



David M. Phillips
Operations Support, Regulatory and
Environmental Manager
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June 21, 2017

Tracey Braun
Director, Environmental Approvals
Manitoba Sustainable Development
160 – 123 Main Street
Winnipeg, Manitoba
R3C 1A5

RE: Notice of Alteration – Stormwater Retention Pond Reconstruction Work – Imperial Bulk Petroleum Storage Facility, 2925 Henderson Highway, R.M. East St. Paul,

Dear Tracey Braun,

Imperial (IOL) is herein submitting a Notice of Alteration (NoA) for the proposed reconstruction work to the stormwater retention pond at IOL's Winnipeg Distribution Terminal located in East St. Paul. At the request of Manitoba Sustainable Development, this NoA is being resubmitted as a standalone application, rather than as an amendment to the NoA submitted on September 1, 2016. The following NoA report discusses the proposed changes and describes the associated human and environmental effects, as per NoA requirements.

The application contains the Notice of Alteration Form, four hardcopies and one electronic copy of the NOA detailed report and associated attachments. The \$500 fee has been paid to the Minister of Finance.

I trust that the information herein satisfies your requirements. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

We look forward to your response and approval to proceed with the scope of work.


Sincerely,

David M. Phillips,
Operations Support, Regulatory & Environmental Manager, Imperial

Cc: Jordan Barrett – Manitoba/Saskatchewan Area Manager, Imperial
Ryan Rand – Winnipeg and Gretna Terminal Manager, Imperial
Raja Abbas – Project Manager - Development, Imperial
Nick Costa- Project Manager- Execution, Imperial
Tara Rodrigues – Regulatory & Environmental Specialist, Imperial

Notice of Alteration Form



Client File No. : 5531.00		Environment Act Licence No. : 3088	
Legal name of the Licencee: Imperial Oil Ltd.			
Name of the development: Bulk Petroleum Storage Facility - 2925 Henderson Hwy, RM of E			
Category and Type of development per Classes of Development Regulation: Manufacturing Bulk materials handling facilities			
Licencee Contact Person: David M. Phillips			
Mailing address of the Licencee: PO Box 2480 Stn M			
City: Calgary		Province: Alberta	Postal Code: T2P 3M9
Phone Number: (587) 476-3559		Fax:	Email: david.m.phillips@esso.ca
Name of proponent contact person for purposes of the environmental assessment (e.g. consultant): Tara Rodrigues			
Phone: (587) 476-4509		Mailing address: PO Box 2480 Stn M	
Fax:		Calgary, AB T2P 3M9	
Email address: tara.k.rodrigues@esso.ca			
Short Description of Alteration (max 90 characters): Reconstruct the existing storm water retention pond to regain designed capacity.			
Alteration fee attached: Yes: <input checked="" type="checkbox"/> No: <input type="checkbox"/>			
If No, please explain: To be paid by credit card			
Date: 2017-06-21		Signature: 	
		Printed name: David Phillips	
<p>A complete Notice of Alteration (NoA) consists of the following components:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Cover letter <input checked="" type="checkbox"/> Notice of Alteration Form <input checked="" type="checkbox"/> 4 hard copies and 1 electronic copy of the NOA detailed report (see "Information Bulletin - Alteration to Developments with Environment Act Licences") <input checked="" type="checkbox"/> \$500 Application fee, if applicable (Cheque, payable to the Minister of Finance) 		<p>Submit the complete NOA to:</p> <p>Director Environmental Approvals Branch Manitoba Sustainable Development Suite 160, 123 Main Street Winnipeg, Manitoba R3C 1A5</p> <p>Formore information:</p> <p>Phone: (204) 945-8321 Fax: (204) 945-5229 http://www.gov.mb.ca/sd/eal</p>	

Notice of Alteration Report

Scope of Work

The proposed changes to the pond are necessary to ensure that the pond is restored to its original design capacity, and in order to meet the combined drainage requirements of the facility and engineered containment areas such as the product transfer and tank farm areas. Substantial erosion and weakening of the pond slopes has led to reduced working volume of the pond. Reconstruction work is required to ensure that the working pond volume is in accordance with operational needs and is aligned with the site's Environmental Act Licence.

The rehabilitated pond was sized based on a 1 in 10 year, 5 day storm event which requires a containment of 13 900m³. The existing pond will be expanded on a single side and the outlet piping will be raised. The inlet piping would remain as is. The attachment *Winnipeg Retention Pond – SOW Drawings June 15, 2017* contains a figure containing the rehabilitated pond dimensions and required sloping changes. The attachment *IOL POND- Outlet Pipe Change* shows the changes necessary to the outlet piping.

Other Considerations:

1. Temporary storm water storage
 - During execution of the reconstruction work to the pond, an existing empty tank lot/berm will be used for temporary retention. The size of the temporary tank lot is 9300m³.
 - Storm water will be pumped from the pond lift station to the empty tank lot. The plan is to retain, sample and discharge water from the berm as per the terminal's discharge license.
 - Upon completion of the pond reconstruction, use of the temporary pond will be discontinued and any water in the lot will be discharged as per the license.
 - The location of the temporary pond and piping plan can be seen in the attachment titled *Retention Pond- Temporary SOW June 15, 2017*. The temporary pond is highlighted in blue, please note the tanks noted in the temporary storage area have been demolished.
2. Sludge assessment/disposal
 - Sludge and soil that demonstrate visual or olfactory signs of impact will be disposed of at an Imperial approved waste facility.
3. Soil assessment/disposal
 - Soil that is excavated and does not demonstrate visual or olfactory signs of impact will be sampled and analyzed to ensure the soil meets the applicable commercial land use criteria, the criteria is included in the attachment *Soil Contaminant Criteria*.
 - Confirmatory sampling and analysis of the potentially clean piles will be executed as follows:
 - Field screening on one discrete sample from every 10m³ of soil will be collected.
 - One sample for every 50m³ of soil will be submitted for lab analysis (ie. 1 in 5 field screening samples collected), the worst case field screening sample will be submitted for analysis.
 - Soil that is confirmed to meet commercial land use criteria may be re-distributed on-site or disposed off-site. Soil will be considered impacted and disposed off-site if it exceeds the criteria in the attachment titled *Soil Containment Criteria*.
 - No soil will be stockpiled and stored on-site for future use, if soil cannot be re-distributed and re-contoured in the duration of the project works it will be disposed of at an approved facility.
4. Groundwater/Pond De-watering during Rehabilitation
 - Any groundwater encountered during excavation and rehabilitation activities will be pumped to the temporary storm water storage area. Prior to discharge, water will be sampled and analyzed as per the existing Licence 3088.

Human and Environmental Effects

There are believed to be no resulting human health effects from this work.

The overall resulting aquatic effects shall be positive, as the increased pond capacity shall prevent emergency storm water effluent releases into the Red River during times of significant rainfall. Emptying the pond and removing accumulated sludge may also reduce algae growth, most likely improving water quality by helping to stabilize pH levels. The reduction in slope of the pond walls will positively impact the terrestrial environment by limiting future erosion and pond bank weakening.

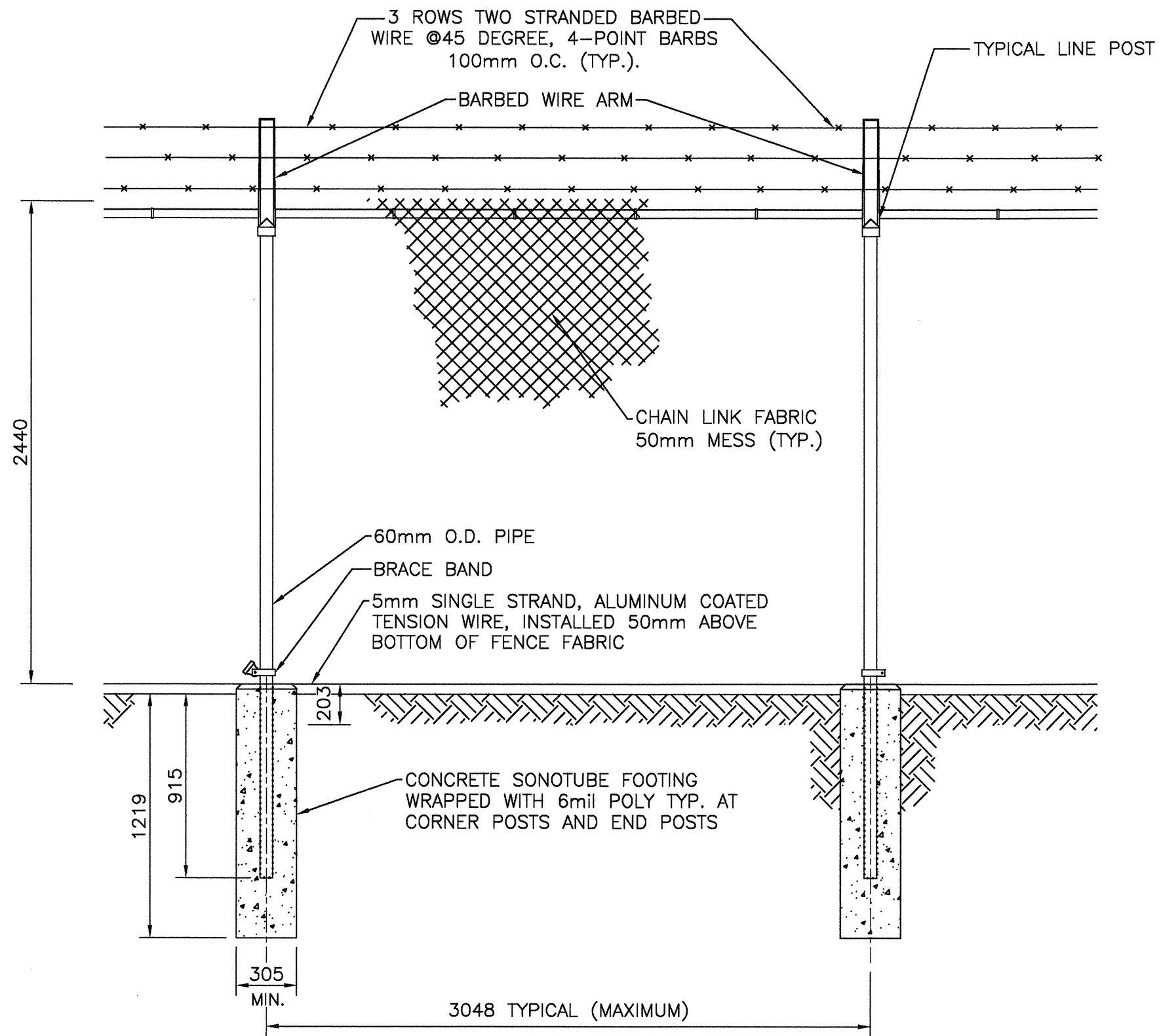
Use of an existing berm as a temporary storage pond should have no effect on aquatic life. Site observations have confirmed the berm holds water, and the discharge requirements in License 3088 will still be met. Dewatering the excavation to the temporary ponds should also have no negative effect on aquatic life, as the water will need to meet the requirements of License 3088 prior to discharge. Additionally, the pond is not currently hydraulically connected to groundwater, and dewatering of the excavation is expected to be minimal.

