GOLDER
MEMBER OF WSP

REPORT

Remediation Action Plan

Former Bulk Petroleum Plant and Cardlock Facility
Highway 2 West, Peace River, Alberta
SAP No. 88002039

Submitted to:

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Project No. 21505917-1005

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Distribution List

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Imperial Oil Limited (Imperial) to develop a Remediation Action Plan (RAP) for the former bulk petroleum plant and cardlock facility at Highway 2 West, Peace River, Alberta (the Site).

2.0 PURPOSE

The objective of the RAP was to provide Imperial with a detailed Site remediation work plan for the removal of petroleum hydrocarbon-impacted (PHC-impacted) soil at the Site. The development of the RAP included the consideration of previous investigations and reports completed by others, in addition to all previous sampling work completed by Golder.

3.0 SITE DESCRIPTION

The Site at Highway 2 West, Peace River, Alberta (Figures 1 and 2) is about 4.0 hectares in size and is accessed via Highway 2. The ground surface is covered with grass, asphalt and/or gravel.

The Site is currently vacant. Formerly, the Site was a bulk petroleum plant and cardlock facility that operated from 1987 to 2015. All facilities associated with the cardlock facility were removed in 2003. All facilities associated with the bulk petroleum plant were removed in 2015 (Golder 2018). The former on-site bulk petroleum plant facilities included tank truck loaders/unloaders, warehouse with platforms, loading rack, underground sewer tank, underground water tank, office, barrel fill meters, pumps and pump base, an underground spill containment tank with associated underground piping and four catch basins, and a tank farm composed of six aboveground storage tanks (ASTs) (Biogenie 2004). The former on-Site cardlock facilities included three underground storage tanks (USTs), a pump island, underground product piping and concrete slab (Golder 2008).

The Site is zoned as Commercial according to the Municipal District of Peace (MD of Peace 2022, internet site). The land use surrounding the Site is as follows:

- north: Agricultural (zoned service commercial district);
- east: Commercial/industrial (zoned as Commercial/industrial district);
- south: under development of commercial/industrial use (zoned highway commercial district); and
- west: Agricultural (zoned highway commercial district).

3.1 Stratigraphy

The stratigraphy at the Site generally consisted of silt, clayey silt and clay from surface to 16.8 metres below ground surface (mbgs), the maximum depth of investigation. Discontinuous sand and silty sand layers were observed between 2.0 and 5.5 mbgs and between 15.5 and 16.8 mbgs.

Grain size analyses completed on soil samples collected indicated that fine-grained materials are predominantly present at the Site.

3.2 Hydrogeology

Based on a previous groundwater monitoring events conducted at the Site, all three monitoring wells (GA08-01, GA08-02 and GA08-03) have been found dry. Light non-aqueous phase liquid (LNAPL) has not been detected in any of the monitoring wells.

4.0 PREVIOUS INVESTIGATIONS

Previous investigations were reviewed by Golder in order to assess the historical Site conditions and as a source of information for reporting. The Site was a former bulk petroleum plant and cardlock facility that operated from 1987 to 2015. All facilities associated with the cardlock were removed.

Previous investigations were conducted by Golder at the Site between 2008 to 2018 to delineate and assess soil and groundwater quality at the Site. 18 boreholes/monitoring wells, 29 test pits and seven excavation soil samples were completed on the Site. Twelve locations reported PHC parameters exceeding the applied guidelines at depths of 0.0 to 3.0 mbgs (Golder 2008, 2015, 2017b, 2018).

Groundwater samples were not collected due to the absence of a shallow aquifer, demonstrated by the three monitoring wells at the Site being dry. A water well drilling report for a well on SW-33-083-22 W5M, where the Site is located, indicated that the water-bearing formation was found at 31.7 mbgs (Golder 2017a). The deepest monitoring well (G08-03) installed on-site was 16.8 mbgs.

LNAPL has not been detected at the Site.

The areas of potential environmental concern (APECs), based on a review of previous work, are identified in the following table.

APECs	Location	Potential Contaminant of Concern
Former petroleum warehouses	Central portion of the Site	Benzene, toluene, ethylbenzene, xylenes (BTEX), PHC Fractions F1 and F2, polycyclic aromatic hydrocarbons (PAHs), 1,2-dichloroethane (1,2-DCA) and lead
Former loading and unloading racks and associated catch basins	Central portion of the Site	BTEX, PHC Fractions F1 and F2, PAHs, 1,2-DCA and lead
Former USTs nest, pump island and associated piping	East portion of the Site	BTEX, PHC Fractions F1 and F2, PAHs, 1,2-DCA and lead
Former AST farm and unloading rack	Central-west portion of the Site	BTEX, PHC Fractions F1 and F2, PAHs, 1,2-DCA and lead

5.0 SELECTED GUIDELINES

Based on the land use, grain size and applicable exposure pathways, the following guidelines are applied to assess soil quality at the Site:

- BTEX, PHC Fractions F1 to F4 and carcinogenic PAH parameters were compared to the site-specific Tier 2 surface soil (0 to 3 metres [m]) remediation guidelines for commercial land use or commercial land use with an agricultural buffer and fine-grained soils (Golder 2019). Soil samples below 3 m in depth were compared to the site-specific Tier 2 subsoil (>3 m) remediation guidelines for commercial land use or commercial land use with an agricultural buffer and fine-grained soils, with the ecological direct soil contact (F1 to F4 only) exposure pathway excluded (Golder 2019).
- 1,2-DCA and metals parameters were compared to the Alberta Tier 1 soil remediation guidelines for commercial land use or commercial land use with an agricultural buffer and fine-grained soils (AEP 2019a).

- PAH parameters were compared to either the Site-Specific Tier 2 Soil Remediation guidelines, values for commercial land use or commercial land use with an agricultural buffer and fine-grained soils (Golder 2019) or the Alberta Tier 2 soil remediation guidelines for commercial land use or commercial land use with an agricultural buffer and fine-grained soils, with the freshwater aquatic life (FAL) exposure pathway excluded (AEP 2019a,b).

6.0 DELINEATION OF IDENTIFIED IMPACTS

To facilitate the development of a RAP, all soil data were compared to the applied guidelines. A summary of all soil analytical results are illustrated in Figures 3 to 5.

6.1 Soil Analytical Results

6.1.1 Petroleum Hydrocarbons

A summary of soil analytical results for PHC parameters are illustrated in Figure 3. The analytical results indicated the following:

- Soil samples collected from boreholes MW1, MW2, MW3 and MW5 in the area of the former AST farm and pumps at depths ranging from 0.0 to 0.8 mbgs, reported concentrations of PHC Fraction F2 above the applied guideline.
- Soil samples collected from boreholes MW6, MW7, TP15-09 and TP17-02 in the area of the former loading and unloading racks at depths ranging from 0.8 to 2.3 mbgs, reported concentrations of PHC Fractions F1, F2 and/or F3 above the applied guidelines.
- A soil sample collected from borehole WW@1M-31 on the northwest corner of the former UST nest at 1.0 mbgs, reported concentrations of PHC Fraction F2 above the applied guideline.
- Soil samples collected from excavation samples EW@2M-52 and SW@3M-47 and test pits TP B and TP17-07 in the area of the former pump island and UST nest at depths ranging from 2.0 to 6.0 mbgs, reported concentrations of benzene, xylenes, PHC Fractions F1, F2 and/or F4 above the applied guideline or within 80% of the applied guidelines.
- All other locations investigated reported concentrations below the applied guidelines.

Based on the analytical results, hydrocarbon-impacted soil is present at depths ranging from 0.0 to 3.0 mbgs (potentially up to 6.0 mbgs) in the area of the former AST farm, warehouse, pump islands, loading racks, barrel fill meters and UST nest.

6.1.2 1,2-Dichloroethane

A summary of soil analytical results for 1,2-DCA parameters are illustrated in Figure 3. The analytical results indicated the following:

- All soil samples collected for analysis of 1,2-DCA parameters reported concentrations below the applied guidelines and below the reportable detection limits (RDLs).

6.1.3 Polycyclic Aromatic Hydrocarbons

A summary of soil analytical results for PAH parameters are illustrated in Figure 4. The analytical results indicated the following:

- All soil samples collected for analysis of PAH parameters reported concentrations below the applied guidelines and/or below the RDLs.

6.1.4 Metals

A summary of soil analytical results for metals parameters are illustrated in Figure 5. The analytical results indicated the following:

- All soil samples collected for analysis of metals parameters reported concentrations below the applied guidelines and/or below the RDLs.

7.0 REMEDIATION ACTION PLAN

Based on recent and previous environmental Site investigations, the remediation option selected is to excavate hydrocarbon-impacted soil from the west-central and east portions of the Site.

The RAP was developed based on all the data collected at the Site, previously mentioned in this report, to propose a probable scenario of excavation extents illustrated in Figure 6.

It is important to note that the excavation volume is based on limited sample data and that the actual extent of the excavation will be controlled in the field by the environmental monitor using field screening techniques and laboratory confirmatory testing to assess contaminant concentrations. It is also important to note that impacted soil will only be removed to the Site boundaries.

Excavated materials will be loaded into hauling trucks and transported off-site for disposal at an appropriate licensed facility. Landfill suitability testing of the excavated material is required for landfill acceptance.

Excavated soil classified as hazardous according to the guidelines outlined in the Alberta User Guide for Waste Managers (AB EP 1996) would require transportation to a Class 1 landfill that is licensed to accept hazardous waste, while soil classified as non-hazardous according to the guidelines outlined in the Alberta User Guide for Waste Managers would require transportation to either a Class 1 or a Class 2 landfill.

The following sections outline the volume of impacted soil to be removed, the estimated extents of the remedial excavation areas and the general excavation requirements.

7.1 Soil Volume Estimate

The depth of hydrocarbon-impacted soil was generally between 0.8 and 3.0 mbgs. It is assumed that the depth of the impacts extends to between 1.3 and 3.5 mbgs and that there is about 0 to 0.30 m of clean overburden. Therefore, the thickness of impacted soil is estimated to be about 3.2 m. Soil volume that will be removed to safely slope the sides of the excavation have not been calculated.

Area A

Area A represents the probable excavation limits and is centred on boreholes MW1, MW2, MW3, and MW5 where analytical results were reported at concentrations greater than the applied guidelines for PHC parameters.

Using the assumption that there is a 1.3-m thickness of hydrocarbon-impacted soil present in this area, the probable estimated volume of impacted soil to be removed would be 478 cubic metres (m^3) (Figure 6). Clean overburden is not expected in this area.

