dup Av	DM-3	2015	Year 3	Phase I	40-50	29	29	7.9	<0.5	3	33	50	**1**	<0.1	<0.05	<6	<4	18	23
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

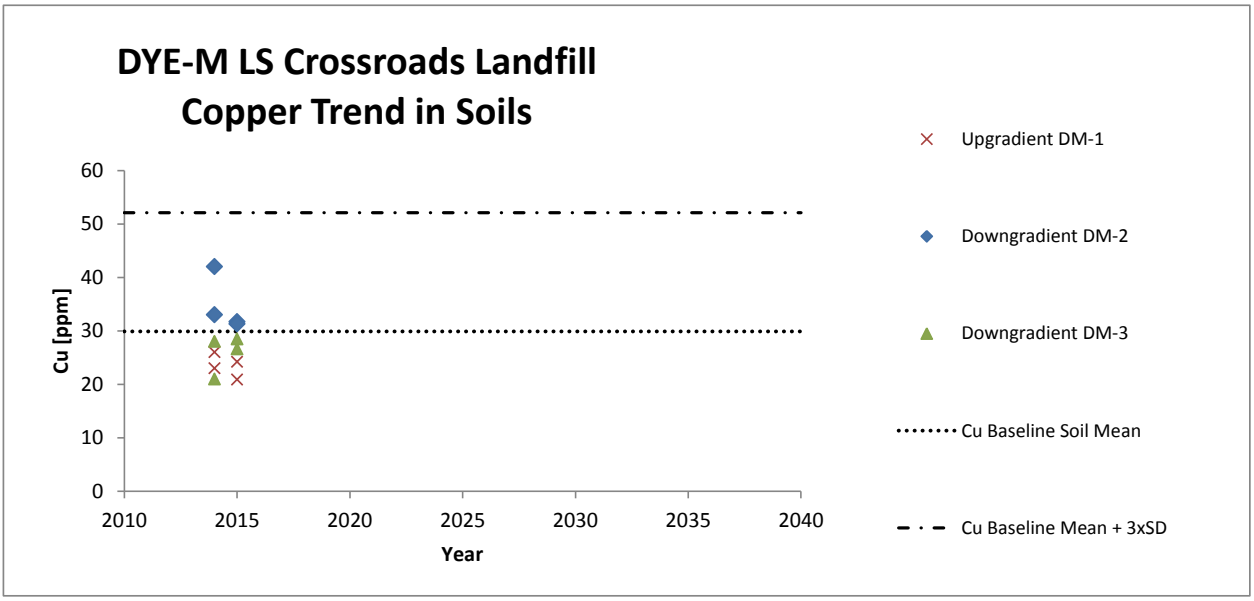
Legend

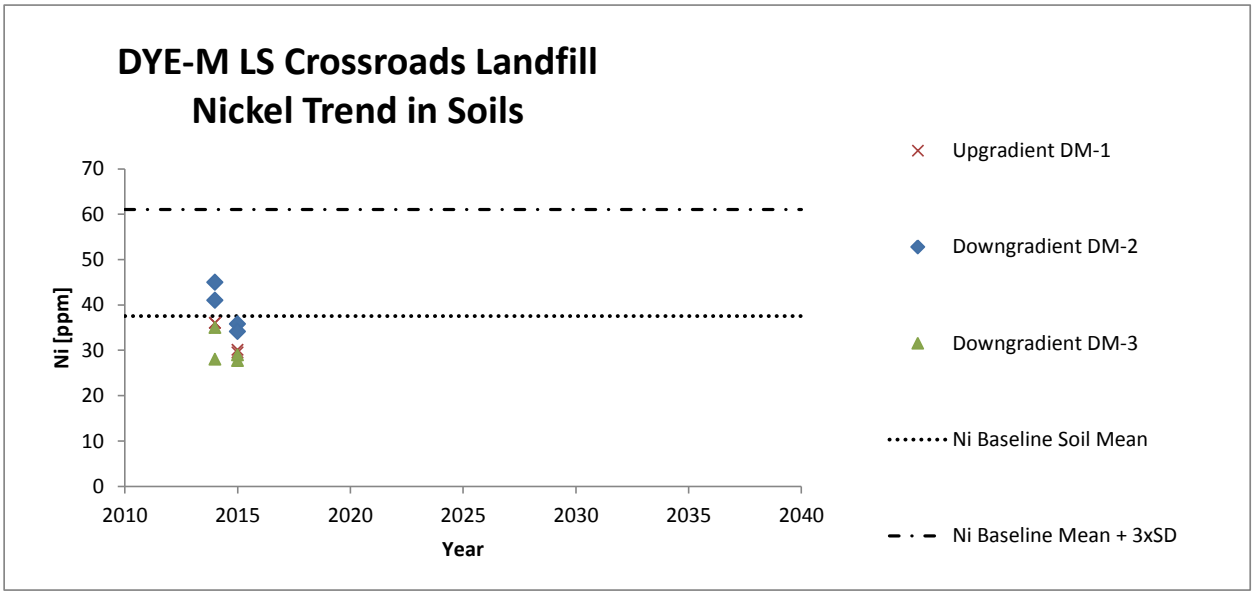
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

DYE-M LS Crossroads Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

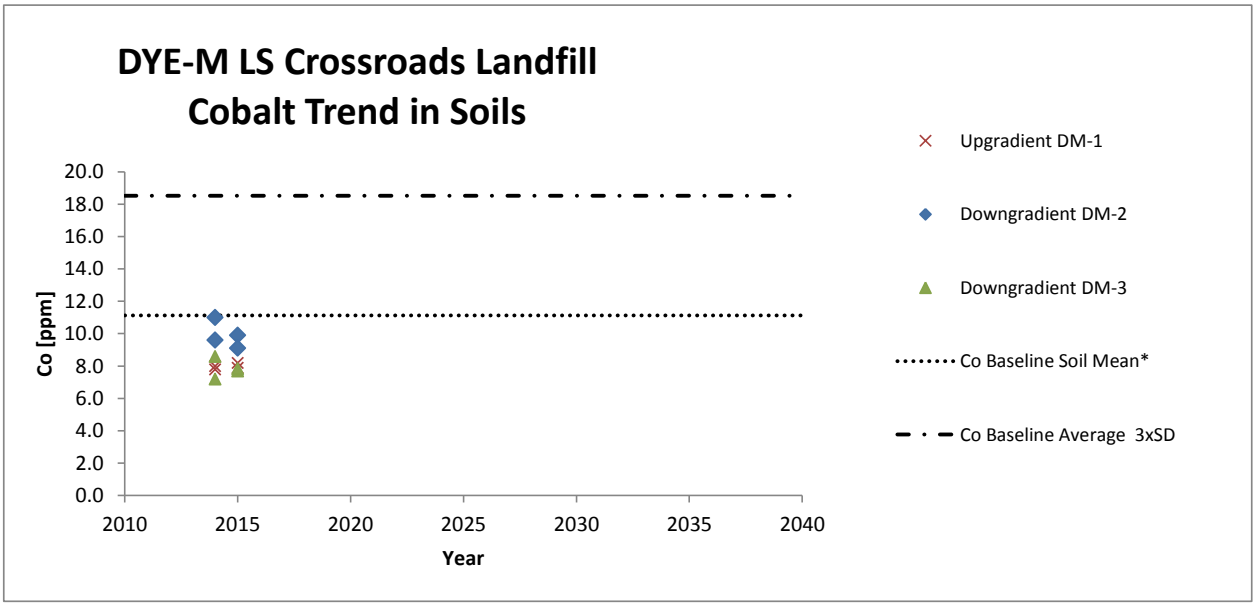


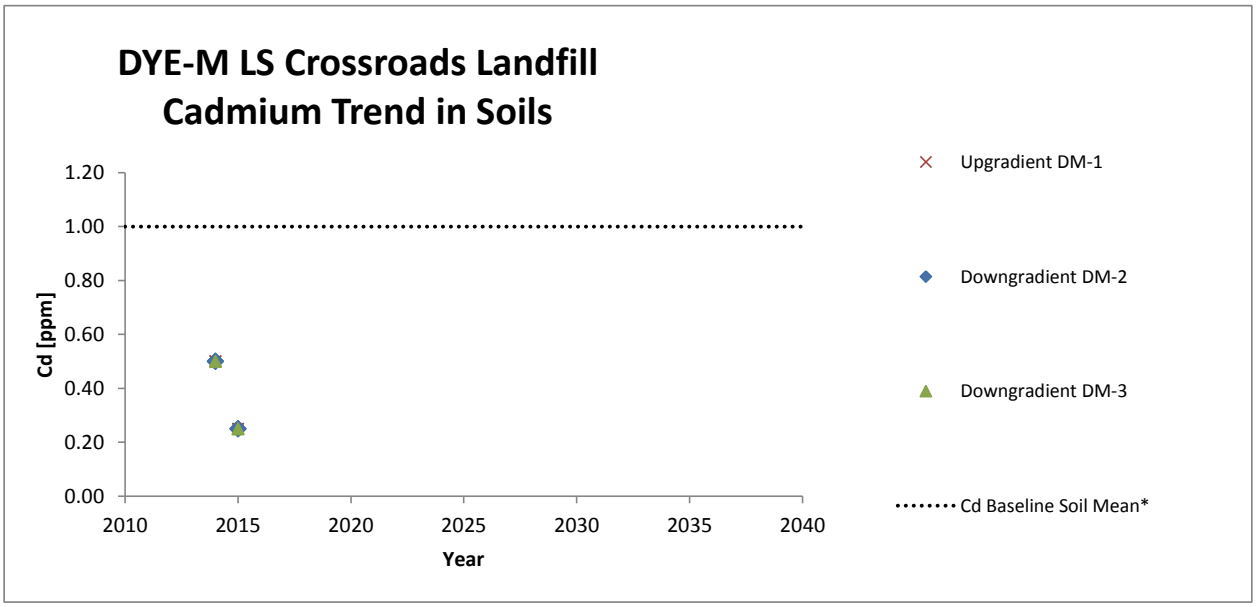


DYE-M LS Crossroads Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



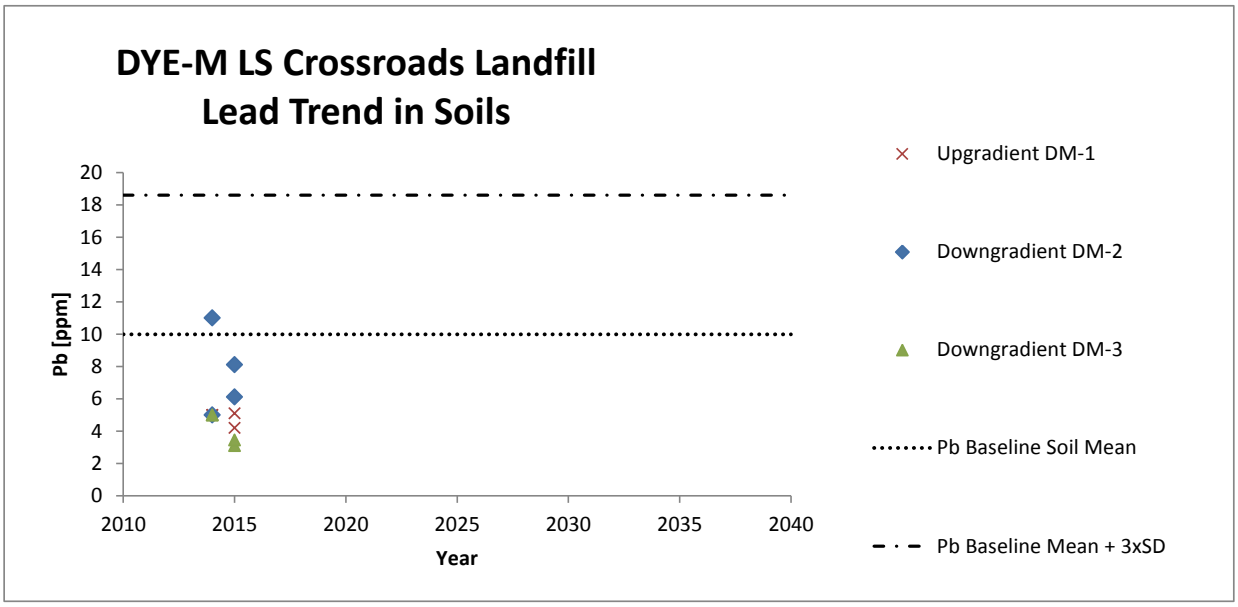


*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.
*Cd Baseline SD = 0

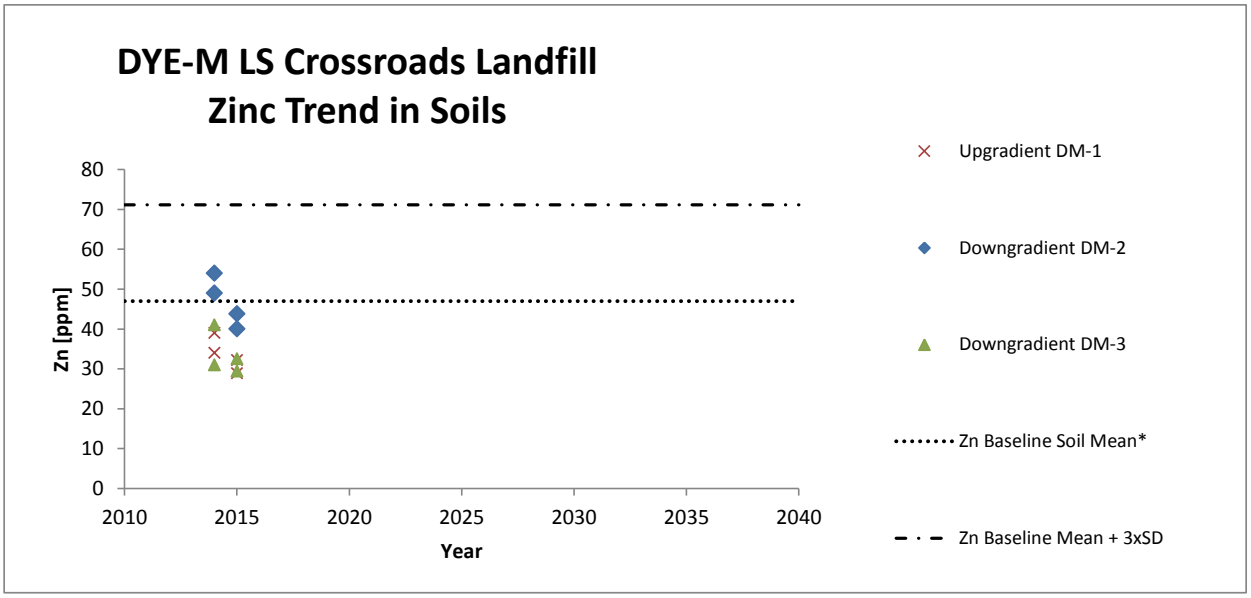
DYE-M LS Crossroads Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



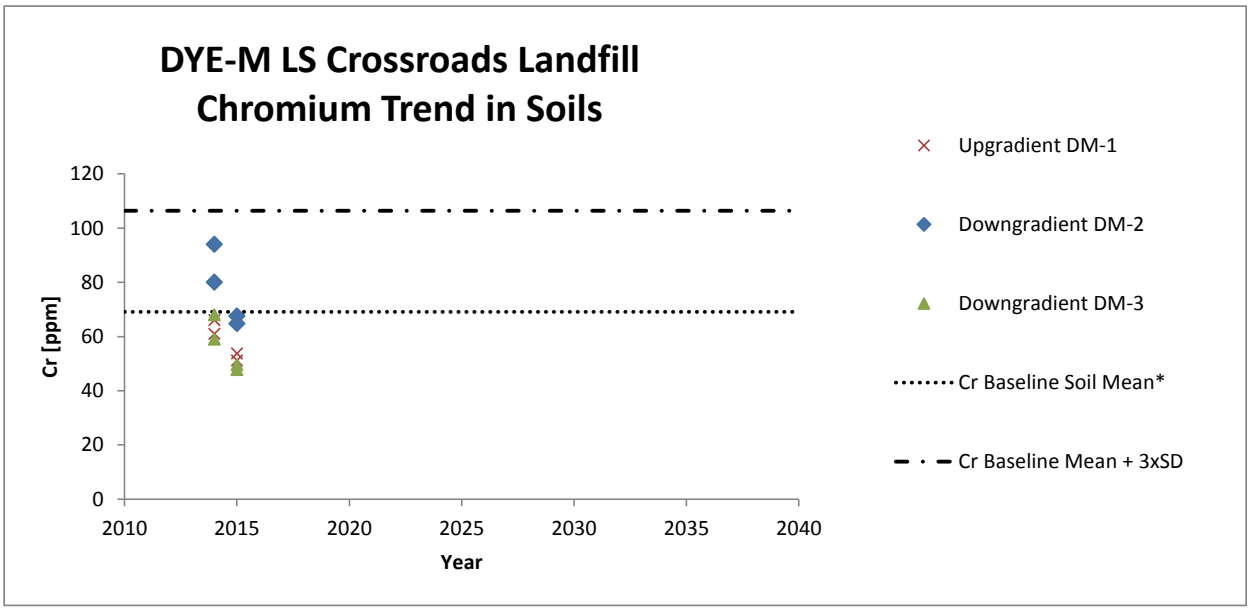
*Pb Baseline Arithmetic Mean is equal to the baseline detection limit.

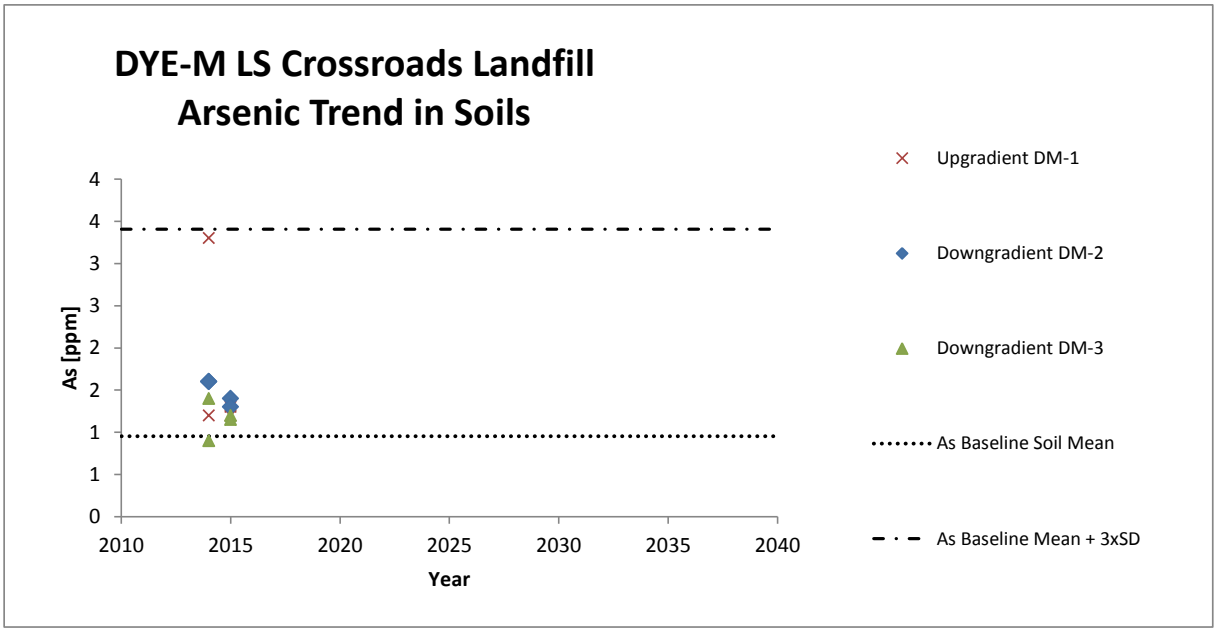


DYE-M LS Crossroads Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



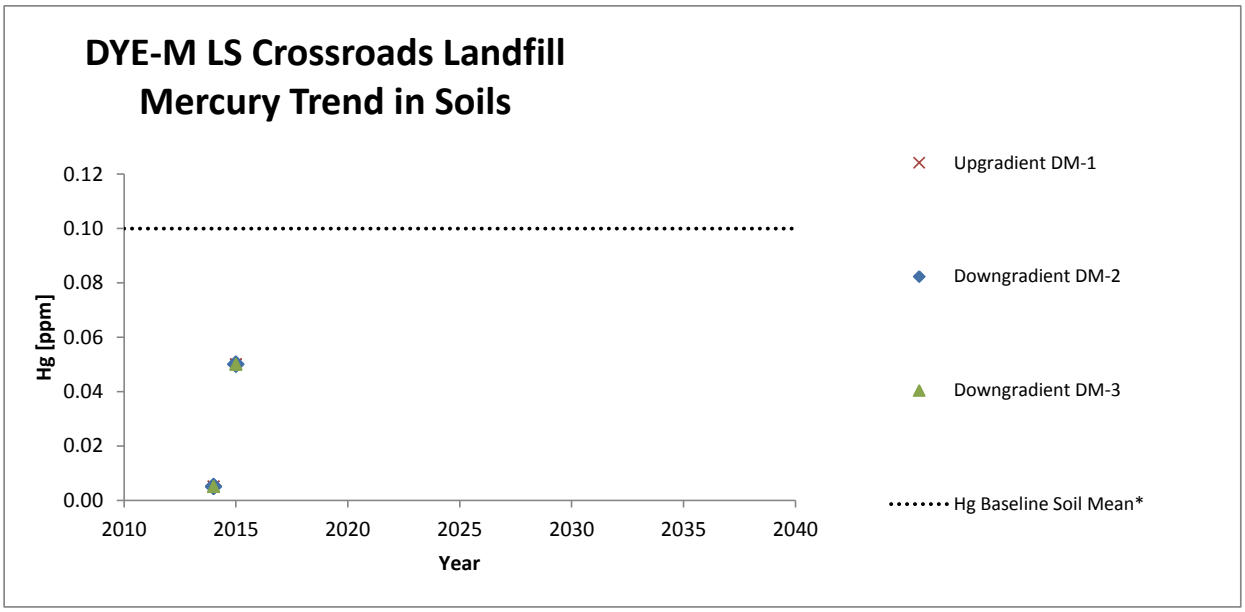


*As Baseline Arithmetic Mean is equal to the baseline detection limit.

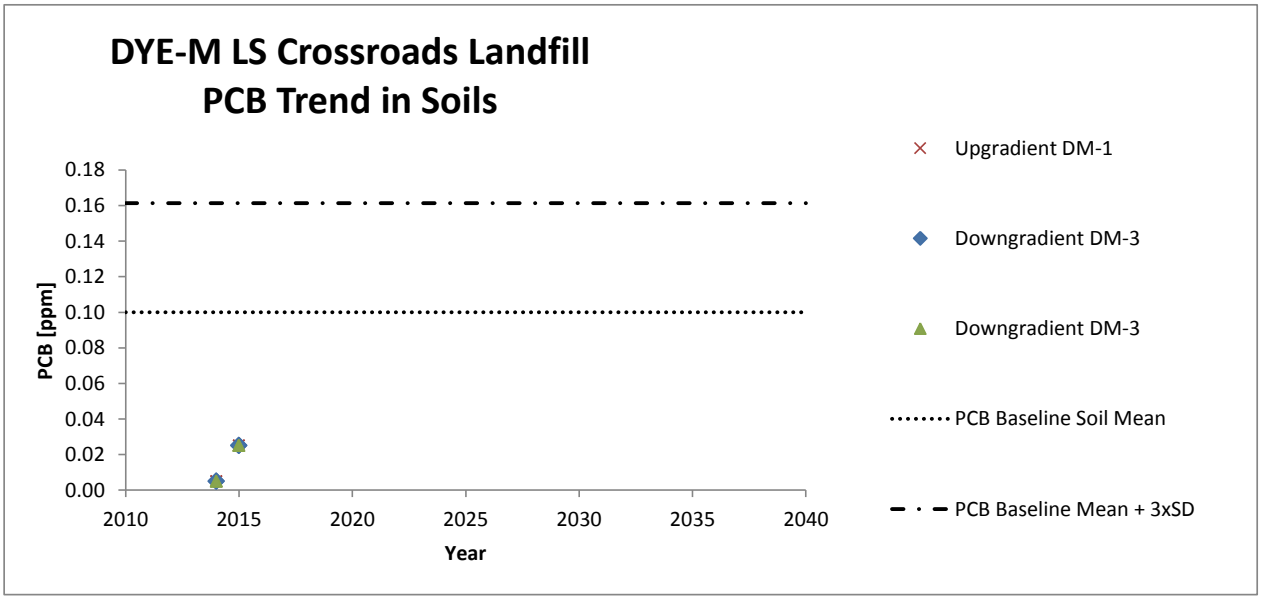
DYE-M LS Crossroads Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.
Hg baseline SD = 0

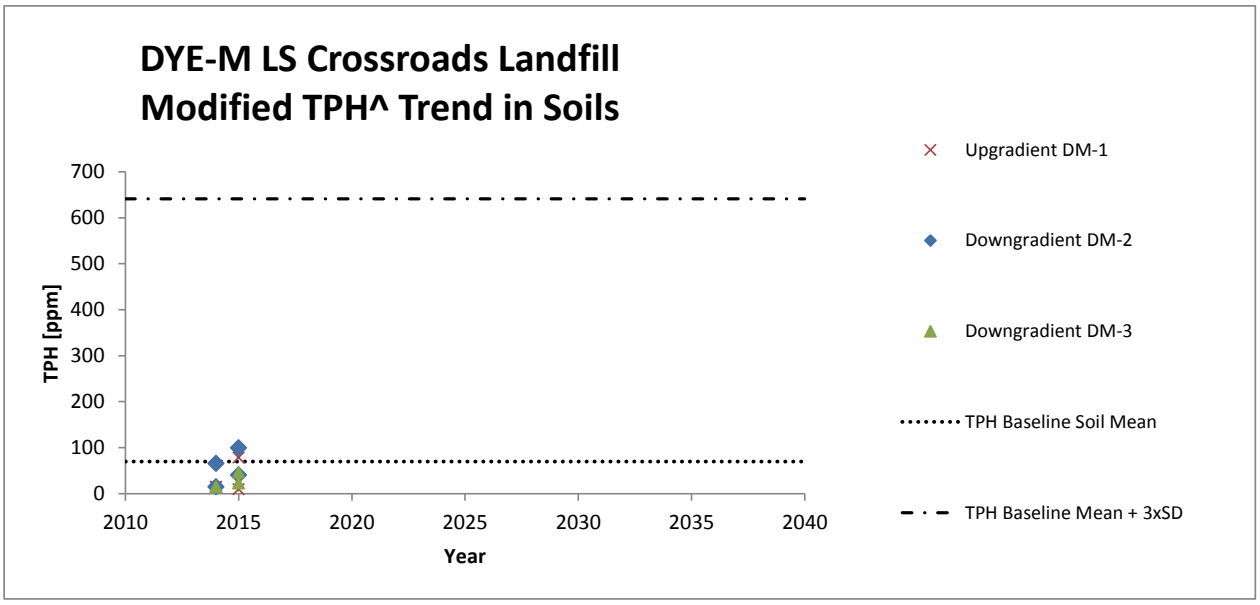


*PCB Baseline Arithmetic Mean is equal to the baseline detection limit.

DYE-M LS Crossroads Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M LS Foundation Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic Mean						43	38	12	1.0	10	84	94	1.0	0.50	0.0002	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mean						**28**	**35**	**11**	**1.0**	**10**	**61**	**67**	**1.0**	**0.10**	**0.10**	**10**	**4.8**	**25**	**133**
Baseline Data - Standard Deviation						13	6.0	2.4	0.0	19	39	10	0.54	0.000	0.11	0.0	3.2	32	242
Baseline Data Mean + 3xStandard Deviation						67	53	18	1.0	66	179	98	2.6	0.10	0.42	10	14	121	859
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
DEW Line Cleanup Tier II Criteria & Hydrocarbon Action Level						*100*	*100*	*50*	*5*	*500*	*500*	*250*	*30*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	DM-4 surface																		
14-8322	DM-4	2014	Year 1	Phase I	0-10	26	32	7.7	<1.0	<10	42	**68**	**1.0**	<0.010	0.027	<10	<10	<10	15
DM-04 (0-15)	DM-4	2015	Year 3	Phase I	0-15	25.3	31.2	9.3	<0.5	9.1	41.6	61.3	**1.2**	<0.1	0.09	<7	<4	**38**	44
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-4 depth																		
14-8323	DM-4	2014	Year 1	Phase I	40-45	20	29	7.2	<1.0	<10	35	59	**1.0**	<0.010	0.014	<10	<10	<10	15
DM-04 (40-50)	DM-4	2015	Year 3	Phase I	40-50	18.5	24.8	7.4	<0.5	6.8	31.4	49.3	<1	<0.1	<0.05	<7	<4	**28**	34
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Foundation Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			
	DM-5 surface																		
14-8324	DM-5	2014	Year 1	Phase I	0-10	26	**35**	8.4	<1.0	**19**	49	**75**	**1.3**	0.013	0.052	<10	<10	**170**	**180**
DM-05 (0-15)	DM-5	2015	Year 3	Phase I	0-15	27.8	34.2	9.9	<0.5	3.6	38.5	**67**	**2.1**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-5 depth																		
14-8325	DM-5	2014	Year 1	Phase I	40-45	**30**	**38**	9.5	<1.0	<10	45	**75**	**1.3**	<0.010	<0.010	<10	<10	<10	15
DM-05 (40-50)	DM-5	2015	Year 3	Phase I	40-50	17.4	23.6	6.9	<0.5	2.4	24.8	45	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS Foundation Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-6 surface																		
14-8327	DM-6	2014	Year 1	Phase I	0-10	**31**	**38**	9.3	<1.0	<10	46	**76**	**1.6**	<0.010	<0.010	<10	<10	<10	15
DM-06 (0-15)	DM-6	2015	Year 3	Phase I	0-15	**29.7**	**36.3**	**11.1**	<0.5	4.6	42.4	**71.8**	**2.2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-6 depth																		
14-8328	DM-6	2014	Year 1	Phase I	40-45	**30**	**43**	**11**	<1.0	<10	49	**86**	**1.3**	<0.010	<0.010	<10	<10	<10	15
DM-06 (40-50)	DM-6	2015	Year 3	Phase I	40-50	27.8	30.8	8.9	<0.5	3.4	38.3	59.3	**1.7**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

Legend

XX sample exceeds background

XX sample exceeds baseline

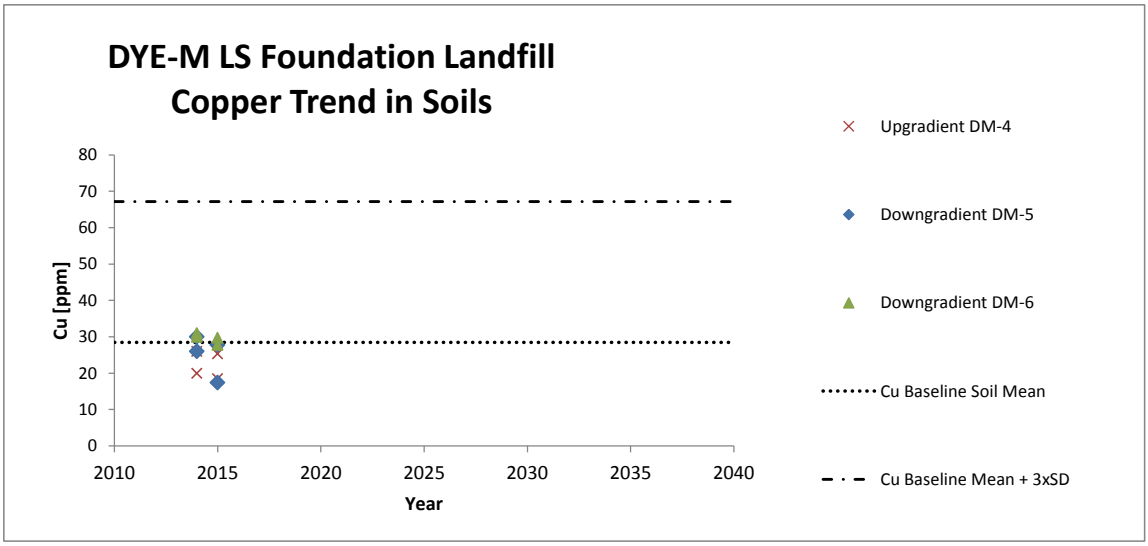
XX sample exceeds DLCU Tier I criteria

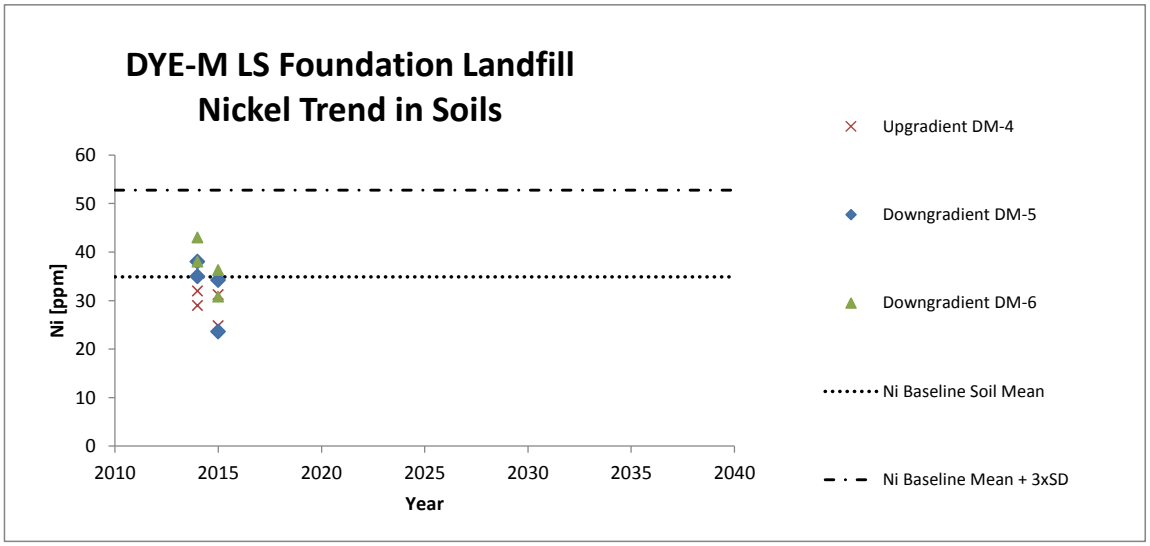
XX sample exceeds DLCU Tier II criteria

DYE-M LS Foundation Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

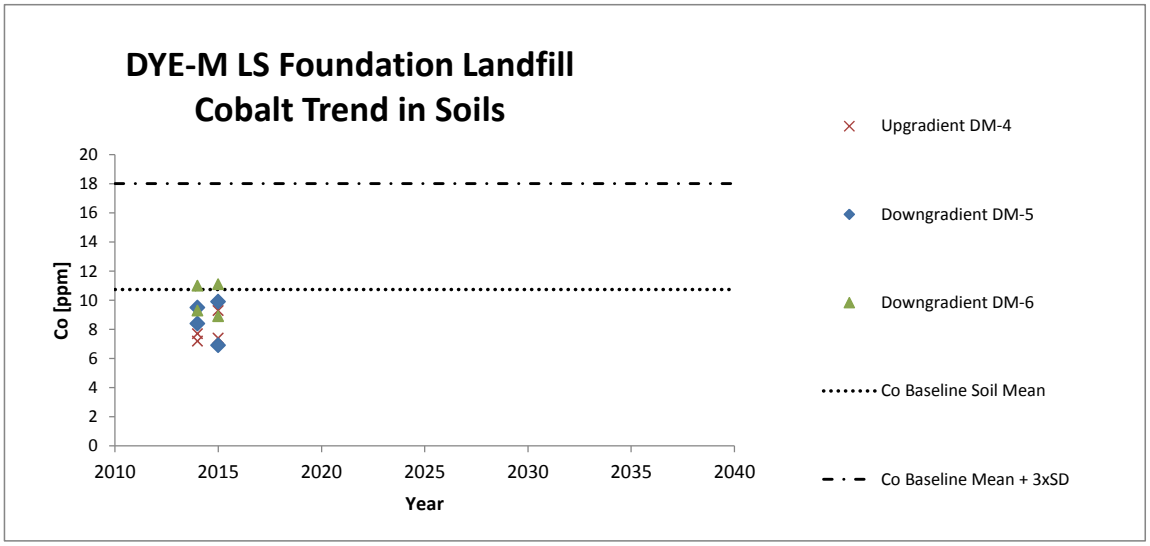
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

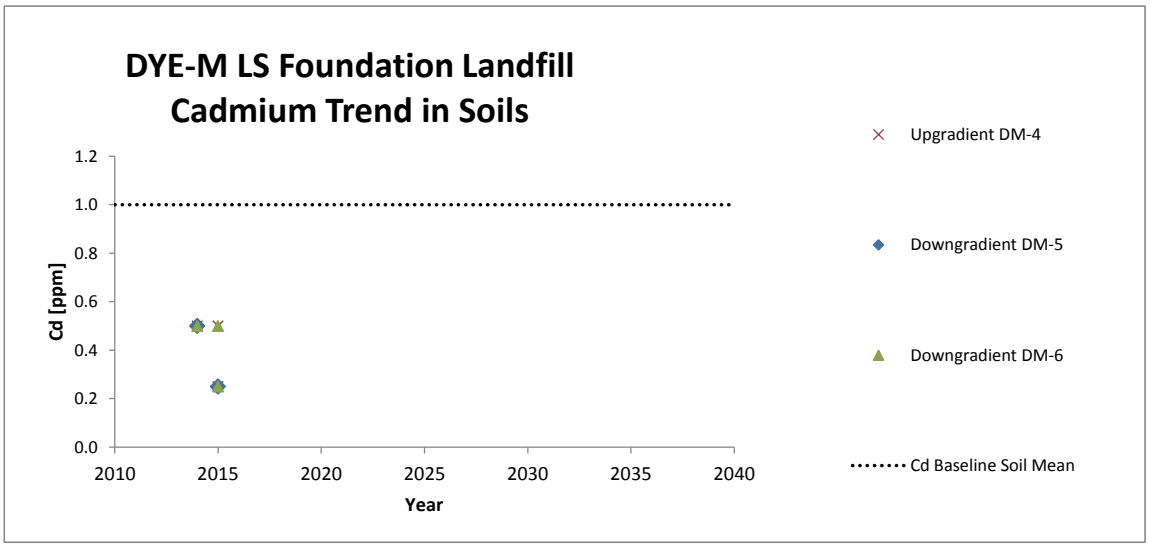




DYE-M LS Foundation Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



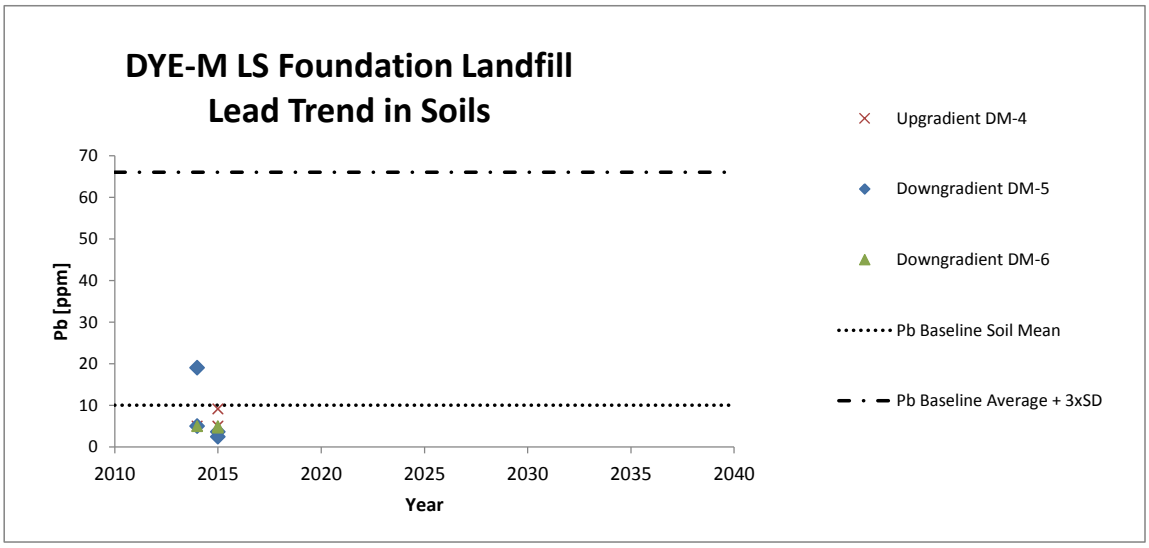


*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.
*Cd Baseline SD = 0

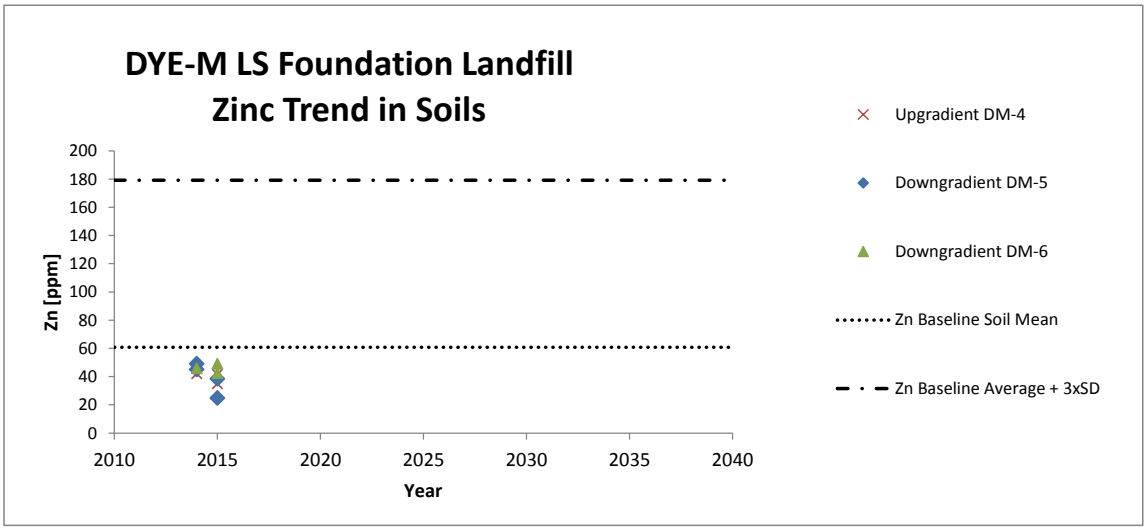
DYE-M LS Foundation Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



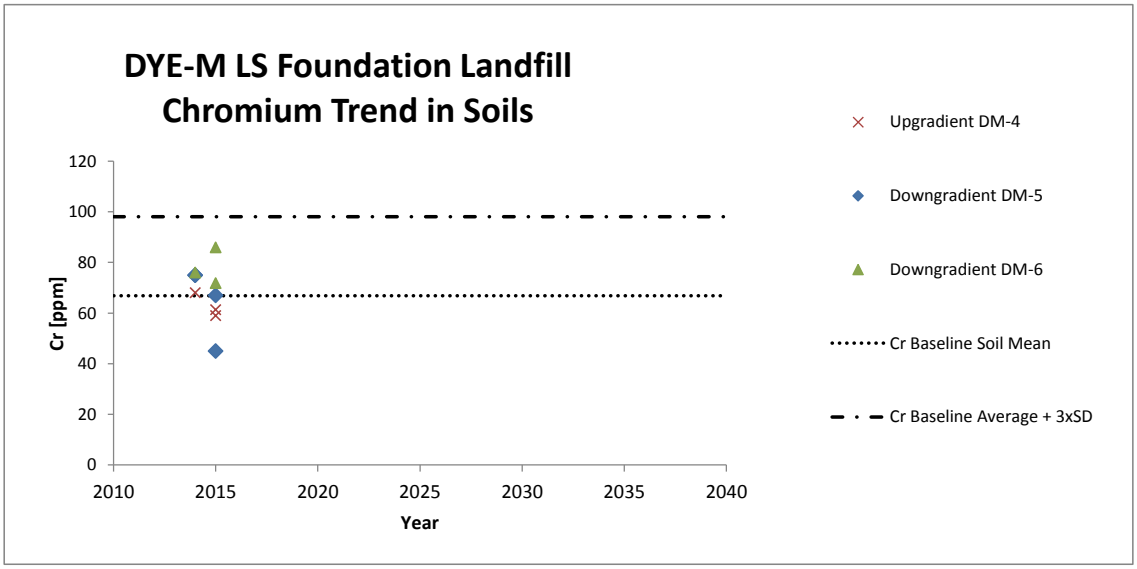
*Pb Baseline Arithmetic Mean is equal to the baseline detection limit.

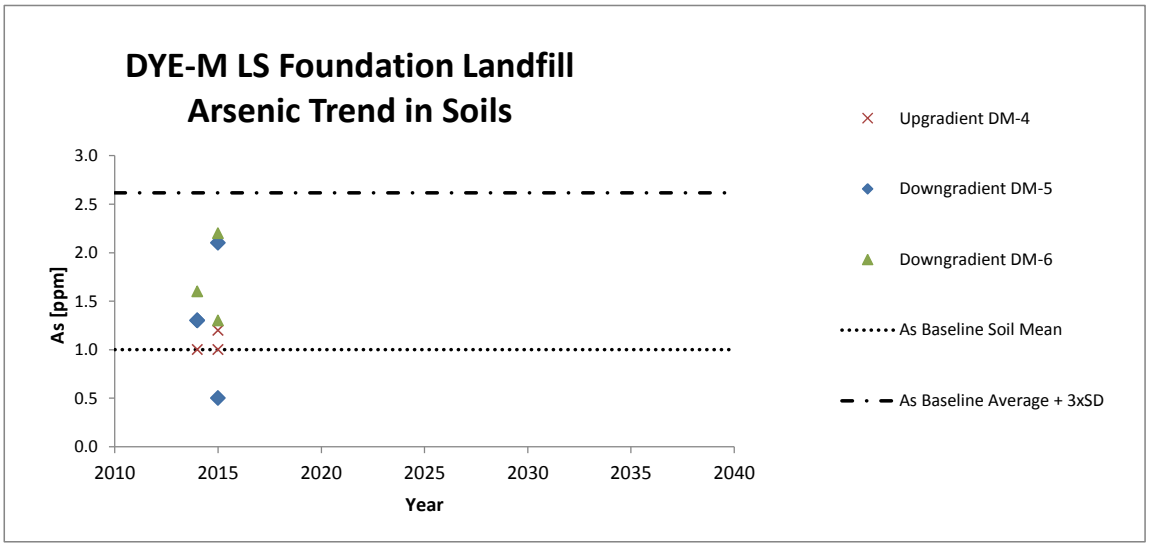


DYE-M LS Foundation Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

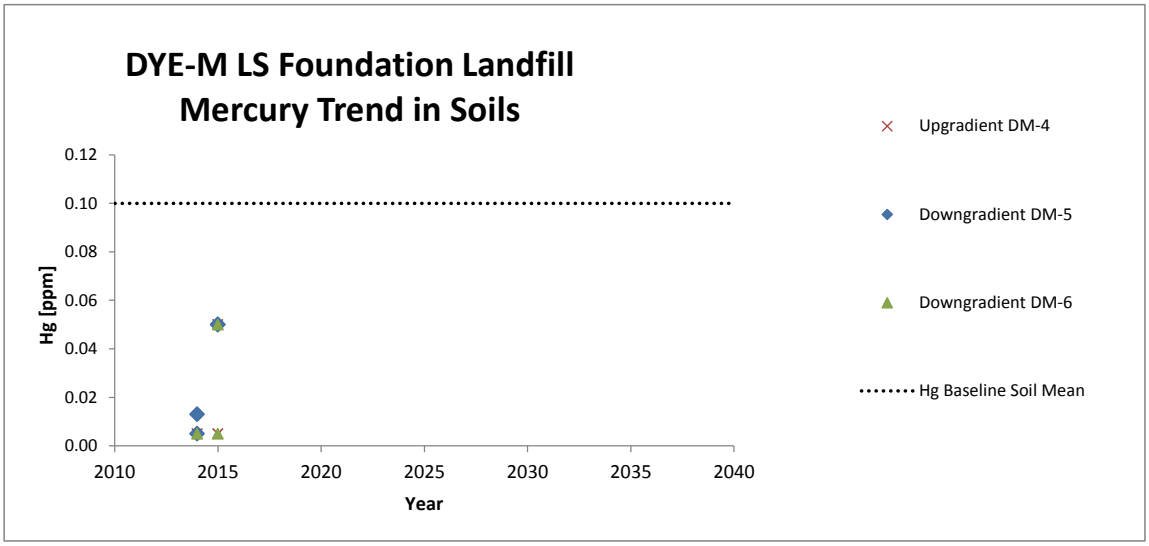




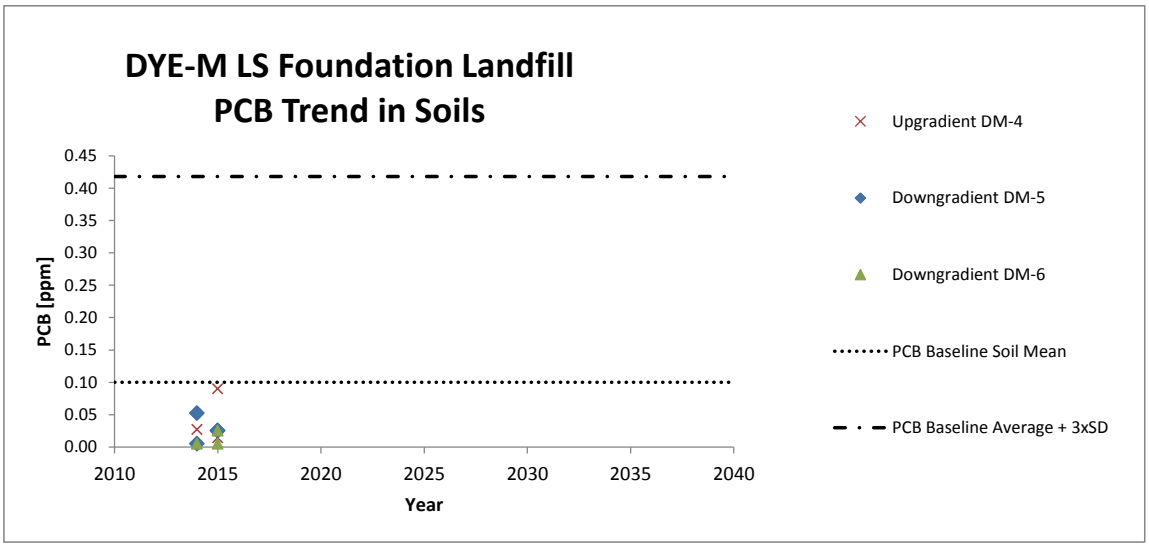
*As Baseline Arithmetic Mean is equal to the detection limit.

DYE-M LS Foundation Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.
Hg Baseline SD is equal to zero

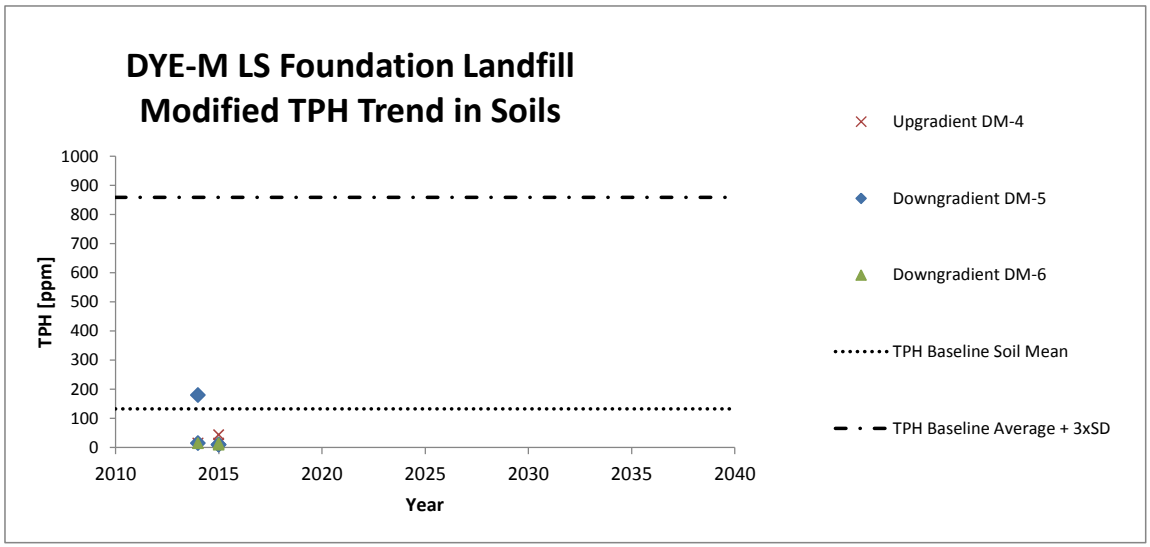


*PCB Baseline Arithmetic Mean is equal to the baseline detection limit.

DYE-M LS Foundation Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M LS North Warning System (NWS) Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic Mean						43	38	12	1.0	10	84	94	1.00	0.50	0.0002	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mean						**26**	**34**	**12**	**1.0**	**10**	**51**	**65**	**1.0**	**0.10**	**0.10**	**10**	**4.0**	**9.0**	**101**
Baseline Data - Standard Deviation						7.2	10	3.6	0.0	4.0	15	21	0.66	0.000	0.017	0	3.7	11	276
Baseline Data Mean + 3xStandard Deviation						48	64	23	1.0	22	97	126	3.0	0.10	0.15	10	15	43	929
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
DEW Line Cleanup Tier II Criteria & Hydrocarbon Action Level						*100*	*100*	*50*	*5*	*500*	*500*	*250*	*30*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	DM-7 surface																		
14-8444	DM-7	2014	Year 1	Phase I	5-10	21	29	6.0	<1.0	<10	35	47	**1.3**	<0.010	<0.010	<10	<10	<10	15
DM-07 (0-15)	DM-7	2015	Year 3	Phase I	0-15	23.5	**37**	11.3	<0.5	3.8	39.5	**68.3**	**1.2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-7 depth																		
14-8445	DM-7	2014	Year 1	Phase I	40-45	25	33	7.0	<1.0	<10	39	58	**1.1**	<0.010	<0.010	<10	<10	<10	15
DM-07 (40-50)	DM-7	2015	Year 3	Phase I	40-50	23.8	**37.6**	11.2	<0.5	4.9	38.7	**67**	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS North Warning System (NWS) Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			
	DM-8 surface																		
14-8453	DM-8	2014	Year 1	Phase I	5-10	18	32	6.9	<1.0	**11**	49	54	**1.3**	<0.010	0.01	<10	<10	<10	15
DM-08 (0-15) (Dup Avg	DM-8	2015	Year 3	Phase I	0-15	23	30	9.3	<0.5	**11**	50	55	**1**	<0.1	<0.05	<6	<4	**11**	16
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-8 depth																		
14-8454	DM-8	2014	Year 1	Phase I	45-50	15	29	6.3	<1.0	<10	40	50	**1.1**	<0.010	<0.010	<10	<10	<10	15
Not sampled, refusal	DM-8	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS North Warning System (NWS) Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-9 surface																		
14-8450/51	DM-9	2014	Year 1	Phase I	5-10	**40**	**74**	**16**	<1.0	<10	**91**	**130**	**2.0**	<0.010	<0.010	<10	<10	<10	15
DM-09 (0-15)	DM-9	2015	Year 3	Phase I	0-15	**40.5**	**53.7**	**19**	<0.5	9.7	**70.1**	**107**	**1.8**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-9 depth																		
14-8452	DM-9	2014	Year 1	Phase I	40-45	**38**	**71**	**15**	<1.0	<10	**87**	**120**	**1.8**	<0.010	<0.010	<10	<10	<10	15
Not sampled, refusal	DM-9	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M LS North Warning System (NWS) Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-10 surface																		
14-8447*	DM-10	2014	Year 1	Phase I	5-10	21	**40**	8.4	<1.0	<10	48	**77**	**1.1**	<0.010	<0.010	<10	<10	<10	15
DM-10 (0-15)	DM-10	2015	Year 3	Phase I	0-15	**30.8**	**39.2**	**14.5**	<0.5	8.9	**55.7**	**74.7**	**1.7**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-10 depth																		
14-8448	DM-10	2014	Year 1	Phase I	30-35	18	31	6.5	<1.0	<10	37	58	0.8	<0.010	<0.010	<10	<10	<10	15
Not sampled, refusal	DM-10	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

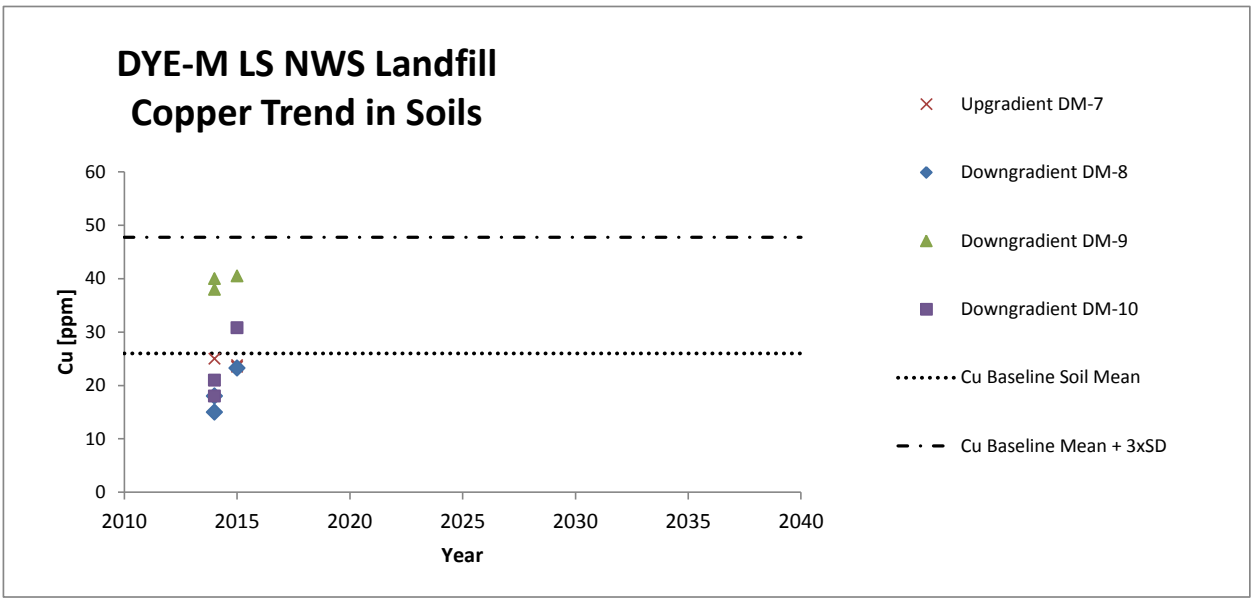
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

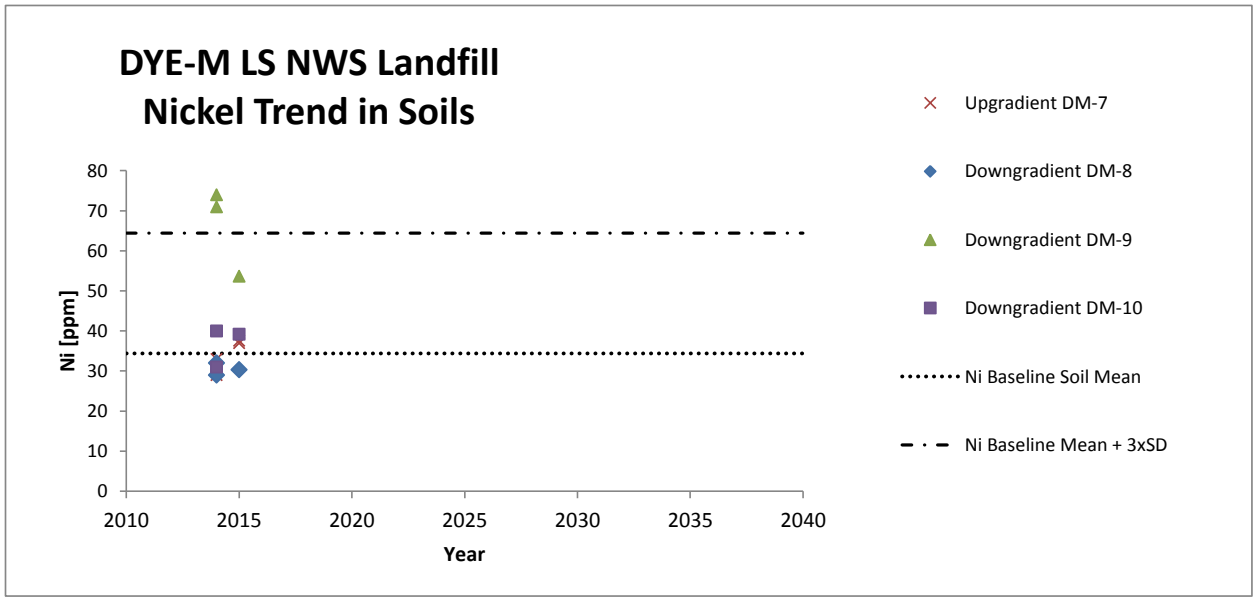
Legend

XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

DYE-M LS NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

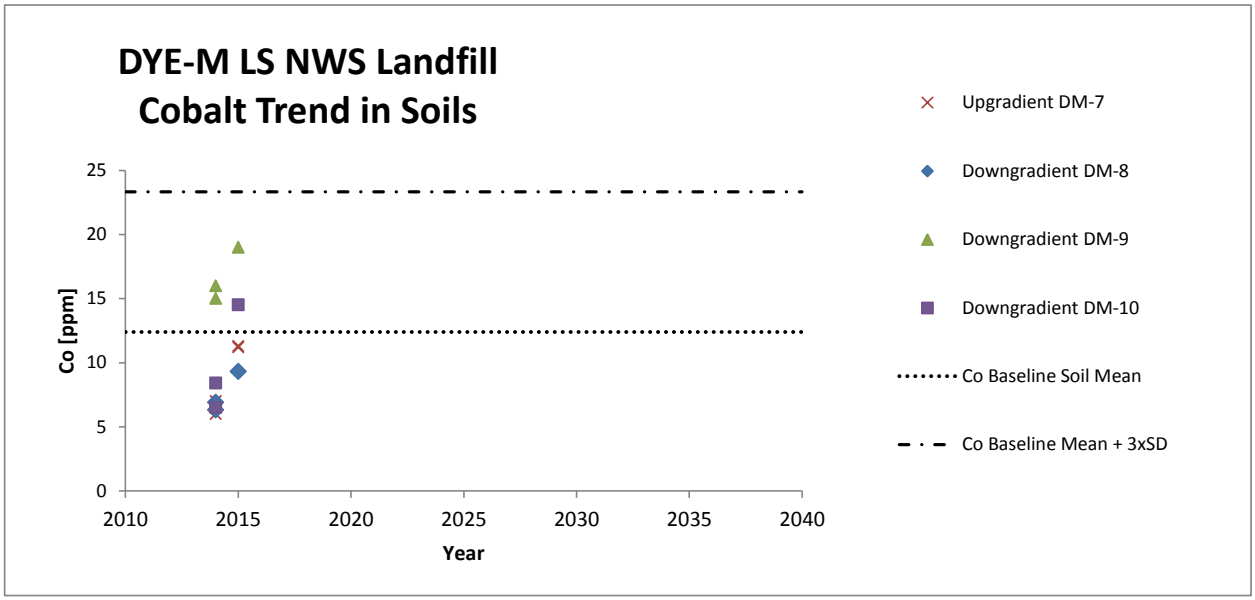


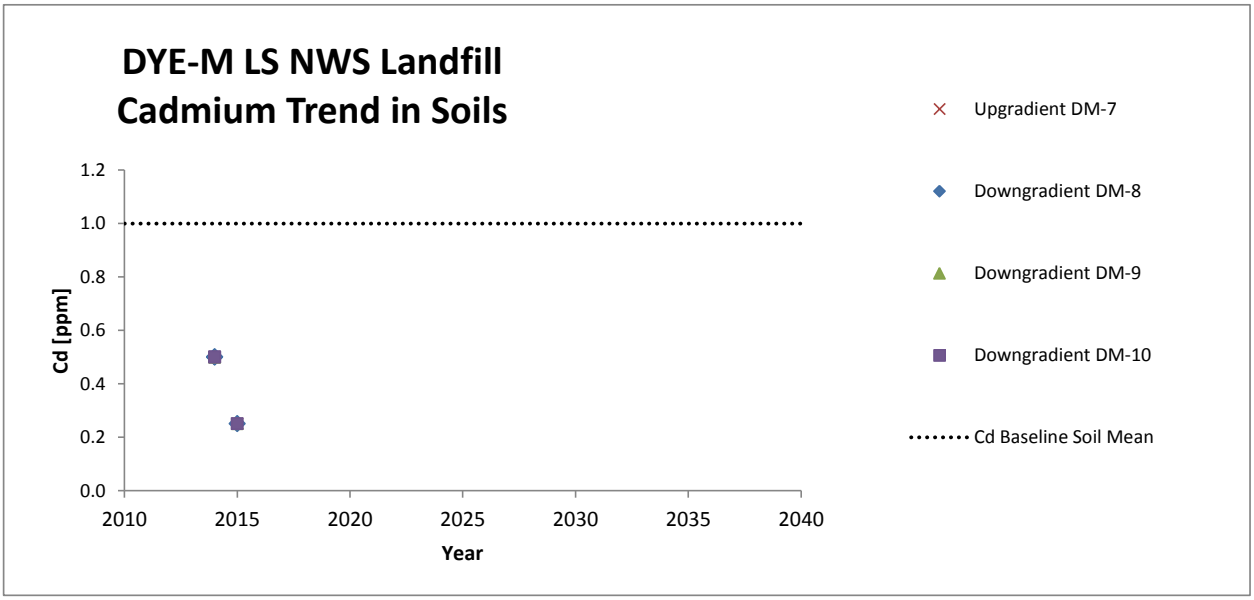


DYE-M LS NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



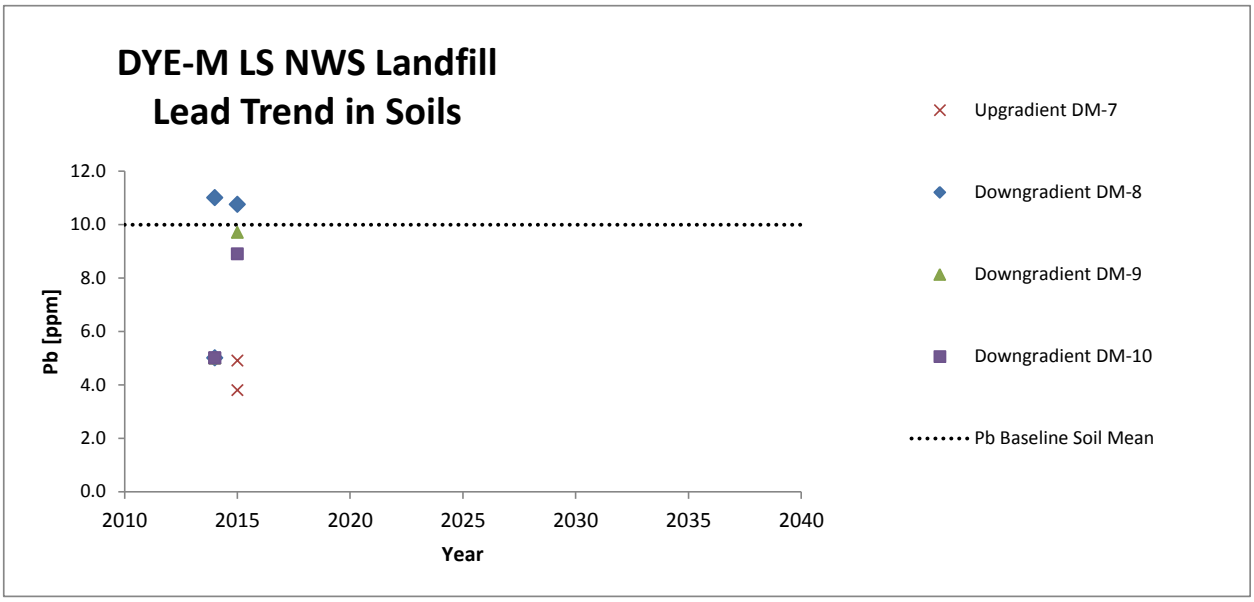


*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.
Cd Baseline SD = 0

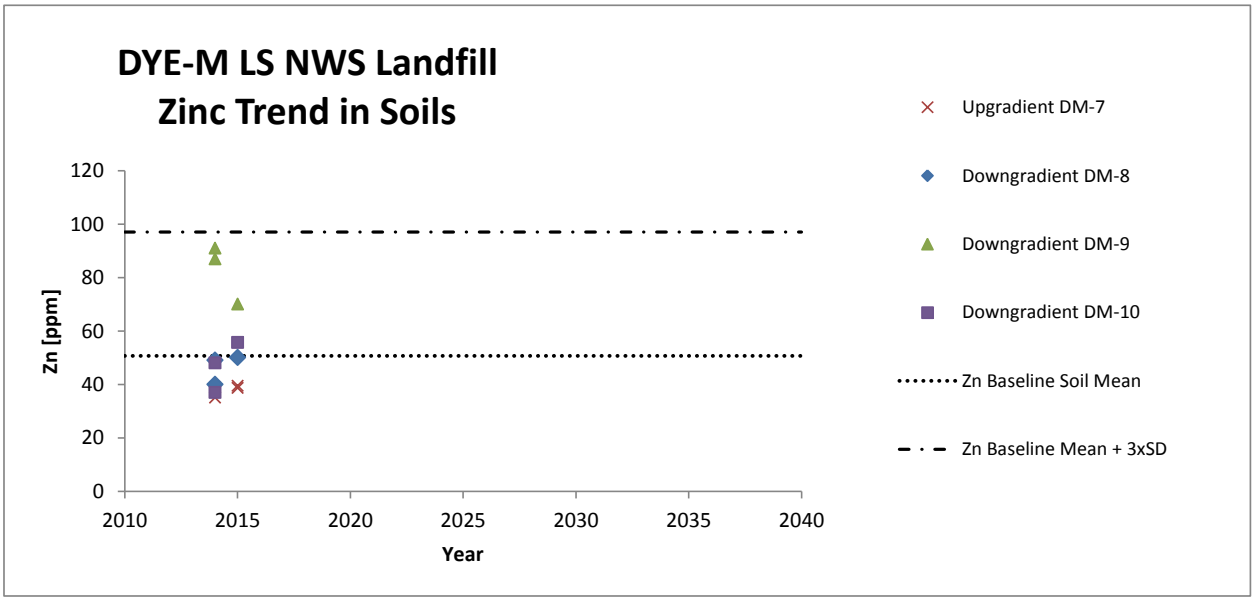
DYE-M LS NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



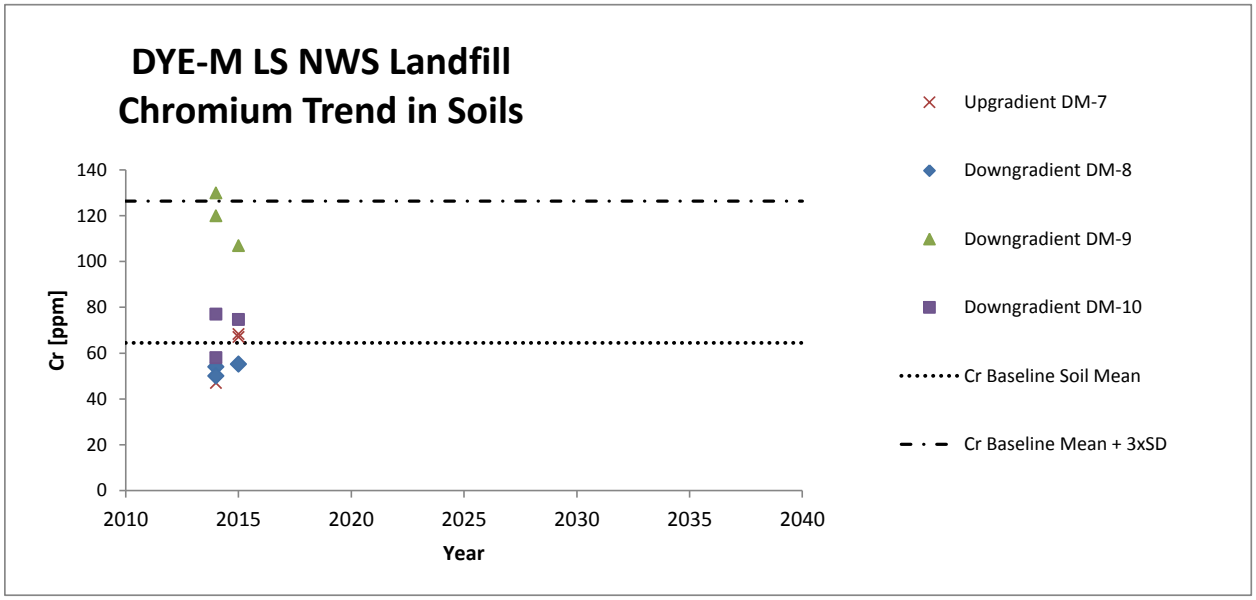
Pb Baseline Arithmetic Mean is equal to the detection limit

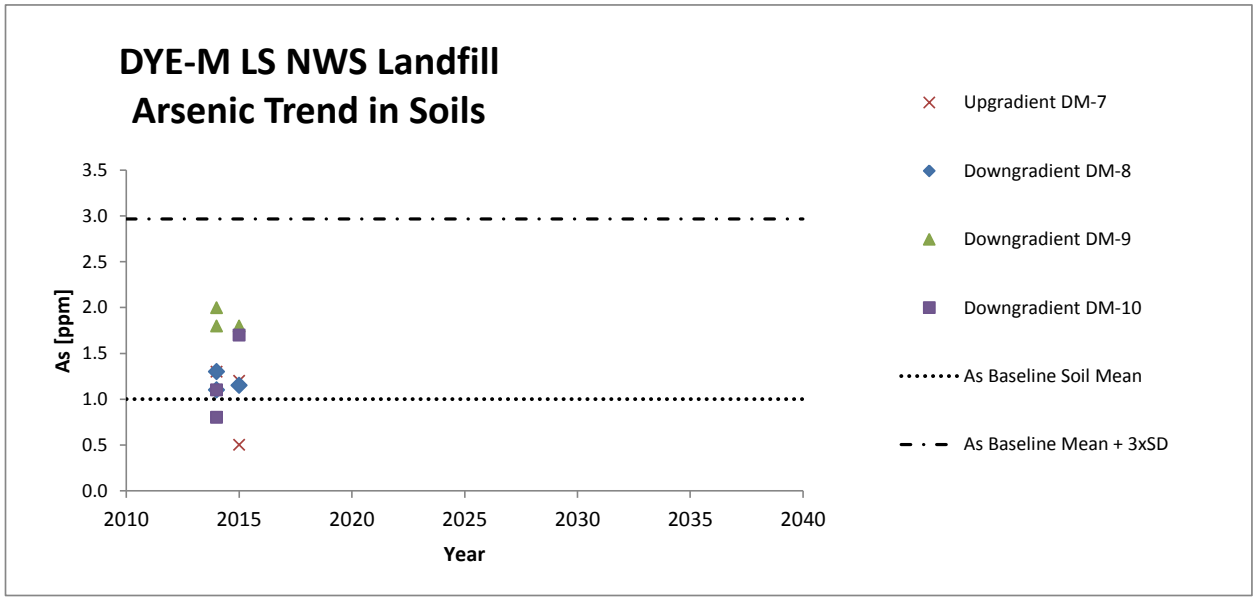


DYE-M LS NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



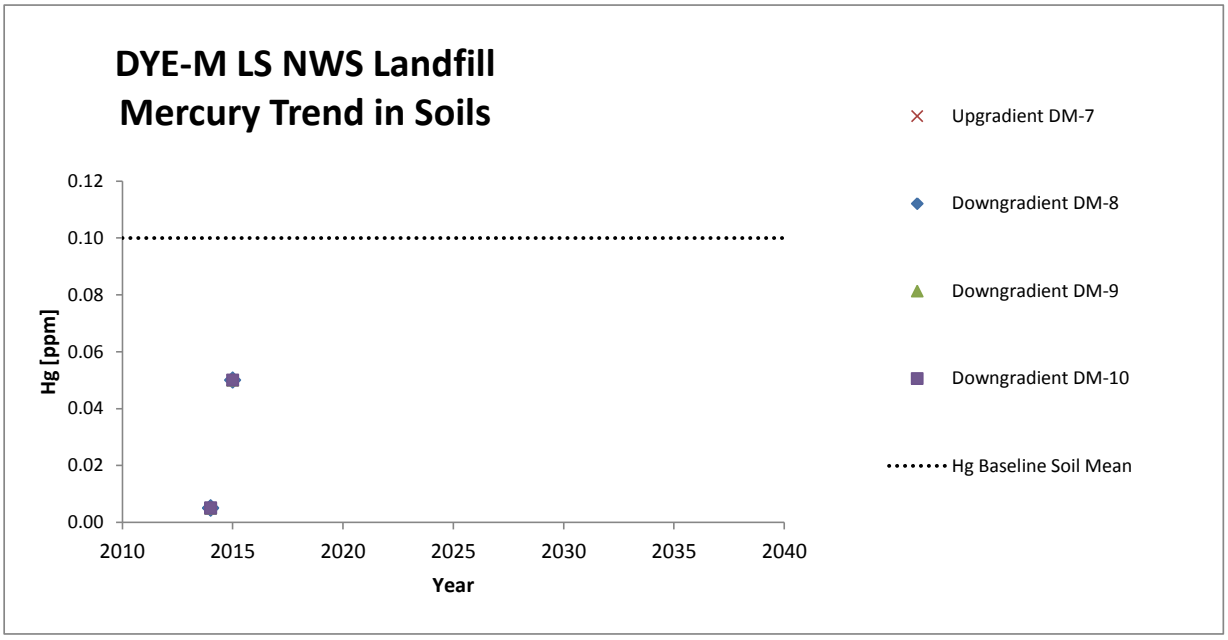


*As Baseline Arithmetic Mean is equal to the detection limit.