The resulting terrestrial effects will be limited to the existing pond area and are believed to be insignificant. All changes to the pond will take place within the existing pond area fence line. Soil removal shall be limited to the amount needed to meet capacity requirements, as determined by a Geotechnical Engineer. As outlined above, any impacted soils will be disposed of offsite, in a manner compliant with all regulations. Soils which are deemed to be not impacted, will be field screened, sampled and analyzed prior to being considered for redistribution on site. If re-distributed on site, those areas will be regraded to ensure proper drainage, and landscaped and maintained as per existing site plans. An environmental consultant will be retained to manage sampling and analysis of potentially impacted soils to ensure that no impacted soil is re-distributed on-site, and to assess suitability for non-impacted soils to be re-distributed.

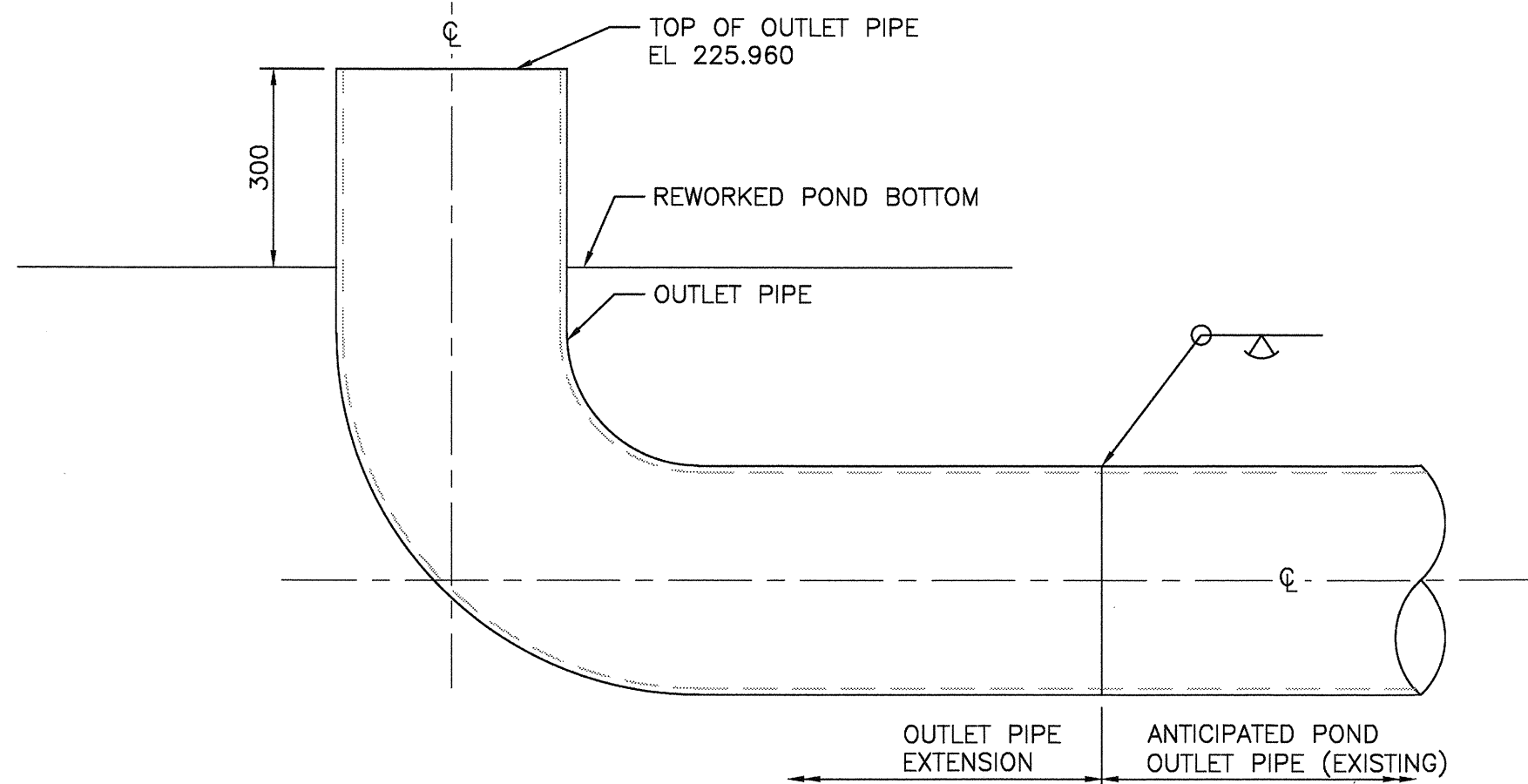
There are believed to be no resulting atmospheric effects from this work.

Project Timing

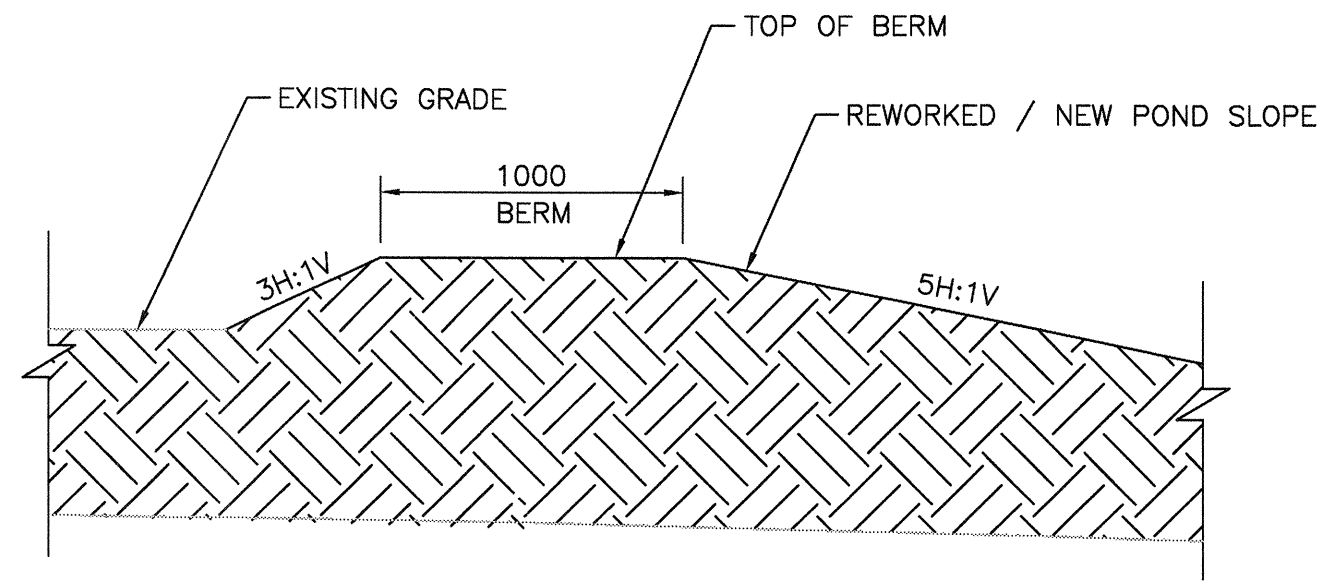
The optimal construction conditions for this project are in Q3 of the calendar year; Imperial plans for construction to begin in Q3 2017. This will allow Manitoba Sustainable Development time to review this Notice of Alteration. In order to prevent the need to request emergency discharge (and knowing that a pond reconstruction project is imminent), Imperial has been running the existing pond as a dry pond (i.e. draining below the level previously required to prevent sloughing).