Area B

Area B represents the probable excavation limits and is centred on boreholes MW6, MW7, TP15-09 and TP17-02, where analytical results were reported at concentrations greater than the applied guidelines for PHC parameters.

Using the assumption that there is a 2.3-m thickness of hydrocarbon-impacted soil present in this area, the probable estimated volume of impacted soil to be removed would be 1,534 m^3 (Figure 6). The overburden volume generated with the excavation of Area B is estimated at 334 m^3.

Area C

Area C represents the probable excavation limits and is centred on borehole WW@1M-31, where analytical results were reported at concentrations greater than the applied guidelines for PHC parameters.

Using the assumption that there is a 2.0-m thickness of hydrocarbon-impacted soil present in this area, the probable estimated volume of impacted soil to be removed would be 80 m^3 (Figure 6). The overburden volume generated with the excavation of Area C is estimated at 20 m^3.

Area D

Area D represents the probable excavation limits and is centred on excavation samples EW@2M-52, SW@3M-47 and test pits TP B and TP17-07, where analytical results were reported at concentrations greater than or within 80% of the applied guidelines for PHC parameters.

Using the assumption that there is a 3.5 m thickness of hydrocarbon-impacted soil present in this area, the probable estimated volume of impacted soil to be removed would be 700 m^3 (Figure 6). The overburden volume generated with the excavation of Area D is estimated at 300 m^3.

7.2 General Excavation Requirements

7.2.1 Overhead Power Line and Underground Utilities

Based on previous investigations and Site visits, the utilities present on-site and/or adjacent to the property boundaries include:

- overhead electrical lines that run along the north and east property boundaries;
- a gas line from the east neighboring building, running toward the Site where the signal cuts off at the edge of site; and
- a telus cable that runs from the east neighboring building toward Site to a Telus pedestal and then runs along the Site boundary south towards Highway 2.

The civil contractor will be responsible for keeping the excavation equipment at a safe distance from the overhead power lines and underground lines. The utilities described above are shown in Figure 2.

7.2.2 Monitoring Wells Decommissioning

As part of the remediation, all the monitoring wells within the excavation area will be decommissioned. The flush-mounted road boxes will be removed prior to the excavation and the other components of the well (screen, polyvinyl chloride pipe, sand pack and bentonite plug) will be removed during the excavation. Deep wells will be backfilled with bentonite pellets.

7.2.3 Sloping

The boundaries of the extents of the excavation not adjacent to the building or along the property boundaries should be sloped appropriately (1:1) to minimize excavation wall failures. Excavated materials will be stockpiled adjacent to the excavation on a temporary liner. Non-impacted material excavated for sloping purposes only will be sampled and re-used as backfill material following analytical result confirmations. There will be about 848 m^3 of soil handled to slope the extents of the excavations.

7.2.4 Overburden

The surface soils (overburden) of the excavation (0.0 to 1.5 mbgs) will be placed in a separate stockpile on-site for future utilization as backfill material. The overburden material will be sampled and submitted for analysis of PHC parameters. If the analytical results determine the overburden meets the applied guidelines for the Site, it will be used as backfill material.

7.2.5 Hydrocarbon-Resistant Liner

A hydrocarbon-resistant liner will be used beneath stockpiles to prevent contaminant migration prior to off-site disposal. Golder will supervise placement of the liner; however, it is the responsibility of the civil contractor to source, supply and place the liner(s). If weather conditions indicate that surface water has the potential to transport contaminants from stockpiles to other areas/drainages at the Site, the stockpiles will be created within a berm and the liners placed on top of the berm and bermed areas. Berms will be constructed of clean fill material and designed to retain any surface water that may run off stockpiles.

7.2.6 Backfill

The civil contractor will be responsible for sourcing clean backfill to import. Any imported backfill will be tested for suitability. It is noted that any excavated soil that is determined to meet the applied guidelines for the Site, based on chemical analysis, may also be used for backfill. The excavation will be backfilled with clay material, placed in thin lifts (approximately 300 millimetres [mm]) and compacted to 98% standard proctor density. Exact specifications for backfilling will be dependent upon soil conditions and geotechnical engineering recommendations.

8.0 CONCLUSIONS

A RAP has been developed for the former bulk petroleum plant and cardlock facility at Highway 2 West, Peace River, Alberta (the Site).

A summary of the RAP is as follows:

- The applied guidelines at the Site for the excavation of PHC-impacted soil are site-specific Alberta Tier 2 Soil Guidelines for commercial land use or commercial land use with an agricultural buffer and fine-grained soils with the ecological direct soil contact exposure pathway excluded.
- The COCs for the excavation are BTEX and PHC Fractions F1 to F4.
- The probable area containing PHC impacts is estimated to be 1,275 m^2. Based on the depths of hydrocarbon-impacted soils, about 2,752 m^3 of impacted soil would require removal. It is estimated that approximately 654 m^3 of clean overburden material could be stockpiled on a liner, screened and sampled, and used as near surface backfill material for the excavation.

- Excavated material will be transported off-site for disposal to either a non-hazardous waste or hazardous waste facility depending on landfill suitability testing.
- The remainder of the excavation will be backfilled with clay material, placed in thin lifts (approximately 300 mm) and compacted.

9.0 REFERENCES

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Internet Site

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10.0 LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by Golder Associates Ltd. for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively, “Imperial Oil”). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Golder Associates Ltd. make no representation or warranty to any other person with regard to this report and the work referred to in this report, and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, or reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.’s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report, and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report.

Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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Signature Page

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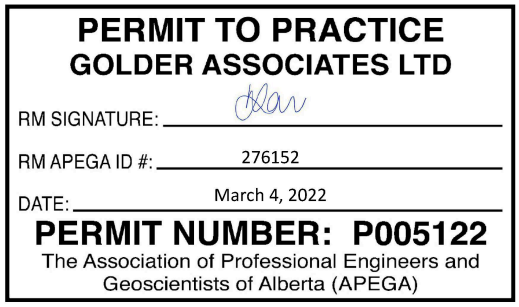

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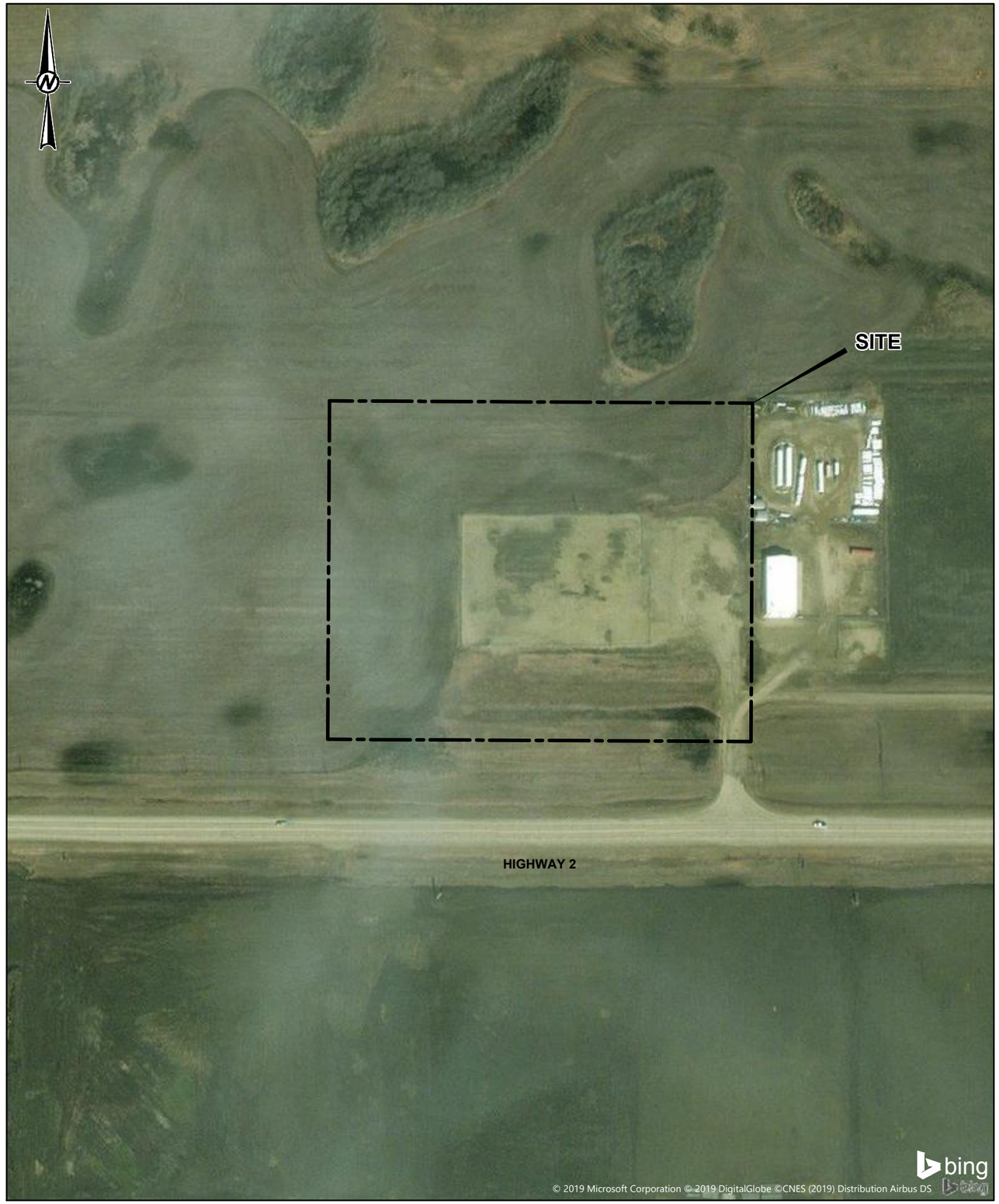

