APPENDIX A

GEOTECHNICAL REPORT

SIMPSON Geotechnical Ltd

August 10, 2018
File: SGL18-021

Canadian Coast Guard – Maritime and Civil Infrastructure
25 Huron Street
Victoria, BC
V8V 4V9

Re: Proposed Amphitrite Point Communications Building and Antenna Tower
Report of Geotechnical Assessment

INTRODUCTION

As requested, Simpson Geotechnical Ltd. has conducted a geotechnical assessment for a proposed communications building and antenna tower at Amphitrite Point, near Ucluelet, BC in general accordance with our proposal of July 18, 2018 (Our File Reference P434). We understand that the proposed building would be single storey with a grade supported floor slab designed and constructed in accordance with the post-disaster considerations of National Building Code of Canada (NBCC) 2015. The proposed antenna tower would be a self-supported metal lattice tower approximately 12m in height, designed and constructed in accordance with CSA S37-13 Antennas, Towers, and Antenna-Supporting Structures.

Figure 1 illustrates the proposed building and tower location at the Amphitrite Point lighthouse site.

BACKGROUND

Geologic mapping of the site area was obtained from the BC Ministry of Energy, Mines and Petroleum Resources. That mapping indicated the site area to be underlain by undivided volcanic rocks of the Pacific Rim complex. Numerous faults are shown in the area, generally aligned northwest to southeast, the nearest being a thrust fault located approximately 3km northeastward of Amphitrite Point.

A site specific Seismic Hazard Calculation for Amphitrite Point was obtained from Natural Resources Canada. That calculation indicated a Peak Ground Acceleration of 0.711g for the 2% in 50 year probability seismic event. The Seismic Hazard Calculation is appended.

SITE ASSESSMENT

The site assessment was conducted on July 30, 2018 and consisted of observations of the general setting of the site, and the excavation of three test holes in the vicinity of the proposed building and tower location with a rubber-tired backhoe contracted from Gibson Bros. Contracting Ltd. A photolog of our site observations is appended.

The proposed communications building site was located southeastwards of an existing emergency response building and adjacent to an asphaltic concrete surfaced driveway that led to a helipad. At least 23m northwestward and southwestward of the proposed communications building and tower sites was the poorly defined and gently rolling crest of a slope. That slope led down to the Pacific Ocean at an overall angle of approximately 20 degrees from horizontal, through a series of locally flatter and locally steeper "steps", for a total vertical height estimated at approximately 20m. Frequent basaltic bedrock exposures between the brush and conifer tree vegetation on the slope indicated the slope was bedrock controlled, with the "steps" generally defined by orthogonal joints in the rock.

Relatively level ground, several buildings, and asphaltic concrete surfaced parking areas were located southeastwards and northwestwards of the proposed communications building and tower sites.

The proposed communications building area spanned across a variety of existing surfaces that included gravel, concrete pavement, and grass. We understand that the southwestern gravel surfaced portion of the proposed building area was formerly the location of a residence that was recently removed, and that the existing gravel surfacing was placed in the area following soil remediation activities. The concrete pavement northeastwards of the gravel area was reportedly a patio area for the house. The proposed antenna tower site was adjacent to the northeastern side of the proposed communications building, in a grassy area between two conifer trees.

The three test holes encountered relatively consistent subsurface conditions that comprised a thin layer of random fill material or previously disturbed soil of variable composition that contained roots, boulders and metal debris, overlying fine-grained, basaltic bedrock. The depth to bedrock ranged from 0.4m to 0.7m in the three test holes. The bedrock surface was weathered and could be broken with several blows of a geologic hammer, and rapidly increased in strength within 100mm of the bedrock surface. Below the weathered surface the rock was hard and required many blows of a geologic hammer to chip, indicative of Grade R5 (very strong) rock in accordance with the Canadian Foundation Engineering Manual rock classification system.

The predominant bedrock discontinuities were closely spaced and near vertical with a strike that varied substantially between test pits. The observed discontinuities in the test pits were tight and dry with a trace of filler, although locally gapped discontinuities were noted in surface bedrock exposures in the immediate vicinity.

The Rock Quality Designation (RQD) was measured by surface scanline method at the base of each test pit. Those measurements resulted in RQD = 34 to 60%, indicative of poor to fair quality rock.

No groundwater seepage was encountered in the test pits. The test pit locations are shown on Figure 1 and logs of the test pits are appended.

LABORATORY TESTING

A sample of the basaltic rock retained from the base of Test Pit 2 was tested for relative density in accordance with the ASTM C127 method. That test indicated a relative density of 2.65 g/cm^3. The test report is appended.

DISCUSSION AND RECOMMENDATIONS

General

The proposed communications building and self-supported antenna tower sites shown on Figure 1 are considered geotechnically suitable, provided the following recommendations are implemented. The intact, undisturbed bedrock surface that was encountered in the test holes is considered suitable subgrade for both the building and antenna tower foundations. We anticipate that the most practical method for providing uplift resistance to the foundation would be bonded rock anchors.

The materials encountered in the site assessment are not considered to be susceptible to strength loss from seismic liquefaction. Due to the lateral distance from the slopes to the northwest and southwest of the proposed building and antenna tower sites, and their relatively gentle and bedrock-controlled grade, those slopes are not considered to have influence on geotechnical considerations for the proposed development and no further assessment of potential slope instability is considered warranted at this time.

Excavation

All excavations should be conducted in accordance with the BC Occupational Health and Safety Regulation. Excavated materials are not anticipated to be suitable for reuse in areas

that provide structural support to footings, floor slabs-on-ground or pavements due to their variable composition and organic content.

Although not encountered in the test pits, groundwater perched atop the bedrock surface may be encountered in excavations, especially during periods of wet weather. Groundwater control with sumps and pumps may be required in the foundation excavation.

Communications Building

Foundations

The communications building foundation should bear directly on approved, broom cleaned, level, undisturbed and intact, basaltic bedrock. Some local bedrock removal may be required to level the footing subgrade. Footings bearing directly on an approved basaltic bedrock surface may be designed in accordance with NBCC 2015 based on the parameters provided below. The use of engineered fill to raise and level the bedrock subgrade is not recommended.

For Limit States Design foundations may be designed based on an Ultimate (unfactored) Limit State (ULS) bearing resistance of 4000 KPa. A Serviceability Limit State (SLS) bearing resistance of 400 KPa may be used for the communications building, based on limiting total settlement to less than 25mm and differential settlement to less than 19mm between typical 4.5m column spacing, which is normally tolerable for framed structures.

Sliding resistance may be based on a friction angle of 32° between cast-in-place concrete footings and clean, sound, basaltic bedrock. Geotechnical resistance factors (Φ) of 0.5 for bearing and 0.8 for sliding are recommended.

The site may be considered Site Class A in accordance with the 2015 National Building Code of Canada Section 4.1.8.4.

All footings should be located so that the smallest lateral clear distance between footings will be at least equal to the difference in their bearing elevations. All footings should be provided with a minimum 600mm of soil cover for confinement and frost protection.

Uplift resistance for the communications building, if required, should be provided with bonded rock anchors designed in accordance with geotechnical parameters provided below for the self-supported antenna tower.

All foundation bearing surfaces should be reviewed by SGL prior to the placement of engineered fill, footing formwork or concrete. Following approval of subgrade surfaces concrete should be placed as quickly as possible to avoid disturbance of the foundation subgrade.

Floor Slabs-on-Ground

Concrete floor slabs-on-ground areas for the anticipated light industrial floor loads of the proposed communications building should be stripped of all existing soil, fill, organics, loosened or disturbed materials to expose a subgrade of approved intact, sound, basaltic bedrock.

Approved floor slab-on-ground subgrade may be raised and levelled with slab-on-ground grading fill comprised of imported, well graded, clean (less than 5% passing the 75 micron sieve) nominal 75mm minus sand and gravel. The grading fill should be placed and uniformly compacted in maximum 200mm loose lift thickness to at least 95% of the Standard Proctor maximum (ASTM D698) dry density.

Floor slabs-on-ground should be immediately underlain by a minimum 100mm thickness of nominal 20mm minus, clean, well graded sand and gravel uniformly compacted to at least 95% of the Standard Proctor maximum dry density.

Compaction of all fill that supports floor slabs-on-ground should be verified by field density testing.

The floor slab should be designed to float independently of load-bearing walls and columns to minimize potential cracking that can occur along and around the foundation system. A 100mm thick cushion of aggregate is recommended between the underside of the floor slab and top of footings. Resting the floor slab directly on top of footings is not recommended.

Permanent Drainage

The proposed communication building should be provided with a foundation drainage system constructed of rigid PVC pipe in accordance with the BC Building Code requirements. The foundation drainage system should drain by gravity to the site storm water disposal system.

Final site grading should provide positive drainage away from the building.

Backfill

Foundation walls retaining less than 3m in height of soil should be designed to resist a minimum backfill pressure per lineal metre (P), including seismic load, as follows:

$P = 0.5K_vH^2$, where

K_v = 6 kPa; and
H = retained height of the soil in metres.

The resulting lateral load may be considered to act on the retaining wall at 1/3H above the base of the retaining wall.

The above lateral earth pressure is based on granular backfill with nominal compaction (minimum 90% of Standard Proctor maximum dry density), an essentially level adjacent ground surface, and the wall maintained in a fully drained condition. Surcharge loads on walls would be additional, if applicable.

Antenna Tower

The self-supported communications tower foundation may consist of a combination of concrete footings bearing on approved undisturbed intact bedrock with uplift resistance provided by cementitious bonded rock anchors. A two-part plastic resin grout may be used in dry conditions, if desired. The foundation design should be based on the geotechnical parameters tabled below in accordance with CSA S37-13 Antennas, Towers, and Antenna-Supporting Structures.

The uplift resistance should be based on the inverted cone approach using the parameters in this report, based on a maximum cone apex angle of 90 degrees (45 degrees each side of the long axis of the anchor). The anchor to rock bond length required for the uplift resistance should be centered on the apex of the cone. Anchors located laterally closer than 1.2 x D (where D is the anchor depth) should be considered to as act as a group.

Recommended Geotechnical Foundation Design Parameters for Proposed Amphitrite Point Communications Tower (In accordance with CSA S37-13)

Parameter	Value
Bedrock type	Fine-grained basaltic
Design depth to sound bedrock (including weathered rock)	0.1m
Ultimate, unfactored, bearing resistance (bearing on approved, undisturbed, intact basaltic bedrock)	4000 KPa
Serviceability bearing resistance	400 KPa
Ultimate, unfactored compressive strength of intact basaltic bedrock	100 MPa
Ultimate unfactored tensile strength of rock mass on surface of cone (based on poor quality rock mass with RQD=34%)	Do not use
Bulk unit weight of rock mass	26 KN/m^3
Ultimate, unfactored, grout to rock bond stress	1.5 MPa
Recommended design depth to groundwater	>6m
Rock Quality Designation (RQD)	34%
Design cone apex angle	maximum 90 degrees
Seismic site class (NBCC 4.1.8.4)	A

Uplift rock anchors should have a minimum 4m embedment length and should be installed in accordance with the tendon and grout manufacturers' recommendations. All rock anchors should be proof loaded to 110% of the factored load under the review of Simpson Geotechnical Ltd. Although groundwater is not anticipated to be encountered during rock anchor installation, wet conditions may be encountered in the rock anchor drill holes from perched surface water, especially during periods of wet weather.

The prepared foundation subgrade and rock anchor proof loading should be reviewed by Simpson Geotechnical Ltd. prior to the placement of foundation concrete to verify conformance to the intent of the recommendations provided.

CLOSURE

We appreciate the opportunity to provide our services on this project. Should you have any questions, please do not hesitate to contact us.

This report was prepared for the exclusive use of Canadian Coast Guard, Maritime and Civil Infrastructure and their appointed agents for the proposed communication building and antenna tower described above. Any use or reliance made on this report by an unauthorized third party is the responsibility of that third party. Contractors should make their own assessment of the property for the purposes of bidding on and performing work on the site.

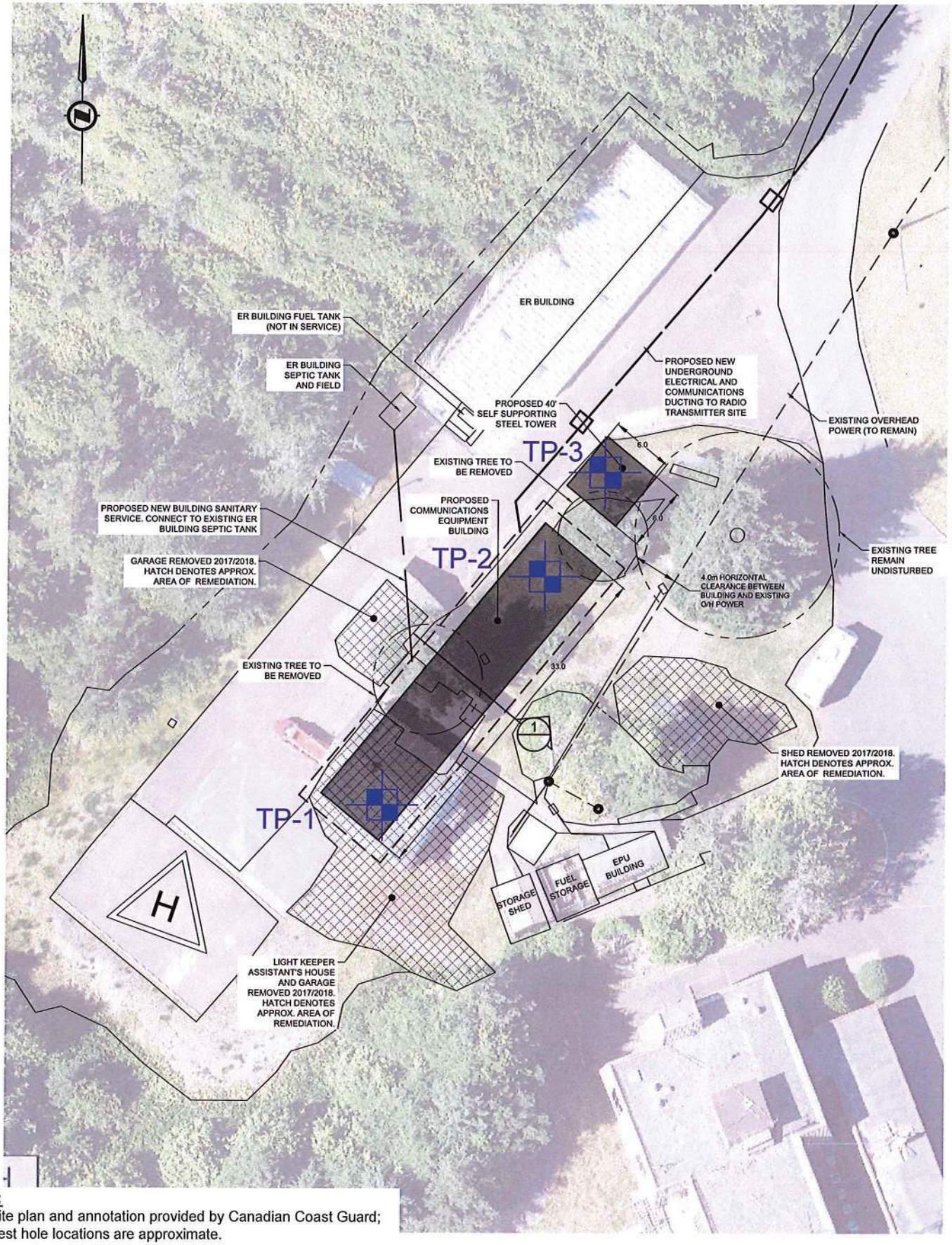
This report has been prepared in accordance with standard geotechnical engineering practice. No other warranty is provided, either expressed or implied.