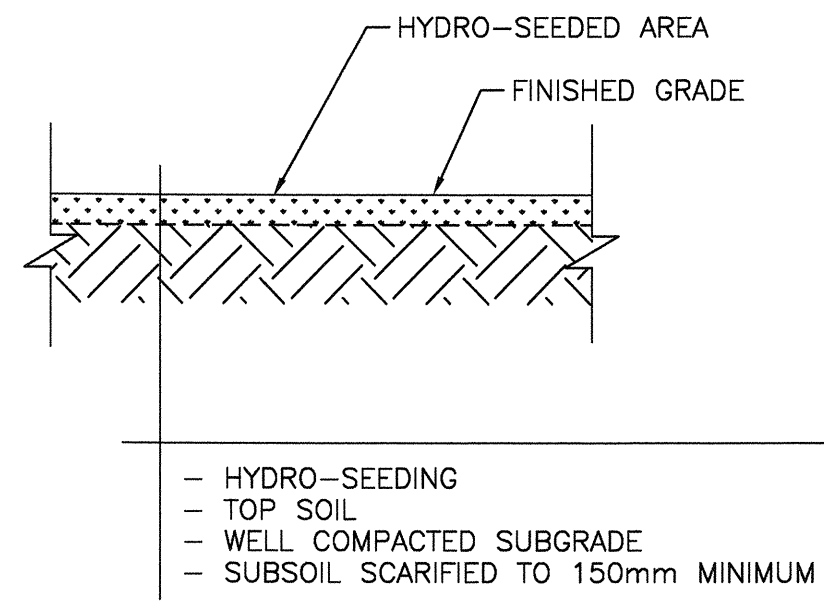
PERIMETER FENCE DETAIL 1
TYP



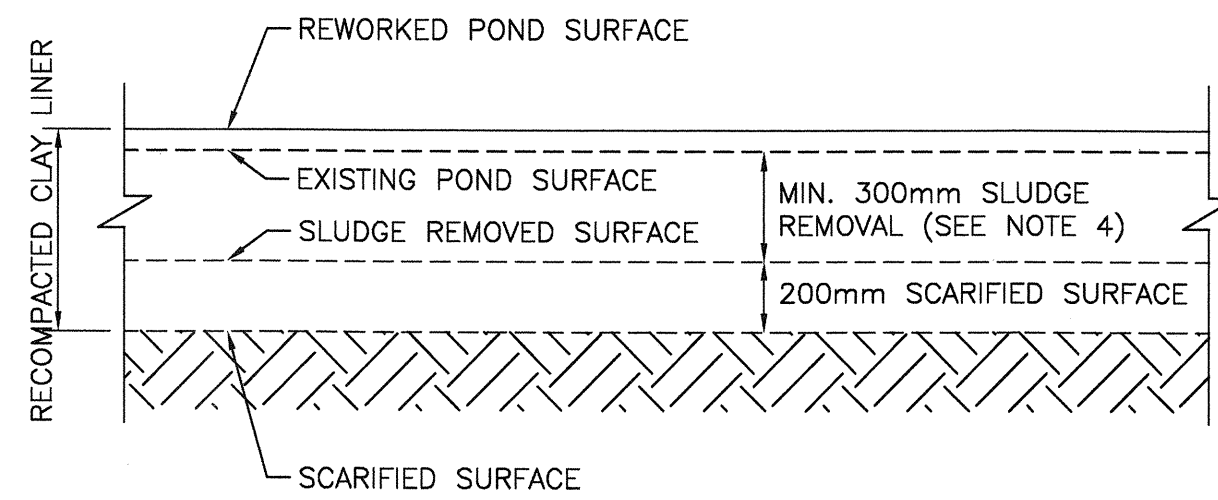
POND OUTLET PIPE ADJUSTMENT DETAIL 2
TYP



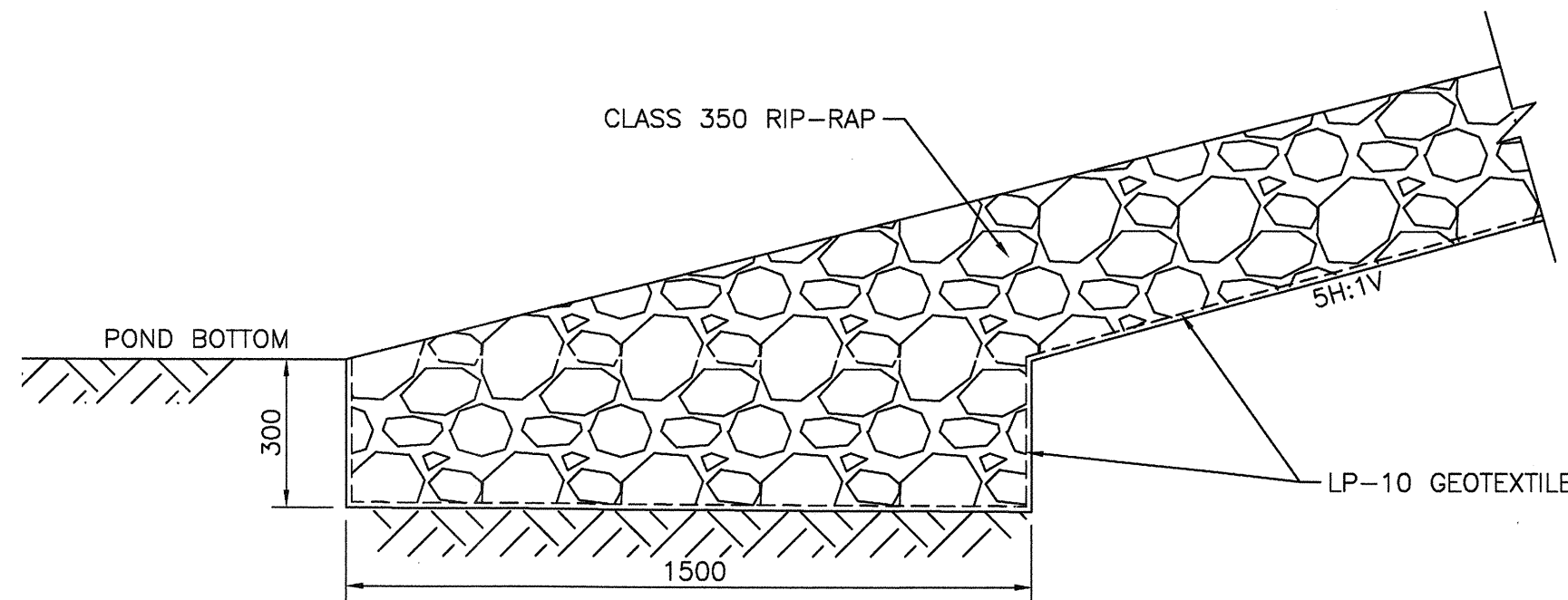
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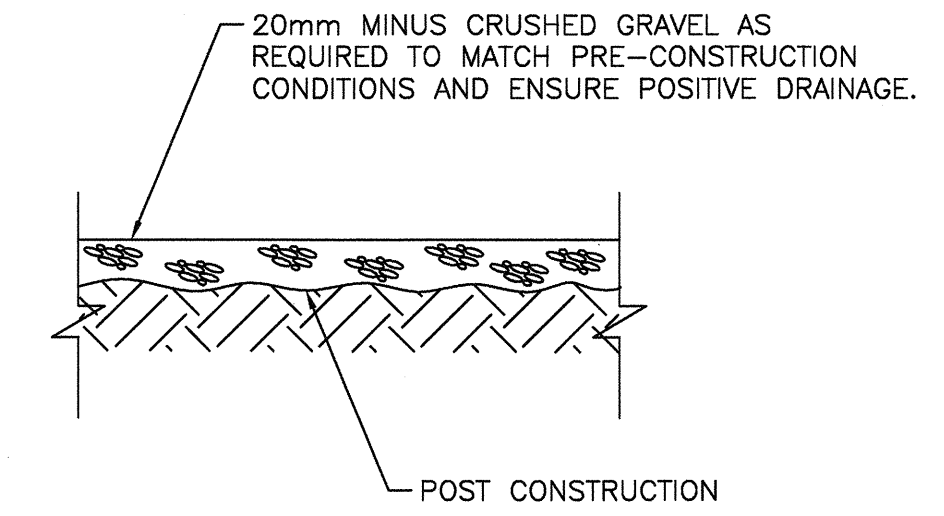
HYDRO-SEEDING DETAIL 4
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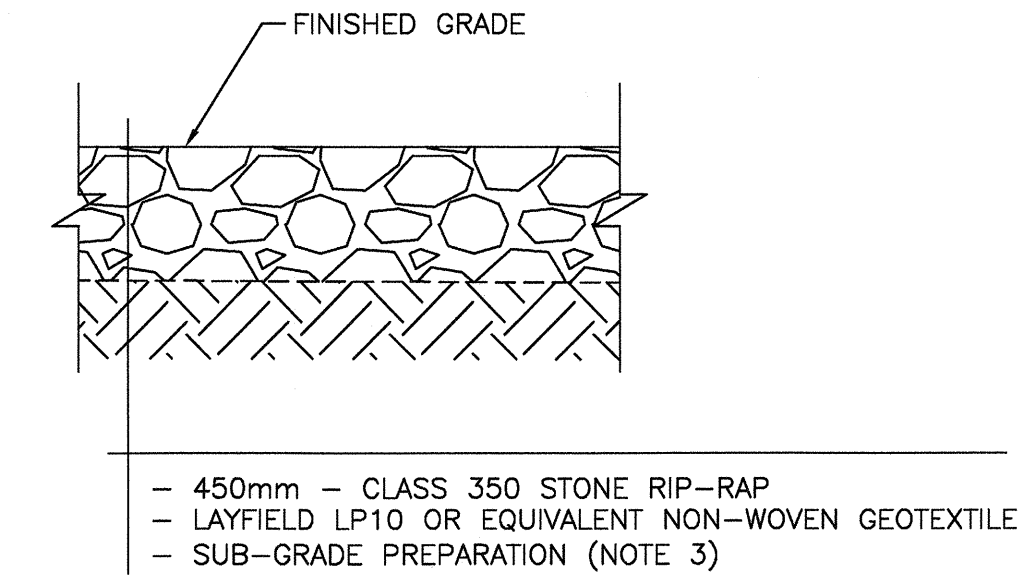
POND SLOPE AND BOTTOM RESTORATION DETAIL 5
TYP