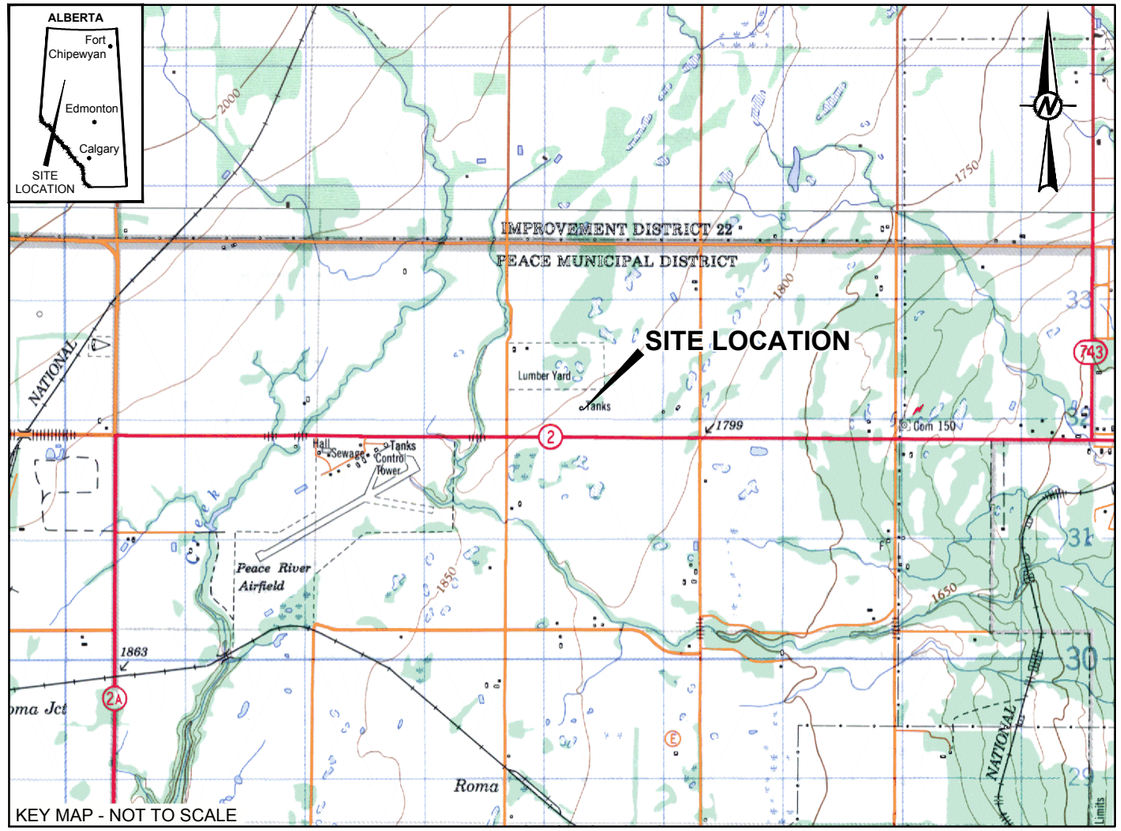

KEY MAP - NOT TO SCALE

LEGEND

PROPERTY BOUNDARY

REFERENCE

ORIGINAL DRAWING OBTAINED FROM McELHANNEY LAND SURVEYS (ALTA) LTD.; DWG No.: 77230; SCALE: 1:5,000; DATE: MARCH 31, 2015.

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0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

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PROJECT
FORMER BULK PETROLEUM PLANT AND CARDLOCK FACILITY
HIGHWAY 2 WEST
PEACE RIVER, ALBERTA

TITLE
SITE LOCATION PLAN

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21505917	1005-2216	0	1

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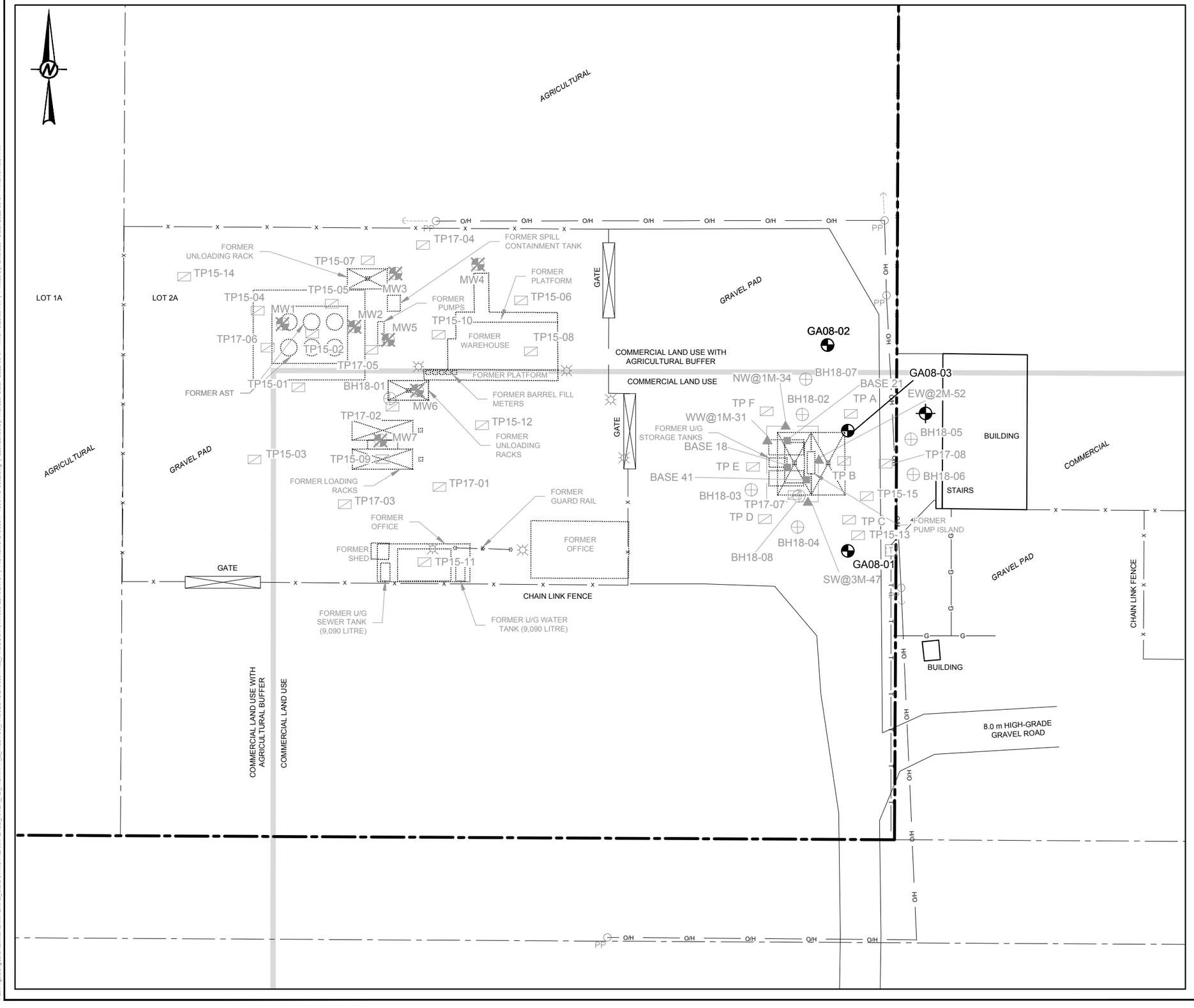
25 mm



LEGEND

- PROPERTY BOUNDARY
- LAND USE BOUNDARY
- EXCAVATION LIMITS (FORMER)
- FENCELINE
- FORMER FACILITY
- OVERHEAD POWER LINE
- UNDERGROUND GAS LINE
- UNDERGROUND TELEPHONE LINE
- BOREHOLE LOCATION (FORMER)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
- SOIL SAMPLE LOCATION (BASE) (FORMER)
- SOIL SAMPLE LOCATION (WALL) (FORMER)
- TEST PIT LOCATION (FORMER)
- WATER WELL
- LIGHT POST
- POWER POLE
- TELEPHONE PEDESTAL

LIST OF APPLICABLE ABBREVIATIONS

AST	ABOVEGROUND STORAGE TANK
m	METRE
U/G	UNDERGROUND

REFERENCE

ORIGINAL DRAWING OBTAINED FROM McELHANNEY LAND SURVEYS (ALTA) LTD.;
DWG No.: 77230; SCALE: 1:750; DATE: MARCH 31, 2015.

0 12.5 25
1:750 METRES

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PROJECT
FORMER BULK PETROLEUM PLANT AND CARDLOCK FACILITY
HIGHWAY 2 WEST
PEACE RIVER, ALBERTA

TITLE
SITE PLAN WITH HISTORICAL FACILITIES, SOIL SAMPLE, TEST PIT, BOREHOLE AND MONITORING WELL LOCATIONS

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-04
DESIGNED	MGreer
PREPARED	LMoraes
REVIEWED	LMcDavid
APPROVED	HLavoie

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21505917	1005-2216	0	2

COMMERCIAL LAND USE

MW6 — Date Sampled - October 22/03

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.8 - 1.5	3.0	3.4	21	95	2,000	15,000	9,500	34	-
1.5 - 2.3	0.55	<0.10	14	11	480	2,000	1,600	<10	-
3.0 - 3.8	<0.04	<0.10	1.2	2.2	<10	14	71	15	-

MW7 — Date Sampled - October 22/03

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.8 - 1.5	1.5	2.9	31	170	360	1,800	1,300	130	-
1.5 - 2.3	0.5	<0.10	<0.10	<0.10	18	28	130	19	-
2.3 - 3.0	<0.04	<0.10	<0.10	<0.10	<10	21	61	<10	-

BASE 41 — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
4.5	<0.0050	0.088	<0.010	0.34	20	170	38	<10	-

BASE 18 — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
4.5	<0.0050	0.038	<0.010	0.054	<12	28	190	<10	-

BASE 21 — Date Sampled - July 02/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
4.5	<0.0050	<0.020	<0.010	<0.040	<12	12	12	<10	-

SW@3M-47 — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
3.0	0.40	4.8	2.1	220	620	850	41	<10	-
3.0 (DUP)	0.34	5.0	2.6	290	880	640	32	<10	-

WW@1M-31 — Date Sampled - July 02/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	<0.0050	<0.020	<0.010	0.068	<12	1,200	64	15	-

NW@1M-34 — Date Sampled - July 02/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	<0.0050	0.044	<0.010	0.17	<12	19	76	42	-

EW@2M-52 — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
2.0	0.74	130	73	910	1,600	2,000	200	11	-
2.0 (DUP)	1.2	77	170	850	960	1,900	220	23	-

TP A — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	<0.0050	<0.020	<0.010	<0.040	29	18	100	56	-
5.0	<0.0050	<0.020	<0.010	0.081	<12	15	36	15	-

TP B — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
2.0	0.35	0.49	3.2	31	790	6,000	3,200	42	-
3.0	0.022	<0.020	0.063	0.34	21	85	69	<10	-
6.0	<0.0050	<0.020	<0.010	<0.040	<12	22	30	12	-

TP C — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
5.0	0.05	0.036	<0.010	0.099	<12	16	16	<10	-
6.0	0.22	0.084	<0.010	<0.040	<12	16	30	<10	-