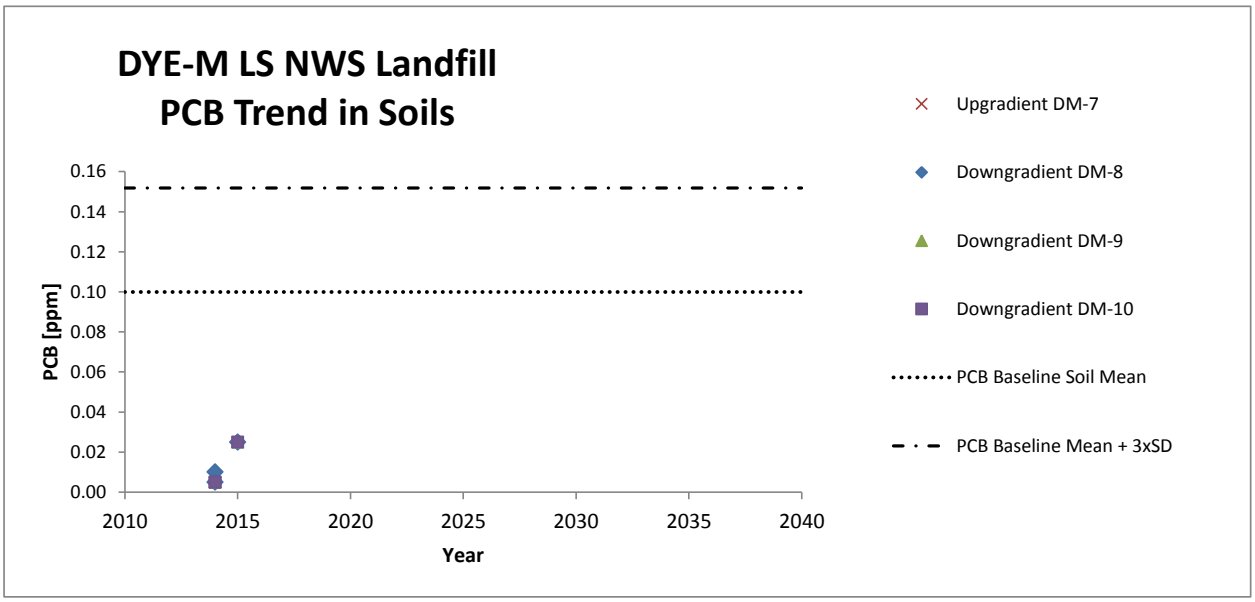
DYE-M LS NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.
Hg Baseline SD is equal to zero

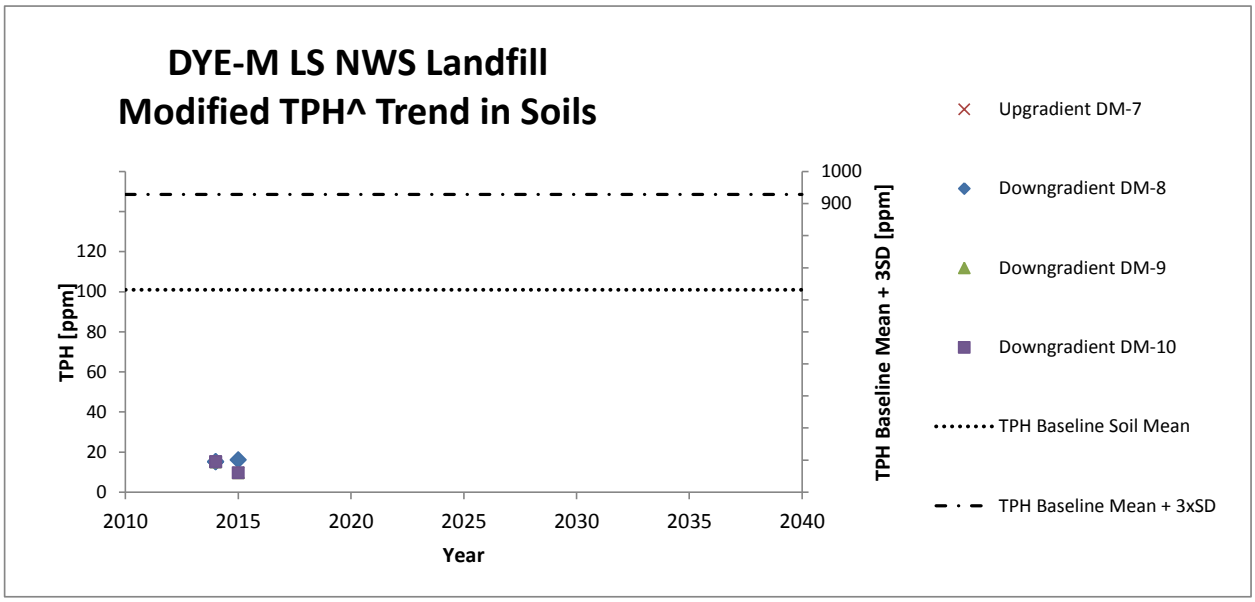


*PCB Baseline Arithmetic Mean is equal to the detection limit

DYE-M LS NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M -Upper Site Tier II Disposal Facility - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic mean						60	141	20	1.0	10	70	90	1.0	0.5	0.002				N/A
Baseline Data - Arithmetic mean						**43**	**83**	**19**	**1.0**	**18**	**77**	**115**	**3.7**	**0.05**	**0.05**	**10**	**10**	**10**	**18**
Baseline Data - Standard Deviation						29	74	7.1	0.0	21	46	95	3.0	0.0	0.012	3.6	1.8	6.0	7.5
Baseline Data mean + 3xStandard Deviation						130	304	40	1.0	80	214	398	13	0.05	0.085	21	15	28	40
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
DEW Line Cleanup ***Site Specific*** *Tier II Criteria*						*296*	*2100*	*153*	*5*	*500*	*500*	*250*	*30*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and**
Upgradient																			
	BMW #12-02 surface																		
14-8413	BMW 12-02	2014	Year 1	Phase I	5-10	**82**	76	15	<1.0	11	**110**	**150**	**11**	0.019	<0.010	<10	<10	<10	15
Not sampled, frozen	BMW 12-02	2015	Year 2	Phase I															#N/A
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	BMW #12-02 depth																		
14-8414	BMW 12-02	2014	Year 1	Phase I	30-35	**70**	**90**	17	<1.0	13	**100**	**160**	**7**	0.012	<0.010	<10	<10	<10	15
Not sampled, frozen	BMW 12-02	2015	Year 2	Phase I															#N/A
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M -Upper Site Tier II Disposal Facility - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	BMW #07-22 surface																		
14-8424	BMW 07-22	2014	Year 1	Phase I	5-10	13	25	11	<1.0	**19**	52	26	1.6	<0.010	<0.010	<10	<10	<10	15
MW 07-22 (0-15)	BMW 07-22	2015	Year 2	Phase I	0-15	**71.6**	57.8	14.4	<0.5	10.6	**98.3**	112	3.5	<0.1	<0.05	<7	<4	<8	9.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	BMW #07-22 depth																		
14-8425	BMW 07-22	2014	Year 1	Phase I	45-50	10	36	13	<1.0	**30**	60	29	1.8	<0.010	<0.010	<10	<10	<10	15
MW 07-22 (15-30)	BMW 07-22	2015	Year 2	Phase I	15-30	**59.2**	76	15.9	<0.5	**18.4**	**89.6**	**142**	**3.9**	<0.1	<0.05	<7	<4	<8	9.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M -Upper Site Tier II Disposal Facility - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			
	MW #07-23 surface																		
14-8415	MW 07-23	2014	Year 1	Phase I	5-10	**76**	**180**	**21**	<1.0	<10	44	100	**17**	<0.010	<0.010	<10	<10	<10	15
MW 07-23 (0-25)	MW 07-23	2015	Year 2	Phase I	0-25	**71.9**	**86**	15.9	<0.5	7.4	37.8	49.1	3.3	<0.1	<0.05	<7	<4	<8	9.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW #07-23 depth																		
14-8417	MW 07-23	2014	Year 1	Phase I	45-50	**72**	**130**	**19**	<1.0	<10	40	87	**12**	<0.010	<0.010	<10	<10	<10	15
Not sampled, refusal	MW 07-23	2015	Year 2	Phase I															#N/A
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M -Upper Site Tier II Disposal Facility - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW #08-24 surface																		
14-8418	MW 08-24	2014	Year 1	Phase I	5-10	27	47	10	<1.0	<10	40	66	1.4	<0.010	<0.010	<10	<10	<10	15
MW08-24 (0-15) (Dup A	MW 08-24	2015	Year 2	Phase I	0-15	31	54	13.5	0.5	13.8	61.1	76.9	1	<0.1	<0.1	**21**	<7	<29	**39**
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW #08-24 depth																		
14-8420/21	MW 08-24	2014	Year 1	Phase I	30-35	27	45	11	<1.0	10	40	63	1.1	<0.010	<0.010	<10	<10	<10	15
Not sampled, refusal	MW 08-24	2015	Year 2	Phase I															#N/A
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M -Upper Site Tier II Disposal Facility - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW #08-25 surface																		
14-8422	MW 08-25	2014	Year 1	Phase I	5-10	31	77	16	<1.0	18	50	**150**	1.2	<0.010	<0.010	<10	<10	<10	15
MW 08-25 (0-15)	MW 08-25	2015	Year 2	Phase I	0-15	**65.2**	82.7	**22**	<0.5	**41.3**	**133**	**176**	2.9	<0.1	<0.05	<7	<4	<8	9.5
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW #08-25 depth																		
14-8423	MW 08-25	2014	Year 1	Phase I	40-45	**84**	**200**	**43**	<1.0	17	66	*710*	2.2	<0.010	<0.010	<10	<10	<10	15
Not sampled, refusal	MW 08-25	2015	Year 2	Phase I															#N/A
			Year 3	Phase I															#N/A
			Year 4	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

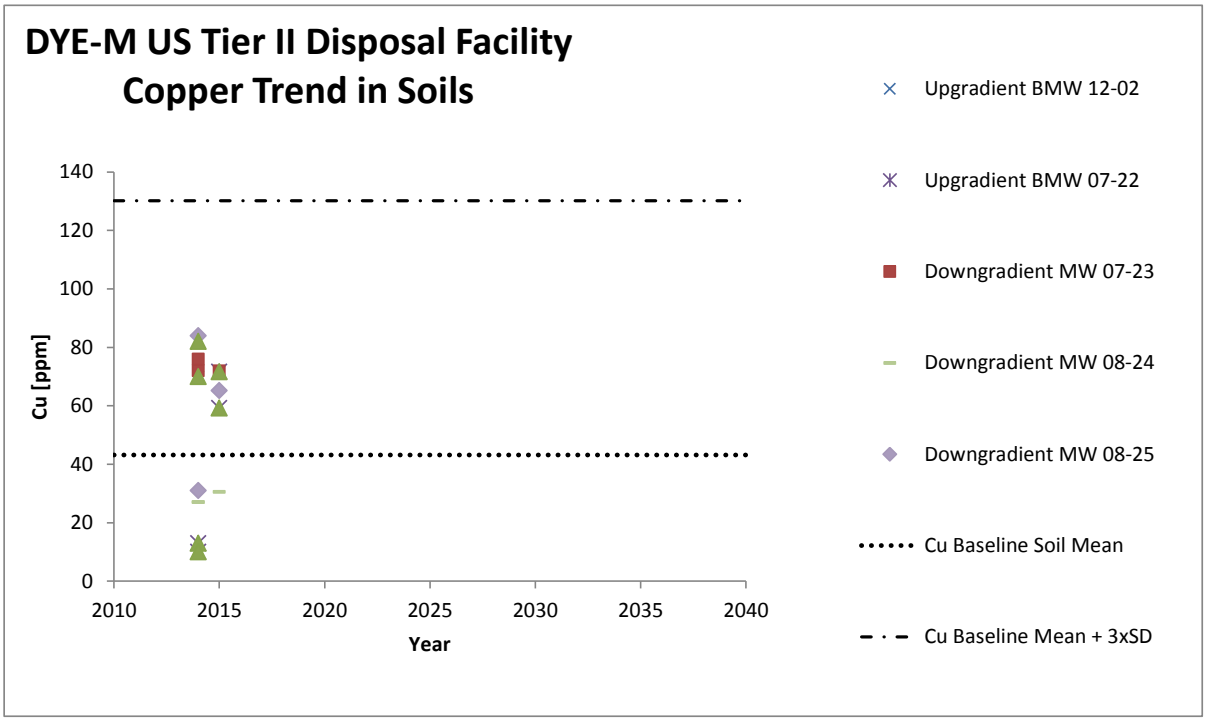
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

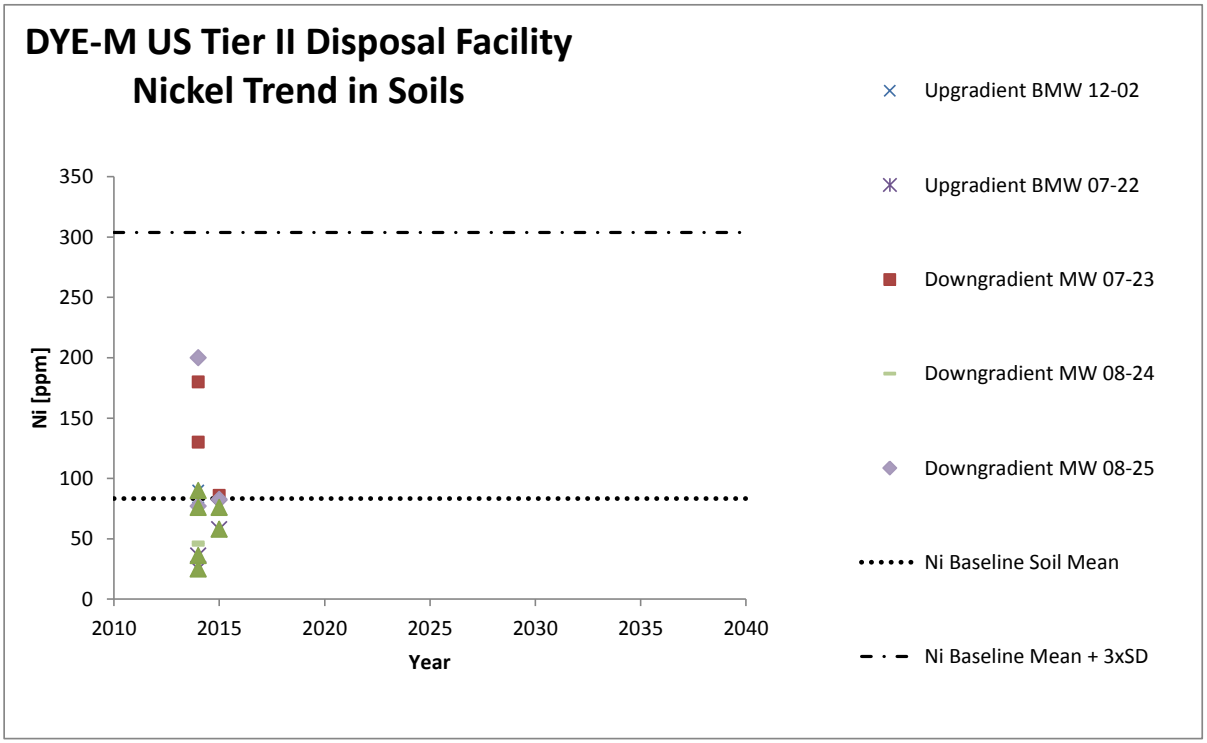
Legend

XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

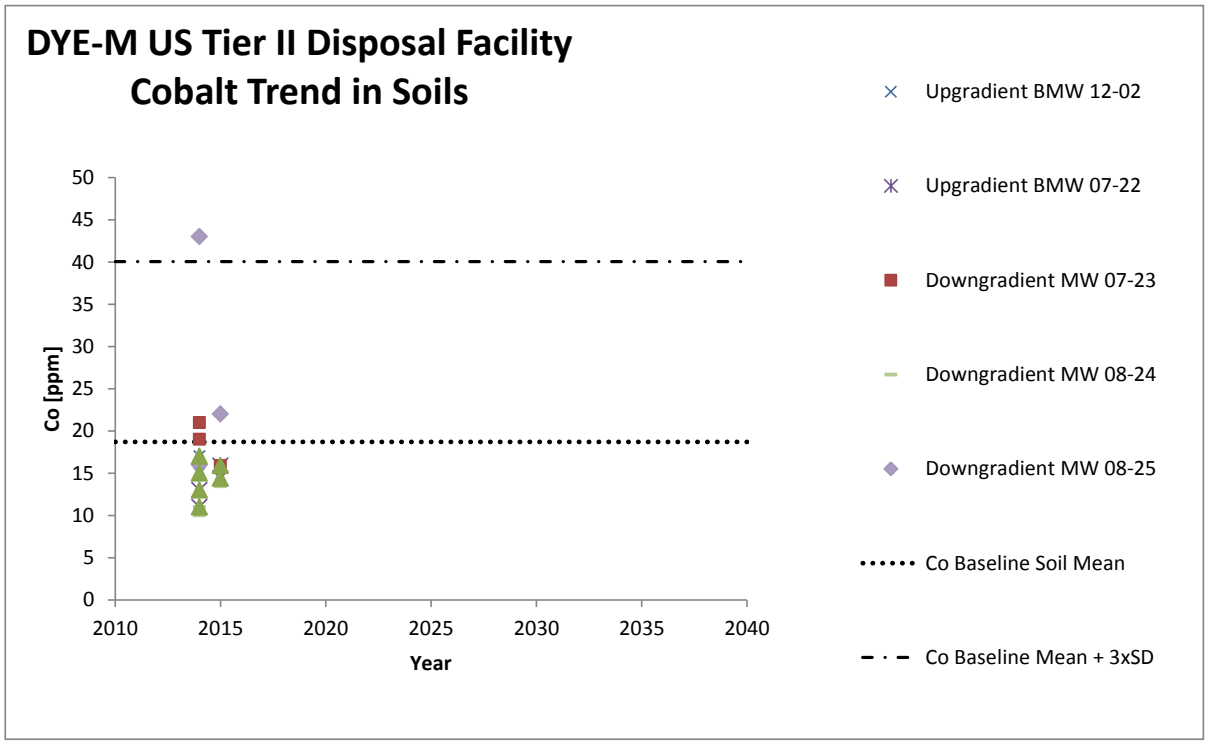
DYE-M Upper Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

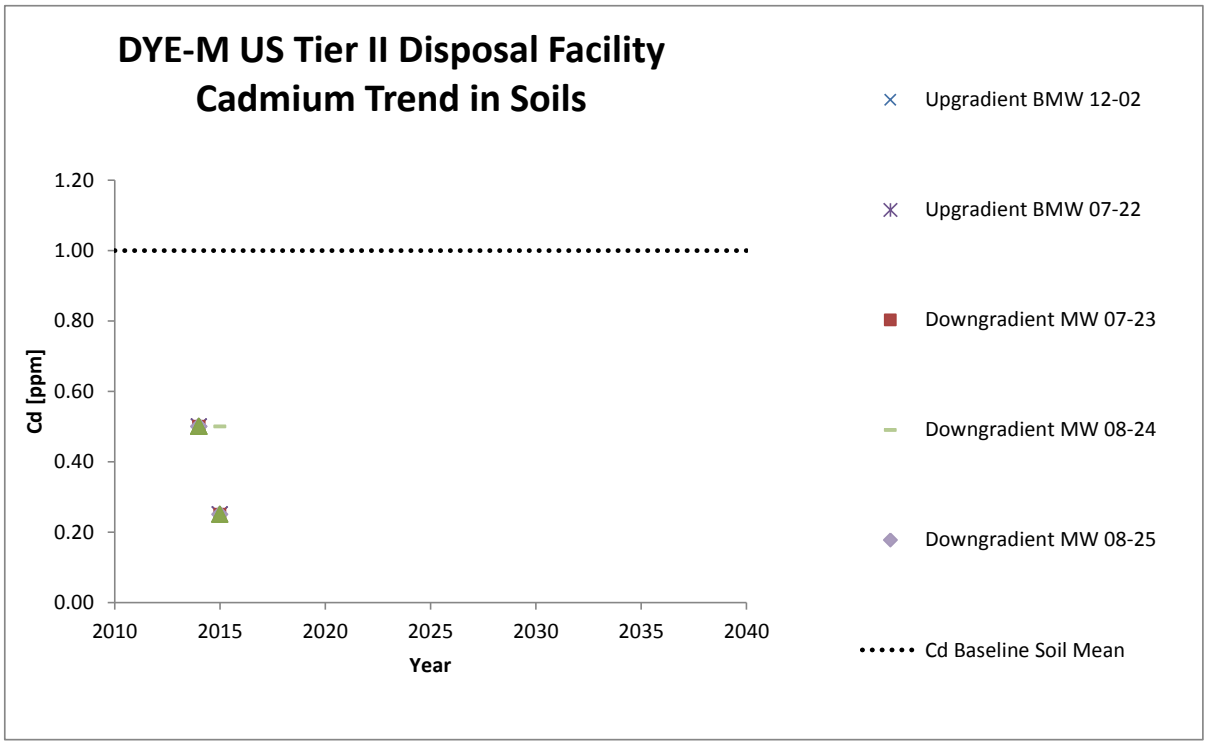
Where results are below detection, half of the detection limit has been used in the charts for the sample points.
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





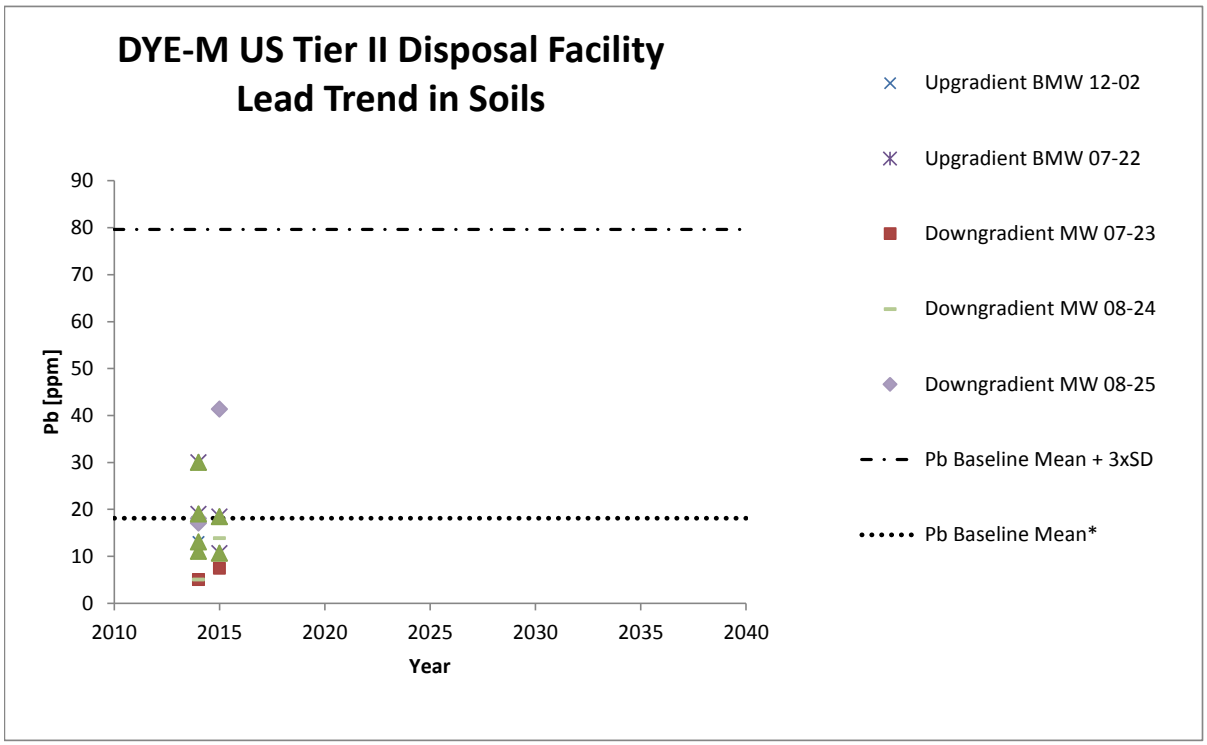
DYE-M Upper Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

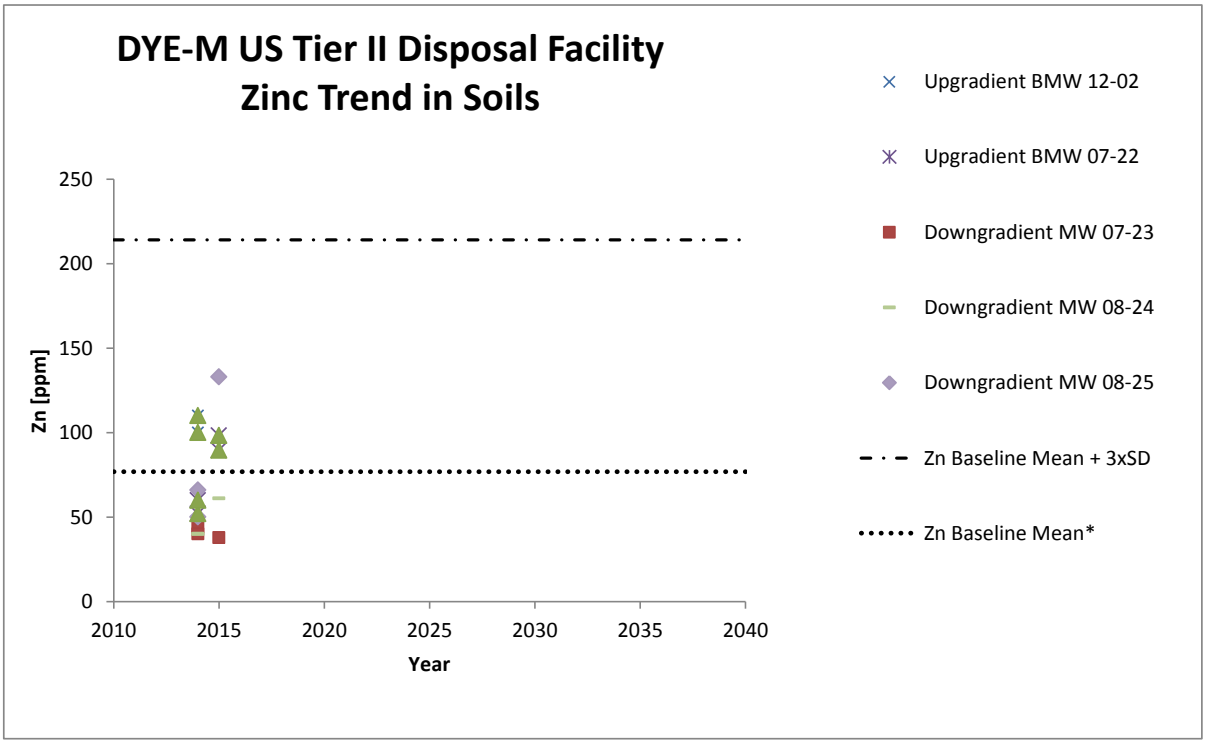




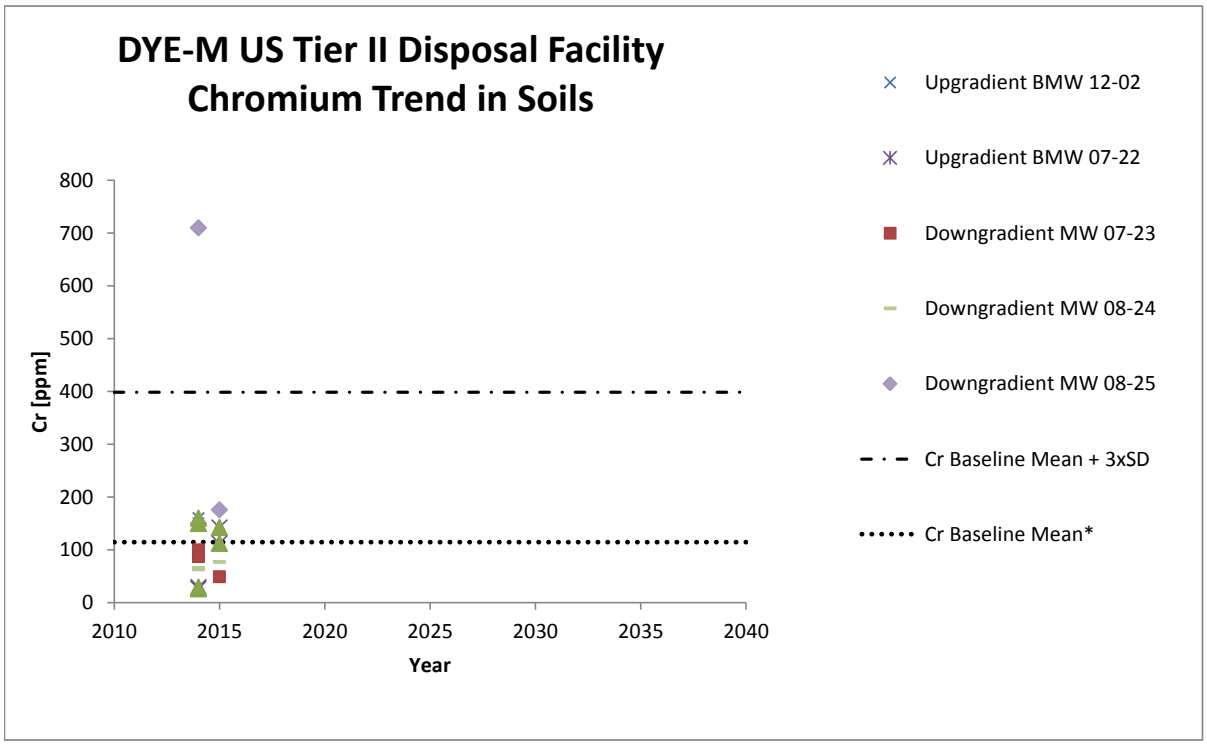
*Cd Baseline Mean is equal to the baseline detection limit.
Cd Baseline SD = 0

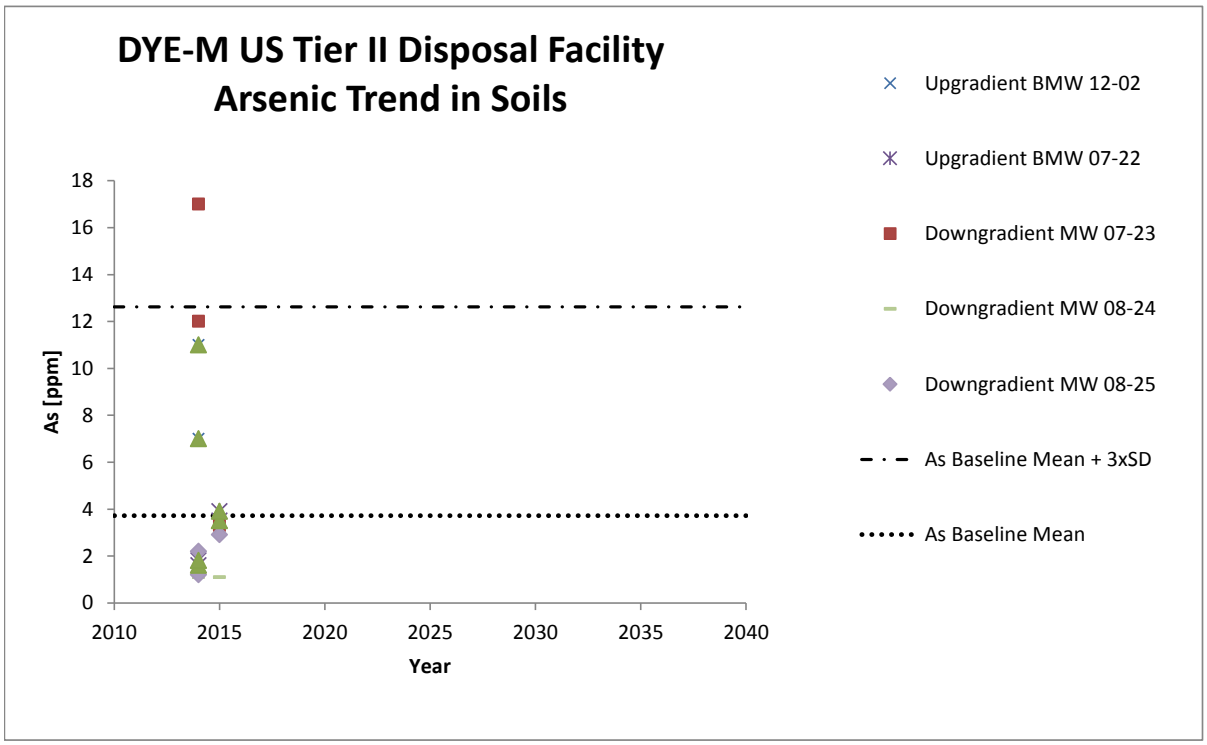
DYE-M Upper Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



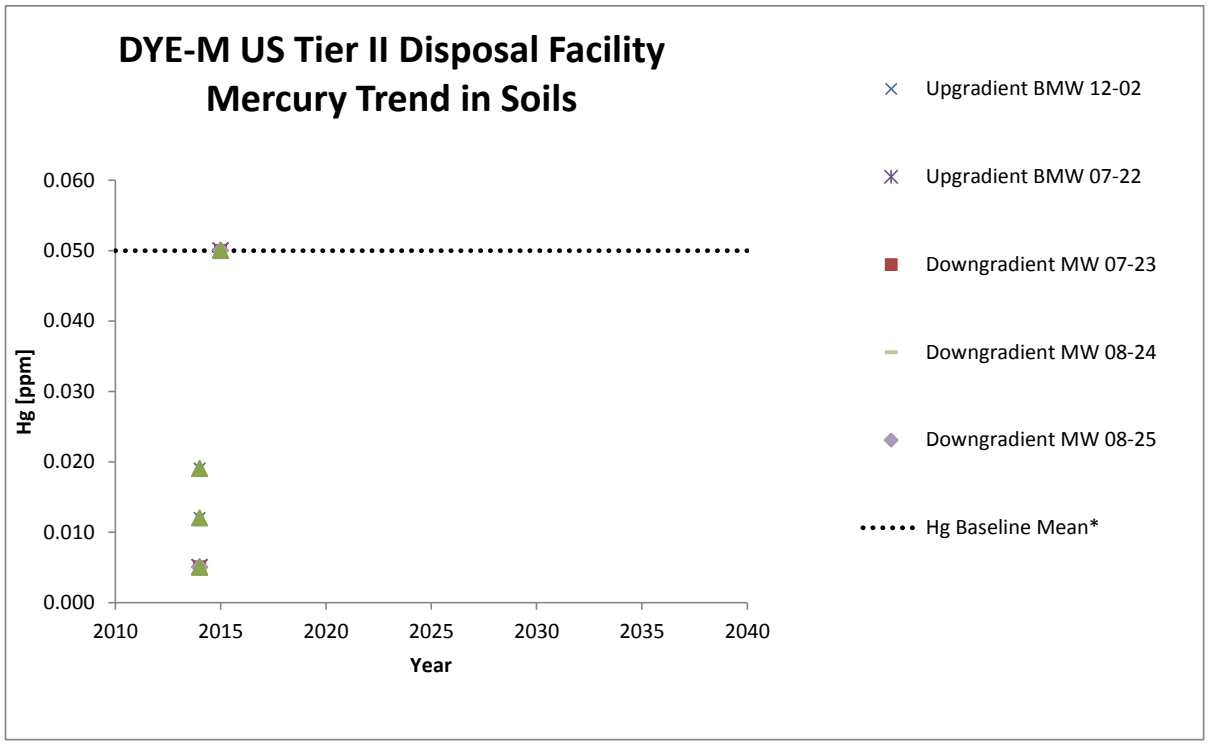


DYE-M Upper Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

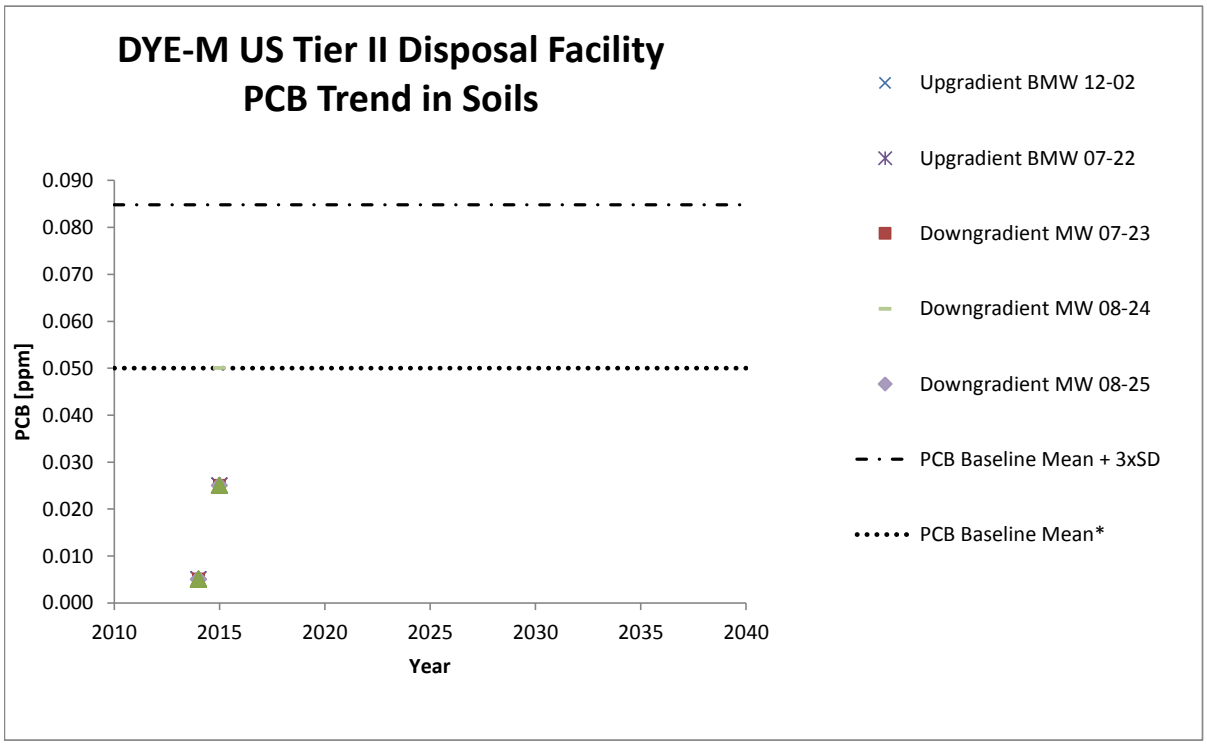




DYE-M Upper Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

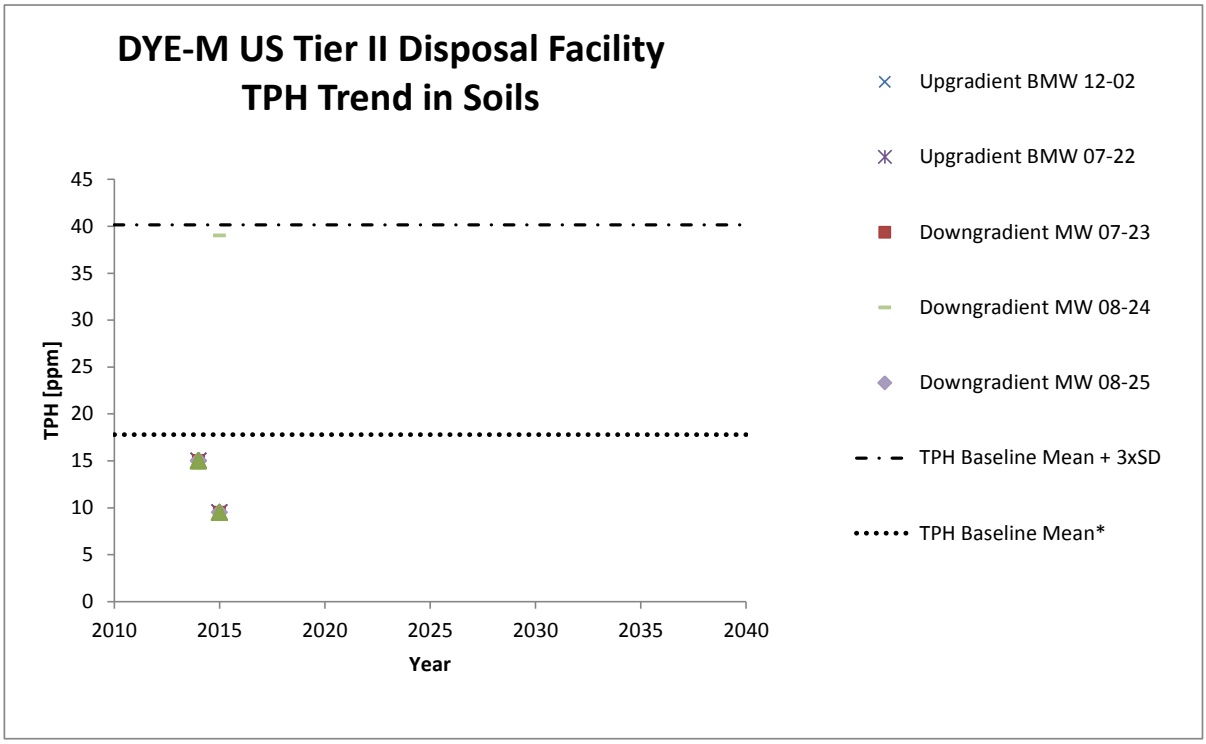


*Hg Baseline Mean is equal to the baseline detection limit.
Hg Baseline SD = 0



*PCB Baseline Mean is equal to the detection limit

DYE-M Upper Site Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M US Tier II Disposal Facility - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Baseline Data																		
Upgradient:																		
12-34978	BMW12-02	2012			<0.0050	<0.0050	<0.0030	<0.0010	<0.0050	0.011	0.76	<0.0010	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
Downgradient:																		
08-9742	MW07-23	2008			0.036	0.16	0.008	<0.0010	<0.010	0.025	0.30	<0.0030	<0.00040	<0.000020	<0.050	<0.050	<1.0	0.6
09-21499	MW07-23	2009			0.094	0.073	0.015	<0.0010	0.013	0.11	0.08	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
09-21572	MW08-24	2009			0.12	0.41	0.0135	<0.0010	0.020	0.049	0.52	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12190/91	MW07-23	2011			<0.0050	<0.0050	<0.0030	<0.0010	<0.010	5.92	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12192	MW08-24	2011			0.007	<0.0050	<0.0030	<0.0010	<0.010	0.29	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
12-34966	MW07-23	2012			<0.0050	<0.0050	<0.0030	<0.0010	<0.0050	0.25	0.16	0.0057	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
12-34967	MW08-24	2012			<0.0050	0.0100	<0.0030	<0.0010	<0.0050	0.23	0.41	0.007	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13-29589	MW08-24	2013			<0.0050	<0.0050	<0.0030	<0.0010	<0.0050	0.16	0.17	0.002	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
		N value			9	9	9	9	9	9	9	9	9	9	9	9	9	9
		Arithmetic Mean			**0.083**	**0.21**	**0.003**	**0.0010**	**0.010**	**0.78**	**0.34**	**0.003**	**0.0002**	**0.0007**	**0.025**	**0.23**	**0.5**	**0.23**
		Arithmetic Mean Adjusted for Detection Limit			**0.005**	**0.005**	**0.003**	**0.001**	**0.010**	**0.78**	**0.34**	**0.003**	**0.0004**	**0.003**	**0.05**	**0.5**	**1.0**	**1.0**
		Standard Deviation			0.043	0.17	0.004	0.000	0.0	1.9	0.24	0.0022	0.000	0.001	0.000	0.0	0.0	0.1
		Arithmetic Mean + 3xStandard Deviation			0.13	0.53	0.014	0.001	0.033	6.6	1.1	0.010	0.0004	0.005	0.050	0.5	1.0	1.2
		Detection Limit			0.0050	0.005	0.0030	0.0010	0.010	0.0100	0.0050	0.003	0.0004	0.0030	0.0500	0.5	1.0	1.0
Monitoring Data																		
Upgradient - BMW 12-02																		
Not Sampled	BMW 12-02	2014	Year 1	Phase I														#N/A
Not Sampled, buried	BMW 12-02	2015	Year 2	Phase I														#N/A
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.

DYE-M US Tier II Disposal Facility - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Upgradient - BMW 07-22																		
Not Sampled	BMW 07-22	2014	Year 1	Phase I														#N/A
MW07-22	BMW 07-22	2015	Year 2	Phase I	**0.0062**	0.004	0.0009	<0.0001	0.0052	0.072	0.004	0.001	<0.0001	**N/A**	<0.025	<0.1	<0.1	0.1
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 07-23																		
14-8183	MW07-23	2014	Year 1	Phase I	<0.0010	0.0025	<0.00030	<0.000090	<0.00050	0.02	<0.00050	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.2
Not sampled, frozen	MW07-23	2015	Year 2	Phase I														#N/A
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

DYE-M US Tier II Disposal Facility - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Downgradient - MW 08-24																		
14-8184	MW08-24	2014	Year 1	Phase I	0.0036	0.004	<0.00030	<0.000090	<0.00050	<0.0030	0.001	0.0020	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.2
MW08-24	MW08-24	2015	Year 2	Phase I	**0.0242**	**0.031**	0.0023	<0.0001	0.0024	0.379	0.012	<0.001	<0.0001	**N/A**	<0.025	<0.177	<0.177	0.2
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 08-25																		
Not Sampled	MW 08-25	2014	Year 1	Phase I														#N/A
MW08-25	MW 08-25	2015	Year 2	Phase I	**0.0121**	**0.027**	0.0023	<0.0001	0.0034	**0.939**	0.01	<0.001	<0.0001	**N/A**	<0.025	<0.286	<0.286	0.3
			Year 3	Phase I														#N/A
			Year 4	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

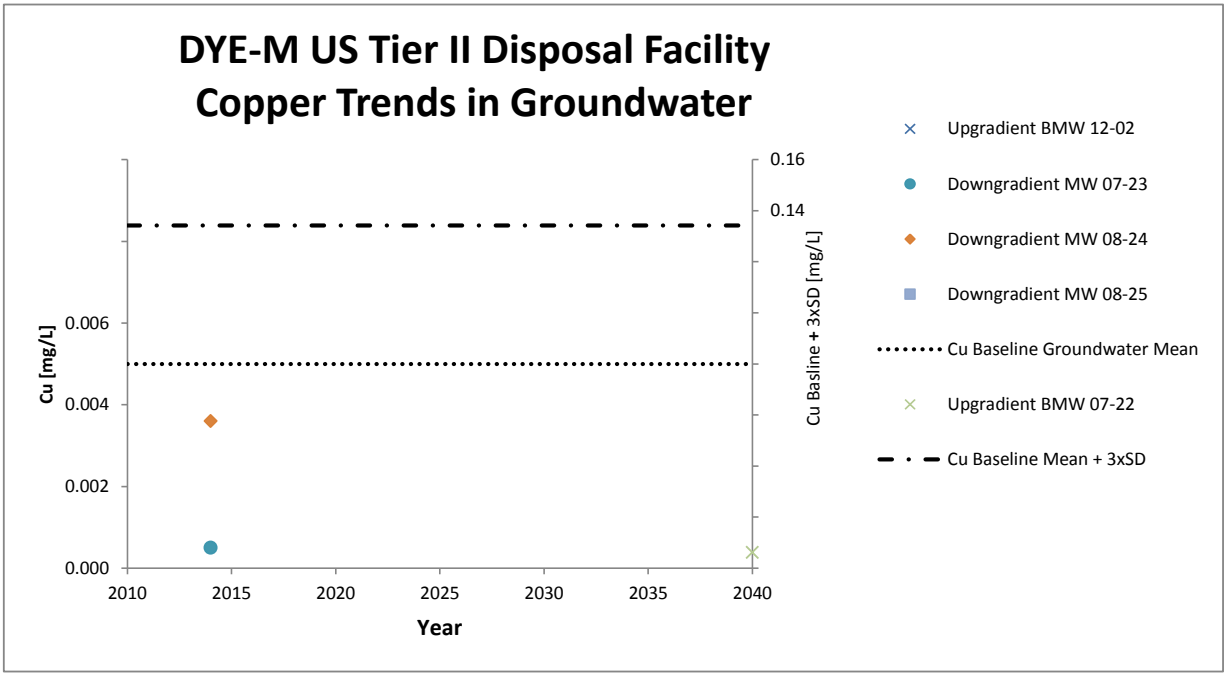
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

blue highlight indicates dissolved metal results. No highlight indicates total metals.

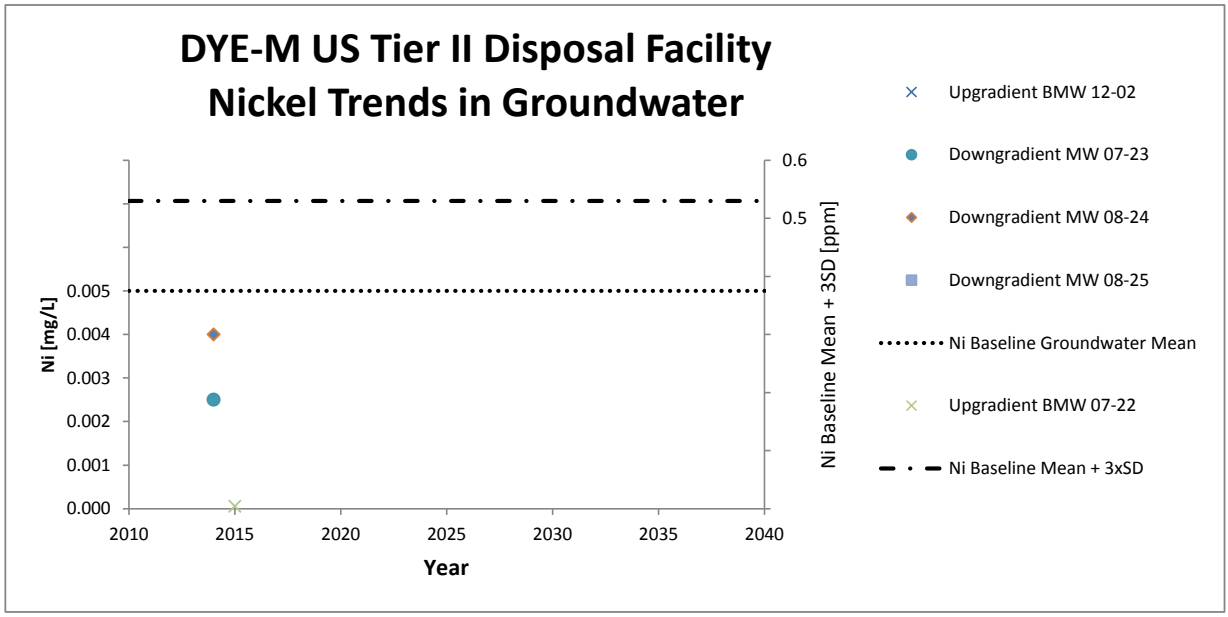
Dissolved metal results have not been included in the Baseline Arithmetic Mean

DYE-M US Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

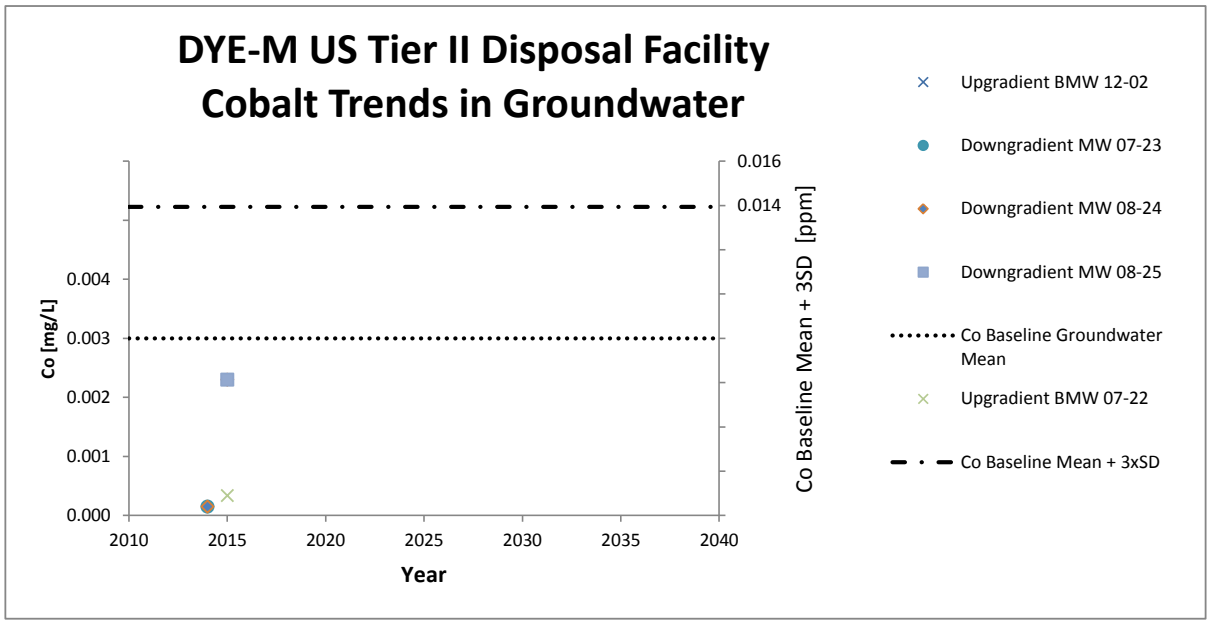


*Cu Baseline Mean is equal to the baseline detection limit

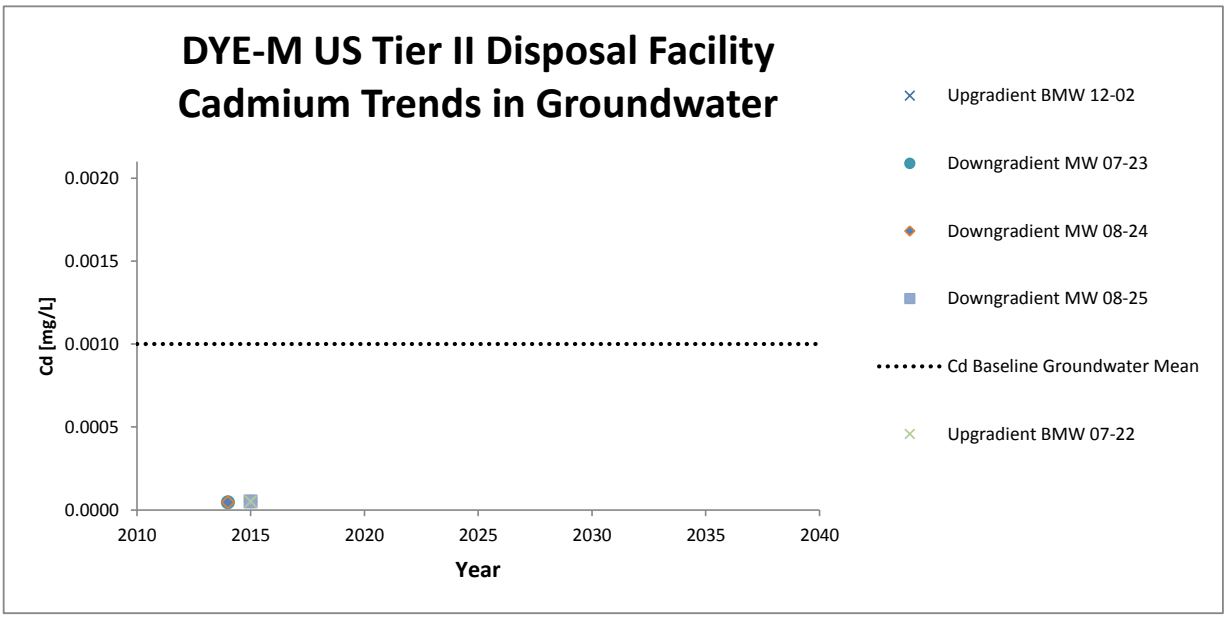


*Ni Baseline Mean is equal to the baseline detection limit

DYE-M US Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

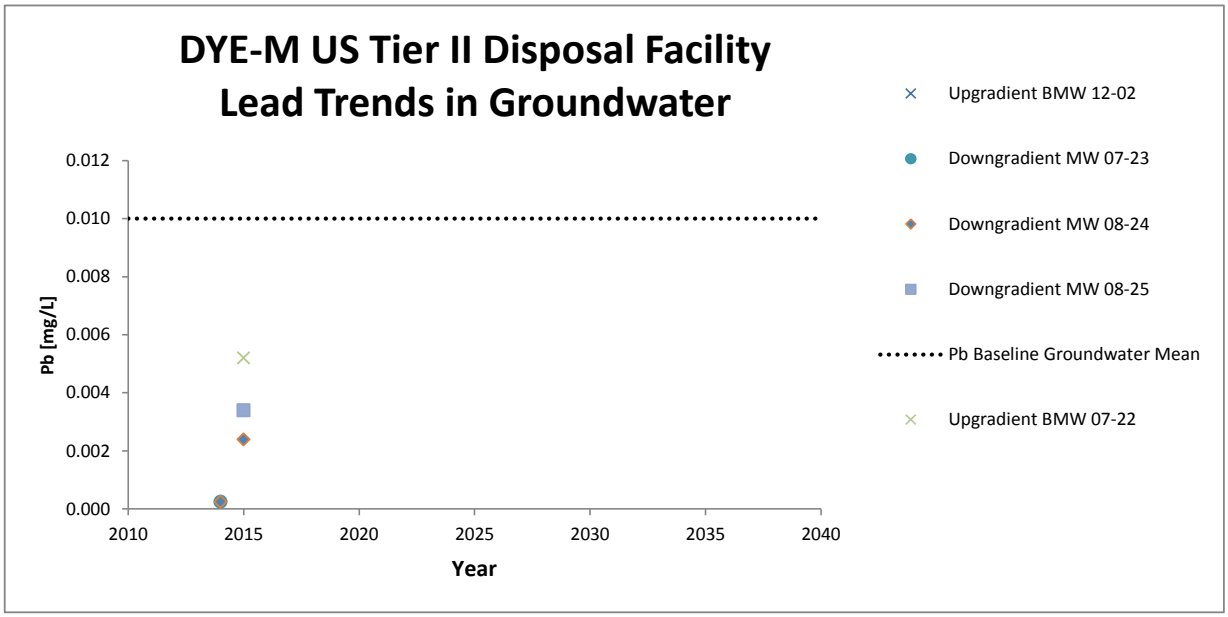


*Co Baseline Mean is equal to the baseline detection limit.

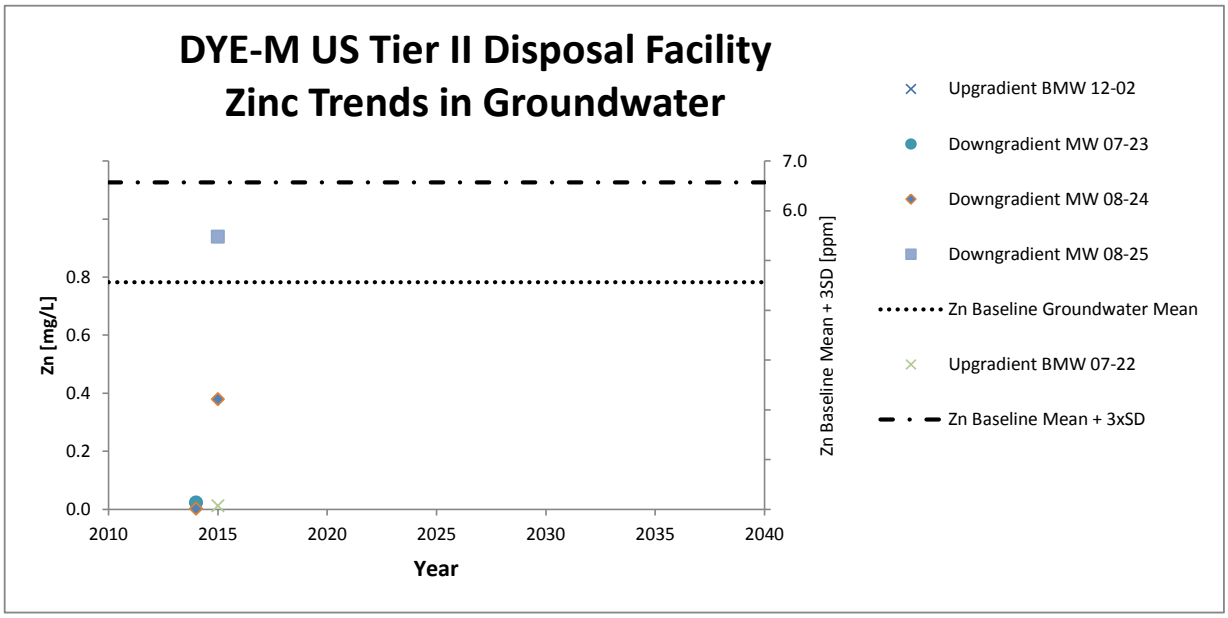


*Cd Baseline Mean is equal to the baseline detection limit.
*Cd Baseline Mean SD = 0

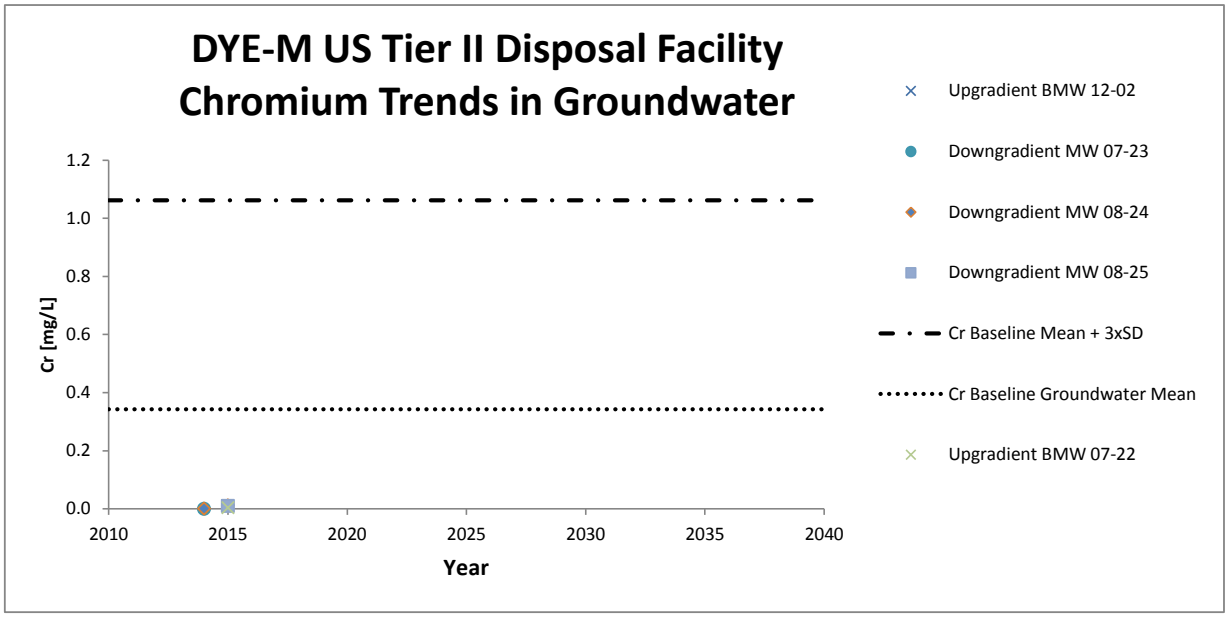
DYE-M US Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

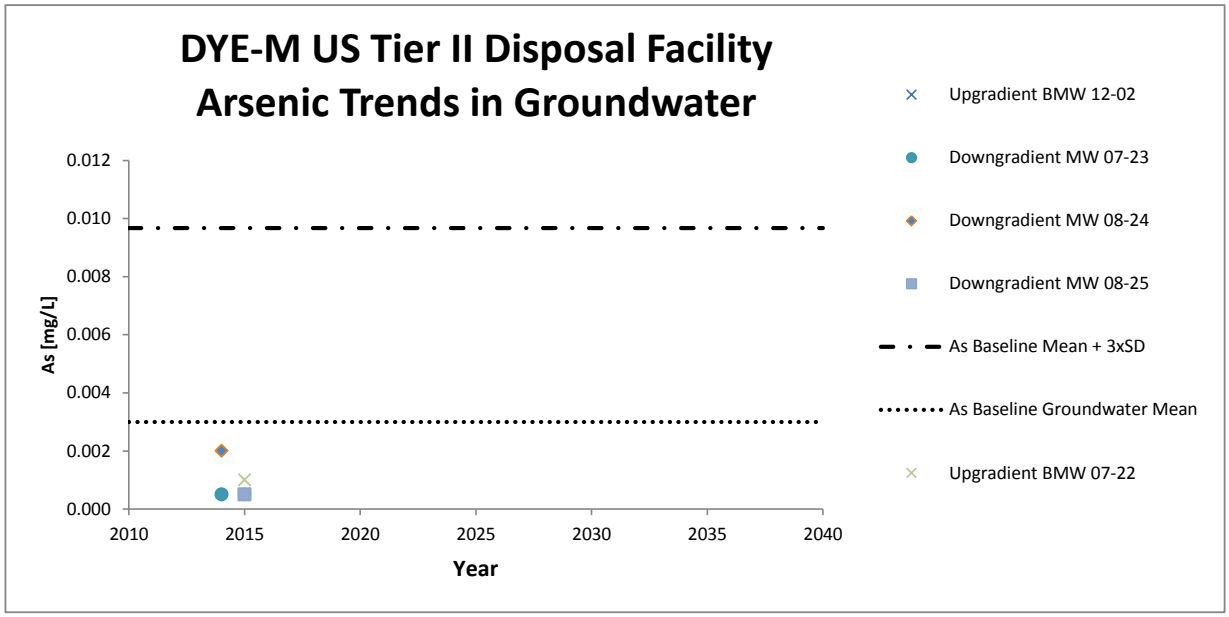


*Pb Baseline Mean is equal to the baseline detection limit.
*Pb Baseline SD=0



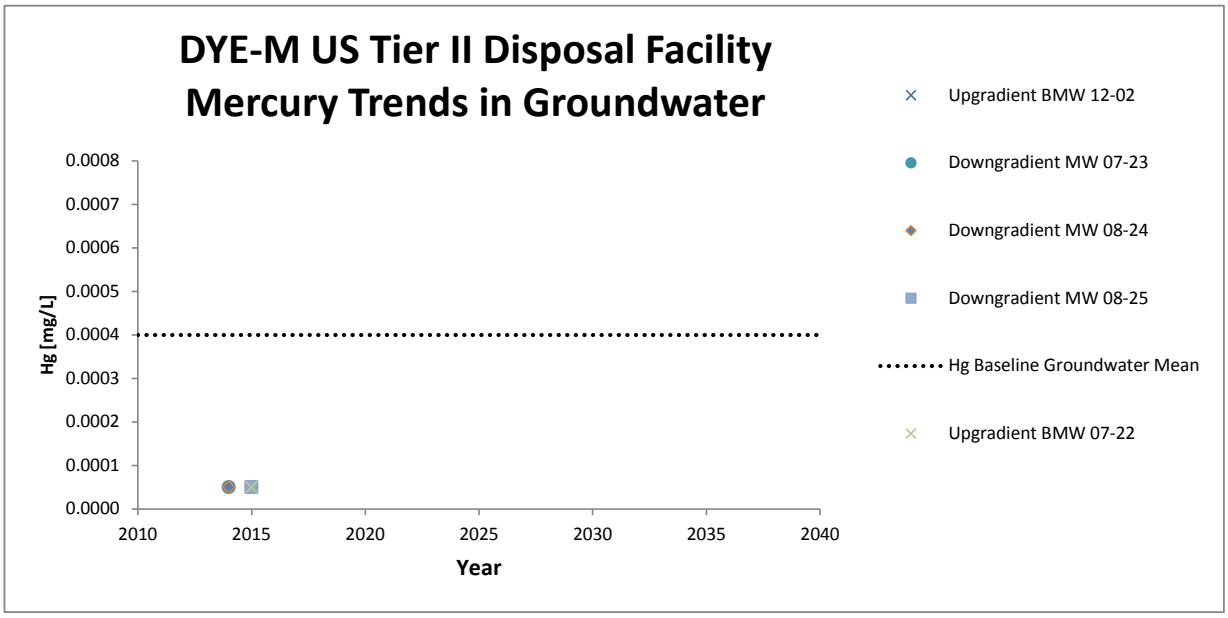
DYE-M US Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



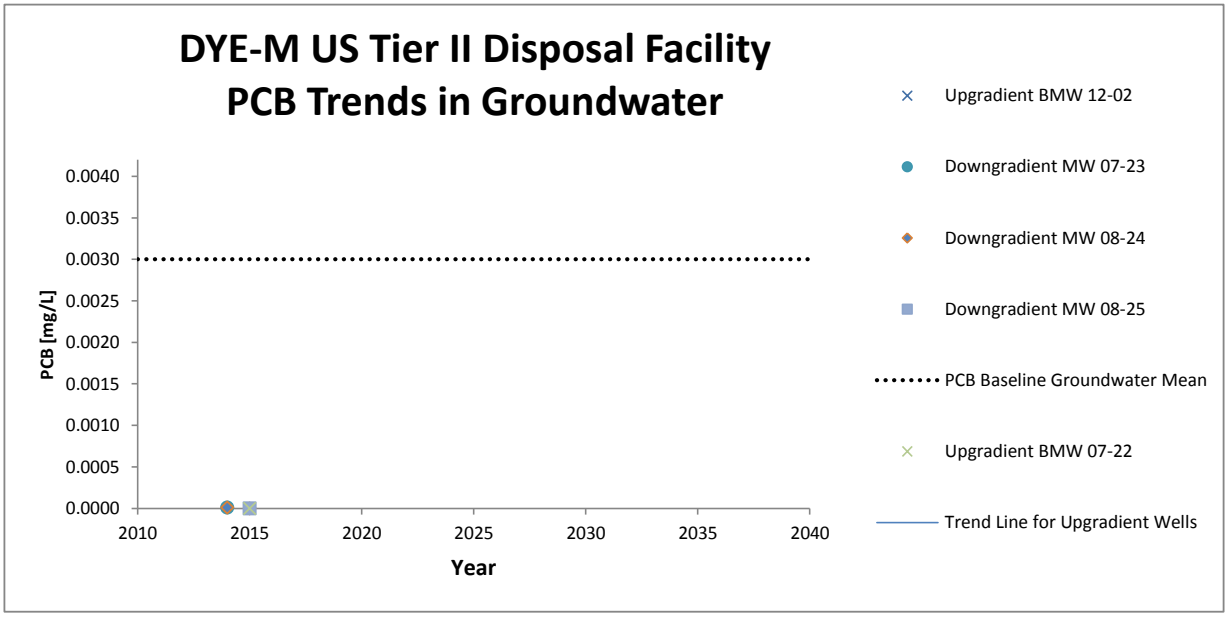


*As Baseline Mean is equal to the baseline detection limit.