RIP-RAP ANCHOR DETAIL 6
TYP



PARKING / STOCKPILE AREA DETAIL 7
TYP



STONE RIP-RAP DETAIL 8
TYP

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES, COORDINATES AND ELEVATIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- FOR GENERAL NOTES SEE DWG 062-0031-010-133 01.
- SUBGRADE TO BE SCARIFIED TO DEPTH OF 200mm AND RE-COMPACTED TO MIN. 98% S.P.M.D.D. AND APPROVED BY GEOTECHNICAL REPRESENTATIVE.
- SLUDGE REMOVAL DEPTH SHALL BE INSPECTED BY FIELD GEOTECHNICAL ENGINEER. SLUDGE SHALL BE REMOVED TILL STABLE SUBGRADE IS ENCOUNTERED OR AS DIRECTED BY IOL GEOTECHNICAL REPRESENTATIVE.
- DIAMETER OF OUTLET PIPE IS ASSUMED, MATCH EXISTING CONDITIONS INCLUDING GRATING IF REQUIRED. PIPE EXTENSION TO BE FIELD ADJUSTED AS REQUIRED.
- FENCING TO BE INDUSTRIAL/COMMERCIAL GRADE GALVANIZED STEEL CHAIN LINK FENCE, GRADE TYPE 1, CLASS A, 50mm MESH SIZE.
- PROVIDE & INSTALL GATE LATCHES FOR ALL GATES.

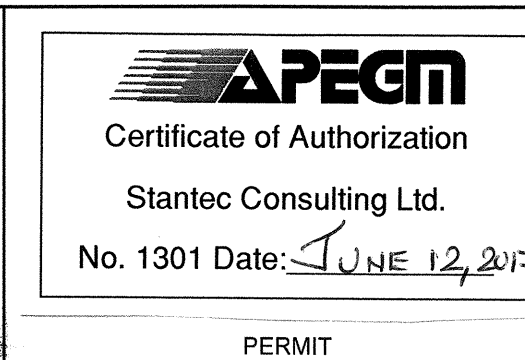
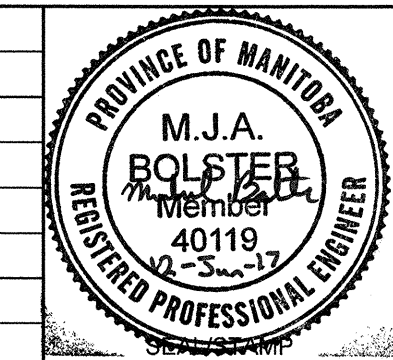


IMPERIAL OIL

WINNIPEG TERMINAL
POND REMEDIATION
TYPICAL DETAILS - SHEET 1

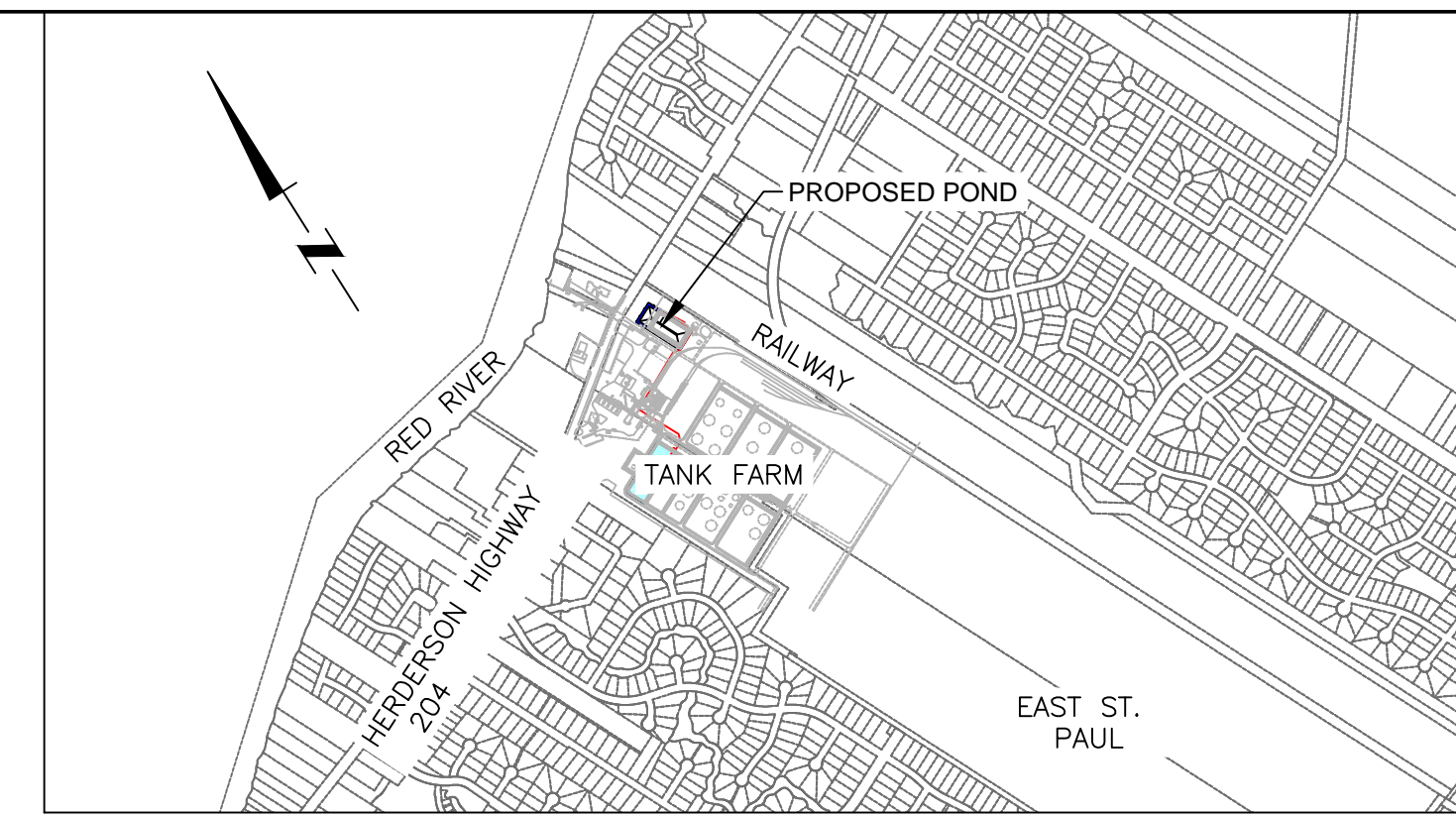
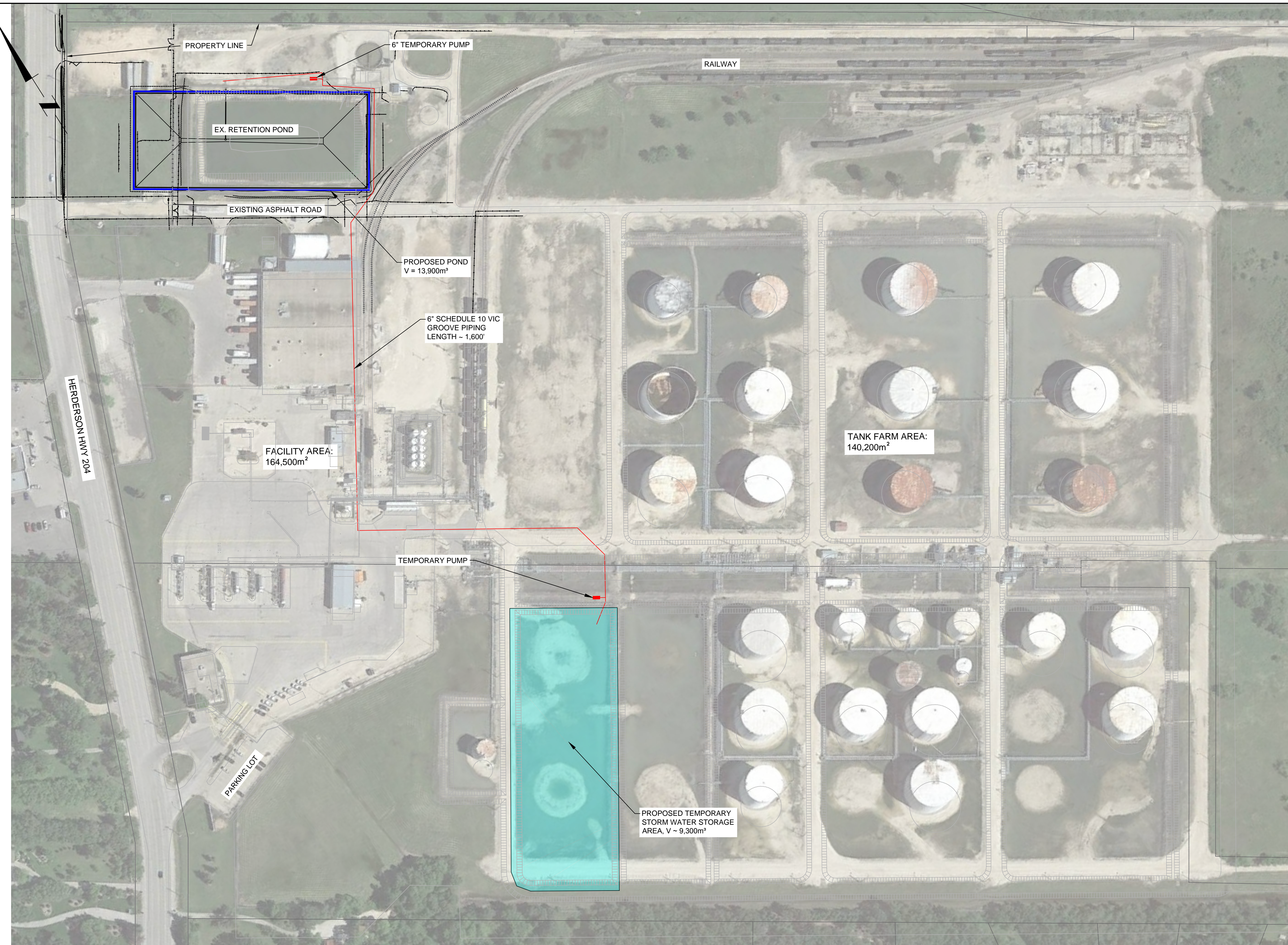
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								REFERENCE DRAWINGS