TP D — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
5.0	<0.0050	<0.020	<0.010	<0.040	<12	14	38	13	-
6.0	<0.0050	<0.020	<0.010	<0.040	<12	15	43	13	-

TP E — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	<0.0050	<0.020	<0.010	<0.040	<12	16	43	20	-
6.0	<0.0050	<0.020	<0.010	<0.040	<12	15	49	15	-

TP F — Date Sampled - July 03/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
5.0	<0.0050	<0.020	<0.010	<0.040	<12	15	47	10	-
6.0	<0.0050	<0.020	<0.010	<0.040	<12	15	41	<10	-

GA08-01 — Date Sampled - July 15/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
9.9 - 10.7	0.021	<0.020	<0.010	<0.040	<12	<10	16	<10	-
11.4 - 12.2	<0.0050	<0.020	<0.010	<0.040	<12	<10	34	<10	-

GA08-03 — Date Sampled - July 16/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
7.6 - 8.4	5.0	20	10	40	12	10	10	10	-
12.2 - 12.9	<0.0050	0.090	0.031	0.28	<12	<10	<10	<10	-
16.0 - 16.8	0.0050	0.020	0.010	0.040	12	10	10	10	-

TP15-01 — Date Sampled - April 27/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	74	<50	<0.0020

TP15-09 — Date Sampled - April 28/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	0.063	<0.020	3.0	4.7	150	1,100	930	<50	<0.0020
3.5	<0.0050	<0.020	0.025	0.097	<12	57	70	<50	<0.0020
6.0	<0.0050	<0.020	0.034	0.10	<12	<10	<50	<50	<0.0020

TP15-11 — Date Sampled - April 28/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.2	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-12 — Date Sampled - April 28/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
2.5	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-13 — Date Sampled - April 29/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
3.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-15 — Date Sampled - April 29/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
4.5	0.040	0.045	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	0.072	0.20	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP17-01 — Date Sampled - June 27/17

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.00	<0.0050	<0.020	<0.010	<0.040	<10	<10	<50	<50	-
2.00	<0.0050	<0.020	<0.010	<0.040	<10	<10	<50	<50	-

TP17-02 — Date Sampled - June 27/17

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
2.0	0.023	<0.020	3.5	0.29	120	1,100	1,100	<50	-
2.0 (DUP)	0.023	<0.020	3.4	0.13	110	700	830	<50	-
2.5	<0.0050	<0.020	0.022	<0.040	<10	39	160	<50	-

TP17-03 — Date Sampled - June 27/17

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.1	<0.0050	<0.020	<0.010	<0.040	<10	<10	50	<50	-
1.0	<0.0050	<0.020	<0.010	<0.040	<10	<10	<50	<50	-
2.5	<0.0050	<0.020	<0.010	<0.040	<10	<10	110	53	-

COMMERCIAL LAND USE

TP17-07 — Date Sampled - June 28/17

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
4.0	0.16	0.95	0.12	15	18	<10	53	<50	-
4.5	0.17	1.6	0.91	34	76	64	<50	<50	-
6.0	0.51	1.3	0.55	7.6	52	340	76	<50	-
6.0 (DUP)	2.0	12	5.7	76	730	510	81	<50	-

TP17-08 — Date Sampled - June 28/17

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
3.0	0.15	<0.020	<0.010	<0.040	20	<10	120	55	-
5.0	0.66	3.1	0.15	0.59	20	<10	53	<50	-

BH18-03 — Date Sampled - November 06/18

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
3.4 - 3.7	<0.0050	<0.020	<0.010	<0.045	<10	<10	<50	<50	-
4.1 - 4.4	0.014	<0.020	<0.010	<0.045	<10	<10	<50	<50	-
7.7 - 7.9	0.053	0.063	0.029	<0.11	<24	<10	<50	<50	-

BH18-04 — Date Sampled - November 06/18

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
4.2 - 4.5	0.014	<0.020	<0.010	<0.045	<10	<10	<50	<50	-
7.8 - 8.1	0.014	<0.020	<0.010	<0.045	<10	<10	<50	<50	-

BH18-05 — Date Sampled - November 07/18

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
4.9 - 5.3	<0.0050	<0.020	<0.010	<0.045	<10	<10	<50	<50	-
7.9 - 8.3	<0.0050	<0.020	<0.010	<0.045	<10	<10	<50	<50	-

BH18-06 — Date Sampled - November 07/18

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
5.0 - 5.3	<0.0050	<0.020	<0.010	<0.045	<10	<10	<50	<50	-
5.0 - 5.3 (DUP)	<0.0050	<0.020	<0.010	<0.045	<10	<10	<50	<50	-
8.0 - 8.3	<0.0050	<0.020	<0.010	<0.045	<10	<10	<50	<50	-

COMMERCIAL LAND USE WITH AGRICULTURAL BUFFER

MW1 — Date Sampled - October 23/03

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.0 - 0.8	<0.04	<0.10	<0.10	<0.10	34	300	170	<10	-
2.3 - 3.5	<0.04	<0.10	<0.10	<0.10	<10	<10	87	<10	-

MW2 — Date Sampled - October 23/03

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.0 - 0.8	<0.04	<0.10	<0.10	<0.10	49	370	220	<10	-
1.5 - 2.3	<0.04	<0.10	<0.10	<0.10	14	<10	64	<10	-
5.3 - 6.0	<0.04	<0.10	<0.10	<0.10	<10	<10	46	<10	-

MW3 — Date Sampled - October 22/03

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.0 - 0.8	0.32	0.46	5.0	25	240	2,900	1,700	<10	-
2.3 - 3.0	<0.04	<0.10	<0.10	3.2	43	<10	140	43	-

MW4 — Date Sampled - October 22/03

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.0 - 0.8	<0.04	<0.10	<0.10	<0.10	<10	<10	76	<10	-
1.5 - 2.3	<0.04	<0.10	<0.10	<0.10	<10	<10	95	27	-

MW5 — Date Sampled - October 22/03

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.0 - 0.8	<0.04	<0.10	<0.10	2.7	42	490	620	23	-
1.5 - 2.3	<0.04	<0.10	<0.10	<0.10	23	<10	58	<10	-

GA08-02 — Date Sampled - July 16/08

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
6.1 - 6.9	<0.0050	<0.020	<0.010	<0.040	<12	<10	<10	<10	-
15.2 - 16.0	<0.0050	<0.020	<0.010	<0.040	12	10	10	10	-

TP15-02 — Date Sampled - April 27/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-03 — Date Sampled - April 27/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	87	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-04 — Date Sampled - April 27/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
2.5	<0.0050	<0.020	<0.010	<0.040	<12	<10	73	<50	<0.0020
4.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	80	<50	<0.0020

TP15-05 — Date Sampled - April 28/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.5	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-06 — Date Sampled - April 28/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
2.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-07 — Date Sampled - April 28/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	0.018	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-08 — Date Sampled - April 28/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
4.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-10 — Date Sampled - April 28/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
1.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	62	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP15-14 — Date Sampled - April 29/15

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
2.5	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020
6.0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<50	<50	<0.0020

TP17-04 — Date Sampled - June 27/17

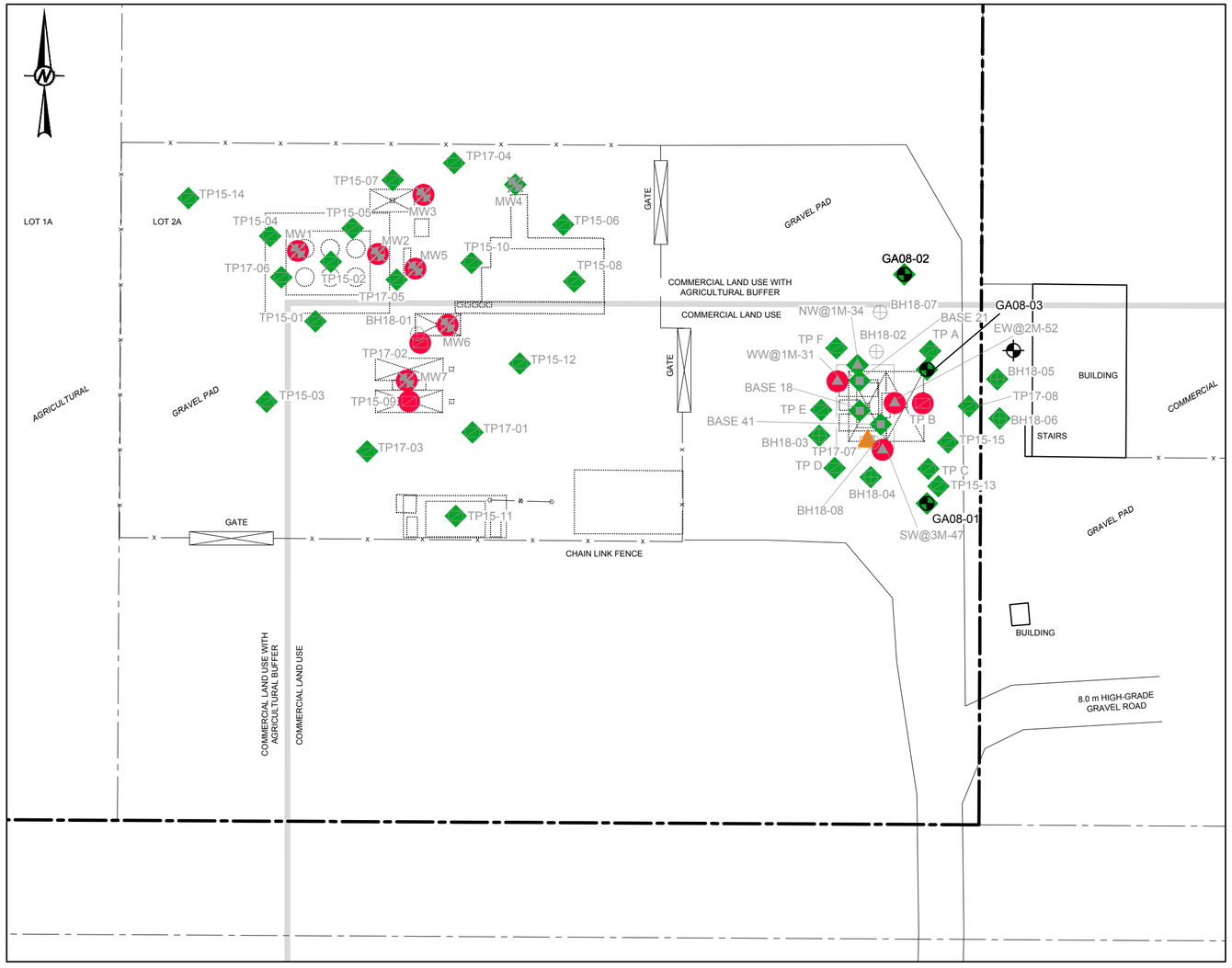
Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.1	<0.0050	<0.020	<0.010	<0.040	<10	<10	<50	<50	-
1.0	<0.0050	<0.020	<0.010	<0.040	<10	<10	51	<50	-