DYE-M US Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

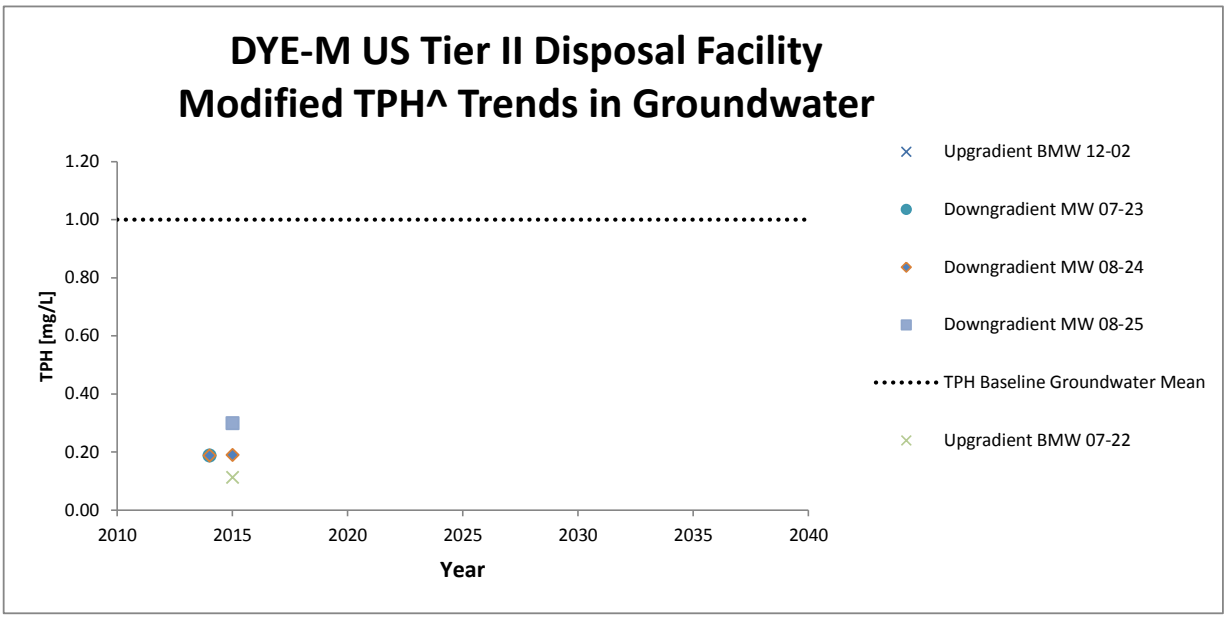


*Hg Baseline Mean is equal to the baseline detection limit.
*Hg Baseline SD = 0



*PCB Baseline Mean is equal to the baseline detection limit.
*PCB Baseline SD = 0

DYE-M US Tier II Disposal Facility Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



*TPH Baseline Mean is equal to the baseline detection limit.
^ modified TPH equals the sum of F1, F2 and F3 Hydrocarbon fractions

DYE-M US Non Hazardous Waste Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic Mean						60	141	20	1.0	10	70	90	1.00	0.50	0.002	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mean						**27**	**65**	**14**	**1.0**	**10**	**57**	**41**	**1.0**	**0.10**	**0.05**	30	10	10	**216**
Baseline Data - Standard Deviation						16	38	5.8	0.0	7.7	30	24	0.37	0.0	0.093	3.8	1.7	256	416
Baseline Data Mean + 3xStandard Deviation						74	178	31	1.0	33	148	115	2.1	0.10	0.33	41	15	777	1464
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
*DEW Line Cleanup **Site Specific** Tier II Criteria & Hydrocarbon Action Level*						*296*	*2100*	*153*	*5*	*500*	*500*	*250*	*30*	*2.0*	*5*				*2500*
Monitoring Data																**TPH Sum will appear when F1, F2 and F3 fractions are entered.**			
Upgradient																			
	BMW 06-18 surface																		
14-8292	BMW 06-18	2014	Year 1	Phase I	5-10	25	62	12	<1.0	<10	44	33	0.77	<0.010	0.034	<10	<10	<10	15
Not sampled, buried	BMW 06-18	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	BMW 06-18 depth																		
14-8293	BMW 06-18	2014	Year 1	Phase I	40-50	24	63	12	<1.0	<10	48	33	0.8	<0.010	<0.010	<10	<10	<10	15
Not sampled, buried	BMW 06-18	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Non Hazardous Waste Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			
	MW 06-19 surface																		
14-8294	MW 06-19	2014	Year 1	Phase I	5-10	19	**87**	13	<1.0	<10	36	36	0.85	<0.010	<0.010	<10	<10	<10	15
MW 06-19 (0-20)	MW 06-19	2015	Year 3	Phase I	0-20	18.9	**82.8**	13.4	<0.5	7.6	37.9	36.2	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 06-19 depth																		
14-8295	MW 06-19	2014	Year 1	Phase I	25-35	16	**82**	12	<1.0	<10	30	30	0.5	<0.010	<0.010	<10	<10	<10	15
Not sampled, refusal	MW 06-19	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Non Hazardous Waste Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW 06-20 surface																		
14-8297	MW 06-20	2014	Year 1	Phase I	5-10	26	53	11	<1.0	<10	47	27	0.7	<0.010	<0.010	<10	<10	<10	15
MW 06-20 (0-20)	MW 06-20	2015	Year 3	Phase I	0-15	23.3	**67.2**	11.9	<0.5	5.7	34.6	28.1	**1.2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 06-20 depth																		
14-8298	MW 06-20	2014	Year 1	Phase I	40-45	**35**	**65**	13	<1.0	<10	56	33	0.9	<0.010	<0.010	<10	<10	<10	15
Not sampled, refusal	MW 06-20	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Non Hazardous Waste Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	MW 07-21 surface																		
14-8300/01	MW 07-21	2014	Year 1	Phase I	5-10	16	49	8.8	<1.0	<10	34	24	0.56	<0.010	<0.010	<10	<10	<10	15
MW 07-21 (0-15)	MW 07-21	2015	Year 3	Phase I	0-15	25.8	**76**	14	<0.5	7.3	42.8	31.1	**1.1**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW 07-21 depth																		
14-8302	MW 07-21	2014	Year 1	Phase I	40-50	19	55	9.9	<1.0	<10	39	28	0.60	<0.010	<0.010	<10	<10	<10	15
MW 07-21 (30-40)	MW 07-21	2015	Year 3	Phase I	30-40	18.6	63.1	11	<0.5	5.7	30	23.6	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

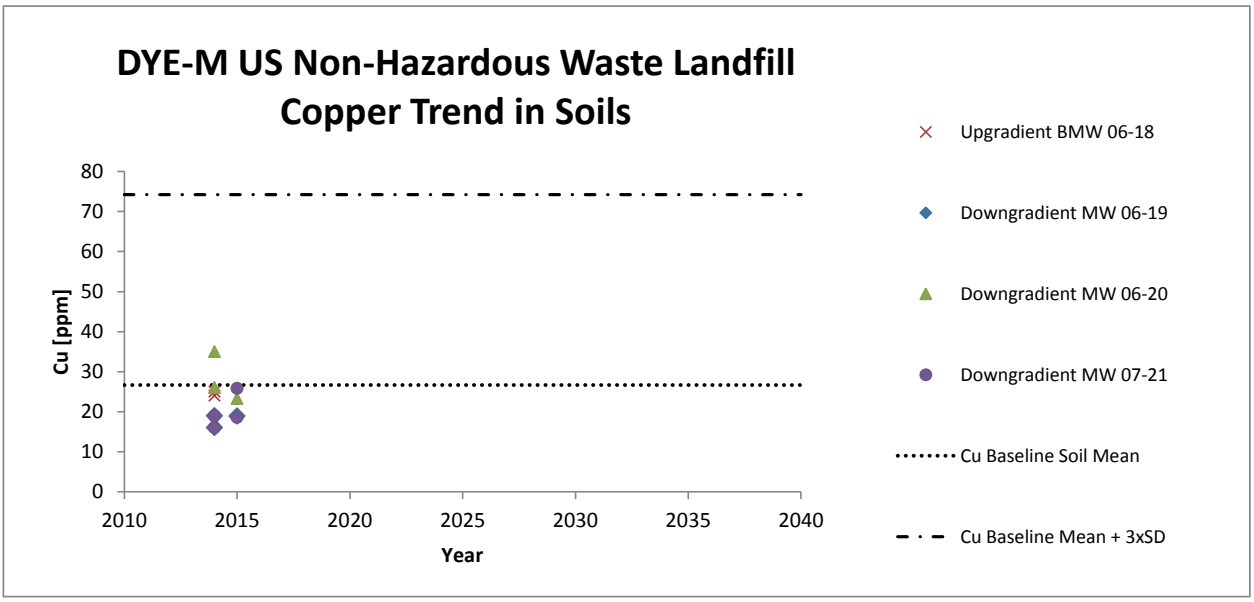
Legend

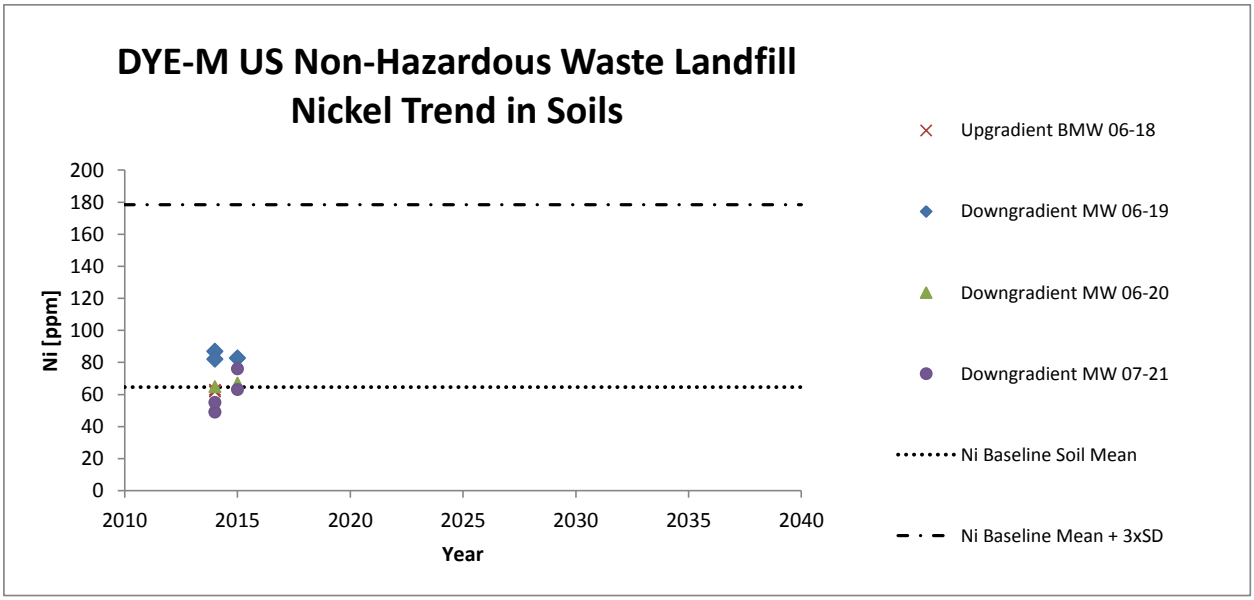
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

DYE-M US Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

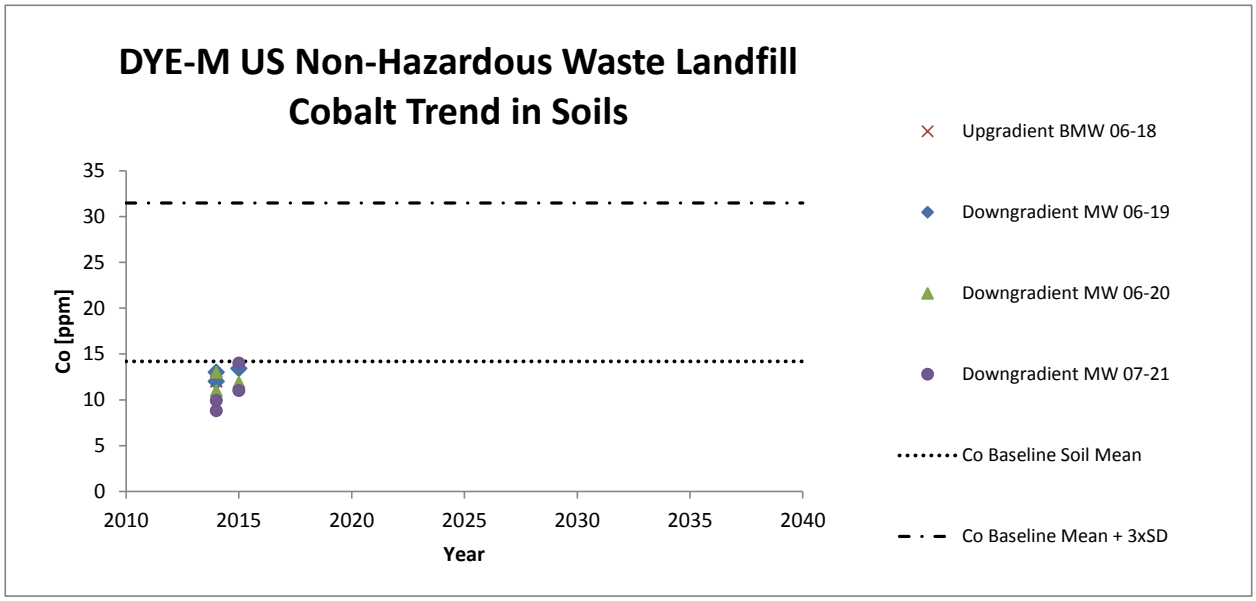
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

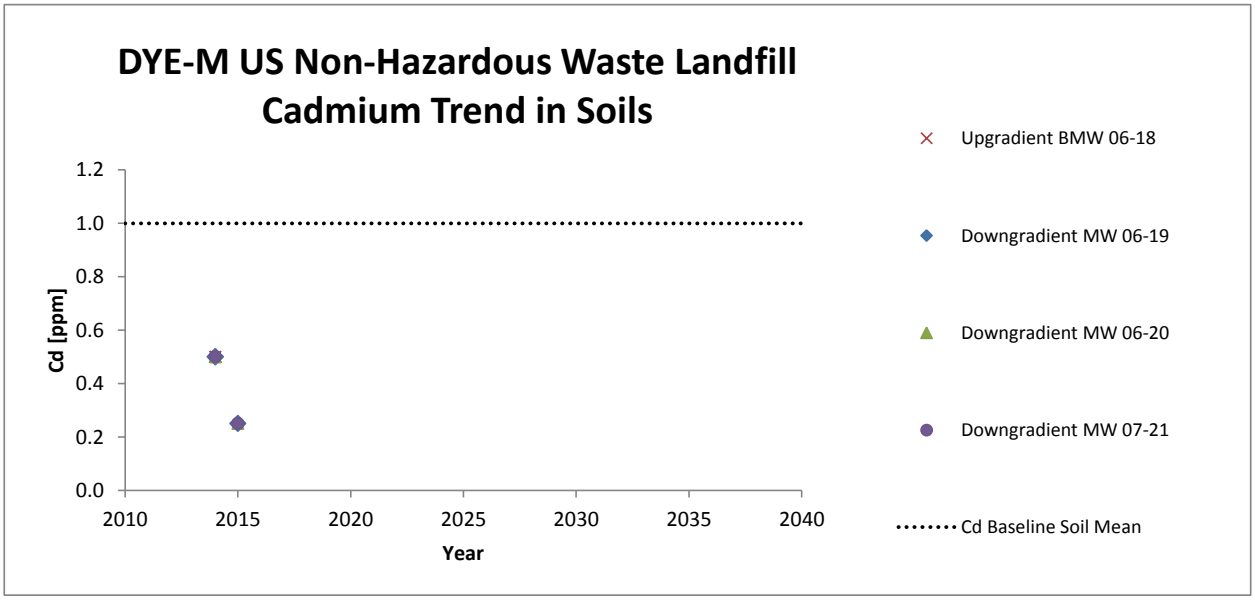
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





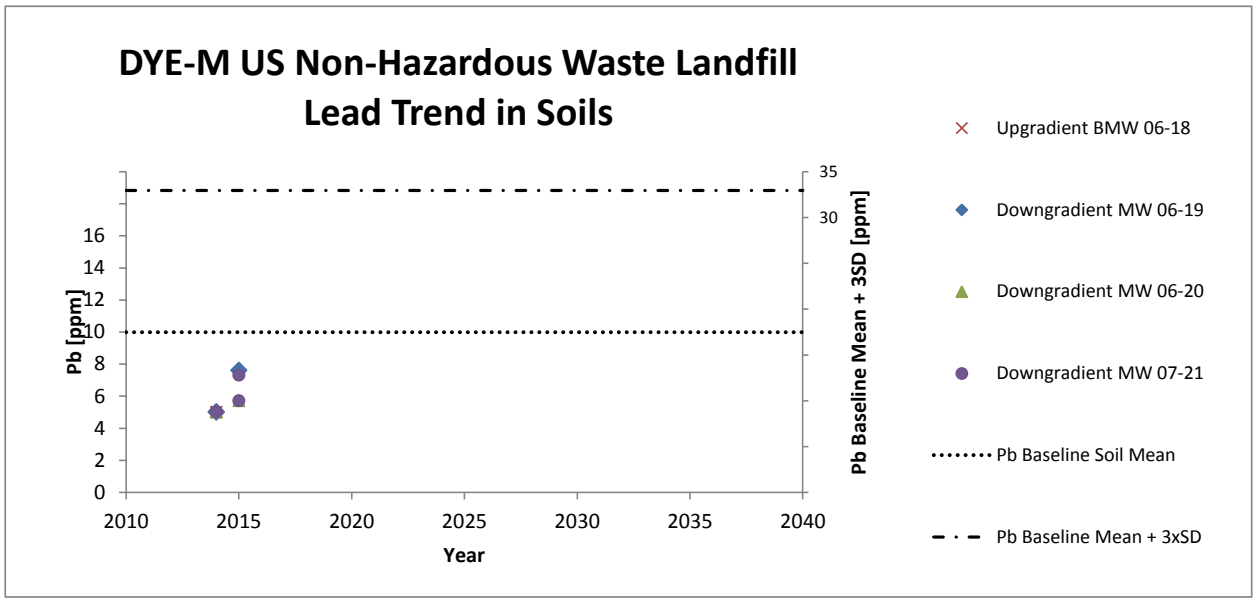
DYE-M US Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



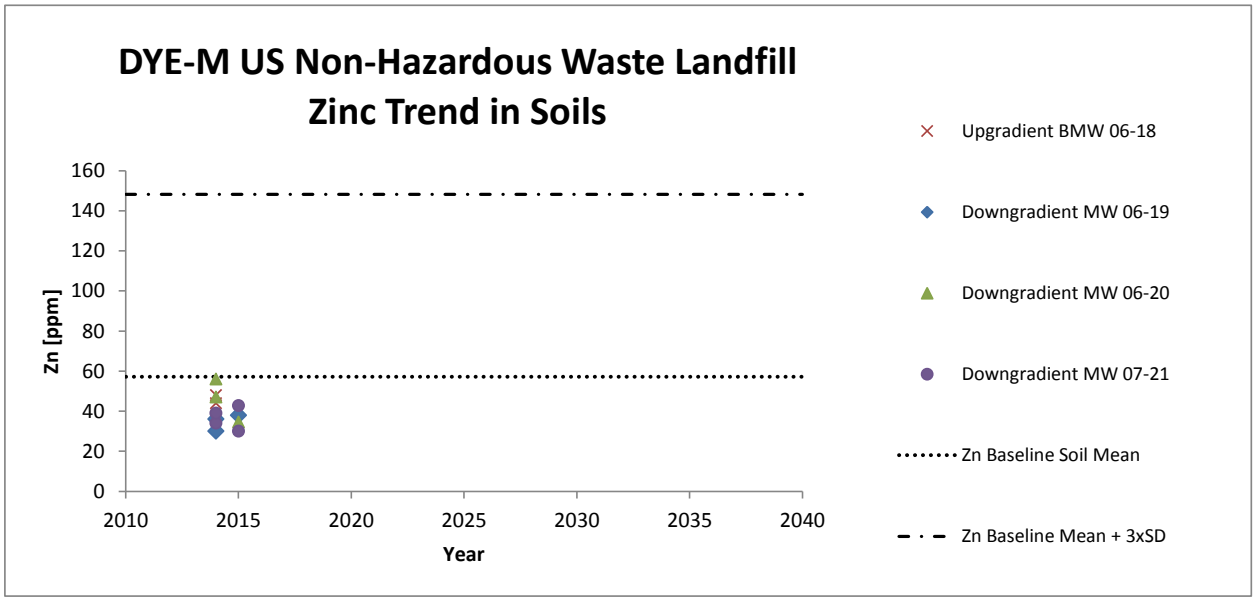


*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.
*Cd Baseline SD = 0

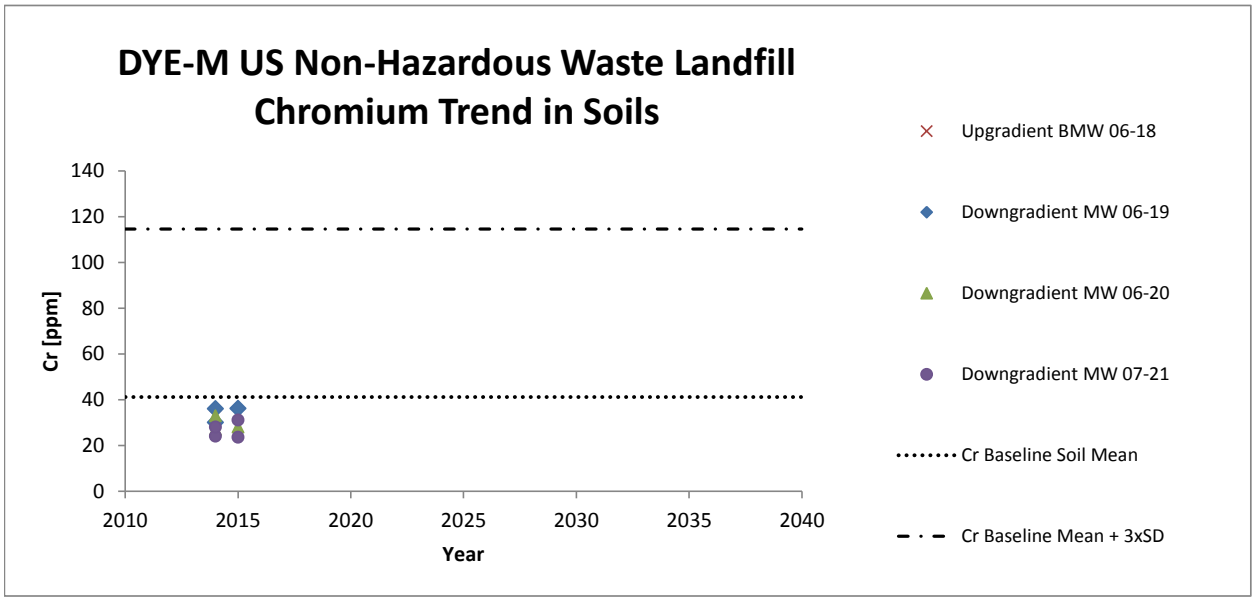
DYE-M US Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

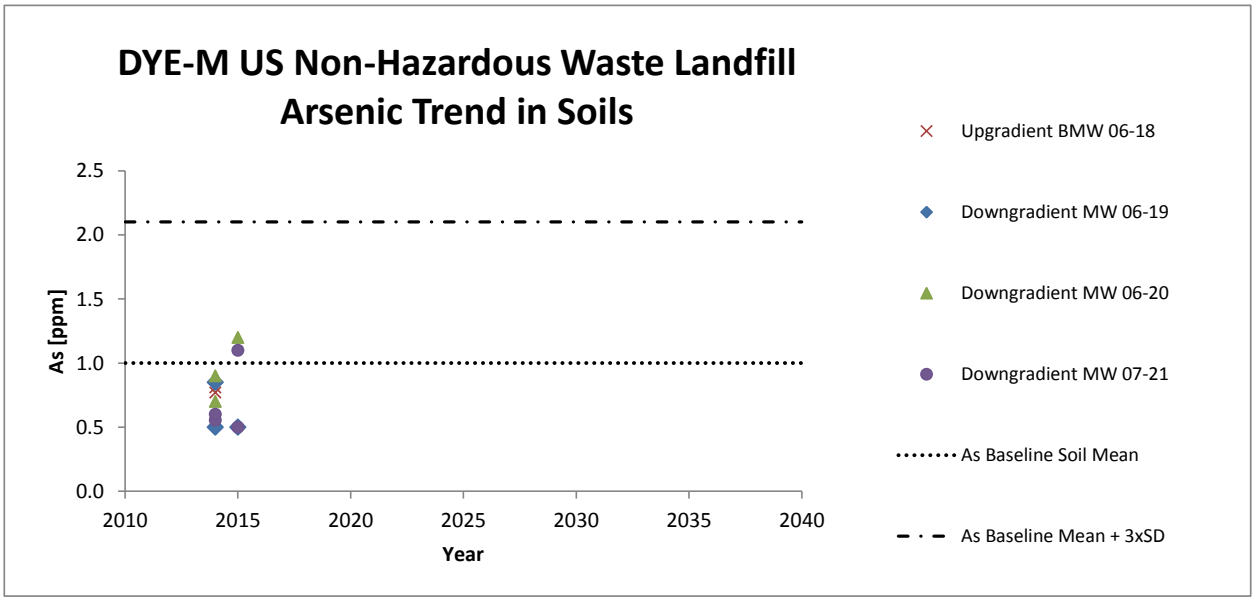


*Pb Baseline Arithmetic Mean equals the detection limit



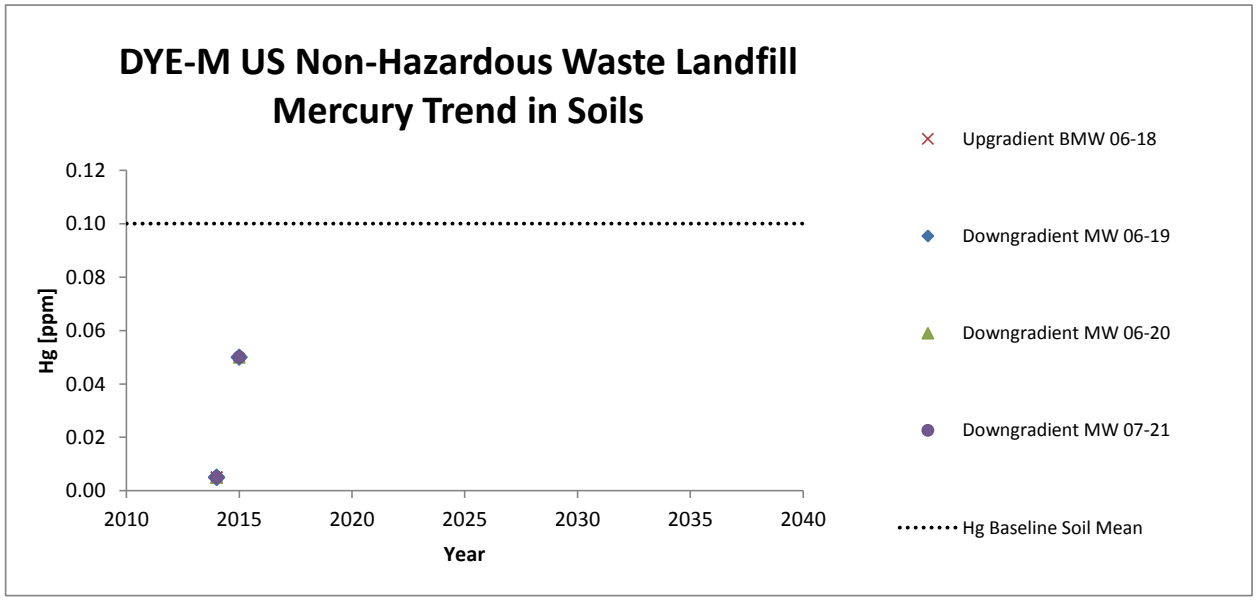
DYE-M US Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



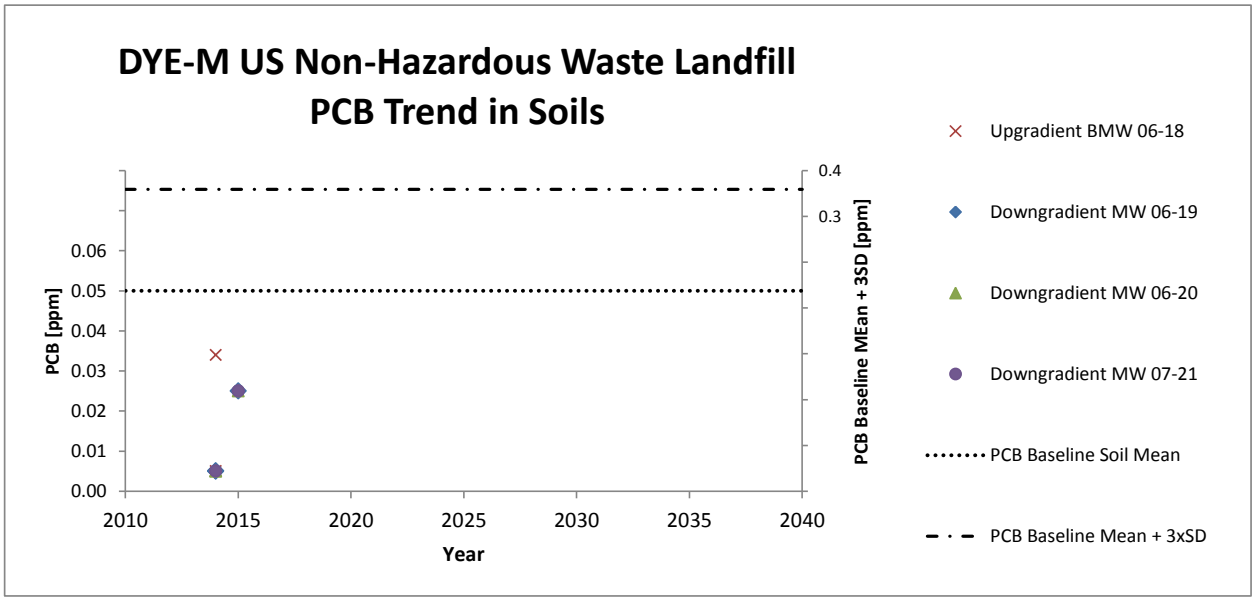


*As Baseline Arithmetic Mean equals the detection limit

DYE-M US Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

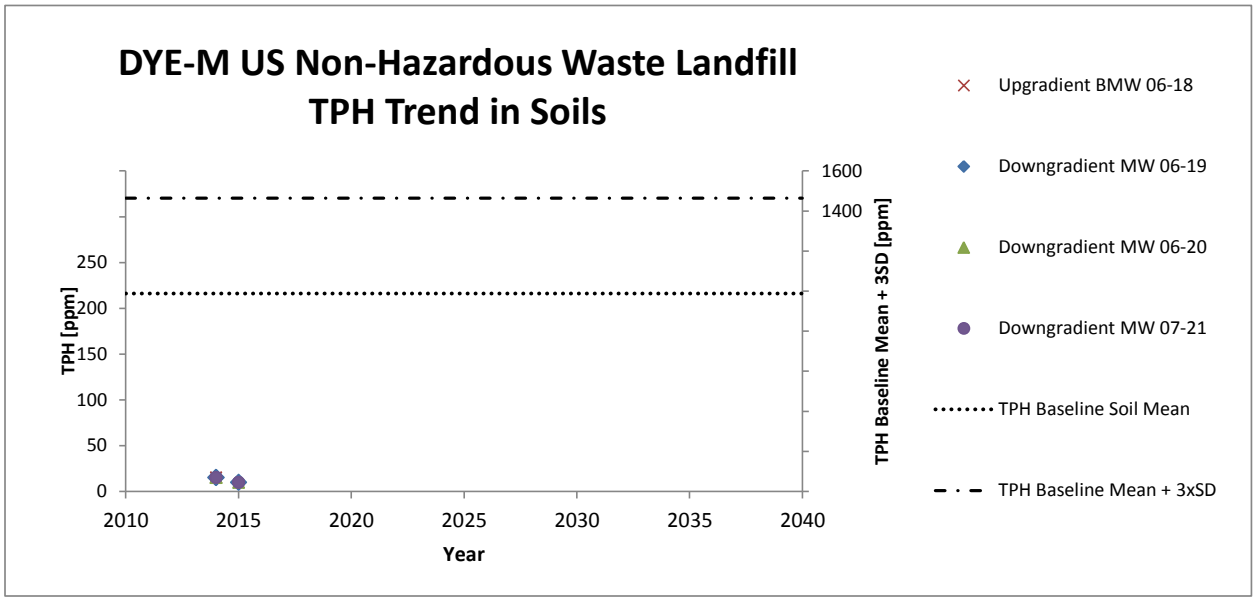


*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.
Hg Baseline SD = 0



*PCB Baseline Arithmetic Mean is equal to the baseline detection limit.

DYE-M US Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M US Non-Hazardous Waste Landfill - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Baseline Data																		
Upgradient:																		
08-9739	BMW06-18				0.110	0.0888	0.029	<0.0010	0.041	0.71	0.088	0.0078	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
09-21484	BMW06-18				0.376	0.3910	0.086	0.00277	0.256	18	0.59	0.020	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
12-34964	BMW06-18				<0.0050	0.0061	<0.0030	<0.0010	<0.0050	12	0.30	0.033	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
Downgradient:																		
08-9741	MW06-19				0.033	0.11	0.009	<0.0010	<0.010	0.049	0.19	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
08-9740	MW06-20				0.25	0.19	0.064	<0.0010	0.031	1.00	0.17	0.005	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
09-21497	MW06-19				0.22	0.19	0.074	0.0019	0.088	0.29	0.31	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
09-21493	MW06-20				0.50	0.35	0.130	0.0033	0.068	6.04	0.38	0.006	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12187	MW06-19				<0.0050	0.0089	<0.0030	<0.0010	<0.010	0.33	0.006	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
11-12189	MW07-21				<0.0050	<0.0050	<0.0030	<0.0010	<0.010	0.56	<0.0050	0.0059	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
12-34965	MW06-19				<0.0050	<0.0050	<0.0030	<0.0010	<0.0050	0.094	0.11	0.002	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
12-34963	MW06-20				<0.0050	<0.0050	<0.0030	<0.0010	<0.0050	9.1	0.40	0.018	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13-29590/91	MW06-19				<0.0050	<0.0050	<0.0030	<0.0010	<0.0050	0.095	0.078	<0.0010	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13-29592	MW06-20				<0.0050	<0.0050	<0.0030	<0.0010	<0.0050	6.30	0.07	0.0048	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
13-29593	MW07-21				<0.0050	<0.0050	<0.0030	<0.0010	<0.0050	0.59	0.50	0.0210	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
		N value			14	14	14	14	14	14	14	14	14	14	14	14	14	14
	Arithmetic Mean				**0.25**	**0.22**	**0.07**	**0.002**	**0.082**	**4.0**	**0.27**	**0.009**	**0.0002**	**0.001**	**0.03**	**0.25**	**0.50**	**0.25**
Arithmetic Mean Corrected for Detection Limit					**0.005**	**0.22**	**0.003**	**0.001**	**0.005**	**4.0**	**0.27**	**0.009**	**0.0004**	**0.003**	**0.05**	**0.50**	**1.0**	**1.0**
	Standard Deviation				0.17	0.12	0.04	0.001	0.1	5.7	0.17	0.0098	0.0	0.0008	0.0	0.0	0.0	0.0
Arithmetic Mean + 3xStandard Deviation					0.52	0.59	0.13	0.005	0.28	21	0.79	0.039	0.0004	0.0053	0.05	0.50	1.00	1.0
	Detection Limit				0.005	0.005	0.003	0.001	0.010	0.010	0.005	0.003	0.0004	0.003	0.05	0.50	1.00	1.0
Monitoring Data																		
Upgradient - BMW 06-18																		
Not Sampled	BMW 06-18	2014	Year 1	Phase I														#N/A
Not Sampled, buried	BMW 06-18	2015	Year 3	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.

DYE-M US Non-Hazardous Waste Landfill - Summary of Monitoring Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Downgradient - MW 06-19																		
Not Sampled	MW06-19	2014	Year 1	Phase I														#N/A
MW06-19	MW06-19	2015	Year 3	Phase I	0.0015	<0.001	<0.0005	<0.0001	<0.0001	0.201	<0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	0.1
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 06-20																		
14-8180/81	MW06-20	2014	Year 1	Phase I	<0.0010	<0.0010	<0.00030	<0.000090	<0.00050	0.21	<0.00050	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.2
Not sampled, could not open well	MW06-20	2015	Year 3	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW 07-21																		
14-8182	MW07-21	2014	Year 1	Phase I	<0.0010	<0.0010	<0.00030	<0.000090	<0.00050	<0.0030	<0.00050	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.2
Not sampled, frozen	MW07-21	2015	Year 3	Phase I														#N/A
			Year 5	Phase I														#N/A
			Year 7	Phase II														#N/A
			Year 10	Phase II														#N/A
			Year 15	Phase II														#N/A
			Year 25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

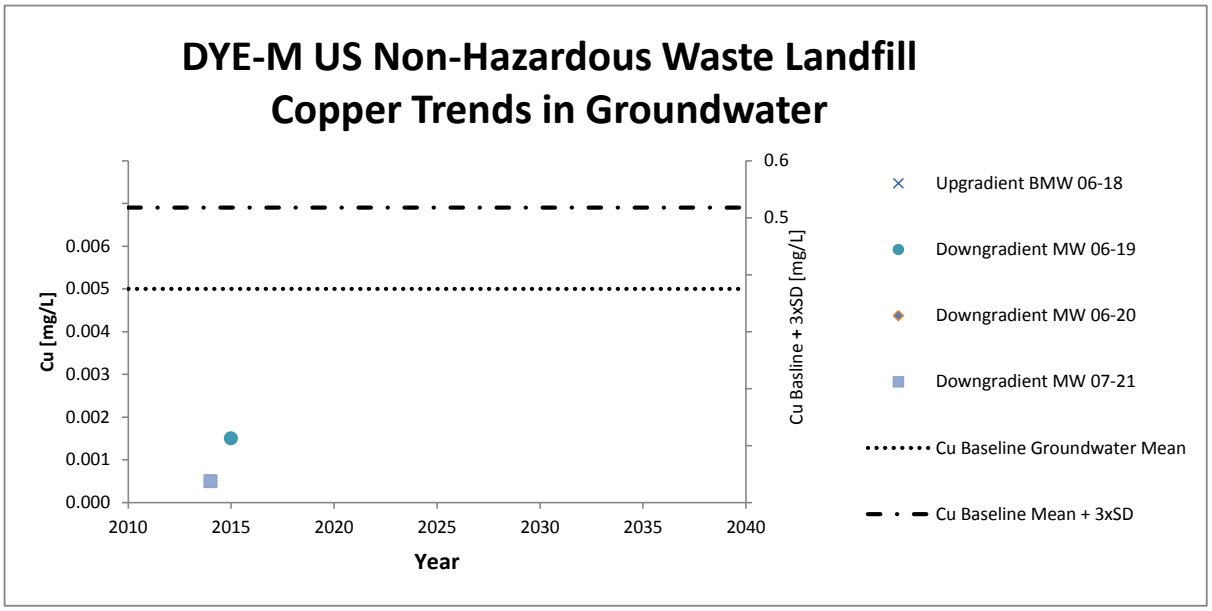
blue highlight indicates dissolved metal results. No highlight indicates total metals.

Dissolved metal results have not been included in the Baseline Arithmetic Mean

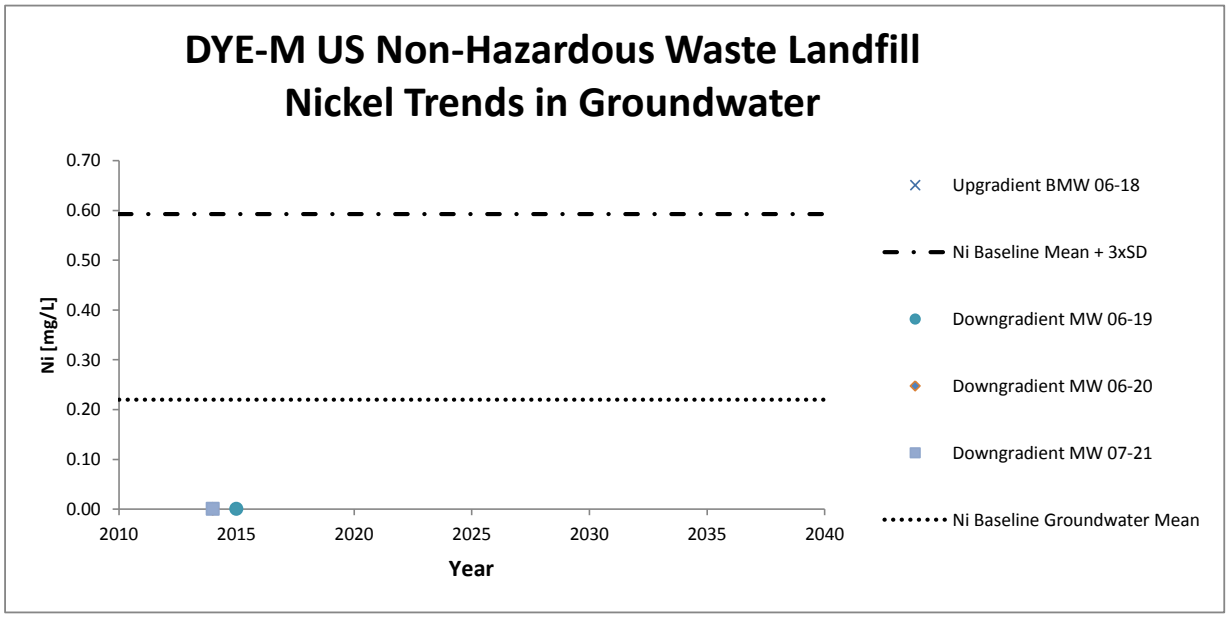
DYE-M US Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

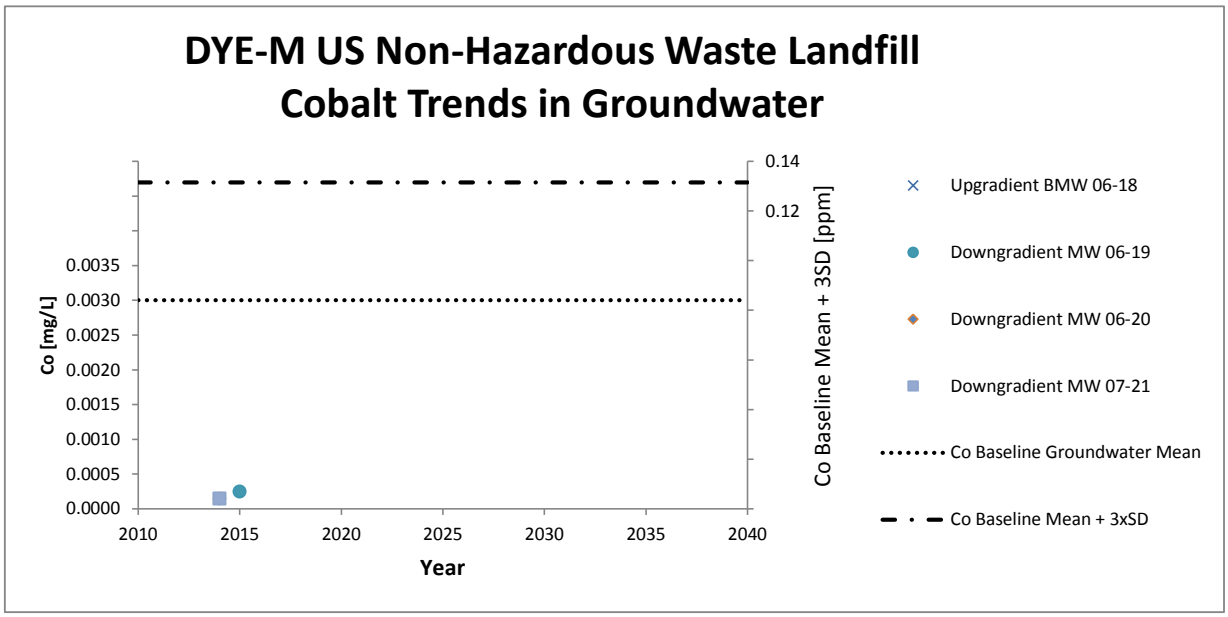
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



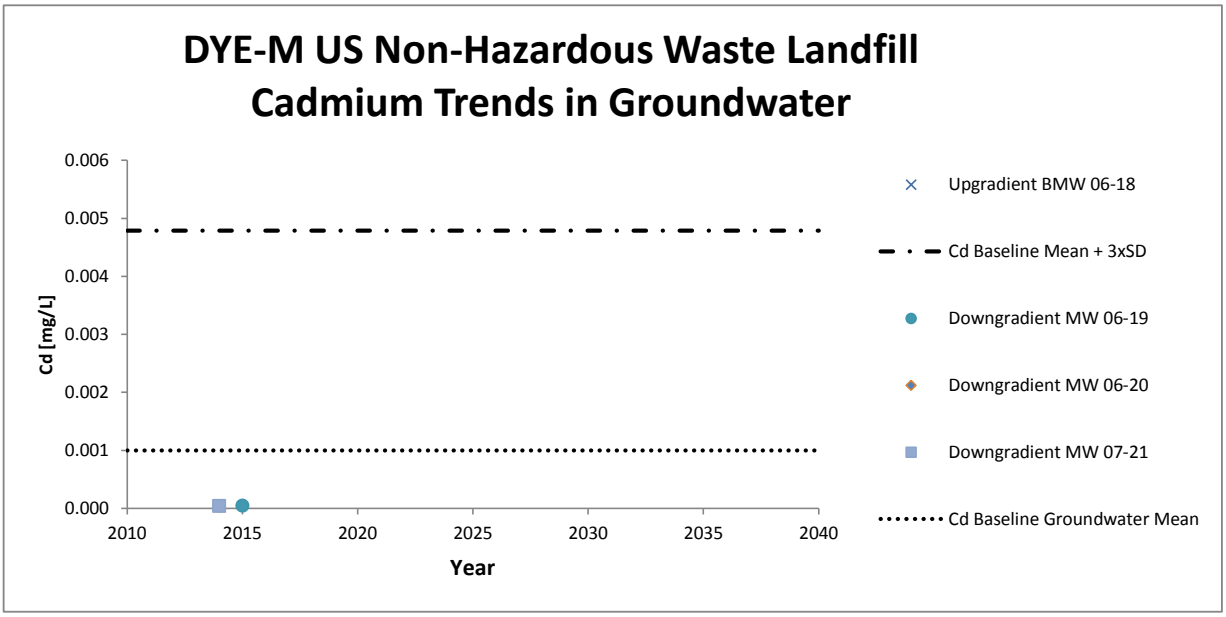
Cu Baseline Arithmetic Mean is equal to the detection limit.



DYE-M US Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

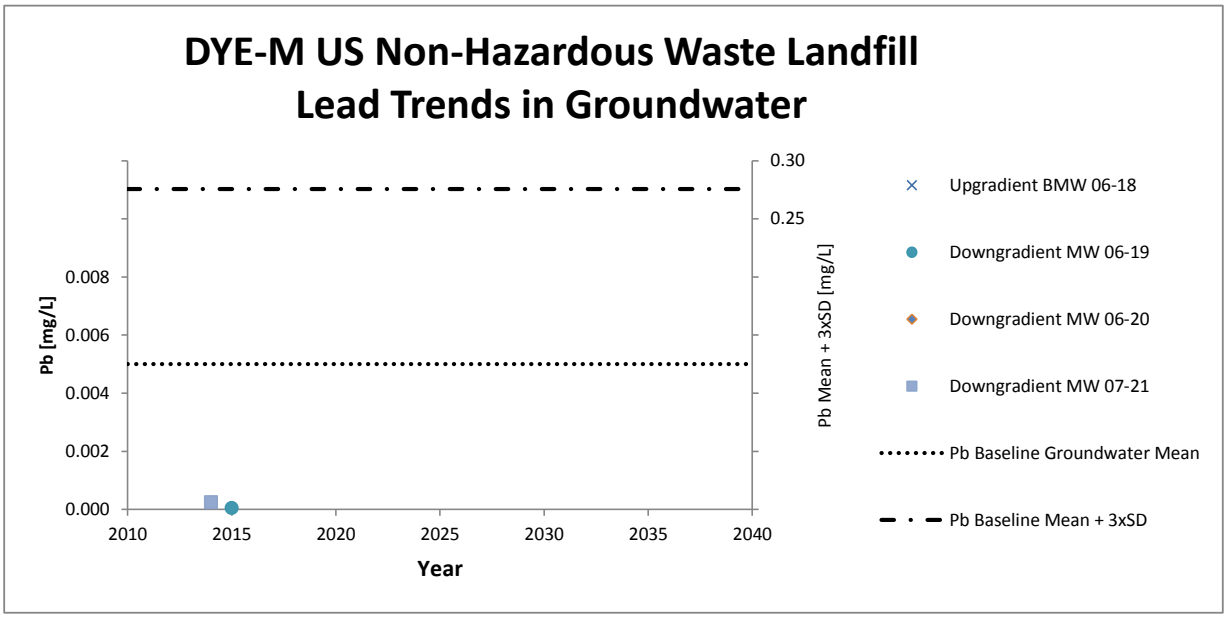


*Co Baseline Mean is equal to the baseline detection limit.

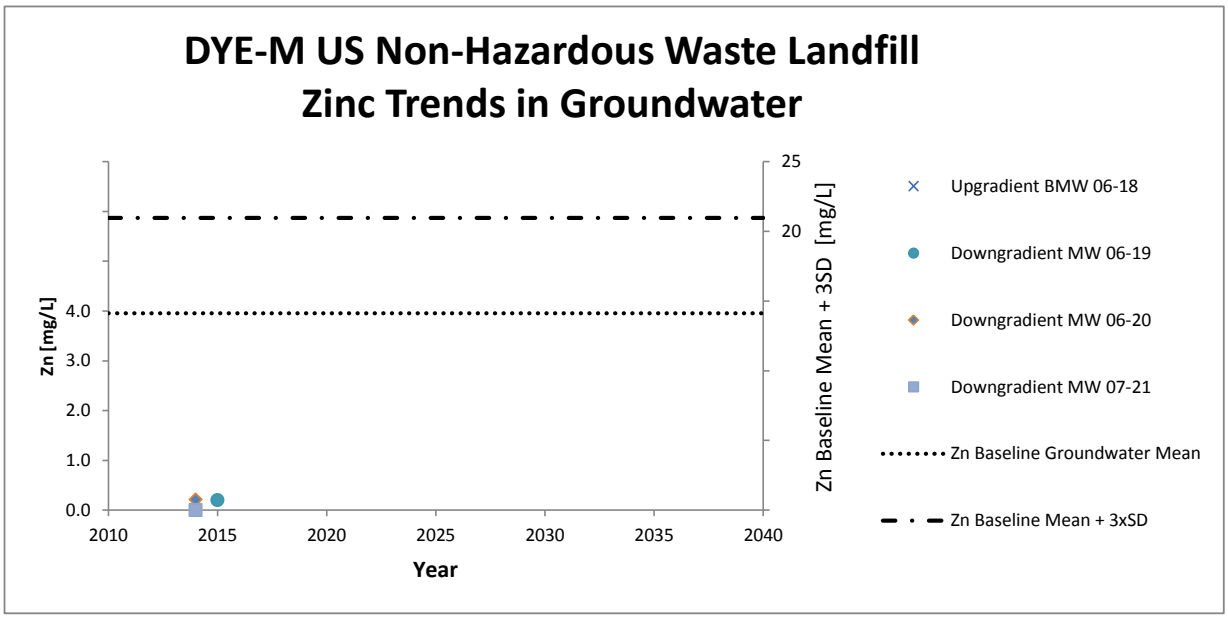


*Cd Baseline Mean is equal to the baseline detection limit.

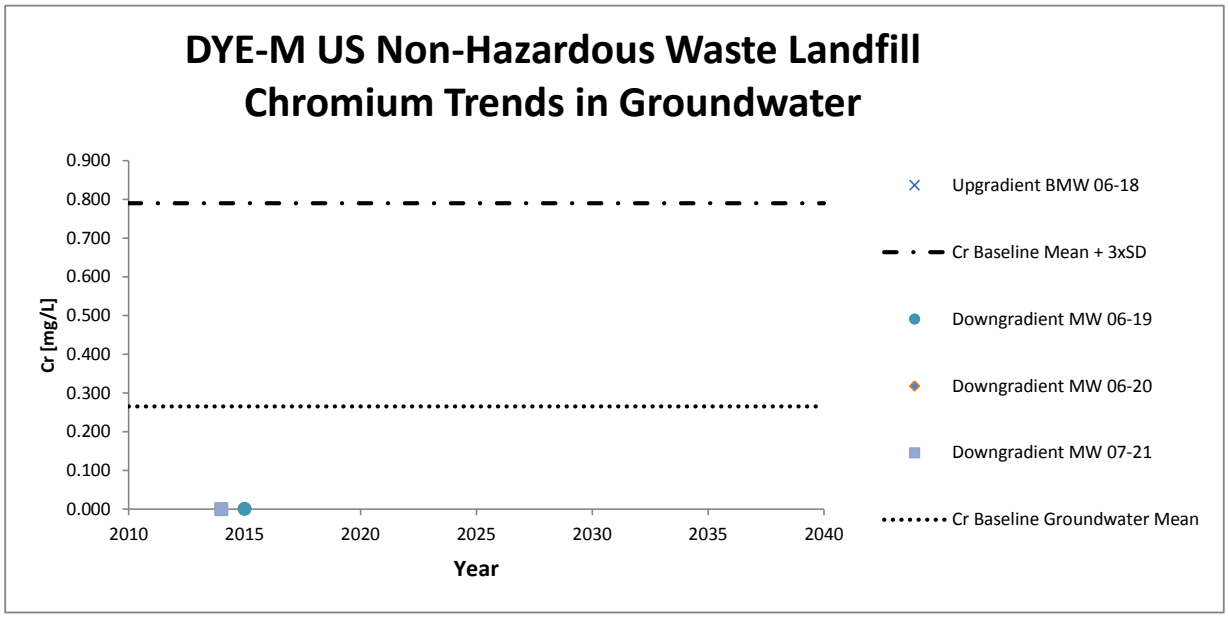
DYE-M US Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

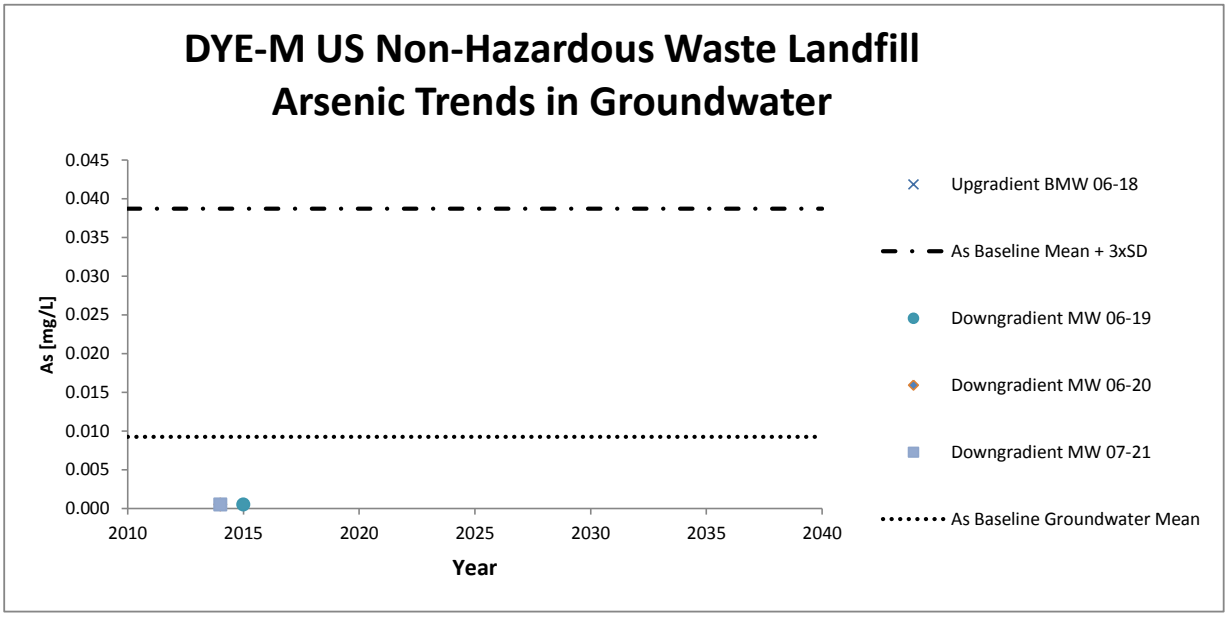


*Pb Baseline Mean is equal to the baseline detection limit.

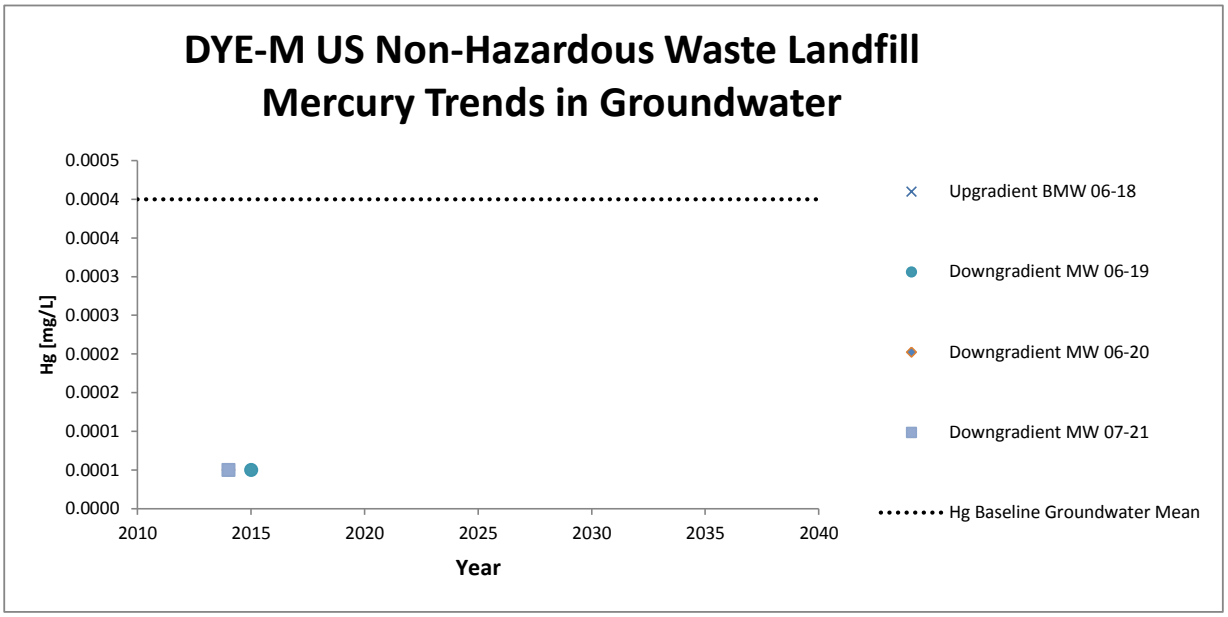


DYE-M US Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

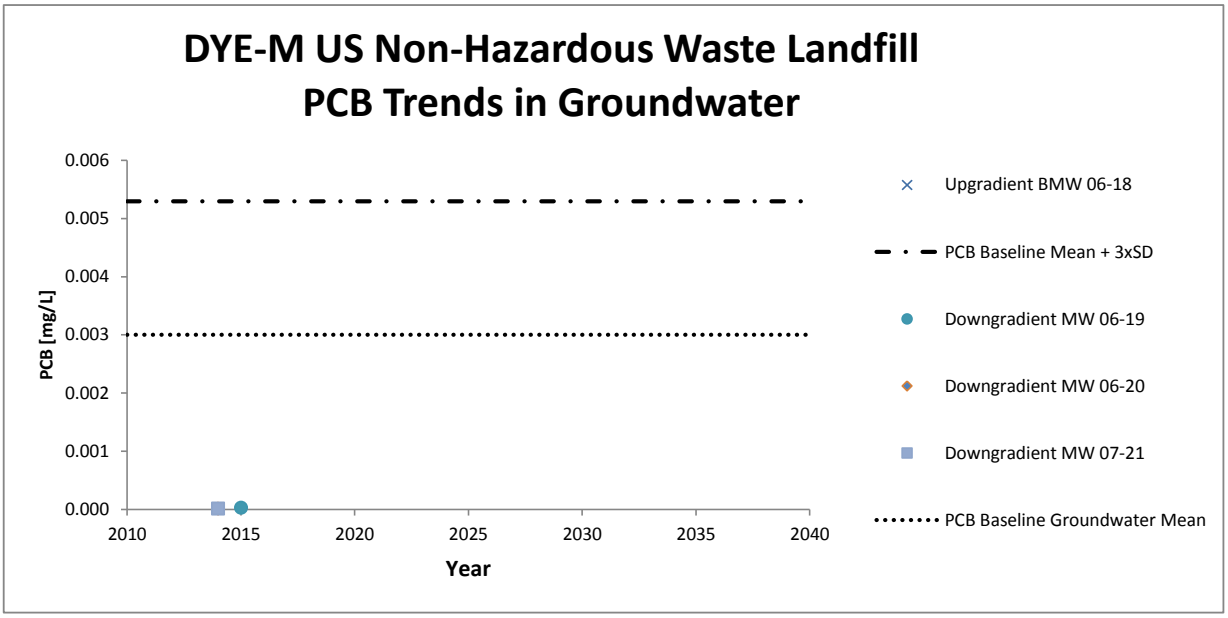




DYE-M US Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

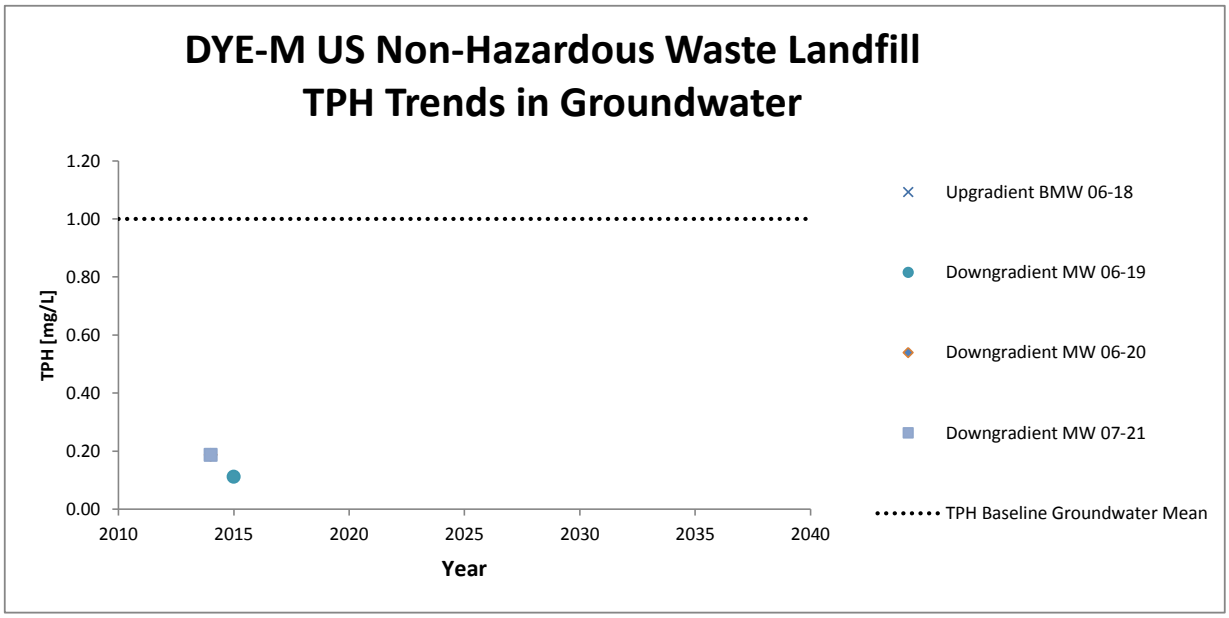


*Hg Baseline Mean is equal to the baseline detection limit.
*Hg Baseline SD = 0



*PCB Baseline Mean is equal to the baseline detection limit.

DYE-M US Non-Hazardous Waste Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



*TPH Baseline Mean is equal to the baseline detection limit.
*TPH Baseline Mean SD = 0

DYE-M US NWS Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic Mean						60	141	20	1.0	10	70	90	1.0	0.5	0.0	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mean						**25**	**55**	**10**	**1.0**	**10**	**63**	**20**	**1.0**	**0.10**	**0.10**	10	4.0	9.0	**252**
Baseline Data - Standard Deviation						15	70	4.3	0.09	8.4	30	35	0.57	0.0	0.15	0	10	10	503
Baseline Data Mean + 3xStandard Deviation						70	266	23	1.3	35	155	126	2.7	0.10	0.56	10	34	39	1760
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
*DEW Line Cleanup **Site Specific** Tier II Criteria & Hydrocarbon Action*						*296*	*2100*	*153*	*5*	*500*	*500*	*250*	*30*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	DM-18 surface																		
14-8274	DM-18	2014	Year 1	Phase I	0-10	23	28	9.6	<1.0	**15**	59	**26**	**1.1**	<0.010	<0.010	<10	<10	<10	15
DM-18 (0-10)	DM-18	2015	Year 3	Phase I	0-10	**66.7**	**118**	**22.4**	<0.5	**16**	58.1	**131**	**4.4**	<0.1	<0.05	<7	<4	<8	10
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-18 depth																		
14-8275	DM-18	2014	Year 1	Phase I	40-50	23	25	9.6	<1.0	**15**	**64**	**21**	**1**	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-18	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US NWS Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			
	DM-19 surface																		
14-8277	DM-19	2014	Year 1	Phase I	0-10	17	24	6.4	<1.0	<10	42	**20**	0.6	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-19	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-19 depth																		
14-8278	DM-19	2014	Year 1	Phase I	40-50	14	17	<5.0	<1.0	<10	36	<20	0.7	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-19	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-20 surface																		
14-8283	DM-20	2014	Year 1	Phase I	0-10	**34**	**61**	**12**	<1.0	<10	44	**25**	0.6	<0.010	<0.010	<10	<10	<10	15
DM-20 (0-15)	DM-20	2015	Year 3	Phase I	0-15	17.1	28.8	7.9	<0.5	**11.2**	48.2	**23.1**	**1.9**	<0.1	<0.05	<7	<4	<8	10
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US NWS Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-20 depth																		
14-8284	DM-20	2014	Year 1	Phase I	30-40	16	13	<5.0	<1.0	**33**	59	<20	0.7	<0.010	<0.010	<10	<10	<10	15
DM-20 (15-30)	DM-20	2015	Year 3	Phase I	15-30	14.3	26.3	7.5	<0.5	**10.5**	43.7	**20**	<1	<0.1	<0.05	<7	<4	<8	10
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-21 surface																		
14-8285	DM-21	2014	Year 1	Phase I	0-10	15	18	8.2	<1.0	**13**	**92**	<20	**1.1**	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-21	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-21 depth																		
14-8287	DM-21	2014	Year 1	Phase I	45-55	21	16	9.2	<1.0	**14**	**120**	<20	**1.6**	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-21	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US NWS Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-22 surface																		
14-8288	DM-22Old	2014	Year 1	Phase I	0-10	**31**	**72**	**13**	<1.0	**10**	**64**	**54**	**1.2**	<0.010	<0.010	<10	<10	<10	15
14-8233	DM-22	2014	Year 1	Phase I	5-10	**33**	48	7.9	<1.0	<10	44	**25**	0.9	<0.10	<0.050				#N/A
DM-22 (0-15)	DM-22	2015	Year 3	Phase I	0-15	**35.8**	34	**15.6**	<0.5	9.5	43.1	**23.7**	**1.9**	<0.1	<0.05	<7	<4	<8	10
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-22 depth																		
14-8290/91	DM-22Old	2014	Year 1	Phase I	25-30	14	29	6.8	<1.0	<10	43	**25**	0.52	<0.010	<0.010	<10	<10	<10	15
14-8234	DM-22	2014	Year 1	Phase I	45-50	**28**	50	8	<1.0	<10	49	**27**	0.9	<0.10	<0.050				#N/A
DM-22 (40-50)	DM-22	2015	Year 3	Phase I	40-50	**54.1**	23.1	**19.3**	<0.5	5.9	28.8	13.9	<1	<0.1	<0.05	<7	<4	<8	10
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US NWS Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-23 surface																		
14-8280/81	DM-23	2014	Year 1	Phase I	0-10	**43**	44	9.3	<1.0	**11**	**84**	**82**	**1.3**	<0.010	<0.010	<10	<10	<10	15
DM-23 (0-20)	DM-23	2015	Year 3	Phase I	0-20	17.1	52.1	9.9	<0.5	9.9	42.4	**35.5**	**1.1**	<0.1	<0.05	<7	<4	<8	10
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-23 depth																		
14-8282	DM-23	2014	Year 1	Phase I	25-35	20	33	7	<1.0	<10	46	**27**	0.7	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-23	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

Legend

XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

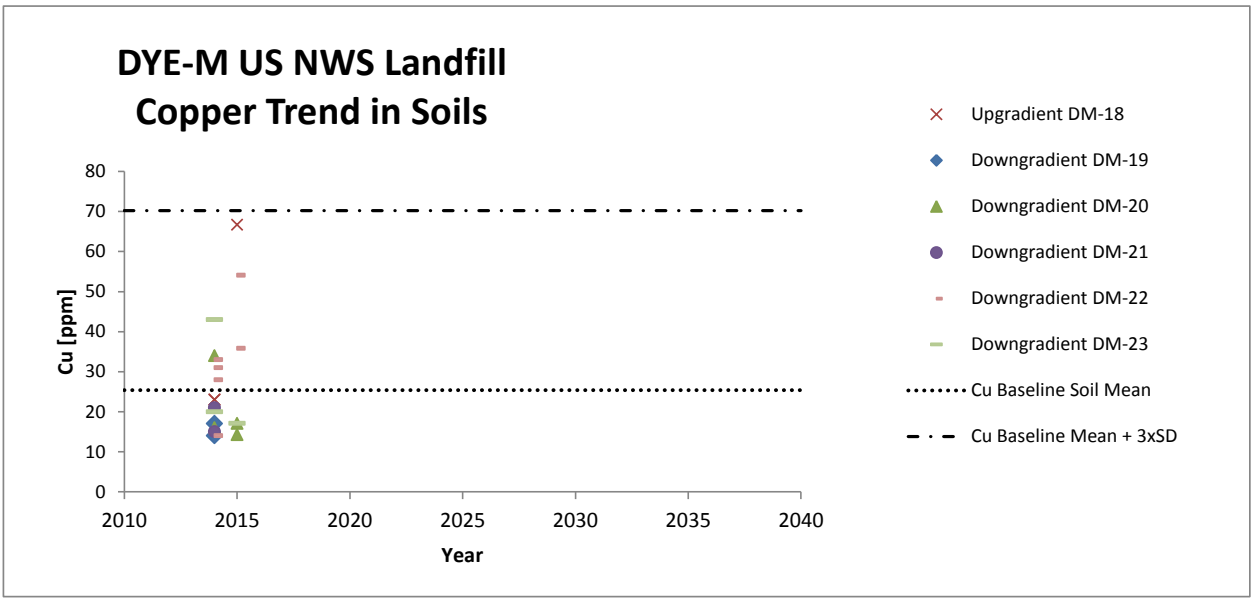
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

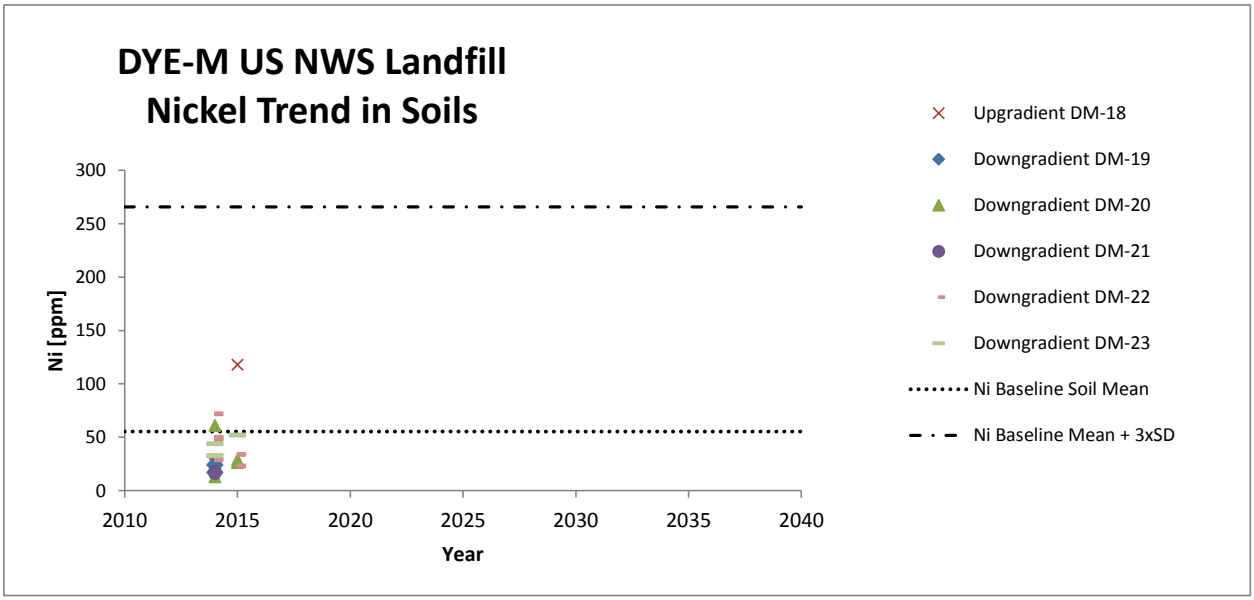
#N/A represents a function that automatically calculates modified TPH value for charts.