APPROVED FOR CONSTRUCTION	
DATE	REV.
PROJECT ENGINEERING	

CONTRACTOR NAME	STANTEC	SCALE	IO DRAWING NUMBER	REV.
CONTRACTOR DWG NUMBER		N.T.S.	062-0031-010-138 01	0



KEY PLAN
N.T.S.

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES. COORDINATES AND ELEVATIONS ARE IN METRES UNLESS NOTE OTHERWISE.
- RUNOFF COEFFICIENT VALUES AS PER TABLES 2 & 3 IN AMEC FOSTER WHEELER - WINNIPEG TERMINAL: POND HYDRAULIC CAPACITY STUDY - DATED 23-NOV-15.

TABLE 2. LAND COVER AND RUNOFF COEFFICIENTS FOR THE FACILITY CATCHMENT

COVER TYPE	PROPORTION OF TOTAL AREA	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
BUILDINGS	3.9%	0.95	0.51
GRASS	29.3%	0.15	
GRAVEL ROAD	12.4%	0.50	
FACILITY AREAS	17.3%	0.50	
OIL WATER SEPARATOR	0.1%	0.95	
PAVEMENT	23.3%	0.95	
POND	2.9%	1.00	
RAILROAD	10.8%	0.30	

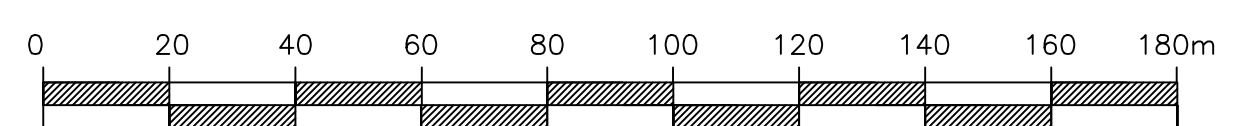
TABLE 3. LAND COVER AND RUNOFF COEFFICIENTS FOR TANK FARM DRAINAGE AREA

COVER TYPE	PROPORTION OF TOTAL AREA	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
BERMED GRAVEL ROAD	13.1%	0.50	0.43
AREA OF TANKS	9.6%	0.95	
TANK FARM BASE GRAVEL	77.3%	0.35	

- RAINFALL INTENSITY FOR TEMPORARY STORM AS PER 1:2 YEAR RETURN PERIOD, 24 HOUR STORM EVENT - 48.8mm.
- SITE AREAS AS PER SECTION 2.0 OF AMEC FOSTER WHEELER - WINNIPEG TERMINAL POND HYDRAULIC CAPACITY STUDY - DATED 23-NOV-15 AND DRAWING 062-0031-010-139-01 - PERMANENT DEVELOPMENT PERMIT PLAN: FACILITY AREA = 164,500m², TANK FARM AREA = 140,200m².
- VOLUME = (0.51) (48.8mm) (164,500m²) / (1000mm/m) + (0.43) (48.8mm) (140,200m²) / (1000mm/m) = 7,036m³. TEMPORARY STORAGE VOLUME ~ 9,300m³ > 7,036m³ REQUIRED.

LEGEND:

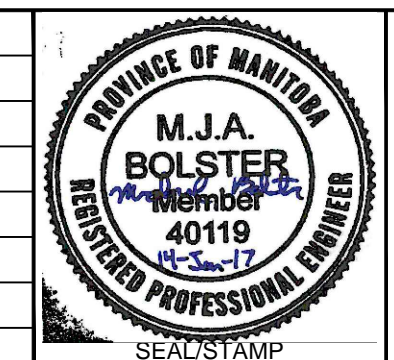
- TEMPORARY STORAGE AREA (V ~ 9,300m³)
- PROPOSED TEMPORARY PIPE ROUTING
- PROPOSED TEMPORARY PUMP LOCATION



BAR SCALE 1:1200

IMPERIAL OIL

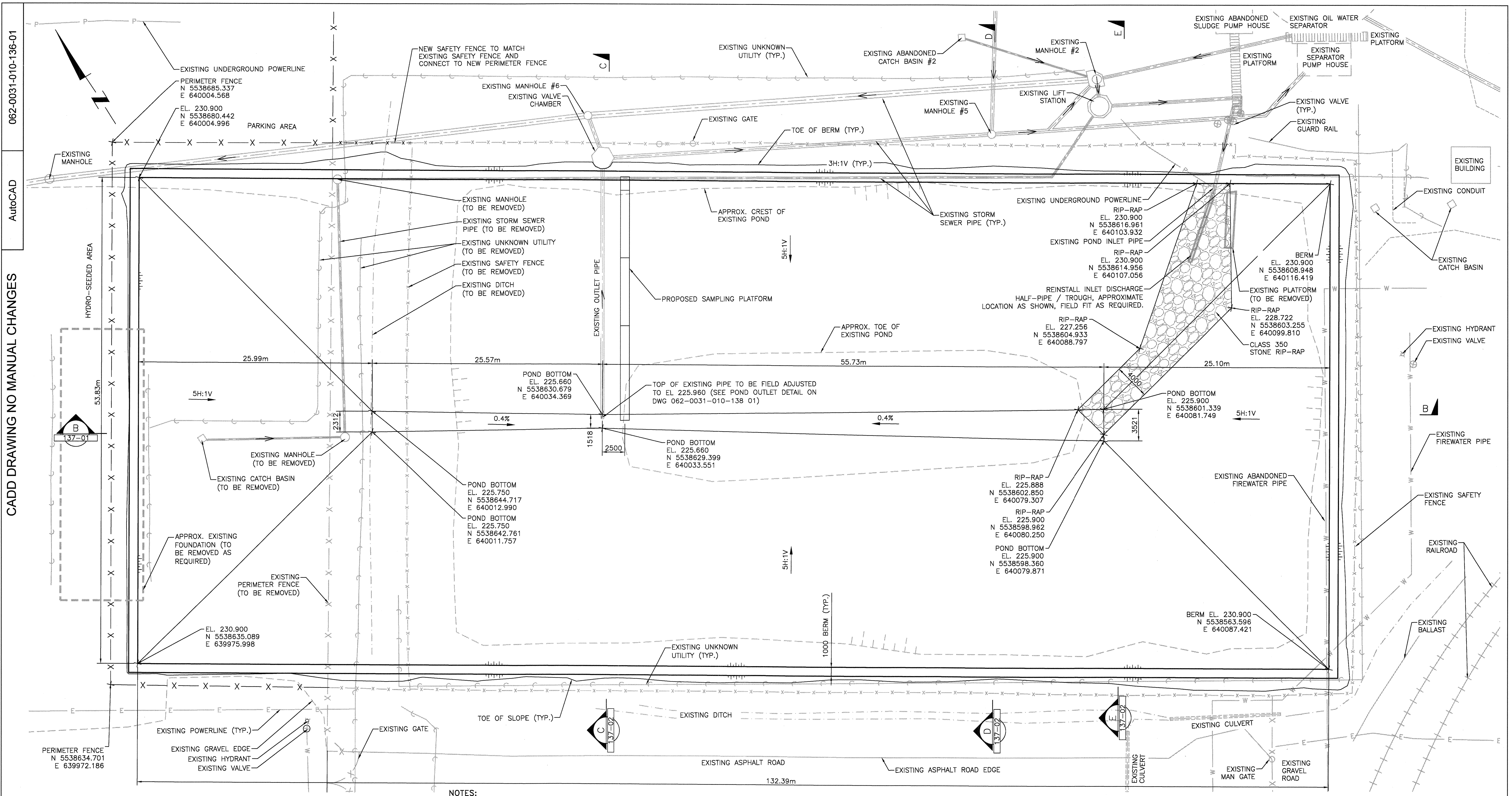
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		REVISIONS	DRAWN	CHECK	DESIGN	APPR.	IO DWG NO.	TITLE
			DRAFTING	ENGINEERING	REFERENCE DRAWINGS			