Yours truly,
Simpson Geotechnical Ltd.

Per: Aug 10, 2018
Richard Simpson, P.Eng.

PROFESSIONAL ENGINEER
PROVINCE OF
R.R. SIMPSON

Attachments: Figure 1 – Geotechnical Site Plan
Photo log
Test Hole Logs (three pages)
Seismic Hazard Calculation
ASTM C127 Relative Density Test Report



Notes:

1. Site plan and annotation provided by Canadian Coast Guard;
2. Test hole locations are approximate.

Project:	Proposed Amphitrite Point Cmmunications Building and Antenna Tower			SIMPSON Geotechnical Ltd	
Title:	Geotechnical Site Plan				
Client:	Canadian Coast Guard - Maritime and Civil Infrastructure				
File: SGL18-021	**Drawn by:** RRS	**Scale:** 1 : 500	**Date:** August 10, 2018	**Dwg. No.:** Figure 1	

Photo 1 – Proposed communications building and antenna tower site looking southeastwards

Photo 2 – Communications building site looking northeast

Photo 3 – Test Pit 2

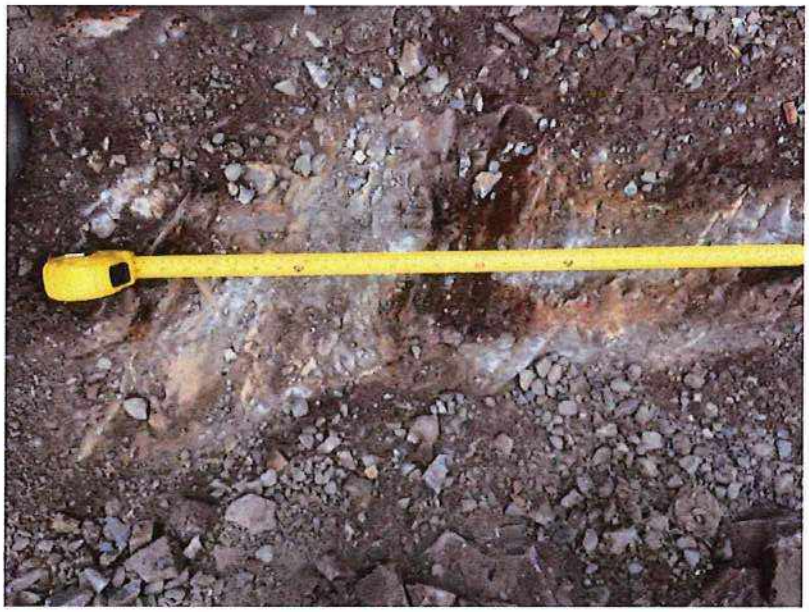
Photo 5 – Slope down to Pacific Ocean approx. 25m northwestwards of communications building site

August 10, 2018
File: SGL18-021

Test Pit Logs

Proposed Communication Building and Antenna Tower
Amphitrite Point
Ucluelet, BC

Test Hole No.	Depth (m)	Description
TP-1	0 – 0.4	Silty sand and gravel, some cobbles, angular particles, loose to compact, dry to damp, greyish-brown (Imported Fill)
	at 0.4	Bedrock, fine grained, basaltic, grey, weathered surface can be broken with several blows of geologic hammer, becomes hard within 0.1m of rock surface Closely spaced persistent joints that dip 25° down at 248° RQD by surface scan in test pit = 44% - end of test pit at 0.4m depth on basaltic bedrock - no seepage - light sloughing of test pit walls



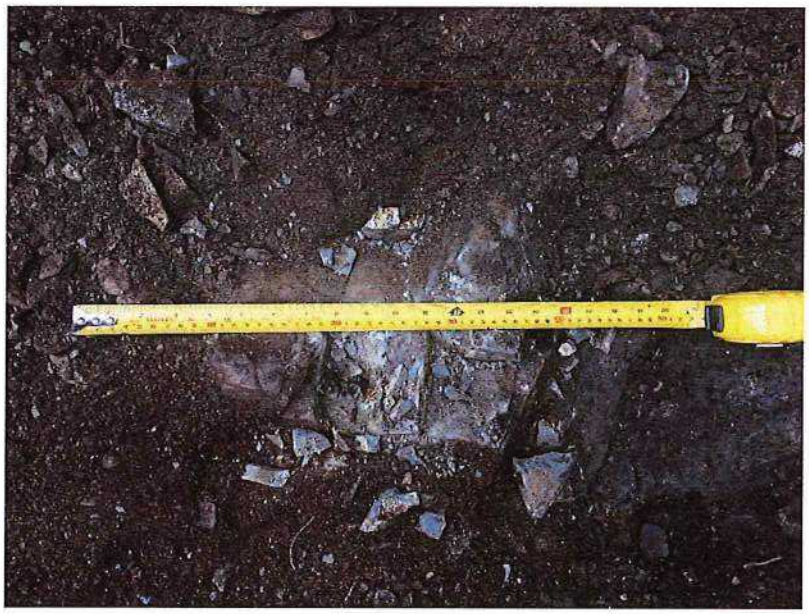
Soil classification based on Canadian Foundation Engineering Manual, 4th Edition
RQD = Rock Quality Designation
M = Natural moisture content as percent of dry weight

August 10, 2018
File: SGL18-021

Test Pit Logs

Proposed Communication Building and Antenna Tower
Amphitrite Point
Ucluelet, BC

Test Hole No.	Depth (m)	Description
TP-2	0 – 0.7	Silty sand, some gravel and cobbles, metal debris, 0.3m diameter angular boulder, loose, dry to damp, brown (Probable fill or previously disturbed ground)
	at 0.7	Bedrock, fine grained, basaltic, grey, weathered surface can be broken with several blows of geologic hammer, becomes hard within 0.1m of rock surface Closely spaced persistent joints that dip 74° down at 304° RQD by surface scan in test pit = 60% - end of test pit at 0.4m depth on basaltic bedrock - no seepage - light sloughing of test pit walls



Soil classification based on Canadian Foundation Engineering Manual, 4th Edition
RQD = Rock Quality Designation
M = Natural moisture content as percent of dry weight

August 10, 2018
File: SGL18-021

Test Pit Logs

Proposed Communication Building and Antenna Tower
Amphitrite Point
Ucluelet, BC

Test Hole No.	Depth (m)	Description
TP-3	0 – 0.4	Silty clayey sand, some angular gravel pieces, loose or soft, damp to moist, contains roots, organic, dark brown (Probable previously disturbed ground)
	at 0.4	Bedrock, fine grained, basaltic, grey, weathered surface can be broken with several blows of geologic hammer, becomes hard within 0.1m of rock surface Closely spaced persistent joints that dip 90° down at 76° and 127° RQD by surface scan in test pit = 34% - end of test pit at 0.4m depth on basaltic bedrock - no seepage - no sloughing of test pit walls

Soil classification based on Canadian Foundation Engineering Manual, 4th Edition
RQD = Rock Quality Designation
M = Natural moisture content as percent of dry weight

2015 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

August 02, 2018

Site: 48.9225 N, 125.5401 W User File Reference: Amphitrite Point

Requested by: , Simpson Geotechnical Ltd.

National Building Code ground motions: 2% probability of exceedance in 50 years (0.000404 per annum)

Sa(0.05)	Sa(0.1)	**Sa(0.2)**	Sa(0.3)	**Sa(0.5)**	**Sa(1.0)**	**Sa(2.0)**	**Sa(5.0)**	**Sa(10.0)**	**PGA (g)**	**PGV (m/s)**
0.806	1.290	**1.490**	1.528	**1.384**	**0.892**	**0.539**	**0.172**	**0.060**	**0.711**	**0.949**

Notes. Spectral (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are given in units of g (9.81 m/s^2). Peak ground velocity is given in m/s. Values are for "firm ground" (NBCC 2015 Site Class C, average shear wave velocity 450 m/s). NBCC2015 and CSAS6-14 values are specified in **bold** font. Three additional periods are provided - their use is discussed in the NBCC2015 Commentary. Only 2 significant figures are to be used. ***These values have been interpolated from a 10-km-spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the directly calculated values.***

Ground motions for other probabilities:

Probability of exceedance per annum	0.010	0.0021	0.001
Probability of exceedance in 50 years	40%	10%	5%
Sa(0.05)	0.061	0.236	0.485
Sa(0.1)	0.094	0.369	0.781
Sa(0.2)	0.124	0.444	0.896
Sa(0.3)	0.127	0.439	0.906
Sa(0.5)	0.109	0.382	0.796
Sa(1.0)	0.064	0.227	0.494
Sa(2.0)	0.035	0.133	0.301
Sa(5.0)	0.0094	0.039	0.094
Sa(10.0)	0.0038	0.014	0.033
PGA	0.052	0.201	0.429
PGV	0.071	0.273	0.541

References

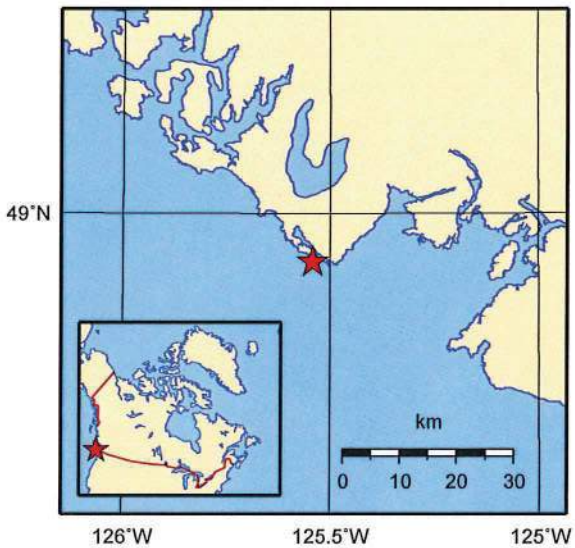
National Building Code of Canada 2015 NRCC no. 56190;
Appendix C: Table C-3, Seismic Design Data for Selected Locations in Canada

User's Guide - NBC 2015, Structural Commentaries NRCC no. xxxxxx (in preparation)
Commentary J: Design for Seismic Effects

Geological Survey of Canada Open File 7893 Fifth Generation Seismic Hazard Model for Canada: Grid values of mean hazard to be used with the 2015 National Building Code of Canada

See the websites *www.EarthquakesCanada.ca* and *www.nationalcodes.ca* for more information

Aussi disponible en français



Natural Resources Canada Ressources naturelles Canada

Canada

SIMPSON Geotechnical Ltd

ASTM C127 Relative Density

Project Amphitrite Point **Project No.** SGL18-021

Client Canadian Coast Guard MCI **Date** 07-Aug-18

Sample Location TP-2 base

Sample Description Basaltic

Pan No. B

Drying Start Time	Aug 1, 2018 0804hrs
Drying Stop Time	Aug 2, 2018 0847hrs
Sample Dry, 110° for 24 hours (**A**) g	728.8 g
Soak Start Time	Aug 2, 2018 1315hrs
Soak Stop Time	Aug 3, 2018 1312hrs
Saturated Surface Dry 24 hour soak (**B**) g	735.2 g
Water Temperature	24.4 ° C
Submerged Weight at 23° g (**C**)	460.5 g
Relative Density (specific gravity) = A/(B-C)	2.65 g/cm^3
Absorption (%) = (B-A)/Ax100	0.88 %

APPENDIX B

SOIL CHARACTERIZATION REPORT

3 October 2018

Hans Damman
Senior Environmental Assessor
Institute of Ocean Sciences
Box 6000, 9860 West Saanich Road
Sidney, BC V8L 4B2

SLR Project No.: 205.03953.00000

Dear Mr. Damman,

RE: SOIL CHARACTERIZATION AT THE PROPOSED COMMUNICATIONS EQUIPMENT BUILDING AND COMMUNCIATION TOWER AT THE AMPHITRITE MCTS STATION, UCLUELET, BC

At the request of Fisheries and Oceans Canada (DFO), SLR Consulting (Canada) Ltd. (SLR) completed an in situ soil characterization program within the footprint of the proposed Communication Equipment Building, the Communication Tower, and the septic field at the Amphitrite Marine Communications and Traffic Services (MCTS) Station, Ucluelet, BC (the site). A drawing showing the soil sampling locations is included at the end of the letter. The program also included percolation tests to determine the approximate infiltration rates in the area of the proposed septic field.

The purpose of the soil sampling program was to characterize the quality of the soil planned to be excavated during construction activities as well as to determine the infiltration rate in the area of the proposed septic field. The quality of the soil was determined to identify off-site disposal options.

BACKGROUND

SLR understands that the Canadian Coast Guard is proposing to construct a new Communication Equipment Building, a self-supporting steel tower and associated underground utilities. In addition, a new septic field may also be installed as part of the construction activities. In preparation of these construction activities, DFO requires an understanding of the soil quality for offsite disposal. As part of the septic field installation, DFO requires an understanding of the infiltration rates in the area.

APPLICABLE STANDARDS FOR OFF-SITE DISPOSAL

SLR has assumed that soil excavated during construction activities will be disposed offsite. Therefore, soil analytical results were compared to the British Columbia Contaminated Sites Regulation (CSR), specifically Schedule 3.1, which is divided into matrix standards and generic numerical standards as described in the following paragraphs.

Matrix Numerical Soil Standards are presented in Part 1 of Schedule 3.1 for a subset of inorganic and organic substances, where they are based on both land use and exposure pathways. Matrix standards are presented for eight classes of land use: wildlands – natural (WLn), wildlands – reverted (WLr), agricultural (AL), urban park (PL), residential – low density (RLld), residential – high density (RLhd), commercial (CL), and industrial (IL).

Several mandatory and potentially applicable most stringent site-specific factors are used to indicate potential exposure to contaminants and to define applicable standards. Mandatory site-specific factors under the CSR section 12(8) include: human intake of contaminated soil and toxicity to soil invertebrates and plants. Commonly applicable most stringent site-specific factors include “groundwater used for drinking water (DW)”, “groundwater flow to surface water used by freshwater aquatic life (AW-f) and marine aquatic life (AW-m)”, “groundwater used for livestock watering (GW-l), and “groundwater used for irrigation (GW-i)”. For the purposes of this investigation, SLR did not include the site specific factors GW-I and GW-i.

Generic Numerical Soil Standards for a variety of inorganic and organic substances are presented in Parts 2 and 3 of Schedule 3.1, which are protective of human health and ecological health, respectively. As with the matrix standards, the generic numerical standards are listed under the same eight classes of land use.

Provision exists in the CSR (section 11(3)) for considering background concentration standards for soils. Requirements have been specified in BC Ministry of Environment & Climate Strategy (ENV) Protocol 4 for Contaminated Sites – *Determining Background Soil Quality* for using local and regional background soils concentrations as an alternative to the numerical standards prescribed in the CSR.