DYE-M US NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

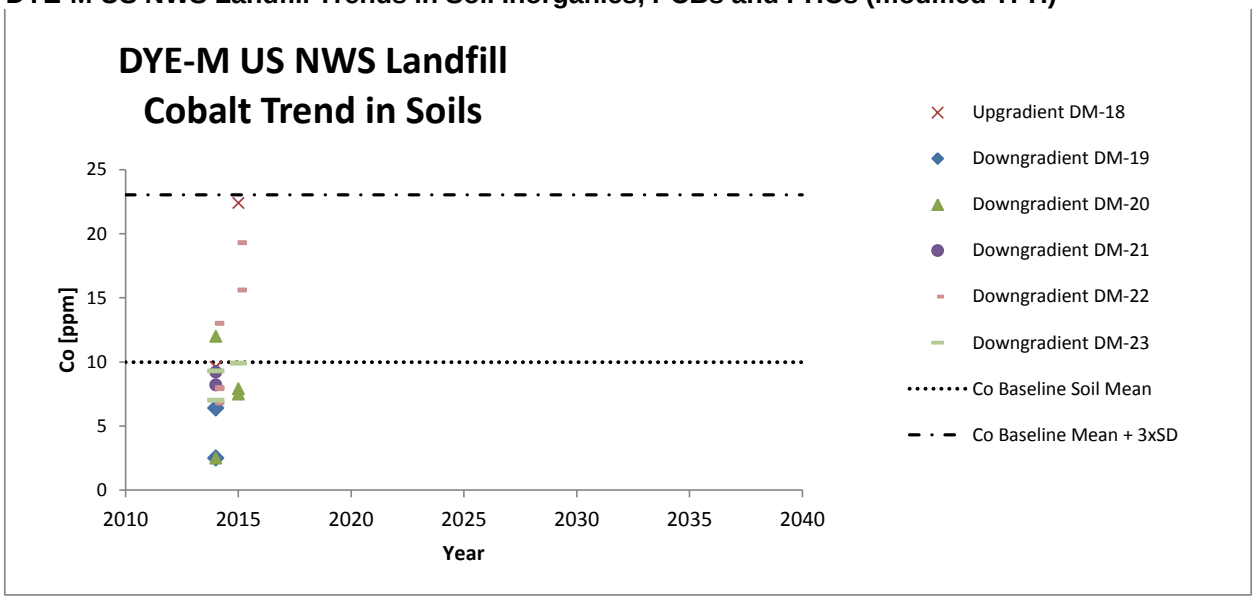
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

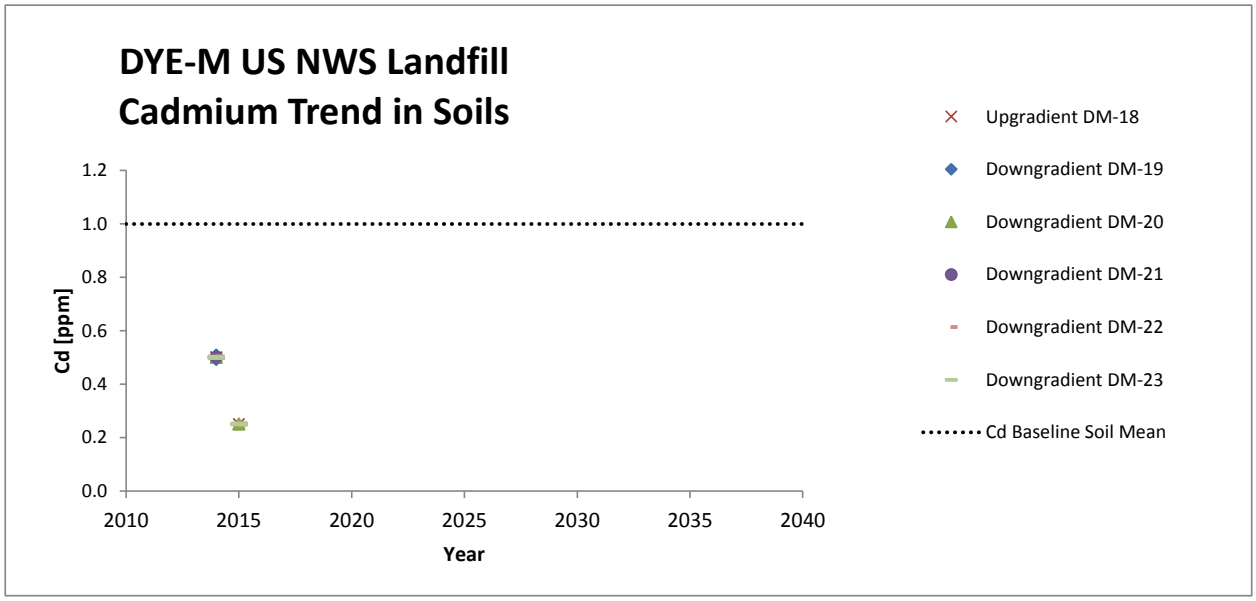
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





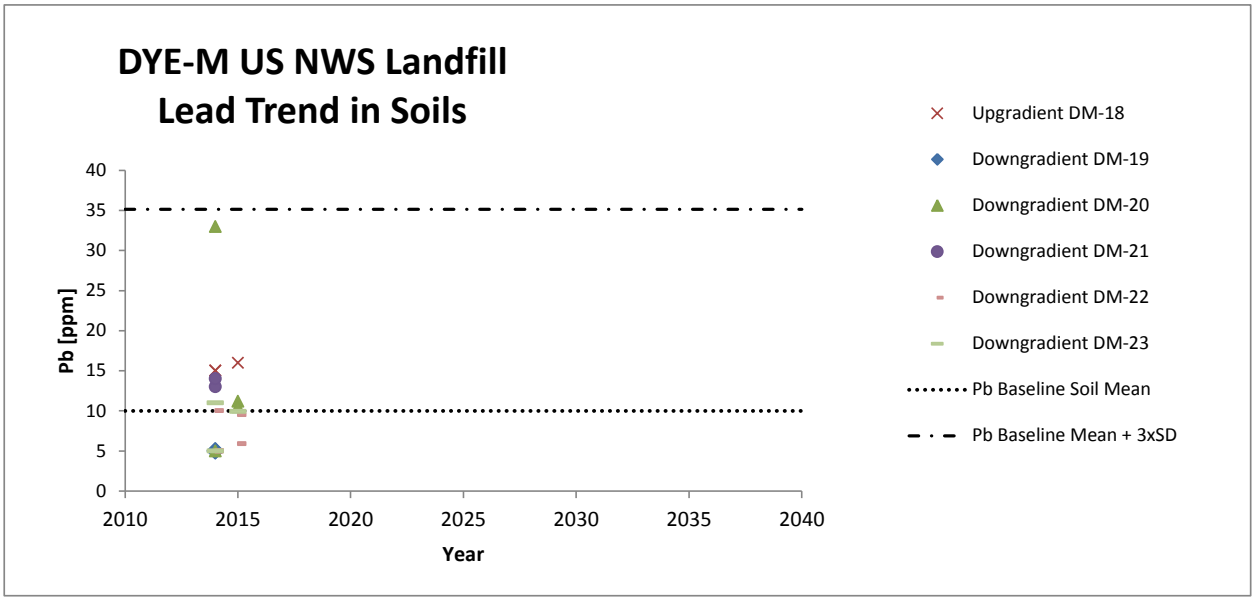
DYE-M US NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



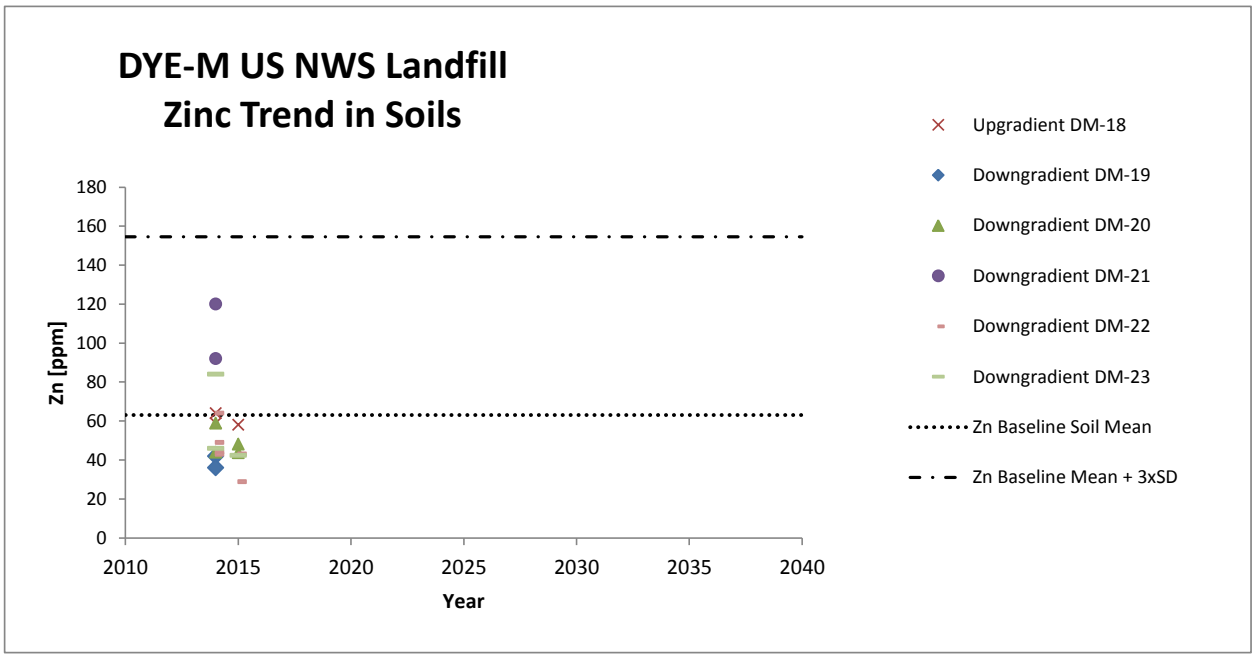


*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.

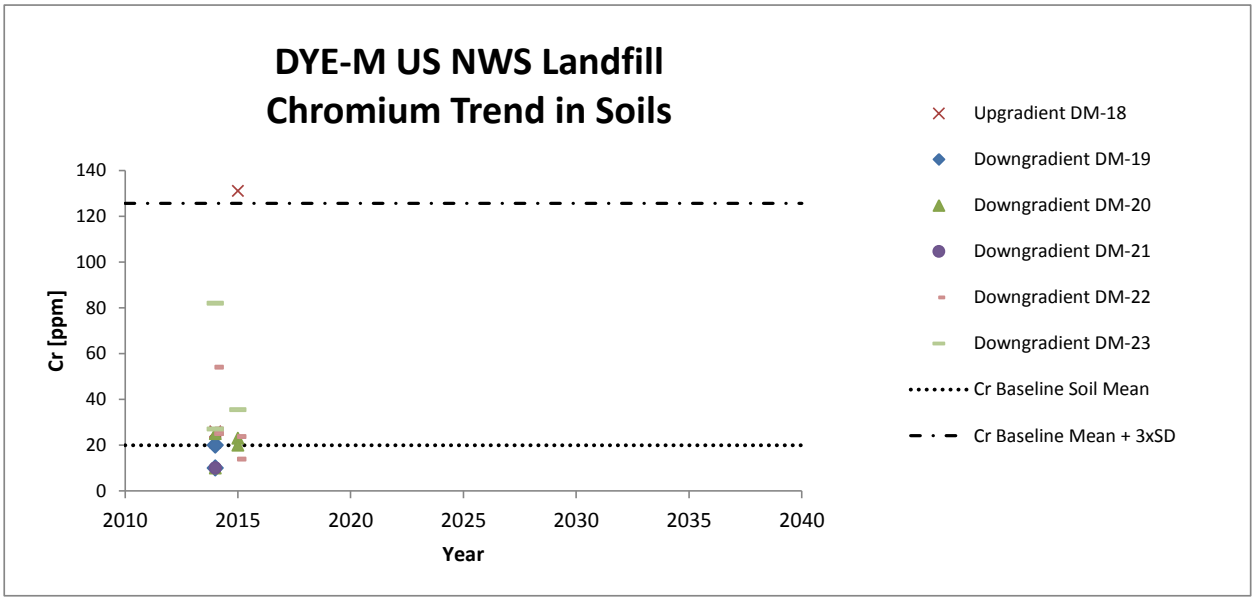
DYE-M US NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



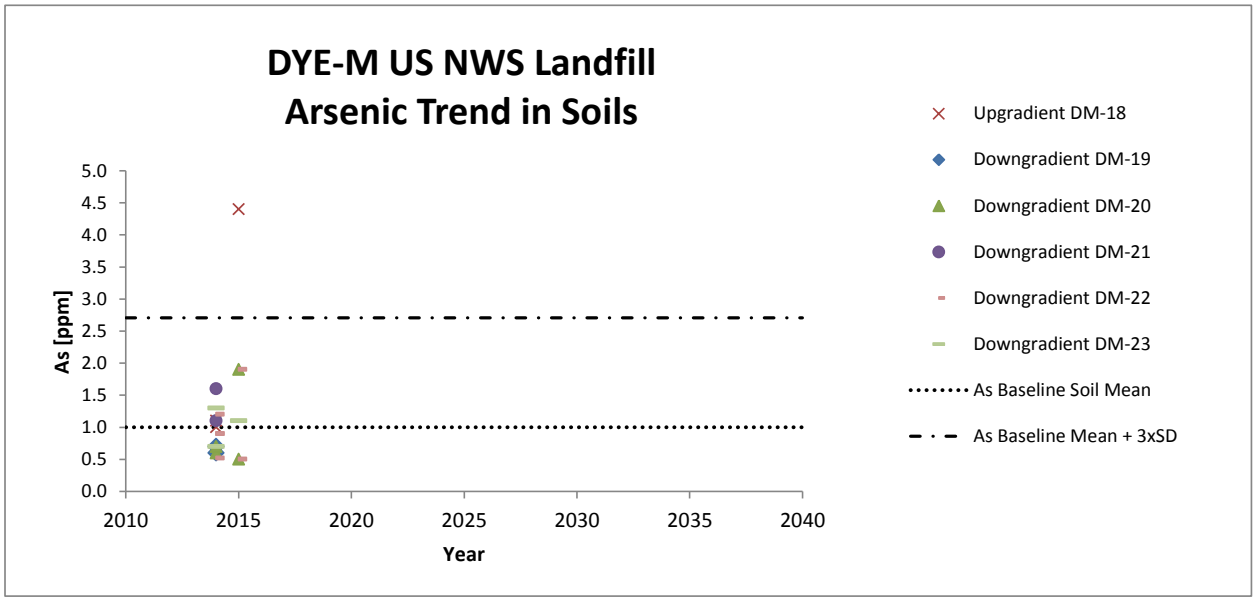
*Pb Baseline Arithmetic Mean is equal to the baseline detection limit.



DYE-M US NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

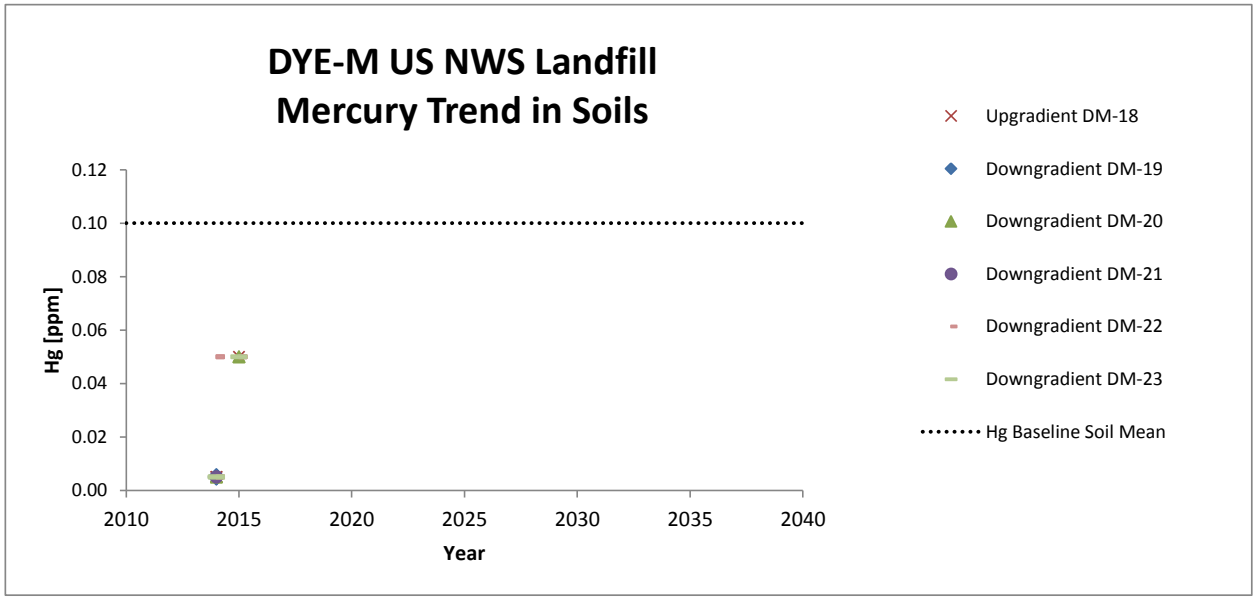


*Cr Baseline Arithmetic Mean is equal to the baseline detection limit.

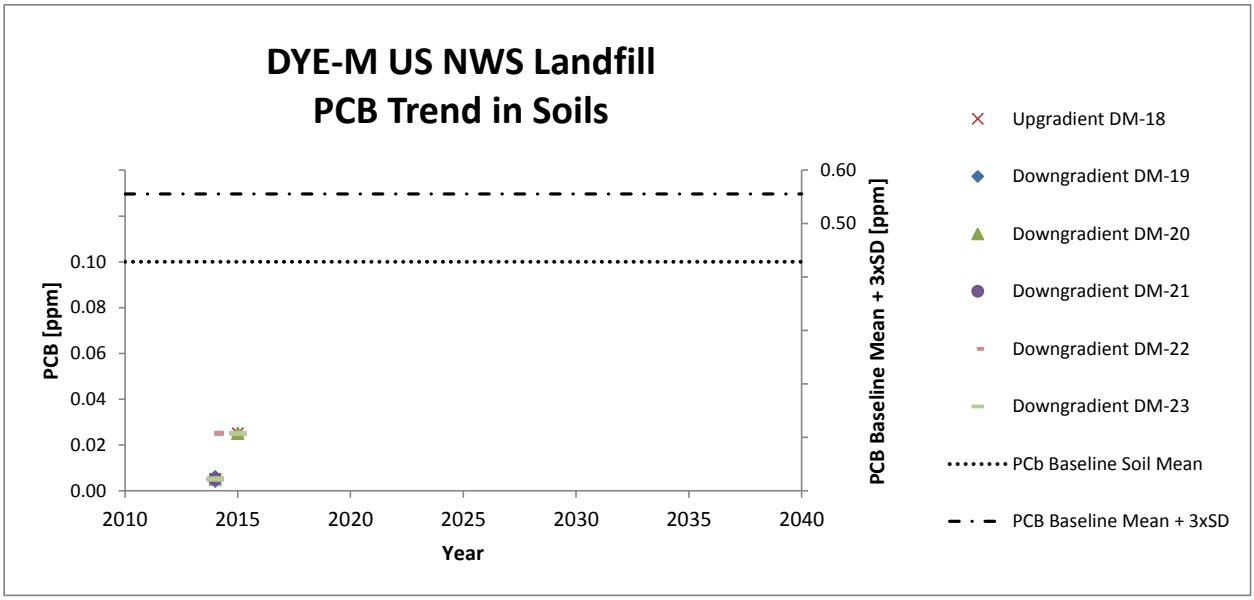


*As Baseline Arithmetic Mean is equal to the baseline detection limit

DYE-M US NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

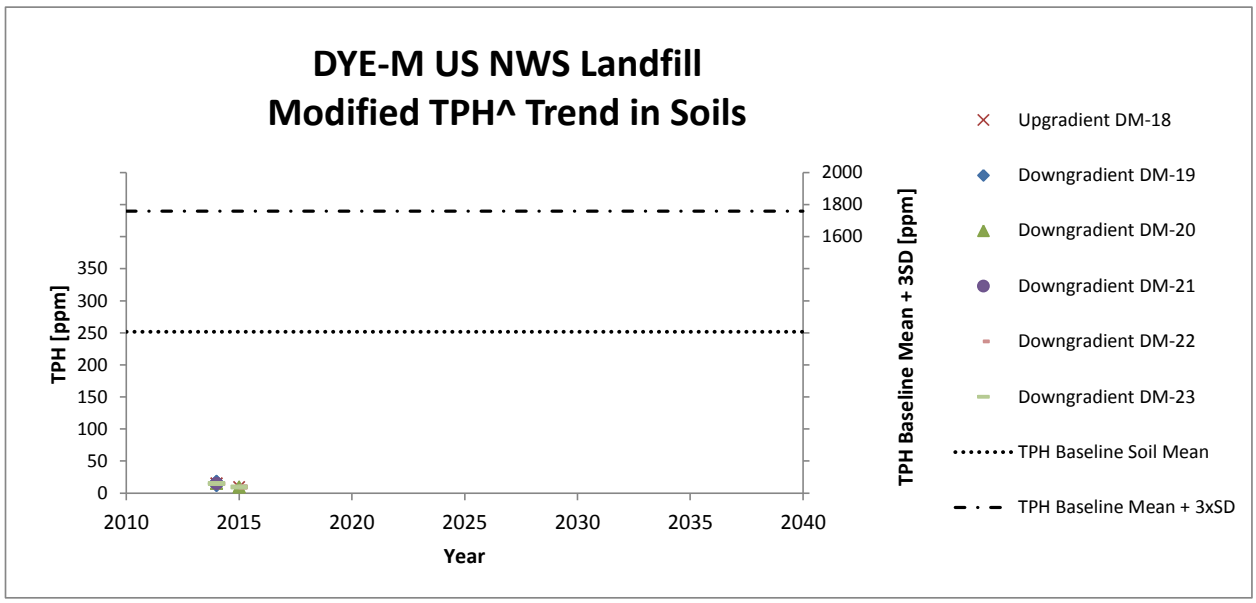


*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.
Hg Baseline SD = 0



DYE-M US NWS Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

*PCB Baseline Arithmetic Mean is equal to the baseline detection limit



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M US South Landfill West - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic Mean						60	141	20	1.0	10	70	90	1.0	0.50	0.002				N/A
Baseline Data - Arithmetic Mean						**26**	**42**	**13**	**1.0**	**10**	**84**	**56**	**2.3**	**0.10**	**0.05**	**10**	**4.0**	**9.0**	**175**
Baseline Data - Standard Deviation						21	20	13	6.8	27	48	41	15	0.0	0.17	0	2.3	41	387
Baseline Data Mean + 3xStandard Deviation						88	102	52	21	92	227	179	47	0.10	0.56	10	11	131	1337
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
*DEW Line Cleanup **Site Specific** Tier II Criteria & Hydrocarbon Action Level*						*296*	*2100*	*153*	*5*	*500*	*500*	*250*	*30*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	DM-19 surface (also US NWS LF downgradient)																		
14-8277	DM-19	2014	Year 1	Phase I	0-10	17	24	6.4	<1.0	<10	42	20	0.6	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-19	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-19 depth (also US NWS LF downgradient)																		
14-8278	DM-19	2014	Year 1	Phase I	40-50	14	17	<5.0	<1.0	<10	36	<20	0.7	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-19	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US South Landfill West - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-23 surface (also US NWS LF downgradient)																		
14-8280/81	DM-23	2014	Year 1	Phase I	0-10	**43**	**44**	9.3	<1.0	**11**	**84**	**82**	1.3	<0.010	<0.010	<10	<10	<10	15
DM-23 (0-20)	DM-23	2015	Year 3	Phase I	0-20	17.1	**52.1**	9.9	<0.5	9.9	42.4	35.5	1.1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-23 depth (also US NWS LF downgradient)																		
14-8282	DM-23	2014	Year 1	Phase I	25-35	20	33	7	<1.0	<10	46	27	0.7	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-23	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
Downgradient																			
	DM-24 surface																		
14-8254	DM-24	2014	Year 1	Phase I	0-10	**33**	**73**	12	<1.0	<10	82	**92**	0.5	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-24	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US South Landfill West - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-24 depth																		
14-8255	DM-24	2014	Year 1	Phase I	25-35	**72**	**170**	**20**	<1.0	<10	**110**	**170**	0.9	<0.010	<0.010	<10	**16**	<10	26
Not sampled - frozen	DM-24	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-25 surface																		
14-8257	DM-25	2014	Year 1	Phase I	0-10	**31**	**82**	**14**	<1.0	<10	81	**89**	1.1	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-25	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-25 depth																		
14-8258	DM-25	2014	Year 1	Phase I	25-35	16	**130**	**15**	<1.0	<10	**94**	**71**	0.7	<0.010	<0.010	<10	**10**	<10	20
Not sampled - frozen	DM-25	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US South Landfill West - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-26 surface																		
14-8260/61	DM-26	2014	Year 1	Phase I	0-10	**72**	**50**	11	<1.0	<10	74	**60**	1.2	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-26	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-26 depth																		
14-8262	DM-26	2014	Year 1	Phase I	25-35	**77**	**50**	**13**	<1.0	<10	**94**	**62**	1.5	<0.010	<0.010	<10	**10**	<10	20
Not sampled - frozen	DM-26	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-27 surface																		
14-8263	DM-27	2014	Year 1	Phase I	0-10	**28**	**58**	**13**	<1.0	<10	78	**58**	0.9	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-27	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US South Landfill West - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-27 depth																		
14-8264	DM-27	2014	Year 1	Phase I	25-35	20	38	**14**	<1.0	<10	**96**	**61**	1	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-27	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-28 surface																		
14-8265	DM-28	2014	Year 1	Phase I	0-10	**27**	**78**	**14**	<1.0	<10	67	51	0.8	<0.010	<0.010	<10	<10	<10	15
DM-28 (0-15)	DM-28	2015	Year 3	Phase I	0-15	**28.8**	**55.5**	**12.9**	<0.5	8.9	77	**80.7**	1.7	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US South Landfill West - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-28 depth																		
14-8267	DM-28	2014	Year 1	Phase I	25-35	15	**43**	10	<1.0	<10	74	32	0.5	<0.010	<0.010	<10	<10	<10	15
DM-28 (40-50)	DM-28	2015	Year 3	Phase I	40-50	25.6	30.6	11	<0.5	7.7	70	39.9	1.6	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-29 surface																		
14-8268	DM-29	2014	Year 1	Phase I	0-10	16	**59**	7.8	<1.0	<10	32	30	0.3	<0.010	<0.010	<10	<10	<10	15
DM-29 (0-20)	DM-29	2015	Year 3	Phase I	0-20	**26.8**	**62.5**	11	<0.5	7.9	42.4	34.1	1.3	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US South Landfill West - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-29 depth																		
14-8270/71	DM-29	2014	Year 1	Phase I	25-35	15	**50**	6.8	<1.0	<10	27	23	0.6	<0.010	<0.010	<10	<10	<10	15
DM-29 (20-40)	DM-29	2015	Year 3	Phase I	20-40	22.9	**65.3**	11.1	<0.5	7.5	37.2	29.4	1.4	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-30 surface																		
14-8272	DM-30	2014	Year 1	Phase I	0-10	20	35	6.8	<1.0	<10	44	28	0.6	<0.010	<0.010	<10	<10	<10	15
DM-30 (0-15)	DM-30	2015	Year 3	Phase I	0-15	23.2	**44.9**	10.5	<0.5	7.7	52	30.6	1.8	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US South Landfill West - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-30 depth																		0
14-8273	DM-30	2014	Year 1	Phase I	25-35	**31**	14	6.2	<1.0	<10	32	<20	0.3	<0.010	<0.010	<10	<10	<10	15
DM-30 (20-30)	DM-30	2015	Year 3	Phase I	20-30	20	40.3	10.1	<0.5	7.4	51	32.1	1.5	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

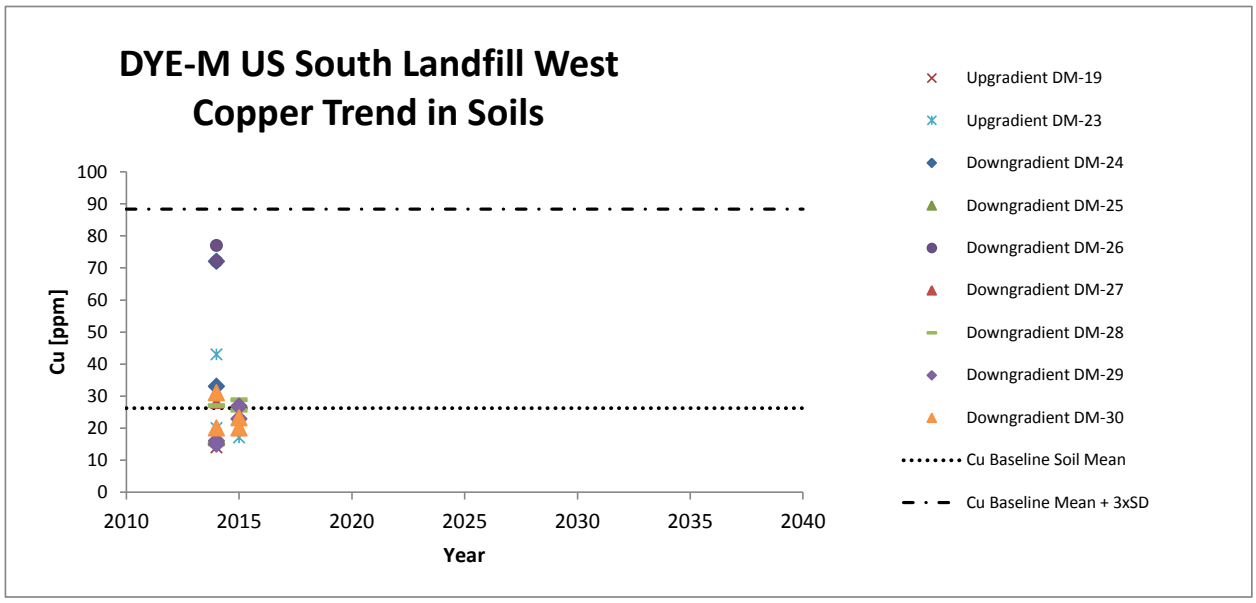
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

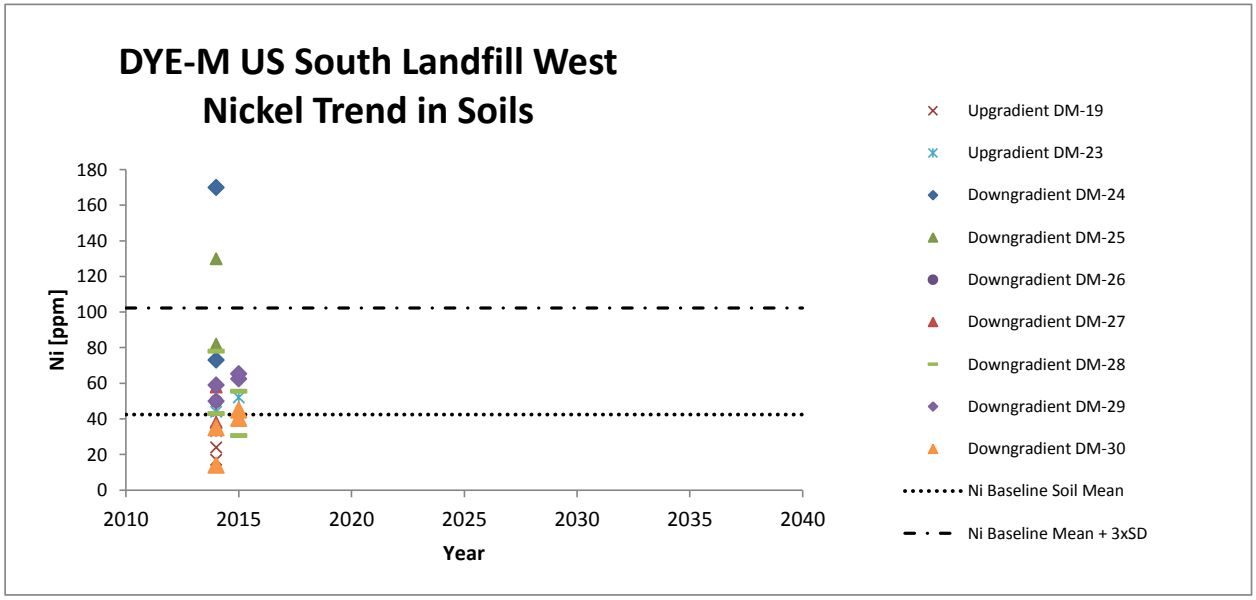
Legend

XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

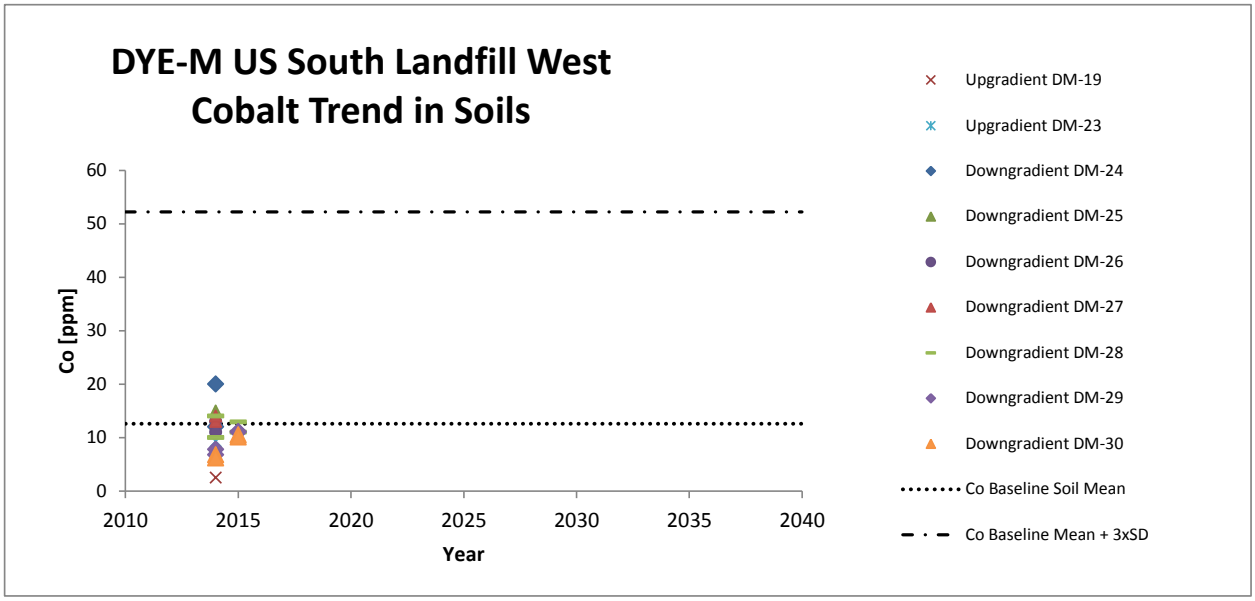
DYE-M US South Landfill West Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

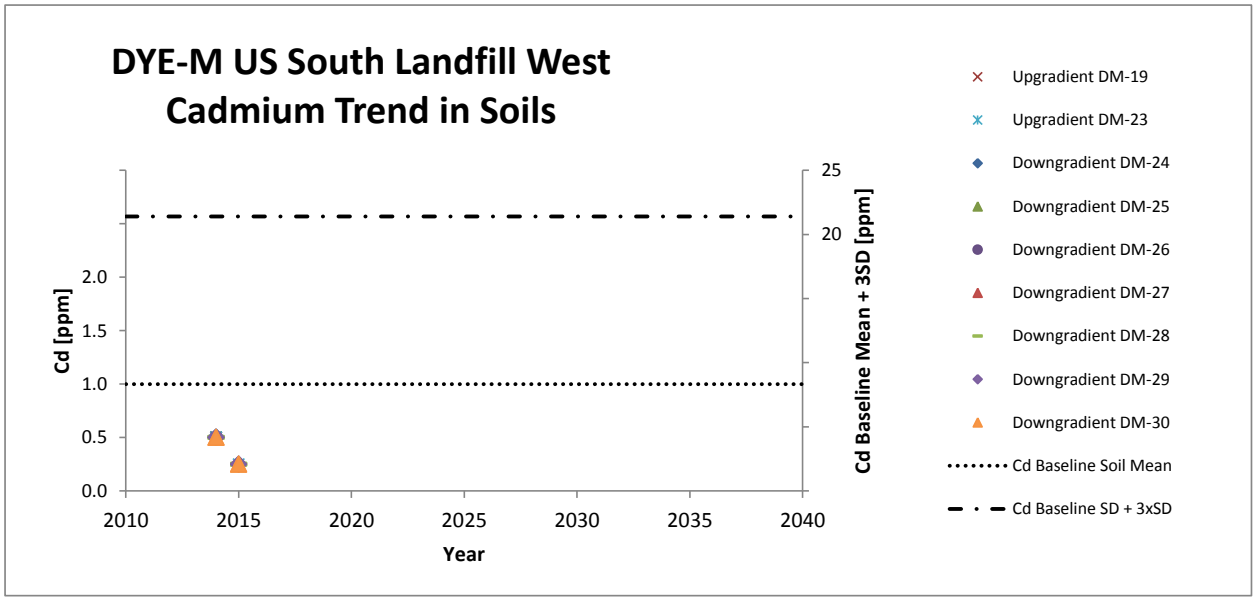
Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





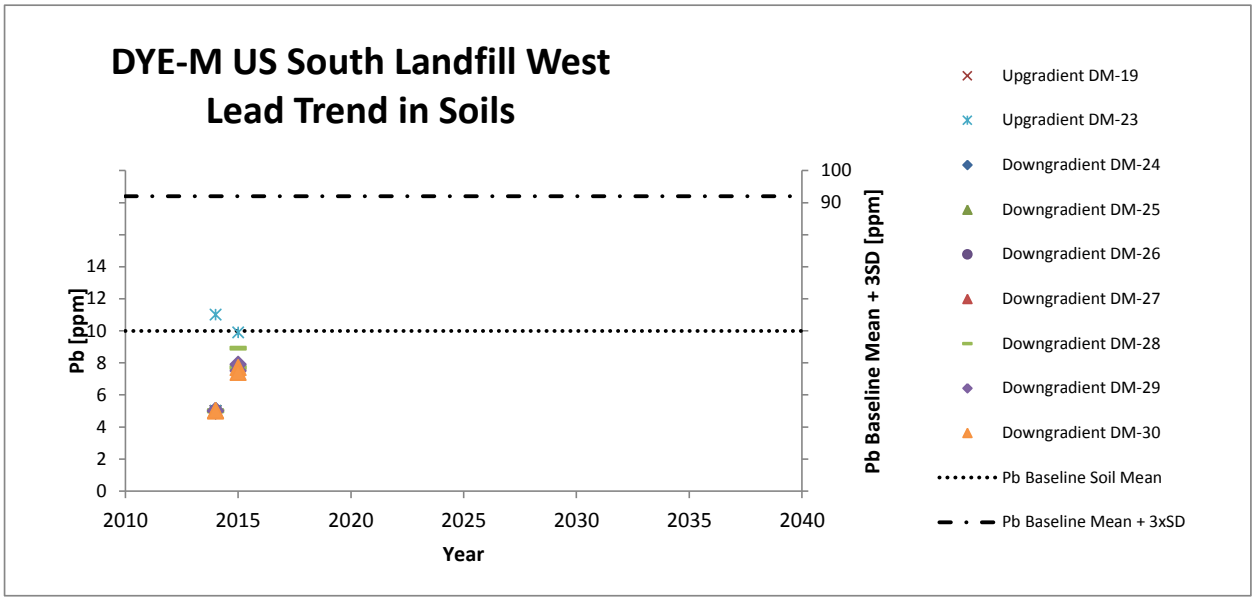
DYE-M US South Landfill West Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



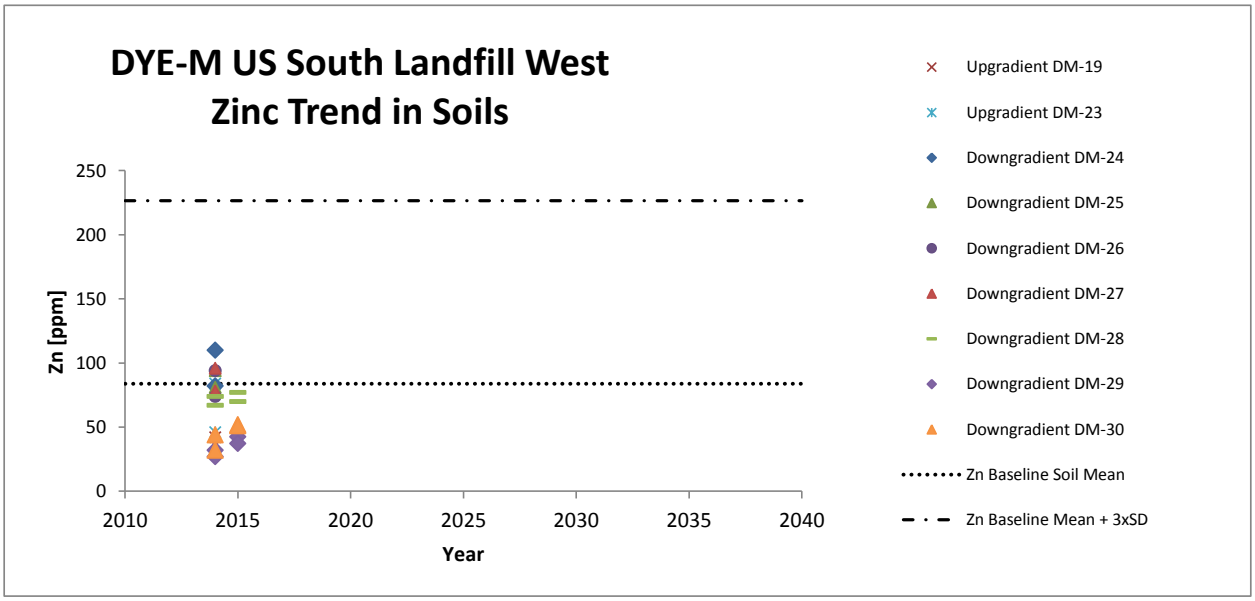


*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.

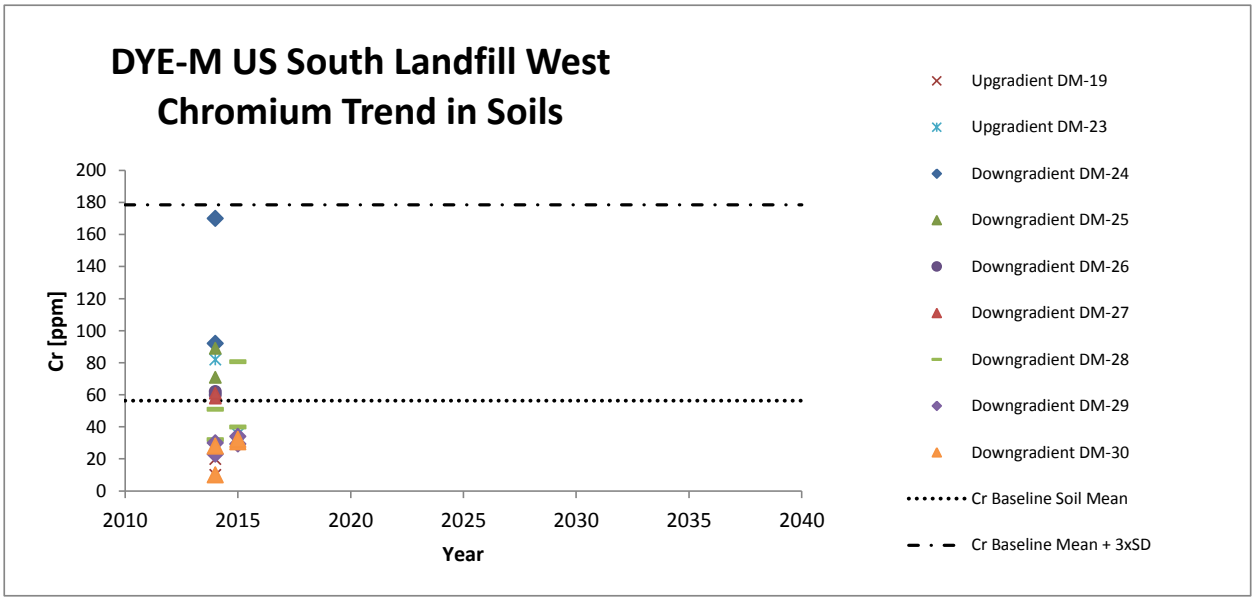
DYE-M US South Landfill West Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

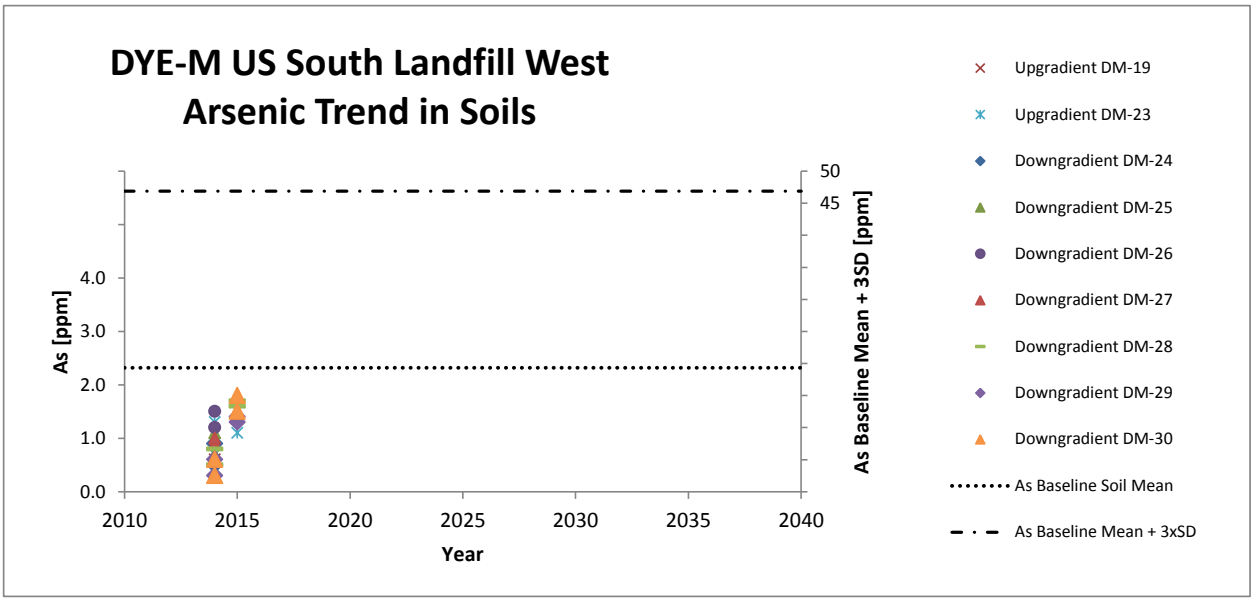


*Pb Baseline Arithmetic Mean is equal to the baseline detection limit

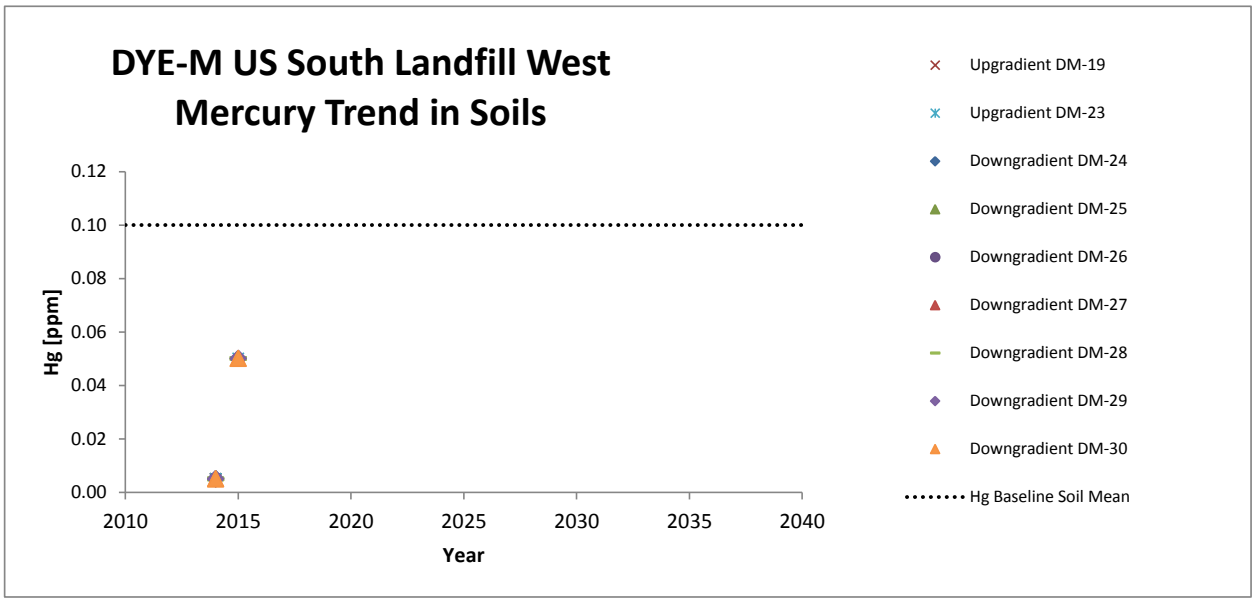


DYE-M US South Landfill West Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

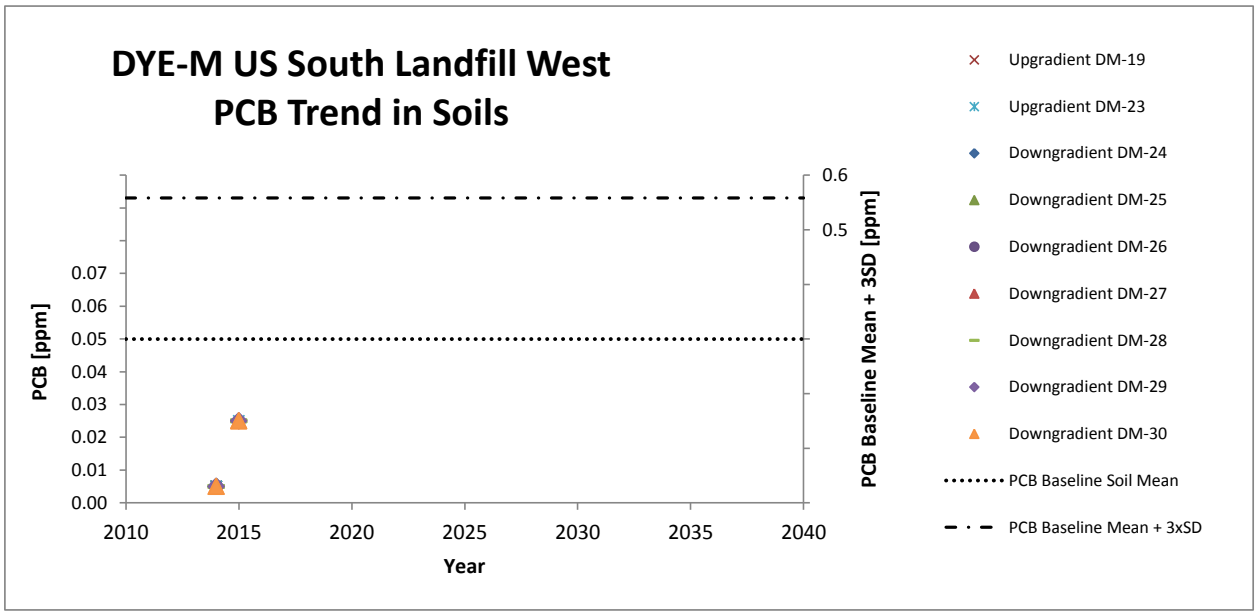




DYE-M US South Landfill West Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

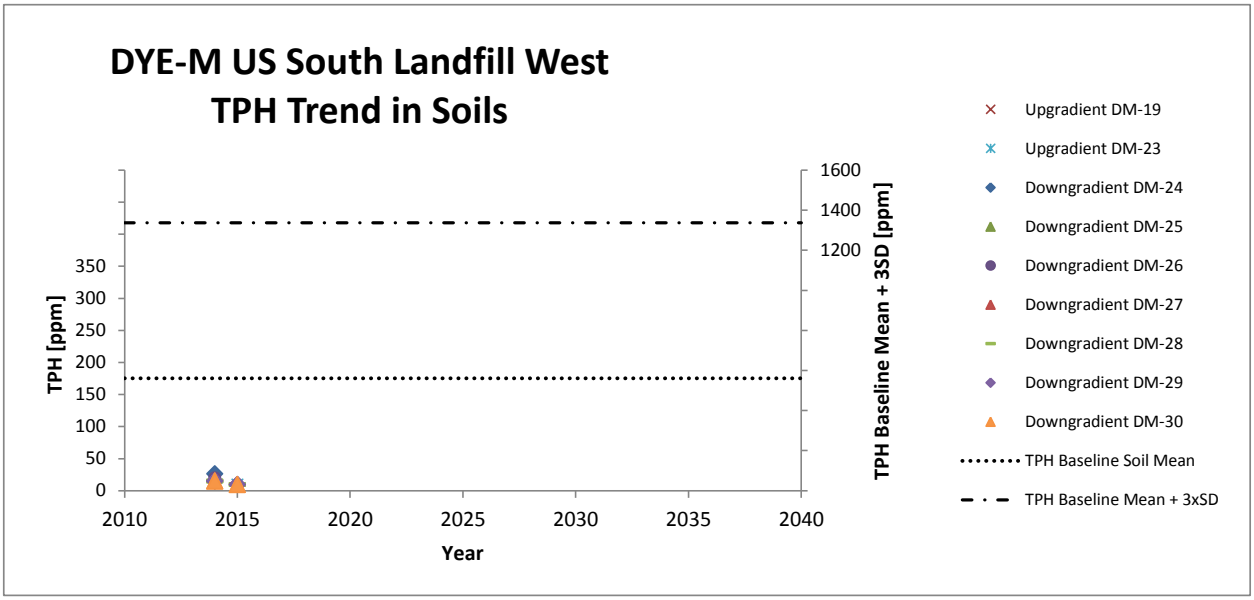


*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.
Hg Baseline SD = 0



*PCB Baseline Arithmetic Mean is equal to the baseline detection limit.

DYE-M US South Landfill West Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
Background Data - Arithmetic Mean						60	141	20	1.0	10	70	90	1.0	0.50	0.0002				N/A
Baseline Data - Arithmetic Mean						**68**	**61**	**16**	**1.0**	**10**	**115**	**133**	**1.3**	**0.1**	**0.1**	**30**	**10**	**10**	**138**
Baseline Data - Standard Deviation						30	48	6.9	0.40	16	46	59	2.3	0.0071	0.12	5.4	85	69	357
Baseline Data Mean + 3xStandard Deviation						157	203	37	2.2	57	254	310	8.3	0.12	0.46	46	264	217	1208
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
*DEW Line Cleanup **Site Specific** Tier II Criteria & Hydrocarbon Action Level*						*296*	*2100*	*153*	*5*	*500*	*500*	*513*	*30*	*2*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	DM-35 surface																		
14-8438	DM-35	2014	Year 1	Phase I	5-10	50	**150**	**23**	<1.0	<10	44	53	0.6	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-35	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-35 depth																		
14-8440/41	DM-35	2014	Year 1	Phase I	45-50	25	**76**	12	<1.0	**11**	45	41	1.0	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-35	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-39 surface																		
14-8427	DM-39	2014	Year 1	Phase I	5-10	**95**	37	11	<1.0	<10	**147**	**160**	**1.6**	<0.010	<0.010	<10	<10	<10	15
DM-39 (0-15)	DM-39	2015	Year 3	Phase I	0-15	**169**	29.3	11.3	<0.5	**10.7**	**153**	**187**	**1.9**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-39 depth																		
14-8428	DM-39	2014	Year 1	Phase I	45-50	**110**	37	11	<1.0	<10	**154**	**170**	**2**	<0.010	<0.010	<10	<10	<10	15
DM-39 (40-50)	DM-39	2015	Year 3	Phase I	40-50	**111**	35	13	<0.5	8.4	**126**	**172**	**1.9**	<0.1	<0.05	<7	**48**	<8	55.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-40 surface																		
14-8367	DM-40	2014	Year 1	Phase I	5-10	**96.5**	51	11	<1.0	**11**	**158**	**200**	**2.7**	0.02	<0.010	<10	<10	<10	15
DM-40 (0-15) (Dup Avg)	DM-40	2015	Year 3	Phase I	0-15	**166**	40	10.0	<0.5	**11**	**225**	*602*	**5**	<0.1	<0.05	<6	9	<8	16
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-40 depth																		
14-8368	DM-40	2014	Year 1	Phase I	45-50	**100**	48	11	<1.0	<10	**180**	**300**	**2.5**	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-40	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-47 surface																		
14-8342	DM-47	2014	Year 1	Phase I	5-10	**93**	**98**	**22**	<1.0	**11**	**190**	**290**	**3.2**	<0.010	<0.010	15	**2100**	**39**	**2144**
DM-47 (0-15)	DM-47	2015	Year 3	Phase I	0-15	**111**	**80.8**	**17.6**	<0.5	**14.8**	**139**	**193**	**4.1**	<0.1	<0.05	**187**	**3000**	**129**	*3316*
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-47 depth																		
14-8343	DM-47	2014	Year 1	Phase I	45-50	**83**	**110**	**17**	<1.0	**14**	**140**	**210**	**2.9**	<0.010	0.059	<10	**600**	**12**	**617**
DM-47 (40-50)	DM-47	2015	Year 3	Phase I	40-50	**95.8**	**66.2**	**21**	<0.5	**12.4**	**163**	**255**	**4**	<0.1	<0.05	<7	**79**	<8	86.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-50 surface																		
14-8338	DM-50	2014	Year 1	Phase I	5-10	**100**	**79**	14	<1.0	**24**	82	**260**	**3.3**	0.015	<0.010	<10	<10	<10	15
DM-50 (0-15)	DM-50	2015	Year 3	Phase I	0-15	**89.9**	51.5	11.5	<0.5	**12.2**	82.3	**154**	**2.6**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-50 depth																		
14-8340/41	DM-50	2014	Year 1	Phase I	35-40	**120**	**74**	15	<1.0	**10**	99	**260**	**4.3**	<0.010	<0.010	<10	<10	<10	15
DM-50 (30-40)	DM-50	2015	Year 3	Phase I	30-40	**118**	55.6	13.2	<0.5	**13.8**	92.9	**186**	**4.2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-51 surface																		
14-8362	DM-51	2014	Year 1	Phase I	5-10	46	**62**	13	<1.0	**13**	86	110	**2**	<0.010	0.018	<10	<10	<10	15
DM-51 (0-15)	DM-51	2015	Year 3	Phase I	0-15	48.3	60.6	11.9	<0.5	**25.6**	107	104	**1.9**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-51 depth																		
14-8363	DM-51	2014	Year 1	Phase I	30-35	56	54	11	<1.0	**23**	100	130	**1.7**	<0.010	0.066	19	**1500**	**390**	**1909**
Not sampled - refusal	DM-51	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
																			#N/A
	DM-52 surface																		
14-8364	DM-52	2014	Year 1	Phase I	5-10	**87**	**290**	**43**	<1.0	<10	61	75	0.6	<0.010	<0.010	<10	<10	<10	15
DM-52 (0-15)	DM-52	2015	Year 3	Phase I	0-15	56.8	**116**	**28.2**	<0.5	5.6	42.9	44.2	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-52 depth																		
14-8365	DM-52	2014	Year 1	Phase I	40-45	**78**	**220**	**34**	<1.0	<10	55	61	0.7	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-52	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
Downgradient																			
	DM-31 surface																		
14-8433	DM-31	2014	Year 1	Phase I	5-10	57	30	9.1	<1.0	**27**	**118**	130	1	<0.010	<0.010	<10	<10	<10	15
DM-31 (0-15)	DM-31	2015	Year 3	Phase I	0-15	**76.4**	28.8	11.3	<0.5	8.1	**150**	**170**	1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-31 depth																		
14-8434	DM-31	2014	Year 1	Phase I	45-50	49	30	7.3	<1.0	<10	97	100	0.7	<0.010	<0.010	<10	<10	<10	15
DM-31 (30-40)	DM-31	2015	Year 3	Phase I	30-40	61.5	32.9	12.3	<0.5	8.5	**138**	**165**	1.1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-32 surface																		
14-8430/31	DM-32	2014	Year 1	Phase I	5-10	66	33	9.9	<1.0	<10	115	**150**	**2.8**	<0.010	<0.010	<10	<10	<10	15
DM-32 (0-15)	DM-32	2015	Year 3	Phase I	0-15	**152**	46.9	15	<0.5	**50.8**	**138**	**282**	**3.1**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-32 depth																		0
14-8432	DM-32	2014	Year 1	Phase I	45-50	**90**	30	8.4	<1.0	<10	108	**150**	**5.3**	<0.010	<0.010	<10	<10	<10	15
DM-32 (20-30)	DM-32	2015	Year 3	Phase I	20-30	**120**	36	11.6	<0.5	**26.2**	**117**	**223**	**2.3**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-33 surface																		
14-8375	DM-33	2014	Year 1	Phase I	5-10	24	45	11	<1.0	<10	60	56	0.6	<0.010	<0.010	<10	<10	<10	15
DM-33 (0-15)	DM-33	2015	Year 3	Phase I	0-15	35.4	47.8	12.3	<0.5	5.7	57.3	70.9	**1.5**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-33 depth																		
14-8377	DM-33	2014	Year 1	Phase I	45-50	27	**63**	11	<1.0	<10	60	60	0.8	<0.010	<0.010	<10	<10	<10	15
DM-33 (20-30)	DM-33	2015	Year 3	Phase I	20-30	36.1	33	10.2	<0.5	4.7	54.9	67.3	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-34 surface																		
14-8378	DM-34	2014	Year 1	Phase I	5-10	30	55	16	<1.0	<10	65	42	1.1	<0.010	<0.010	<10	<10	<10	15
DM-34 (0-15) (Dup Avg)	DM-34	2015	Year 3	Phase I	0-15	15	53	9	<0.5	5	36	28	<1	<0.1	<0.1	<6	<4	<8	9
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-34 depth																		
14-8380/81	DM-34	2014	Year 1	Phase I	45-50	25	**65**	16	<1.0	<10	58	37	0.9	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-34	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-36 surface																		
14-8442	DM-36	2014	Year 1	Phase I	5-10	**98**	48	13	<1.0	**13**	**135**	**180**	1.2	<0.010	<0.010	<10	<10	<10	15
Not sampled - frozen	DM-36	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-36 depth																		
14-8443	DM-36	2014	Year 1	Phase I	45-50	**93**	38	10	<1.0	**12**	106	**140**	**2.9**	<0.010	<0.010	<10	**19**	<10	29
Not sampled - frozen	DM-36	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-37 surface																		
14-8435	DM-37	2014	Year 1	Phase I	5-10	53	37	10.1	<1.0	<10	106	130	**1.4**	<0.010	<0.010	<10	<10	<10	15
DM-37 (0-15)	DM-37	2015	Year 3	Phase I	0-15	55	35.3	12.3	<0.5	8.5	103	**137**	**1.9**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-37 depth																		
14-8437	DM-37	2014	Year 1	Phase I	45-50	37	32	7.6	<1.0	<10	84	100	1.1	<0.010	<0.010	<10	<10	<10	15
DM-37 (30-40)	DM-37	2015	Year 3	Phase I	30-40	31.6	39.8	12.7	<0.5	5.1	93	125	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-38 surface																		
14-8382	DM-38	2014	Year 1	Phase I	5-10	58	**61**	15	<1.0	**94**	**284**	84	**1.7**	0.02	<0.010	<10	<10	<10	15
DM-38 (0-15)	DM-38	2015	Year 3	Phase I	0-15	**92.3**	47.9	14.6	<0.5	**124**	**308**	91.9	**1.5**	<0.1	<0.05	<7	<4	**83**	88.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-38 depth																		
14-8383	DM-38	2014	Year 1	Phase I	45-50	64	**63**	13	<1.0	**100**	**265**	76	**1.6**	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-38	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-41 surface																		
14-8370/71	DM-41	2014	Year 1	Phase I	5-10	**69**	44	11	<1.0	**34**	**155**	125	1.3	<0.010	<0.010	<10	<10	<10	15
DM-41 (0-15)	DM-41	2015	Year 3	Phase I	0-15	**171**	51.8	15.1	<0.5	**27.5**	**351**	**178**	**1.4**	<0.1	<0.05	<7	<4	**43**	48.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-41 depth																		
14-8372	DM-41	2014	Year 1	Phase I	35-40	**76**	**73**	16	<1.0	**15**	**170**	**180**	**1.6**	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-41	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-42 surface																		
14-8373	DM-42	2014	Year 1	Phase I	5-10	**84**	**150**	**41**	<1.0	<10	**180**	120	**3.8**	<0.010	<0.010	<10	<10	<10	15
DM-42 (0-15)	DM-42	2015	Year 3	Phase I	0-15	**95**	**118**	**43.7**	0.6	**10.5**	**173**	**151**	**3.2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-42 depth																		
14-8374	DM-42	2014	Year 1	Phase I	50-55	**69**	42	12	<1.0	<10	**130**	**140**	**1.5**	<0.010	<0.010	<10	<10	<10	15
DM-42 (40-50)	DM-42	2015	Year 3	Phase I	40-50	**98.7**	50.5	**18.5**	<0.5	8.5	**152**	**191**	**1.8**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-43 surface																		
14-8350/51	DM-43	2014	Year 1	Phase I	5-10	40	45	12	<1.0	<10	73	110	1.1	<0.010	<0.010	<10	<10	<10	15
DM-43 (0-15)	DM-43	2015	Year 3	Phase I	0-15	48.9	44.4	15.4	<0.5	5.9	79.8	127	1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-43 depth																		
14-8352	DM-43	2014	Year 1	Phase I	45-50	38	48	12	<1.0	<10	79	110	0.9	<0.010	<0.010	<10	<10	<10	15
DM-43 (20-30) (Dup Avg	DM-43	2015	Year 3	Phase I	20-30	38	36	12	<0.5	4	72	112	1	<0.1	<0.05	<6	<4	<8	9
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-44 surface																		
14-8353	DM-44	2014	Year 1	Phase I	5-10	**110**	41	13	<1.0	<10	**180**	**190**	**3.7**	<0.010	<0.010	<10	<10	<10	15
DM-44 (0-15)	DM-44	2015	Year 3	Phase I	0-15	**244**	26.4	10.1	0.6	**13.3**	**222**	**239**	**7**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-44 depth																		
14-8354	DM-44	2014	Year 1	Phase I	45-50	**190**	51	11	<1.0	**11**	**170**	**180**	**4.9**	0.023	<0.010	<10	<10	**15**	25
Not sampled - refusal	DM-44	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-45 surface																		
14-8355	DM-45	2014	Year 1	Phase I	5-10	**110**	**98**	**21**	<1.0	**10**	**160**	**170**	**2.2**	0.03	<0.010	<10	<10	<10	15
DM-45 (0-15)	DM-45	2015	Year 3	Phase I	0-15	**141**	**103**	**26.5**	<0.5	**11.5**	**158**	**178**	**1.7**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-45 depth																		
14-8357	DM-45	2014	Year 1	Phase I	45-50	**100**	**100**	**17**	<1.0	**11**	**160**	**190**	**1.8**	0.024	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-45	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-46 surface																		
14-8358	DM-46	2014	Year 1	Phase I	5-10	**70**	**81**	14	<1.0	**18**	100	**150**	**3.9**	<0.010	<0.010	<10	<10	**13**	23
DM-46 (0-15) (Dup Avg)	DM-46	2015	Year 3	Phase I	0-15	**122**	54	14	<0.5	**11**	**144**	**161**	**5**	<0.1	<0.05	<6	<4	<8	9
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-46 depth																		
14-8360/61	DM-46	2014	Year 1	Phase I	45-50	**160**	46	7.9	<1.0	**11**	**160**	**160**	**11**	<0.010	<0.010	<10	<10	<10	15
DM-46 (40-50)	DM-46	2015	Year 3	Phase I	40-50	**139**	44.3	11.5	<0.5	**12.4**	**128**	**158**	**7.5**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-48 surface																		
14-8347	DM-48	2014	Year 1	Phase I	5-10	**130**	**320**	**36**	<1.0	**16**	**140**	**450**	**15**	<0.010	<0.010	<10	<10	**16**	26
DM-48 (0-15) (Dup Avg)	DM-48	2015	Year 3	Phase I	0-15	**114**	**357**	**51**	<0.5	**28**	**140**	**487**	**20**	<0.1	0.05	<6	**13**	**108**	124
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-48 depth																		
14-8348	DM-48	2014	Year 1	Phase I	45-50	**130**	**190**	**24**	<1.0	**12**	**130**	**280**	**12**	0.017	<0.010	<10	<10	<10	15
DM-48 (40-50)	DM-48	2015	Year 3	Phase I	40-50	**152**	**221**	**39.3**	<0.5	**16.8**	**131**	**311**	**14.8**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US West Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Cd* (mg/kg)	Pb* (mg/kg)	Zn (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB* (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34* (mg/kg)
	DM-49 surface																		
14-8344	DM-49	2014	Year 1	Phase I	5-10	**120**	37	9	<1.0	<10	**150**	**220**	1	<0.010	<0.010	14	**230**	<10	**249**
DM-49 (0-15) (Dup Avg)	DM-49	2015	Year 3	Phase I	0-15	**107**	**82**	**18**	<0.5	**14**	**147**	**220**	**3**	<0.05	<0.1	<6	**77**	**63**	**142.5**
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-49 depth																		
14-8345	DM-49	2014	Year 1	Phase I	45-50	**130**	31	8.3	<1.0	<10	**150**	**200**	0.9	<0.010	<0.010	<10	<10	<10	15
DM-49 (40-50)	DM-49	2015	Year 3	Phase I	40-50	**90.6**	**87.6**	**20.5**	<0.5	**11.9**	114	**174**	**1.4**	<0.1	<0.05	<7	**90**	**37**	130.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

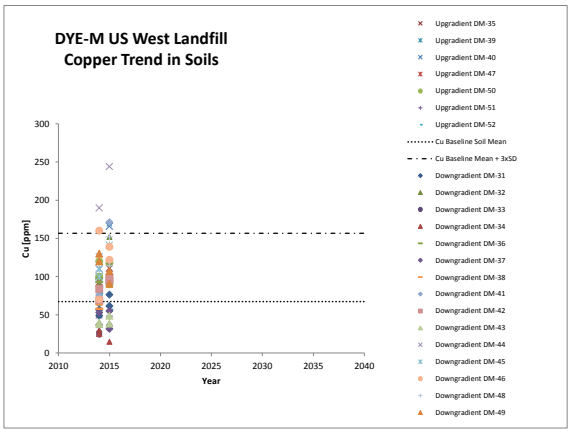
Legend

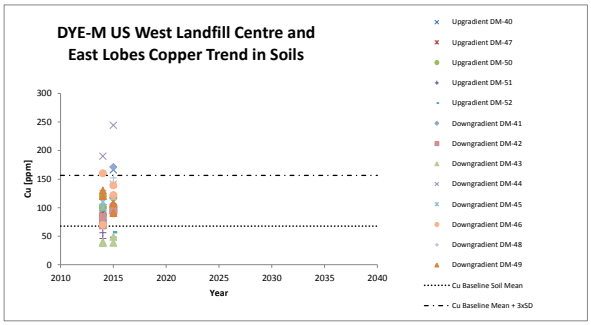
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

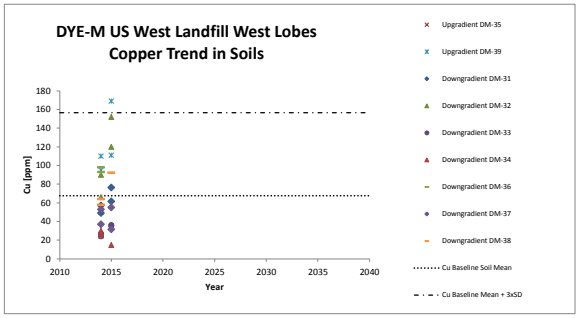
DYE-M US West Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

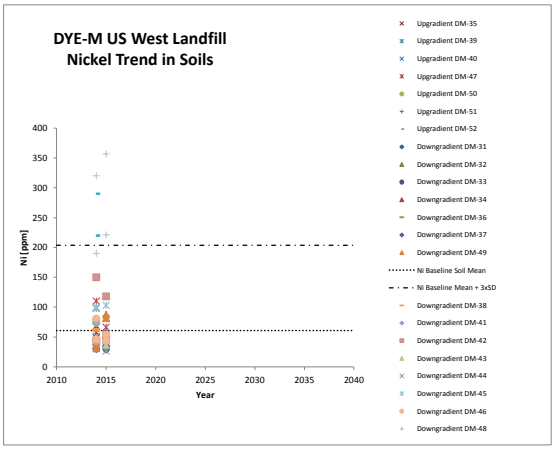
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

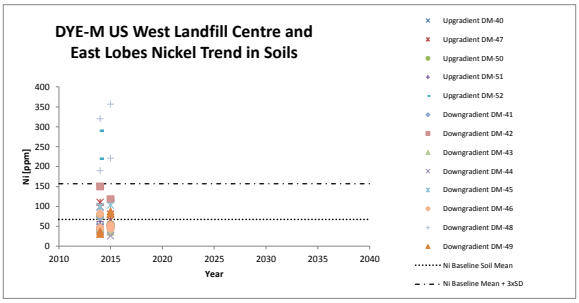


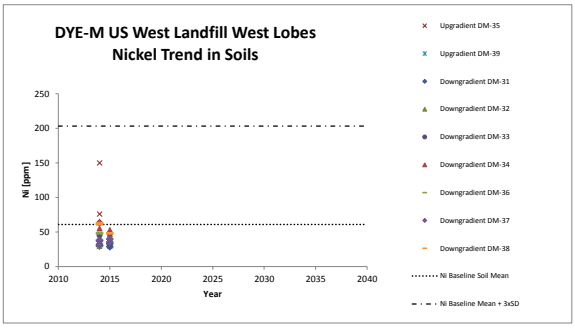


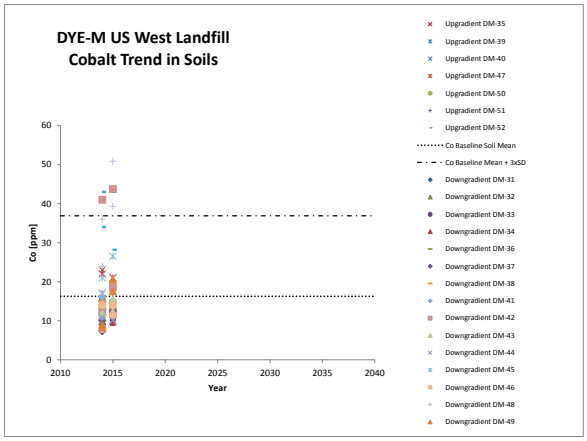




DYE-M US West Landfill Centre and







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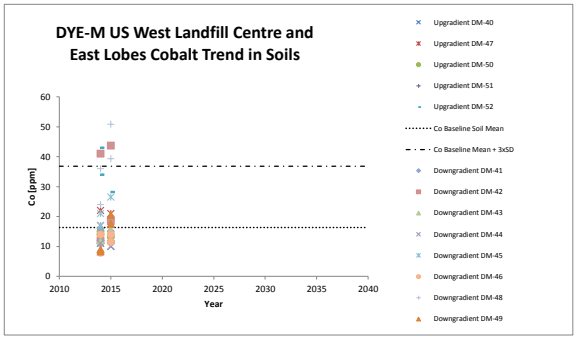
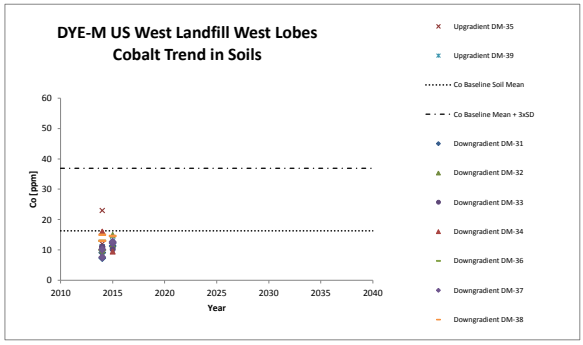
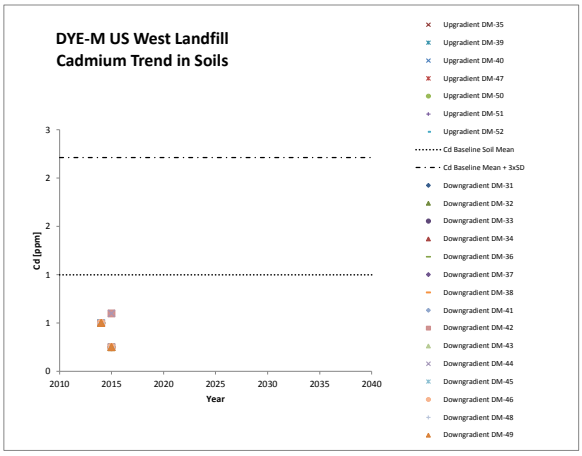
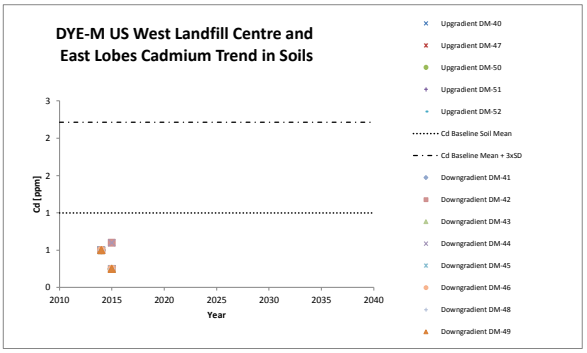


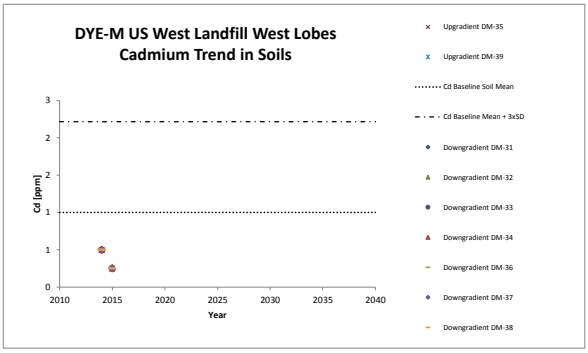


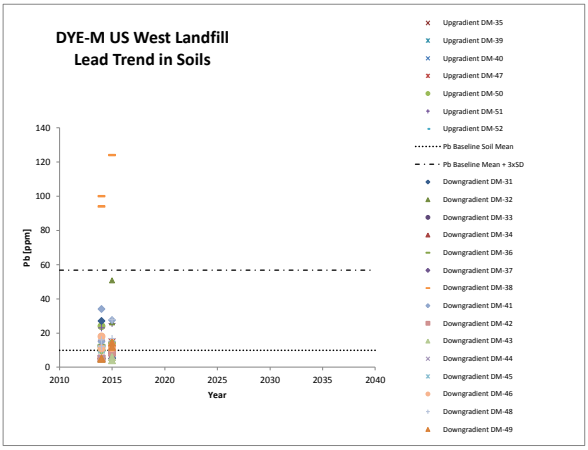


*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.