APEGM
Certificate of Authorization
Stantec Consulting Ltd.
No. 1301 Date: JUNE 14, 2017

APPROVED FOR CONSTRUCTION	
DATE	REV.
PROJECT ENGINEERING	

WINNIPEG TERMINAL POND REMEDIATION TEMPORARY DEVELOPMENT PERMIT PLAN			
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STANTEC	1:1200	062-0031-010-140 01	0
CONTRACTOR DWG NUMBER			



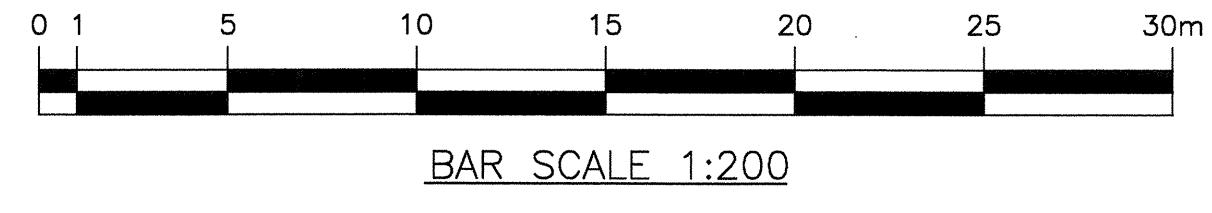
062-0031-010-136-01
AutoCAD
CADD DRAWING NO MANUAL CHANGES

LEGEND:

	SLOPE
	SIDE SLOPE
	NEW PERIMETER FENCE
	EXISTING SAFETY FENCE

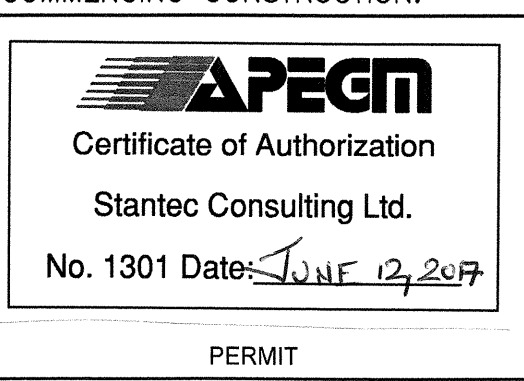
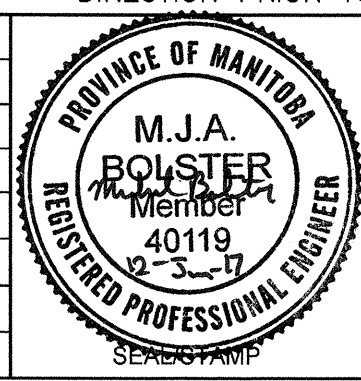
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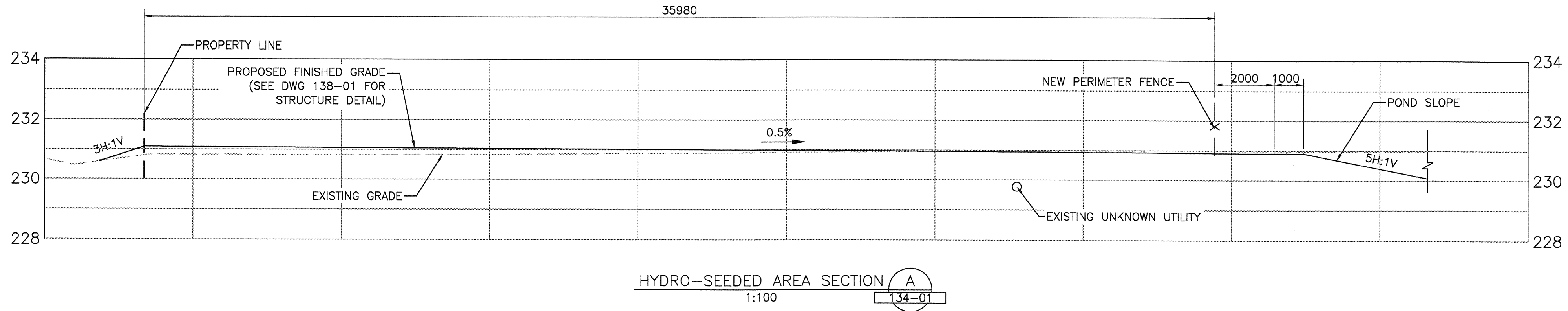
- ALL DIMENSIONS ARE IN MILLIMETRES, COORDINATES AND ELEVATIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- THE COORDINATES ARE IN UTM NAD 83, ZONE 14 COORDINATE SYSTEM. THE COORDINATES AND ELEVATIONS SHOWN ARE GEODETIC AND ARE BASED ON SURVEY DWG. 31485V_TOPO DATED 2016-05-02 AND DWG. 134031648 DATED APRIL 10, 2017.
- ALL EXISTING FACILITIES THAT DO NOT INDICATE "REMOVED" WILL REMAIN.
- CONTRACTOR SHALL REFER TO DEMOLITION DWG 062-0031-010-SKT 01D FOR SCOPE AND EXTENTS OF DEMOLITION.
- SEVERAL UNDERGROUND UTILITIES LOCATIONS AND ELEVATIONS WERE REMODELED BASED ON VARIOUS HARD COPY DRAWINGS PROVIDED BY IOL AND WERE NOT ABLE TO BE VERIFIED AT TIME OF SURVEY, THEREFORE LOCATIONS AND ELEVATIONS OF THESE LINES ARE APPROXIMATELY BASED ON THE BEST INFORMATION AVAILABLE. CONTRACTOR TO POSITIVELY IDENTIFY LOCATION AND ELEVATIONS ALL SUCH BURIED UTILITIES PRIOR TO COMMENCING CONSTRUCTION. IF LOCATION AND/OR ELEVATION VARIES SIGNIFICANTLY FROM THE INFORMATION PROVIDED, CONTACT IOL'S REPRESENTATIVE FOR FURTHER DIRECTION PRIOR TO COMMENCING CONSTRUCTION.



		IMPERIAL OIL		
				WINNIPEG TERMINAL RETENTION POND POND LAYOUT
CONTRACTOR NAME STANTEC		SCALE SHOWN	IO DRAWING NUMBER 062-0031-010-136 01	REV. 0
APPROVED FOR CONSTRUCTION DATE: _____ REV: _____		PROJECT ENGINEERING		