TP17-05 — Date Sampled - June 27/17

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.1	<0.0050	<0.020	<0.010	<0.040	<10	<10	<50	<50	-
1.0	<0.0050	<0.020	<0.010	<0.040	<10	<10	<50	<50	-
1.0 (DUP)	<0.0050	<0.020	<0.010	<0.040	<10	<10	<50	<50	-
2.0	<0.0050	<0.020	<0.010	<0.040	<10	<10	58	<50	-

TP17-06 — Date Sampled - June 27/17

Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	1,2-DCA
0.1	<0.0050	<0.020	<0.010	<0.040	<10	<10	52	<50	-
1.0	<0.0050	<0.020	<0.010	<0.040	<10	<10	<50	<50	-



SITE-SPECIFIC GUIDELINES

PARAMETERS	B	T	E	X	F1	F2	F3	F4	1,2-DCA
CRITERIA[a]	11	330	430	230	320	260	2,500	6,600	0.025[e]
CRITERIA[b]	11	660	860	460	800	1,000	4,300	10,000	0.025[e]
CRITERIA[c]	1.6	330	430	230	320	260	2,500	6,600	0.025[e]
CRITERIA[d]	1.6	660	860	257	631	1,000	4,300	10,000	0.025[e]
RDL	0.0050	0.020	0.010	0.040	10	10	50	50	0.002
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg

(a) SITE SPECIFIC TIER 2 SURFACE SOIL (0 TO 3.0 mbgs) REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE AND FINE-GRAINED SOILS (GOLDER 2019).

(b) SITE SPECIFIC TIER 2 SUBSOIL (>3.0 mbgs) REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE AND FINE-GRAINED SOILS, WITH THE ECOLOGICAL DIRECT SOIL CONTACT (F1 TO F4 ONLY) EXPOSURE PATHWAY EXCLUDED (GOLDER 2019).

(c) SITE SPECIFIC TIER 2 SURFACE SOIL (0 TO 3.0 mbgs) REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE WITH AN AGRICULTURAL BUFFER AND FINE-GRAINED SOILS (GOLDER 2019).

(d) SITE SPECIFIC TIER 2 SUBSOIL (>3.0 mbgs) REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE WITH AN AGRICULTURAL BUFFER AND FINE-GRAINED SOILS, WITH THE ECOLOGICAL DIRECT SOIL CONTACT (F1 TO F4 ONLY) EXPOSURE PATHWAY EXCLUDED (GOLDER 2019).

(e) ALBERTA TIER 1 SOIL REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE OR COMMERCIAL LAND USE WITH AN AGRICULTURAL BUFFER AND FINE-GRAINED SOILS (AEP 2019a)

LEGEND

- PROPERTY BOUNDARY
- LAND USE BOUNDARY
- FENCELINE
- FORMER FACILITY
- BOREHOLE LOCATION (FORMER)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
- SOIL SAMPLE LOCATION (BASE) (FORMER)
- SOIL SAMPLE LOCATION (WALL) (FORMER)
- TEST PIT LOCATION (FORMER)
- WATER WELL

LIST OF APPLICABLE ABBREVIATIONS

>	GRATER THAN
<	LESS THAN
-	NOT AVAILABLE OR NO DATA
1,2-DCA	1,2-DICHLOROETHANE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{21})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{21}-C_{32})
m	METRE
mbgs	METRES BELOW GROUND SURFACE
mg/kg	MILLIGRAMS PER KILOGRAM
n/g	NO GUIDELINE
RDL	REPORTABLE DETECTION LIMIT

NOTES

1. LOCATIONS WHERE ALL SOIL SAMPLES MEET APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN AS A GREEN DIAMOND (♦).
2. LOCATIONS WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS A RED CIRCLE (●).
3. LOCATIONS WHERE AT LEAST ONE SOIL SAMPLE POTENTIALLY EXCEEDS APPLICABLE GUIDELINES FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS AN ORANGE TRIANGLE (▲).
4. ANALYTICAL RESULTS EXCEEDING 80% OF THE GUIDELINE/STANDARDS VALUE IN TEXT ARE SHOWN IN ORANGE.
5. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN RED.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM McELHANNEY LAND SURVEYS (ALTA) LTD.; DWG No.: 77230; SCALE: 1:750; DATE: MARCH 31, 2015.

0 12.5 25
1:750 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-04
DESIGNED	MGreer
PREPARED	LMoraes
REVIEWED	LMcDavid
APPROVED	HLavoie

PROJECT
FORMER BULK PETROLEUM PLANT AND CARDLOCK FACILITY
HIGHWAY 2 WEST
PEACE RIVER, ALBERTA

TITLE
HISTORICAL SOIL ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4 AND 1,2-DICHLOROETHANE

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21505917	1005-2216	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI C
25 mm
0

COMMERCIAL LAND USE

TP17-01 — Date Sampled - June 27/17

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
1.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-
2.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-

TP17-02 — Date Sampled - June 27/17

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
2.0	0.69	0.14	-	0.034	-	-	-	-	-	-	-	-	-	-	1.5	-	6.3	0.97	0.26	-	2.8	-	-	-	-
2.0 (DUP)	0.44	0.085	-	0.028	-	-	-	-	-	-	-	-	-	-	0.95	-	3.8	0.028	0.028	-	1.6	-	-	-	-
2.5	0.0093	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	0.034	-	0.033	<0.0050	<0.0050	-	0.12	-	-	-	-

TP17-03 — Date Sampled - June 27/17

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
0.5	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-
1.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-
2.5	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-

TP17-07 — Date Sampled - June 28/17

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
4.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-
4.5	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	0.11	0.34	1.7	-	<0.0050	-	-	-	-
6.0	0.021	0.0058	-	<0.0040	-	-	-	-	-	-	-	-	-	-	0.040	-	2.0	3.5	5.9	-	0.068	-	-	-	-
6.0 (DUP)	0.030	0.0074	-	<0.0040	-	-	-	-	-	-	-	-	-	-	0.059	-	2.7	3.6	8.2	-	0.098	-	-	-	-

TP17-08 — Date Sampled - June 28/17

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
3.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-
5.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	0.019	0.046	0.046	-	<0.0050	-	-	-	-

BH18-01 — Date Sampled - November 06/18

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
3.3 - 3.7	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.025	<0.0050	<0.0050	<0.010	<0.0071	<0.10
5.7 - 6.0	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	<0.0050	0.013	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.027	<0.0050	<0.0050	<0.010	<0.0071	<0.10

BH18-02 — Date Sampled - November 06/18

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
4.2 - 4.4	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.022	0.022	0.015	<0.0050	0.013	0.0054	<0.010	<0.0071	<0.10
5.7 - 6.0	0.30	0.067	<0.010	0.11	<0.0050	<0.0050	0.0086	0.0097	0.0075	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.66	<0.0050	5.8	13	8.7	0.095	1.5	0.065	0.088	<0.0071	<0.10
5.7 - 6.0 (Dup)	0.28	0.060	<0.010	0.092	<0.0050	<0.0050	0.011	0.012	0.010	<0.0050	<0.0050	<0.0050	<0.0050	0.019	0.62	<0.0050	5.6	12	9.2	0.13	1.4	0.062	0.14	<0.0071	<0.10
8.0 - 8.2	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.010	0.013	0.0069	<0.0050	<0.0050	<0.0050	<0.0050	0.0071	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.046	<0.0050	0.0069	<0.010	<0.0071	<0.10

BH18-03 — Date Sampled - November 06/18

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
3.4 - 3.7	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.0088	0.015	0.0070	<0.0050	<0.0050	<0.0050	<0.0050	0.0072	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.060	0.0085	<0.0050	<0.010	<0.0071	<0.10
4.1 - 4.4	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.010	0.013	0.0093	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.10	<0.0050	0.0070	<0.010	<0.0071	<0.10
7.7 - 7.9	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.012	0.014	0.0090	<0.0050	<0.0050	<0.0050	<0.0050	0.0068	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.077	<0.0050	0.0085	<0.010	<0.0071	<0.10

BH18-04 — Date Sampled - November 06/18

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
4.2 - 4.5	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.0066	0.011	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.017	<0.0050	<0.0050	<0.010	<0.0071	<0.10
7.8 - 8.1	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.0091	0.011	0.0070	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.046	<0.0050	0.0062	<0.010	<0.0071	<0.10

BH18-05 — Date Sampled - November 07/18

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
4.9 - 5.3	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	<0.0050	<0.0050	0.0073	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.048	<0.0050	<0.0050	<0.010	<0.0071	<0.10
7.9 - 8.3	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.0086	0.012	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.038	<0.0050	<0.0050	<0.010	<0.0071	<0.10

BH18-06 — Date Sampled - November 07/18

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
5.0 - 5.3	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.0072	0.011	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.030	<0.0050	<0.0050	<0.010	<0.0071	<0.10
8.0 - 8.3	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.0092	0.011	0.0067	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.050	<0.0050	0.0067	<0.010	<0.0071	<0.10

BH18-07 — Date Sampled - November 07/18

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
4.2 - 5.5	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0071	<0.10
5.8 - 6.0	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.012	0.014	0.012	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0078	<0.0050	<0.0050	<0.0050	0.0089	0.65	0.15	<0.0050	0.011	<0.0071	<0.10
5.8 - 6.0 (Dup)	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.012	0.013	0.011	<0.0050	<0.0050	<0.0050	<0.0050	0.0077	<0.0050	<0.0050	<0.0050	<0.0050	0.0069	1.1	0.13	<0.0050	0.010	<0.0071	<0.10
8.0 - 8.3	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.024	<0.0050	<0.0050	<0.010	<0.0071	<0.10

BH18-08 — Date Sampled - November 08/18

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
4.1 - 4.5	0.021	0.0076	<0.010	0.0072	<0.0050	<0.0050	0.013	0.015	0.0099	<0.0050	<0.0050	<0.0050	<0.0050	0.013	0.057	<0.0050	3.1	9.4	13	0.11	0.096	0.020	0.086	<0.0071	<0.10
6.4 - 6.7	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.015	0.016	0.014	<0.0050	<0.0050	<0.0050	<0.0050	0.0090	<0.0050	0.0059	<0.0050	<0.0050	<0.0050	0.17	<0.0050	0.013	<0.010	0.0080	<0.10
7.9 - 8.2	<0.0050	<0.0050	<0.010	<0.0040	<0.0050	<0.0050	0.010	0.013	0.0074	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.060	<0.0050	0.0078	<0.010	<0.0071	<0.10