DYE-M US West Landfill Centre and

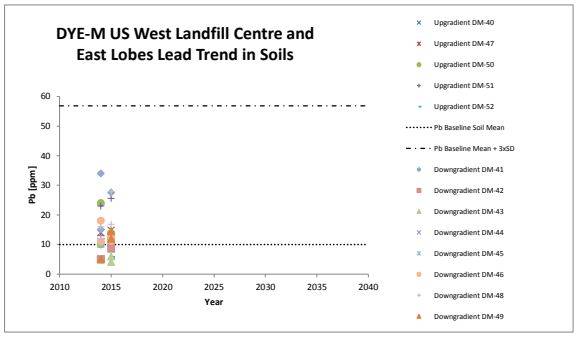


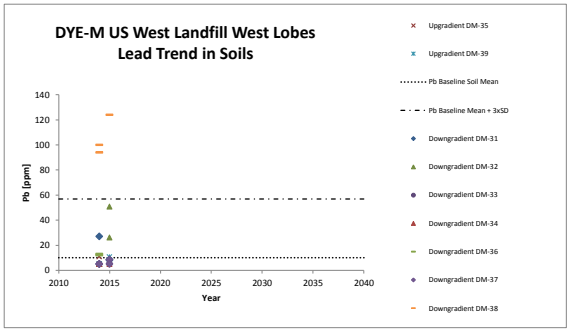


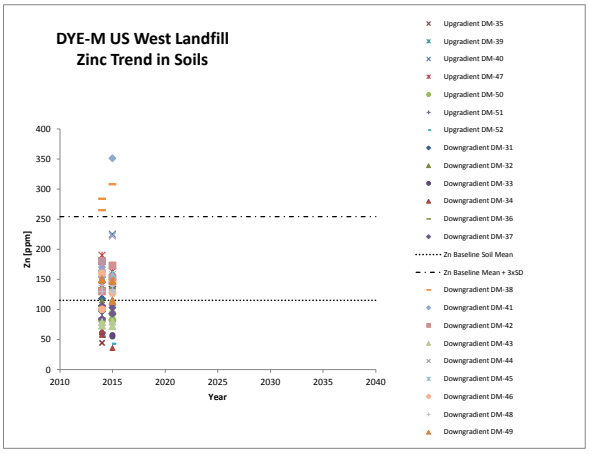


*Pb Baseline Arithmetic Mean is equal to the baseline detection limit

DYE-M US West Landfill Centre and







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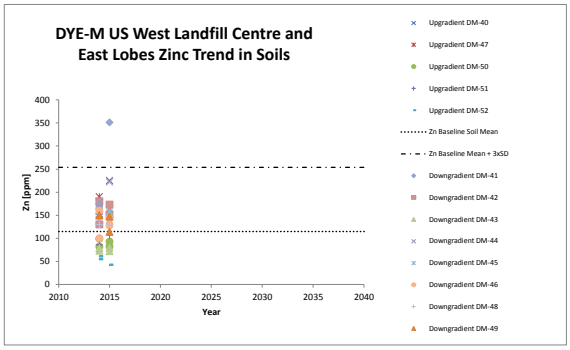
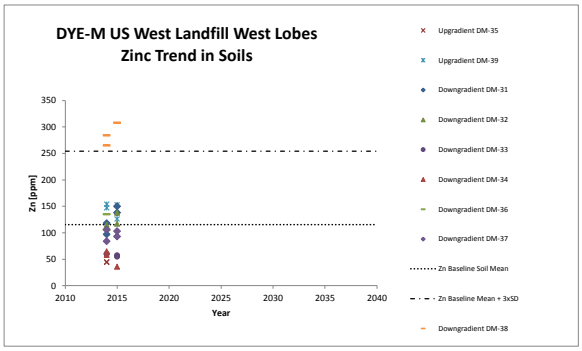
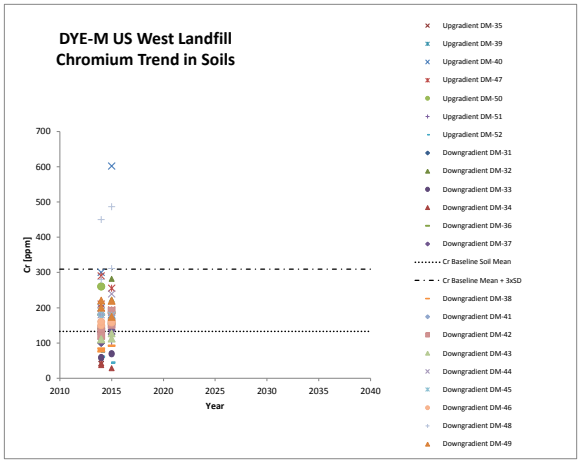
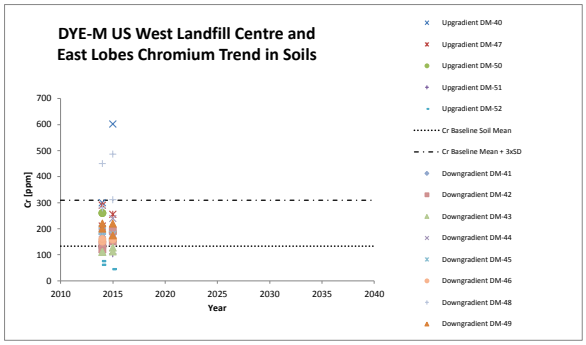
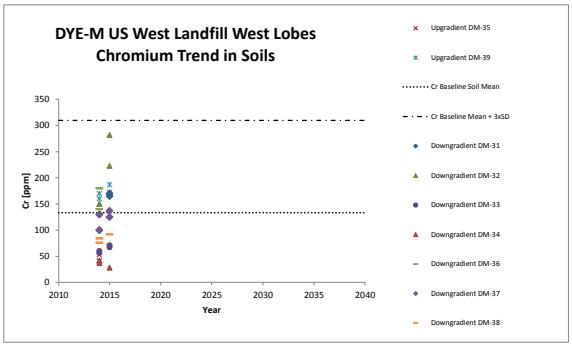


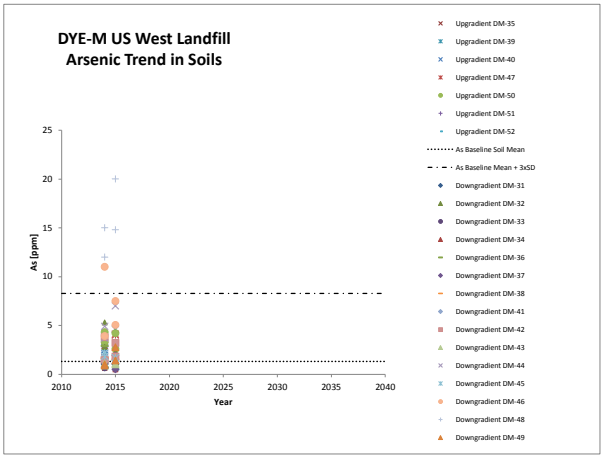




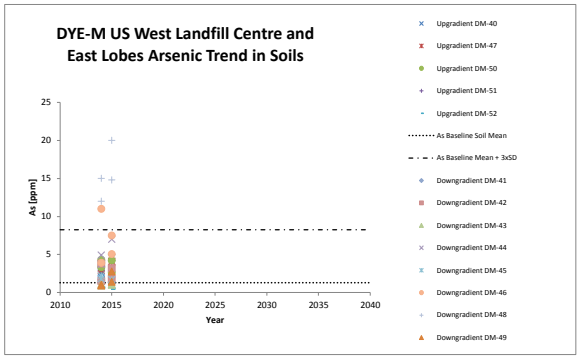
DYE-M US West Landfill Centre and

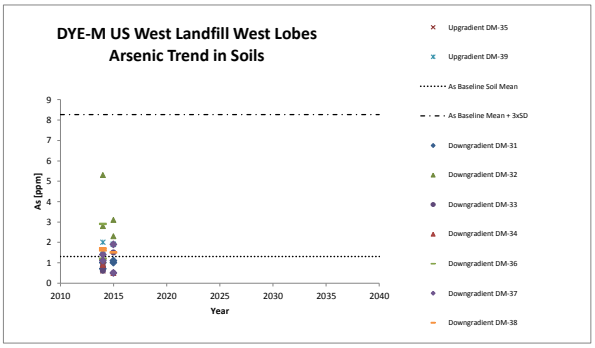


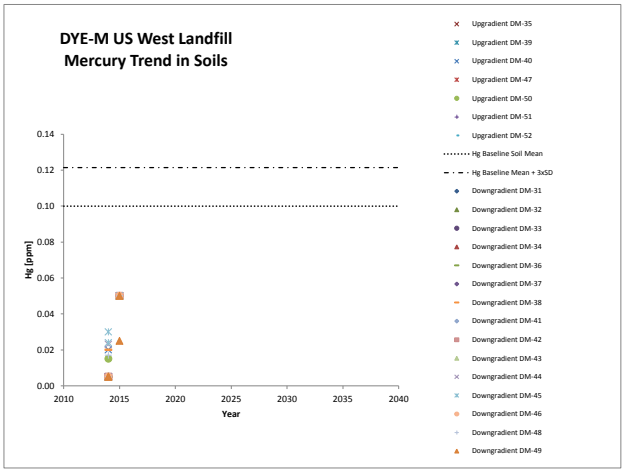




DYE-M US West Landfill Centre and

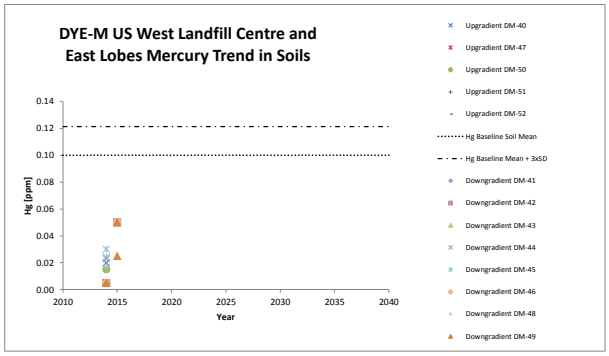


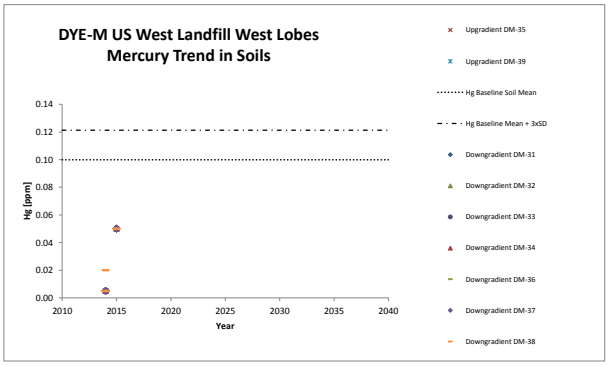


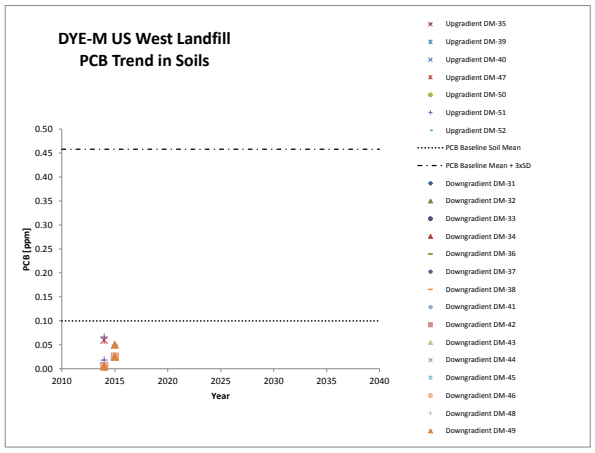


*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.

DYE-M US West Landfill Centre and

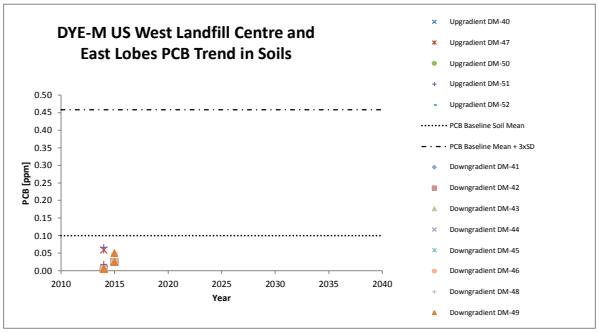


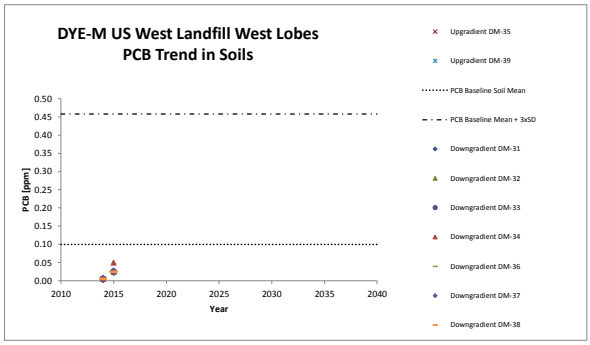


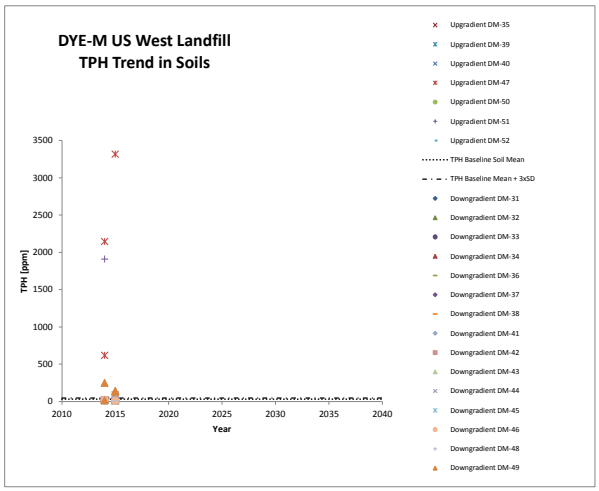


*PCB Baseline Arithmetic Mean is equal to the baseline detection limit.

DYE-M US West Landfill Centre and

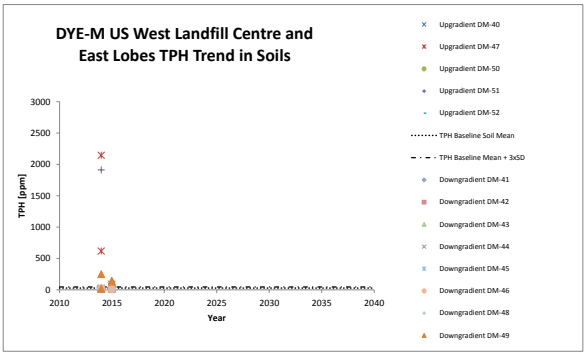


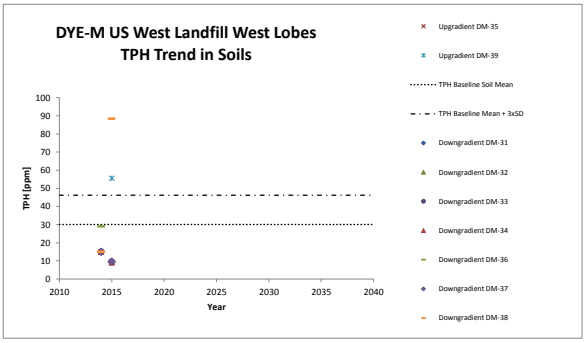




^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

DYE-M US West Landfill Centre and





DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Background Data - Arithmetic Mean						60	141	20	1.0	10	70	90	1.0	0.5	0.002				N/A
Baseline Data - Arithmetic Mean						**37**	**75**	**17**	**1.0**	**10**	**75**	**72**	**1.0**	**0.1**	**0.05**	**30**	**10**	**10**	**324**
Baseline Data - Standard Deviation						17	25	6.3	0.15	24	33	36	0.6	0.0053	0.13	77	293	265	576
Baseline Data Mean + 3xStandard Deviation						88	150	35	1.4	82	175	179	2.8	0.12	0.44	261	888	806	2051
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																			
DEW Line Cleanup Tier I Criteria										*200*					*1*				
*DEW Line Cleanup **Site Specific** Tier II Criteria & Hydrocarbon Action Level*						*296*	*2100*	*153*	*5*	*500*	*500*	*250*	*30*	*2*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	DM-50 surface																		
14-8338	DM-50	2014	Year 1	Phase I	5-10	**100**	**79**	14	<1.0	**24**	**82**	*260*	**3.3**	0.015	<0.010	<10	<10	<10	15
DM-50 (0-15)	DM-50	2015	Year 3	Phase I	0-15	**89.9**	51.5	11.5	<0.5	**12.2**	**82.3**	**154**	**2.6**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-50 depth																		
14-8340/41	DM-50	2014	Year 1	Phase I	35-40	**120**	74	15	<1.0	**10**	**99**	*260*	**4.3**	<0.010	<0.010	<10	<10	<10	15
DM-50 (30-40)	DM-50	2015	Year 3	Phase I	30-40	**118**	55.6	13.2	<0.5	**13.8**	**92.9**	**186**	**4.2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-51 surface																		
14-8362	DM-51	2014	Year 1	Phase I	5-10	**46**	62	13	<1.0	**13**	**86**	**110**	**2.0**	<0.010	0.018	<10	<10	<10	15
DM-51 (0-15)	DM-51	2015	Year 3	Phase I	0-15	**48.3**	60.6	11.9	<0.5	**25.6**	**107**	**104**	**1.9**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-51 depth																		
14-8363	DM-51	2014	Year 1	Phase I	30-35	**56**	54	11	<1.0	**23**	**100**	**130**	**1.7**	<0.010	**0.066**	19	**1500**	**390**	**1909**
Not sampled - refusal	DM-51	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-53 surface																		
14-8395	DM-53	2014	Year 1	Phase I	5-10	32	54	10	<1.0	**12**	70	**87**	**1.4**	<0.010	0.013	<10	<10	<10	15
DM-53 (0-15)	DM-53	2015	Year 3	Phase I	0-15	32	44.3	10	<0.5	**11**	68.2	**79.8**	**1**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-53 depth																		
14-8397	DM-53	2014	Year 1	Phase I	45-50	**50**	65	12	<1.0	**15**	**89**	**130**	**2.1**	<0.010	<0.010	<10	<10	<10	15
DM-53 (40-50)	DM-53	2015	Year 3	Phase I	40-50	**65.6**	63.8	14.2	<0.5	**17.8**	**113**	**155**	**1.7**	<0.1	<0.05	<7	**13**	**82**	98.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-60 surface																		
14-8410/11	DM-60	2014	Year 1	Phase I	5-10	25.5	**85**	16	<1.0	<10	58.5	51.5	0.75	<0.010	<0.010	<10	<10	<10	15
DM-60 (0-15)	DM-60	2015	Year 3	Phase I	0-15	27.1	**87.5**	**18.3**	<0.5	9.1	61	51.5	**1.3**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-60 depth																		
14-8412	DM-60	2014	Year 1	Phase I	40-45	18	**78**	14	<1.0	**10**	49	36	**1**	<0.010	<0.010	<10	<10	<10	15
DM-60 (40-50)	DM-60	2015	Year 3	Phase I	40-50	25.3	**101**	**16.9**	<0.5	7	48.5	52.5	**1.2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
Downgradient																			0
	DM-54 surface																		0
14-8393	DM-54	2014	Year 1	Phase I	5-10	35	**93**	15	<1.0	**22**	66	59	**1.6**	<0.010	<0.010	<10	<10	<10	15
DM-54 (0-15)	DM-54	2015	Year 3	Phase I	0-15	36.5	63.4	13.8	<0.5	**32.9**	65.2	54.4	**2.6**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-54 depth																		0
14-8394	DM-54	2014	Year 1	Phase I	35-40	34	**82**	15	<1.0	**22**	66	56	**1.5**	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-54	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-55 surface																		0
14-8384	DM-55	2014	Year 1	Phase I	5-10	**39**	**79**	16	<1.0	**28**	**81**	63	**2.4**	<0.010	<0.010	<10	<10	<10	15
DM-55 (0-15)	DM-55	2015	Year 3	Phase I	0-15	31.9	55.1	16.5	<0.5	**23.1**	67.4	54.8	**5.6**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-55 depth																		0
14-8385	DM-55	2014	Year 1	Phase I	45-50	36	72	15	<1.0	**28**	**77**	56	**2.4**	<0.010	<0.010	<10	<10	<10	15
DM-55 (30-40)	DM-55	2015	Year 3	Phase I	30-40	32	58.3	**16.9**	<0.5	**23.3**	69.7	58.7	**5.2**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-56 surface																		0
14-8387	DM-56	2014	Year 1	Phase I	5-10	36	**97**	15	<1.0	**16**	61	68	**1.5**	<0.010	<0.010	<10	<10	<10	15
DM-56 (0-15)	DM-56	2015	Year 3	Phase I	0-15	**41.8**	**102**	**17.5**	<0.5	**14.2**	55.9	67.8	**1.7**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
																			#N/A
	DM-56 depth																		0
14-8388	DM-56	2014	Year 1	Phase I	45-50	32	**100**	15	<1.0	**13**	58	67	**1.1**	<0.010	<0.010	<10	<10	<10	15
Not sampled - refusal	DM-56	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-57 surface																		0
14-8390/91	DM-57	2014	Year 1	Phase I	5-10	36	**83.5**	12	<1.0	<10	64	62.5	**1.25**	<0.010	<0.010	<10	<10	<10	15
DM-57 (0-15)	DM-57	2015	Year 3	Phase I	0-15	32.9	**81.9**	14.7	<0.5	9.7	62	62.6	**1.4**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-57 depth																		0
14-8392	DM-57	2014	Year 1	Phase I	40-45	27	**94**	13	<1.0	<10	56	54	**1**	<0.010	<0.010	<10	<10	<10	15
DM-57 (40-50)	DM-57	2015	Year 3	Phase I	40-50	34.6	**86.3**	15.4	<0.5	**10.2**	64.3	66.9	**1.7**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-58 surface																		0
14-8398	DM-58	2014	Year 1	Phase I	5-10	**42**	**110**	**18**	<1.0	**14**	**85**	**75**	**1.5**	<0.010	<0.010	<10	<10	<10	15
DM-58 (0-15)	DM-58	2015	Year 3	Phase I	0-15	**37.7**	**108**	**18.6**	<0.5	**12.8**	**85.5**	63.1	**1.9**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-58 depth																		0
14-8400/01	DM-58	2014	Year 1	Phase I	45-50	29.5	**94.5**	16	<1.0	**10**	60.5	56.5	**1**	<0.010	<0.010	<10	<10	<10	15
DM-58 (40-50) (Dup Av	DM-58	2015	Year 3	Phase I	40-50	**40**	**97**	**19**	<0.5	**14**	**111**	**75**	**2**	<0.1	<0.05	<6	<4	<8	9
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-59 surface																		0
14-8402	DM-59	2014	Year 1	Phase I	5-10	**37**	**100**	15	<1.0	**11**	55	48	0.8	<0.010	<0.010	<10	**210**	**29**	244
DM-59 (0-15)	DM-59	2015	Year 3	Phase I	0-15	**71.5**	**119**	**25.4**	<0.5	3.8	33.4	33.1	<1	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-59 depth																		
14-8403	DM-59	2014	Year 1	Phase I	40-45	**44**	71	11	<1.0	<10	43	37	0.6	<0.010	<0.010	28	**720**	**29**	**777**
Not sampled - refusal	DM-59	2015	Year 3	Phase I															#N/A
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-61 surface																		
14-8407	DM-61	2014	Year 1	Phase I	5-10	**46**	**81**	15	<1.0	<10	63	53	0.9	<0.010	<0.010	<10	<10	<10	15
DM-61 (0-15)	DM-61	2015	Year 3	Phase I	0-15	30.7	54.8	14.2	<0.5	**12.9**	57.7	50.2	**1.7**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-61 depth																		
14-8408	DM-61	2014	Year 1	Phase I	40-45	**44**	**97**	**18**	<1.0	<10	73	63	**1.2**	<0.010	<0.010	<10	<10	<10	15
DM-61 (20-30)	DM-61	2015	Year 3	Phase I	20-30	**54.4**	**91.5**	**21.5**	<0.5	**10.1**	54.2	44.2	**1.5**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

DYE-M US Pallet Line Landfill - Summary of Monitoring Soil Analytical Data

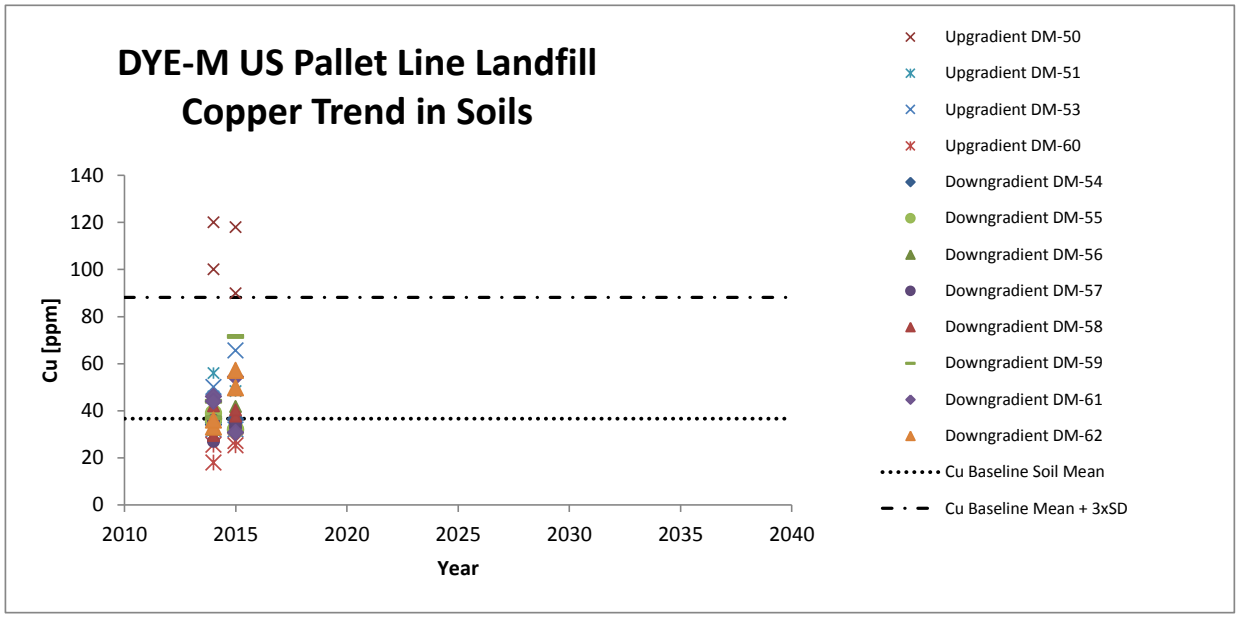
Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu (mg/kg)	Ni (mg/kg)	Co* (mg/kg)	Cd* (mg/kg)	Pb (mg/kg)	Zn* (mg/kg)	Cr* (mg/kg)	As (mg/kg)	Hg* (mg/kg)	Total PCB (mg/kg)	F1 C_6-C_{10} (mg/kg)	F2 C_{10}-C_{16} (mg/kg)	F3 C_{16}-C_{34} (mg/kg)	Modified TPH^ - Total C6-C34 (mg/kg)
	DM-62 surface																		
14-8404	DM-62	2014	Year 1	Phase I	5-10	33	**150**	**19**	<1.0	<10	46	53	**1.1**	<0.010	<0.010	<10	<10	<10	15
DM-62 (0-15)	DM-62	2015	Year 3	Phase I	0-15	**49.7**	**99.2**	**18.2**	<0.5	**11.8**	60.6	53.7	**1.4**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	DM-62 depth																		0
14-8405	DM-62	2014	Year 1	Phase I	40-45	36	**110**	16	<1.0	<10	51	53	0.9	<0.010	<0.010	<10	<10	<10	15
DM-62 (20-30)	DM-62	2015	Year 3	Phase I	20-30	**57.1**	**98.6**	**18.6**	<0.5	**13**	65.9	57.8	**1**	<0.1	<0.05	<7	<4	<8	9.5
			Year 5	Phase I															#N/A
			Year 7	Phase II															#N/A
			Year 10	Phase II															#N/A
			Year 15	Phase II															#N/A
			Year 25	Phase II															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

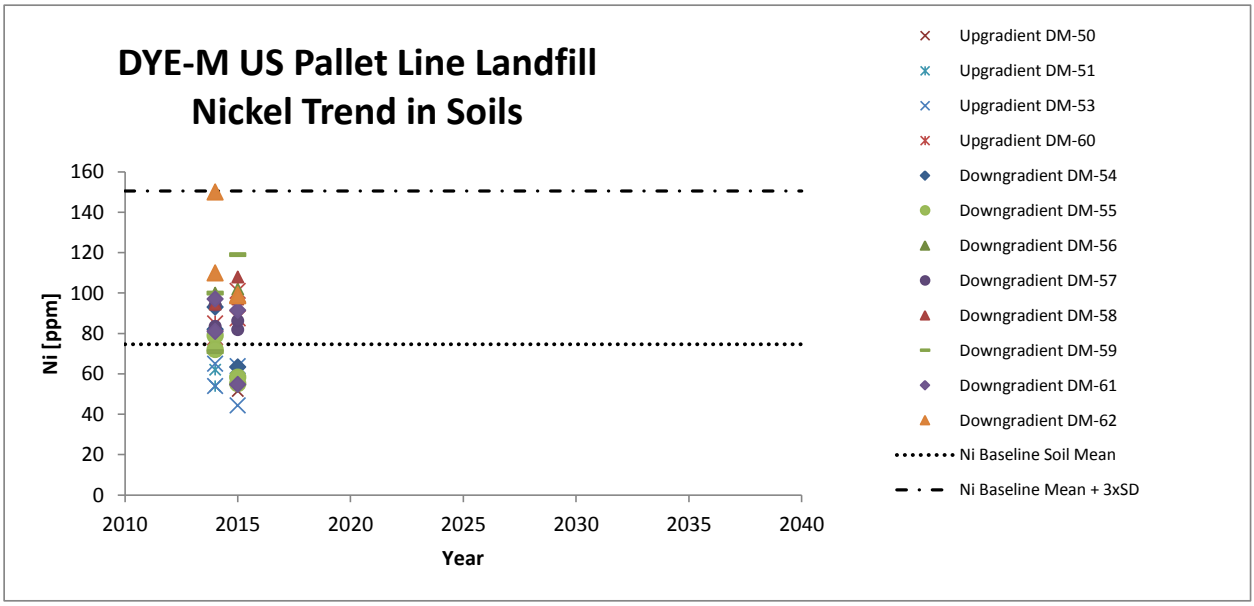
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

Legend	
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

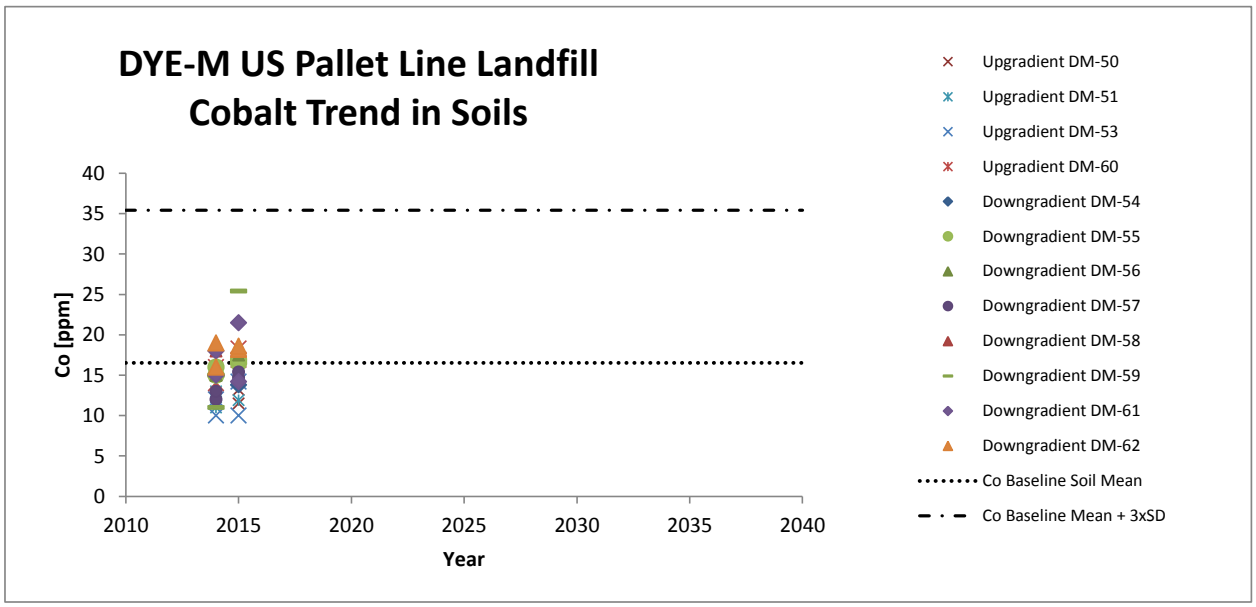
DYE-M US Pallet Line Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

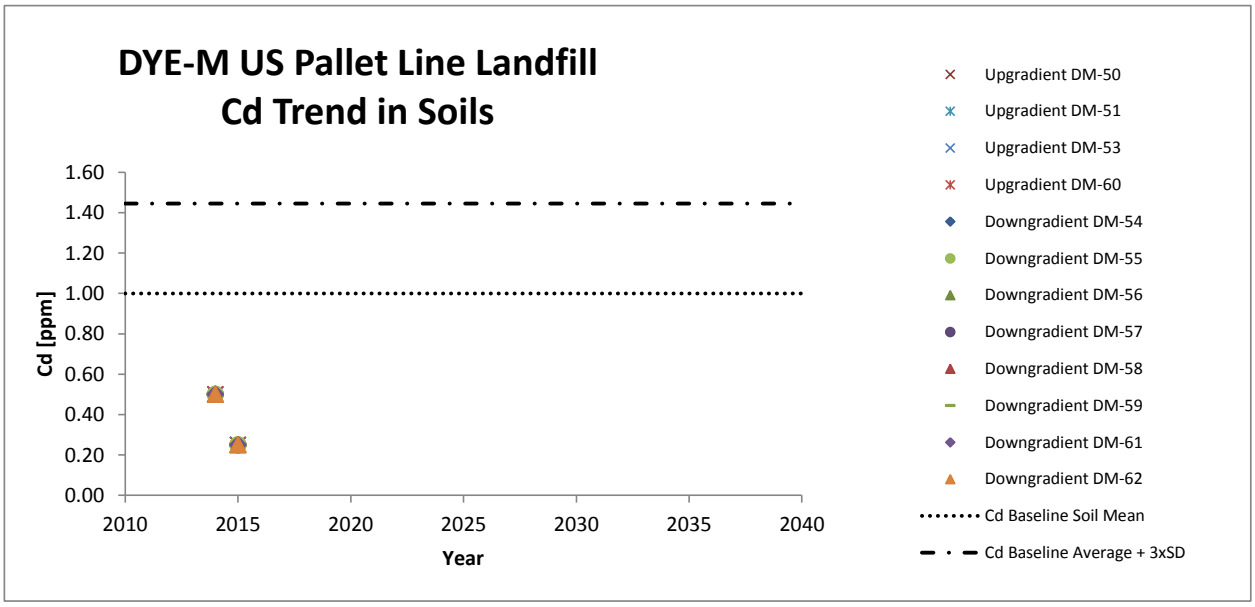
Where results are below detection, half of the detection limit has been used in the charts for the sample points. Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





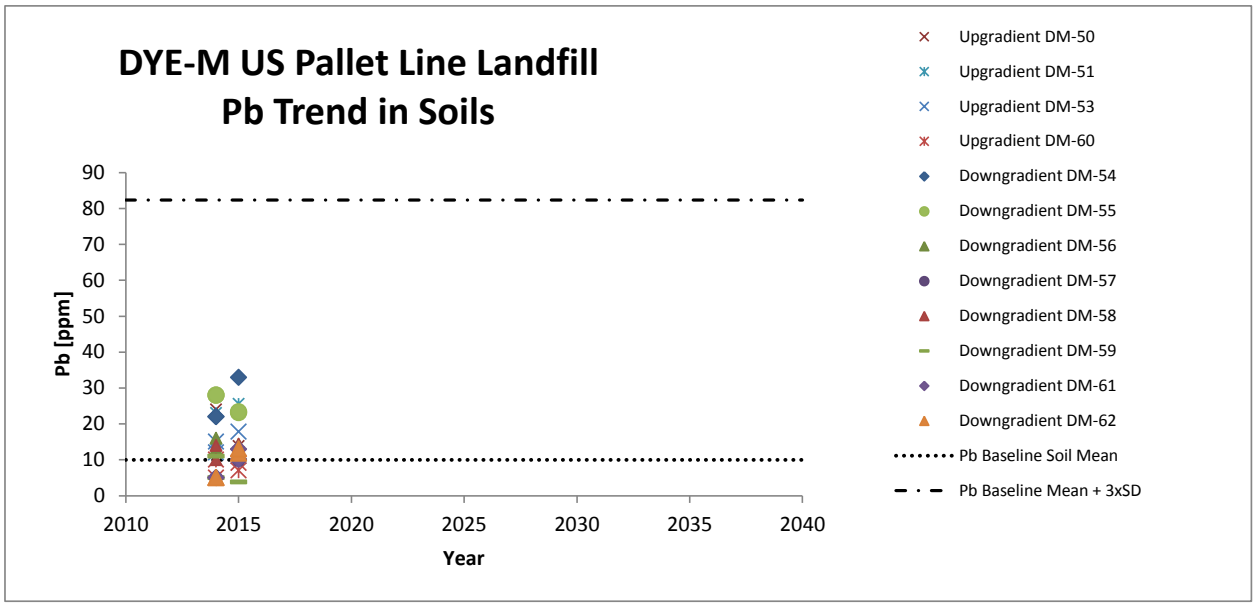
DYE-M US Pallet Line Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)





*Cd Baseline Mean is equal to the baseline detection limit

DYE-M US Pallet Line Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



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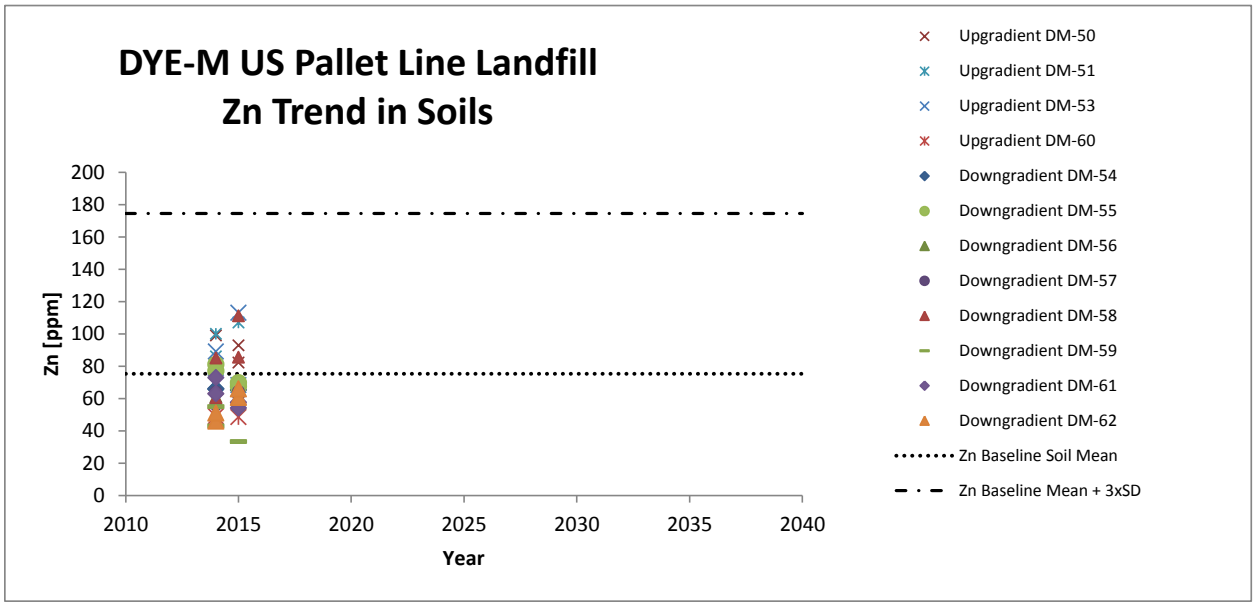
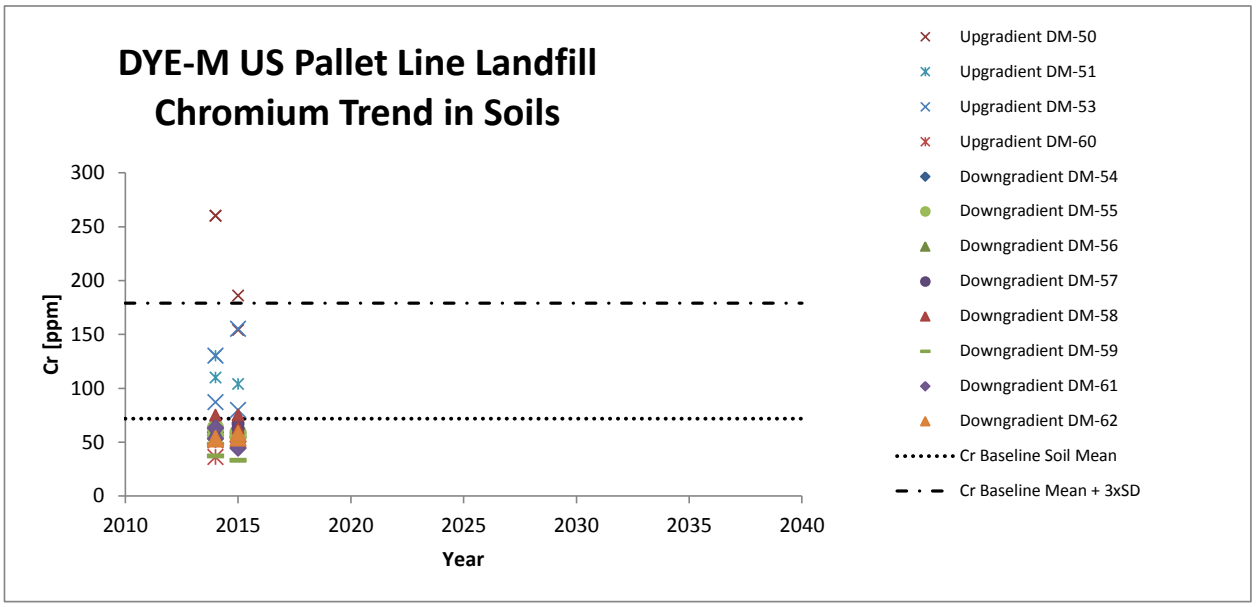
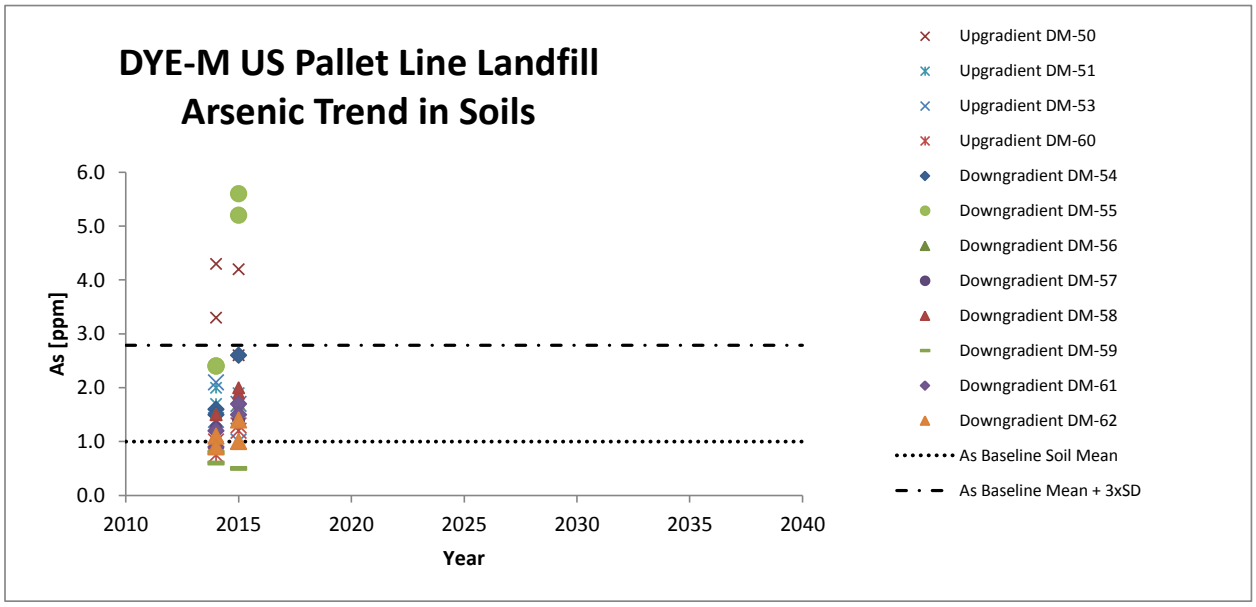


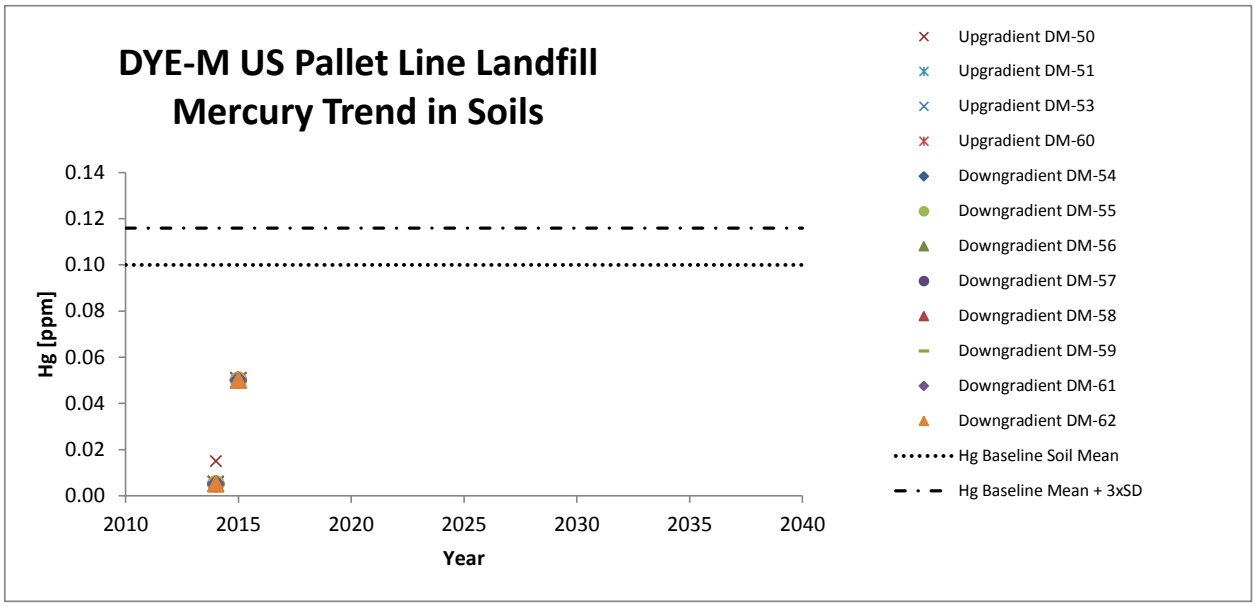
DYE-M US Pallet Line Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



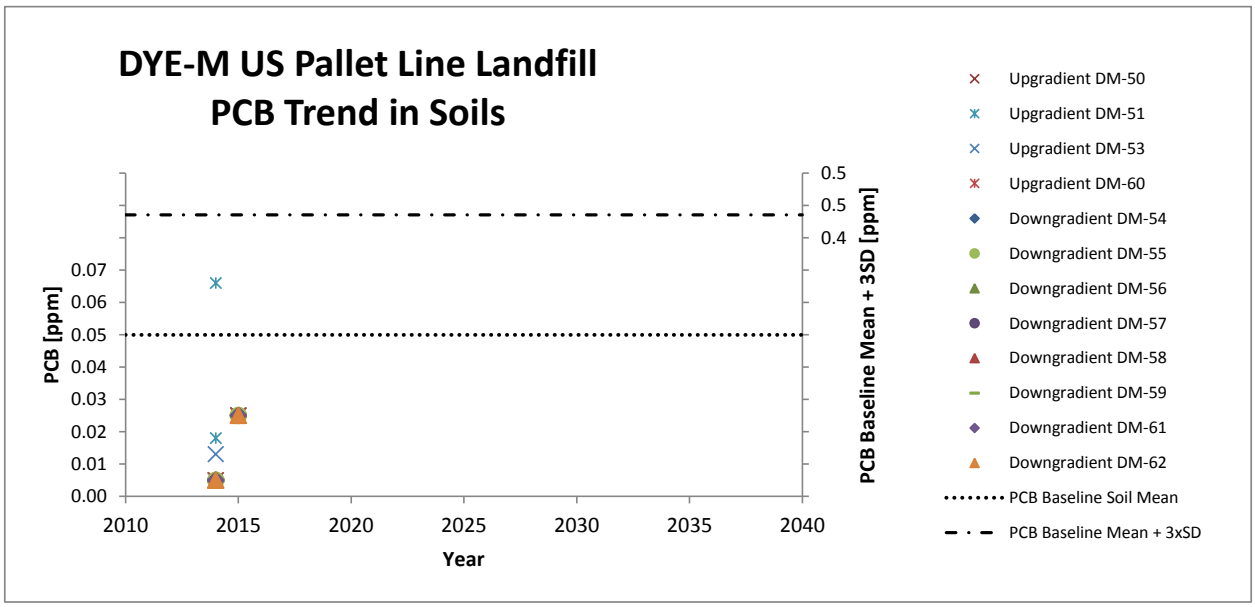


*As Baseline Mean is equal to the baseline detection limit

DYE-M US Pallet Line Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



*Hg Baseline Arithmetic Mean equals the baseline detection limit



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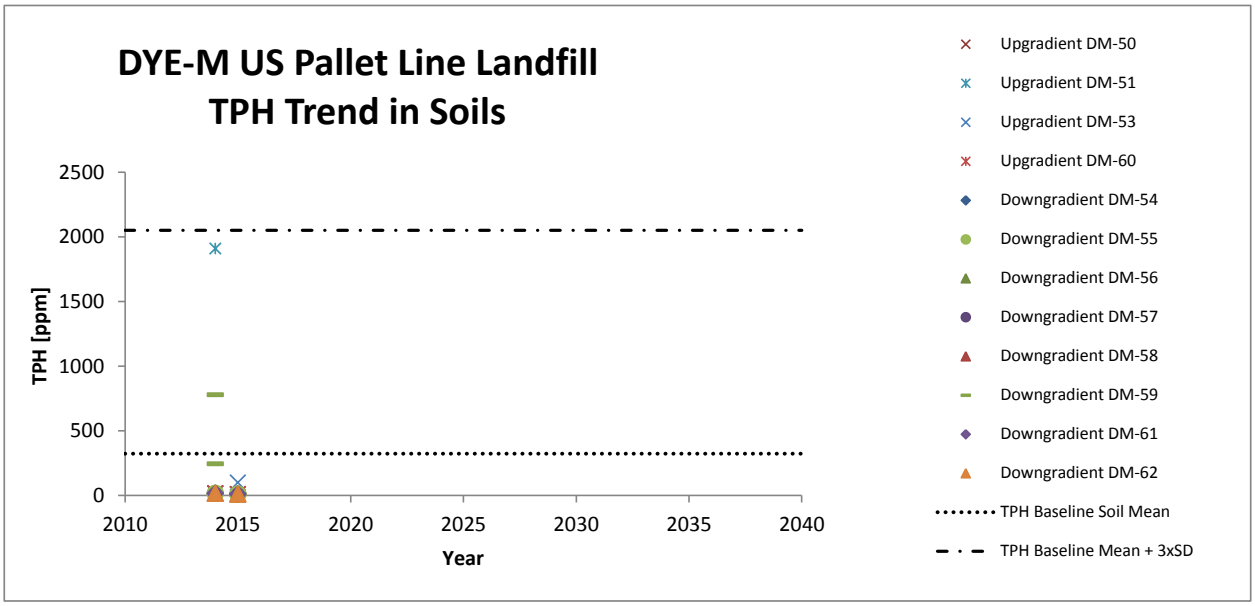
DYE-M US Pallet Line Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



APPENDIX D

Photograph Log

Visual Inspection Photographs

Thermistor Photographs

Monitoring Well Photographs

Soil Sampling Photographs

PHOTOS

Photo 1: Lower Site Crossroads Landfill – Southwest slope from road (ATT301_Photo1.jpg) (ATT302_Photo2.jpg) (ATT303_Photo3.jpg) 1
Photo 2: Lower Site Crossroads Landfill – Feature F, ponded water at southwest toe (ATT304_Photo1.jpg) 1
Photo 3: Lower Site Crossroads Landfill – Feature B, sparse grass on slopes and crest surface (ATT305_Photo1.jpg) 2
Photo 4: Lower Site Crossroads Landfill – Feature G, minor thaw creep tension cracks on southeast slope (ATT306_Photo1.jpg) 2
Photo 5: Lower Site Crossroads Landfill – Side slopes from east end corner (ATT307_Photo1.jpg) (ATT308_Photo2.jpg) 3
Photo 6: Lower Site Crossroads Landfill – Feature H, minor thaw crack on northeast slope (ATT309_Photo1.jpg) 3
Photo 7: Lower Site Crossroads Landfill – North slope, facing northwest (ATT310_Photo1.jpg) 4
Photo 8: Lower Site Crossroads Landfill – Feature I, minor thaw crack on north slope (ATT311_Photo1.jpg) 4
Photo 9: Lower Site Crossroads Landfill – Northwest corner facing southeast (ATT312_Photo1.jpg) 5
Photo 10: Lower Site Crossroads Landfill – Cover surface, facing southeast (ATT313_Photo1.jpg) 5
Photo 11: Lower Site Crossroads Landfill – Crest surface, facing northwest – Feature J, weathered tire/dozer tracks (ATT314_Photo1.jpg) 6
Photo 12: Lower Site Foundation Landfill – Southeast view of landfill (ATT315_Photo1.jpg) 6
Photo 13: Lower Site Foundation Landfill – Northwest slope, facing northeast (Feature D) (ATT316_Photo1.jpg) 7
Photo 14: Lower Site Foundation Landfill – Feature D, moderate grass vegetation (ATT317_Photo1.jpg) 7
Photo 15: Lower Site Foundation Landfill – Crest at south end, Feature D, moderately vegetated (ATT318_Photo1.jpg) 8
Photo 16: Lower Site Foundation Landfill – South slope, facing east (ATT319_Photo1.jpg) 8
Photo 17: Lower Site Foundation Landfill – Crest surface facing north (Feature D) (ATT320_Photo1.jpg) 9
Photo 18: Lower Site Foundation Landfill – Feature K, minor thaw crack at south crest (ATT321_Photo1.jpg) 9
Photo 19: Lower Site Foundation Landfill – Feature L, minor thaw crack on southeast slope (ATT322_Photo1.jpg) 10
Photo 20: Lower Site Foundation Landfill – East slope, facing west – 3 photo panorama (ATT323_Photo1.jpg) (ATT324_Photo2.jpg) (ATT325_Photo3.jpg) 10
Photo 21: Lower Site Foundation Landfill – South end crest surface – Feature D, moderately vegetated with grasses (ATT326_Photo1.jpg) 11
Photo 22: Lower Site Foundation Landfill – Feature M, minor settlement depression (ATT327_Photo1.jpg) 11
Photo 23: Lower Site Foundation Landfill – Feature N, minor thaw cracks at crest corner (ATT328_Photo1.jpg) 12
Photo 24: Lower Site Foundation Landfill – Landfill from north end, facing south (ATT329_Photo1.jpg) (ATT330_Photo2.jpg) 12
Photo 25: Lower Site Foundation Landfill – Crest surface facing south towards hangar – More grass vegetation at south end (Feature D) (ATT331_Photo1.jpg) 13
Photo 26: Lower Site Non-Haz Waste Landfill – North toe, facing northeast (ATT3_Photo1.jpg) 13

Photo 27: Lower Site Non-Haz Waste Landfill – Feature D, minor self-armouring erosion on west slope with fines washing down slope (ATT4_Photo1.jpg) 14
Photo 28: Lower Site Non-Haz Waste Landfill – Feature E, Ponded water along west toe – Entire east toe, 10 m wide (ATT5_Photo1.jpg) 14
Photo 29: Lower Site Non-Haz Waste Landfill – South slope, facing east (ATT6_Photo1.jpg) 15
Photo 30: Lower Site Non-Haz Waste Landfill – Feature F, ponded thaw water at south toe (ATT7_Photo1.jpg) 15
Photo 31: Lower Site Non-Haz Waste Landfill – East slope, facing north (ATT8_Photo1.jpg) 16
Photo 32: Lower Site Non-Haz Waste Landfill – Feature G, Sparse grass on south slope (ATT9_Photo1.jpg) 16
Photo 33: Lower Site Non-Haz Waste Landfill – Feature C, tire tracks previously observed on east slope (ATT10_Photo1.jpg) 17
Photo 34: Lower Site Non-Haz Waste Landfill – Feature H, self-armouring erosion on east slope – Fines accumulating at toe washed from above (ATT11_Photo1.jpg) 17
Photo 35: Lower Site Non-Haz Waste Landfill – Feature I, ponded water at east toe and Feature G, spare grasses on east slope (ATT12_Photo1.jpg) 18
Photo 36: Lower Site Non-Haz Waste Landfill – North slope, facing south (ATT13_Photo2.jpg) 18
Photo 37: Lower Site Non-Haz Waste Landfill – North slope facing south towards monument (ATT14_Photo1.jpg) 19
Photo 38: Lower Site Non-Haz Waste Landfill – Feature J, previously noted tire tracks – No degradation (ATT15_Photo1.jpg) 19
Photo 39: Lower Site Non-Haz Waste Landfill – North crest, facing west (ATT16_Photo1.jpg) 20
Photo 40: Lower Site Non-Haz Waste Landfill – Feature K, minor crack along west crest (ATT17_Photo1.jpg) 20
Photo 41: Lower Site Non-Haz Waste Landfill – Crest surface facing northwest (ATT18_Photo1.jpg) 21
Photo 42: Lower Site Non-Haz Waste Landfill – East slope with minor self-armouring erosion (Feature H) (ATT19_Photo1.jpg) 21
Photo 43: Lower Site Non-Haz Waste Landfill – Feature L, minor thaw crack along north crest edge, facing west (ATT20_Photo1.jpg) 22
Photo 44: Lower Site Non-Haz Waste Landfill – Feature L, minor thaw crack along crest edge (ATT21_Photo1.jpg) 22
Photo 45: Lower Site Non-Haz Waste Landfill – Cover surface, facing west (ATT22_Photo1.jpg) 23
Photo 46: Lower Site Non-Haz Waste Landfill – Cover surface, facing north (ATT23_Photo1.jpg) 23
Photo 47: Lower Site NWS Landfill – Southeast slope, facing northwest – Feature G, sparse vegetation (ATT189_Photo1.jpg) 24
Photo 48: Lower Site NWS Landfill – Feature C, tire track on cover surface, facing northwest (ATT191_Photo2.jpg) 24
Photo 49: Lower Site NWS Landfill – Southwest crest and slope, facing northwest (ATT192_Photo1.jpg) 25
Photo 50: Lower Site NWS Landfill – Southwest slope and crest, facing southeast – Feature B, sparse vegetation (ATT193_Photo1.jpg) 25
Photo 51: Lower Site NWS Landfill – Northwest slope and crest, facing northeast – Feature B, sparse vegetation (ATT194_Photo1.jpg) 26
Photo 52: Lower Site NWS Landfill – Northeast slope and crest, facing southeast – Feature B, sparse vegetation (ATT195_Photo1.jpg) 26
Photo 53: Lower Site NWS Landfill – Cover surface, facing southeast from the northwest crest edge – Feature D (ATT196_Photo1.jpg) 27

Photo 54: Lower Site NWS Landfill – Southeast slope and crest, facing southwest – Feature B (ATT198_Photo1.jpg) 27
Photo 55: Lower Site NWS Landfill – Feature E, minor settlement on the northeast slope, facing northwest (ATT199_Photo1.jpg) 28
Photo 56: Lower Site NWS Landfill – Northeast slope south end, facing southeast – Feature B (ATT201_Photo2.jpg) 28
Photo 57: Lower Site Powerhouse Landfill – South slope, facing North (ATT24_Photo1.jpg) 29
Photo 58: Lower Site Powerhouse Landfill – Cover surface, facing south (ATT27_Photo1.jpg) 29
Photo 59: Lower Site Powerhouse Landfill – Crest edge along west side, facing southeast (hanger) (ATT28_Photo1.jpg) 30
Photo 60: Lower Site Powerhouse Landfill – South crest edge, facing west (ATT29_Photo1.jpg) 30
Photo 61: Lower Site Powerhouse Landfill – East slope (ATT31_Photo1.jpg) 31
Photo 62: Lower Site Powerhouse Landfill – Feature B, ponded water at east toe (ATT34_Photo1.jpg) 31
Photo 63: Lower Site Powerhouse Landfill – North slope, facing south (ATT35_Photo1.jpg) 32
Photo 64: Lower Site Powerhouse Landfill – Northwest slope, facing southeast from toe (ATT37_Photo1.jpg) 32
Photo 65: Lower Site Powerhouse Landfill – West slope, facing east from access road (ATT38_Photo1.jpg) 33
Photo 66: Lower Site Tier II Disposal Facility – East crest surface, facing north (ATT176_Photo1.jpg) 33
Photo 67: Lower Site Tier II Disposal Facility – North crest surface, facing west (ATT177_Photo1.jpg) 34
Photo 68: Lower Site Tier II Disposal Facility – West crest surface, facing south (ATT180_Photo1.jpg) 34
Photo 69: Lower Site Tier II Disposal Facility – South crest surface, facing east (ATT181_Photo1.jpg) 35
Photo 70: Lower Site Tier II Disposal Facility – Feature B, minor self-armouring erosion, facing south from the north end point (ATT183_Photo1.jpg) 35
Photo 71: Lower Site Tier II Disposal Facility – Cover surface, facing north from south crest edge (west half) (ATT185_Photo1.jpg) 36
Photo 72: Lower Site Tier II Disposal Facility – Cover surface, facing north from south crest edge (east half) (ATT186_Photo1.jpg) 36
Photo 73: Lower Site Tier II Disposal Facility – Overview north and west slopes, from VT background facing east (ATT188_Photo1.jpg) 37
Photo 74: Lower Site Tier II Disposal Facility – North slope and toe, facing west (ATT203_Photo2.jpg) 37
Photo 75: Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope (ATT204_Photo2.jpg) 38
Photo 76: Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope and accumulation of fines (ATT205_Photo1.jpg) 38
Photo 77: Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope and accumulation of fines at toe, facing north (ATT206_Photo1.jpg) 39
Photo 78: Lower Site Tier II Disposal Facility – Feature D, sparse vegetation on north slope, (ATT207_Photo1.jpg) 39
Photo 79: Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope, facing north from crest edge (ATT208_Photo1.jpg) 40

Photo 80: Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope, facing north from crest (ATT209_Photo1.jpg) 40
Photo 81: Lower Site Tier II Disposal Facility – Feature E, wet and soft area in the middle of north slope, facing west from east end – No signs of seepage only wet (ATT210_Photo1.jpg) 41
Photo 82: Lower Site Tier II Disposal Facility – Feature F, sloughing on north slope, wet no sign of seepage, facing the slope (ATT211_Photo1.jpg) 41
Photo 83: Lower Site Tier II Disposal Facility – Feature E, wet and soft area in the middle of north slope, facing east from west end – no signs of seepage (ATT212_Photo1.jpg) 42
Photo 84: Lower Site Tier II Disposal Facility – West slope and toe, facing south (ATT213_Photo1.jpg) 42
Photo 85: Lower Site Tier II Disposal Facility – Feature G, self-armouring erosion along west slope (ATT214_Photo1.jpg) 43
Photo 86: Lower Site Tier II Disposal Facility – Feature H, minor sloughing on west slope, no sign of seepage (ATT215_Photo1.jpg) 43
Photo 87: Lower Site Tier II Disposal Facility – Feature D, sparse vegetation on west slope, facing slope (ATT216_Photo1.jpg) 44
Photo 88: Lower Site Tier II Disposal Facility – Feature I, minor crack along west slope near toe, facing south from north endpoint (ATT218_Photo2.jpg) 44
Photo 89: Lower Site Tier II Disposal Facility – Feature I, minor crack on west slope near toe, facing north from south endpoint (ATT219_Photo1.jpg) 45
Photo 90: Lower Site Tier II Disposal Facility – Feature G, self-armouring erosion, west slope facing down from slope (ATT220_Photo1.jpg) 45
Photo 91: Lower Site Tier II Disposal Facility – Feature J, minor crack near crest on west slope, facing south from north endpoint (ATT221_Photo2.jpg) 46
Photo 92: Lower Site Tier II Disposal Facility – South slope and toe, facing east from SW corner – Feature K, frequent self-armouring erosion along south slope (ATT222_Photo1.jpg) 46
Photo 93: Lower Site Tier II Disposal Facility – Feature K, self-armouring erosion on south slope, facing down from south crest edge (ATT223_Photo1.jpg) 47
Photo 94: Lower Site Tier II Disposal Facility – Feature L, minor crack on south slope near crest, facing east from west endpoint (ATT224_Photo1.jpg) 47
Photo 95: Lower Site Tier II Disposal Facility – Feature L, minor crack on south slope near crest – good coarse structure beneath the crack (ATT225_Photo2.jpg) 48
Photo 96: Lower Site Tier II Disposal Facility – Feature L, minor crack on south slope near crest, facing west from east endpoint (ATT226_Photo1.jpg) 48
Photo 97: Lower Site Tier II Disposal Facility – Feature D, sparse vegetation on south slope, facing north (ATT227_Photo1.jpg) 49
Photo 98: Lower Site Tier II Disposal Facility – Feature M, ponded water at east toe, facing north (ATT228_Photo1.jpg) 49
Photo 99: Lower Site Tier II Disposal Facility – Feature M, ponded water at east toe, facing south (ATT229_Photo1.jpg) 50
Photo 100: Lower Site Tier II Disposal Facility – East slope, facing west (ATT230_Photo1.jpg) 50
Photo 101: Upper Site Helipad Landfill – Northeast slope, facing northwest from south (ATT116_Photo1.jpg) 51
Photo 102: Upper Site Helipad Landfill – Southeast slope, facing southwest (ATT117_Photo1.jpg) 51
Photo 103: Upper Site Helipad Landfill – Feature A, differential settlement, facing south (ATT118_Photo1.jpg) 52
Photo 104: Upper Site Helipad Landfill – Feature A, differential settlement, facing west (ATT119_Photo1.jpg) 52