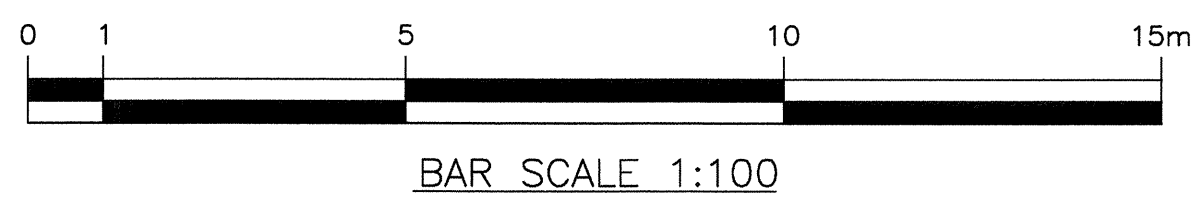
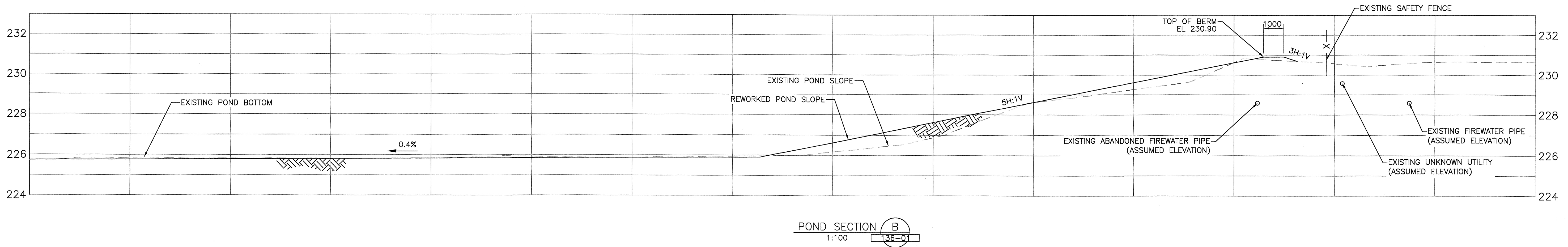
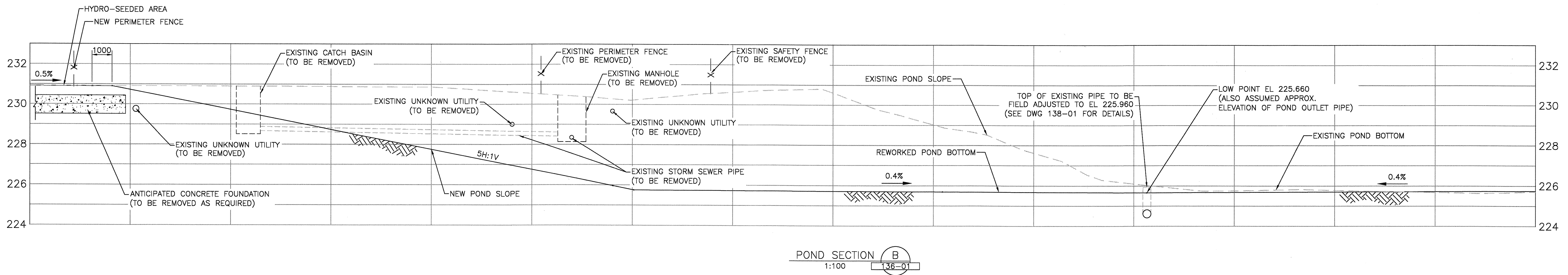
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							062-0031-010-133 01	GENERAL NOTES
							062-0031-010-SKT 01D	DEMOLITION PLAN
							062-0031-010-134 01	OVERALL SITE PLAN
							062-0031-010-138 01 (02)	TYPICAL DETAILS - SHEET 1 (SHEET 2)
							062-0031-010-137 01 (02)	SECTIONS AND DETAILS - SHEET 1 (SHEET 2)
NO.	DATE	REVISIONS	DRAWN	CHECK	DESIGN	APPR.	IO DWG NO.	TITLE
			DRAFTING			ENGINEERING	REFERENCE DRAWINGS	





NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES. COORDINATES AND ELEVATIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. FOR GENERAL NOTES SEE DWG 062-0031-010-133 01.
3. UTILITIES WITH ASSUMED ELEVATION SHALL BE FIELD VERIFIED.
4. SEVERAL UNDERGROUND UTILITIES LOCATIONS AND ELEVATIONS WERE REMODELED BASED ON VARIOUS HARD COPY DRAWINGS PROVIDED BY IOL AND WERE NOT ABLE TO BE VERIFIED AT TIME OF SURVEY, THEREFORE LOCATIONS AND ELEVATIONS OF THESE LINES ARE APPROXIMATE BASED ON THE BEST INFORMATION AVAILABLE. CONTRACTOR TO POSITIVELY IDENTIFY LOCATION AND ELEVATIONS ALL SUCH BURIED UTILITIES PRIOR TO COMMENCING CONSTRUCTION. IF LOCATION AND/OR ELEVATION VARIES SIGNIFICANTLY FROM THE INFORMATION PROVIDED, CONTACT IOL'S REPRESENTATIVE FOR FURTHER DIRECTION PRIOR TO COMMENCING CONSTRUCTION.

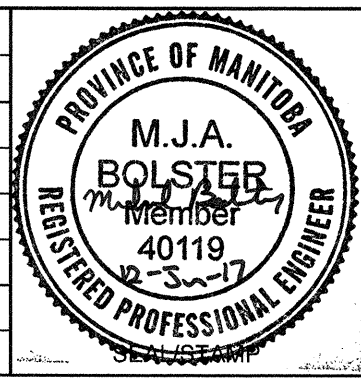


		IMPERIAL OIL	
WINNIPEG TERMINAL RETENTION POND SECTIONS AND DETAILS - SHEET 1			
CONTRACTOR NAME	SCALE	IO DRAWING NUMBER	REV.
STANTEC	SHOWN	062-0031-010-137 01	0
CONTRACTOR DWG NUMBER			

Version: 2
I.O.D.-STD

NO.	DATE	REVISIONS	DRAFTING	ENGINEERING	IO DWG NO.	TITLE	REFERENCE DRAWINGS
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			JF	DD	062-0031-010-136 01	POND LAYOUT	
			JF	DD	062-0031-010-133 01	GENERAL NOTES	
			JF	DD	062-0031-010-138 01	TYPICAL DETAILS	
			JF	DD	062-0031-090-144 01	SAMPLING PLATFORM PLAN, SECTIONS AND DETAILS	

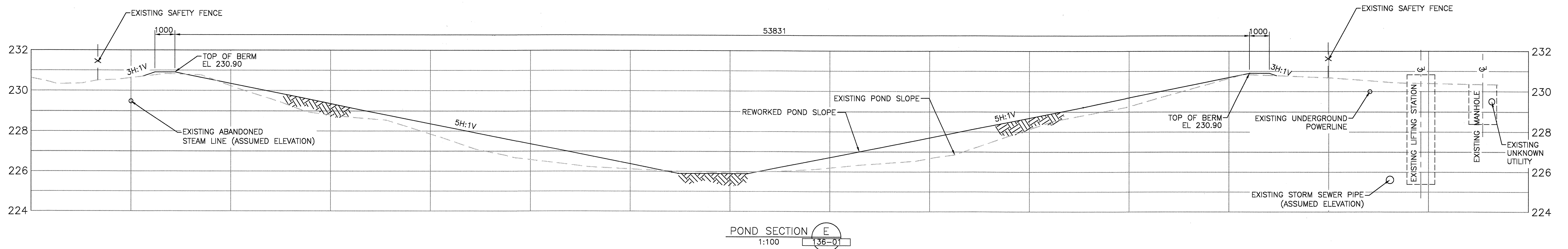
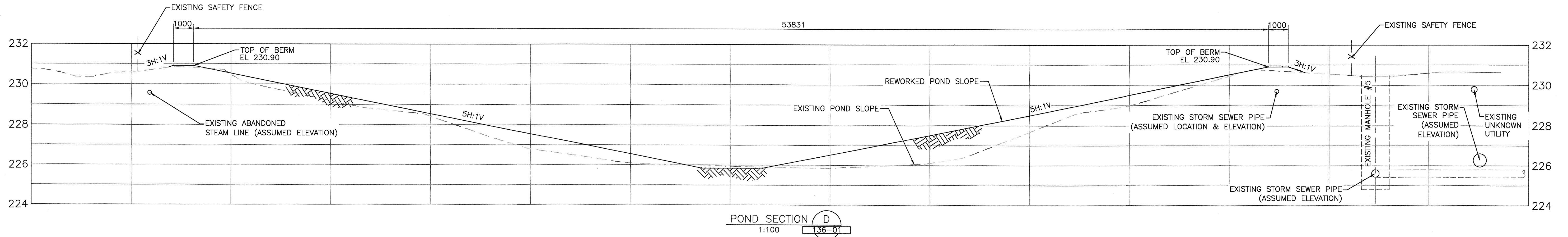
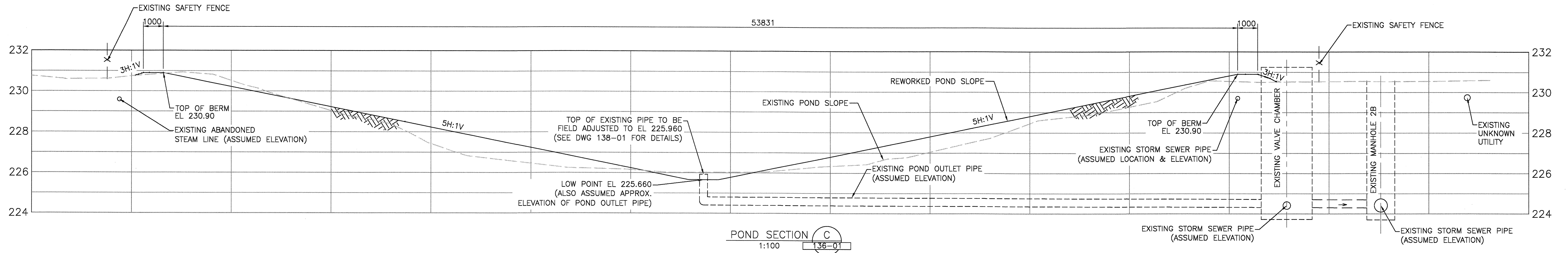
NO.	DATE	REVISIONS	DRAFTING	ENGINEERING	IO DWG NO.	TITLE	REFERENCE DRAWINGS
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APEGM
Certificate of Authorization
Stantec Consulting Ltd.
No. 1301 Date: JUNE 12, 2017