The BC Hazardous Waste Regulation (HWR) defines hazardous wastes as wastes that could harm human health or the environment if not properly handled or disposed. The HWR defines leachable toxic waste when liquids, solids, and/or slurries are subject to the Toxicity Characteristic Leaching Procedure (TCLP) and the extract has a concentration greater than the Leachate Quality Standards prescribed in Table 1 of Schedule 4.

Soil Disposal: Because the disposal site is not known, the most stringent standards for the following land uses were considered: AL, RLld, RLhd, CL and IL, based on the existing pH at the site. When a disposal site is chosen, it should be evaluated so that the appropriate site specific factors (e.g. land use, receiving site pH, marine water or drinking water applicability, etc.) may be taken into consideration for soil classification.

METHODS

The field program was conducted on August 30 and 31, 2018. The program included advancement of hand and machine dug test pits to determine in situ soil quality in the footprint of the proposed structures and percolation tests to determine the approximate infiltration rate of the soil in the proposed area of the septic field.

Soil Characterization

The soil characterization program included the advancement of test pits by hand and machine digging. Hand dug test pits were advanced with a stainless steel shovel, pickaxe, digging bar and/or hand auger. Machine dug test pits were advanced with a 75G John Deere excavator supplied and operated by Gibson Bros Ltd. of Tofino, BC.

The test pits were advanced within the footprint of the Communication Equipment Building, the Communication Tower, and the septic field. Soil samples were collected in general accordance with BC ENV Technical Guidance (TG) 1 on Contaminated Sites – *Site Characterization and Confirmation Testing*.

A total of twelve test pits were advanced at the site. Two test pits were hand dug in the footprint of the Communication Tower; two test pits were hand dug and four were machine dug in the footprint of the proposed Communication Equipment Building; and two test pits were machine dug in the footprint of the septic field. The soil underlying the concrete surface area near the existing vault was not accessed or characterized during the field program. The concrete was from the former Assistant's House.

The hand dug test pits were advanced to approximately 0.8 metres below ground surface (mbgs); the machine dug test pits were advanced to bedrock which was encountered from approximately 0.4 to 1.8 mbgs. One soil sample was collected from the entire soil horizon at each test pit location and submitted for laboratory analysis.

Soil samples were field screened for head space vapour level using an RKI Eagle 2 with a catalytic combustible gas detector. A re-sealable plastic bag was half-filled with soil and sealed for approximately 15 minutes prior to puncturing and analysing the headspace. The RKI Eagle 2 recorded the concentration of combustible organic vapours in parts per million volumetric (ppmv).

Soil samples were submitted to Maxxam Analytics (Maxxam) for analysis of one or more of metals; leachable metals; benzene, toluene, ethylbenzene, and xylenes (BTEX); styrene; methyl tertiary butyl ether (MTBE); light and heavy extractable hydrocarbons (LEPH/HEPH); polycyclic aromatic hydrocarbons (PAH); leachable PAH; and saturated paste parameters including sodium and chloride.

Quality assurance and quality control (QA/QC) field procedures included the following:

- Maintaining a proper holding temperature for sample via storage in an ice-chilled cooler during field activities and during shipment to the analytical laboratory;
- Using a new pair of nitrile gloves for the sample recovered; and
- Completing a chain-of-custody form to accompany the sample during shipment to the laboratory.

Sampling procedures were in accordance with the following:

- Environmental Management Act and CSR;
- BC ENV TG 1 on Contaminated Sites – *Site Characterization and Confirmation Testing*; and
- SLR standard field procedures.

Percolation Test

The percolation tests were conducted to determine the approximate infiltration rate in the area of the proposed septic field located adjacent and southeast of the helicopter landing pad. The percolation test was conducted based on the BC Sewerage System Standard Practice Manual Version #3 (September 2004), Volume III, Section 8.3.2 – *Percolation Test Procedure*.

The test was conducted on August 30, 2018 and consisted of hand digging two circular test holes at the northeast and southwest sections of the proposed septic field area. The test holes had a diameter of approximately 36 centimeters (cm) and a depth of approximately 60 cm. The smeared soil on the walls of the test holes were removed using a trowel. The result was a hole with a ragged inner surface. In addition, the base of the test hole was cleaned of debris and was approximately level.

Subsequently, the test holes were filled with tap water up to 15 cm from the bottom of the hole. The water was added carefully and slowly to avoid disturbing the soil. Once the water level was approximately 12 cm from the bottom of the test hole, water was added again to refill the hole to 15 cm from the bottom.

When the water level after the second filling was at 12 cm from the bottom of the hole, water was once again added to bring the depth of water to 15 cm or slightly more from the bottom of the hole. Once the water level dropped to the 15 cm depth, a stop watch timer was commenced and time was recorded until the water level dropped to the 12 cm depth. This procedure was repeated 10 times in both test holes:

RESULTS

The results of the field program are summarized in the following sections.

Field Observations

The observations recorded during the advancement of the test pits are summarized in the following table. None of the test pit locations had visual or olfactory observations of potential contamination.

Table A
Test Pit Observations

Sample ID	HSVL (ppmv)	Sampling Depth (mbgs)	Test Pit Characteristics
PK00016-000-1808-SL001	30	0.5-0.8	Top soil (silty SAND, some gravel, trace cobbles), dark brown, dry, loose
PK00016-000-1808-SL002	0	0.2-0.7	Top soil (silty SAND, trace gravel, cobbles), dark brown to black, dry, loose, boulder at 0.7 mbgs
PK00016-000-1808-SL003	5	0.3-0.7	Top soil (SAND, some silt, some gravel, cobbles), dark brown, dry, loose, boulder at 0.7 mbgs
PK00016-000-1808-SL004	0	0.4-0.9	Top soil (CLAY, trace silt, trace gravel), brown, moist, soft
PK00016-000-1808-SL005	0	1.4-1.8	COBBLES, some sand, some clay, some gravel, dark brown, moist, dense, bedrock at 1.8 mbgs
PK00016-000-1808-SL006	0	0.7-1.0	SAND and GRAVEL, cobbles, grey to brown, dry, loose, contains one rebar rod, bedrock at 1.0 mbgs
PK00016-000-1808-SL007	0	0.2-0.4	Gravelly SAND, brown, dry, loose, bedrock at 0.4 mbgs
PK00016-000-1808-SL008	0	0.2-0.9	Silty SAND, some gravel, brown, dry, loose, bedrock at 0.5 mbgs
PK00016-000-1808-SL009	10	0.2-0.5	SAND and SILT, some gravel, brown, dry, loose, bedrock at 0.5 mbgs

Sample ID	HSVL (ppmv)	Sampling Depth (mbgs)	Test Pit Characteristics
PK00016-000-1808-SL010	0	0.4-0.8	Sandy SILT, some gravel, brown, moist, soft, contains one rebar rod and concrete fragments, bedrock at 0.8 mbgs
PK00016-000-1808-SL011	0	0.4-0.7	Top soil (sandy SILT, trace gravel), dark brown, dry, soft, bedrock at 0.7 mbgs
PK00016-000-1808-SL012	0	0.2-0.6	Top soil (silty SAND, trace gravel), dark brown and grey, dry, loose contains, bedrock at 0.6 mbgs

Notes:
HSLV = head space vapour level
ppmv = part per million by volume
mbgs = metres below ground surface

Analytical Results

Soil analytical results are presented on the attached Tables 1 to 6 with comparison to the CSR and HWR standards. A copy of the Maxxam analytical reports is attached. The soil sample quality is summarized in the following table.

Soil samples with concentrations of one or more parameter(s) less than the ENV Protocol 4 for CSR Background Soil Quality Estimates for Region 1 Vancouver Island were not considered exceedances (i.e. iron and vanadium) but are identified in the tables following the text.

Table B
Soil Sample Analytical Results Summary of Exceedances

Sample ID	Parameters Exceeding CSR Standard (most stringent onsite considerations)	Conservative Sample Classification
PK00016-000-1808-SL004	Lithium (37.5 mg/kg) > AL and RLld	RL+ (>RL metals <IL) RL- (<RL hydrocarbons)
PK00016-000-1808-SL007	Benzo(b+j)fluoranthene (0.13 mg/kg) and pyrene (0.21 mg/kg) > AL Lead (128 mg/kg) > AL, RLld and RLhd Mercury (0.678 mg/kg) > AL Zinc (365 mg/kg) > AL, RLld, RLhd and IL	IL+ (>IL metals) RL+ (>RL hydrocarbons <IL)
PK00016-000-1808-SL011	Zinc (229 mg/kg) > AL, RLld, RLhd and IL	IL+ (>IL metals) RL- (<RL hydrocarbons)

Notes:
AL = Agricultural Land Use
CL = Commercial Land Use
IL = Industrial Land Use
RLld = Residential Land Use (Low Density)
RLhd = Residential Land Use (High Density)

Toxicity characteristic leaching procedure. (TCLP) for metals and PAH was requested on sample PK00016-000-1808-SL007 because this sample had the highest lead and benzo(a)pyrene concentrations.

The results of the leachability testing indicated that the leachable metal and PAH concentrations in sample PK00016-000-1808-SL007 were less than the HWR Leachate Quality standards.

The remaining samples had concentrations less than the most stringent standards and are classified as "< RL metals and hydrocarbons", for the purposes of offsite disposal.

Percolation Test

The soil in the area of the proposed septic field was composed of gravelly sand with cobbles. The results of the percolation test are tabulated in the following table.

Table C
Percolation Test Results

Test Hole ID	Total Infiltration Time (HH:MM:SS)
Test Hole 1 PK00016-000-1808-SL006 (Northeast Section)	00:01:59
	00:02:23
	00:02:28
	00:02:35
	00:02:35
	00:02:46
	00:02:30
	00:02:50
	00:02:53
	00:02:34
Median	**00:02:35**
Test Hole 2 PK00016-000-1808-SL005 (Southwest Section)	00:00:37
	00:00:45
	00:00:47
	00:00:44
	00:01:01
	00:00:57
	00:01:02
	00:01:14
	00:01:04
	00:01:15
Median	**00:00:59**

CONCLUSIONS AND RECOMMENDATIONS

The results of the soil characterization program identified two locations where soils require offsite disposal to a permitted facility.

Location1- Two soil samples, PK00016-000-1808-SL004 and PK00016-000-1808-SL011, within the footprint of the proposed Communication Equipment Building had concentrations of metals (i.e. lithium and zinc, respectively) greater than the most stringent CSR standards. The two locations are adjacent to each other and in the approximate centre of the proposed building. This area would result in approximately 79 cubic metres (m^3) of soil to be transported offsite to a permitted facility classified as IL+ metals; RL- hydrocarbons.

Location 2- One soil sample, PK00016-000-1808-SL007, near the footprint of the former Assistant's House had concentrations of metals (lead, mercury, zinc) greater than the most stringent CSR standards. The concentrations of benzo(b+j)fluoranthene and pyrene in the soil from this location was greater than the BC CSR AL standards. This area would result in approximately 8 m^3 of soil to be transported offsite to a permitted facility classified as IL+ metals; RL+ hydrocarbons.

The remaining samples had concentrations less than the most stringent standards and are classified as "RL- metals and hydrocarbons", for the purposes of offsite disposal.

If soil excavated during the construction activities is to be transported and disposed at a facility outside of Vancouver Island, the material would have to be reclassified because the Protocol 4 Regional Background Soil Quality Estimates for Vancouver Island would not apply.

STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR for Fisheries and Oceans Canada (DFO) and completed in compliance with Contract Number F1950-180227/E/2. Under the DFO Standing Offer No. F5211-150277/C, DFO has the exclusive right to copy and redistribute this report.

This report has been prepared for specific application to this site and site conditions existing at the time work for the report was completed. Any conclusions or recommendations made in this report reflect SLR's professional opinion based on limited investigations including: visual observation of the site, surface and subsurface investigation at discrete locations and depths, and laboratory analysis of specific chemical parameters. The results cannot be extended to previous or future site conditions, portions of the site that were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters and materials that were not addressed. Substances other than those addressed by the investigation may exist within the site; and substances addressed by the investigation may exist in areas of the site not investigated in concentrations that differ from those reported. SLR does not warranty information from third party sources used in the development of investigations and subsequent reporting.

Nothing in this report is intended to constitute or provide a legal opinion. SLR expresses no warranty to the accuracy of laboratory methodologies and analytical results. SLR makes no representation as to the requirements of compliance with environmental laws, rules, regulations or policies established by federal, provincial or local government bodies. Revisions to the regulatory standards referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary.

DFO may submit this report to the BC and/or related BC environmental regulatory authorities or persons for review and comment purposes.

CLOSURE

We trust that this meets your current requirements. If you need any further information or require clarification on anything outlined in this report please feel free to contact the undersigned at (250) 475-9595.

Yours sincerely,

SLR Consulting (Canada) Ltd.

Roberto Prieto, M.Sc., P.Ag.
Environmental Scientist

Phyllis Bruleigh, M.S., P.Geo, PMP.
Senior Scientist

Enclosed
Table 1: Soil Analytical Results – Petroleum Hydrocarbons
Table 2: Soil Analytical Results – Polycyclic Aromatic Hydrocarbons
Table 3: Soil Analytical Results – Metals
Table 4: Leachate Analytical Results – Polycyclic Aromatic Hydrocarbons
Table 5: Leachate Analytical Results – Metals

Figure 1 – Soil Sample Locations

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TABLE 1: SOIL ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS

				Petroleum Hydrocarbons															
				Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylenes Total	Styrene	MTBE	VH C6-C10	VPH	EPH(10-19)	LEPH	EPH(19-32)	HEPH
				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
Reportable Detection Limit				0.005	0.01	0.02	0.04	0.04	0.04	0.03	0.1	10	10	100	100	100	100
Most Stringent BC CSR IL Standards				0.035 (dw)	15 (dw)	0.5 (fw)			6.5 (dw)	50 (e)	20000 (h)		200 (e,h)		2000 (e,h)		5000 (e,h)
Most Stringent BC CSR CL Standards				0.035 (dw)	15 (dw)	0.5 (fw)			6.5 (dw)	50 (e)	20000 (h)		200 (e,h)		2000 (e,h)		5000 (e,h)
Most Stringent BC CSR RLhd Standards				0.035 (dw)	15 (dw)	0.5 (fw)			6.5 (dw)	50 (e)	8000 (h)		200 (e,h)		1000 (e,h)		1000 (e,h)
Most Stringent BC CSR RLld Standards				0.035 (dw)	15 (dw)	0.5 (fw)			6.5 (dw)	5 (e)	4000 (h)		200 (e,h)		1000 (e,h)		1000 (e,h)
Most Stringent BC CSR PL Standards				0.035 (dw)	15 (dw)	0.5 (fw)			6.5 (dw)	5 (e)	8000 (h)		200 (e,h)		1000 (e,h)		1000 (e,h)
Most Stringent BC CSR AL Standards				0.035 (dw)	15 (dw)	0.5 (fw)			6.5 (dw)	0.1 (e)	4000 (h)		200 (e,h)		1000 (e,h)		1000 (e,h)
Sample Location	**Sample ID**	**Sample Depth (mbg)**	**Sample Date**														
PK00016--SL001	PK00016-000-1808-SL001	0.5-0.8	2018-Aug-30	<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	120	120
PK00016-SL002	PK00016-000-1808-SL002	0.2-0.7		<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	250	250
PK00016-SL003	PK00016-000-1808-SL003	0.3-0.7	2018-Aug-31	<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	110	110
PK00016-SL004	PK00016-000-1808-SL004	0.4-0.9		<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	<100	<100
PK00016-SL005	PK00016-000-1808-SL005	1.4-1.8		<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	<100	<100
PK00016-SL006	PK00016-000-1808-SL006	0.7-1.0		<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	<100	<100
PK00016-SL007	PK00016-000-1808-SL007	0.2-0.4		<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	<100	<100
PK00016-SL008	PK00016-000-1808-SL008	0.2-0.9		<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	<100	<100
PK00016-SL009	PK00016-000-1808-SL009	0.2-0.5		<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	200	200
PK00016-SL010	PK00016-000-1808-SL010	0.4-0.8		<0.005	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	110	110
PK00016-SL011	PK00016-000-1808-SL011	0.4-0.7		<0.005	<0.01	0.027	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	170	170
PK00016-SL012	PK00016-000-1808-SL012	0.2-0.6		0.018	<0.01	<0.02	<0.04	<0.04	<0.04	<0.03	<0.1	<10	<10	<100	<100	110	110