Photo 105: Upper Site Helipad Landfill – Landfill surface facing north from southeast crest edge (ATT120_Photo1.jpg) 53
Photo 106: Upper Site Helipad Landfill – South slope, facing north (ATT122_Photo2.jpg) (ATT123_Photo3.jpg) 53
Photo 107: Upper Site Helipad Landfill – Feature B, rough area on south slope, facing northwest from southeast endpoint (ATT124_Photo1.jpg) 54
Photo 108: Upper Site Helipad Landfill – Feature B, rough area on south slope, facing southeast from northwest endpoint (ATT125_Photo1.jpg) 54
Photo 109: Upper Site Helipad Landfill – West slope, facing north from southwest corner (ATT126_Photo1.jpg) 55
Photo 110: Upper Site Helipad Landfill – Feature C, settlement, facing east (ATT127_Photo1.jpg) 55
Photo 111: Upper Site Helipad Landfill – Cover surface, facing east from west crest edge (ATT128_Photo1.jpg) (ATT129_Photo2.jpg) (ATT130_Photo3.jpg) 56
Photo 112: Upper Site Helipad Landfill – Feature D, tire track with ponded water, facing southwest (ATT131_Photo1.jpg) 56
Photo 113: Upper Site Helipad Landfill – Cover surface, facing south from north crest (ATT132_Photo1.jpg) (ATT133_Photo2.jpg) (ATT134_Photo3.jpg) 57
Photo 114: Upper Site Non-Haz Waste Landfill – South slope facing west from southeast corner (ATT50_Photo1.jpg) 57
Photo 115: Upper Site Non-Haz Waste Landfill – East slope facing north from southeast corner (ATT51_Photo1.jpg) 58
Photo 116: Upper Site Non-Haz Waste Landfill – South slope, facing west from warehouse (ATT52_Photo2.jpg) 58
Photo 117: Upper Site Non-Haz Waste Landfill – Southwest slope facing northwest (ATT53_Photo1.jpg) 59
Photo 118: Upper Site Non-Haz Waste Landfill – West slope, facing north (ATT54_Photo1.jpg) 59
Photo 119: Upper Site Non-Haz Waste Landfill – North slope, facing east (ATT55_Photo1.jpg) 60
Photo 120: Upper Site Non-Haz Waste Landfill – Landfill crest surface facing west from east crest edge (ATT56_Photo1.jpg) (ATT57_Photo2.jpg) (ATT58_Photo3.jpg) 60
Photo 121: Upper Site Non-Haz Waste Landfill – Feature B – previously noted as area of segregation in southeast corner of crest (ATT59_Photo1.jpg) 61
Photo 122: Upper Site Non-Haz Waste Landfill – Feature A – Regraded area of east slope with tire tracks – facing south (ATT60_Photo1.jpg) 61
Photo 123: Upper Site Non-Haz Waste Landfill – Feature B, area of segregation – facing north (ATT61_Photo1.jpg) 62
Photo 124: Upper Site Non-Haz Waste Landfill – Feature B, area of segregation – facing south (ATT62_Photo1.jpg) 62
Photo 125: Upper Site Non-Haz Waste Landfill – Feature C – ponded water and segregated material on cover surface – facing north (ATT63_Photo1.jpg) 63
Photo 126: Upper Site Non-Haz Waste Landfill – Feature D – ponded water on cover surface near north crest and wet area (ATT64_Photo1.jpg) 63
Photo 127: Upper Site Non-Haz Waste Landfill – Feature D – ponded water and wet area along north crest, facing north (ATT65_Photo2.jpg) 64
Photo 128: Upper Site Non-Haz Waste Landfill – Feature D – ponded water and wet area along north crest – facing east (ATT66_Photo1.jpg) 64
Photo 129: Upper Site NWS Landfill – East slope along the road, facing south (ATT95_Photo1.jpg) 65
Photo 130: Upper Site NWS Landfill – Northeast slope and crest, facing northwest from northeast corner (ATT96_Photo1.jpg) 65

Photo 131: Upper Site NWS Landfill – Upper south slope, facing northwest from southeast corner (ATT97_Photo1.jpg) 66
Photo 132: Upper Site NWS Landfill – Lower south slope, facing west (ATT98_Photo1.jpg) 66
Photo 133: Upper Site NWS Landfill – Upper south slope, facing N from lower south crest (ATT99_Photo1.jpg) (ATT100_Photo2.jpg) 67
Photo 134: Upper Site NWS Landfill – Feature B, debris, steel cable, lower south slope, facing N (ATT101_Photo1.jpg) 67
Photo 135: Upper Site NWS Landfill – Feature C, minor erosion channel on upper south slope, facing west (ATT102_Photo1.jpg) 68
Photo 136: Upper Site NWS Landfill – Feature C, minor erosion channel on upper south slope, facing slope from toe (ATT103_Photo1.jpg) 68
Photo 137: Upper Site NWS Landfill – Feature C, minor erosion channel on upper south slope, facing slope from toe – (ATT105_Photo2.jpg) 69
Photo 138: Upper Site NWS Landfill – Upper south slope and lower landfill surface, facing northeast from southwest corner (ATT106_Photo1.jpg) 69
Photo 139: Upper Site NWS Landfill – West slope, facing north from southwest corner (ATT107_Photo1.jpg) 70
Photo 140: Upper Site NWS Landfill – Cover surface, facing east from west toe (ATT108_Photo1.jpg) 70
Photo 141: Upper Site NWS Landfill – Feature D, minor (self-armouring) erosion channel on surface, facing east from west end – L 9 m, w 10-20 cm (ATT109_Photo1.jpg) 71
Photo 142: Upper Site NWS Landfill – Feature D, minor (self-armouring) erosion channel on surface, facing west from east end (ATT110_Photo1.jpg) 71
Photo 143: Upper Site NWS Landfill – Landfill upper cover surface, facing east (ATT111_Photo1.jpg) 72
Photo 144: Upper Site NWS Landfill – Northwest slope and crest, facing southwest (ATT112_Photo1.jpg) 72
Photo 145: Upper Site NWS Landfill – Northeast slope and crest, facing southeast (ATT113_Photo1.jpg) 73
Photo 146: Upper Site NWS Landfill – Upper cover surface, facing west from northeast crest (ATT115_Photo1.jpg) 73
Photo 147: Upper Site Pallet Line Landfills – Lobe 1 – North crest and slope, facing east (ATT135_Photo1.jpg) 74
Photo 148: Upper Site Pallet Line Landfills – Lobe 1 – North toe, facing east (ATT136_Photo1.jpg) 74
Photo 149: Upper Site Pallet Line Landfills – Lobe 1 – West crest and slope, facing north from southwest (ATT137_Photo1.jpg) 75
Photo 150: Upper Site Pallet Line Landfills – Lobe 1 – South slope and crest, facing east (ATT138_Photo1.jpg) 75
Photo 151: Upper Site Pallet Line Landfills – Lobe 1 – South slope and crest, facing east (ATT139_Photo1.jpg) 76
Photo 152: Upper Site Pallet Line Landfills – Lobe 1 – Feature K, crack on south slope (ATT141_Photo2.jpg) 76
Photo 153: Upper Site Pallet Line Landfills – Lobe 1 – Feature L, minor cracks on south slope (ATT142_Photo1.jpg) 77
Photo 154: Upper Site Pallet Line Landfills – Lobe 1 – Feature C, crack along west slope of south side extension, facing north (ATT143_Photo1.jpg) 77
Photo 155: Upper Site Pallet Line Landfills – Lobe 1 – South crest, facing east (ATT144_Photo1.jpg) 78
Photo 156: Upper Site Pallet Line Landfills – Lobe 1 – Southeast slope and toe, facing east (ATT145_Photo1.jpg) 78

Photo 157: Upper Site Pallet Line Landfills – Lobe 1 – Feature M, ponded water south toe, facing south towards Lobe 2 (ATT146_Photo1.jpg)....79
Photo 158: Upper Site Pallet Line Landfills – Lobe 1 – Southeast slope, facing southwest (ATT147_Photo1.jpg)....79
Photo 159: Upper Site Pallet Line Landfills – Lobe 1 – East slope and crest, facing north from southeast corner (ATT148_Photo1.jpg)....80
Photo 160: Upper Site Pallet Line Landfills – Lobe 1 – Cover surface, facing northwest from southeast corner (ATT149_Photo1.jpg)....80
Photo 161: Upper Site Pallet Line Landfills – Lobe 2 – Northwest crest edge, facing northeast (ATT274_Photo1.jpg)....81
Photo 162: Upper Site Pallet Line Landfills – Lobe 2 – Internal slope, facing north (ATT275_Photo1.jpg)....81
Photo 163: Upper Site Pallet Line Landfills – Lobe 2 – Feature A, minor self-armouring erosion (ATT276_Photo1.jpg)....82
Photo 164: Upper Site Pallet Line Landfills – Lobe 2 – Northwest central, facing east (ATT277_Photo1.jpg)....82
Photo 165: Upper Site Pallet Line Landfills – Lobe 2 – Feature M, ponded water between lobes 1 and 2 (ATT278_Photo1.jpg)....83
Photo 166: Upper Site Pallet Line Landfills – Lobe 2 – Feature N, ponded water at toe in northeast corner (ATT279_Photo1.jpg)....83
Photo 167: Upper Site Pallet Line Landfills – Feature I ponded water on gravel cover draining south – Between Lobes 2 and 5 (ATT280_Photo1.jpg)....84
Photo 168: Upper Site Pallet Line Landfills – Lobe 5 – North slope, facing east (ATT281_Photo1.jpg)....84
Photo 169: Upper Site Pallet Line Landfills – Lobe 5 – East slope facing, south (ATT282_Photo1.jpg)....85
Photo 170: Upper Site Pallet Line Landfills – Lobe 5 – sparse grass (Feature P) on slope and ponded water (Feature O) at east toe (ATT283_Photo1.jpg)....85
Photo 171: Upper Site Pallet Line Landfills – Lobe 5 – Cover surface, facing west (ATT284_Photo1.jpg)....86
Photo 172: Upper Site Pallet Line Landfills – Lobe 5 – Feature Q, minor tension crack and settlement – Lobe 5, south slope (ATT285_Photo1.jpg)....86
Photo 173: Upper Site Pallet Line Landfills – Lobe 2 – Southeast slope and crest, facing southwest – Feature R, some minor erosion into boulders at toe (ATT286_Photo1.jpg)....87
Photo 174: Upper Site Pallet Line Landfills – Lobe 2 – Feature S, uneven ground, potential settlement (ATT287_Photo1.jpg)....87
Photo 175: Upper Site Pallet Line Landfills – Lobe 2 – Feature T, self-armouring erosion, facing north up southeast slope (ATT288_Photo1.jpg)....88
Photo 176: Upper Site Pallet Line Landfills – Riprap along southeast toe and slope, facing northwest (ATT289_Photo1.jpg)....88
Photo 177: Upper Site Pallet Line Landfills – Lobe 2 – Cover surface, facing east (ATT290_Photo1.jpg)....89
Photo 178: Upper Site Pallet Line Landfills – Lobe 2 – South end facing south (ATT291_Photo1.jpg)....89
Photo 179: Upper Site Pallet Line Landfills – Abandoned Lobe – North slope, facing southwest (ATT292_Photo1.jpg)....90
Photo 180: Upper Site Pallet Line Landfills – Abandoned Lobe – North crest edge facing west (ATT293_Photo1.jpg)....90
Photo 181: Upper Site Pallet Line Landfills – Abandoned Lobe – West crest edge facing south (ATT294_Photo1.jpg)....91

Photo 182: Upper Site Pallet Line Landfills – Abandoned Lobe – West crest facing south (ATT295_Photo1.jpg) 91
Photo 183: Upper Site Pallet Line Landfills – Abandoned Lobe – Cover surface facing north (ATT296_Photo1.jpg) 92
Photo 184: Upper Site Pallet Line Landfills – Abandoned Lobe – Riprap on south toe facing northeast (ATT297_Photo1.jpg) 92
Photo 185: Upper Site Pallet Line Landfills – Abandoned Lobe – South cover slope facing north – Some snow still on cover (ATT298_Photo1.jpg) 93
Photo 186: Upper Site Pallet Line Landfills – Abandoned Lobe – southeast corner facing slope (ATT299_Photo1.jpg) 93
Photo 187: Upper Site Pallet Line Landfills – Abandoned Lobe – East slope facing south (ATT300_Photo1.jpg) 94
Photo 188: Upper Site South Landfill (West) – West slope and crest surface, facing east (ATT72_Photo1.jpg) 94
Photo 189: Upper Site South Landfill (West) – South slope, facing north (ATT73_Photo1.jpg) 95
Photo 190: Upper Site South Landfill (West) – Feature A, sparse vegetation on south slope, facing N (ATT74_Photo1.jpg) 95
Photo 191: Upper Site South Landfill (West) – Feature C – accumulation of fines from erosion, facing west (ATT75_Photo1.jpg) 96
Photo 192: Upper Site South Landfill (West) – Feature E – minor self-armouring erosion, facing east (ATT76_Photo1.jpg) 96
Photo 193: Upper Site South Landfill (West) – Feature E – minor self-armouring erosion, facing west (ATT77_Photo2.jpg) 97
Photo 194: Upper Site South Landfill (West) – East slope facing south from northeast corner (ATT78_Photo1.jpg) 97
Photo 195: Upper Site South Landfill (West) – North toe facing west from northeast corner – Snow and ice at the toe (ATT79_Photo1.jpg) 98
Photo 196: Upper Site South Landfill (West) – South crest, facing west from southeast corner (ATT80_Photo1.jpg) 98
Photo 197: Upper Site South Landfill (West) – North crest, facing west (ATT81_Photo1.jpg) 99
Photo 198: Upper Site South Landfill (West) – Overview, facing southwest (ATT82_Photo1.jpg) 99
Photo 199: Upper Site South Landfill (West) – South crest, facing west (ATT83_Photo1.jpg) 100
Photo 200: Upper Site South Landfill (West) – Feature F, erosion channel, facing north from south crest edge (ATT84_Photo1.jpg) 100
Photo 201: Upper Site South Landfill (West) – Feature F, erosion channel, facing south from north endpoint (ATT85_Photo1.jpg) 101
Photo 202: Upper Site South Landfill (West) – Feature G, self-armouring erosion, facing north from south endpoint (ATT86_Photo1.jpg) 101
Photo 203: Upper Site South Landfill (West) – Feature G, self-armouring erosion, north endpoint (ATT87_Photo1.jpg) 102
Photo 204: Upper Site South Landfill (West) – South crest facing west (ATT88_Photo1.jpg) 102
Photo 205: Upper Site South Landfill (West) – South crest facing west (ATT89_Photo2.jpg) 103
Photo 206: Upper Site South Landfill (West) – South crest facing west (ATT90_Photo1.jpg) 103
Photo 207: Upper Site South Landfill (West) – Cover surface, facing north from south end (ATT91_Photo1.jpg) 104
Photo 208: Upper Site South Landfill (West) – Feature H, self-armouring erosion, facing west from east endpoint (ATT92_Photo1.jpg) 104

Photo 209: Upper Site South Landfill (West) – Feature H, self-armouring erosion, facing east from west endpoint (ATT93_Photo1.jpg) 105
Photo 210: Upper Site South Landfill (West) – North slope and crest, facing west (ATT94_Photo1.jpg) 105
Photo 211: Upper Site Tier II Disposal Facility – Overview, facing south (ATT151_Photo1.jpg) 106
Photo 212: Upper Site Tier II Disposal Facility – Northwest slope and toe, facing southwest (ATT152_Photo1.jpg) 106
Photo 213: Upper Site Tier II Disposal Facility – Northeast slope and toe, facing southeast (ATT153_Photo1.jpg) 107
Photo 214: Upper Site Tier II Disposal Facility – Northwest crest, facing west (ATT154_Photo1.jpg) 107
Photo 215: Upper Site Tier II Disposal Facility – Northeast crest, facing southeast (ATT155_Photo1.jpg) 108
Photo 216: Upper Site Tier II Disposal Facility – Feature A, tension crack, 2 m from northwest crest (ATT156_Photo1.jpg) 108
Photo 217: Upper Site Tier II Disposal Facility – Feature B, self-armouring erosion on northwest slope (ATT157_Photo1.jpg) 109
Photo 218: Upper Site Tier II Disposal Facility – Feature B, self-armouring erosion on northwest slope (ATT159_Photo2.jpg) 109
Photo 219: Upper Site Tier II Disposal Facility – Feature C, rough area at west crest corner, facing west (ATT160_Photo1.jpg) 110
Photo 220: Upper Site Tier II Disposal Facility – Southwest crest, facing southeast from west corner (ATT161_Photo1.jpg) 110
Photo 221: Upper Site Tier II Disposal Facility – Southwest slope and toe, facing southeast from west corner (ATT162_Photo1.jpg) 111
Photo 222: Upper Site Tier II Disposal Facility – Southwest toe, facing southeast from west corner (ATT163_Photo1.jpg) 111
Photo 223: Upper Site Tier II Disposal Facility – Feature D, sparse vegetation on southwest slope (ATT164_Photo1.jpg) 112
Photo 224: Upper Site Tier II Disposal Facility – Southwest slope and crest, facing northwest from south corner (ATT165_Photo1.jpg) 112
Photo 225: Upper Site Tier II Disposal Facility – Southeast slope and crest, facing east (ATT166_Photo1.jpg) 113
Photo 226: Upper Site Tier II Disposal Facility – Crest surface, from southeast to northwest (ATT167_Photo1.jpg) 113
Photo 227: Upper Site Tier II Disposal Facility – Feature E, self-armouring erosion, accumulation of fines on southeast slope – (ATT168_Photo1.jpg) 114
Photo 228: Upper Site Tier II Disposal Facility – Feature F, rough area at east crest corner (ATT169_Photo1.jpg) 114
Photo 229: Upper Site Tier II Disposal Facility – Northeast slope and crest, facing northwest from east corner (ATT170_Photo1.jpg) 115
Photo 230: Upper Site Tier II Disposal Facility – Northeast toe, from east corner (ATT171_Photo1.jpg) 115
Photo 231: Upper Site Tier II Disposal Facility – Northeast toe, from east corner (ATT172_Photo2.jpg) 116
Photo 232: Upper Site Tier II Disposal Facility – Cover surface, facing east – VT 10 shown (ATT173_Photo1.jpg) 116
Photo 233: Upper Site Tier II Disposal Facility – Cover surface, facing east, north half (ATT174_Photo1.jpg) 117
Photo 234: Upper Site West Landfill (Centre and East Lobes), facing east (ATT231_Photo1.jpg) 117

Photo 235: Upper Site West Landfill (Centre and East Lobes) – Riprap along road facing south (ATT232_Photo1.jpg) 118
Photo 236: Upper Site West Landfill (Centre and East Lobes) – Feature B, tension cracks on north slope (ATT233_Photo1.jpg) 118
Photo 237: Upper Site West Landfill (Centre and East Lobes) – North slope facing south (ATT234_Photo1.jpg) 119
Photo 238: Upper Site West Landfill (Centre and East Lobes) – North slope, rock fill berm in background (ATT235_Photo1.jpg) 119
Photo 239: Upper Site West Landfill (Centre and East Lobes) – Feature D, self armouring erosion with fines washing out downslope (ATT236_Photo1.jpg) 120
Photo 240: Upper Site West Landfill (Centre and East Lobes) – Feature D, self armouring erosion on east slope (ATT237_Photo1.jpg) 120
Photo 241: Upper Site West Landfill (Centre and East Lobes) – Cover surface, facing west (ATT238_Photo1.jpg) 121
Photo 242: Upper Site West Landfill (Centre and East Lobes) – South cover surface, facing west (ATT239_Photo1.jpg) 121
Photo 243: Upper Site West Landfill (Centre and East Lobes) – South crest facing west (ATT240_Photo1.jpg) 122
Photo 244: Upper Site West Landfill (Centre and East Lobes) – Riprap slope facing north (ATT241_Photo1.jpg) 122
Photo 245: Upper Site West Landfill (Centre and East Lobes) – Feature E, self-armouring erosion (ATT242_Photo1.jpg) 123
Photo 246: Upper Site West Landfill (Centre and East Lobes) – Rip rap toe facing west (ATT243_Photo1.jpg) 123
Photo 247: Upper Site West Landfill (Centre and East Lobes) – Feature F, self-armouring erosion transporting fines down slope, facing upslope to south on north slope (ATT244_Photo1.jpg) 124
Photo 248: Upper Site West Landfill (Centre and East Lobes) – North slope surface facing east (ATT245_Photo1.jpg) 124
Photo 249: Upper Site West Landfill (Centre and East Lobes) – Rip rap on north toe facing east (ATT246_Photo1.jpg) 125
Photo 250: Upper Site West Landfill (Centre and East Lobes) – Feature G, self-armouring erosion on west slope (ATT247_Photo1.jpg) 125
Photo 251: Upper Site West Landfill (Centre and East Lobes) – southwest toe facing east – Snow on slope (ATT248_Photo1.jpg) 126
Photo 252: Upper Site West Landfill (Centre and East Lobes) – Cover surface facing northwest (ATT249_Photo1.jpg) 126
Photo 253: Upper Site West Landfill (Centre and East Lobes) – Cover surface, facing east (ATT250_Photo1.jpg) 127
Photo 254: Upper Site West Landfill (Centre and East Lobes) – Cover surface facing west – Feature H, some minor self-armouring erosion (ATT251_Photo1.jpg) 127
Photo 255: Upper Site West Landfill (Centre and East Lobes) – Cover surface facing southeast (ATT252_Photo1.jpg) 128
Photo 256: Upper Site West Landfill (Centre and East Lobes) – Feature I, thaw creep cracks at southwest corner – Snow on slope so just melted (ATT253_Photo1.jpg) 128
Photo 257: Upper Site West Landfill (West Lobe) – Rip rap along east edge, facing south (ATT254_Photo1.jpg) 129
Photo 258: Upper Site West Landfill (West Lobe) – Cover surface facing north (ATT255_Photo1.jpg) 129

Photo 259: Upper Site West Landfill (West Lobe) – Feature C, running water and erosion at southwest toe – Beyond riprap (ATT256_Photo1.jpg) 130
Photo 260: Upper Site West Landfill (West Lobe) – Southwest corner facing northwest – Snow-covered toe (ATT257_Photo1.jpg) 130
Photo 261: Upper Site West Landfill (West Lobe) – Feature D, self-armouring erosion on southwest slope (ATT258_Photo1.jpg) 131
Photo 262: Upper Site West Landfill (West Lobe) – Feature E, small erosion gulley facing downslope (ATT259_Photo1.jpg) 131
Photo 263: Upper Site West Landfill (West Lobe) – Cove surface facing north – Slope and toe in foreground (ATT260_Photo1.jpg) 132
Photo 264: Upper Site West Landfill (West Lobe) – Cover surface, facing south (ATT261_Photo1.jpg) 132
Photo 265: Upper Site West Landfill (West Lobe) – North crest and toe facing southwest (ATT262_Photo1.jpg) 133
Photo 266: Upper Site West Landfill (West Lobe) – North edge of cover with steep slope – Feature F, some erosion at toe – Facing west (ATT263_Photo1.jpg) 133
Photo 267: Upper Site West Landfill (West Lobe) – Feature G, some minor self-armouring erosion (ATT264_Photo1.jpg) 134
Photo 268: Upper Site West Landfill (West Lobe) – Cover surface, facing northeast (ATT265_Photo1.jpg) 134
Photo 269: Upper Site West Landfill (West Lobe) – West end facing southwest (ATT266_Photo1.jpg) 135
Photo 270: Upper Site West Landfill (West Lobe) – Feature A, minor erosion area, some self-armouring gulley (ATT267_Photo1.jpg) 135
Photo 271: Upper Site West Landfill (West Lobe) – Feature A, west end of erosion area (ATT268_Photo1.jpg) 136
Photo 272: Upper Site West Landfill (West Lobe) – Facing north (ATT269_Photo1.jpg) 136
Photo 273: Upper Site West Landfill (West Lobe) – Feature H, self armouring erosion, from toe facing up slope (ATT270_Photo1.jpg) 137
Photo 274: Upper Site West Landfill (West Lobe) – Rip rap along edge facing southwest (ATT271_Photo1.jpg) 137
Photo 275: Upper Site West Landfill (West Lobe) – Perimeter slope facing southeast (ATT272_Photo1.jpg) 138
Photo 276: Upper Site West Landfill (West Lobe) – Cover surface facing north (ATT273_Photo1.jpg) 138
Photo 277: Monitoring well [MW05-13] Lower Site Tier II Disposal Facility 139
Photo 278: Monitoring well [MW05-16] Lower Site Tier II Disposal Facility 139
Photo 279: Monitoring Well [MW06-19] Upper Site NHWL 140
Photo 280: Monitoring well [MW07-21] Upper Site NHWL 140
Photo 281: Monitoring Well [MW07-22] Upper Site Tier II Disposal Facility 141
Photo 282: Monitoring Well [MW07-23] Upper Site Tier II Disposal Facility 141
Photo 283: Monitoring Well [MW08-25] Upper Site Tier II Disposal Facility 142
Photo 284: Monitoring Well [MW12-01] Lower Site Tier II Disposal Facility 142
Photo 285: Soil Sample [DM-01] (2 after excavation), Lower Site Crossroads Landfill 143
Photo 286: Soil Sample [DM-02] (2 after excavation), Lower Site Crossroads Landfill 143
Photo 287: Soil sample [DM-03] (1 before excavation), Lower Site Crossroads Landfill 144
Photo 288: Soil sample [DM-03] (2 after excavation), Lower Site Crossroads Landfill 144
Photo 289: Soil sample [DM-04] (1 before excavation), Lower Site Foundation Landfill 145
Photo 290: Soil sample [DM-04] (2 after excavation), Lower Site Foundation Landfill 145
Photo 291: Soil sample [DM-04] (3 after backfilling), Lower Site Foundation Landfill 146

Photo 292: Soil sample [DM-05] (1 before excavation), Lower Site Foundation Landfill 146
Photo 293: Soil sample [DM-05] (2 after excavation), Lower Site Foundation Landfill 147
Photo 294: Soil sample [DM-05] (3 after backfilling), Lower Site Foundation Landfill 147
Photo 295: Soil sample [DM-06] (1 before excavation), Lower Site Foundation Landfill 148
Photo 296: Soil sample [DM-06] (2 after excavation), Lower Site Foundation Landfill 148
Photo 297: Soil sample [DM-06] (3 after backfilling), Lower Site Foundation Landfill 149
Photo 298: Soil sample [DM-20] (1 before excavation), Upper site NWS Landfill 149
Photo 299: Soil sample [DM-20] (2 after excavation), Upper site NWS Landfill 150
Photo 300: Soil sample [DM-20] (3 after backfilling), Upper site NWS Landfill 150
Photo 301: Soil sample [DM-23] (1 before excavation), Upper site South Landfill West 151
Photo 302: Soil sample [DM-23] (2 after excavation), Upper site South Landfill West 151
Photo 303: Soil sample [DM-23] (3 after backfilling), Upper site South Landfill West 152
Photo 304: Soil sample [DM-24] (unable to sample due to deep snow), Upper site South Landfill West 152
Photo 305: Soil sample [DM-29] (1 before excavation), Upper site South Landfill West 153
Photo 306: Soil sample [DM-29] (2 after excavation), Upper site South Landfill West 153
Photo 307: Soil sample [DM-29] (3 after backfilling), Upper site South Landfill West 154
Photo 308: Soil sample [DM-31] (1 before excavation), Upper site West Landfill – West Lobe 154
Photo 309: Soil sample [DM-31] (2 after excavation), Upper site West Landfill – West Lobe 155
Photo 310: Soil sample [DM-31] (3 after backfilling), Upper site West Landfill – West Lobe 155
Photo 311: Soil sample [DM-34] (2 after excavation), Upper site West Landfill – West Lobe 156
Photo 312: Soil sample [DM-34] (3 after backfilling), Upper site West Landfill – West Lobe 156
Photo 313: Soil sample [DM-53] (1 after backfilling)), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 157
Photo 314: Soil sample [DM-53] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 157
Photo 315: Soil sample [DM-53] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 158
Photo 316: Soil sample [DM-54] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 158
Photo 317: Soil sample [DM-54] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 159
Photo 318: Soil sample [DM-54] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 159
Photo 319: Soil sample [DM-55] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 160
Photo 320: Soil sample [DM-55] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 160
Photo 321: Soil sample [DM-55] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 161
Photo 322: Soil sample [DM-56] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 161
Photo 323: Soil sample [DM-56] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 162
Photo 324: Soil sample [DM-56] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 162
Photo 325: Soil sample [DM-57] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe 163

Photo 326: Soil sample [DM-57] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....163
Photo 327: Soil sample [DM-58] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....164
Photo 328: Soil sample [DM-59] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....164
Photo 329: Soil sample [DM-59] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....165
Photo 330: Soil sample [DM-59] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....165
Photo 331: Soil sample [DM-60] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....166
Photo 332: Soil sample [DM-60] (3 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....166
Photo 333: Soil sample [DM-61] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....167
Photo 334: Soil sample [DM-61] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....167
Photo 335: Soil sample [DM-61] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....168
Photo 336: Soil sample [DM-62] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....168
Photo 337: Soil sample [DM-62] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....169
Photo 338: Soil sample [DM-62] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe....169
Photo 339: Soil sample [DM-07] (1 before excavation), Lower Site NWS....170
Photo 340: Soil sample [DM-07] (2 after excavation), Lower Site NWS....170
Photo 341: Soil sample [DM-07] (3 after backfilling), Lower Site NWS....171
Photo 342: Soil sample [DM-08] (1 before excavation), Lower Site NWS....171
Photo 343: Soil sample [DM-08] (2 after excavation), Lower Site NWS....172
Photo 344: Soil sample [DM-08] (3 after backfilling), Lower Site NWS....172
Photo 345: Soil sample [DM-09] (1 before excavation), Lower Site NWS....173
Photo 346: Soil sample [DM-09] (2 after excavation), Lower Site NWS....173
Photo 347: Soil sample [DM-09] (3 after backfilling), Lower Site NWS....174
Photo 348: Soil sample [DM-10] (1 before excavation), Lower Site NWS....174
Photo 349: Soil sample [DM-10] (2 after excavation), Lower Site NWS....175
Photo 350: Soil sample [DM-10] (3 after backfilling), Lower Site NWS....175
Photo 351: Soil sample [DM-11] (1 before excavation), Upper Site Helipad Landfill....176
Photo 352: Soil sample [DM-11] (2 after excavation), Upper Site Helipad Landfill....176
Photo 353: Soil sample [DM-11] (3 after backfilling), Upper Site Helipad Landfill....177
Photo 354: Soil sample [DM-12] (1 before excavation), Upper Site Helipad Landfill....177
Photo 355: Soil sample [DM-12] (2 after excavation), Upper Site Helipad Landfill....178
Photo 356: Soil sample [DM-12] (3 after backfilling), Upper Site Helipad Landfill....178
Photo 357: Soil sample [DM-13] (1 before excavation), Upper Site Helipad Landfill....179
Photo 358: Soil sample [DM-13] (2 after excavation), Upper Site Helipad Landfill....179
Photo 359: Soil sample [DM-13] (3 after backfilling), Upper Site Helipad Landfill....180

Photo 360: Soil sample [DM-14] (1 before excavation), Upper Site Helipad Landfill 180
Photo 361: Soil sample [DM-14] (2 after excavation), Upper Site Helipad Landfill 181
Photo 362: Soil sample [DM-14] (3 after backfilling), Upper Site Helipad Landfill 181
Photo 363: Soil sample [DM-15] (2 after excavation), Upper Site Helipad Landfill 182
Photo 364: Soil sample [DM-15] (3 after backfilling), Upper Site Helipad Landfill 182
Photo 365: Soil sample [DM-16] (1 before excavation), Upper Site Helipad Landfill 183
Photo 366: Soil sample [DM-16] (2 after excavation), Upper Site Helipad Landfill 183
Photo 367: Soil sample [DM-16] (3 after backfilling), Upper Site Helipad Landfill 184
Photo 368: Soil sample [DM-17] (1 before excavation), Upper Site Helipad Landfill 184
Photo 369: Soil sample [DM-17] (2 after excavation), Upper Site Helipad Landfill 185
Photo 370: Soil sample [DM-17] (3 after backfilling), Upper Site Helipad Landfill 185
Photo 371: Soil sample [DM-18] (1 before excavation), Upper Site NWS Landfill 186
Photo 372: Soil sample [DM-18] (2 after excavation), Upper Site NWS Landfill 186
Photo 373: Soil sample [DM-18] (3 after backfilling), Upper Site NWS Landfill 187
Photo 374: Soil sample [DM-20] (1 before excavation), Upper Site NWS Landfill 187
Photo 375: Soil sample [DM-21] (unable to sample due to deep snow), Upper Site NWS Landfill 188
Photo 376: Soil sample [DM-22] (1 before excavation), Upper Site NWS Landfill 188
Photo 377: Soil sample [DM-22] (2 after excavation), Upper Site NWS Landfill 189
Photo 378: Soil sample [DM-22] (3 after backfilling), Upper Site NWS Landfill 189
Photo 379: Soil sample [DM-27] (unable to sample due to deep snow), Upper Site South Landfill West 190
Photo 380: Soil sample [DM-28] (1 before excavation), Upper Site South Landfill West 190
Photo 381: Soil sample [DM-28] (2 after excavation), Upper Site South Landfill West 191
Photo 382: Soil sample [DM-28] (3 after backfilling), Upper Site South Landfill West 191
Photo 383: Soil sample [DM-30] (1 before excavation), Upper Site South Landfill West 192
Photo 384: Soil sample [DM-30] (2 after excavation), Upper Site South Landfill West 192
Photo 385: Soil sample [DM-30] (3 after backfilling), Upper Site South Landfill West 193
Photo 386: Soil sample [DM-32] (1 before excavation), Upper Site West Landfill – West Lobe 193
Photo 387: Soil sample [DM-32] (2 after excavation), Upper Site West Landfill – West Lobe 194
Photo 388: Soil sample [DM-32] (3 after backfilling), Upper Site West Landfill – West Lobe 194
Photo 389: Soil sample [DM-33] (1 before excavation), Upper Site West Landfill – West Lobe 195
Photo 390: Soil sample [DM-33] (2 after excavation), Upper Site West Landfill – West Lobe 195
Photo 391: Soil sample [DM-33] (3 after backfilling), Upper Site West Landfill – West Lobe 196
Photo 392: Soil sample [DM-34] (1 before excavation), Upper Site West Landfill – West Lobe 196
Photo 393: Soil sample [DM-34] (2 after excavation), Upper Site West Landfill – West Lobe 197
Photo 394: Soil sample [DM-34] (3 after backfilling), Upper Site West Landfill – West Lobe 197
Photo 395: Soil sample [DM-35] (1 before excavation), Upper Site West Landfill – West Lobe 198
Photo 396: Soil sample [DM-35] (2 after excavation), Upper Site West Landfill – West Lobe 198
Photo 397: Soil sample [DM-35] (3 after backfilling), Upper Site West Landfill – West Lobe 199
Photo 398: Soil sample [DM-36] (1 before excavation), Upper Site West Landfill – West Lobe 199
Photo 399: Soil sample [DM-37] (1 before excavation), Upper Site West Landfill – West Lobe 200
Photo 400: Soil sample [DM-37] (2 after excavation), Upper Site West Landfill – West Lobe 200
Photo 401: Soil sample [DM-37] (3 after backfilling), Upper Site West Landfill – West Lobe 201
Photo 402: Soil sample [DM-38] (1 before excavation), Upper Site West Landfill – West Lobe 201
Photo 403: Soil sample [DM-38] (2 after excavation), Upper Site West Landfill – West Lobe 202

Photo 404: Soil sample [DM-38] (3 after backfilling), Upper Site West Landfill – West Lobe 202
Photo 405: Soil sample [DM-39] (1 before excavation), Upper Site West Landfill – West Lobe 203
Photo 406: Soil sample [DM-39] (2 after excavation), Upper Site West Landfill – West Lobe 203
Photo 407: Soil sample [DM-39] (3 after backfilling), Upper Site West Landfill – West Lobe 204
Photo 408: Soil sample [DM-40] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 204
Photo 409: Soil sample [DM-40] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 205
Photo 410: Soil sample [DM-40] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 205
Photo 411: Soil sample [DM-41] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 206
Photo 412: Soil sample [DM-41] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 206
Photo 413: Soil sample [DM-41] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 207
Photo 414: Soil sample [DM-42] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 207
Photo 415: Soil sample [DM-42] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 208
Photo 416: Soil sample [DM-42] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 208
Photo 417: Soil sample [DM-43] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 209
Photo 418: Soil sample [DM-43] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 209
Photo 419: Soil sample [DM-43] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 210
Photo 420: Soil sample [DM-44] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 210
Photo 421: Soil sample [DM-44] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 211
Photo 422: Soil sample [DM-44] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 211
Photo 423: Soil sample [DM-45] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 212
Photo 424: Soil sample [DM-45] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 212
Photo 425: Soil sample [DM-45] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 213
Photo 426: Soil sample [DM-46] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 213
Photo 427: Soil sample [DM-46] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 214
Photo 428: Soil sample [DM-46] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 214
Photo 429: Soil sample [DM-47] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 215

Photo 430: Soil sample [DM-47] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 215
Photo 431: Soil sample [DM-47] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 216
Photo 432: Soil sample [DM-48] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 216
Photo 433: Soil sample [DM-48] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 217
Photo 434: Soil sample [DM-48] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 217
Photo 435: Soil sample [DM-49[(3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 218
Photo 436: Soil sample [DM-49] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 218
Photo 437: Soil sample [DM-49] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 219
Photo 438: Soil sample [DM-50] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 219
Photo 439: Soil sample [DM-50] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 220
Photo 440: Soil sample [DM-50] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 220
Photo 441: Soil sample [DM-51] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 221
Photo 442: Soil sample [DM-51] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 221
Photo 443: Soil sample [DM-51] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 222
Photo 444: Soil sample [DM-52] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe 222
Photo 445: Soil sample [DM-52] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe 223
Photo 446: Soil sample [DM-52] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe 223
Photo 447: Soil sample [MW05-05] (1 before excavation), Lower Site Powerhouse landfill 224
Photo 448: Soil sample [MW05-06] (1 before excavation), Lower Site Powerhouse landfill 224
Photo 449: Soil sample [MW05-06] (2 after excavation), Lower Site Powerhouse landfill 225
Photo 450: Soil sample [MW05-07] (1 before excavation), Lower Site Powerhouse landfill 225
Photo 451: Soil sample [MW05-07] (2 after excavation), Lower Site Powerhouse landfill 226
Photo 452: Soil sample [MW05-07] (3 after backfilling), Lower Site Powerhouse landfill 226
Photo 453: Soil sample [MW05-08] (1 before excavation), Lower Site Powerhouse landfill 227
Photo 454: Soil sample [MW05-08] (2 after excavation), Lower Site Powerhouse landfill 227
Photo 455: Soil sample [MW05-08] (3 after backfilling), Lower Site Powerhouse landfill 228
Photo 456: Soil sample [MW05-09] (1 before excavation), Lower Site NHWL 228
Photo 457: Soil sample [MW05-09] (3 after backfilling), Lower Site NHWL 229
Photo 458: Soil sample [MW05-09] 2(after excavation), Lower Site NHWL 229
Photo 459: Soil sample [MW05-12] (1 before excavation), Lower Site NHWL 230

Photo 460: Soil sample [MW05-12] (2 after excavation), Lower Site NHWL....230
Photo 461: Soil sample [MW05-12] (3 after backfilling), Lower Site NHWL....231
Photo 462: Soil sample [MW05-13] (1 before excavation) Lower Site Tier II Disposal Facility....231
Photo 463: Soil sample [MW05-13] (2 after excavation) Lower Site Tier II Disposal Facility....232
Photo 464: Soil sample [MW05-13] (3 after backfilling) Lower Site Tier II Disposal Facility....232
Photo 465: Soil sample [MW05-15] (1 before excavation) Lower Site Tier II Disposal Facility....233
Photo 466: Soil sample [MW05-15] (2 after excavation) Lower Site Tier II Disposal Facility....233
Photo 467: Soil sample [MW05-15] (3 after backfilling) Lower Site Tier II Disposal Facility....234
Photo 468: Soil sample [MW05-16], (1 before excavation) Lower Site Tier II Disposal Facility....234
Photo 469: Soil sample [MW05-16], (2 after excavation) Lower Site Tier II Disposal Facility....235
Photo 470: Soil sample [MW05-16], (3 after backfilling) Lower Site Tier II Disposal Facility....235
Photo 471: Soil sample [MW06-19], (1 before excavation) Upper Site – NHWL....236
Photo 472: Soil sample [MW06-19], (2 after excavation) Upper Site – NHWL....236
Photo 473: Soil Sample [MW06-19] (3 after backfilling) Upper Site – NHWL....237
Photo 474: Soil sample [MW06-20], (1 before excavation) Upper Site – NHWL....237
Photo 475: Soil sample [MW06-20], (2 after excavation) Upper Site – NHWL....238
Photo 476: Soil Sample [MW06-20] (3 after backfilling) Upper Site – NHWL....238
Photo 477: Soil sample [MW07-21], (1 before excavation) Upper Site – NHWL....239
Photo 478: Soil sample [MW07-21], (2 after excavation) Upper Site – NHWL....239
Photo 479: Soil Sample [MW07-21] (3 after backfilling) Upper Site – NHWL....240
Photo 480: Soil sample [MW07-22] (1 before excavation), Upper Site – Tier II Disposal Facility....240
Photo 481: Soil sample [MW07-22] (2 after excavation), Upper Site – Tier II Disposal Facility....241
Photo 482: Soil sample [MW07-22] (3 after backfilling), Upper Site – Tier II Disposal Facility....241
Photo 483: Soil sample [MW07-23] (1 before excavation), Upper Site – Tier II Disposal Facility....242
Photo 484: Soil sample [MW07-23] (2 after excavation), Upper Site – Tier II Disposal Facility....242
Photo 485: Soil sample [MW07-23] (3 after backfilling), Upper Site – Tier II Disposal Facility....243
Photo 486: Soil sample [MW08-24] (1 before excavation), Upper Site – Tier II Disposal Facility....243
Photo 487: Soil sample [MW08-25] (1 before excavation), Upper Site – Tier II Disposal Facility....244
Photo 488: Soil sample [MW08-25] (2 after excavation), Upper Site – Tier II Disposal Facility....244
Photo 489: Soil sample [MW08-25] (3 after backfiling), Upper Site – Tier II Disposal Facility....245
Photo 490: Soil sample [MW09-26] (1 before excavation), Lower Site NHWL....245
Photo 491: Soil sample [MW09-26] (2 after excavation), Lower Site NHWL....246
Photo 492: Soil sample [MW09-26] (3 after backfilling), Lower Site NHWL....246
Photo 493: Soil sample [MW09-27] (1 before excavation), Lower Site NHWL....247
Photo 494: Soil sample [MW09-27] (2 after excavation), Lower Site NHWL....247
Photo 495: Soil sample [MW09-27] (3 after backfilling), Lower Site NHWL....248
Photo 496: Soil sample [MW09-28] (2 after excavation), Lower Site NHWL....248
Photo 497: Soil sample [MW09-28] (3 after backfilling), Lower Site NHWL....249
Photo 498: Soil Sample [MW12-01] (1 before excavation) Lower Site Tier II Disposal Facility....249
Photo 499: Soil Sample [MW12-01] (2 after excavation) Lower Site Tier II Disposal Facility....250
Photo 500: Soil Sample [MW12-01] (3 after backfilling) Lower Site Tier II Disposal Facility....250
Photo 501: Soil sample [MW12-02] (unable to sample due to deep snow) Upper Site – Tier II Disposal Facility....251
Photo 502: Thermistor VT6 – Lower Site – Powerhouse Landfill....251
Photo 503: Thermistor VT5 – Lower Site – Powerhouse Landfill....252

Photo 504: Thermistor VT7 – Lower Site – Powerhouse Landfill 252
Photo 505: Thermistor VT3 – Lower Site – Tier II Disposal Facility 253
Photo 506: Thermistor VT1 – Lower Site – Tier II Disposal Facility 253
Photo 507: Thermistor VT2 – Lower Site – Tier II Disposal Facility 254
Photo 508: Thermistor VT4 – Lower Site – Tier II Disposal Facility 254
Photo 509: Thermistor VTBL – Lower Site – Tier II Disposal Facility 255
Photo 510: Thermistor VT11 – Upper Site – Tier II Disposal Facility 255
Photo 511: Thermistor VT10 – Upper Site – Tier II Disposal Facility 256
Photo 512: Thermistor VT9 – Upper Site – Tier II Disposal Facility 256
Photo 513: Thermistor VT8 – Upper Site – Tier II Disposal Facility 257
Photo 514: Thermistor VT BU – Upper Site – Tier II Disposal Facility 257

Photo 1: *Lower Site Crossroads Landfill – Southwest slope from road (ATT301_Photo1.jpg) (ATT302_Photo2.jpg) (ATT303_Photo3.jpg)*

Photo 2: *Lower Site Crossroads Landfill – Feature F, ponded water at southwest toe (ATT304_Photo1.jpg)*

Photo 3: *Lower Site Crossroads Landfill – Feature B, sparse grass on slopes and crest surface (ATT305_Photo1.jpg)*

Photo 4: *Lower Site Crossroads Landfill – Feature G, minor thaw creep tension cracks on southeast slope (ATT306_Photo1.jpg)*

Photo 5: *Lower Site Crossroads Landfill – Side slopes from east end corner (ATT307_Photo1.jpg) (ATT308_Photo2.jpg)*

Photo 6: *Lower Site Crossroads Landfill – Feature H, minor thaw crack on northeast slope (ATT309_Photo1.jpg)*

Photo 7: *Lower Site Crossroads Landfill – North slope, facing northwest (ATT310_Photo1.jpg)*

Photo 8: *Lower Site Crossroads Landfill – Feature I, minor thaw crack on north slope (ATT311_Photo1.jpg)*

Photo 9: *Lower Site Crossroads Landfill – Northwest corner facing southeast (ATT312_Photo1.jpg)*

Photo 10: *Lower Site Crossroads Landfill – Cover surface, facing southeast (ATT313_Photo1.jpg)*

Photo 11: *Lower Site Crossroads Landfill – Crest surface, facing northwest – Feature J, weathered tire/dozer tracks (ATT314_Photo1.jpg)*

Photo 12: *Lower Site Foundation Landfill – Southeast view of landfill (ATT315_Photo1.jpg)*

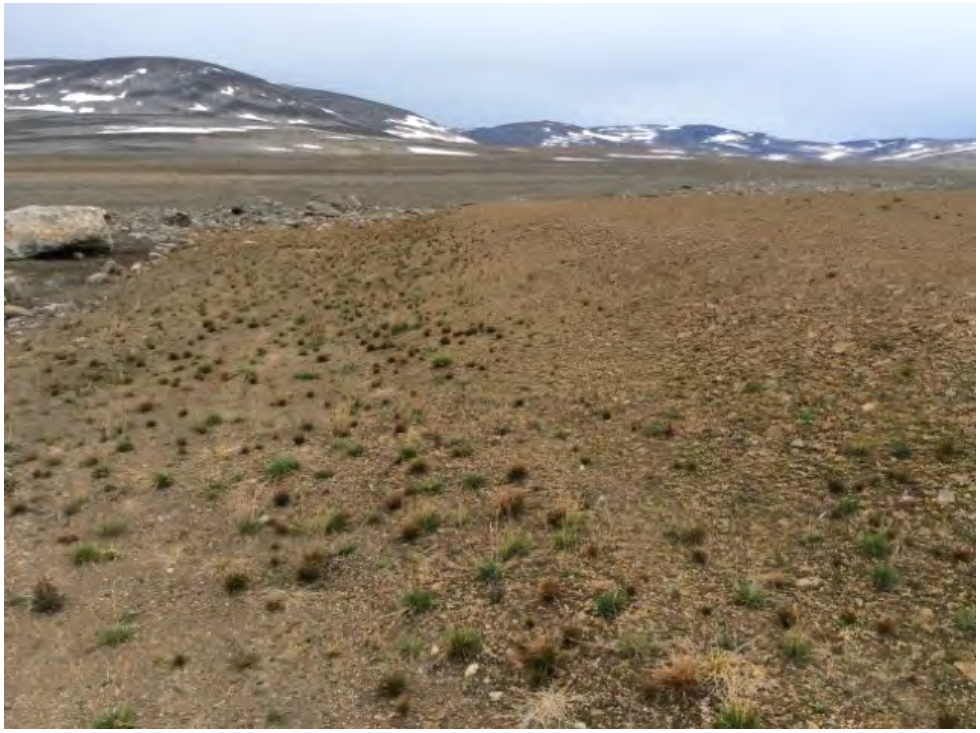


Photo 13: *Lower Site Foundation Landfill – Northwest slope, facing northeast (Feature D) (ATT316_Photo1.jpg)*

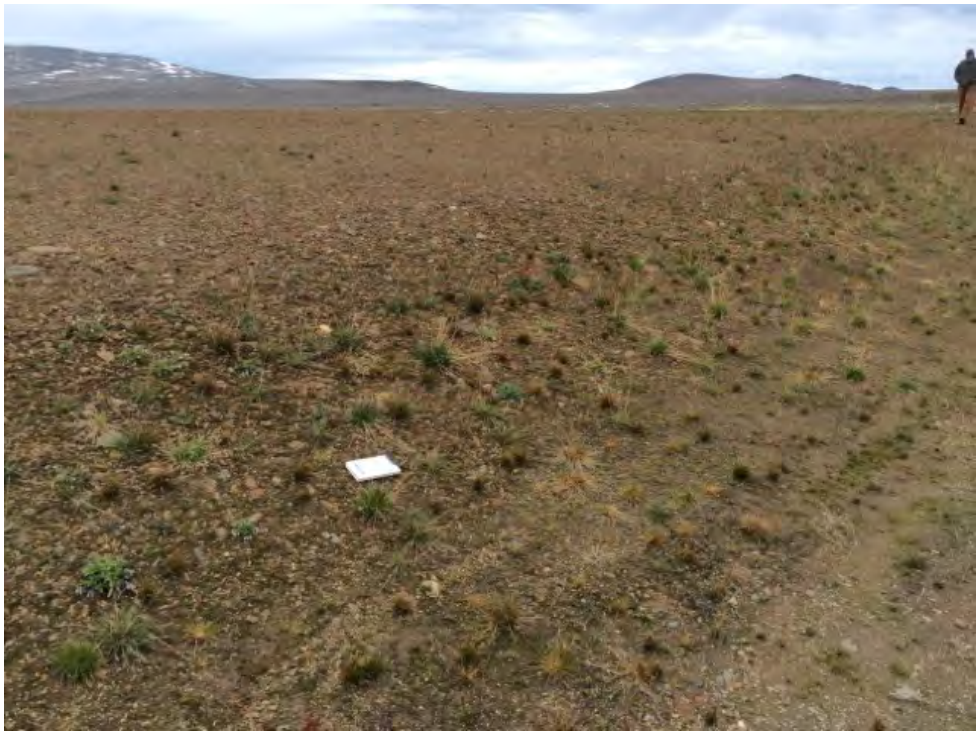


Photo 14: *Lower Site Foundation Landfill – Feature D, moderate grass vegetation (ATT317_Photo1.jpg)*

Photo 15: *Lower Site Foundation Landfill – Crest at south end, Feature D, moderately vegetated (ATT318_Photo1.jpg)*

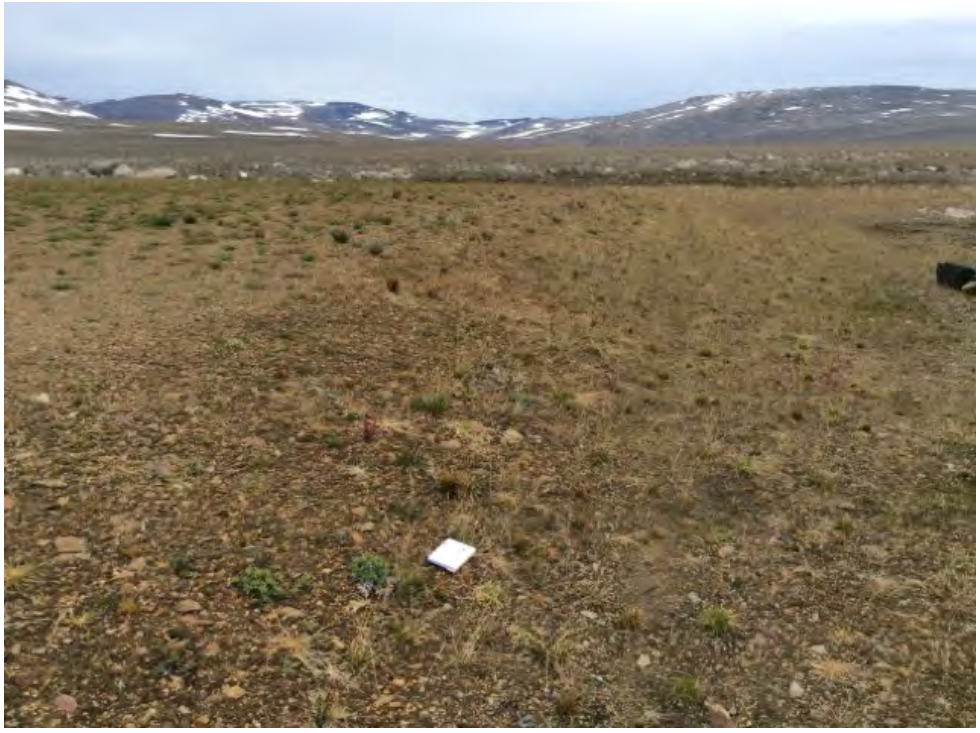


Photo 16: *Lower Site Foundation Landfill – South slope, facing east (ATT319_Photo1.jpg)*

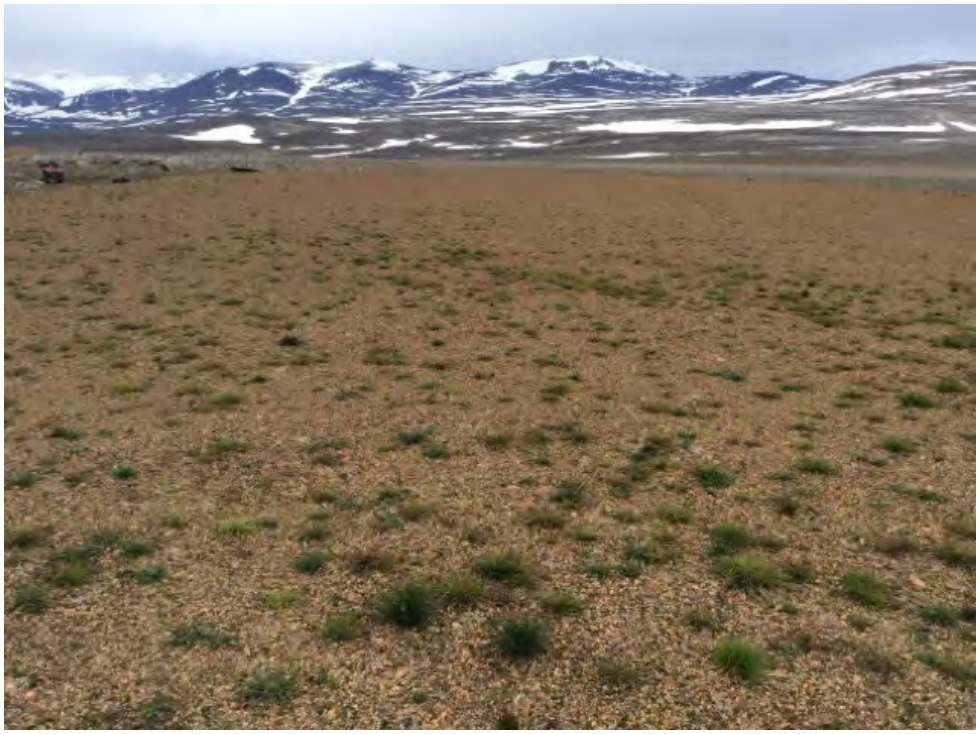


Photo 17: Lower Site Foundation Landfill – Crest surface facing north (Feature D) (ATT320_Photo1.jpg)

Photo 18: Lower Site Foundation Landfill – Feature K, minor thaw crack at south crest (ATT321_Photo1.jpg)

Photo 19: *Lower Site Foundation Landfill – Feature L, minor thaw crack on southeast slope (ATT322_Photo1.jpg)*

Photo 20: *Lower Site Foundation Landfill – East slope, facing west – 3 photo panorama (ATT323_Photo1.jpg) (ATT324_Photo2.jpg) (ATT325_Photo3.jpg)*

Photo 21: *Lower Site Foundation Landfill – South end crest surface – Feature D, moderately vegetated with grasses (ATT326_Photo1.jpg)*

Photo 22: *Lower Site Foundation Landfill – Feature M, minor settlement depression (ATT327_Photo1.jpg)*

Photo 23: *Lower Site Foundation Landfill – Feature N, minor thaw cracks at crest corner (ATT328_Photo1.jpg)*

Photo 24: *Lower Site Foundation Landfill – Landfill from north end, facing south (ATT329_Photo1.jpg) (ATT330_Photo2.jpg)*

Photo 25: *Lower Site Foundation Landfill – Crest surface facing south towards hangar – More grass vegetation at south end (Feature D) (ATT331_Photo1.jpg)*

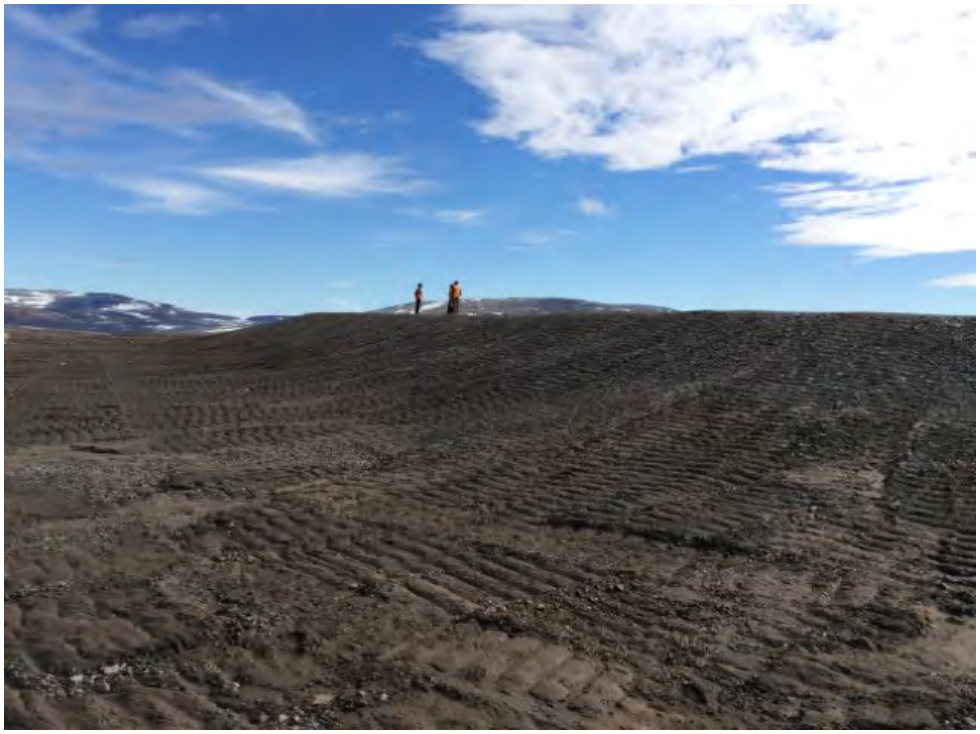


Photo 26: *Lower Site Non-Haz Waste Landfill – North toe, facing northeast (ATT3_Photo1.jpg)*

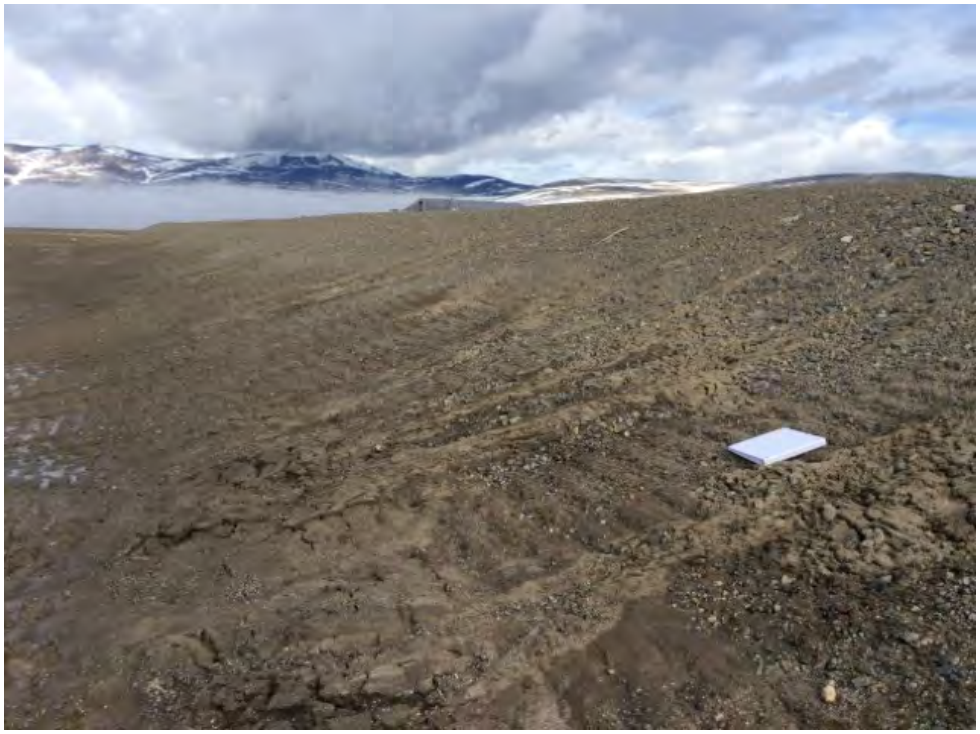


Photo 27: *Lower Site Non-Haz Waste Landfill – Feature D, minor self-armouring erosion on west slope with fines washing down slope (ATT4_Photo1.jpg)*

Photo 28: *Lower Site Non-Haz Waste Landfill – Feature E, Ponded water along west toe – Entire east toe, 10 m wide (ATT5_Photo1.jpg)*

Photo 29: Lower Site Non-Haz Waste Landfill – South slope, facing east (ATT6_Photo1.jpg)

Photo 30: Lower Site Non-Haz Waste Landfill – Feature F, ponded thaw water at south toe (ATT7_Photo1.jpg)

Photo 31: *Lower Site Non-Haz Waste Landfill – East slope, facing north (ATT8_Photo1.jpg)*

Photo 32: *Lower Site Non-Haz Waste Landfill – Feature G, Sparse grass on south slope (ATT9_Photo1.jpg)*

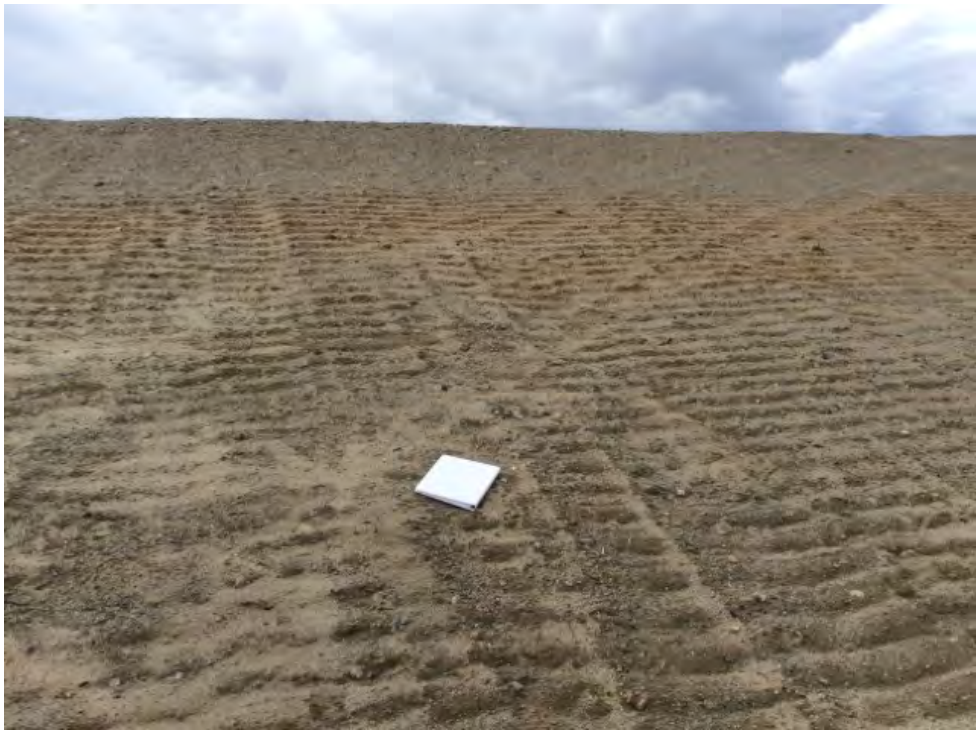


Photo 33: *Lower Site Non-Haz Waste Landfill – Feature C, tire tracks previously observed on east slope (ATT10_Photo1.jpg)*

Photo 34: *Lower Site Non-Haz Waste Landfill – Feature H, self-armouring erosion on east slope – Fines accumulating at toe washed from above (ATT11_Photo1.jpg)*

Photo 35: *Lower Site Non-Haz Waste Landfill – Feature I, ponded water at east toe and Feature G, spare grasses on east slope (ATT12_Photo1.jpg)*

Photo 36: *Lower Site Non-Haz Waste Landfill – North slope, facing south (ATT13_Photo2.jpg)*

Photo 37: *Lower Site Non-Haz Waste Landfill – North slope facing south towards monument (ATT14_Photo1.jpg)*

Photo 38: *Lower Site Non-Haz Waste Landfill – Feature J, previously noted tire tracks – No degradation (ATT15_Photo1.jpg)*

Photo 39: Lower Site Non-Haz Waste Landfill – North crest, facing west (ATT16_Photo1.jpg)

Photo 40: Lower Site Non-Haz Waste Landfill – Feature K, minor crack along west crest (ATT17_Photo1.jpg)

Photo 41: *Lower Site Non-Haz Waste Landfill – Crest surface facing northwest (ATT18_Photo1.jpg)*

Photo 42: *Lower Site Non-Haz Waste Landfill – East slope with minor self-armouring erosion (Feature H) (ATT19_Photo1.jpg)*

Photo 43: *Lower Site Non-Haz Waste Landfill – Feature L, minor thaw crack along north crest edge, facing west (ATT20_Photo1.jpg)*

Photo 44: *Lower Site Non-Haz Waste Landfill – Feature L, minor thaw crack along crest edge (ATT21_Photo1.jpg)*

Photo 45: *Lower Site Non-Haz Waste Landfill – Cover surface, facing west (ATT22_Photo1.jpg)*

Photo 46: *Lower Site Non-Haz Waste Landfill – Cover surface, facing north (ATT23_Photo1.jpg)*

Photo 47: *Lower Site NWS Landfill – Southeast slope, facing northwest – Feature G, sparse vegetation (ATT189_Photo1.jpg)*

Photo 48: *Lower Site NWS Landfill – Feature C, tire track on cover surface, facing northwest (ATT191_Photo2.jpg)*

Photo 49: *Lower Site NWS Landfill – Southwest crest and slope, facing northwest (ATT192_Photo1.jpg)*

Photo 50: *Lower Site NWS Landfill – Southwest slope and crest, facing southeast – Feature B, sparse vegetation (ATT193_Photo1.jpg)*

Photo 51: *Lower Site NWS Landfill – Northwest slope and crest, facing northeast – Feature B, sparse vegetation (ATT194_Photo1.jpg)*

Photo 52: *Lower Site NWS Landfill – Northeast slope and crest, facing southeast – Feature B, sparse vegetation (ATT195_Photo1.jpg)*

Photo 53: *Lower Site NWS Landfill – Cover surface, facing southeast from the northwest crest edge – Feature D (ATT196_Photo1.jpg)*

Photo 54: *Lower Site NWS Landfill – Southeast slope and crest, facing southwest – Feature B (ATT198_Photo1.jpg)*

Photo 55: *Lower Site NWS Landfill – Feature E, minor settlement on the northeast slope, facing northwest (ATT199_Photo1.jpg)*

Photo 56: *Lower Site NWS Landfill – Northeast slope south end, facing southeast – Feature B (ATT201_Photo2.jpg)*

Photo 57: *Lower Site Powerhouse Landfill – South slope, facing North (ATT24_Photo1.jpg)*

Photo 58: *Lower Site Powerhouse Landfill – Cover surface, facing south (ATT27_Photo1.jpg)*

Photo 59: *Lower Site Powerhouse Landfill – Crest edge along west side, facing southeast (hanger) (ATT28_Photo1.jpg)*

Photo 60: *Lower Site Powerhouse Landfill – South crest edge, facing west (ATT29_Photo1.jpg)*

Photo 61: *Lower Site Powerhouse Landfill – East slope (ATT31_Photo1.jpg)*

Photo 62: *Lower Site Powerhouse Landfill – Feature B, ponded water at east toe (ATT34_Photo1.jpg)*

Photo 63: *Lower Site Powerhouse Landfill – North slope, facing south (ATT35_Photo1.jpg)*

Photo 64: *Lower Site Powerhouse Landfill – Northwest slope, facing southeast from toe (ATT37_Photo1.jpg)*

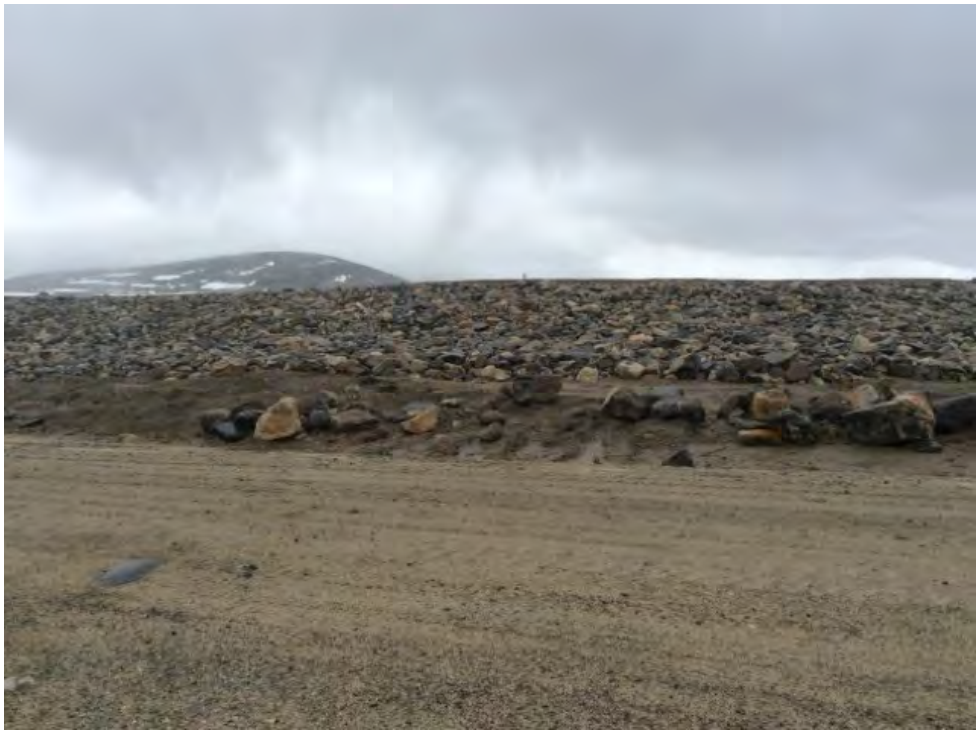


Photo 65: *Lower Site Powerhouse Landfill – West slope, facing east from access road (ATT38_Photo1.jpg)*

Photo 66: *Lower Site Tier II Disposal Facility – East crest surface, facing north (ATT176_Photo1.jpg)*

Photo 67: *Lower Site Tier II Disposal Facility – North crest surface, facing west (ATT177_Photo1.jpg)*

Photo 68: *Lower Site Tier II Disposal Facility – West crest surface, facing south (ATT180_Photo1.jpg)*