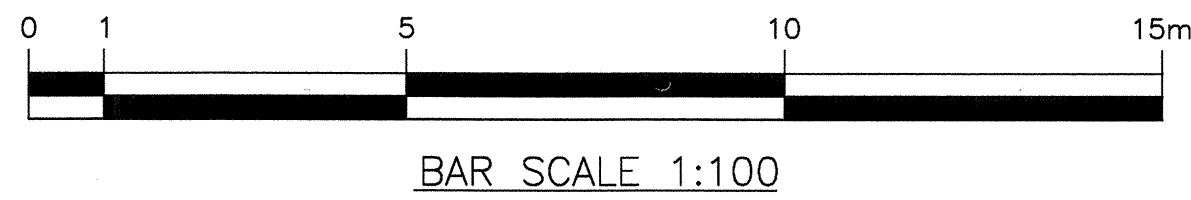
PERMIT

APPROVED FOR CONSTRUCTION	
DATE	REV.
PROJECT ENGINEERING	



NOTES:

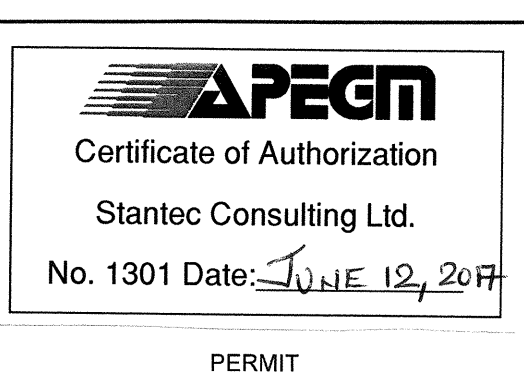
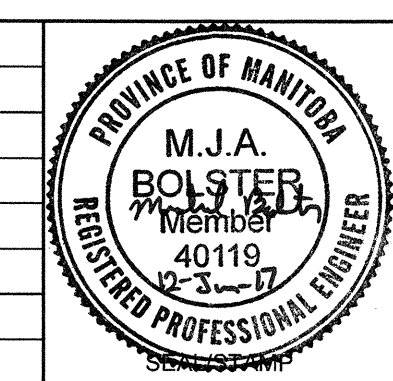
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	IMPERIAL OIL	
	WINNIPEG TERMINAL RETENTION POND SECTIONS AND DETAILS - SHEET 2	
CONTRACTOR NAME STANTEC	SCALE SHOWN	IO DRAWING NUMBER 062-0031-010-137 02
CONTRACTOR DWG NUMBER	REV.	0

Version: 2

NO.	DATE	REVISIONS	DRAWN	CHECK	DESIGN	APPR.	IO DWG NO.	TITLE
0	17 06 12	ISSUED FOR CONSTRUCTION	JF	DD	MB	DD	062-0031-010-137 02	SAMPLING PLATFORM PLAN, SECTIONS AND DETAILS
			JF	DD	MB	DD	062-0031-010-138 01	TYPICAL DETAILS
			JF	DD	MB	DD	062-0031-010-133 01	GENERAL NOTES
			JF	DD	MB	DD	062-0031-010-136 01	POND LAYOUT



APPROVED FOR CONSTRUCTION	
DATE	REV.
PROJECT ENGINEERING	

SOIL - FINE GRAINED/COMMERCIAL/FRESHWATER AQUATIC LIFE/POTABLE

TABLE 2

SOIL ANALYTICAL RESULTS - BOREHOLES PETROLEUM HYDROCARBON PARAMETERS, LEAD AND LEAD SCAVENGERS

SAMPLE LOCATIONS	CRITERIA	
	Surface Soil (0.0 - 1.5 mbgs)	Subsoil (>1.5 mbgs)
Maxxam Sample ID		
Sample Depth (mbgs)		
Date Sampled (yyyy/mm/dd)		
PARAMETERS		
Benzene	0.0068 ^{a,c}	0.0068 ^{b,c}
Toluene	0.08 ^a	0.08 ^b
Ethylbenzene	0.018 ^a	0.018 ^b
Total Xylenes	2.4 ^a	2.4 ^b
Petroleum Hydrocarbons F1 (C6 - C10) ^h	170 ^d	170 ^e
Petroleum Hydrocarbons F2 (>C10 - C16) ⁱ	230 ^d	230 ^e
Petroleum Hydrocarbons F3 (>C16 - C34) ^j	2500 ^d	5000 ^e
Petroleum Hydrocarbons F4 (>C34 - C50)	6600 ^d	10 000 ^e
1,2-Dibromoethane	0.05 ^f	0.05 ^f
1,2-Dichloroethane	50 ^g	50 ^g
Lead	260 ^g	260 ^g

a - Canadian Council of Ministers of the Environment (CCME); Canadian Environmental Quality Guidelines (CEQG)(2016);

Soil quality guidelines and check values in surface soil - fine grained soils, commercial land use

b - CCME; CEQG (2016); Soil quality guidelines and check values in subsoil - fine grained soils, commercial land use

c - human health guidelines/check values - 10⁻⁵ incremental risk

d - CCME; Canada Wide Standards for Petroleum Hydrocarbons in Soil (2008); Tier 1 levels for PHCs for fine grained surface soils - commercial land use

e - CCME; Canada Wide Standards for Petroleum Hydrocarbons in Soil (2008); Tier 1 levels for PHCs for fine grained subsoils - commercial land use

f - Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act

Ontario Ministry of the Environment and Climate Change (2011);

Full Depth Generic Site Condition Standards in a Potable Groundwater Condition

g - CCME; CEQG (2016); Soil quality guidelines and check values - commercial land use

h - BTEX have been subtracted from the fraction

i - Naphthalene has not been subtracted from the fraction

j - PAHs have not been subtracted from the fraction

mbgs - metres below ground surface

Results for all parameters are reported in milligrams per kilogram (mg/kg) on a dry weight basis

BOLD - Exceeds applicable criterion

SOIL - PAHs (FINE GRAINED/COMMERCIAL LAND USE/FRESHWATER AQUATIC LIFE/POTABLE

TABLE 2

SOIL ANALYTICAL RESULTS - BOREHOLES
POLYCYCLIC AROMATIC HYDROCARBONS

SAMPLE LOCATIONS	
Maxxam Sample ID	CRITERIA
Date Sampled (yyyy/mm/dd)	
PARAMETERS	
Acenaphthene	0.28 ^a
Acenaphthylene	320 ^a
Anthracene	32 ^a
Benzo(a)anthracene	10 ^a
Benzo(a)pyrene	72 ^a
Benzo(b)fluoranthene	10 ^a
Benzo(g,h,i)perylene	9.6 ^c
Benzo(k)fluoranthene	10 ^a
Benzo[a]pyrene equivalency	1 ^{a,b}
Chrysene	9.6 ^c
Dibenz(a,h)anthracene	10 ^a
Fluoranthene	180 ^a
Fluorene	0.25 ^a
Indeno(1,2,3-cd)pyrene	10 ^a
Naphthalene	0.013 ^a
Phenanthrene	0.046 ^a
Pyrene	100 ^a

a - Canadian Council of Ministers of the Environment; Canadian Environmental Quality Guidelines (2015);
Soil Quality Guidelines for Carcinogenic and Other Polycyclic Aromatic Hydrocarbons - commercial land use

b - Incremental lifetime cancer risk (ILCR) of 1 in 100,000 (10^{-5})

c - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act
(Ontario Ministry of the Environment and Climate Change, 2011)

Full Depth Generic Site Condition Standards in a Potable Groundwater Condition

NV - No Value

mbgs - metres below ground surface

Results for all parameters are reported in milligrams per kilograms (mg/kg) on a dry weight basis

BOLD - Exceeds applicable criterion

SOIL - METALS, COMMERCIAL LAND USE (SAME CRITERIA FOR FINE OR COARSE GRAINED)

TABLE 2

SOIL ANALYTICAL RESULTS - BOREHOLES SELECTED METALS

SAMPLE LOCATIONS	
Maxxam Sample ID	CRITERIA ^a
Sample Depth (mbgs)	
Date Sampled (yyyy/mm/dd)	
PARAMETERS	
Aluminum	NV
Antimony	40 ^a
Arsenic	12 ^a
Barium	2000 ^a
Beryllium	8 ^a
Cadmium	22 ^a
Chromium (Total)	87 ^a
Cobalt	300 ^a
Copper	91 ^a
Iron	NV
Lead	260 ^a
Mercury	24 ^a
Molybdenum	40 ^a
Nickel	89 ^a
Selenium	2.9 ^a
Silver	40 ^a
Thallium	1 ^a
Tin	300 ^a
Uranium	33 ^a
Vanadium	130 ^a
Zinc	360 ^a

a - Canadian Council of Ministers of the Environment; Canadian Environmental Quality Guidelines (2016); Soil quality guidelines and check values - commercial land use

NV - No Value

mbgs - metres below ground surface

Results for all parameters are reported in milligrams per kilograms (mg/kg)

BOLD - Exceeds applicable criterion