BC CSR IL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Standards for Industrial Land Use (IL)
BC CSR CL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Commercial Land Use (CL)
BC CSR RLhd: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Residential (high density) Land Use (RLhd)
BC CSR RLld: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Residential (low density) Land Use (RLld)
BC CSR PL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Pakland Use (PL)
BC CSR AL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Agricultural Land Use (AL)
Site-specific and mandatory factors include:
h = protection of human health
e = protection of ecological health
dw = groundwater used for drinking water
fw = groundwater flow to surface water used by freshwater aquatic life
i = intake of contaminated soil
m = groundwater flow to surface water used by marine aquatic life
t = toxicity to soil invertebrates and plants
lw = groundwater used for livestock watering (AL)
nli = livestock ingesting soil and fodder (AL)
rmm = major microbial functional impairment (AL)

YELLOW Concentration greater than applicable BC CSR standards

Notes:
m - metres
mg/kg - milligrams per kilogram
< - less than reported detection limit
'-' - sample not analyzed for parameter indicated
• formatting of cells indicates exceedances of like-formatted standards
• formatting indicates the least stringent standard/guideline exceeded
• samples collected from the same location, date and depth interval are blind field duplicate / parent sample pairs
• laboratory analytical reports detail detection limits, testing protocols and QA/QC procedures
BETX - benzene, ethylbenzene, toluene, xylenes
HSVL - headspace vapour level
MTBE - methyl tert-butyl ether
PAHs - polycyclic aromatic hydrocarbons
ppmv - parts per million by volume
EPHs10-19 - extractable petroleum hydrocarbon in soil (nC10-nC19)
LEPHs - Light Extractable Petroleum Hydrocarbons in soil: EPHs10-19 minus PAH compounds: naphthalene and phenanthrene
EPHs19-32 - heavy extractable petroleum hydrocarbons (nC19-nC32)
HEPHs - EPHs19-32 minus PAH compounds: benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene and pyrene
VHsC6-C10 - volatile petroleum hydrocarbons (nC6-nC10)
VPHs - VHC6-C10 minus BETX and styrene
PAHs - polycyclic aromatic hydrocarbons

TABLE 2: SOIL
ANALYTICAL RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS

				PAHs																							
				Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzo(j)fluoranthene	Benzo(b+j)fluoranthenes	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	HEAVY MOLECULAR WT. PAH SUM	LIGHT MOLECULAR WT. PAH SUM	PAHs (Sum of total)
				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	mg/kg
Reportable Detection Limit				0.005	0.005	0.05	0.004	0.02	0.02	0.02	0.05	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.01	0.01	0.02	0.05	0.05	0.05	0.05
Most Stringent BC CSR IL Standards				15000 (h)			30 (t)	10 (e)	50 (i)			10 (e)		10 (e)	4500 (h)	10 (e)	200 (t)	9500 (h)	10 (e)	1000 (h)	950 (h)	20 (t)	50 (e)	100 (e)	10 (h)			
Most Stringent BC CSR CL Standards				15000 (h)			30 (t)	10 (e)	30 (i)			10 (e)		10 (e)	4500 (h)	10 (e)	200 (t)	9500 (h)	10 (e)	1000 (h)	950 (h)	20 (t)	50 (e)	100 (e)	10 (h)			
Most Stringent BC CSR RLhd Standards				2000 (h)			30 (t)	10 (e)	10 (i)			10 (e)		10 (e)	400 (h)	10 (e)	200 (t)	1000 (h)	10 (e)	500 (h)	100 (h)	20 (t)	50 (e)	100 (e)	4.5 (h)			
Most Stringent BC CSR RLld Standards				950 (h)			2.5 (t)	1 (e)	5 (i)			1 (e)		1 (e)	200 (h)	1 (e)	50 (t)	600 (h)	1 (e)	250 (h)	60 (h)	0.6 (t)	5 (e)	10 (e)	2.5 (h)			
Most Stringent BC CSR PL Standards				2000 (h)			2.5 (t)	1 (e)	10 (i)			1 (e)		1 (e)	400 (h)	1 (e)	50 (t)	1000 (h)	1 (e)	500 (h)	100 (h)	0.6 (t)	5 (e)	10 (e)	4.5 (h)			
Most Stringent BC CSR AL Standards				950 (h)			2.5 (t)	0.1 (e)	5 (i)			0.1 (e)		0.1 (e)	200 (h)	0.1 (e)	50 (t)	600 (h)	0.1 (e)	250 (h)	60 (h)	0.6 (t)	0.1 (e)	0.1 (e)	2.5 (h)			
Sample Location	Sample ID	Sample Depth (mbg)	Sample Date																									
PK00016--SL001	PK00016-000-1808-SL001	0.5-0.8	2018-Aug-30	<0.005	<0.005	<0.05	<0.004	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	<0.02	<0.05	<0.05	<0.05	<0.05
PK00016-SL002	PK00016-000-1808-SL002	0.2-0.7		<0.005	<0.005	<0.05	<0.004	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	<0.02	<0.05	<0.05	<0.05	<0.05
PK00016-SL003	PK00016-000-1808-SL003	0.3-0.7	2018-Aug-31	<0.005	<0.005	<0.05	<0.004	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	<0.02	<0.05	<0.05	<0.05	<0.05
PK00016-SL004	PK00016-000-1808-SL004	0.4-0.9		<0.005	<0.005	<0.05	<0.004	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	<0.02	<0.05	<0.05	<0.05	<0.05
PK00016-SL005	PK00016-000-1808-SL005	1.4-1.8		<0.005	<0.005	<0.05	<0.004	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	<0.02	<0.05	<0.05	<0.05	<0.05
PK00016-SL006	PK00016-000-1808-SL006	0.7-1.0		<0.005	<0.005	<0.05	<0.004	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	<0.02	<0.05	<0.05	<0.05	<0.05
PK00016-SL007	PK00016-000-1808-SL007	0.2-0.4		<0.005	0.0081	<0.05	0.014	0.098	0.097	0.079	0.063	0.046	0.049	0.13	0.11	<0.02	0.22	<0.02	0.054	<0.05	<0.02	<0.01	0.065	0.21	<0.05	1	0.088	1.1
PK00016-SL008	PK00016-000-1808-SL008	0.2-0.9		<0.005	<0.005	<0.05	<0.004	<0.02	0.021	<0.02	<0.05	<0.02	<0.02	<0.02	0.024	<0.02	0.039	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	0.049	<0.05	0.13	<0.05	0.13
PK00016-SL009	PK00016-000-1808-SL009	0.2-0.5		<0.005	<0.005	<0.05	<0.004	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	<0.02	<0.05	<0.05	<0.05	<0.05
PK00016-SL010	PK00016-000-1808-SL010	0.4-0.8		<0.005	<0.005	<0.05	<0.004	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	<0.02	<0.05	<0.05	<0.05	<0.05
PK00016-SL011	PK00016-000-1808-SL011	0.4-0.7		<0.005	0.013	<0.05	0.0091	0.026	0.041	0.034	<0.05	<0.02	<0.02	0.034	0.032	<0.02	0.032	<0.02	0.03	<0.05	<0.02	<0.01	<0.01	0.043	<0.05	0.24	<0.05	0.26
PK00016-SL012	PK00016-000-1808-SL012	0.2-0.6		<0.005	<0.005	<0.05	<0.004	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.01	<0.01	<0.02	<0.05	<0.05	<0.05	<0.05

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BC CSR CL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Commercial Land Use (CL)
BC CSR RLhd: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Residential (high density) Land Use (RLhd)
BC CSR RLld: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Residential (low density) Land Use (RLld)
BC CSR PL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Pakland Use (PL)
BC CSR AL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Agricultural Land Use (AL)
Site-specific and mandatory factors include:
h = protection of human health
e = protection of ecological health
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fw = groundwater flow to surface water used by freshwater aquatic life
i = intake of contaminated soil
m = groundwater flow to surface water used by marine aquatic life
t = toxicity to soil invertebrates and plants
lw = groundwater used for livestock watering (AL)
nli = livestock ingesting soil and fodder (AL)
rmm = major microbial functional impairment (AL)

YELLOW Concentration greater than applicable BC CSR standards

Notes:
m - metres
mg/kg - milligrams per kilogram
< - less than reported detection limit
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• formatting of cells indicates exceedances of like-formatted standards
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BETX - benzene, ethylbenzene, toluene, xylenes
HSVL - headspace vapour level
MTBE - methyl tert-butyl ether
PAHs - polycyclic aromatic hydrocarbons
ppmv - parts per million by volume
EPHs10-19 - extractable petroleum hydrocarbon in soil (nC10-nC19)
LEPHs - Light Extractable Petroleum Hydrocarbons in soil: EPHs10-19 minus PAH compounds: naphthalene and phenanthrene
EPHs19-32 - heavy extractable petroleum hydrocarbons (nC19-nC32)
HEPHs - EPHs19-32 minus PAH compounds: benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene and pyrene
VHsC6-C10 - volatile petroleum hydrocarbons (nC6-nC10)
VPHs - VHC6-C10 minus BETX and styrene
PAHs - polycyclic aromatic hydrocarbons
B(a)P TPE (BC CSR)- benzo(a)pyrene toxicity potency equivalence; calculated by adding the concentrations of the following parameters multiplied by their TEF:
benz(a)anthracene[0.1], benzo(b+j)fluoranthene[0.1], benzo(k)fluoranthene[0.1], dibenzo(a,h)anthracene[1], indeno(1,2,3-cd)pyrene[0.1]
TEF - toxicity equivalent factor