Photo 69: *Lower Site Tier II Disposal Facility – South crest surface, facing east (ATT181_Photo1.jpg)*

Photo 70: *Lower Site Tier II Disposal Facility – Feature B, minor self-armouring erosion, facing south from the north end point (ATT183_Photo1.jpg)*

Photo 71: *Lower Site Tier II Disposal Facility – Cover surface, facing north from south crest edge (west half) (ATT185_Photo1.jpg)*

Photo 72: *Lower Site Tier II Disposal Facility – Cover surface, facing north from south crest edge (east half) (ATT186_Photo1.jpg)*

Photo 73: *Lower Site Tier II Disposal Facility – Overview north and west slopes, from VT background facing east (ATT188_Photo1.jpg)*

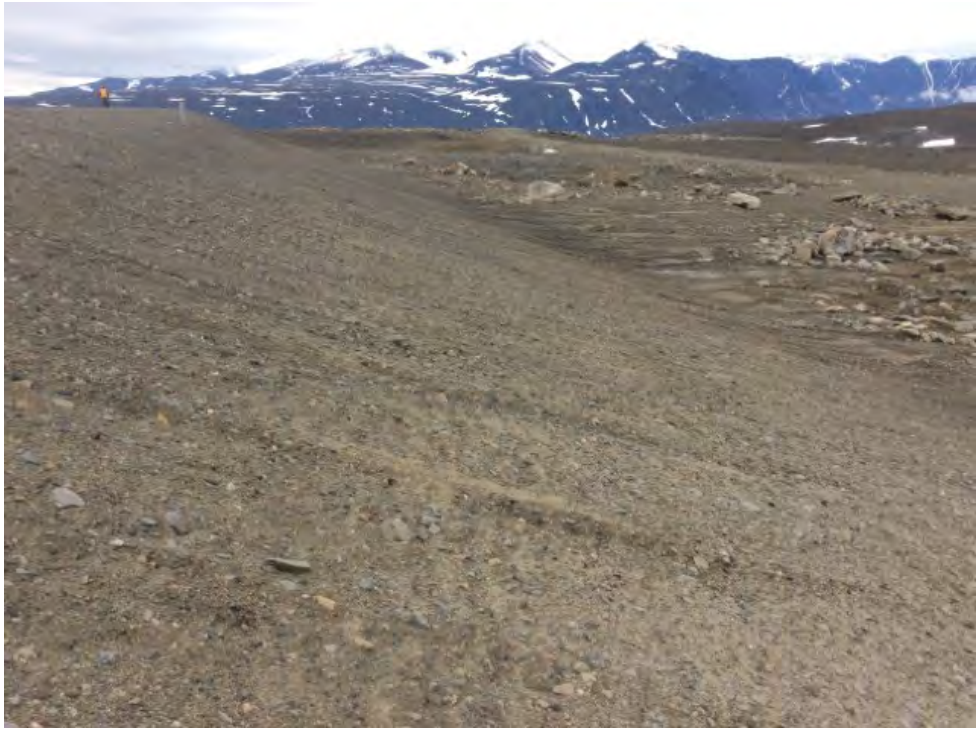


Photo 74: *Lower Site Tier II Disposal Facility – North slope and toe, facing west (ATT203_Photo2.jpg)*

Photo 75: *Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope (ATT204_Photo2.jpg)*

Photo 76: *Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope and accumulation of fines (ATT205_Photo1.jpg)*

Photo 77: *Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope and accumulation of fines at toe, facing north (ATT206_Photo1.jpg)*

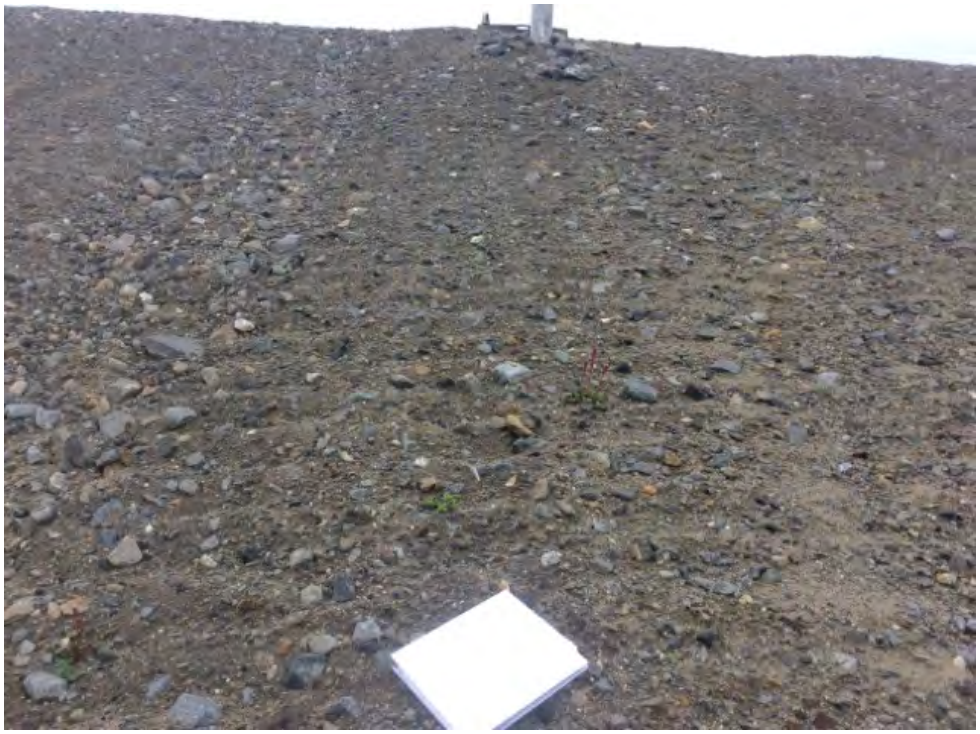


Photo 78: *Lower Site Tier II Disposal Facility – Feature D, sparse vegetation on north slope, (ATT207_Photo1.jpg)*

Photo 79: *Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope, facing north from crest edge (ATT208_Photo1.jpg)*

Photo 80: *Lower Site Tier II Disposal Facility – Feature C, self-armouring erosion on north slope, facing north from crest (ATT209_Photo1.jpg)*

Photo 81: *Lower Site Tier II Disposal Facility – Feature E, wet and soft area in the middle of north slope, facing west from east end – No signs of seepage only wet (ATT210_Photo1.jpg)*

Photo 82: *Lower Site Tier II Disposal Facility – Feature F, sloughing on north slope, wet no sign of seepage, facing the slope (ATT211_Photo1.jpg)*

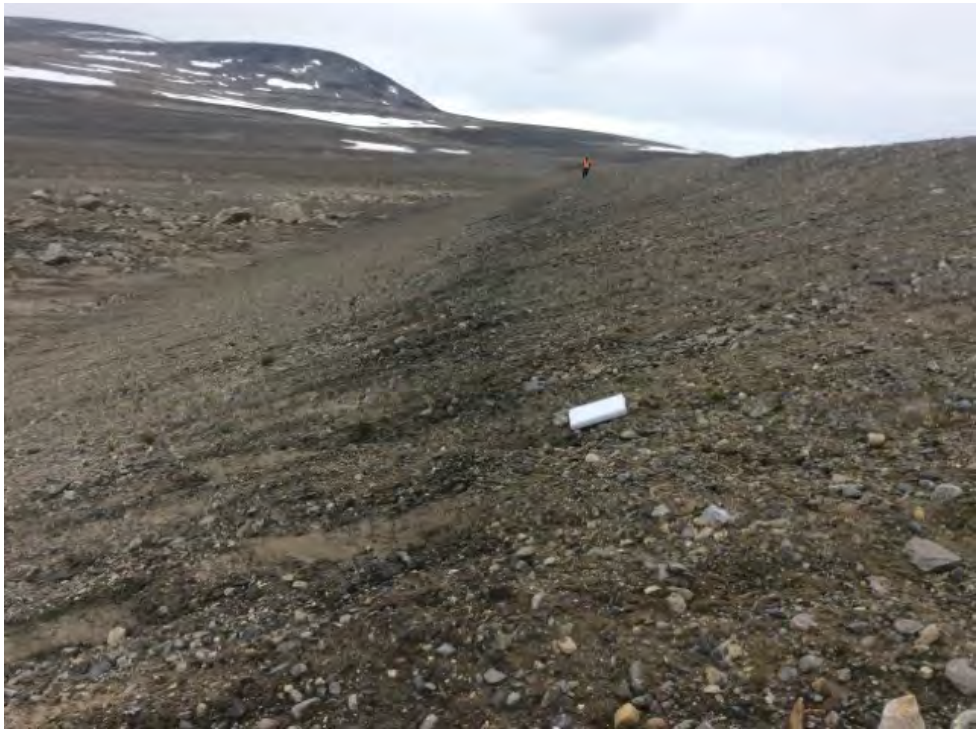


Photo 83: *Lower Site Tier II Disposal Facility – Feature E, wet and soft area in the middle of north slope, facing east from west end – no signs of seepage (ATT212_Photo1.jpg)*

Photo 84: *Lower Site Tier II Disposal Facility – West slope and toe, facing south (ATT213_Photo1.jpg)*

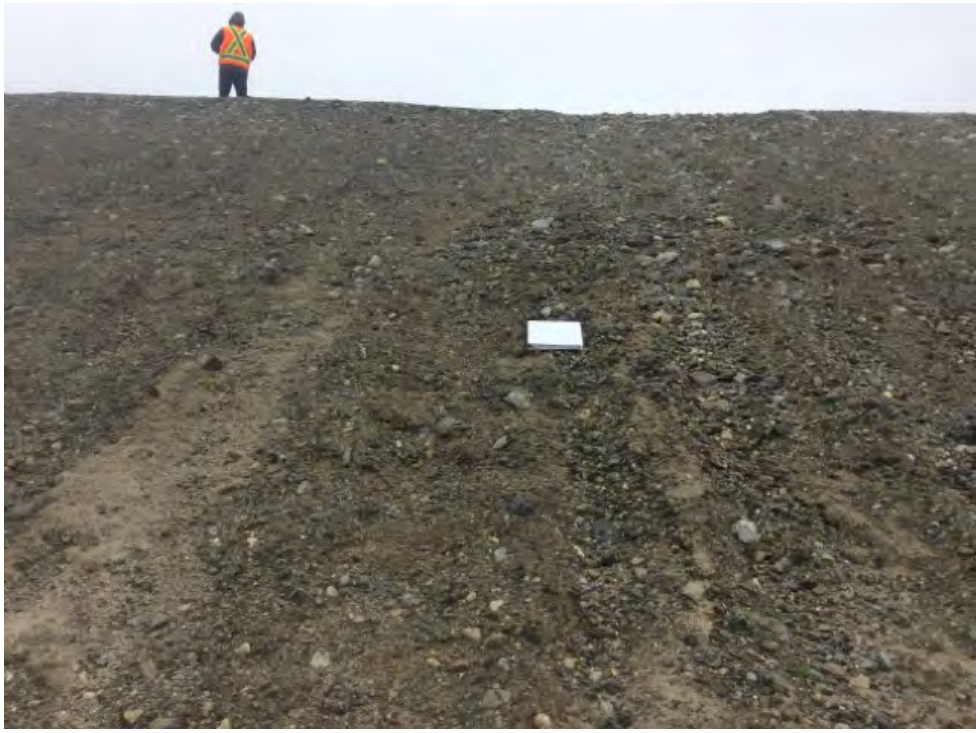


Photo 85: *Lower Site Tier II Disposal Facility – Feature G, self-armouring erosion along west slope (ATT214_Photo1.jpg)*

Photo 86: *Lower Site Tier II Disposal Facility – Feature H, minor sloughing on west slope, no sign of seepage (ATT215_Photo1.jpg)*

Photo 87: *Lower Site Tier II Disposal Facility – Feature D, sparse vegetation on west slope, facing slope (ATT216_Photo1.jpg)*

Photo 88: *Lower Site Tier II Disposal Facility – Feature I, minor crack along west slope near toe, facing south from north endpoint (ATT218_Photo2.jpg)*

Photo 89: *Lower Site Tier II Disposal Facility – Feature I, minor crack on west slope near toe, facing north from south endpoint (ATT219_Photo1.jpg)*

Photo 90: *Lower Site Tier II Disposal Facility – Feature G, self-armouring erosion, west slope facing down from slope (ATT220_Photo1.jpg)*

Photo 91: *Lower Site Tier II Disposal Facility – Feature J, minor crack near crest on west slope, facing south from north endpoint (ATT221_Photo2.jpg)*

Photo 92: *Lower Site Tier II Disposal Facility – South slope and toe, facing east from SW corner – Feature K, frequent self-armouring erosion along south slope (ATT222_Photo1.jpg)*

Photo 93: *Lower Site Tier II Disposal Facility – Feature K, self-armouring erosion on south slope, facing down from south crest edge (ATT223_Photo1.jpg)*

Photo 94: *Lower Site Tier II Disposal Facility – Feature L, minor crack on south slope near crest, facing east from west endpoint (ATT224_Photo1.jpg)*

Photo 95: *Lower Site Tier II Disposal Facility – Feature L, minor crack on south slope near crest – good coarse structure beneath the crack (ATT225_Photo2.jpg)*

Photo 96: *Lower Site Tier II Disposal Facility – Feature L, minor crack on south slope near crest, facing west from east endpoint (ATT226_Photo1.jpg)*

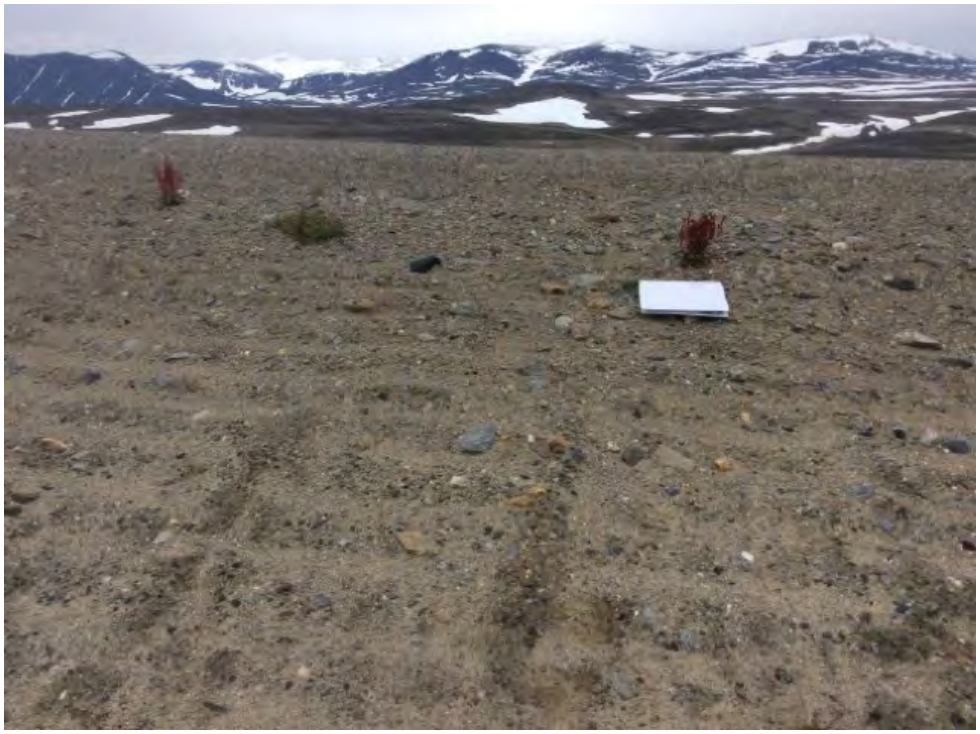


Photo 97: *Lower Site Tier II Disposal Facility – Feature D, sparse vegetation on south slope, facing north (ATT227_Photo1.jpg)*

Photo 98: *Lower Site Tier II Disposal Facility – Feature M, ponded water at east toe, facing north (ATT228_Photo1.jpg)*

Photo 99: *Lower Site Tier II Disposal Facility – Feature M, ponded water at east toe, facing south (ATT229_Photo1.jpg)*

Photo 100: *Lower Site Tier II Disposal Facility – East slope, facing west (ATT230_Photo1.jpg)*

Photo 101: Upper Site Helipad Landfill – Northeast slope, facing northwest from south (ATT116_Photo1.jpg)

Photo 102: Upper Site Helipad Landfill – Southeast slope, facing southwest (ATT117_Photo1.jpg)

Photo 103: *Upper Site Helipad Landfill – Feature A, differential settlement, facing south (ATT118_Photo1.jpg)*

Photo 104: *Upper Site Helipad Landfill – Feature A, differential settlement, facing west (ATT119_Photo1.jpg)*

Photo 105: Upper Site Helipad Landfill – Landfill surface facing north from southeast crest edge (ATT120_Photo1.jpg)

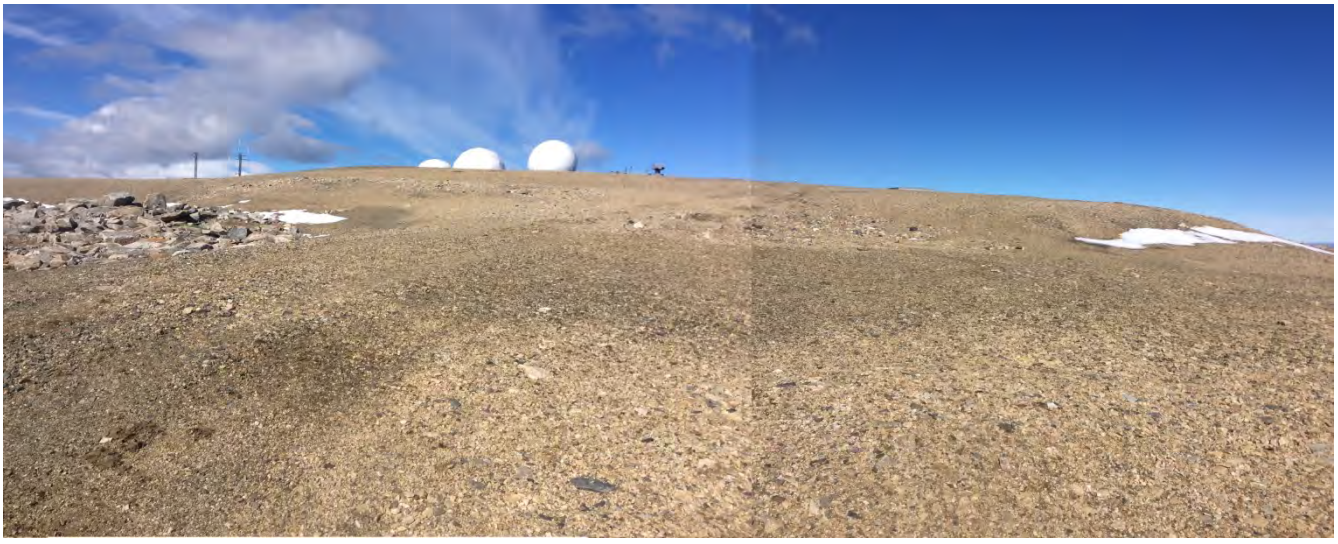


Photo 106: Upper Site Helipad Landfill – South slope, facing north (ATT122_Photo2.jpg) (ATT123_Photo3.jpg)

Photo 107: *Upper Site Helipad Landfill – Feature B, rough area on south slope, facing northwest from southeast endpoint (ATT124_Photo1.jpg)*

Photo 108: *Upper Site Helipad Landfill – Feature B, rough area on south slope, facing southeast from northwest endpoint (ATT125_Photo1.jpg)*

Photo 109: *Upper Site Helipad Landfill – West slope, facing north from southwest corner (ATT126_Photo1.jpg)*

Photo 110: *Upper Site Helipad Landfill – Feature C, settlement, facing east (ATT127_Photo1.jpg)*

Photo 111: *Upper Site Helipad Landfill – Cover surface, facing east from west crest edge (ATT128_Photo1.jpg) (ATT129_Photo2.jpg) (ATT130_Photo3.jpg)*

Photo 112: *Upper Site Helipad Landfill – Feature D, tire track with ponded water, facing southwest (ATT131_Photo1.jpg)*

Photo 113: *Upper Site Helipad Landfill – Cover surface, facing south from north crest (ATT132_Photo1.jpg) (ATT133_Photo2.jpg) (ATT134_Photo3.jpg)*

Photo 114: *Upper Site Non-Haz Waste Landfill – South slope facing west from southeast corner (ATT50_Photo1.jpg)*

Photo 115: Upper Site Non-Haz Waste Landfill – East slope facing north from southeast corner (ATT51_Photo1.jpg)

Photo 116: Upper Site Non-Haz Waste Landfill – South slope, facing west from warehouse (ATT52_Photo2.jpg)

Photo 117: Upper Site Non-Haz Waste Landfill – Southwest slope facing northwest (ATT53_Photo1.jpg)

Photo 118: Upper Site Non-Haz Waste Landfill – West slope, facing north (ATT54_Photo1.jpg)

Photo 119: *Upper Site Non-Haz Waste Landfill – North slope, facing east (ATT55_Photo1.jpg)*

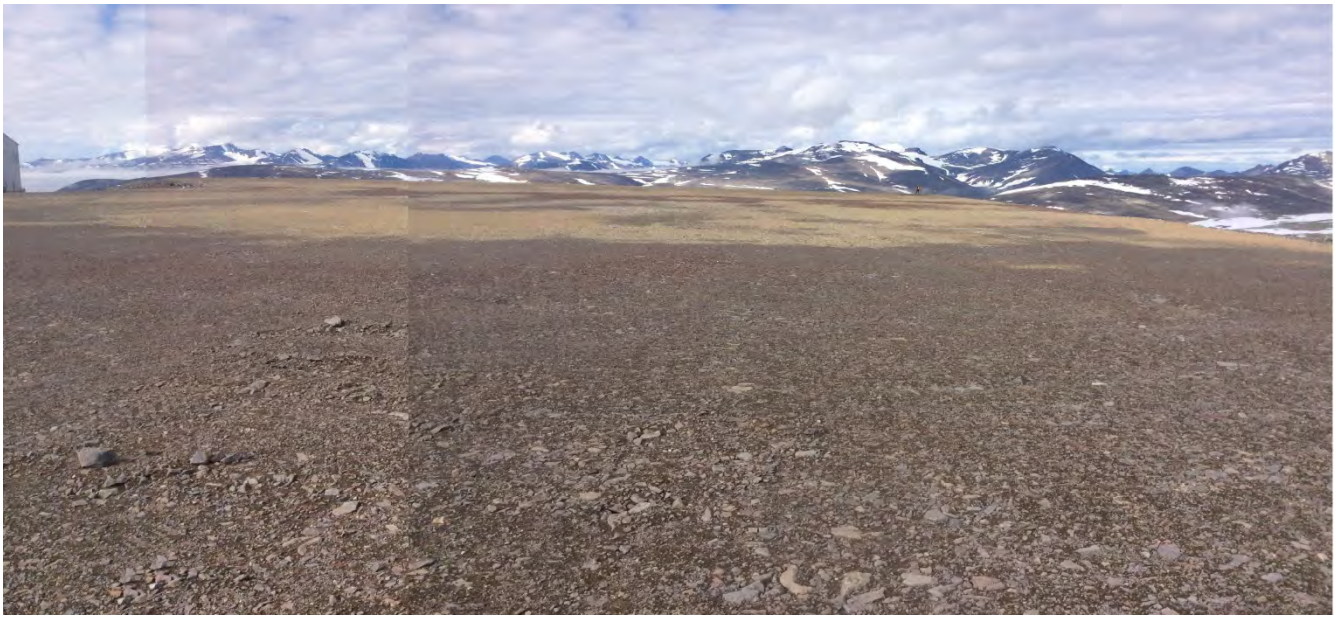


Photo 120: *Upper Site Non-Haz Waste Landfill – Landfill crest surface facing west from east crest edge (ATT56_Photo1.jpg) (ATT57_Photo2.jpg) (ATT58_Photo3.jpg)*

Photo 121: *Upper Site Non-Haz Waste Landfill – Feature B – previously noted as area of segregation in southeast corner of crest (ATT59_Photo1.jpg)*

Photo 122: *Upper Site Non-Haz Waste Landfill – Feature A – Regraded area of east slope with tire tracks – facing south (ATT60_Photo1.jpg)*

Photo 123: Upper Site Non-Haz Waste Landfill – Feature B, area of segregation – facing north (ATT61_Photo1.jpg)

Photo 124: Upper Site Non-Haz Waste Landfill – Feature B, area of segregation – facing south (ATT62_Photo1.jpg)

Photo 125: *Upper Site Non-Haz Waste Landfill – Feature C – ponded water and segregated material on cover surface – facing north (ATT63_Photo1.jpg)*

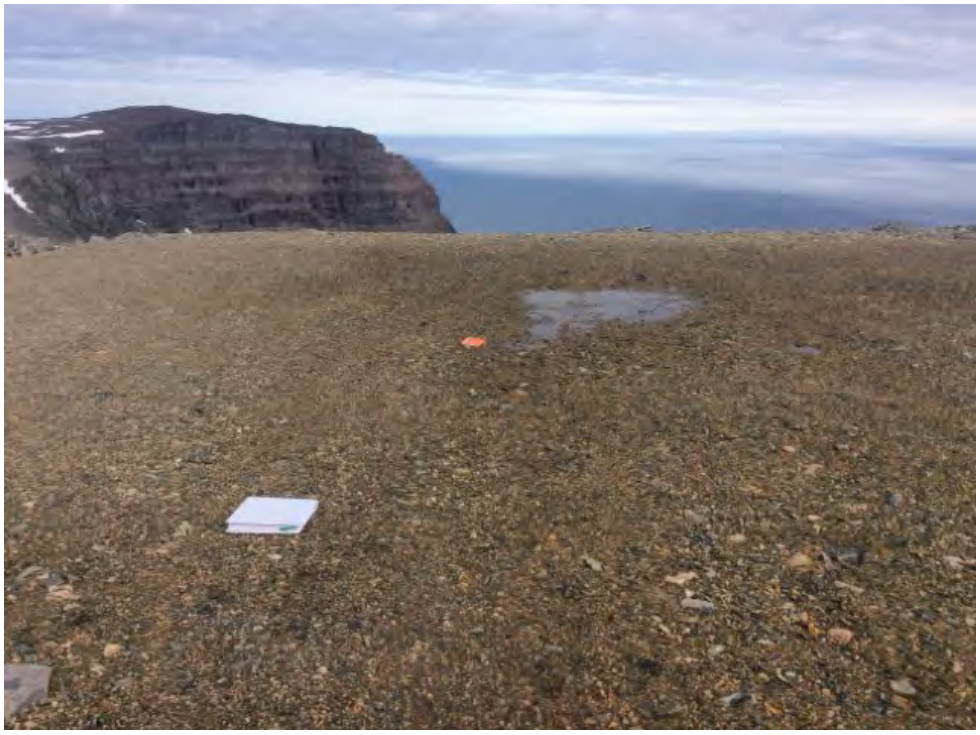


Photo 126: *Upper Site Non-Haz Waste Landfill – Feature D – ponded water on cover surface near north crest and wet area (ATT64_Photo1.jpg)*

Photo 127: *Upper Site Non-Haz Waste Landfill – Feature D – ponded water and wet area along north crest, facing north (ATT65_Photo2.jpg)*

Photo 128: *Upper Site Non-Haz Waste Landfill – Feature D – ponded water and wet area along north crest – facing east (ATT66_Photo1.jpg)*

Photo 129: *Upper Site NWS Landfill – East slope along the road, facing south (ATT95_Photo1.jpg)*

Photo 130: *Upper Site NWS Landfill – Northeast slope and crest, facing northwest from northeast corner (ATT96_Photo1.jpg)*

Photo 131: Upper Site NWS Landfill – Upper south slope, facing northwest from southeast corner (ATT97_Photo1.jpg)

Photo 132: Upper Site NWS Landfill – Lower south slope, facing west (ATT98_Photo1.jpg)

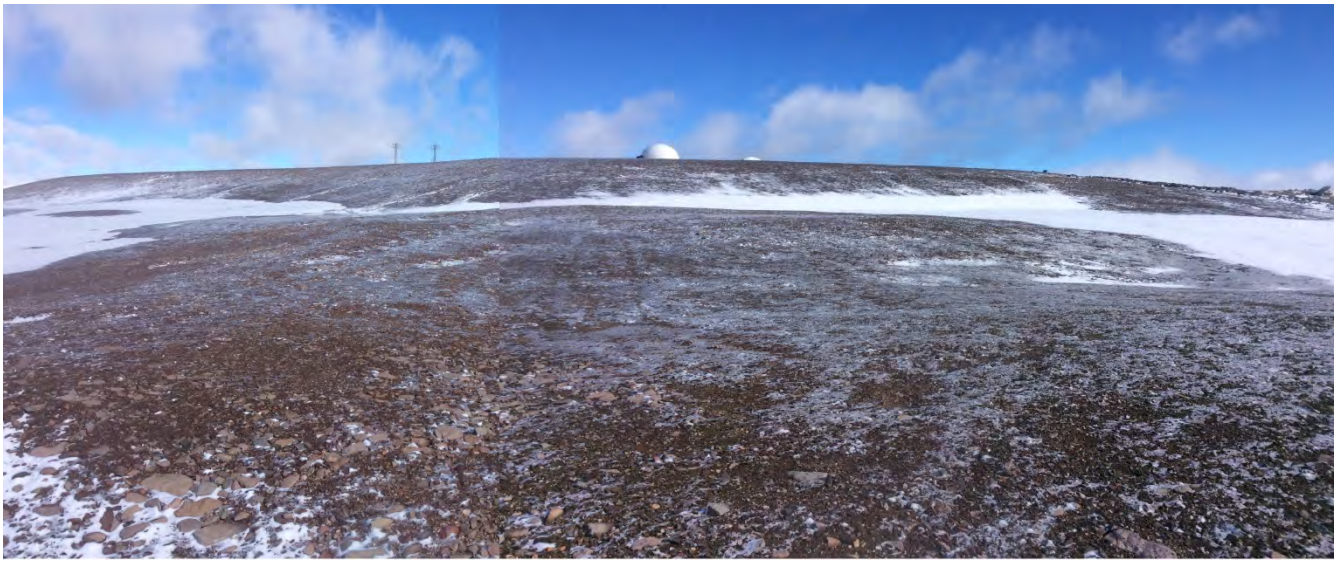


Photo 133: *Upper Site NWS Landfill – Upper south slope, facing N from lower south crest (ATT99_Photo1.jpg) (ATT100_Photo2.jpg)*

Photo 134: *Upper Site NWS Landfill – Feature B, debris, steel cable, lower south slope, facing N (ATT101_Photo1.jpg)*

Photo 135: *Upper Site NWS Landfill – Feature C, minor erosion channel on upper south slope, facing west (ATT102_Photo1.jpg)*

Photo 136: *Upper Site NWS Landfill – Feature C, minor erosion channel on upper south slope, facing slope from toe (ATT103_Photo1.jpg)*

Photo 137: *Upper Site NWS Landfill – Feature C, minor erosion channel on upper south slope, facing slope from toe – (ATT105_Photo2.jpg)*

Photo 138: *Upper Site NWS Landfill – Upper south slope and lower landfill surface, facing northeast from southwest corner (ATT106_Photo1.jpg)*

Photo 139: Upper Site NWS Landfill – West slope, facing north from southwest corner (ATT107_Photo1.jpg)

Photo 140: Upper Site NWS Landfill – Cover surface, facing east from west toe (ATT108_Photo1.jpg)

Photo 141: *Upper Site NWS Landfill – Feature D, minor (self-armouring) erosion channel on surface, facing east from west end – L 9 m, w 10-20 cm (ATT109_Photo1.jpg)*

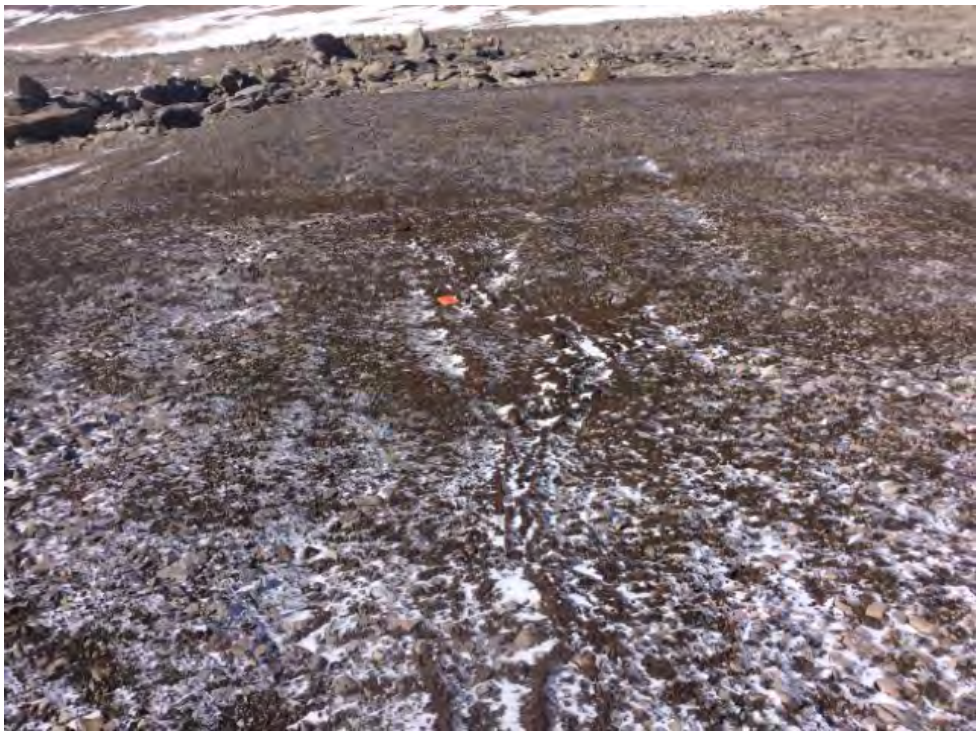


Photo 142: *Upper Site NWS Landfill – Feature D, minor (self-armouring) erosion channel on surface, facing west from east end (ATT110_Photo1.jpg)*

Photo 143: *Upper Site NWS Landfill – Landfill upper cover surface, facing east (ATT111_Photo1.jpg)*

Photo 144: *Upper Site NWS Landfill – Northwest slope and crest, facing southwest (ATT112_Photo1.jpg)*

Photo 145: Upper Site NWS Landfill – Northeast slope and crest, facing southeast (ATT113_Photo1.jpg)

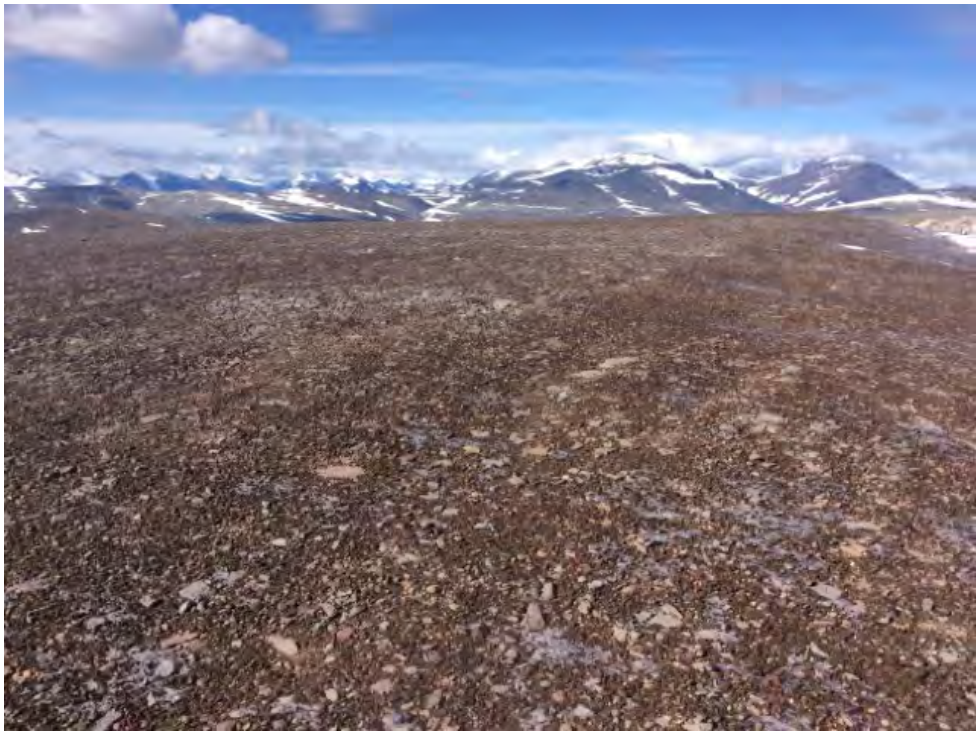


Photo 146: Upper Site NWS Landfill – Upper cover surface, facing west from northeast crest (ATT115_Photo1.jpg)

Photo 147: *Upper Site Pallet Line Landfills – Lobe 1 – North crest and slope, facing east (ATT135_Photo1.jpg)*

Photo 148: *Upper Site Pallet Line Landfills – Lobe 1 – North toe, facing east (ATT136_Photo1.jpg)*

Photo 149: *Upper Site Pallet Line Landfills – Lobe 1 – West crest and slope, facing north from southwest (ATT137_Photo1.jpg)*

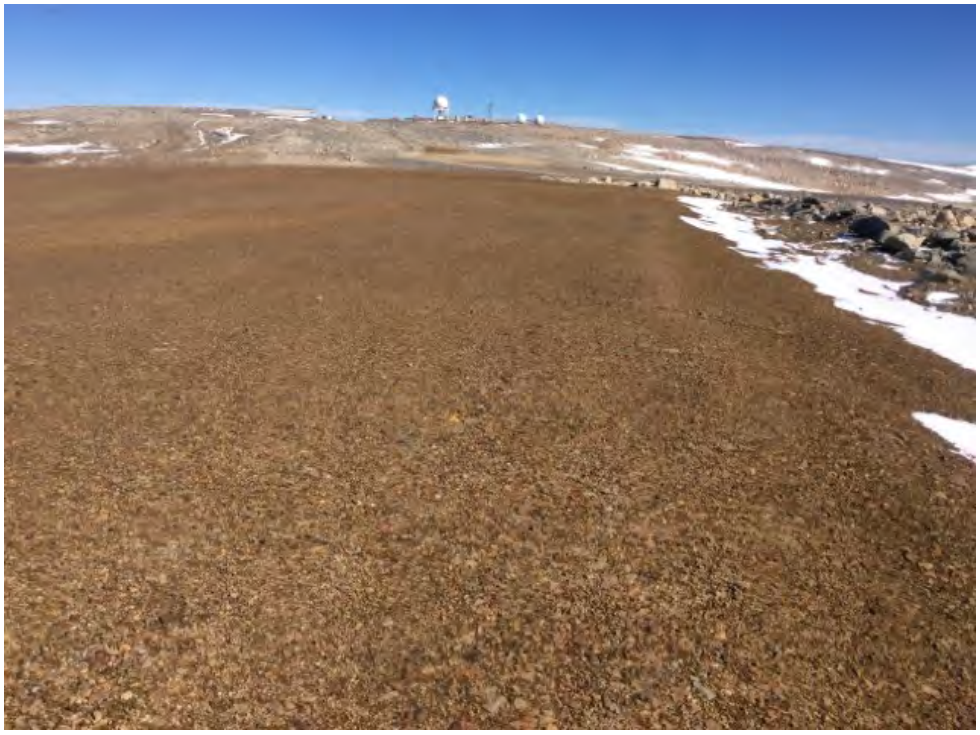


Photo 150: *Upper Site Pallet Line Landfills – Lobe 1 – South slope and crest, facing east (ATT138_Photo1.jpg)*

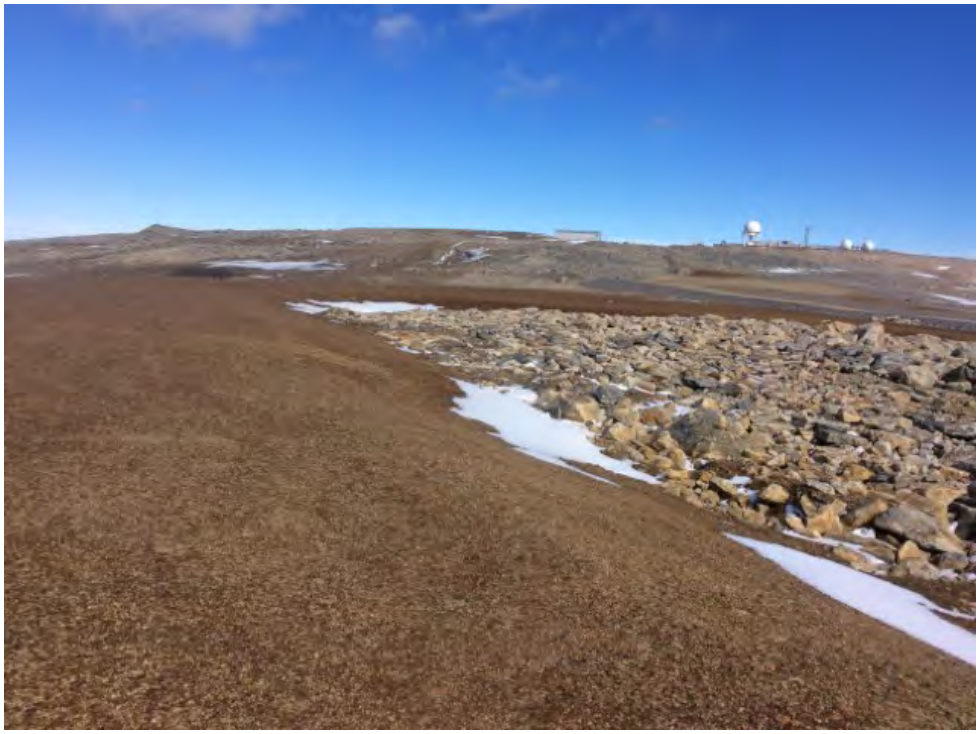


Photo 151: *Upper Site Pallet Line Landfills – Lobe 1 – South slope and crest, facing east (ATT139_Photo1.jpg)*

Photo 152: *Upper Site Pallet Line Landfills – Lobe 1 – Feature K, crack on south slope (ATT141_Photo2.jpg)*

Photo 153: *Upper Site Pallet Line Landfills – Lobe 1 – Feature L, minor cracks on south slope (ATT142_Photo1.jpg)*

Photo 154: *Upper Site Pallet Line Landfills – Lobe 1 – Feature C, crack along west slope of south side extension, facing north (ATT143_Photo1.jpg)*

Photo 155: *Upper Site Pallet Line Landfills – Lobe 1 – South crest, facing east (ATT144_Photo1.jpg)*

Photo 156: *Upper Site Pallet Line Landfills – Lobe 1 – Southeast slope and toe, facing east (ATT145_Photo1.jpg)*

Photo 157: *Upper Site Pallet Line Landfills – Lobe 1 – Feature M, ponded water south toe, facing south towards Lobe 2 (ATT146_Photo1.jpg)*

Photo 158: *Upper Site Pallet Line Landfills – Lobe 1 – Southeast slope, facing southwest (ATT147_Photo1.jpg)*

Photo 159: *Upper Site Pallet Line Landfills – Lobe 1 – East slope and crest, facing north from southeast corner (ATT148_Photo1.jpg)*

Photo 160: *Upper Site Pallet Line Landfills – Lobe 1 – Cover surface, facing northwest from southeast corner (ATT149_Photo1.jpg)*

Photo 161: Upper Site Pallet Line Landfills – Lobe 2 – Northwest crest edge, facing northeast (ATT274_Photo1.jpg)

Photo 162: Upper Site Pallet Line Landfills – Lobe 2 – Internal slope, facing north (ATT275_Photo1.jpg)

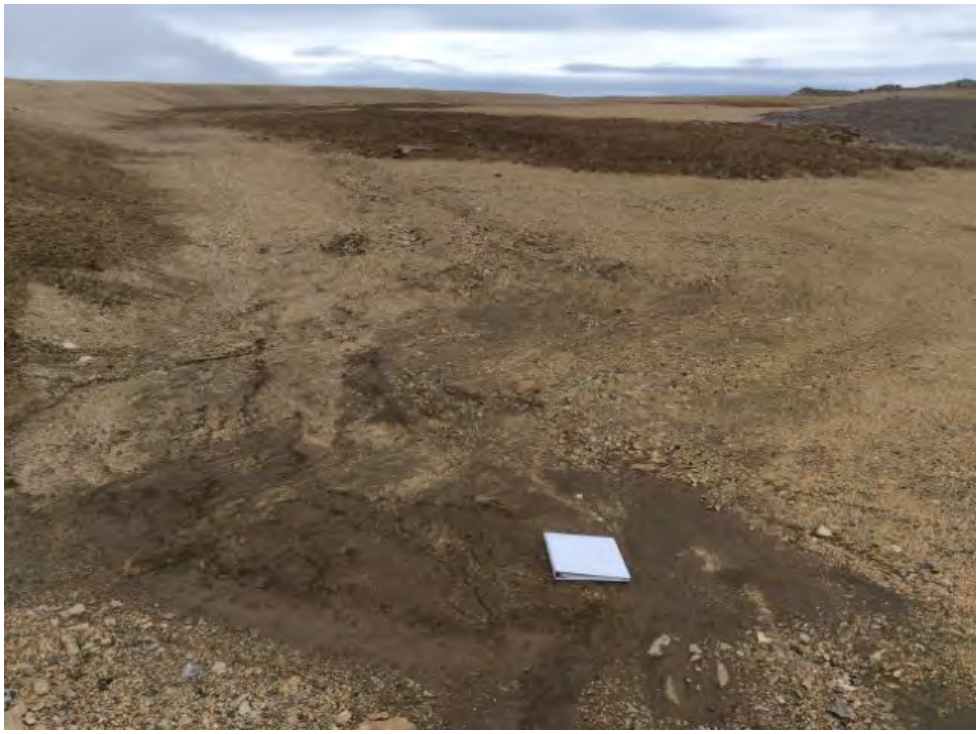


Photo 163: Upper Site Pallet Line Landfills – Lobe 2 – Feature A, minor self-armouring erosion (ATT276_Photo1.jpg)

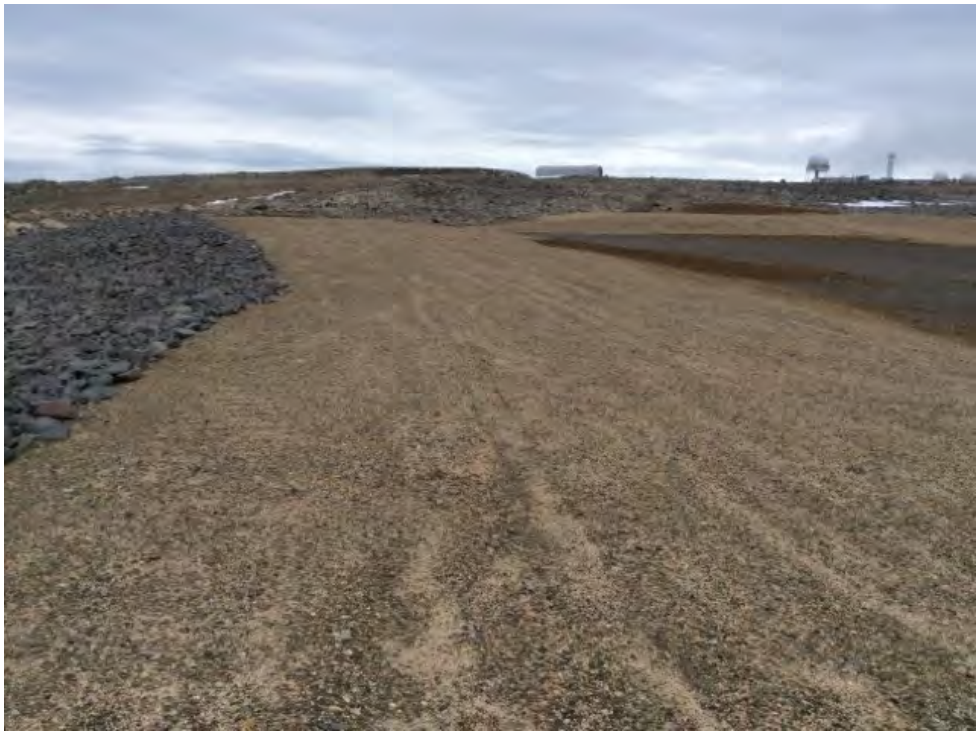


Photo 164: Upper Site Pallet Line Landfills – Lobe 2 – Northwest central, facing east (ATT277_Photo1.jpg)

Photo 165: *Upper Site Pallet Line Landfills – Lobe 2 – Feature M, ponded water between lobes 1 and 2 (ATT278_Photo1.jpg)*

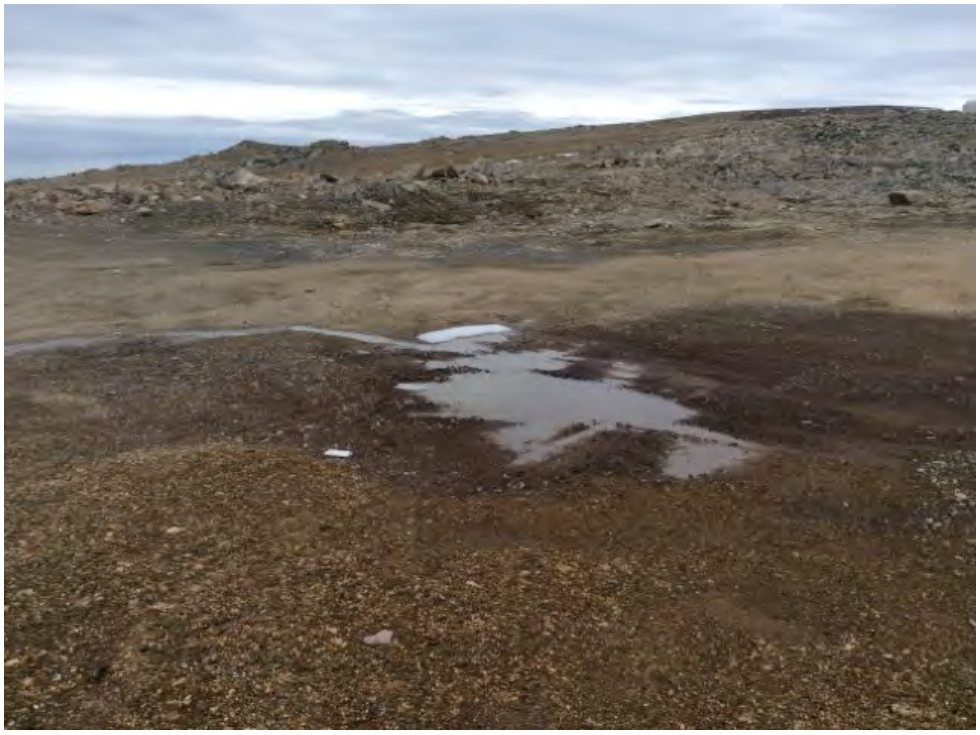


Photo 166: *Upper Site Pallet Line Landfills – Lobe 2 – Feature N, ponded water at toe in northeast corner (ATT279_Photo1.jpg)*

Photo 167: *Upper Site Pallet Line Landfills – Feature I ponded water on gravel cover draining south – Between Lobes 2 and 5 (ATT280_Photo1.jpg)*

Photo 168: *Upper Site Pallet Line Landfills – Lobe 5 – North slope, facing east (ATT281_Photo1.jpg)*

Photo 169: *Upper Site Pallet Line Landfills – Lobe 5 – East slope facing, south (ATT282_Photo1.jpg)*

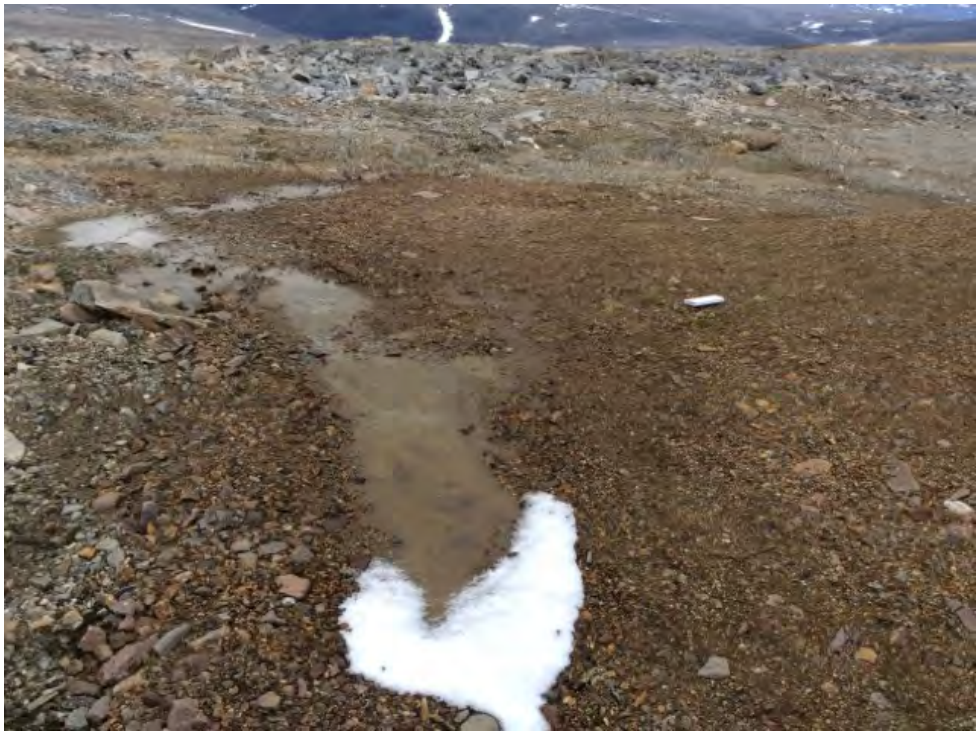


Photo 170: *Upper Site Pallet Line Landfills – Lobe 5 – sparse grass (Feature P) on slope and ponded water (Feature O) at east toe (ATT283_Photo1.jpg)*

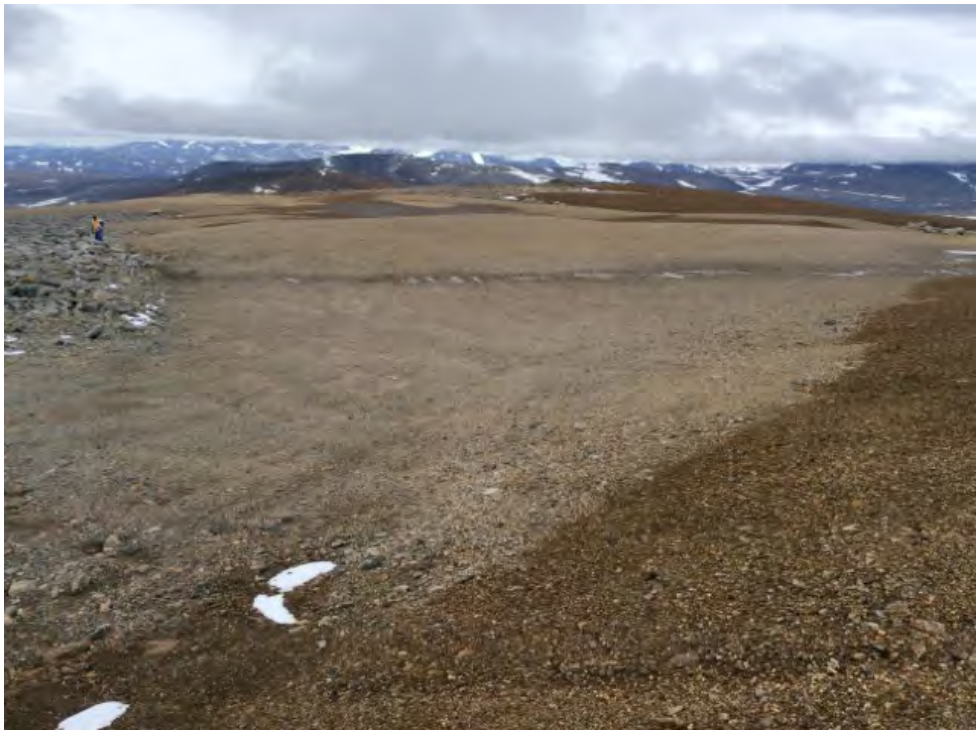


Photo 171: *Upper Site Pallet Line Landfills – Lobe 5 – Cover surface, facing west (ATT284_Photo1.jpg)*

Photo 172: *Upper Site Pallet Line Landfills – Lobe 5 – Feature Q, minor tension crack and settlement – Lobe 5, south slope (ATT285_Photo1.jpg)*

Photo 173: *Upper Site Pallet Line Landfills – Lobe 2 – Southeast slope and crest, facing southwest – Feature R, some minor erosion into boulders at toe (ATT286_Photo1.jpg)*

Photo 174: *Upper Site Pallet Line Landfills – Lobe 2 – Feature S, uneven ground, potential settlement (ATT287_Photo1.jpg)*

Photo 175: *Upper Site Pallet Line Landfills – Lobe 2 – Feature T, self-armouring erosion, facing north up southeast slope (ATT288_Photo1.jpg)*

Photo 176: *Upper Site Pallet Line Landfills – Riprap along southeast toe and slope, facing northwest (ATT289_Photo1.jpg)*

Photo 177: *Upper Site Pallet Line Landfills – Lobe 2 – Cover surface, facing east (ATT290_Photo1.jpg)*

Photo 178: *Upper Site Pallet Line Landfills – Lobe 2 – South end facing south (ATT291_Photo1.jpg)*

Photo 179: *Upper Site Pallet Line Landfills – Abandoned Lobe – North slope, facing southwest (ATT292_Photo1.jpg)*

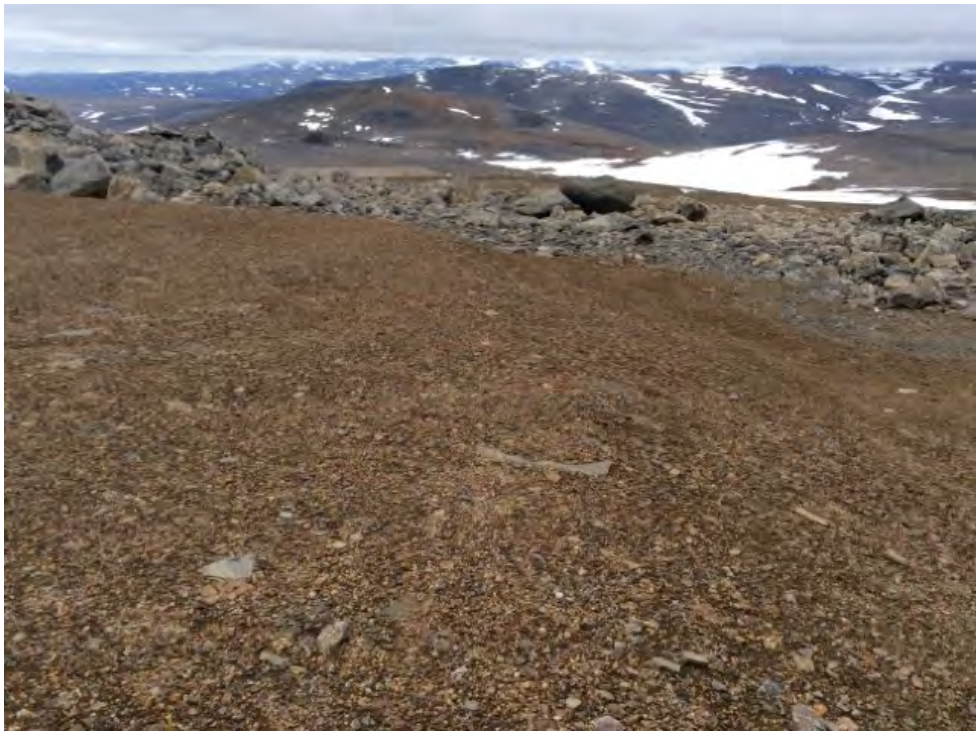


Photo 180: *Upper Site Pallet Line Landfills – Abandoned Lobe – North crest edge facing west (ATT293_Photo1.jpg)*

Photo 181: Upper Site Pallet Line Landfills – Abandoned Lobe – West crest edge facing south (ATT294_Photo1.jpg)

Photo 182: Upper Site Pallet Line Landfills – Abandoned Lobe – West crest facing south (ATT295_Photo1.jpg)

Photo 183: *Upper Site Pallet Line Landfills – Abandoned Lobe – Cover surface facing north (ATT296_Photo1.jpg)*

Photo 184: *Upper Site Pallet Line Landfills – Abandoned Lobe – Riprap on south toe facing northeast (ATT297_Photo1.jpg)*

Photo 185: *Upper Site Pallet Line Landfills – Abandoned Lobe – South cover slope facing north – Some snow still on cover (ATT298_Photo1.jpg)*

Photo 186: *Upper Site Pallet Line Landfills – Abandoned Lobe – southeast corner facing slope (ATT299_Photo1.jpg)*

Photo 187: *Upper Site Pallet Line Landfills – Abandoned Lobe – East slope facing south (ATT300_Photo1.jpg)*

Photo 188: *Upper Site South Landfill (West) – West slope and crest surface, facing east (ATT72_Photo1.jpg)*

Photo 189: *Upper Site South Landfill (West) – South slope, facing north (ATT73_Photo1.jpg)*

Photo 190: *Upper Site South Landfill (West) – Feature A, sparse vegetation on south slope, facing N (ATT74_Photo1.jpg)*

Photo 191: *Upper Site South Landfill (West) – Feature C – accumulation of fines from erosion, facing west (ATT75_Photo1.jpg)*

Photo 192: *Upper Site South Landfill (West) – Feature E – minor self-armouring erosion, facing east (ATT76_Photo1.jpg)*

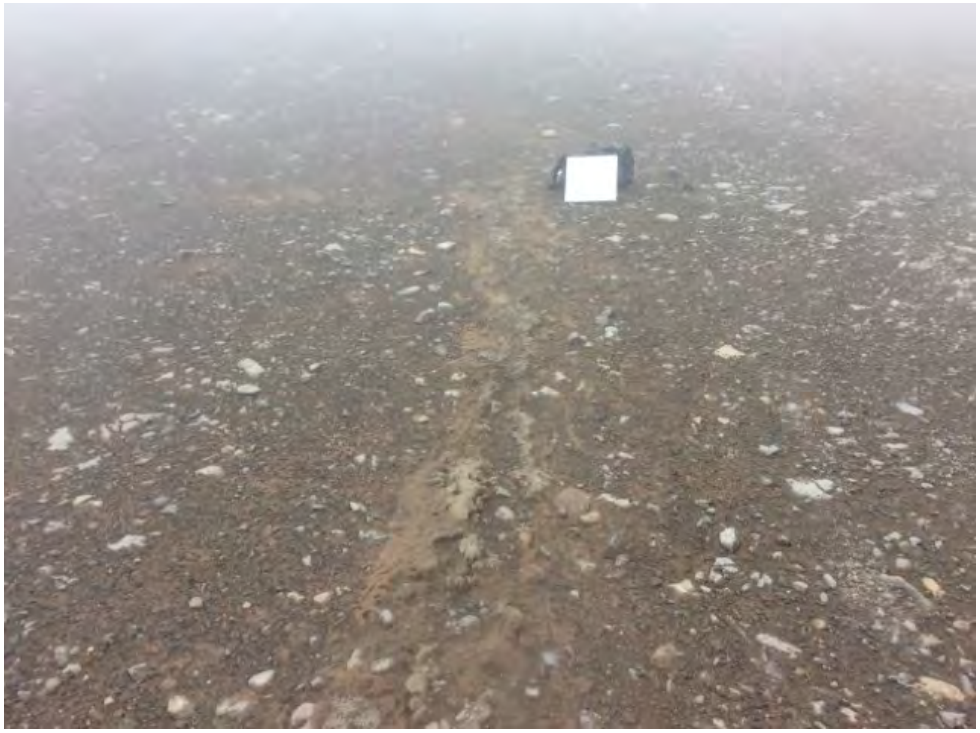


Photo 193: *Upper Site South Landfill (West) – Feature E – minor self-armouring erosion, facing west (ATT77_Photo2.jpg)*

Photo 194: *Upper Site South Landfill (West) – East slope facing south from northeast corner (ATT78_Photo1.jpg)*

Photo 195: *Upper Site South Landfill (West) – North toe facing west from northeast corner – Snow and ice at the toe (ATT79_Photo1.jpg)*

Photo 196: *Upper Site South Landfill (West) – South crest, facing west from southeast corner (ATT80_Photo1.jpg)*

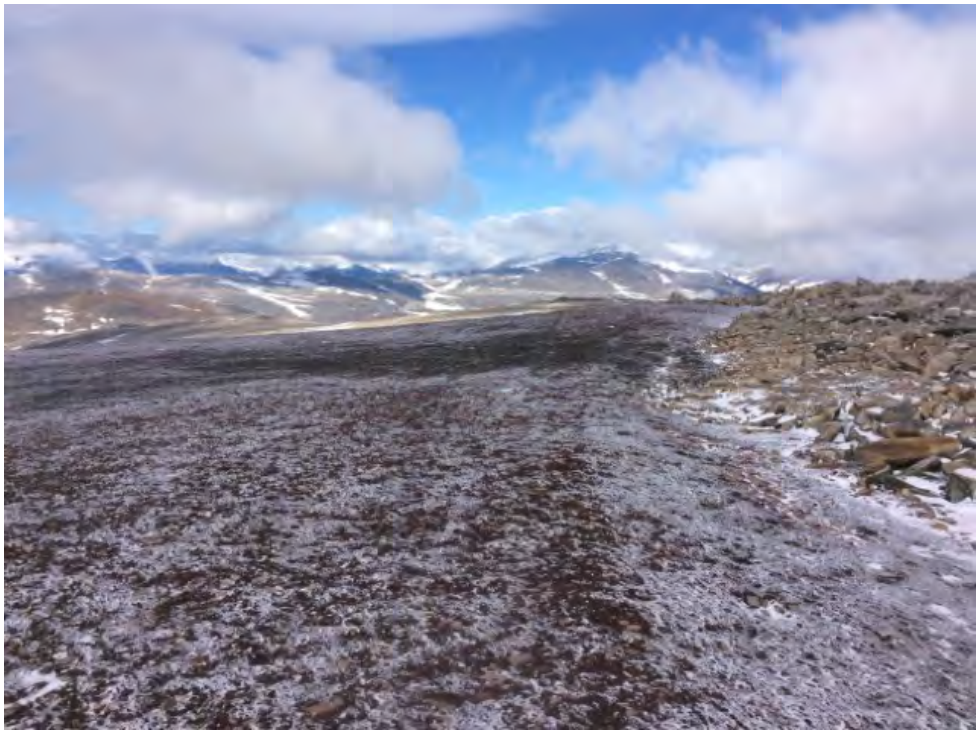


Photo 197: *Upper Site South Landfill (West) – North crest, facing west (ATT81_Photo1.jpg)*

Photo 198: *Upper Site South Landfill (West) – Overview, facing southwest (ATT82_Photo1.jpg)*

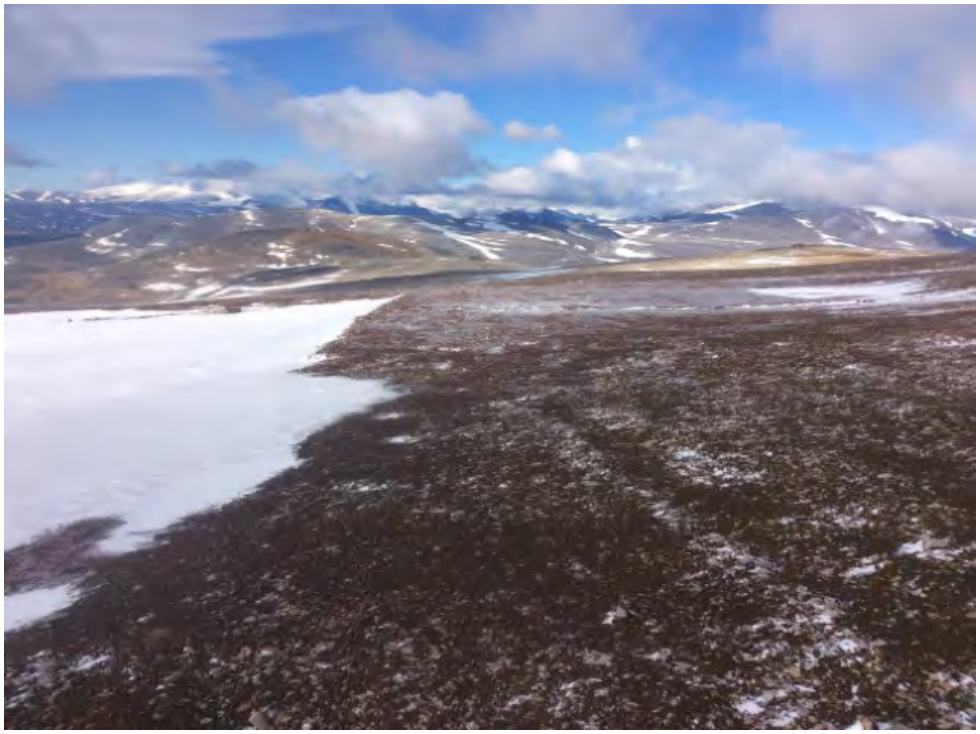


Photo 199: *Upper Site South Landfill (West) – South crest, facing west (ATT83_Photo1.jpg)*

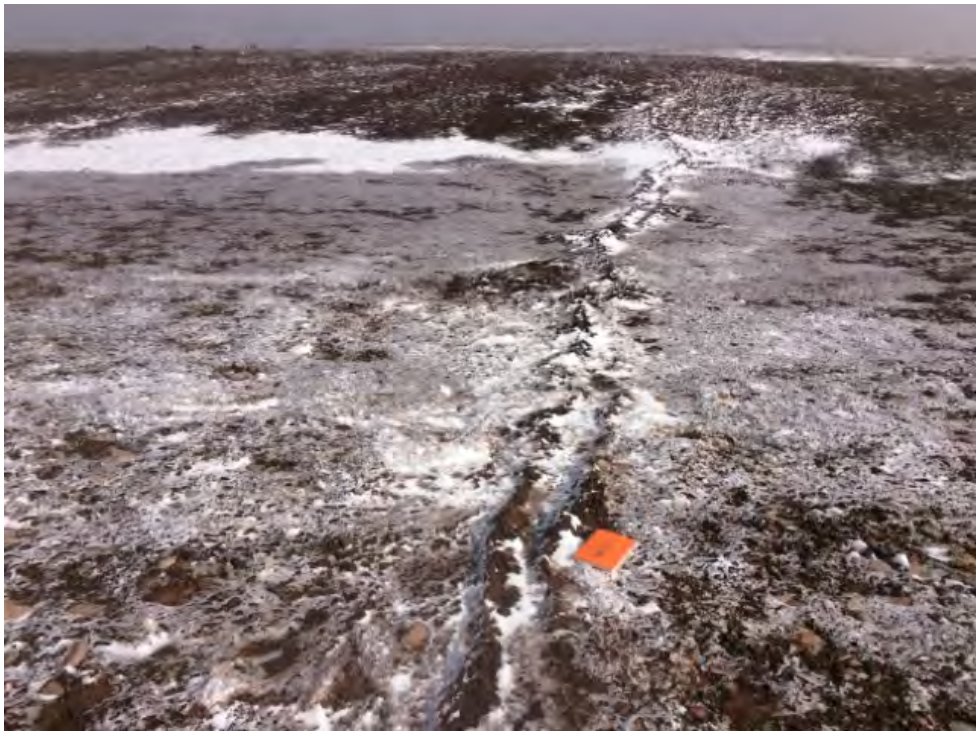


Photo 200: *Upper Site South Landfill (West) – Feature F, erosion channel, facing north from south crest edge (ATT84_Photo1.jpg)*

Photo 201: *Upper Site South Landfill (West) – Feature F, erosion channel, facing south from north endpoint (ATT85_Photo1.jpg)*

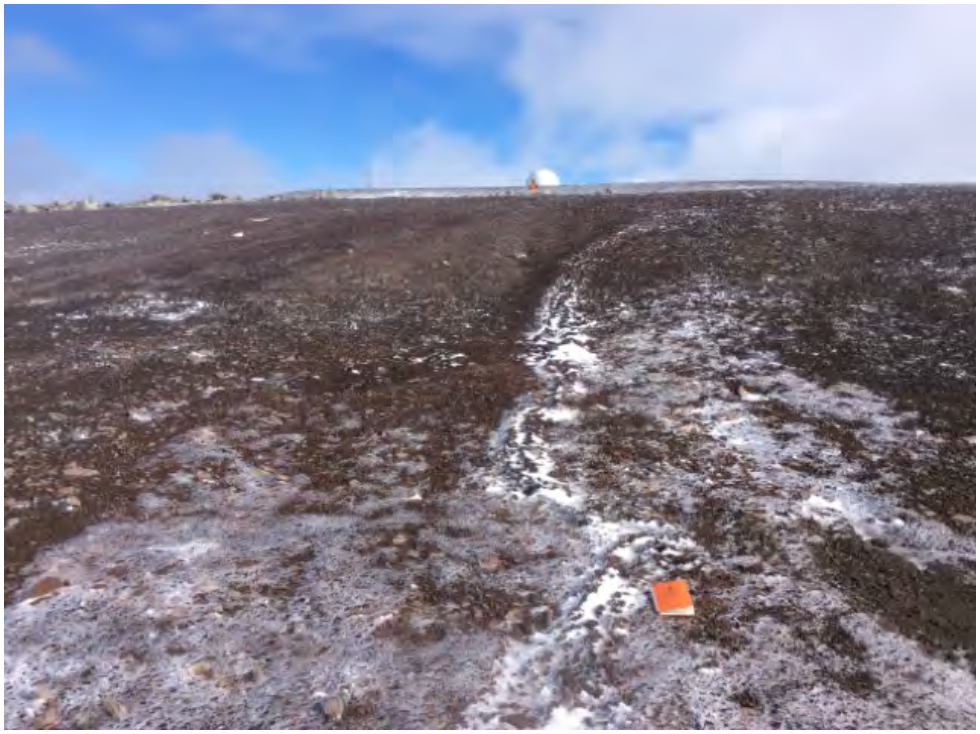


Photo 202: *Upper Site South Landfill (West) – Feature G, self-armouring erosion, facing north from south endpoint (ATT86_Photo1.jpg)*