COMMERCIAL LAND USE WITH AGRICULTURAL BUFFER

TP17-04 — Date Sampled - June 27/17

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
0.5	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-
1.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-

TP17-05 — Date Sampled - June 27/17

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
0.5	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-
1.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-
1.0 (DUP)	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	<0.0050	-	-	-	-
2.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	0.018	<0.0050	<0.0050	-	<0.0050	-	-	-	-

TP17-06 — Date Sampled - June 27/17

Depth (mbgs)	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
0.5	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	0.0098	-	-	-	-
1.0	<0.0050	<0.0050	-	<0.0040	-	-	-	-	-	-	-	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	0.0092	-	-	-	-

SITE-SPECIFIC GUIDELINES

PARAMETERS	ANPTH	ANPTHL	ACR	ATRC	B(a)A	B(a)P	B(e)P	B(b+j)F	B(g,h,i)P	B(k)F	B(c)P	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	NPT	PYLH	PHNTR	PYR	QN	B(a)P TPE	IACR
CRITERIA[a,b]	8,000[c,d]	n/g	n/g	32[c,d]	n/g	72	n/g	n/g	n/g	n/g	n/g	n/g	n/g	180[c,d]	4,100[c,d]	n/g	n/g	n/g	28[c,d]	n/g	n/g[c,d]	3,200[c,d]	n/g	IACR <1.0	1.0
RDL	0.0050	0.0050	0.010	0.0040	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.010	0.0071	0.10
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	none

(a) SITE SPECIFIC TIER 2 SOIL REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE AND FINE-GRAINED SOILS (GOLDER 2019).
(b) SITE SPECIFIC TIER 2 SOIL REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE WITH AGRICUTURAL BUFFER AND FINE-GRAINED SOILS (GOLDER 2019).
(c) ALBERTA TIER 2 SOIL REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE AND FINE-GRAINED SOILS, WITH FRESHWATER AQUATIC LIFE EXPOSURE PATHWAYS EXCLUDED (AEP 2019a,b).
(d) ALBERTA TIER 2 SOIL REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE WITH AGRICULTURAL BUFFER AND FINE-GRAINED SOILS, WITH FRESHWATER AQUATIC LIFE EXPOSURE PATHWAYS EXCLUDED (AEP 2019a,b).

LEGEND

- PROPERTY BOUNDARY
- LAND USE BOUNDARY
- FENCELINE
- FORMER FACILITY
- BOREHOLE LOCATION (FORMER)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
- TEST PIT LOCATION (FORMER)
- SOIL SAMPLE LOCATION (BASE) (FORMER)
- SOIL SAMPLE LOCATION (WALL) (FORMER)
- WATER WELL

LIST OF APPLICABLE ABBREVIATIONS

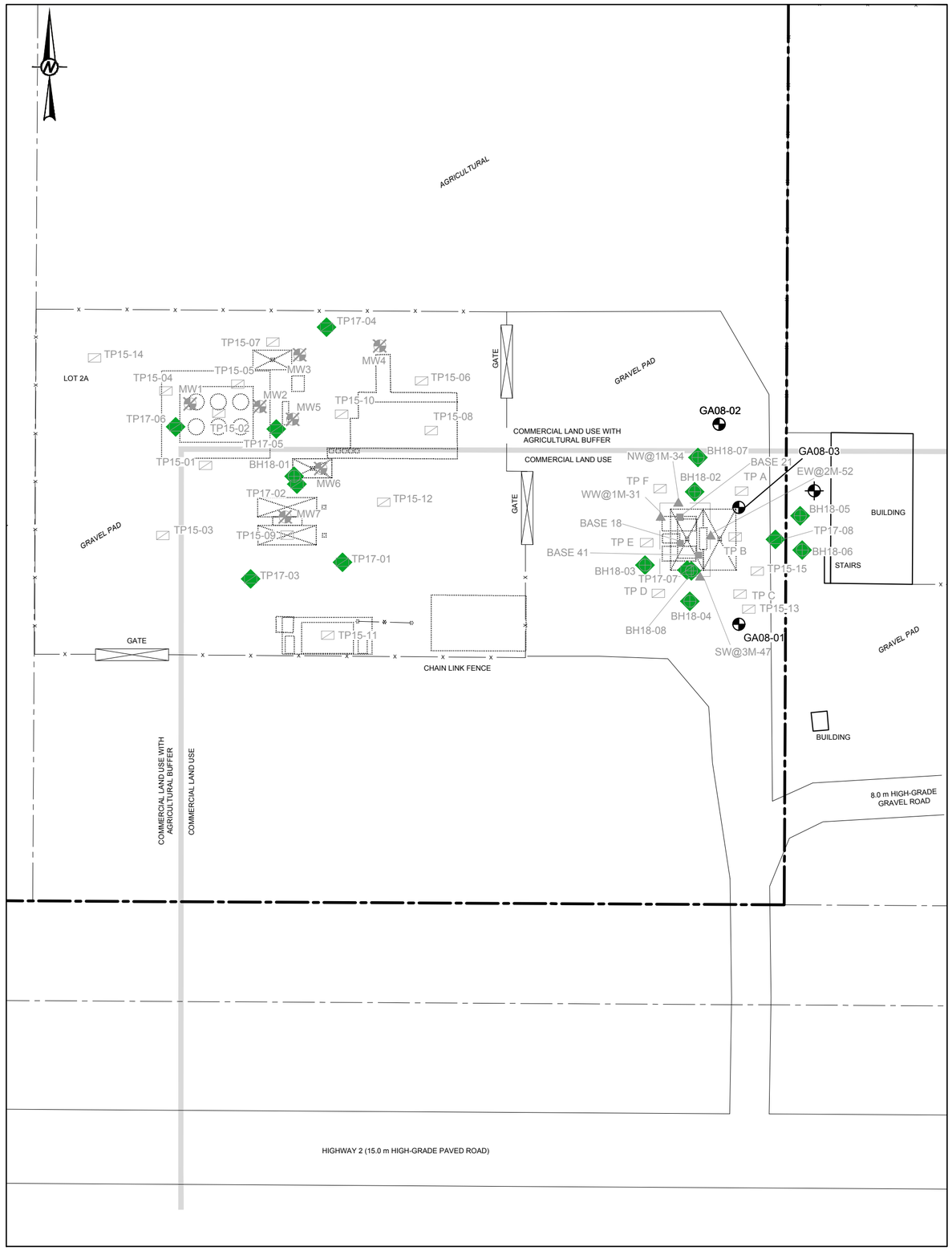
<	LESS THAN	D(a,h)A	DIBENZ(a,h)ANTHRACENE
-	NOT AVAILABLE OR NO DATA	FLATH	FLUORANTHENE
1-MNPT	1-METHYLNAPHTHALENE	FLR	FLUORENE
2-MNPT	2-METHYLNAPHTHALENE	I(1,2,3-cd)P	INDENO(1,2,3-CD)PYRENE
ACR	ACRIDINE	IACR	INDEX OF ADDITIVE CANCER RISK
ANPTH	ACENAPHTHENE	mbgs	METRES BELOW GROUND SURFACE
ANPTHL	ACENAPHTHYLENE	mg/kg	MILLIGRAMS PER KILOGRAM
ATRC	ANTHRACENE	n/a	NOT APPLICABLE
B(a)A	BENZO(a)ANTHRACENE	n/g	NO GUIDELINE
B(a)P	BENZO(a)PYRENE	NP	NON-PURGE
B(a)P TPE	BENZO(a)PYRENE TOTAL POTENCY EQUIVALENCE	NPT	NAPHTHALENE
B(b+j)F	BENZO(b+j)FLUORANTHENE	PHNTR	PHENANTHRENE
B(c)P	BENZO(c)PHENANTHRENE	PYLH	PERYLENE
B(e)P	BENZO(e)PYRENE	PYR	PYRENE
B(g,h,i)P	BENZO(g,h,i)PERYLENE	QN	QUINOLINE
B(k)F	BENZO(k)FLUORANTHENE	RDL	REPORTABLE DETECTION LIMIT
CHRY	CHRYSENE		

NOTES

1. LOCATIONS WHERE ALL SOIL SAMPLES MEET APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN AS A GREEN DIAMOND (♦).
2. LOCATIONS WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS A RED CIRCLE (●).
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN RED.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM McELHANNEY LAND SURVEYS (ALTA) LTD.; DWG No.: 77230; SCALE: 1:750; DATE: MARCH 31, 2015.



0 12.5 25
1:750 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-04
DESIGNED	MGreer
PREPARED	LMoraes
REVIEWED	LMcDavid
APPROVED	HLavoie

PROJECT
FORMER BULK PETROLEUM PLANT AND CARDLOCK FACILITY
HIGHWAY 2 WEST
PEACE RIVER, ALBERTA

TITLE
HISTORICAL SOIL ANALYTICAL RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21505917	1005-2216	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI C
25 mm
0

COMMERCIAL LAND USE

MW6 — Date Sampled - October 22/03

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
0.8 - 1.5	-	-	-	-	-	-	-	-	-	-	-	16.5	-	-	-	-	-	-	-	-
1.5 - 2.3	-	-	-	-	-	-	-	-	-	-	-	16.5	-	-	-	-	-	-	-	-
3.0 - 3.8	-	-	-	-	-	-	-	-	-	-	-	13.9	-	-	-	-	-	-	-	-

MW7 — Date Sampled - October 22/03

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
0.8 - 1.5	-	-	-	-	-	-	-	-	-	-	-	14.9	-	-	-	-	-	-	-	-
1.5 - 2.3	-	-	-	-	-	-	-	-	-	-	-	13.4	-	-	-	-	-	-	-	-
2.3 - 3.0	-	-	-	-	-	-	-	-	-	-	-	12.2	-	-	-	-	-	-	-	-

BASE 41 — Date Sampled - July 03/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
4.5	0.1	<0.15	<0.05	<1	6	120	<0.4	0.3	4	3	5	4	0.7	10	<0.5	<1	<0.3	<1	12	35

BASE 18 — Date Sampled - July 02/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
4.5	0.1	<0.15	<0.05	<1	6	110	<0.4	0.3	5	3	<5	3	0.7	9	<0.5	<1	<0.3	<1	12	36