TABLE 3: SOIL
ANALYTICAL RESULTS - METALS

Sample Location	Sample ID	Sample Depth (mbg)	Sample Date	pH (Lab)	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chloride (Soluble)	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Lithium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Sodium (Soluble)	Strontium	Thallium	Tin	Tungsten	Uranium	Vanadium	Zinc	Zirconium
				pH_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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Reportable Detection Limit					100	0.1	0.5	0.1	0.2	0.1	1	0.05	100	4.1	1	0.3	0.5	100	0.1	5	0.2	0.05	0.1	0.8	100	0.5	0.05	100	2	0.1	0.05	0.1	0.5	0.05	2	1	0.5
Most Stringent BC CSR IL Standards					250000 (h)	40 (e)	10 (dw,m,fw)	350 (dw)	1 - 350 * (dw,t)		1000000 (h)	1 - 50 * (fw,m)		100 (dw)	60 (dw,m,fw)	25 (dw,m,fw)	75 - 300 * (fw,t)	150000 (h)	120 - 1000 * (dw,t)	450 (h)	2000 (dw,t)	75 (t)	15 (dw)	70 - 250 * (dw,fw,m,t)		1 (dw,fw,m)	40 (e)	1000 (t)		150000 (h)	25 (e)	300 (e)	200 (h)	150 (fw,m)	100 (dw)	150 - 200 * (fw,m)	
Most Stringent BC CSR CL Standards					250000 (h)	40 (e)	10 (dw,m,fw)	350 (dw)	1 - 350 * (dw,t)		50000 (h)	1 - 50 * (fw,m)		100 (dw)	60 (dw,m,fw)	25 (dw,m,fw)	75 - 300 * (fw,t)	150000 (h)	120 - 150 * (dw,i)	450 (h)	2000 (dw,t)	75 (I,t)	15 (dw)	70 - 250 * (dw,fw,m,t)		1 (dw,fw,m)	40 (e)	1000 (t)		150000 (h)	25 (e)	300 (e)	200 (h)	150 (fw,m)	100 (dw)	150 - 200 * (fw,m)	
Most Stringent BC CSR RLhd Standards					40000 (h)	40 (e)	10 (dw,m,fw)	350 (dw)	1 - 150 * (dw,i)		15000 (h)	1 - 40 * (fw,m)		100 (dw)	60 (dw,m,fw)	25 (dw,i,m,fw)	75 - 300 * (fw,t)	35000 (h)	120 (i)	65 (h)	2000 (dw,t)	25 (i)	15 (dw)	70 - 250 * (dw,fw,m,t)		1 (dw,fw,m)	40 (e)	1000 (t)		20000 (h)	25 (e)	300 (e)	25 (h)	150 (fw,m)	100 (dw)	150 - 200 * (fw,m)	
Most Stringent BC CSR RLld Standards					40000 (h)	20 (e)	10 (dw,m,fw)	350 (dw)	1 - 85 * (dw,i)		8500 (h)	1 - 20 * (fw,m)		100 (dw)	60 (dw,m,fw)	25 (dw,i,m,fw)	75 - 150 * (fw,t)	35000 (h)	120 (i)	30 (h)	2000 (dw,t)	10 (i)	15 (dw)	70 - 150 * (dw,fw,m,t)		1 (dw,fw,m)	20 (e)	200 (t)		9500 (h)	9 (e)	50 (e)	15 (h)	100 (fw,m)	100 (dw)	150 - 200 * (fw,m)	
Most Stringent BC CSR PL Standards					40000 (h)	20 (e)	10 (dw,m,fw)	350 (dw)	1 - 150 * (dw,i,t)		15000 (h)	1 - 30 * (fw,m)		100 (dw)	60 (dw,m,fw)	25 (dw,i,m,fw)	75 - 150 * (fw,t)	35000 (h)	120 (i)	65 (h)	2000 (dw,t)	25 (i)	3 (dw)	70 - 150 * (dw,fw,m,t)		1 (dw,fw,m)	20 (e)	200 (t)		20000 (h)	9 (e)	50 (e)	25 (h)	15 (fw,m)	100 (dw)	150 - 200 * (fw,m)	
Most Stringent BC CSR AL Standards					40000 (h)	20 (e)	10 (dw,m,fw,lw)	350 (dw)	1 - 85 * (dw,i)		8500 (h)	1 - 10 * (fw,m)		100 (dw)	60 (dw,m,fw,lw,nli,rrm)	25 (dw,i,m,fw)	75 - 150 * (t,lw,nli)	35000 (h)	120 (i)	30	2000 (dw,t)	0.6 (nli)	3.5 (lw)	70 - 150 * (dw,m,t,rmm)		1 (dw,fw,m,lw)	20 (e)	200 (t)		9500 (h)	2 (h)	5 (e)	15 (h)	35 (nli)	100 (dw)	150 - 200 * (fw,m,nli,rrm)	
Protocol 4					55000	4	4	250	0.7		1	0.95			65	30	100	70,000	40		5000	0.15	1	50		4	1			100		4		200	150	
PK00016--SL001	PK00016-000-1808-SL001	0.5-0.8	2018-Aug-30	5.5	30,800	0.98	6.16	29.9	0.28	<0.1	3.6	0.119	3030	-	37.5	10.2	39.7	32,100	16	16.7	424	0.124	0.83	22.8	505	0.75	0.07	180	-	12.4	<0.05	1.01	<0.5	0.403	91.5	80.1	0.68
PK00016-SL002	PK00016-000-1808-SL002	0.2-0.7		5.57	22,100	0.6	4.64	36.4	0.27	<0.1	3.3	0.136	4000	-	25.7	7.48	28.7	24,500	16.6	11.9	359	0.136	0.7	16.2	527	0.54	<0.05	191	-	16.4	<0.05	1.47	<0.5	0.338	78.4	53.3	1.24
PK00016-SL003	PK00016-000-1808-SL003	0.3-0.7		5.71	23,800	0.93	5.55	47.1	0.34	<0.1	3	0.106	4620	-	32	12.1	41.4	30,700	10.1	11.6	960	0.092	0.71	22.6	561	<0.5	<0.05	169	-	18.2	<0.05	0.55	<0.5	0.339	97.3	64.1	0.83
PK00016-SL004	PK00016-000-1808-SL004	0.4-0.9		5.42	35,000	0.38	5.24	42.1	0.27	0.15	3.5	0.072	3230	-	35.3	6.13	22.3	***39,800***	10.5	37.5	298	0.115	1.53	13.9	784	0.82	<0.05	128	-	17.4	0.091	0.92	<0.5	0.566	***151***	49.4	1.5
PK00016-SL005	PK00016-000-1808-SL005	1.4-1.8		6.84	25,200	0.7	4.35	238	0.36	<0.1	3.7	0.132	10,500	9	26.3	14.8	49	27,800	18.5	15	751	0.425	0.84	23.5	767	<0.5	<0.05	746	12.1	73.8	0.052	0.96	<0.5	0.259	69.6	137	1.9
PK00016-SL006	PK00016-000-1808-SL006	0.7-1.0		6.53	24,600	0.7	5.35	53.5	0.4	<0.1	3.5	0.134	4690	6.1	37.3	16.5	52.5	***40,200***	6.4	21.2	941	0.079	0.54	35.9	460	<0.5	<0.05	209	7.6	13.6	<0.05	0.36	<0.5	0.208	85	75.3	4
PK00016-SL007	PK00016-000-1808-SL007	0.2-0.4	2018-Aug-31	7.03	19,000	1.03	4.36	123	0.32	<0.1	3.1	0.366	7290	-	32.2	13.4	47.4	29,700	128	12.9	724	0.678	0.8	21	483	<0.5	0.064	181	-	25.3	<0.05	4.91	<0.5	0.292	74.6	365	1.02
PK00016-SL008	PK00016-000-1808-SL008	0.2-0.9		6.61	14,300	1.09	3.14	45.6	<0.2	<0.1	4.7	0.269	5550	10.4	14.9	4.24	16.8	17,200	80.8	5.3	239	<0.05	0.81	7.79	685	<0.5	<0.05	200	17.6	19.9	<0.05	3.4	<0.5	0.239	64.3	147	0.66
PK00016-SL009	PK00016-000-1808-SL009	0.2-0.5		5.12	10,500	0.3	2.59	31.5	<0.2	<0.1	2.8	<0.05	3320	-	11.5	4.01	13.3	12,100	6.74	5.4	224	<0.05	0.56	6.95	654	<0.5	<0.05	139	-	11.9	<0.05	0.49	<0.5	0.172	48.7	19.4	0.71
PK00016-SL010	PK00016-000-1808-SL010	0.4-0.8		5.8	18,400	0.52	5.2	53.5	0.23	0.12	3.3	0.128	6240	-	20.9	5.1	16.9	27,000	52.4	8.9	295	0.074	0.91	9.92	788	<0.5	<0.05	118	-	20.3	0.054	0.89	<0.5	0.275	95.6	71.2	1.65
PK00016-SL011	PK00016-000-1808-SL011	0.4-0.7		5.94	22,400	1.41	5.67	113	0.28	0.13	3.1	0.819	5050	-	28.4	6.87	55.1	31,000	107	13.2	420	0.143	1.02	12.1	628	<0.5	0.237	193	-	19.1	0.059	3.33	<0.5	0.37	***100***	229	1.02
PK00016-SL012	PK00016-000-1808-SL012	0.2-0.6		5	9350	0.24	2.72	40.8	<0.2	0.11	2.5	<0.05	1140	-	9.6	0.64	4.3	6270	10.6	<5	30.5	<0.05	0.77	1.62	1010	<0.5	<0.05	<100	-	5.94	<0.05	0.71	<0.5	0.194	57.7	12.5	0.87

BC CSR IL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Standards for Industrial Land Use (IL)
BC CSR CL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Commercial Land Use (CL)
BC CSR RLhd: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Residential (high density) Land Use (RLhd)
BC CSR RLld: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Residential (low density) Land Use (RLld)
BC CSR PL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Pakland Use (PL)
BC CSR AL: BC Contaminated Sites Regulation, Schedule 3.1 Part 2 Generic Numerical Soil Standards for Agricultural Land Use (AL)
Site-specific and mandatory factors include:
h = protection of human health
e = protection of ecological health
dw = groundwater used for drinking water
fw = groundwater flow to surface water used by freshwater aquatic life
i = intake of contaminated soil
m = groundwater flow to surface water used by marine aquatic life
t = toxicity to soil invertebrates and plants
lw = groundwater used for livestock watering (AL)
nli = livestock ingesting soil and fodder (AL)
rmm = major microbial functional impairment (AL)

YELLOW Concentration greater than applicable BC CSR standards

Protocol 4 = BC Minitry of Environment and Climate Strategy; Protocol 4 for Contaminated Sites - Determining Background Soil Quality; Table 1: Regional background soil quality estimates for inorganic substances, Region 1 - Vancouver Island

Italics and bold Concentration less than Protocol 4 regional background soil quality estimates for Vancouver Island

Notes:
m - metres
mg/kg - milligrams per kilogram
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• formatting of cells indicates exceedances of like-formatted standards
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HEPHs - EPHs19-32 minus PAH compounds: benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene and pyrene
VHsC6-C10 - volatile petroleum hydrocarbons (nC6-nC10)
VPHs - VHC6-C10 minus BETX and styrene
PAHs - polycyclic aromatic hydrocarbons

TABLE 4: LEACHATE ANALYTICAL RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS

				PAHs																	
				Naphthalene	2-Methylnaphthalene	Quinoline	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Acridine	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b&j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reportable Detection Limit				0.10	0.10	0.50	0.10	0.10	0.10	0.10	0.10	0.50	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.20	0.20
BC HWR				0.001																		
Sample Location	**Sample ID**	**Sample Depth (mbg)**	**Sample Date**																			
PK00016-SL007	PK00016-000-1808-SL007	0.2-0.4	2018-Aug-31	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20

BC HWR: BC Hazardous Waste Regulation, Schedule 4, Table 1 - Leachate Quality Standards

YELLOW Concentration greater than applicable BC HWR standards

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VHsC6-C10 - volatile petroleum hydrocarbons (nC6-nC10)
VPHs - VHC6-C10 minus BETX and styrene
PAHs - polycyclic aromatic hydrocarbons
B(a)P TPE (BC CSR)- benzo(a)pyrene toxicity potency equivalence; calculated by adding the concentrations of the following parameters multiplied by their TEF:
benz(a)anthracene[0.1], benzo(b+j)fluoranthene[0.1], benzo(k)fluoranthene[0.1], dibenzo(a,h)anthracene[1], indeno(1,2,3-cd)pyrene[0.1]
TEF - toxicity equivalent factor

TABLE 5: LEACHATE ANALYTICAL RESULTS - METALS

				Metals																		
				pH (Lab)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Boron (B)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Thallium (Tl)	Uranium (U)	Vanadium (V)	Zinc (Zn)	Zirconium
				pH_Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reportable Detection Limit						2.5	100		500	0.5	5	100			5	0.1									
BC HWR																									
Sample Location	Sample ID	Sample Depth (mbg)	Sample Date																						
PK00016-SL007	PK00016-000-1808-SL007	0.2-0.4	2018-Aug-31	7.49	<0.10	<0.10	0.74	<0.10	0.14	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.0020	<0.10	<0.10	<0.10	<0.010	<0.10	<0.10	<0.10	1.17	<0.10

BC HWR: BC Hazardous Waste Regulation, Schedule 4, Table 1 - Leachate Quality Standards

YELLOW Concentration greater than applicable BC HWR standards

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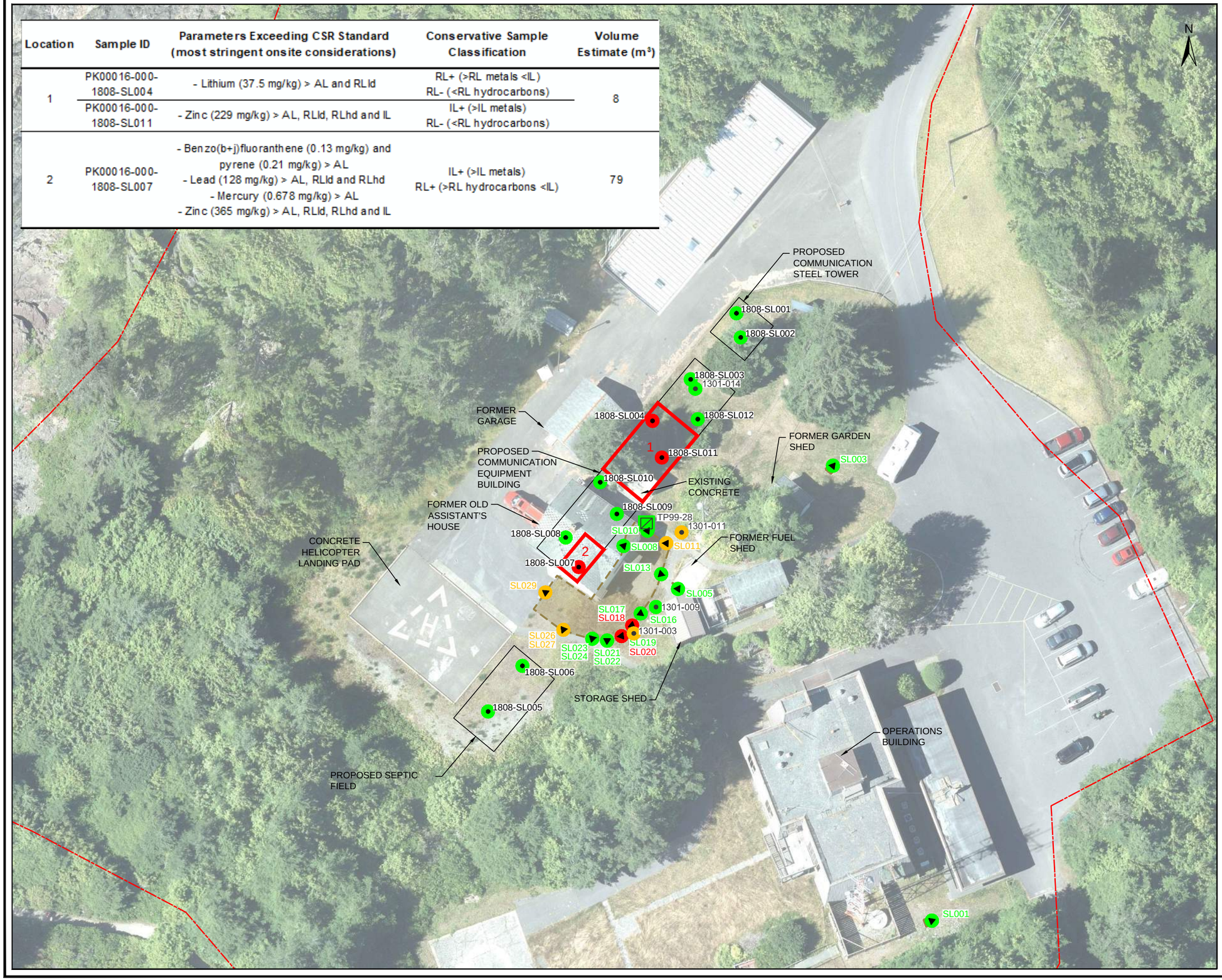
EPHs19-32 - heavy extractable petroleum hydrocarbons (nC19-nC32)
HEPHs - EPHs19-32 minus PAH compounds: benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene and pyrene
VHsC6-C10 - volatile petroleum hydrocarbons (nC6-nC10)
VPHs - VHC6-C10 minus BETX and styrene
PAHs - polycyclic aromatic hydrocarbons

Location	Sample ID	Parameters Exceeding CSR Standard (most stringent onsite considerations)	Conservative Sample Classification	Volume Estimate (m^3)
1	PK00016-000-1808-SL004	- Lithium (37.5 mg/kg) > AL and RLld	RL+ (>RL metals <IL) RL- (<RL hydrocarbons)	8
	PK00016-000-1808-SL011	- Zinc (229 mg/kg) > AL, RLld, RLhd and IL	IL+ (>IL metals) RL- (<RL hydrocarbons)	
2	PK00016-000-1808-SL007	- Benzo(b+j)fluoranthene (0.13 mg/kg) and pyrene (0.21 mg/kg) > AL - Lead (128 mg/kg) > AL, RLld and RLhd - Mercury (0.678 mg/kg) > AL - Zinc (365 mg/kg) > AL, RLld, RLhd and IL	IL+ (>IL metals) RL+ (>RL hydrocarbons <IL)	79



LEGEND

- APPROXIMATE SITE BOUNDARY
- SOIL SAMPLE (SLR)
- NOVEMBER 2016 EXCAVATION
- SLR SOIL SAMPLE, WALL
- SOIL SAMPLE (GOLDER)
- TEST PIT (GOLDER)
- SAMPLE CONCENTRATIONS LESS THAN APPLICABLE CSR AND/OR CCME GUIDELINES
- SAMPLE CONCENTRATIONS EXCEED APPLICABLE CCME GUIDELINES BUT DO NOT EXCEED CSR PROTOCOL 4 BACKGROUND CONCENTRATIONS
- SAMPLE CONCENTRATIONS EXCEED ONE OR MORE OF THE APPLICABLE CSR AND/OR CCME GUIDELINES
- METALS CONCENTRATIONS EXCEED APPLICABLE CSR IL+ STANDARDS

ABBREVIATIONS

CSR	CONTAMINATED SITES REGULATION
CCME	CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT
TP	TEST PIT SOIL SAMPLE

REFERENCES

IMAGERY OBTAINED DFO, FILE: 2016_07_28_Amphitrite_Point_PK00016_16bit.jpg

GOLDER ASSOCIATES 2013 LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT AND RISK ASSESSMENT REPORT

NOTES

1. SAMPLES WERE LABELLED USING THE DFO SAMPLING ID CRITERIA (2016) WITH THE FOLLOWING FORMAT, PAAAAAA-SSS-YYMM-XXNNN, WHERE:
   a. PAAAAAA-THE 7 DIGIT REAL PROPERTY SAFETY AND SECURITY SUPPORT SITE ID (I.E. PK00016);
   b. SSS- THREE DIGIT NUMBER REPRESENTS THE LOCATION (STATION) WHERE THE SAME WAS COLLECTED). FOR SITES WHERE THERE IS NO FIXED POINT TO RETURN TO- THE STATION ID SHOULD HAVE 000 INSERTED. NOTE EARLIER SAMPLES DO NOT INCLUDE AN SSS NUMBER AS THIS WAS NOT REQUIRED IN PREVIOUS DFO NAMING CRITERIA.
   c. YY- THIS 2 DIGIT NUMBER REPRESENTS THE YEAR THE SAMPLE LOCATION WAS CREATED (I.E. 16);
   d. MM- THIS 2 DIGIT NUMBER DENOTES THE MONTH THE SAMPLE LOCATION WAS CREATED (I.E. 11);
   e. XX- 2 LETTER CODE DESCRIBING THE MEDIA TYPE (I.E. SL FOR SOIL; NOTE EARLIER SAMPLES USE SO FOR SOIL AS THAT WAS THE LETTER CODE AT THAT TIME); AND
   f. NNN- 3 DIGIT UNIQUELY IDENTIFYING SAMPLES TAKEN DURING THE SAME SITE VISIT (I.E. 001-007). THE SAMPLE DUPLICATE IS NAMED WITH THE 900 SERIES.