Photo 203: Upper Site South Landfill (West) – Feature G, self-armouring erosion, north endpoint (ATT87_Photo1.jpg)

Photo 204: Upper Site South Landfill (West) – South crest facing west (ATT88_Photo1.jpg)

Photo 205: *Upper Site South Landfill (West) – South crest facing west (ATT89_Photo2.jpg)*

Photo 206: *Upper Site South Landfill (West) – South crest facing west (ATT90_Photo1.jpg)*

Photo 207: *Upper Site South Landfill (West) – Cover surface, facing north from south end (ATT91_Photo1.jpg)*

Photo 208: *Upper Site South Landfill (West) – Feature H, self-armouring erosion, facing west from east endpoint (ATT92_Photo1.jpg)*

Photo 209: *Upper Site South Landfill (West) – Feature H, self-armouring erosion, facing east from west endpoint (ATT93_Photo1.jpg)*

Photo 210: *Upper Site South Landfill (West) – North slope and crest, facing west (ATT94_Photo1.jpg)*

Photo 211: *Upper Site Tier II Disposal Facility – Overview, facing south (ATT151_Photo1.jpg)*

Photo 212: *Upper Site Tier II Disposal Facility – Northwest slope and toe, facing southwest (ATT152_Photo1.jpg)*

Photo 213: Upper Site Tier II Disposal Facility – Northeast slope and toe, facing southeast (ATT153_Photo1.jpg)

Photo 214: Upper Site Tier II Disposal Facility – Northwest crest, facing west (ATT154_Photo1.jpg)

Photo 215: *Upper Site Tier II Disposal Facility – Northeast crest, facing southeast (ATT155_Photo1.jpg)*

Photo 216: *Upper Site Tier II Disposal Facility – Feature A, tension crack, 2 m from northwest crest (ATT156_Photo1.jpg)*

Photo 217: *Upper Site Tier II Disposal Facility – Feature B, self-armouring erosion on northwest slope (ATT157_Photo1.jpg)*

Photo 218: *Upper Site Tier II Disposal Facility – Feature B, self-armouring erosion on northwest slope (ATT159_Photo2.jpg)*

Photo 219: *Upper Site Tier II Disposal Facility – Feature C, rough area at west crest corner, facing west (ATT160_Photo1.jpg)*

Photo 220: *Upper Site Tier II Disposal Facility – Southwest crest, facing southeast from west corner (ATT161_Photo1.jpg)*

Photo 221: *Upper Site Tier II Disposal Facility – Southwest slope and toe, facing southeast from west corner (ATT162_Photo1.jpg)*

Photo 222: *Upper Site Tier II Disposal Facility – Southwest toe, facing southeast from west corner (ATT163_Photo1.jpg)*

Photo 223: *Upper Site Tier II Disposal Facility – Feature D, sparse vegetation on southwest slope (ATT164_Photo1.jpg)*

Photo 224: *Upper Site Tier II Disposal Facility – Southwest slope and crest, facing northwest from south corner (ATT165_Photo1.jpg)*

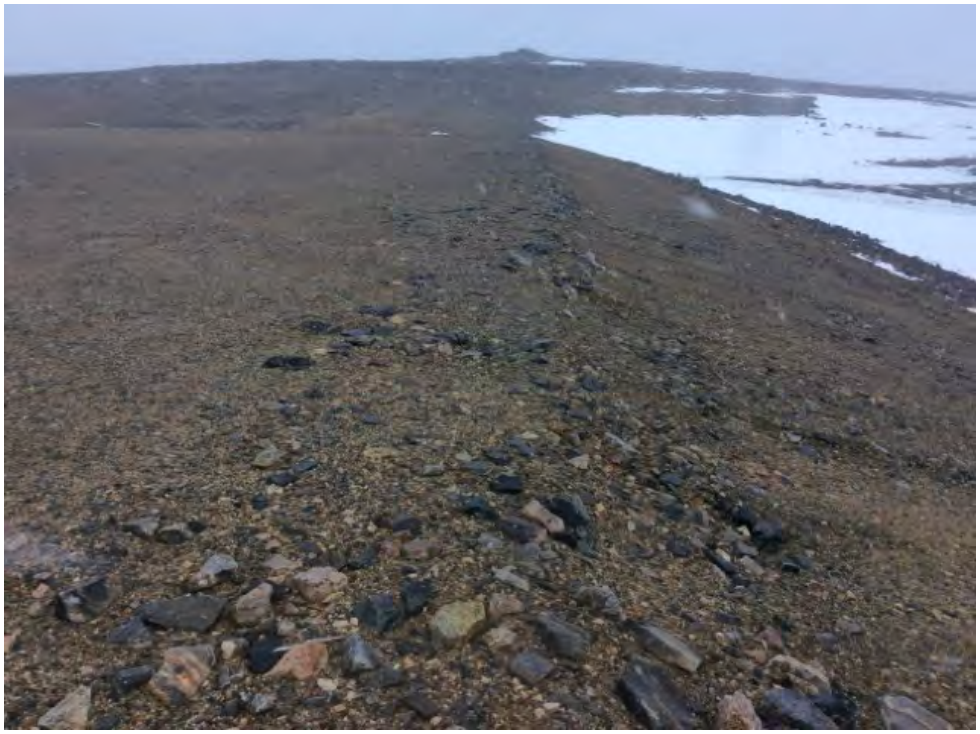


Photo 225: *Upper Site Tier II Disposal Facility – Southeast slope and crest, facing east (ATT166_Photo1.jpg)*

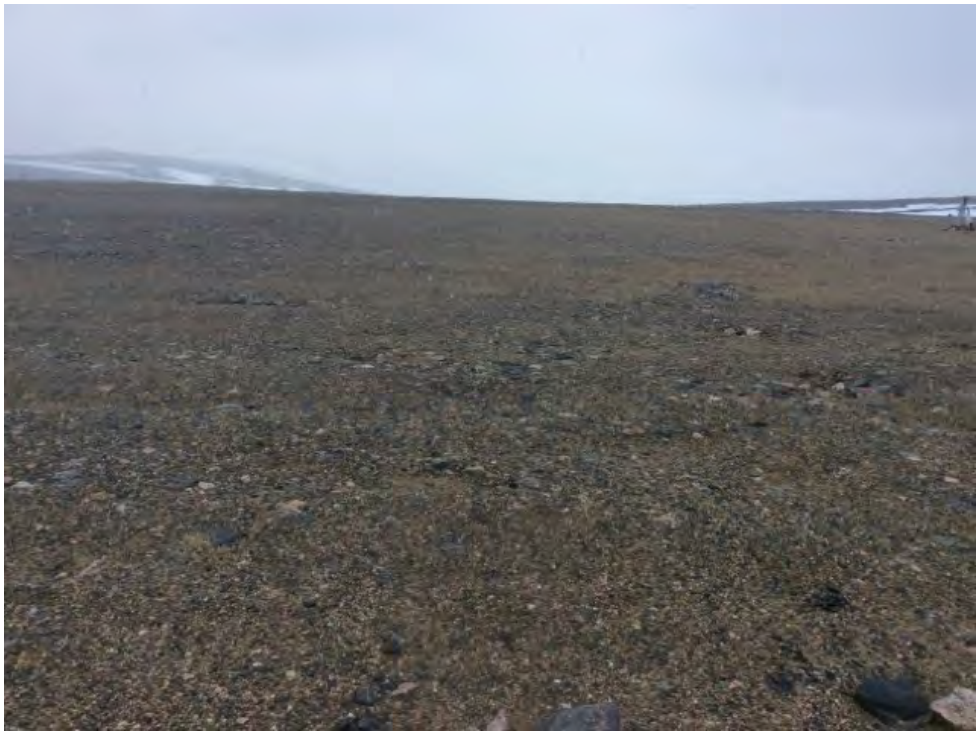


Photo 226: *Upper Site Tier II Disposal Facility – Crest surface, from southeast to northwest (ATT167_Photo1.jpg)*

Photo 227: *Upper Site Tier II Disposal Facility – Feature E, self-armouring erosion, accumulation of fines on southeast slope – (ATT168_Photo1.jpg)*

Photo 228: *Upper Site Tier II Disposal Facility – Feature F, rough area at east crest corner (ATT169_Photo1.jpg)*

Photo 229: *Upper Site Tier II Disposal Facility – Northeast slope and crest, facing northwest from east corner (ATT170_Photo1.jpg)*

Photo 230: *Upper Site Tier II Disposal Facility – Northeast toe, from east corner (ATT171_Photo1.jpg)*

Photo 231: *Upper Site Tier II Disposal Facility – Northeast toe, from east corner (ATT172_Photo2.jpg)*

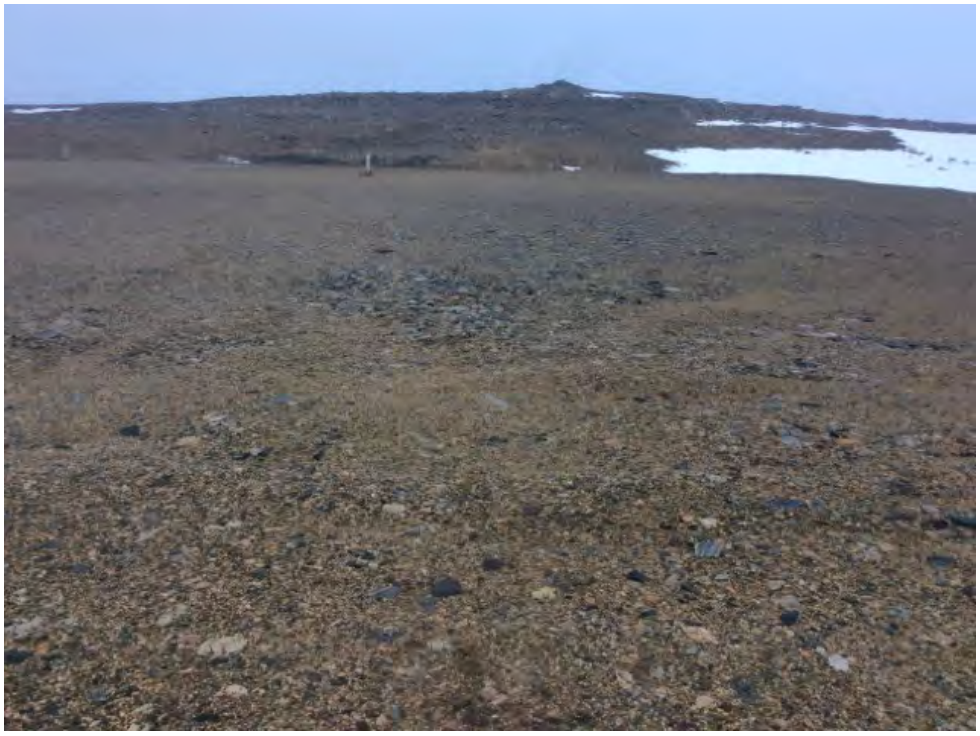


Photo 232: *Upper Site Tier II Disposal Facility – Cover surface, facing east – VT 10 shown (ATT173_Photo1.jpg)*

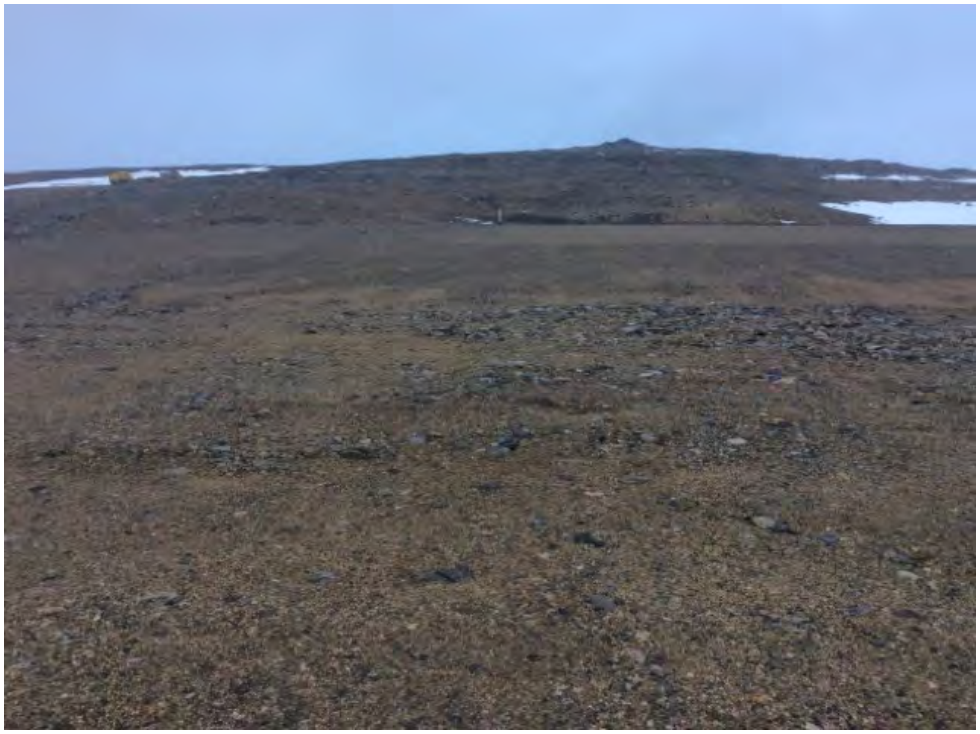


Photo 233: *Upper Site Tier II Disposal Facility – Cover surface, facing east, north half (ATT174_Photo1.jpg)*

Photo 234: *Upper Site West Landfill (Centre and East Lobes), facing east (ATT231_Photo1.jpg)*

Photo 235: *Upper Site West Landfill (Centre and East Lobes) – Riprap along road facing south (ATT232_Photo1.jpg)*

Photo 236: *Upper Site West Landfill (Centre and East Lobes) – Feature B, tension cracks on north slope (ATT233_Photo1.jpg)*

Photo 237: *Upper Site West Landfill (Centre and East Lobes) – North slope facing south (ATT234_Photo1.jpg)*

Photo 238: *Upper Site West Landfill (Centre and East Lobes) – North slope, rock fill berm in background (ATT235_Photo1.jpg)*

Photo 239: *Upper Site West Landfill (Centre and East Lobes) – Feature D, self armouring erosion with fines washing out downslope (ATT236_Photo1.jpg)*

Photo 240: *Upper Site West Landfill (Centre and East Lobes) – Feature D, self armouring erosion on east slope (ATT237_Photo1.jpg)*

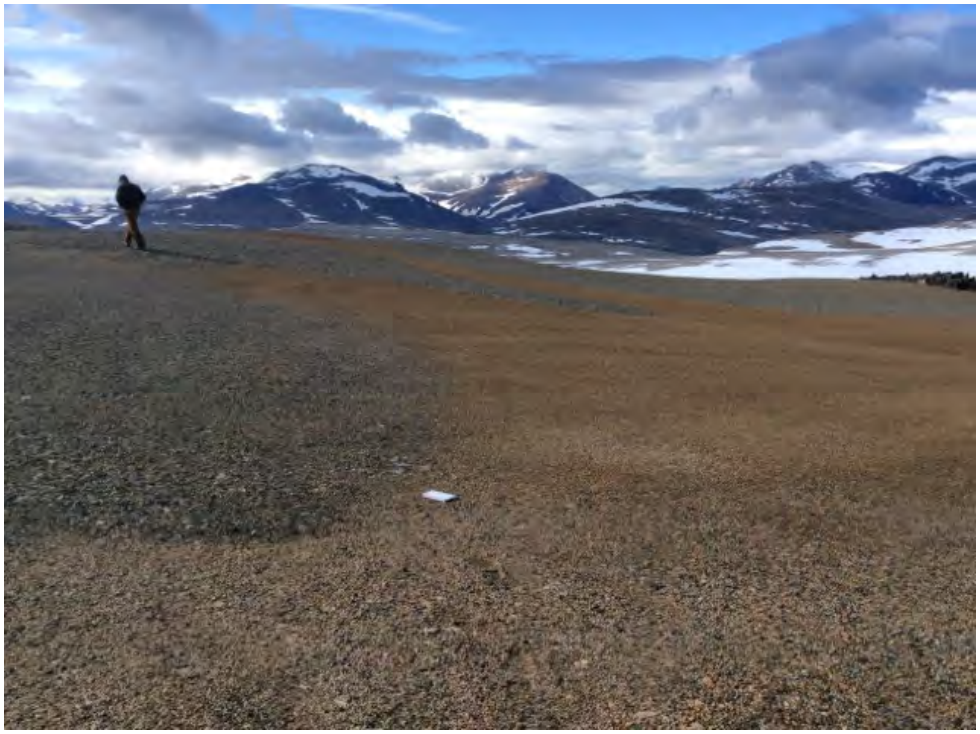


Photo 241: *Upper Site West Landfill (Centre and East Lobes) – Cover surface, facing west (ATT238_Photo1.jpg)*

Photo 242: *Upper Site West Landfill (Centre and East Lobes) – South cover surface, facing west (ATT239_Photo1.jpg)*

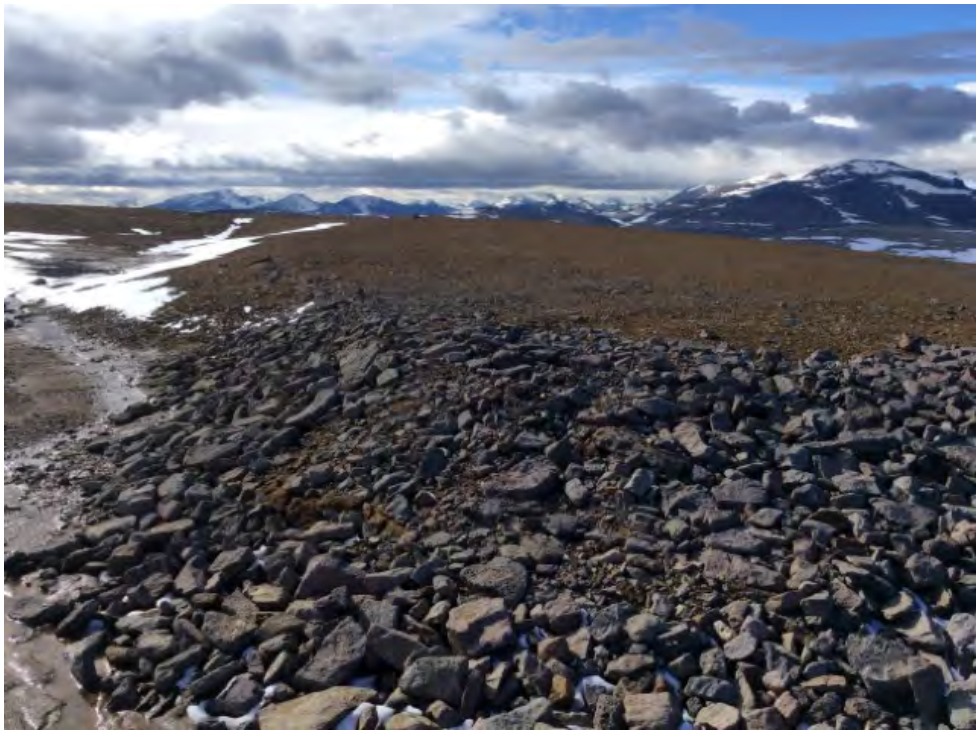


Photo 243: *Upper Site West Landfill (Centre and East Lobes) – South crest facing west (ATT240_Photo1.jpg)*

Photo 244: *Upper Site West Landfill (Centre and East Lobes) – Riprap slope facing north (ATT241_Photo1.jpg)*

Photo 245: *Upper Site West Landfill (Centre and East Lobes) – Feature E, self-armouring erosion (ATT242_Photo1.jpg)*

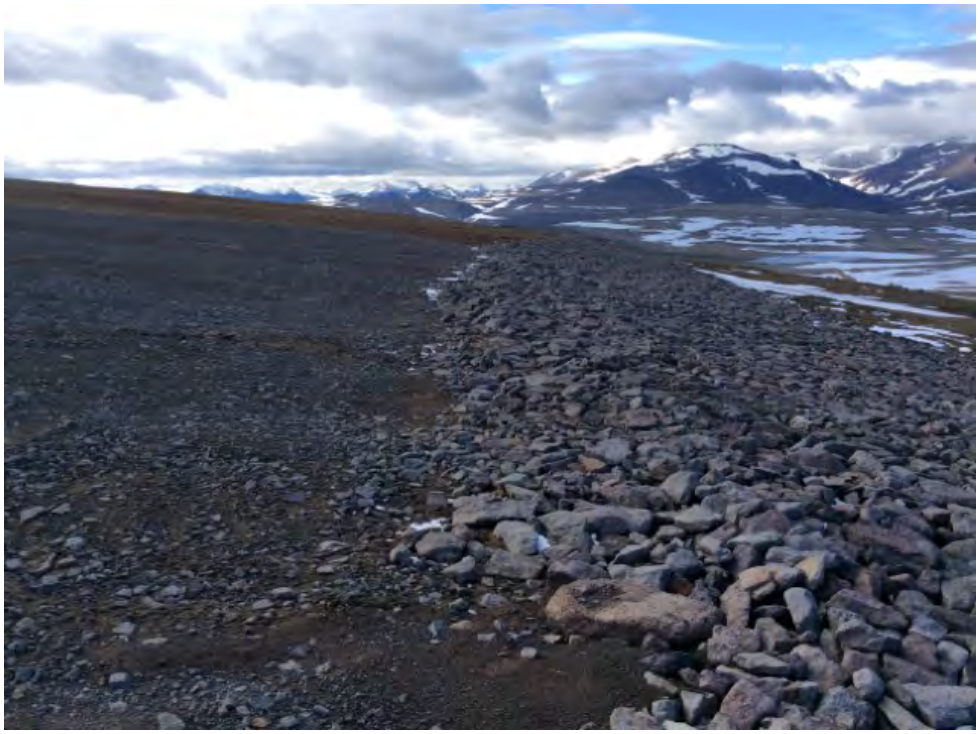


Photo 246: *Upper Site West Landfill (Centre and East Lobes) – Rip rap toe facing west (ATT243_Photo1.jpg)*

Photo 247: *Upper Site West Landfill (Centre and East Lobes) – Feature F, self-armouring erosion transporting fines down slope, facing upslope to south on north slope (ATT244_Photo1.jpg)*

Photo 248: *Upper Site West Landfill (Centre and East Lobes) – North slope surface facing east (ATT245_Photo1.jpg)*

Photo 249: *Upper Site West Landfill (Centre and East Lobes) – Rip rap on north toe facing east (ATT246_Photo1.jpg)*

Photo 250: *Upper Site West Landfill (Centre and East Lobes) – Feature G, self-armouring erosion on west slope (ATT247_Photo1.jpg)*

Photo 251: *Upper Site West Landfill (Centre and East Lobes) – southwest toe facing east – Snow on slope (ATT248_Photo1.jpg)*

Photo 252: *Upper Site West Landfill (Centre and East Lobes) – Cover surface facing northwest (ATT249_Photo1.jpg)*

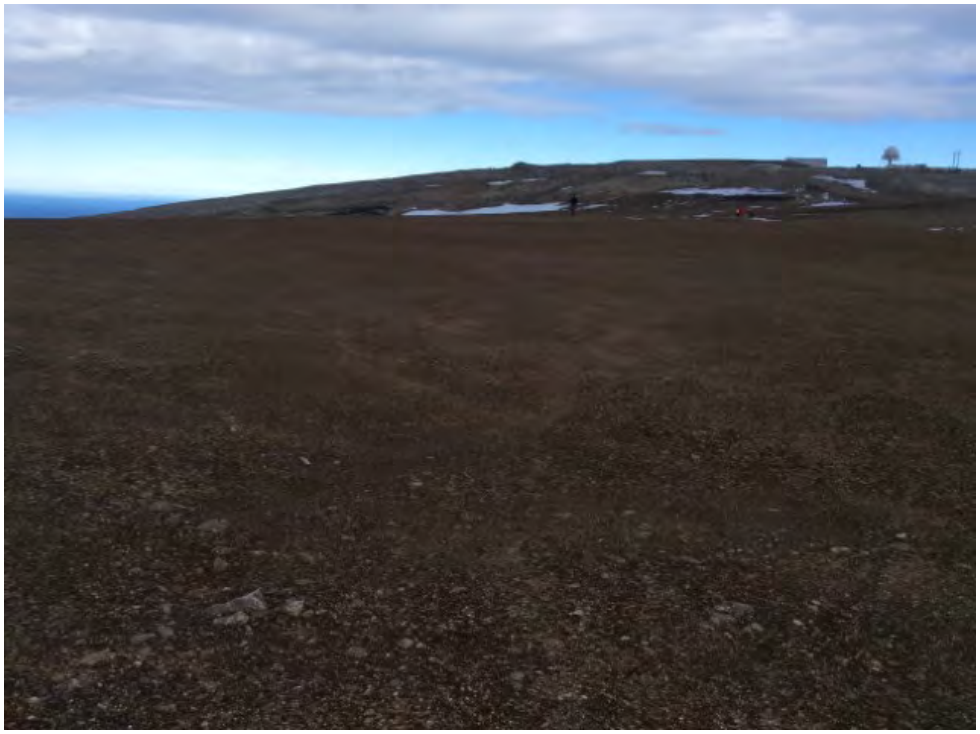


Photo 253: *Upper Site West Landfill (Centre and East Lobes) – Cover surface, facing east (ATT250_Photo1.jpg)*

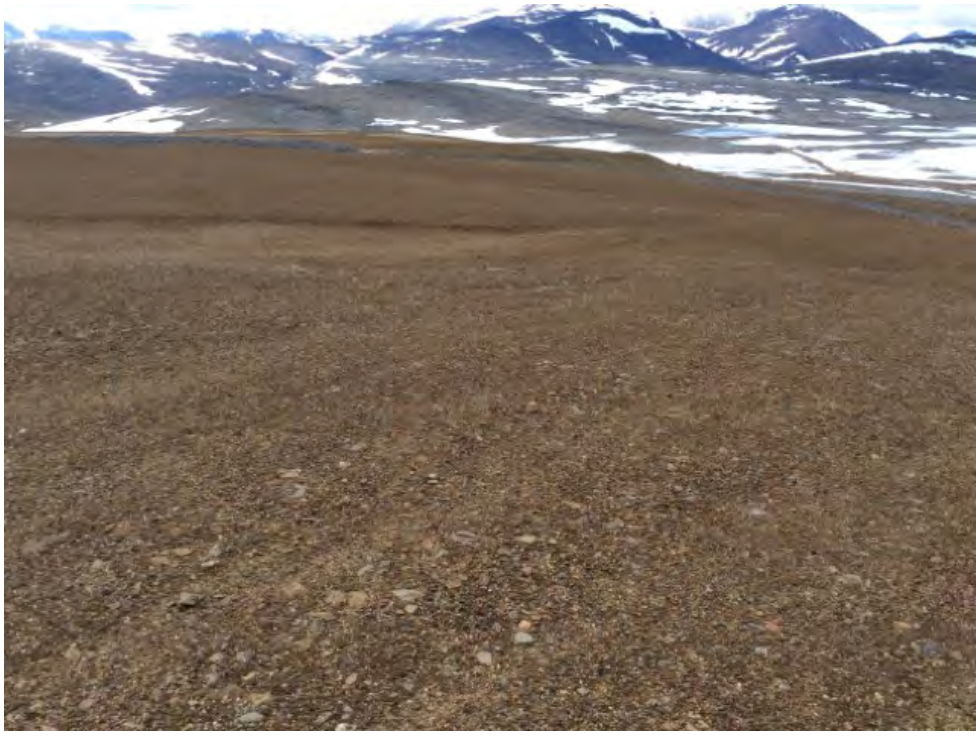


Photo 254: *Upper Site West Landfill (Centre and East Lobes) – Cover surface facing west – Feature H, some minor self-armouring erosion (ATT251_Photo1.jpg)*

Photo 255: *Upper Site West Landfill (Centre and East Lobes) – Cover surface facing southeast (ATT252_Photo1.jpg)*

Photo 256: *Upper Site West Landfill (Centre and East Lobes) – Feature I, thaw creep cracks at southwest corner – Snow on slope so just melted (ATT253_Photo1.jpg)*

Photo 257: *Upper Site West Landfill (West Lobe) – Rip rap along east edge, facing south (ATT254_Photo1.jpg)*

Photo 258: *Upper Site West Landfill (West Lobe) – Cover surface facing north (ATT255_Photo1.jpg)*

Photo 259: *Upper Site West Landfill (West Lobe) – Feature C, running water and erosion at southwest toe – Beyond riprap (ATT256_Photo1.jpg)*

Photo 260: *Upper Site West Landfill (West Lobe) – Southwest corner facing northwest – Snow-covered toe (ATT257_Photo1.jpg)*

Photo 261: *Upper Site West Landfill (West Lobe) – Feature D, self-armouring erosion on southwest slope (ATT258_Photo1.jpg)*

Photo 262: *Upper Site West Landfill (West Lobe) – Feature E, small erosion gulley facing downslope (ATT259_Photo1.jpg)*

Photo 263: *Upper Site West Landfill (West Lobe) – Cove surface facing north – Slope and toe in foreground (ATT260_Photo1.jpg)*

Photo 264: *Upper Site West Landfill (West Lobe) – Cover surface, facing south (ATT261_Photo1.jpg)*

Photo 265: *Upper Site West Landfill (West Lobe) – North crest and toe facing southwest (ATT262_Photo1.jpg)*

Photo 266: *Upper Site West Landfill (West Lobe) – North edge of cover with steep slope – Feature F, some erosion at toe – Facing west (ATT263_Photo1.jpg)*

Photo 267: *Upper Site West Landfill (West Lobe) – Feature G, some minor self-armouring erosion (ATT264_Photo1.jpg)*

Photo 268: *Upper Site West Landfill (West Lobe) – Cover surface, facing northeast (ATT265_Photo1.jpg)*

Photo 269: *Upper Site West Landfill (West Lobe) – West end facing southwest (ATT266_Photo1.jpg)*

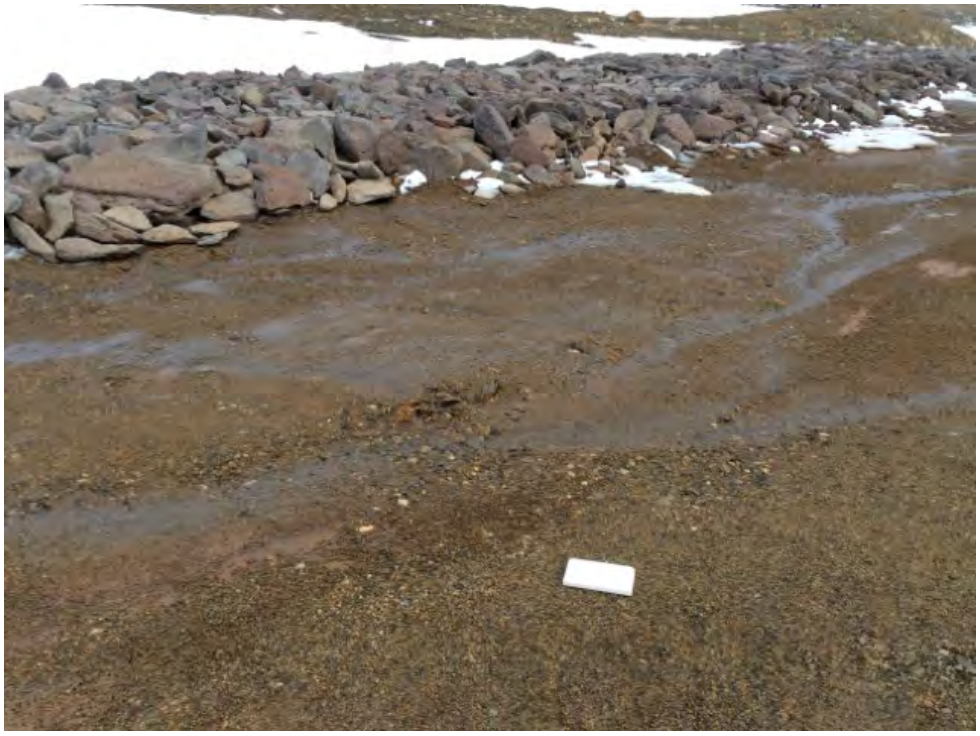


Photo 270: *Upper Site West Landfill (West Lobe) – Feature A, minor erosion area, some self-armouring gulley (ATT267_Photo1.jpg)*

Photo 271: Upper Site West Landfill (West Lobe) – Feature A, west end of erosion area (ATT268_Photo1.jpg)

Photo 272: Upper Site West Landfill (West Lobe) – Facing north (ATT269_Photo1.jpg)

Photo 273: *Upper Site West Landfill (West Lobe) – Feature H, self armouring erosion, from toe facing up slope (ATT270_Photo1.jpg)*

Photo 274: *Upper Site West Landfill (West Lobe) – Rip rap along edge facing southwest (ATT271_Photo1.jpg)*

Photo 275: Upper Site West Landfill (West Lobe) – Perimeter slope facing southeast (ATT272_Photo1.jpg)

Photo 276: Upper Site West Landfill (West Lobe) – Cover surface facing north (ATT273_Photo1.jpg)

Photo 277: *Monitoring well [MW05-13] Lower Site Tier II Disposal Facility*

Photo 278: *Monitoring well [MW05-16] Lower Site Tier II Disposal Facility*

Photo 279: *Monitoring Well [MW06-19] Upper Site NHWL*

Photo 280: *Monitoring well [MW07-21] Upper Site NHWL*

Photo 281: *Monitoring Well [MW07-22] Upper Site Tier II Disposal Facility*

Photo 282: *Monitoring Well [MW07-23] Upper Site Tier II Disposal Facility*

Photo 283: *Monitoring Well [MW08-25] Upper Site Tier II Disposal Facility*

Photo 284: *Monitoring Well [MW12-01] Lower Site Tier II Disposal Facility*

Photo 285: *Soil Sample [DM-01] (2 after excavation), Lower Site Crossroads Landfill*

Photo 286: *Soil Sample [DM-02] (2 after excavation), Lower Site Crossroads Landfill*

Photo 287: *Soil sample [DM-03] (1 before excavation), Lower Site Crossroads Landfill*

Photo 288: *Soil sample [DM-03] (2 after excavation), Lower Site Crossroads Landfill*

Photo 289: *Soil sample [DM-04] (1 before excavation), Lower Site Foundation Landfill*

Photo 290: *Soil sample [DM-04] (2 after excavation), Lower Site Foundation Landfill*

Photo 291: Soil sample [DM-04] (3 after backfilling), Lower Site Foundation Landfill

Photo 292: Soil sample [DM-05] (1 before excavation), Lower Site Foundation Landfill

Photo 293: Soil sample [DM-05] (2 after excavation), Lower Site Foundation Landfill

Photo 294: Soil sample [DM-05] (3 after backfilling), Lower Site Foundation Landfill

Photo 295: Soil sample [DM-06] (1 before excavation), Lower Site Foundation Landfill

Photo 296: Soil sample [DM-06] (2 after excavation), Lower Site Foundation Landfill

Photo 297: *Soil sample [DM-06] (3 after backfilling), Lower Site Foundation Landfill*

Photo 298: *Soil sample [DM-20] (1 before excavation), Upper site NWS Landfill*

Photo 299: *Soil sample [DM-20] (2 after excavation), Upper site NWS Landfill*

Photo 300: *Soil sample [DM-20] (3 after backfilling), Upper site NWS Landfill*

Photo 301: *Soil sample [DM-23] (1 before excavation), Upper site South Landfill West*

Photo 302: *Soil sample [DM-23] (2 after excavation), Upper site South Landfill West*

Photo 303: Soil sample [DM-23] (3 after backfilling), Upper site South Landfill West

Photo 304: Soil sample [DM-24] (unable to sample due to deep snow), Upper site South Landfill West

Photo 305: Soil sample [DM-29] (1 before excavation), Upper site South Landfill West

Photo 306: Soil sample [DM-29] (2 after excavation), Upper site South Landfill West

Photo 307: Soil sample [DM-29] (3 after backfilling), Upper site South Landfill West

Photo 308: Soil sample [DM-31] (1 before excavation), Upper site West Landfill – West Lobe

Photo 309: Soil sample [DM-31] (2 after excavation), Upper site West Landfill – West Lobe

Photo 310: Soil sample [DM-31] (3 after backfilling), Upper site West Landfill – West Lobe

Photo 311: *Soil sample [DM-34] (2 after excavation), Upper site West Landfill – West Lobe*

Photo 312: *Soil sample [DM-34] (3 after backfilling), Upper site West Landfill – West Lobe*

Photo 313: *Soil sample [DM-53] (1 after backfilling)), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 314: *Soil sample [DM-53] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 315: *Soil sample [DM-53] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 316: *Soil sample [DM-54] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 317: *Soil sample [DM-54] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 318: *Soil sample [DM-54] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 319: *Soil sample [DM-55] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 320: *Soil sample [DM-55] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 321: *Soil sample [DM-55] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 322: *Soil sample [DM-56] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 323: *Soil sample [DM-56] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 324: *Soil sample [DM-56] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 325: *Soil sample [DM-57] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 326: *Soil sample [DM-57] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 327: *Soil sample [DM-58] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 328: *Soil sample [DM-59] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 329: *Soil sample [DM-59] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 330: *Soil sample [DM-59] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 331: *Soil sample [DM-60] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 332: *Soil sample [DM-60] (3 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 333: *Soil sample [DM-61] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 334: *Soil sample [DM-61] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 335: *Soil sample [DM-61] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 336: *Soil sample [DM-62] (1 before excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 337: *Soil sample [DM-62] (2 after excavation), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 338: *Soil sample [DM-62] (3 after backfilling), Upper Site Pallet Line Landfill – Lobes 1-5, Abandoned Landfill Lobe*

Photo 339: *Soil sample [DM-07] (1 before excavation), Lower Site NWS*

Photo 340: *Soil sample [DM-07] (2 after excavation), Lower Site NWS*

Photo 341: *Soil sample [DM-07] (3 after backfilling), Lower Site NWS*

Photo 342: *Soil sample [DM-08] (1 before excavation), Lower Site NWS*

Photo 343: *Soil sample [DM-08] (2 after excavation), Lower Site NWS*

Photo 344: *Soil sample [DM-08] (3 after backfilling), Lower Site NWS*

Photo 345: *Soil sample [DM-09] (1 before excavation), Lower Site NWS*

Photo 346: *Soil sample [DM-09] (2 after excavation), Lower Site NWS*

Photo 347: *Soil sample [DM-09] (3 after backfilling), Lower Site NWS*

Photo 348: *Soil sample [DM-10] (1 before excavation), Lower Site NWS*

Photo 349: *Soil sample [DM-10] (2 after excavation), Lower Site NWS*

Photo 350: *Soil sample [DM-10] (3 after backfilling), Lower Site NWS*

Photo 351: *Soil sample [DM-11] (1 before excavation), Upper Site Helipad Landfill*

Photo 352: *Soil sample [DM-11] (2 after excavation), Upper Site Helipad Landfill*

Photo 353: *Soil sample [DM-11] (3 after backfilling), Upper Site Helipad Landfill*

Photo 354: *Soil sample [DM-12] (1 before excavation), Upper Site Helipad Landfill*

Photo 355: *Soil sample [DM-12] (2 after excavation), Upper Site Helipad Landfill*

Photo 356: *Soil sample [DM-12] (3 after backfilling), Upper Site Helipad Landfill*

Photo 357: *Soil sample [DM-13] (1 before excavation), Upper Site Helipad Landfill*

Photo 358: *Soil sample [DM-13] (2 after excavation), Upper Site Helipad Landfill*

Photo 359: *Soil sample [DM-13] (3 after backfilling), Upper Site Helipad Landfill*

Photo 360: *Soil sample [DM-14] (1 before excavation), Upper Site Helipad Landfill*

Photo 361: *Soil sample [DM-14] (2 after excavation), Upper Site Helipad Landfill*

Photo 362: *Soil sample [DM-14] (3 after backfilling), Upper Site Helipad Landfill*

Photo 363: *Soil sample [DM-15] (2 after excavation), Upper Site Helipad Landfill*

Photo 364: *Soil sample [DM-15] (3 after backfilling), Upper Site Helipad Landfill*

Photo 365: Soil sample [DM-16] (1 before excavation), Upper Site Helipad Landfill

Photo 366: Soil sample [DM-16] (2 after excavation), Upper Site Helipad Landfill

Photo 367: Soil sample [DM-16] (3 after backfilling), Upper Site Helipad Landfill

Photo 368: Soil sample [DM-17] (1 before excavation), Upper Site Helipad Landfill

Photo 369: Soil sample [DM-17] (2 after excavation), Upper Site Helipad Landfill

Photo 370: Soil sample [DM-17] (3 after backfilling), Upper Site Helipad Landfill

Photo 371: *Soil sample [DM-18] (1 before excavation), Upper Site NWS Landfill*

Photo 372: *Soil sample [DM-18] (2 after excavation), Upper Site NWS Landfill*

Photo 373: *Soil sample [DM-18] (3 after backfilling), Upper Site NWS Landfill*

Photo 374: *Soil sample [DM-20] (1 before excavation), Upper Site NWS Landfill*

Photo 375: Soil sample [DM-21] (unable to sample due to deep snow), Upper Site NWS Landfill

Photo 376: Soil sample [DM-22] (1 before excavation), Upper Site NWS Landfill

Photo 377: *Soil sample [DM-22] (2 after excavation), Upper Site NWS Landfill*

Photo 378: *Soil sample [DM-22] (3 after backfilling), Upper Site NWS Landfill*

Photo 379: *Soil sample [DM-27] (unable to sample due to deep snow), Upper Site South Landfill West*

Photo 380: *Soil sample [DM-28] (1 before excavation), Upper Site South Landfill West*

Photo 381: *Soil sample [DM-28] (2 after excavation), Upper Site South Landfill West*

Photo 382: *Soil sample [DM-28] (3 after backfilling), Upper Site South Landfill West*

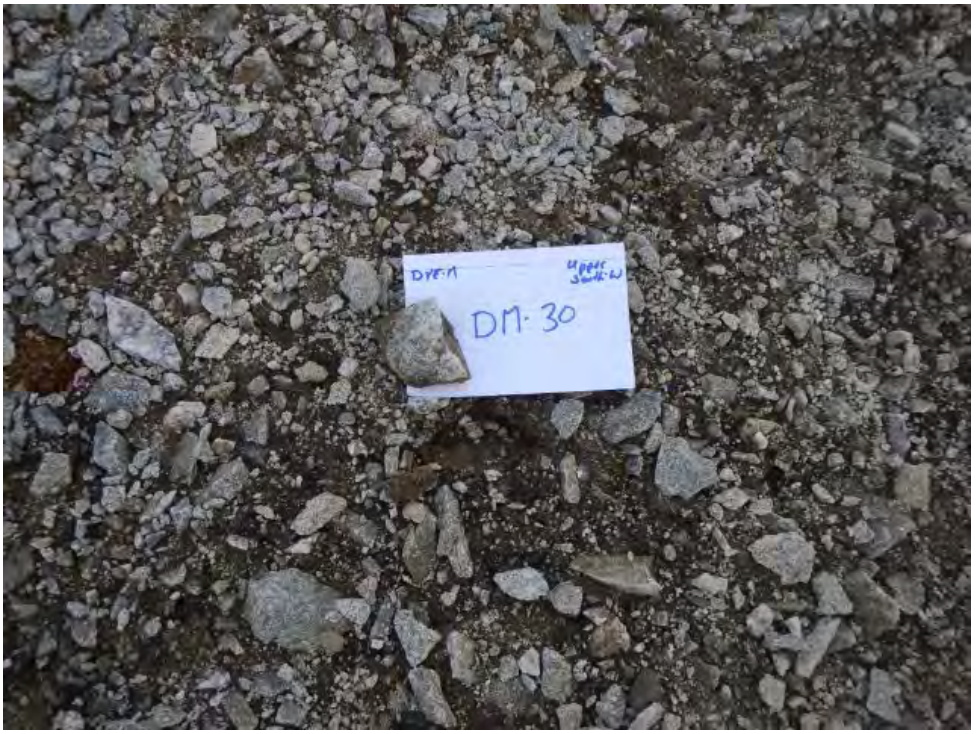


Photo 383: Soil sample [DM-30] (1 before excavation), Upper Site South Landfill West

Photo 384: Soil sample [DM-30] (2 after excavation), Upper Site South Landfill West

Photo 385: *Soil sample [DM-30] (3 after backfilling), Upper Site South Landfill West*

Photo 386: *Soil sample [DM-32] (1 before excavation), Upper Site West Landfill – West Lobe*

Photo 387: *Soil sample [DM-32] (2 after excavation), Upper Site West Landfill – West Lobe*

Photo 388: *Soil sample [DM-32] (3 after backfilling), Upper Site West Landfill – West Lobe*

Photo 389: *Soil sample [DM-33] (1 before excavation), Upper Site West Landfill – West Lobe*

Photo 390: *Soil sample [DM-33] (2 after excavation), Upper Site West Landfill – West Lobe*

Photo 391: *Soil sample [DM-33] (3 after backfilling), Upper Site West Landfill – West Lobe*

Photo 392: *Soil sample [DM-34] (1 before excavation), Upper Site West Landfill – West Lobe*

Photo 393: *Soil sample [DM-34] (2 after excavation), Upper Site West Landfill – West Lobe*

Photo 394: *Soil sample [DM-34] (3 after backfilling), Upper Site West Landfill – West Lobe*

Photo 395: Soil sample [DM-35] (1 before excavation), Upper Site West Landfill – West Lobe

Photo 396: Soil sample [DM-35] (2 after excavation), Upper Site West Landfill – West Lobe

Photo 397: *Soil sample [DM-35] (3 after backfilling), Upper Site West Landfill – West Lobe*

Photo 398: *Soil sample [DM-36] (1 before excavation), Upper Site West Landfill – West Lobe*

Photo 399: *Soil sample [DM-37] (1 before excavation), Upper Site West Landfill – West Lobe*

Photo 400: *Soil sample [DM-37] (2 after excavation), Upper Site West Landfill – West Lobe*

Photo 401: *Soil sample [DM-37] (3 after backfilling), Upper Site West Landfill – West Lobe*

Photo 402: *Soil sample [DM-38] (1 before excavation), Upper Site West Landfill – West Lobe*

Photo 403: *Soil sample [DM-38] (2 after excavation), Upper Site West Landfill – West Lobe*

Photo 404: *Soil sample [DM-38] (3 after backfilling), Upper Site West Landfill – West Lobe*

Photo 405: Soil sample [DM-39] (1 before excavation), Upper Site West Landfill – West Lobe

Photo 406: Soil sample [DM-39] (2 after excavation), Upper Site West Landfill – West Lobe

Photo 407: *Soil sample [DM-39] (3 after backfilling), Upper Site West Landfill – West Lobe*

Photo 408: *Soil sample [DM-40] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe*

Photo 409: Soil sample [DM-40] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 410: Soil sample [DM-40] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 411: Soil sample [DM-41] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 412: Soil sample [DM-41] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 413: Soil sample [DM-41] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 414: Soil sample [DM-42] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 415: Soil sample [DM-42] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 416: Soil sample [DM-42] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 417: Soil sample [DM-43] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 418: Soil sample [DM-43] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 419: Soil sample [DM-43] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 420: Soil sample [DM-44] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 421: Soil sample [DM-44] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 422: Soil sample [DM-44] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 423: *Soil sample [DM-45] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe*

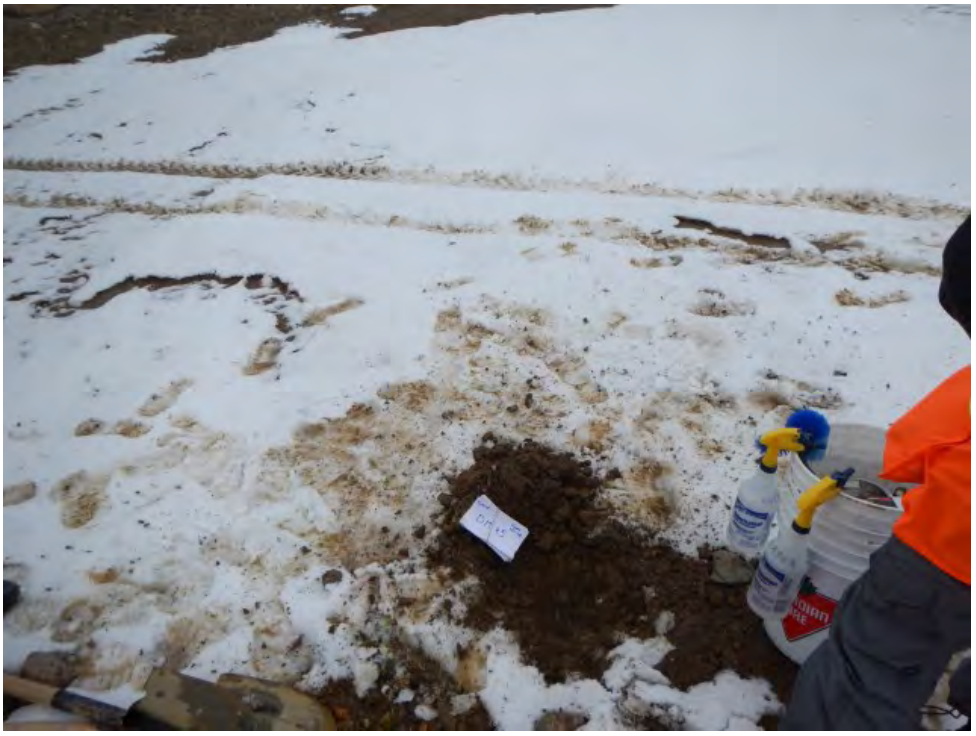


Photo 424: *Soil sample [DM-45] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe*

Photo 425: Soil sample [DM-45] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 426: Soil sample [DM-46] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 427: Soil sample [DM-46] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 428: Soil sample [DM-46] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 429: Soil sample [DM-47] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 430: Soil sample [DM-47] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 431: Soil sample [DM-47] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 432: Soil sample [DM-48] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 433: *Soil sample [DM-48] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe*

Photo 434: *Soil sample [DM-48] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe*

Photo 435: *Soil sample [DM-49[(3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe*

Photo 436: *Soil sample [DM-49] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe*

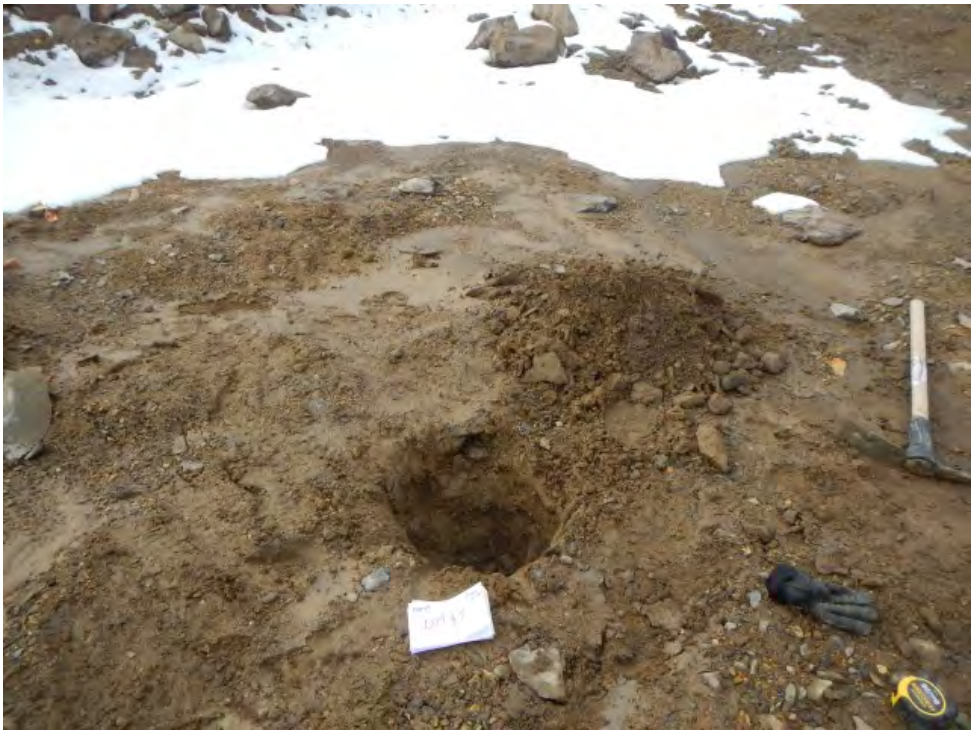


Photo 437: Soil sample [DM-49] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 438: Soil sample [DM-50] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 439: Soil sample [DM-50] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 440: Soil sample [DM-50] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 441: Soil sample [DM-51] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 442: Soil sample [DM-51] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 443: Soil sample [DM-51] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 444: Soil sample [DM-52] (1 before excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 445: Soil sample [DM-52] (2 after excavation), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 446: Soil sample [DM-52] (3 after backfilling), Upper Site West Landfill – Centre Lobe and East Lobe

Photo 447: *Soil sample [MW05-05] (1 before excavation), Lower Site Powerhouse landfill*

Photo 448: *Soil sample [MW05-06] (1 before excavation), Lower Site Powerhouse landfill*

Photo 449: *Soil sample [MW05-06] (2 after excavation), Lower Site Powerhouse landfill*

Photo 450: *Soil sample [MW05-07] (1 before excavation), Lower Site Powerhouse landfill*

Photo 451: Soil sample [MW05-07] (2 after excavation), Lower Site Powerhouse landfill

Photo 452: Soil sample [MW05-07] (3 after backfilling), Lower Site Powerhouse landfill

Photo 453: *Soil sample [MW05-08] (1 before excavation), Lower Site Powerhouse landfill*

Photo 454: *Soil sample [MW05-08] (2 after excavation), Lower Site Powerhouse landfill*

Photo 455: *Soil sample [MW05-08] (3 after backfilling), Lower Site Powerhouse landfill*

Photo 456: *Soil sample [MW05-09] (1 before excavation), Lower Site NHWL*

Photo 457: *Soil sample [MW05-09] (3 after backfilling), Lower Site NHWL*

Photo 458: *Soil sample [MW05-09] 2(after excavation), Lower Site NHWL*

Photo 459: *Soil sample [MW05-12] (1 before excavation), Lower Site NHWL*

Photo 460: *Soil sample [MW05-12] (2 after excavation), Lower Site NHWL*

Photo 461: *Soil sample [MW05-12] (3 after backfilling), Lower Site NHWL*

Photo 462: *Soil sample [MW05-13] (1 before excavation) Lower Site Tier II Disposal Facility*

Photo 463: *Soil sample [MW05-13] (2 after excavation) Lower Site Tier II Disposal Facility*

Photo 464: *Soil sample [MW05-13] (3 after backfilling) Lower Site Tier II Disposal Facility*

Photo 465: Soil sample [MW05-15] (1 before excavation) Lower Site Tier II Disposal Facility

Photo 466: Soil sample [MW05-15] (2 after excavation) Lower Site Tier II Disposal Facility

Photo 467: Soil sample [MW05-15] (3 after backfilling) Lower Site Tier II Disposal Facility

Photo 468: Soil sample [MW05-16], (1 before excavation) Lower Site Tier II Disposal Facility

Photo 469: *Soil sample [MW05-16], (2 after excavation) Lower Site Tier II Disposal Facility*

Photo 470: *Soil sample [MW05-16], (3 after backfilling) Lower Site Tier II Disposal Facility*

Photo 471: *Soil sample [MW06-19], (1 before excavation) Upper Site – NHWL*

Photo 472: *Soil sample [MW06-19], (2 after excavation) Upper Site – NHWL*

Photo 473: *Soil Sample [MW06-19] (3 after backfilling) Upper Site – NHWL*

Photo 474: *Soil sample [MW06-20], (1 before excavation) Upper Site – NHWL*

Photo 475: Soil sample [MW06-20], (2 after excavation) Upper Site – NHWL

Photo 476: Soil Sample [MW06-20] (3 after backfilling) Upper Site – NHWL

Photo 477: *Soil sample [MW07-21], (1 before excavation) Upper Site – NHWL*

Photo 478: *Soil sample [MW07-21], (2 after excavation) Upper Site – NHWL*

Photo 479: *Soil Sample [MW07-21] (3 after backfilling) Upper Site – NHWL*

Photo 480: *Soil sample [MW07-22] (1 before excavation), Upper Site – Tier II Disposal Facility*

Photo 481: *Soil sample [MW07-22] (2 after excavation), Upper Site – Tier II Disposal Facility*

Photo 482: *Soil sample [MW07-22] (3 after backfilling), Upper Site – Tier II Disposal Facility*

Photo 483: *Soil sample [MW07-23] (1 before excavation), Upper Site – Tier II Disposal Facility*

Photo 484: *Soil sample [MW07-23] (2 after excavation), Upper Site – Tier II Disposal Facility*

Photo 485: Soil sample [MW07-23] (3 after backfilling), Upper Site – Tier II Disposal Facility

Photo 486: Soil sample [MW08-24] (1 before excavation), Upper Site – Tier II Disposal Facility

Photo 487: *Soil sample [MW08-25] (1 before excavation), Upper Site – Tier II Disposal Facility*

Photo 488: *Soil sample [MW08-25] (2 after excavation), Upper Site – Tier II Disposal Facility*

Photo 489: *Soil sample [MW08-25] (3 after backfiling), Upper Site – Tier II Disposal Facility*

Photo 490: *Soil sample [MW09-26] (1 before excavation), Lower Site NHWL*

Photo 491: *Soil sample [MW09-26] (2 after excavation), Lower Site NHWL*

Photo 492: *Soil sample [MW09-26] (3 after backfilling), Lower Site NHWL*

Photo 493: *Soil sample [MW09-27] (1 before excavation), Lower Site NHWL*

Photo 494: *Soil sample [MW09-27] (2 after excavation), Lower Site NHWL*

Photo 495: *Soil sample [MW09-27] (3 after backfilling), Lower Site NHWL*

Photo 496: *Soil sample [MW09-28] (2 after excavation), Lower Site NHWL*

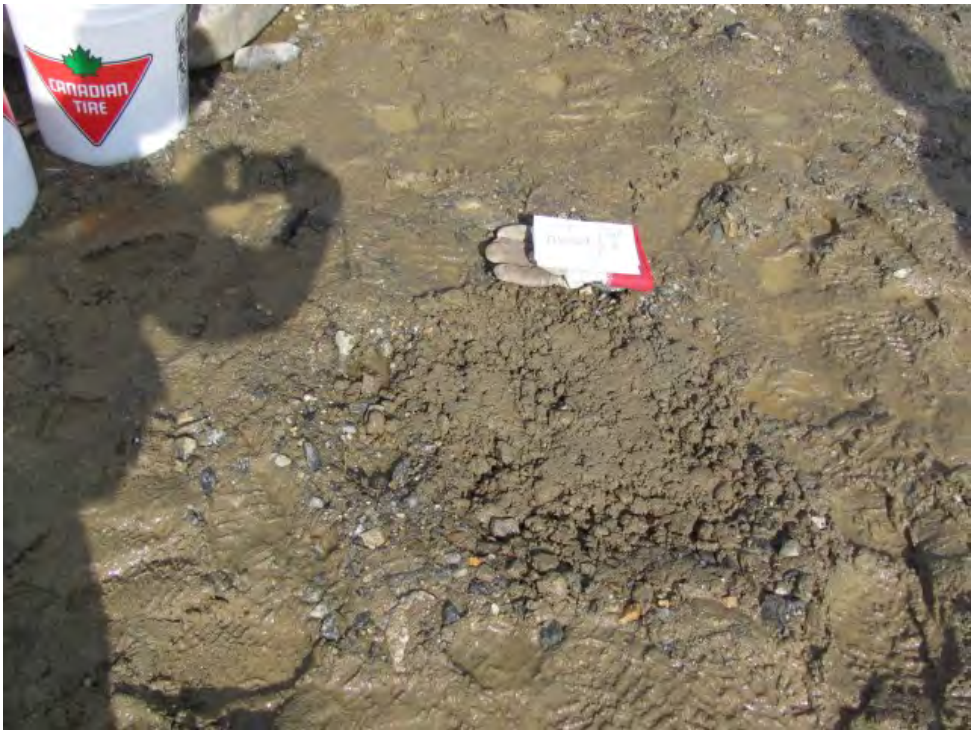


Photo 497: *Soil sample [MW09-28] (3 after backfilling), Lower Site NHWL*

Photo 498: *Soil Sample [MW12-01] (1 before excavation) Lower Site Tier II Disposal Facility*

Photo 499: *Soil Sample [MW12-01] (2 after excavation) Lower Site Tier II Disposal Facility*

Photo 500: *Soil Sample [MW12-01] (3 after backfilling) Lower Site Tier II Disposal Facility*

Photo 501: Soil sample [MW12-02] (unable to sample due to deep snow) Upper Site – Tier II Disposal Facility

Photo 502: Thermistor VT6 – Lower Site – Powerhouse Landfill

Photo 503: *Thermistor VT5 – Lower Site – Powerhouse Landfill*

Photo 504: *Thermistor VT7 – Lower Site – Powerhouse Landfill*

Photo 505: *Thermistor VT3 – Lower Site – Tier II Disposal Facility*

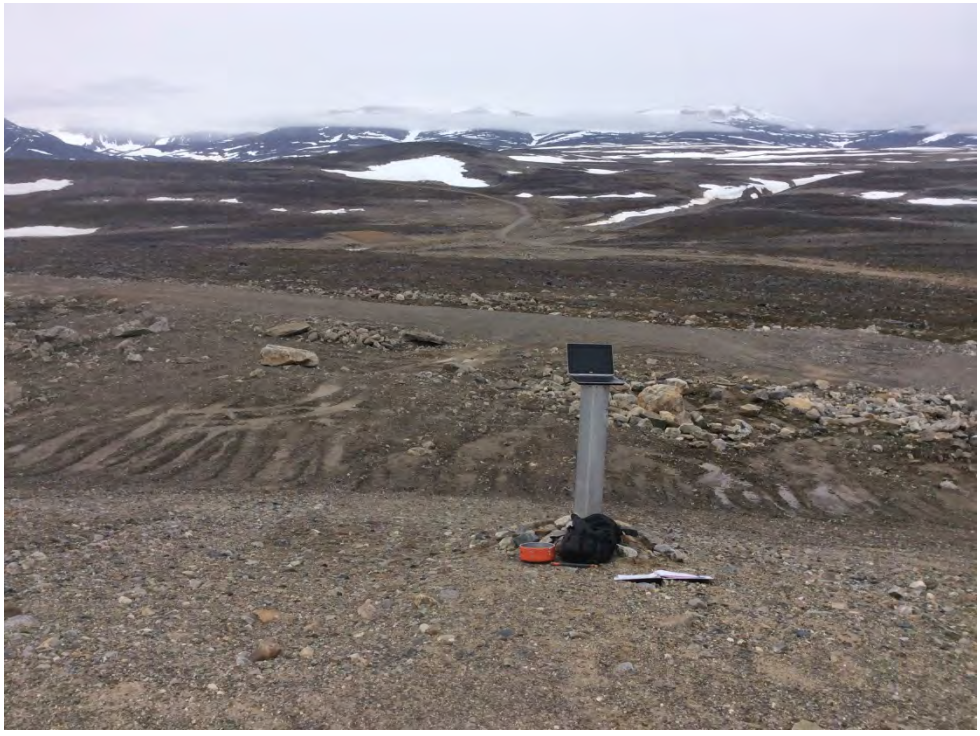


Photo 506: *Thermistor VT1 – Lower Site – Tier II Disposal Facility*

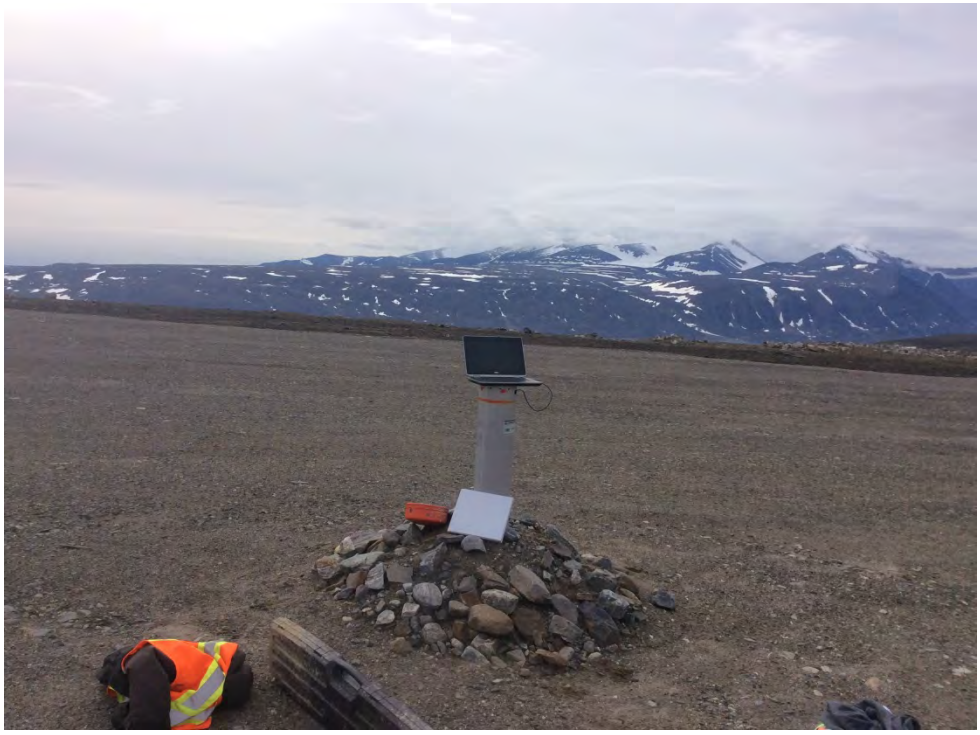


Photo 507: *Thermistor VT2 – Lower Site – Tier II Disposal Facility*

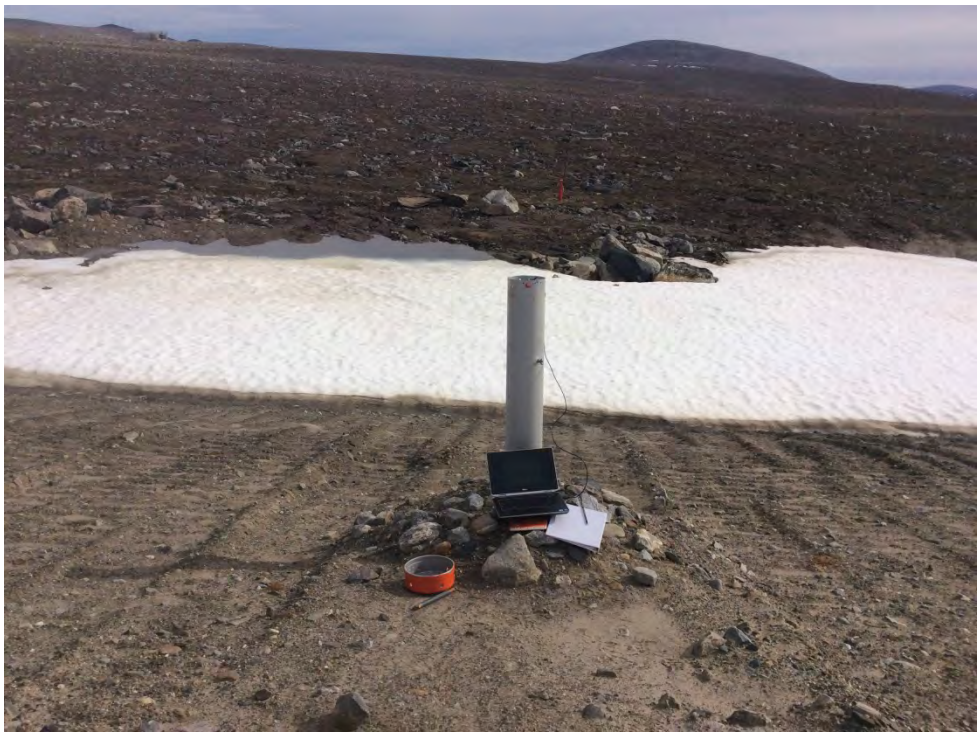


Photo 508: *Thermistor VT4 – Lower Site – Tier II Disposal Facility*

Photo 509: *Thermistor VTBL – Lower Site – Tier II Disposal Facility*

Photo 510: *Thermistor VT11 – Upper Site – Tier II Disposal Facility*

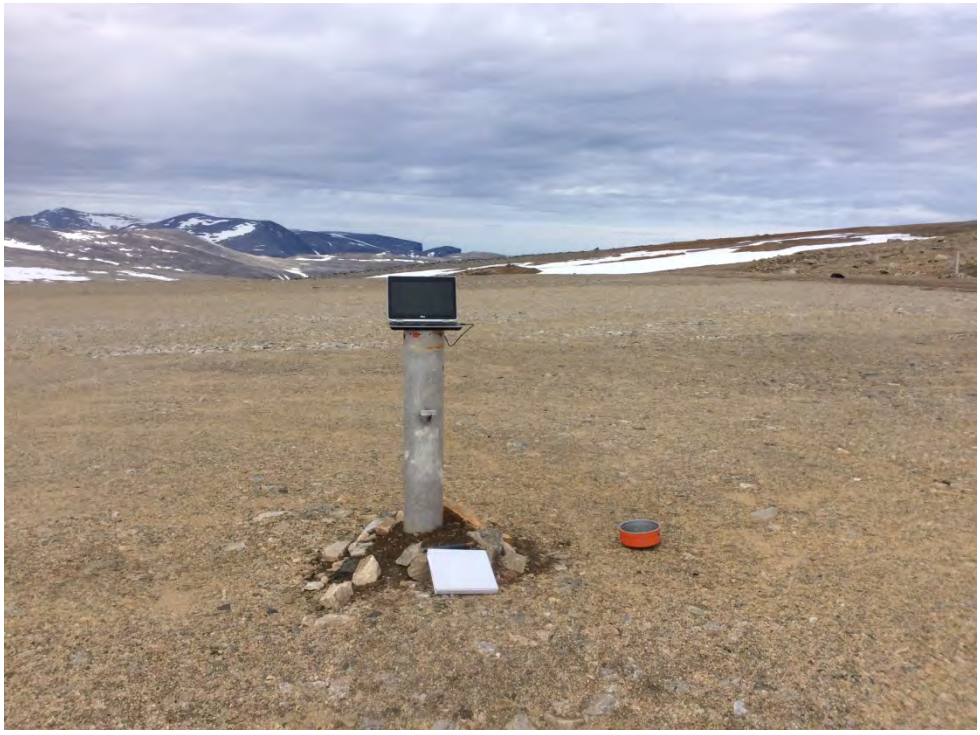


Photo 511: Thermistor VT10 – Upper Site – Tier II Disposal Facility

Photo 512: Thermistor VT9 – Upper Site – Tier II Disposal Facility

Photo 513: Thermistor VT8 – Upper Site – Tier II Disposal Facility

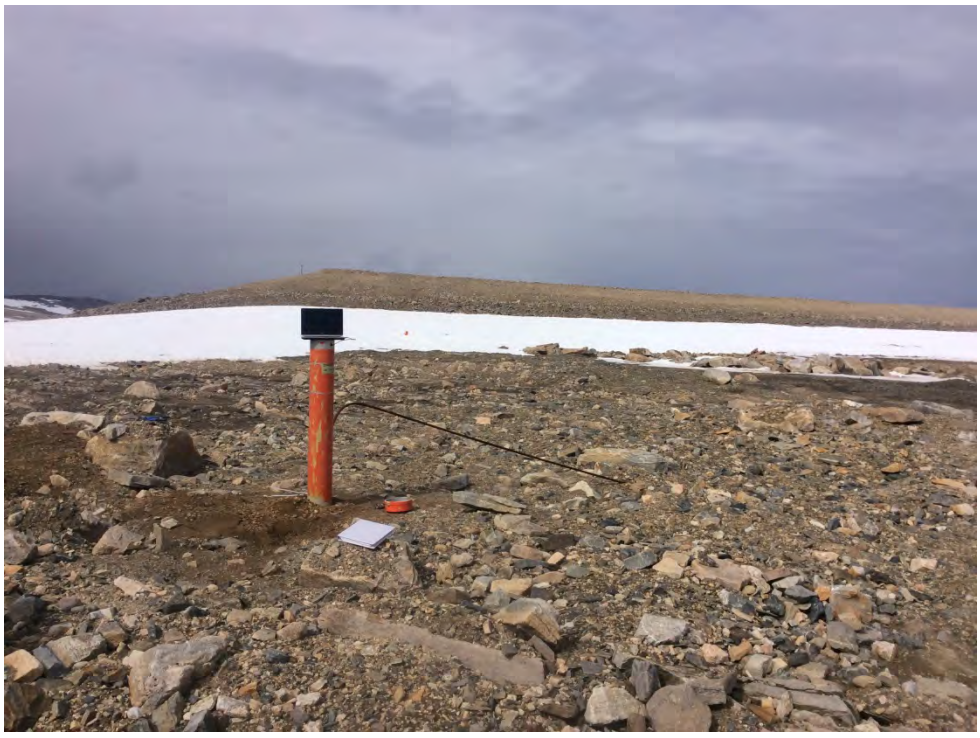


Photo 514: Thermistor VT BU – Upper Site – Tier II Disposal Facility

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