BASE 21 — Date Sampled - July 02/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
4.5	<0.1	<0.15	<0.05	<1	6	130	<0.4	0.3	5	3	5	3	0.8	10	<0.5	<1	<0.3	<1	12	32

SW@3M-47 — Date Sampled - July 03/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
3..0	0.4	<0.15	0.08	<1	7	120	<0.4	0.3	5	4	9	5	1	13	0.7	<1	<0.3	<1	12	48
3..0 (DUP)	0.3	<0.15	0.05	<1	7	120	<0.4	0.3	6	4	8	5	0.9	13	<0.5	<1	<0.3	<1	13	43

WW@1M-31 — Date Sampled - July 02/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	0.7	<0.15	0.09	<1	10	190	<0.4	0.4	10	7	20	9	1.3	20	1.5	<1	<0.3	<1	17	81

NW@1M-34 — Date Sampled - July 02/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	1.3	<0.15	0.08	<1	10	180	0.5	0.4	12	9	21	10	0.8	25	1.7	<1	<0.3	<1	22	77

EW@2M-52 — Date Sampled - July 03/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
2.0	0.2	<0.15	<0.05	<1	6	120	<0.4	0.3	5	4	<5	3	0.7	10	<0.5	<1	<0.3	<1	12	35
2.0 (DUP)	0.2	<0.15	<0.05	<1	7	200	<0.4	0.3	6	4	6	4	1.1	11	<0.5	<1	<0.3	<1	17	43

TP A — Date Sampled - July 03/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	1.7	<0.15	0.09	<1	12	400	1.0	0.4	33	12	33	14	1.5	41	1.3	<1	<0.3	<1	60	110
5.0	0.5	<0.15	0.10	<1	11	280	<0.4	0.6	11	7	18	9	2.4	23	1.3	<1	<0.3	<1	22	98

TP B — Date Sampled - July 03/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
2.0	0.6	<0.15	0.07	<1	11	270	0.5	0.5	32	9	23	11	1.8	34	1.2	<1	<0.3	<1	35	91
3.0	0.8	<0.15	0.09	<1	12	320	0.6	0.5	21	10	27	12	1.7	32	1.4	<1	<0.3	<1	39	110
6.0	0.6	<0.15	0.09	<1	12	280	0.4	0.6	16	8	22	10	2.2	26	1.2	<1	<0.3	<1	29	100

TP C — Date Sampled - July 03/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
5.0	0.5	<0.15	0.09	<1	12	280	0.4	0.5	14	8	22	10	2.2	23	1.1	<1	<0.3	<1	28	100
6.0	0.7	<0.15	0.09	<1	12	300	0.5	0.5	18	8	26	11	1.5	26	1.1	<1	<0.3	<1	34	100

TP D — Date Sampled - July 03/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
5.0	0.6	<0.15	0.08	<1	12	280	0.4	0.5	14	8	21	10	2.0	24	1.5	<1	<0.3	<1	28	98
6.0	0.6	<0.15	0.08	<1	10	260	<0.4	0.5	9	6	16	8	1.9	18	1.0	<1	<0.3	<1	19	85

TP E — Date Sampled - July 03/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	1.5	<0.15	0.07	<1	12	370	1.0	0.4	32	12	34	14	1.5	46	2.0	<1	<0.3	<1	62	110
6.0	0.7	<0.15	0.09	<1	15	340	0.5	0.6	17	10	28	13	1.8	30	1.7	<1	<0.3	<1	34	120

TP F — Date Sampled - July 03/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
5.0	0.5	<0.15	0.09	<1	12	300	<0.4	0.6	13	8	21	10	2.2	25	1.2	<1	<0.3	<1	25	100
6.0	0.5	<0.15	0.09	<1	11	270	<0.4	0.5	12	7	19	9	2.0	22	1.1	<1	<0.3	<1	24	97

GA08-01 — Date Sampled - July 15/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
9.9 - 10.7	0.5	<0.15	0.14	<1	13	270	0.5	0.6	13	8	21	11	1.8	25	1.1	<1	<0.3	<1	24	100
11.4 - 12.2	0.5	<0.15	0.10	<1	13	290	0.5	0.6	16	8	21	11	1.9	25	1.2	<1	<0.3	<1	25	100

GA08-03 — Date Sampled - July 16/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
7.6 - 8.4	0.6	<0.15	0.13	<1	13	300	0.5	0.6	13	8	21	11	2.1	24	1.4	<1	<0.3	<1	25	110
12.2 - 12.9	0.5	<0.15	0.14	<1	13	240	<0.4	0.6	10	8	20	11	1.9	22	1.2	<1	<0.3	<1	20	100
16.0 - 16.8	0.1	<0.15	<0.05	<1	4	57	<0.4	0.1	3	2	<5	2	0.6	6	<0.5	<1	<0.3	<1	5	23

TP15-01 — Date Sampled - April 27/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-

TP15-09 — Date Sampled - April 28/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-
3.5	-	-	-	-	-	-	-	-	-	-	-	9.4	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-

TP15-11 — Date Sampled - April 28/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
0.2	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-

TP15-12 — Date Sampled - April 28/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
2.5	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	9.3	-	-	-	-	-	-	-	-

TP15-13 — Date Sampled - April 29/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
3.0	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-

TP15-15 — Date Sampled - April 29/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
4.5	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-

COMMERCIAL LAND USE WITH AGRICULTURAL BUFFER

MW1 — Date Sampled - October 23/03

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
0.0 - 0.8	-	-	-	-	-	-	-	-	-	-	-	11.7	-	-	-	-	-	-	-	-
2.3 - 3.5	-	-	-	-	-	-	-	-	-	-	-	15.2	-	-	-	-	-	-	-	-

MW2 — Date Sampled - October 23/03

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
0.0 - 0.8	-	-	-	-	-	-	-	-	-	-	-	15.1	-	-	-	-	-	-	-	-
1.5 - 2.3	-	-	-	-	-	-	-	-	-	-	-	14.9	-	-	-	-	-	-	-	-
5.3 - 6.0	-	-	-	-	-	-	-	-	-	-	-	12.1	-	-	-	-	-	-	-	-

MW3 — Date Sampled - October 22/03

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
0.0 - 0.8	-	-	-	-	-	-	-	-	-	-	-	15.7	-	-	-	-	-	-	-	-
2.3 - 3.0	-	-	-	-	-	-	-	-	-	-	-	14.2	-	-	-	-	-	-	-	-

MW4 — Date Sampled - October 22/03

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
0.0 - 0.8	-	-	-	-	-	-	-	-	-	-	-	12.5	-	-	-	-	-	-	-	-
1.5 - 2.3	-	-	-	-	-	-	-	-	-	-	-	13.4	-	-	-	-	-	-	-	-

MW5 — Date Sampled - October 22/03

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
0.0 - 0.8	-	-	-	-	-	-	-	-	-	-	-	13.6	-	-	-	-	-	-	-	-
1.5 - 2.3	-	-	-	-	-	-	-	-	-	-	-	14.7	-	-	-	-	-	-	-	-

GA08-02 — Date Sampled - July 16/08

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
6.1 - 6.9	0.4	<0.15	0.12	2	10	210	0.4	0.5	9	6	14	8	2.4	18	0.9	<1	<0.3	<1	18	80
15.2 - 16.0	0.4	<0.15	0.10	<1	9	200	<0.4	0.5	11	7	14	8	1.5	20	0.8	<1	<0.3	<1	19	79

TP15-02 — Date Sampled - April 27/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-

TP15-03 — Date Sampled - April 27/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-

TP15-04 — Date Sampled - April 27/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
2.5	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-
4.0	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-

TP15-05 — Date Sampled - April 28/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
0.5	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-

TP15-06 — Date Sampled - April 28/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
2.0	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	9.4	-	-	-	-	-	-	-	-

TP15-07 — Date Sampled - April 28/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	9.1	-	-	-	-	-	-	-	-

TP15-08 — Date Sampled - April 28/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
4.0	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	9.3	-	-	-	-	-	-	-	-

TP15-10 — Date Sampled - April 28/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
1.0	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	9.6	-	-	-	-	-	-	-	-

TP15-14 — Date Sampled - April 28/15

Depth (mbgs)	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
2.5	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-

ALBERTA TIER 1 GUIDELINES

PARAMETERS	B	Cr 6+	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	Sn	V	Zn
CRITERIA[a,b]	n/g	1.4	24	40	26	2,000	8	22	87	300	91	260	40	89	2.9	40	1	300	130	410
RDL	0.1	0.15	0.05	1	1	10	0.4	0.1	1	1	5	1	0.4	1	0.5	1	0.3	1	1	10
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg

(a) ALBERTA TIER 1 SOIL REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE AND FINE-GRAINED SOILS (AEP 2019a).

(b) ALBERTA TIER 1 SOIL REMEDIATION GUIDELINES, VALUES FOR COMMERCIAL LAND USE WITH AGRICULTURAL BUFFER AND FINE-GRAINED SOILS (AEP 2019a).

LEGEND

- PROPERTY BOUNDARY
- LAND USE BOUNDARY
- FENCELINE
- FORMER FACILITY
- BOREHOLE LOCATION (FORMER)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
- SOIL SAMPLE LOCATION (BASE) (FORMER)
- SOIL SAMPLE LOCATION (WALL) (FORMER)
- TEST PIT LOCATION (FORMER)
- WATER WELL