FOR 2016 SAMPLING:

2. THE SAMPLE NAMES HAVE BEEN SHORTENED ON THE FIGURE TO SHOW ONLY XX-NNN BECAUSE THEY ALL HAVE THE SAME NAME (PK000-1611).

FOR 2013 AND 2018 SAMPLING:

3. THE SAMPLE NAMES ON THE FIGURE HAVE BEEN SHORTENED BECAUSE THEY ALL BEGIN WITH PK00016

4. SSS- REPRESENTS THE LOCATION (STATION) WHERE THE SAMPLE WAS COLLECTED. FOR SITES WITH NO FIXED POINT TO RETURN TO, THE STATION ID SHOULD HAVE (000) INSERTED.

Scale 1:500

10 5 0 5 10 metres

Title: SOIL SAMPLE LOCATIONS

Project: SOIL CHARACTERIZATION
MCTS TOFINO - AMPHITRITE POINT
250 COAST GUARD DRIVE
UCLUELET, BC

Client: FISHERIES AND OCEANS CANADA PACIFIC REGION
REAL PROPERTY AND TECHNICAL SUPPORT DIVISION

DRAWN BY:	CHECKED BY:	PLOT SIZE:	Date:
IHO	IS	11X17"	SEPTEMBER 2018

SLR global environmental solutions

FIGURE 1

1855-1001/CAD/NR-SG/S_205-03953-00000-A1.dwg

Your P.O. #: VIC2924
Your Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your C.O.C. #: 564062-01-01, 08457573

Attention: Roberto Prieto

SLR CONSULTING (CANADA) LTD
#303-3960 Quadra Street
VICTORIA, BC
CANADA V8X 4A3

Report Date: 2018/09/17
Report #: R2620151
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B874856
Received: 2018/09/01, 09:05

Sample Matrix: Soil
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/MTBE LH VH F1 in Soil - Field Pres. (1)	4	N/A	2018/09/05	BBY8SOP-00010/11/12	BCMOE BCLM Jul 2017
BTEX/MTBE LH VH F1 in Soil - Field Pres. (1)	8	N/A	2018/09/06	BBY8SOP-00010/11/12	BCMOE BCLM Jul 2017
Chloride (soluble)	3	2018/09/06	2018/09/06	BBY6SOP-00011	SM 22 4500-Cl- E m
Soluble Chloride Ion Calc. (mg/kg)	3	N/A	2018/09/06	BBY WI-00033	Auto Calc
Elements by ICPMS (total)	12	2018/09/06	2018/09/07	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Metals - TCLP	1	2018/09/13	2018/09/14	BBY7SOP-00005,	EPA 1311, 6020bR2 m
Moisture	12	2018/09/05	2018/09/05	BBY8SOP-00017	BCMOE BCLM Dec2000 m
Soluble Sodium Ion Calc. (mg/kg)	3	N/A	2018/09/06	BBY WI-00033	Auto Calc
PAH in TCLP Leachate by GC/MS (SIM)	1	2018/09/14	2018/09/14	BBY7SOP-00005,	BCMOE BCLM Jul2017m
PAH in Soil by GC/MS (SIM)	12	2018/09/05	2018/09/05	BBY8SOP-00022	BCMOE BCLM Jul2017m
Total LMW, HMW, Total PAH Calc (2)	1	N/A	2018/09/17	BBY WI-00033	Auto Calc
Total PAH and B(a)P Calculation (3)	12	N/A	2018/09/06	BBY WI-00033	Auto Calc
pH (2:1 DI Water Extract)	12	2018/09/07	2018/09/07	BBY6SOP-00028	BCMOE BCLM Mar2005 m
TCLP pH Measurements	1	N/A	2018/09/14	BBY7SOP-00005	EPA 1311
Saturated Paste	3	2018/09/06	2018/09/06	BBY6SOP-00030	BC Lab Manual 2015
Soluble Cations (Ca,K,Mg,Na,S)	3	N/A	2018/09/06	BBY7SOP-00018,	EPA 6010c R3 m
EPH less PAH in Soil By GC/FID (4)	12	N/A	2018/09/06	BBY WI-00033	Auto Calc
EPH in Soil by GC/FID	12	2018/09/05	2018/09/05	BBY8SOP-00029	BCMOE BCLM Jul 2016
Volatile HC-BTEX for Soil (5)	12	N/A	2018/09/06	BBY WI-00033	Auto Calc

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed

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Report Date: 2018/09/17
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CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B874856
Received: 2018/09/01, 09:05

or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) The extraction date for VOC, BTEX, VH, or F1 samples that are field preserved with methanol equals the date sampled, unless otherwise stated.
(2) Total PAHs include: Quinoline, Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Acridine, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b&j)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene.
(3) Total PAHs in Soil include: Quinoline, Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Acridine, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b&j)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene.

Total PAHs in Sediment include: Naphthalene, 2-Methylnaphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(a)pyrene, and Dibenz(a,h)anthracene.
(4) LEPH = EPH (C10 to C19) - (Naphthalene + Phenanthrene)
HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Benzo(b)fluoranthene + Benzo(k)fluoranthene + Dibenz(a,h)anthracene + Indeno(1,2,3-cd)pyrene + Pyrene)
(5) VPH = VH - (Benzene + Toluene + Ethylbenzene + m & p-Xylene + o-Xylene + Styrene)

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Safiann Maiter, Sr Project Manager
Email: smaiter@maxxam.ca
Phone# (604) 734 7276
==========
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		UF4640		
Sampling Date		2018/08/31 11:00		
COC Number		564062-01-01		
	UNITS	**PK900016-000-1808-SL007**	**RDL**	**QC Batch**
Calculated Parameters				
Leachate Low Molecular Weight PAH`s	ug/L	<0.50	0.50	9138368
Leachate High Molecular Weight PAH`s	ug/L	<0.20	0.20	9138368
Leachate Total PAH	ug/L	<0.50	0.50	9138368
RDL = Reportable Detection Limit				

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

PHYSICAL TESTING (SOIL)

Maxxam ID		UF4634	UF4635	UF4636		
Sampling Date		2018/08/30 11:00	2018/08/30 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL001**	**PK900016-000-1808-SL002**	**PK900016-000-1808-SL003**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	20	14	8.0	0.30	9129691
RDL = Reportable Detection Limit						

Maxxam ID		UF4637	UF4638	UF4639		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL004**	**PK900016-000-1808-SL005**	**PK900016-000-1808-SL006**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	28	13	5.1	0.30	9129691
RDL = Reportable Detection Limit						

Maxxam ID		UF4640	UF4641	UF4642		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL007**	**PK900016-000-1808-SL008**	**PK900016-000-1808-SL009**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	7.6	23	32	0.30	9129691
RDL = Reportable Detection Limit						

Maxxam ID		UF4643	UF4644	UF4645		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	08457573	08457573		
	UNITS	**PK900016-000-1808-SL010**	**PK900016-000-1808-SL011**	**PK900016-000-1808-SL012**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	26	20	17	0.30	9129691
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		UF4640		
Sampling Date		2018/08/31 11:00		
COC Number		564062-01-01		
	UNITS	**PK900016-000-1808-SL007**	**RDL**	**QC Batch**
Polycyclic Aromatics				
Leachate Naphthalene	ug/L	<0.10	0.10	9143103
Leachate 2-Methylnaphthalene	ug/L	<0.10	0.10	9143103
Leachate Quinoline	ug/L	<0.50	0.50	9143103
Leachate Acenaphthylene	ug/L	<0.10	0.10	9143103
Leachate Acenaphthene	ug/L	<0.10	0.10	9143103
Leachate Fluorene	ug/L	<0.10	0.10	9143103
Leachate Phenanthrene	ug/L	<0.10	0.10	9143103
Leachate Anthracene	ug/L	<0.10	0.10	9143103
Leachate Acridine	ug/L	<0.50	0.50	9143103
Leachate Fluoranthene	ug/L	<0.10	0.10	9143103
Leachate Pyrene	ug/L	<0.10	0.10	9143103
Leachate Benzo(a)anthracene	ug/L	<0.10	0.10	9143103
Leachate Chrysene	ug/L	<0.10	0.10	9143103
Leachate Benzo(b&j)fluoranthene	ug/L	<0.10	0.10	9143103
Leachate Benzo(k)fluoranthene	ug/L	<0.10	0.10	9143103
Leachate Benzo(a)pyrene	ug/L	<0.10	0.10	9143103
Leachate Indeno(1,2,3-cd)pyrene	ug/L	<0.20	0.20	9143103
Leachate Dibenz(a,h)anthracene	ug/L	<0.20	0.20	9143103
Leachate Benzo(g,h,i)perylene	ug/L	<0.20	0.20	9143103
Surrogate Recovery (%)				
Leachate D10-ANTHRACENE (sur.)	%	102		9143103
Leachate D8-ACENAPHTHYLENE (sur.)	%	94		9143103
Leachate D8-NAPHTHALENE (sur.)	%	108		9143103
Leachate TERPHENYL-D14 (sur.)	%	107		9143103
RDL = Reportable Detection Limit				

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Client Project #: 205.03953.00000.0001
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Your P.O. #: VIC2924
Sampler Initials: N/A

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		UF4640	
Sampling Date		2018/08/31 11:00	
COC Number		564062-01-01	
	UNITS	**PK900016-000-1808-SL007**	**QC Batch**
TCLP Extraction Procedure			
Initial pH of Sample	pH	7.49	9142159
pH after HCl	pH	1.25	9142159
Final pH of Leachate	pH	5.01	9142159
pH of Leaching Fluid	pH	4.95	9142159

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SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR BTEX/VPH IN SOIL - FIELD PRESERVED (SOIL)

Maxxam ID		UF4634	UF4635	UF4636		
Sampling Date		2018/08/30 11:00	2018/08/30 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL001**	**PK900016-000-1808-SL002**	**PK900016-000-1808-SL003**	**RDL**	**QC Batch**
Calculated Parameters						
VPH (VHW6 to 10 - BTEX)	mg/kg	<10	<10	<10	10	9128181
Volatiles						
Methyl-tert-butylether (MTBE)	mg/kg	<0.10	<0.10	<0.10	0.10	9130448
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	9130448
Toluene	mg/kg	<0.020	<0.020	<0.020	0.020	9130448
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	0.010	9130448
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
o-Xylene	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
Styrene	mg/kg	<0.030	<0.030	<0.030	0.030	9130448
Xylenes (Total)	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
VH C6-C10	mg/kg	<10	<10	<10	10	9130448
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	100	100	99		9130448
4-Bromofluorobenzene (sur.)	%	105	105	104		9130448
D10-ETHYLBENZENE (sur.)	%	109	108	108		9130448
D4-1,2-Dichloroethane (sur.)	%	118	118	117		9130448

RDL = Reportable Detection Limit

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR BTEX/VPH IN SOIL - FIELD PRESERVED (SOIL)

Maxxam ID		UF4637	UF4638	UF4639		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL004**	**PK900016-000-1808-SL005**	**PK900016-000-1808-SL006**	**RDL**	**QC Batch**
Calculated Parameters						
VPH (VHW6 to 10 - BTEX)	mg/kg	<10	<10	<10	10	9128181
Volatiles						
Methyl-tert-butylether (MTBE)	mg/kg	<0.10	<0.10	<0.10	0.10	9130448
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	9130448
Toluene	mg/kg	<0.020	<0.020	<0.020	0.020	9130448
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	0.010	9130448
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
o-Xylene	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
Styrene	mg/kg	<0.030	<0.030	<0.030	0.030	9130448
Xylenes (Total)	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
VH C6-C10	mg/kg	<10	<10	<10	10	9130448
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	99	98	99		9130448
4-Bromofluorobenzene (sur.)	%	104	104	105		9130448
D10-ETHYLBENZENE (sur.)	%	113	104	106		9130448
D4-1,2-Dichloroethane (sur.)	%	115	117	120		9130448

RDL = Reportable Detection Limit

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SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR BTEX/VPH IN SOIL - FIELD PRESERVED (SOIL)

Maxxam ID		UF4640	UF4641	UF4642		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL007**	**PK900016-000-1808-SL008**	**PK900016-000-1808-SL009**	**RDL**	**QC Batch**
Calculated Parameters						
VPH (VHW6 to 10 - BTEX)	mg/kg	<10	<10	<10	10	9128181
Volatiles						
Methyl-tert-butylether (MTBE)	mg/kg	<0.10	<0.10	<0.10	0.10	9130448
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	9130448
Toluene	mg/kg	<0.020	<0.020	<0.020	0.020	9130448
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	0.010	9130448
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
o-Xylene	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
Styrene	mg/kg	<0.030	<0.030	<0.030	0.030	9130448
Xylenes (Total)	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
VH C6-C10	mg/kg	<10	<10	<10	10	9130448
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	97	98	90		9130448
4-Bromofluorobenzene (sur.)	%	104	105	104		9130448
D10-ETHYLBENZENE (sur.)	%	107	110	111		9130448
D4-1,2-Dichloroethane (sur.)	%	117	117	111		9130448

RDL = Reportable Detection Limit

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR BTEX/VPH IN SOIL - FIELD PRESERVED (SOIL)

Maxxam ID		UF4643	UF4644	UF4645		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	08457573	08457573		
	UNITS	**PK900016-000-1808-SL010**	**PK900016-000-1808-SL011**	**PK900016-000-1808-SL012**	**RDL**	**QC Batch**
Calculated Parameters						
VPH (VHW6 to 10 - BTEX)	mg/kg	<10	<10	<10	10	9128181
Volatiles						
Methyl-tert-butylether (MTBE)	mg/kg	<0.10	<0.10	<0.10	0.10	9130448
Benzene	mg/kg	<0.0050	<0.0050	0.018	0.0050	9130448
Toluene	mg/kg	<0.020	0.027	<0.020	0.020	9130448
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	0.010	9130448
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
o-Xylene	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
Styrene	mg/kg	<0.030	<0.030	<0.030	0.030	9130448
Xylenes (Total)	mg/kg	<0.040	<0.040	<0.040	0.040	9130448
VH C6-C10	mg/kg	<10	<10	<10	10	9130448
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	91	98	98		9130448
4-Bromofluorobenzene (sur.)	%	106	104	105		9130448
D10-ETHYLBENZENE (sur.)	%	110	109	111		9130448
D4-1,2-Dichloroethane (sur.)	%	108	120	117		9130448
RDL = Reportable Detection Limit						