NOTES

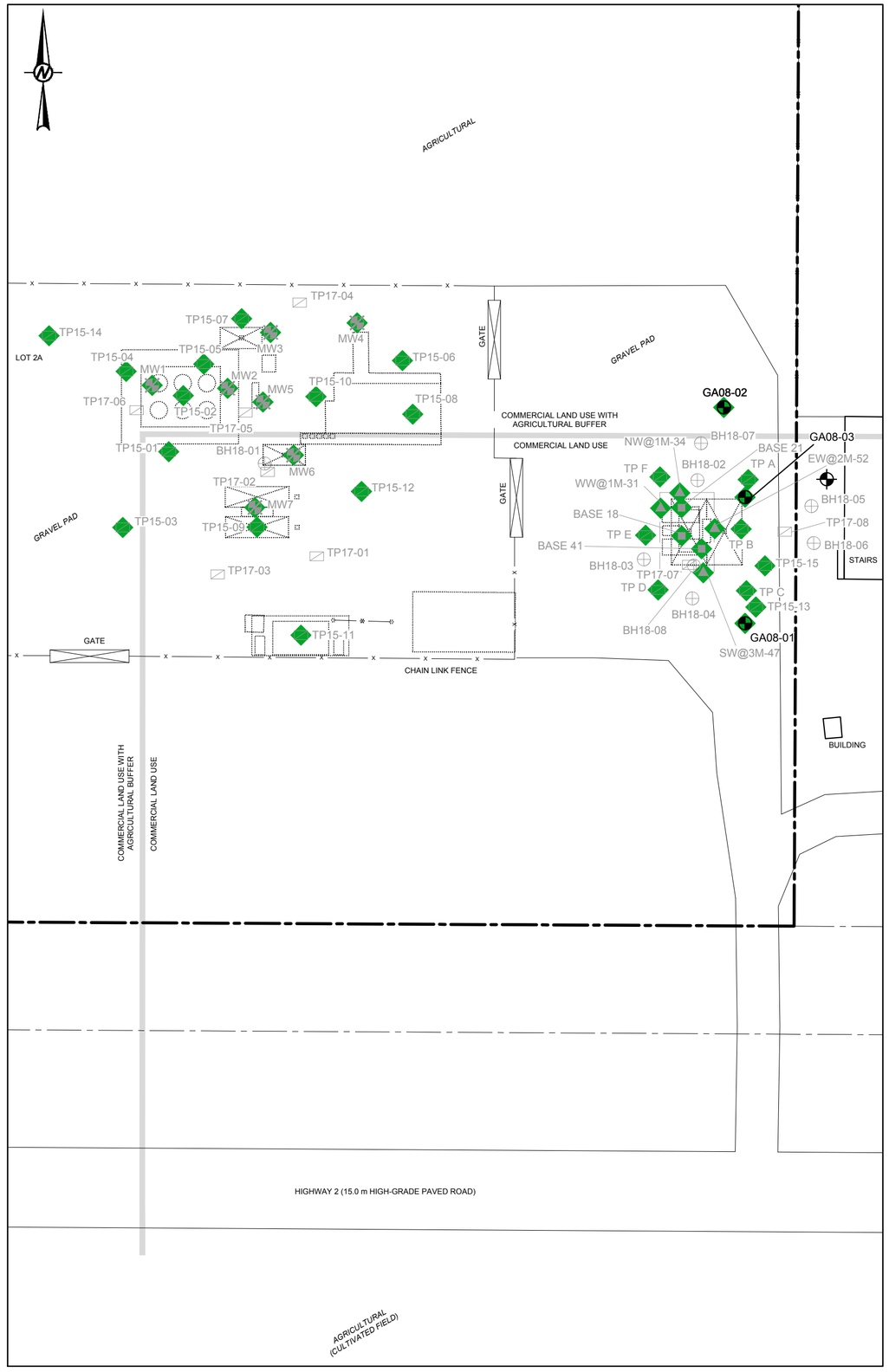
1. LOCATIONS WHERE ALL SOIL SAMPLES MEET APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN AS A **GREEN DIAMOND (♦)**.
2. LOCATIONS WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS A **RED CIRCLE (●)**.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

REFERENCE

ORIGINAL DRAWING OBTAINED FROM McELHANNEY LAND SURVEYS (ALTA) LTD.; DWG No.: 77230; SCALE: 1:750; DATE: MARCH 31, 2015.

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN	mbgs	METRES BELOW GROUND SURFACE
-	NOT AVAILABLE OR NO DATA	mg/kg	MILLIGRAMS PER KILOGRAM
Ag	SILVER	Mo	MOLYBDENUM
As	ARSENIC	n/g	NO GUIDELINE
B	BORON	Ni	NICKEL
Ba	BARIUM	Pb	LEAD
Be	BERYLLIUM	RDL	REPORTABLE DETECTION LIMIT
Cd	CADMIUM	Sb	ANTIMONY
Co	COBALT	Se	SELENIUM
Cr	CHROMIUM	Sn	TIN
Cr (6+)	HEXAVALENT CHROMIUM	Tl	THALLIUM
Cu	COPPER	V	VANADIUM
Hg	MERCURY	Zn	ZINC



0 12.5 25
1:750 METRES

CLIENT
IMPERIAL OIL LIMITED

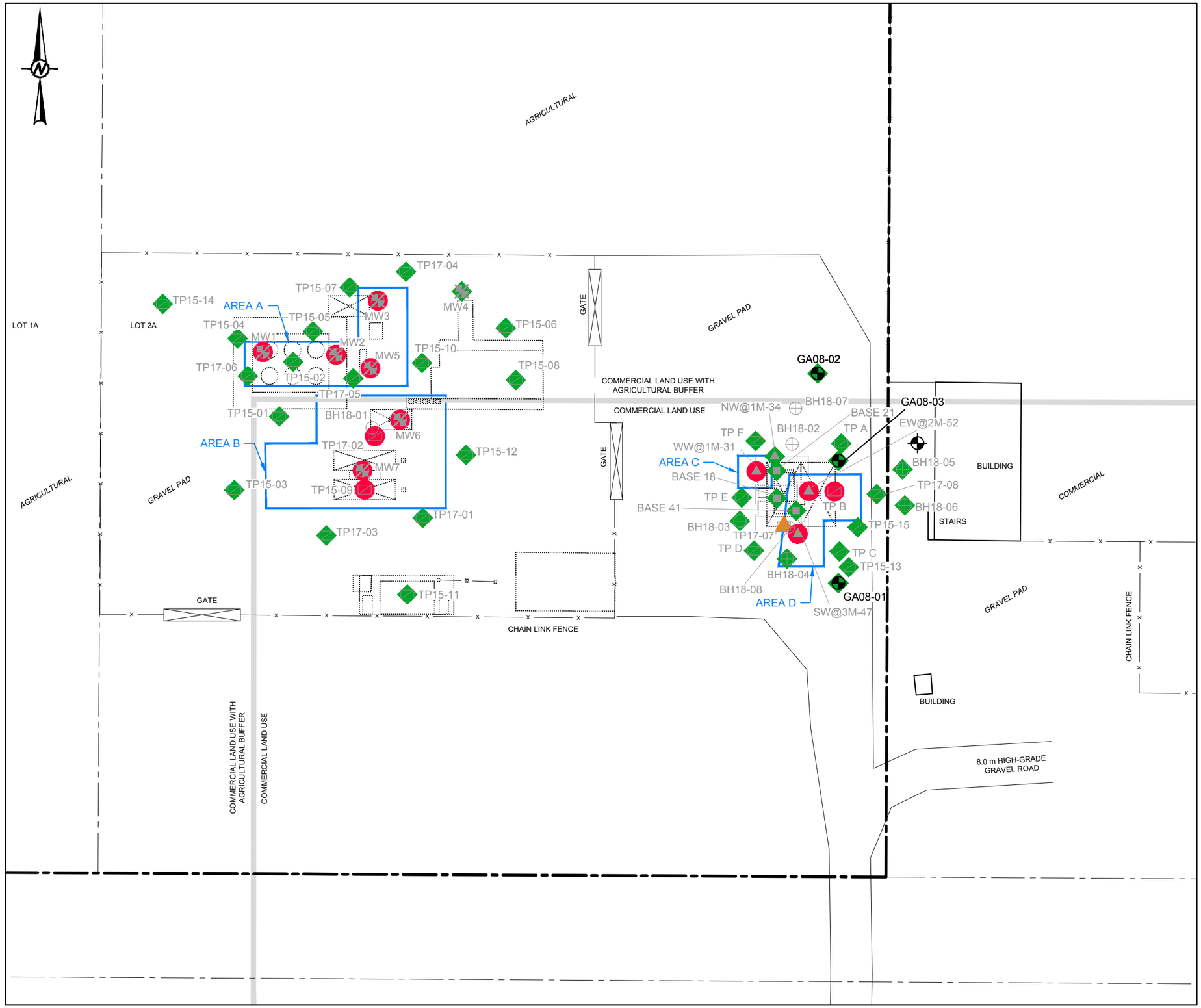
CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-04
DESIGNED	MGreer
PREPARED	LMoraes
REVIEWED	LMcDavid
APPROVED	HLavoie

PROJECT
FORMER BULK PETROLEUM PLANT AND CARDLOCK FACILITY
HIGHWAY 2 WEST
PEACE RIVER, ALBERTA

TITLE
HISTORICAL SOIL ANALYTICAL RESULTS - METALS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21505917	1005-2216	0	5



LEGEND

- PROPERTY BOUNDARY
- LAND USE BOUNDARY
- FENCELINE
- FORMER FACILITY
- PROPOSED PROBABLE EXCAVATION LIMITS
- BOREHOLE LOCATION (FORMER)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
- SOIL SAMPLE LOCATION (BASE) (FORMER)
- SOIL SAMPLE LOCATION (WALL) (FORMER)
- TEST PIT LOCATION (FORMER)
- WATER WELL

Excavation Area	Area (m²)	Depth of Impact (m)	Depth of Overburden (m)	Exceeds Guidelines	Clean Overburden	Sloping (m³)
A	368	1.3	0	478	0	87
B	667	2.3	0.5	1,534	334	291
C	40	1.0	0.5	40	20	60
D	200	3.5	1.5	700	300	410
			Total Volume (m³)	2,752	654	848

LIST OF APPLICABLE ABBREVIATIONS

m	METRE
m²	SQUARE METRES
m³	CUBIC METRES

NOTES

1. LOCATIONS WHERE ALL SOIL SAMPLES MEET APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN AS A **GREEN DIAMOND (♦)**.
2. LOCATIONS WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS A **RED CIRCLE (●)**.
3. LOCATIONS WHERE AT LEAST ONE SOIL SAMPLE POTENTIALLY EXCEEDS APPLICABLE GUIDELINES FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS AN **ORANGE TRIANGLE (▲)**.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM McELHANNEY LAND SURVEYS (ALTA) LTD.; DWG No.: 77230; SCALE: 1:750; DATE: MARCH 31, 2015.

0 12.5 25
1:750 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER BULK PETROLEUM PLANT AND CARDLOCK FACILITY
HIGHWAY 2 WEST
PEACE RIVER, ALBERTA

TITLE
PROPOSED REMEDIATION EXCAVATION EXTENTS - SOIL ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4 AND 1,2-DICHLOROETHANE

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-04
DESIGNED	MGreer
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PROJECT NO.	PHASE-TASK	REV.	FIGURE
21505917	1005-2216	0	6

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

25 mm

0

Path: \\golder.gds\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\PEACE_RIVER_AB_HIGHWAY_2_WEST\99_PROJECTS\21505917-02_PRODUCTION\1005-2216\DWG\ | File Name: 21505917-1005-HS-0006.dwg | Last Edited By: lmoraes Date: 2022-03-04 Time:2:21:38 PM | Printed By: LMoraes Date: 2022-03-04 Time:2:22:24 PM

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