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Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

LEPH & HEPH WITH PAH FOR CSR IN SOIL (SOIL)

Maxxam ID		UF4634	UF4635	UF4636		
Sampling Date		2018/08/30 11:00	2018/08/30 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL001**	**PK900016-000-1808-SL002**	**PK900016-000-1808-SL003**	**RDL**	**QC Batch**
Calculated Parameters						
Low Molecular Weight PAH`s	mg/kg	<0.050	<0.050	<0.050	0.050	9128206
High Molecular Weight PAH`s	mg/kg	<0.050	<0.050	<0.050	0.050	9128206
Total PAH	mg/kg	<0.050	<0.050	<0.050	0.050	9128206
Polycyclic Aromatics						
Quinoline	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Naphthalene	mg/kg	<0.010	<0.010	<0.010	0.010	9130136
1-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
2-Methylnaphthalene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	9130136
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	9130136
Fluorene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Phenanthrene	mg/kg	<0.010	<0.010	<0.010	0.010	9130136
Anthracene	mg/kg	<0.0040	<0.0040	<0.0040	0.0040	9130136
Acridine	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Pyrene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(a)anthracene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Chrysene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(b&j)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(b)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(j)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(k)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(a)pyrene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Indeno(1,2,3-cd)pyrene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Dibenz(a,h)anthracene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(g,h,i)perylene	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Calculated Parameters						
LEPH (C10-C19 less PAH)	mg/kg	<100	<100	<100	100	9128209
HEPH (C19-C32 less PAH)	mg/kg	120	250	110	100	9128209
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

LEPH & HEPH WITH PAH FOR CSR IN SOIL (SOIL)

Maxxam ID		UF4634	UF4635	UF4636		
Sampling Date		2018/08/30 11:00	2018/08/30 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL001**	**PK900016-000-1808-SL002**	**PK900016-000-1808-SL003**	**RDL**	**QC Batch**
Hydrocarbons						
EPH (C10-C19)	mg/kg	<100	<100	<100	100	9130143
EPH (C19-C32)	mg/kg	120	250	110	100	9130143
Surrogate Recovery (%)						
D10-ANTHRACENE (sur.)	%	89	91	86		9130136
D8-ACENAPHTHYLENE (sur.)	%	83	79	83		9130136
D8-NAPHTHALENE (sur.)	%	79	80	81		9130136
TERPHENYL-D14 (sur.)	%	97	97	96		9130136
O-TERPHENYL (sur.)	%	90	92	89		9130143
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

LEPH & HEPH WITH PAH FOR CSR IN SOIL (SOIL)

Maxxam ID		UF4637	UF4638	UF4639		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL004**	**PK900016-000-1808-SL005**	**PK900016-000-1808-SL006**	**RDL**	**QC Batch**
Calculated Parameters						
Low Molecular Weight PAH`s	mg/kg	<0.050	<0.050	<0.050	0.050	9128206
High Molecular Weight PAH`s	mg/kg	<0.050	<0.050	<0.050	0.050	9128206
Total PAH	mg/kg	<0.050	<0.050	<0.050	0.050	9128206
Polycyclic Aromatics						
Quinoline	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Naphthalene	mg/kg	<0.010	<0.010	<0.010	0.010	9130136
1-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
2-Methylnaphthalene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	9130136
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	9130136
Fluorene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Phenanthrene	mg/kg	<0.010	<0.010	<0.010	0.010	9130136
Anthracene	mg/kg	<0.0040	<0.0040	<0.0040	0.0040	9130136
Acridine	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Pyrene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(a)anthracene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Chrysene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(b&j)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(b)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(j)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(k)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(a)pyrene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Indeno(1,2,3-cd)pyrene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Dibenz(a,h)anthracene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(g,h,i)perylene	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Calculated Parameters						
LEPH (C10-C19 less PAH)	mg/kg	<100	<100	<100	100	9128209
HEPH (C19-C32 less PAH)	mg/kg	<100	<100	<100	100	9128209
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

LEPH & HEPH WITH PAH FOR CSR IN SOIL (SOIL)

Maxxam ID		UF4637	UF4638	UF4639		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL004**	**PK900016-000-1808-SL005**	**PK900016-000-1808-SL006**	**RDL**	**QC Batch**
Hydrocarbons						
EPH (C10-C19)	mg/kg	<100	<100	<100	100	9130143
EPH (C19-C32)	mg/kg	<100	<100	<100	100	9130143
Surrogate Recovery (%)						
D10-ANTHRACENE (sur.)	%	88	81	85		9130136
D8-ACENAPHTHYLENE (sur.)	%	82	81	82		9130136
D8-NAPHTHALENE (sur.)	%	82	79	77		9130136
TERPHENYL-D14 (sur.)	%	97	94	96		9130136
O-TERPHENYL (sur.)	%	91	90	89		9130143
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

LEPH & HEPH WITH PAH FOR CSR IN SOIL (SOIL)

Maxxam ID		UF4640	UF4641	UF4642		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL007**	**PK900016-000-1808-SL008**	**PK900016-000-1808-SL009**	**RDL**	**QC Batch**
Calculated Parameters						
Low Molecular Weight PAH`s	mg/kg	0.088	<0.050	<0.050	0.050	9128206
High Molecular Weight PAH`s	mg/kg	1.0	0.13	<0.050	0.050	9128206
Total PAH	mg/kg	1.1	0.13	<0.050	0.050	9128206
Polycyclic Aromatics						
Quinoline	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Naphthalene	mg/kg	<0.010	<0.010	<0.010	0.010	9130136
1-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
2-Methylnaphthalene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Acenaphthylene	mg/kg	0.0081	<0.0050	<0.0050	0.0050	9130136
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	9130136
Fluorene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Phenanthrene	mg/kg	0.065	<0.010	<0.010	0.010	9130136
Anthracene	mg/kg	0.014	<0.0040	<0.0040	0.0040	9130136
Acridine	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Fluoranthene	mg/kg	0.22	0.039	<0.020	0.020	9130136
Pyrene	mg/kg	0.21	0.049	<0.020	0.020	9130136
Benzo(a)anthracene	mg/kg	0.098	<0.020	<0.020	0.020	9130136
Chrysene	mg/kg	0.11	0.024	<0.020	0.020	9130136
Benzo(b&j)fluoranthene	mg/kg	0.13	<0.020	<0.020	0.020	9130136
Benzo(b)fluoranthene	mg/kg	0.079	<0.020	<0.020	0.020	9130136
Benzo(j)fluoranthene	mg/kg	0.049	<0.020	<0.020	0.020	9130136
Benzo(k)fluoranthene	mg/kg	0.046	<0.020	<0.020	0.020	9130136
Benzo(a)pyrene	mg/kg	0.097	0.021	<0.020	0.020	9130136
Indeno(1,2,3-cd)pyrene	mg/kg	0.054	<0.020	<0.020	0.020	9130136
Dibenz(a,h)anthracene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(g,h,i)perylene	mg/kg	0.063	<0.050	<0.050	0.050	9130136
Calculated Parameters						
LEPH (C10-C19 less PAH)	mg/kg	<100	<100	<100	100	9128209
HEPH (C19-C32 less PAH)	mg/kg	<100	<100	200	100	9128209
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

LEPH & HEPH WITH PAH FOR CSR IN SOIL (SOIL)

Maxxam ID		UF4640	UF4641	UF4642		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL007**	**PK900016-000-1808-SL008**	**PK900016-000-1808-SL009**	**RDL**	**QC Batch**
Hydrocarbons						
EPH (C10-C19)	mg/kg	<100	<100	<100	100	9130143
EPH (C19-C32)	mg/kg	<100	<100	200	100	9130143
Surrogate Recovery (%)						
D10-ANTHRACENE (sur.)	%	84	84	86		9130136
D8-ACENAPHTHYLENE (sur.)	%	84	81	84		9130136
D8-NAPHTHALENE (sur.)	%	80	77	82		9130136
TERPHENYL-D14 (sur.)	%	91	93	94		9130136
O-TERPHENYL (sur.)	%	89	90	90		9130143
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

LEPH & HEPH WITH PAH FOR CSR IN SOIL (SOIL)

Maxxam ID		UF4643	UF4644	UF4645		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	08457573	08457573		
	UNITS	**PK900016-000-1808-SL010**	**PK900016-000-1808-SL011**	**PK900016-000-1808-SL012**	**RDL**	**QC Batch**
Calculated Parameters						
Low Molecular Weight PAH`s	mg/kg	<0.050	<0.050	<0.050	0.050	9128206
High Molecular Weight PAH`s	mg/kg	<0.050	0.24	<0.050	0.050	9128206
Total PAH	mg/kg	<0.050	0.26	<0.050	0.050	9128206
Polycyclic Aromatics						
Quinoline	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Naphthalene	mg/kg	<0.010	<0.010	<0.010	0.010	9130136
1-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
2-Methylnaphthalene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Acenaphthylene	mg/kg	<0.0050	0.013	<0.0050	0.0050	9130136
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	9130136
Fluorene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Phenanthrene	mg/kg	<0.010	<0.010	<0.010	0.010	9130136
Anthracene	mg/kg	<0.0040	0.0091	<0.0040	0.0040	9130136
Acridine	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Fluoranthene	mg/kg	<0.020	0.032	<0.020	0.020	9130136
Pyrene	mg/kg	<0.020	0.043	<0.020	0.020	9130136
Benzo(a)anthracene	mg/kg	<0.020	0.026	<0.020	0.020	9130136
Chrysene	mg/kg	<0.020	0.032	<0.020	0.020	9130136
Benzo(b&j)fluoranthene	mg/kg	<0.020	0.034	<0.020	0.020	9130136
Benzo(b)fluoranthene	mg/kg	<0.020	0.034	<0.020	0.020	9130136
Benzo(j)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(k)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(a)pyrene	mg/kg	<0.020	0.041	<0.020	0.020	9130136
Indeno(1,2,3-cd)pyrene	mg/kg	<0.020	0.030	<0.020	0.020	9130136
Dibenz(a,h)anthracene	mg/kg	<0.020	<0.020	<0.020	0.020	9130136
Benzo(g,h,i)perylene	mg/kg	<0.050	<0.050	<0.050	0.050	9130136
Calculated Parameters						
LEPH (C10-C19 less PAH)	mg/kg	<100	<100	<100	100	9128209
HEPH (C19-C32 less PAH)	mg/kg	110	170	110	100	9128209
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

LEPH & HEPH WITH PAH FOR CSR IN SOIL (SOIL)

Maxxam ID		UF4643	UF4644	UF4645		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	08457573	08457573		
	UNITS	**PK900016-000-1808-SL010**	**PK900016-000-1808-SL011**	**PK900016-000-1808-SL012**	**RDL**	**QC Batch**
Hydrocarbons						
EPH (C10-C19)	mg/kg	<100	<100	<100	100	9130143
EPH (C19-C32)	mg/kg	110	170	110	100	9130143
Surrogate Recovery (%)						
D10-ANTHRACENE (sur.)	%	85	89	86		9130136
D8-ACENAPHTHYLENE (sur.)	%	85	82	84		9130136
D8-NAPHTHALENE (sur.)	%	81	81	82		9130136
TERPHENYL-D14 (sur.)	%	95	95	95		9130136
O-TERPHENYL (sur.)	%	90	90	90		9130143
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF4634	UF4635	UF4636		
Sampling Date		2018/08/30 11:00	2018/08/30 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL001**	**PK900016-000-1808-SL002**	**PK900016-000-1808-SL003**	**RDL**	**QC Batch**
Physical Properties						
Soluble (2:1) pH	pH	5.50	5.57	5.71	N/A	9131916
Total Metals by ICPMS						
Total Aluminum (Al)	mg/kg	30800	22100	23800	100	9131910
Total Antimony (Sb)	mg/kg	0.98	0.60	0.93	0.10	9131910
Total Arsenic (As)	mg/kg	6.16	4.64	5.55	0.50	9131910
Total Barium (Ba)	mg/kg	29.9	36.4	47.1	0.10	9131910
Total Beryllium (Be)	mg/kg	0.28	0.27	0.34	0.20	9131910
Total Bismuth (Bi)	mg/kg	<0.10	<0.10	<0.10	0.10	9131910
Total Boron (B)	mg/kg	3.6	3.3	3.0	1.0	9131910
Total Cadmium (Cd)	mg/kg	0.119	0.136	0.106	0.050	9131910
Total Calcium (Ca)	mg/kg	3030	4000	4620	100	9131910
Total Chromium (Cr)	mg/kg	37.5	25.7	32.0	1.0	9131910
Total Cobalt (Co)	mg/kg	10.2	7.48	12.1	0.30	9131910
Total Copper (Cu)	mg/kg	39.7	28.7	41.4	0.50	9131910
Total Iron (Fe)	mg/kg	32100	24500	30700	100	9131910
Total Lead (Pb)	mg/kg	16.0	16.6	10.1	0.10	9131910
Total Lithium (Li)	mg/kg	16.7	11.9	11.6	5.0	9131910
Total Manganese (Mn)	mg/kg	424	359	960	0.20	9131910
Total Mercury (Hg)	mg/kg	0.124	0.136	0.092	0.050	9131910
Total Molybdenum (Mo)	mg/kg	0.83	0.70	0.71	0.10	9131910
Total Nickel (Ni)	mg/kg	22.8	16.2	22.6	0.80	9131910
Total Phosphorus (P)	mg/kg	801	544	644	10	9131910
Total Potassium (K)	mg/kg	505	527	561	100	9131910
Total Selenium (Se)	mg/kg	0.75	0.54	<0.50	0.50	9131910
Total Silver (Ag)	mg/kg	0.070	<0.050	<0.050	0.050	9131910
Total Sodium (Na)	mg/kg	180	191	169	100	9131910
Total Strontium (Sr)	mg/kg	12.4	16.4	18.2	0.10	9131910
Total Thallium (Tl)	mg/kg	<0.050	<0.050	<0.050	0.050	9131910
Total Tin (Sn)	mg/kg	1.01	1.47	0.55	0.10	9131910
Total Tungsten (W)	mg/kg	<0.50	<0.50	<0.50	0.50	9131910

RDL = Reportable Detection Limit
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF4634	UF4635	UF4636		
Sampling Date		2018/08/30 11:00	2018/08/30 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL001**	**PK900016-000-1808-SL002**	**PK900016-000-1808-SL003**	**RDL**	**QC Batch**
Total Uranium (U)	mg/kg	0.403	0.338	0.339	0.050	9131910
Total Vanadium (V)	mg/kg	91.5	78.4	97.3	2.0	9131910
Total Zinc (Zn)	mg/kg	80.1	53.3	64.1	1.0	9131910
Total Zirconium (Zr)	mg/kg	0.68	1.24	0.83	0.50	9131910
RDL = Reportable Detection Limit						

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Your P.O. #: VIC2924
Sampler Initials: N/A

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF4637	UF4638	UF4639		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL004**	**PK900016-000-1808-SL005**	**PK900016-000-1808-SL006**	**RDL**	**QC Batch**
Physical Properties						
Soluble (2:1) pH	pH	5.42	6.84	6.53	N/A	9131916
Total Metals by ICPMS						
Total Aluminum (Al)	mg/kg	35000	25200	24600	100	9131910
Total Antimony (Sb)	mg/kg	0.38	0.70	0.70	0.10	9131910
Total Arsenic (As)	mg/kg	5.24	4.35	5.35	0.50	9131910
Total Barium (Ba)	mg/kg	42.1	238	53.5	0.10	9131910
Total Beryllium (Be)	mg/kg	0.27	0.36	0.40	0.20	9131910
Total Bismuth (Bi)	mg/kg	0.15	<0.10	<0.10	0.10	9131910
Total Boron (B)	mg/kg	3.5	3.7	3.5	1.0	9131910
Total Cadmium (Cd)	mg/kg	0.072	0.132	0.134	0.050	9131910
Total Calcium (Ca)	mg/kg	3230	10500	4690	100	9131910
Total Chromium (Cr)	mg/kg	35.3	26.3	37.3	1.0	9131910
Total Cobalt (Co)	mg/kg	6.13	14.8	16.5	0.30	9131910
Total Copper (Cu)	mg/kg	22.3	49.0	52.5	0.50	9131910
Total Iron (Fe)	mg/kg	39800	27800	40200	100	9131910
Total Lead (Pb)	mg/kg	10.5	18.5	6.40	0.10	9131910
Total Lithium (Li)	mg/kg	37.5	15.0	21.2	5.0	9131910
Total Manganese (Mn)	mg/kg	298	751	941	0.20	9131910
Total Mercury (Hg)	mg/kg	0.115	0.425	0.079	0.050	9131910
Total Molybdenum (Mo)	mg/kg	1.53	0.84	0.54	0.10	9131910
Total Nickel (Ni)	mg/kg	13.9	23.5	35.9	0.80	9131910
Total Phosphorus (P)	mg/kg	243	610	700	10	9131910
Total Potassium (K)	mg/kg	784	767	460	100	9131910
Total Selenium (Se)	mg/kg	0.82	<0.50	<0.50	0.50	9131910
Total Silver (Ag)	mg/kg	<0.050	<0.050	<0.050	0.050	9131910
Total Sodium (Na)	mg/kg	128	746	209	100	9131910
Total Strontium (Sr)	mg/kg	17.4	73.8	13.6	0.10	9131910
Total Thallium (Tl)	mg/kg	0.091	0.052	<0.050	0.050	9131910
Total Tin (Sn)	mg/kg	0.92	0.96	0.36	0.10	9131910
Total Tungsten (W)	mg/kg	<0.50	<0.50	<0.50	0.50	9131910

RDL = Reportable Detection Limit
N/A = Not Applicable

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF4637	UF4638	UF4639		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL004**	**PK900016-000-1808-SL005**	**PK900016-000-1808-SL006**	**RDL**	**QC Batch**
Total Uranium (U)	mg/kg	0.566	0.259	0.208	0.050	9131910
Total Vanadium (V)	mg/kg	151	69.6	85.0	2.0	9131910
Total Zinc (Zn)	mg/kg	49.4	137	75.3	1.0	9131910
Total Zirconium (Zr)	mg/kg	1.50	1.90	4.00	0.50	9131910
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF4640	UF4641	UF4642		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL007**	**PK900016-000-1808-SL008**	**PK900016-000-1808-SL009**	**RDL**	**QC Batch**
Physical Properties						
Soluble (2:1) pH	pH	7.03	6.61	5.12	N/A	9131916
Total Metals by ICPMS						
Total Aluminum (Al)	mg/kg	19000	14300	10500	100	9131910
Total Antimony (Sb)	mg/kg	1.03	1.09	0.30	0.10	9131910
Total Arsenic (As)	mg/kg	4.36	3.14	2.59	0.50	9131910
Total Barium (Ba)	mg/kg	123	45.6	31.5	0.10	9131910
Total Beryllium (Be)	mg/kg	0.32	<0.20	<0.20	0.20	9131910
Total Bismuth (Bi)	mg/kg	<0.10	<0.10	<0.10	0.10	9131910
Total Boron (B)	mg/kg	3.1	4.7	2.8	1.0	9131910
Total Cadmium (Cd)	mg/kg	0.366	0.269	<0.050	0.050	9131910
Total Calcium (Ca)	mg/kg	7290	5550	3320	100	9131910
Total Chromium (Cr)	mg/kg	32.2	14.9	11.5	1.0	9131910
Total Cobalt (Co)	mg/kg	13.4	4.24	4.01	0.30	9131910
Total Copper (Cu)	mg/kg	47.4	16.8	13.3	0.50	9131910
Total Iron (Fe)	mg/kg	29700	17200	12100	100	9131910
Total Lead (Pb)	mg/kg	128	80.8	6.74	0.10	9131910
Total Lithium (Li)	mg/kg	12.9	5.3	5.4	5.0	9131910
Total Manganese (Mn)	mg/kg	724	239	224	0.20	9131910
Total Mercury (Hg)	mg/kg	0.678	<0.050	<0.050	0.050	9131910
Total Molybdenum (Mo)	mg/kg	0.80	0.81	0.56	0.10	9131910
Total Nickel (Ni)	mg/kg	21.0	7.79	6.95	0.80	9131910
Total Phosphorus (P)	mg/kg	706	297	287	10	9131910
Total Potassium (K)	mg/kg	483	685	654	100	9131910
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	0.50	9131910
Total Silver (Ag)	mg/kg	0.064	<0.050	<0.050	0.050	9131910
Total Sodium (Na)	mg/kg	181	200	139	100	9131910
Total Strontium (Sr)	mg/kg	25.3	19.9	11.9	0.10	9131910
Total Thallium (Tl)	mg/kg	<0.050	<0.050	<0.050	0.050	9131910
Total Tin (Sn)	mg/kg	4.91	3.40	0.49	0.10	9131910
Total Tungsten (W)	mg/kg	<0.50	<0.50	<0.50	0.50	9131910

RDL = Reportable Detection Limit
N/A = Not Applicable

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF4640	UF4641	UF4642		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	564062-01-01	564062-01-01		
	UNITS	**PK900016-000-1808-SL007**	**PK900016-000-1808-SL008**	**PK900016-000-1808-SL009**	**RDL**	**QC Batch**
Total Uranium (U)	mg/kg	0.292	0.239	0.172	0.050	9131910
Total Vanadium (V)	mg/kg	74.6	64.3	48.7	2.0	9131910
Total Zinc (Zn)	mg/kg	365	147	19.4	1.0	9131910
Total Zirconium (Zr)	mg/kg	1.02	0.66	0.71	0.50	9131910
RDL = Reportable Detection Limit						

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF4643	UF4644	UF4645		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	08457573	08457573		
	UNITS	**PK900016-000-1808-SL010**	**PK900016-000-1808-SL011**	**PK900016-000-1808-SL012**	**RDL**	**QC Batch**
Physical Properties						
Soluble (2:1) pH	pH	5.80	5.94	5.00	N/A	9131916
Total Metals by ICPMS						
Total Aluminum (Al)	mg/kg	18400	22400	9350	100	9131910
Total Antimony (Sb)	mg/kg	0.52	1.41	0.24	0.10	9131910
Total Arsenic (As)	mg/kg	5.20	5.67	2.72	0.50	9131910
Total Barium (Ba)	mg/kg	53.5	113	40.8	0.10	9131910
Total Beryllium (Be)	mg/kg	0.23	0.28	<0.20	0.20	9131910
Total Bismuth (Bi)	mg/kg	0.12	0.13	0.11	0.10	9131910
Total Boron (B)	mg/kg	3.3	3.1	2.5	1.0	9131910
Total Cadmium (Cd)	mg/kg	0.128	0.819	<0.050	0.050	9131910
Total Calcium (Ca)	mg/kg	6240	5050	1140	100	9131910
Total Chromium (Cr)	mg/kg	20.9	28.4	9.6	1.0	9131910
Total Cobalt (Co)	mg/kg	5.10	6.87	0.64	0.30	9131910
Total Copper (Cu)	mg/kg	16.9	55.1	4.30	0.50	9131910
Total Iron (Fe)	mg/kg	27000	31000	6270	100	9131910
Total Lead (Pb)	mg/kg	52.4	107	10.6	0.10	9131910
Total Lithium (Li)	mg/kg	8.9	13.2	<5.0	5.0	9131910
Total Manganese (Mn)	mg/kg	295	420	30.5	0.20	9131910
Total Mercury (Hg)	mg/kg	0.074	0.143	<0.050	0.050	9131910
Total Molybdenum (Mo)	mg/kg	0.91	1.02	0.77	0.10	9131910
Total Nickel (Ni)	mg/kg	9.92	12.1	1.62	0.80	9131910
Total Phosphorus (P)	mg/kg	353	387	109	10	9131910
Total Potassium (K)	mg/kg	788	628	1010	100	9131910
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	0.50	9131910
Total Silver (Ag)	mg/kg	<0.050	0.237	<0.050	0.050	9131910
Total Sodium (Na)	mg/kg	118	193	<100	100	9131910
Total Strontium (Sr)	mg/kg	20.3	19.1	5.94	0.10	9131910
Total Thallium (Tl)	mg/kg	0.054	0.059	<0.050	0.050	9131910
Total Tin (Sn)	mg/kg	0.89	3.33	0.71	0.10	9131910
Total Tungsten (W)	mg/kg	<0.50	<0.50	<0.50	0.50	9131910

RDL = Reportable Detection Limit
N/A = Not Applicable

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Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
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Your P.O. #: VIC2924
Sampler Initials: N/A

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF4643	UF4644	UF4645		
Sampling Date		2018/08/31 11:00	2018/08/31 11:00	2018/08/31 11:00		
COC Number		564062-01-01	08457573	08457573		
	UNITS	**PK900016-000-1808-SL010**	**PK900016-000-1808-SL011**	**PK900016-000-1808-SL012**	**RDL**	**QC Batch**
Total Uranium (U)	mg/kg	0.275	0.370	0.194	0.050	9131910
Total Vanadium (V)	mg/kg	95.6	100	57.7	2.0	9131910
Total Zinc (Zn)	mg/kg	71.2	229	12.5	1.0	9131910
Total Zirconium (Zr)	mg/kg	1.65	1.02	0.87	0.50	9131910
RDL = Reportable Detection Limit						

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Sampler Initials: N/A

TCLP METALS (SOIL)

Maxxam ID		UF4640		
Sampling Date		2018/08/31 11:00		
COC Number		564062-01-01		
	UNITS	**PK900016-000-1808-SL007**	**RDL**	**QC Batch**
TCLP Extraction Procedure				
LEACHATE Antimony (Sb)	mg/L	<0.10	0.10	9143603
LEACHATE Arsenic (As)	mg/L	<0.10	0.10	9143603
LEACHATE Barium (Ba)	mg/L	0.74	0.10	9143603
LEACHATE Beryllium (Be)	mg/L	<0.10	0.10	9143603
LEACHATE Boron (B)	mg/L	0.14	0.10	9143603
LEACHATE Cadmium (Cd)	mg/L	<0.10	0.10	9143603
LEACHATE Chromium (Cr)	mg/L	<0.10	0.10	9143603
LEACHATE Cobalt (Co)	mg/L	<0.10	0.10	9143603
LEACHATE Copper (Cu)	mg/L	<0.10	0.10	9143603
LEACHATE Iron (Fe)	mg/L	<0.50	0.50	9143603
LEACHATE Lead (Pb)	mg/L	<0.10	0.10	9143603
LEACHATE Mercury (Hg)	mg/L	<0.0020	0.0020	9143603
LEACHATE Molybdenum (Mo)	mg/L	<0.10	0.10	9143603
LEACHATE Nickel (Ni)	mg/L	<0.10	0.10	9143603
LEACHATE Selenium (Se)	mg/L	<0.10	0.10	9143603
LEACHATE Silver (Ag)	mg/L	<0.010	0.010	9143603
LEACHATE Thallium (Tl)	mg/L	<0.10	0.10	9143603
LEACHATE Uranium (U)	mg/L	<0.10	0.10	9143603
LEACHATE Vanadium (V)	mg/L	<0.10	0.10	9143603
LEACHATE Zinc (Zn)	mg/L	1.17	0.10	9143603
LEACHATE Zirconium (Zr)	mg/L	<0.10	0.10	9143603
RDL = Reportable Detection Limit				

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Your P.O. #: VIC2924
Sampler Initials: N/A

SOLUBLE SODIUM AND CHLORIDE IN SOIL (SOIL)

Maxxam ID		UF4638		UF4639		UF4641		
Sampling Date		2018/08/31 11:00		2018/08/31 11:00		2018/08/31 11:00		
COC Number		564062-01-01		564062-01-01		564062-01-01		
	UNITS	**PK900016-000-1808-SL005**	**RDL**	**PK900016-000-1808-SL006**	**RDL**	**PK900016-000-1808-SL008**	**RDL**	**QC Batch**
ANIONS								
Soluble Chloride (Cl)	mg/L	14	10	15	10	17	10	9131742
Calculated Parameters								
Soluble Chloride (Cl)	mg/kg	9.0	6.4	6.1	4.1	10.4	6.2	9128196
Soluble Sodium (Na)	mg/kg	12.1	3.2	7.6	2.0	17.6	3.1	9128202
Soluble Parameters								
Saturation %	%	64.2	N/A	40.7	N/A	61.7	N/A	9131469
Soluble Sodium (Na)	mg/L	18.9	5.0	18.6	5.0	28.6	5.0	9132193

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Sampler Initials: N/A

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C

Samples received with incomplete Chain of Custody. Sampler's initials not provided.

Version 2: Report reissued to include results for TCLP PAH and TCLP Metals on sample PK900016-000-1808-SL007 as per request from Roberto Prieto on 2018/09/11.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9130136	D10-ANTHRACENE (sur.)	2018/09/05	83	50 - 140	84	50 - 140	83	%				
9130136	D8-ACENAPHTHYLENE (sur.)	2018/09/05	80	50 - 140	85	50 - 140	80	%				
9130136	D8-NAPHTHALENE (sur.)	2018/09/05	79	50 - 140	87	50 - 140	80	%				
9130136	TERPHENYL-D14 (sur.)	2018/09/05	88	50 - 140	92	50 - 140	94	%				
9130143	O-TERPHENYL (sur.)	2018/09/05	90	60 - 140	87	60 - 140	89	%				
9130448	1,4-Difluorobenzene (sur.)	2018/09/05	94	70 - 130	96	70 - 130	100	%				
9130448	4-Bromofluorobenzene (sur.)	2018/09/05	104	70 - 130	104	70 - 130	104	%				
9130448	D10-ETHYLBENZENE (sur.)	2018/09/05	104	60 - 130	90	60 - 130	100	%				
9130448	D4-1,2-Dichloroethane (sur.)	2018/09/05	102	70 - 130	102	70 - 130	112	%				
9143103	Leachate D10-ANTHRACENE (sur.)	2018/09/14			103	50 - 140	102	%				
9143103	Leachate D8-ACENAPHTHYLENE (sur.)	2018/09/14			96	50 - 140	95	%				
9143103	Leachate D8-NAPHTHALENE (sur.)	2018/09/14			111	50 - 140	106	%				
9143103	Leachate TERPHENYL-D14 (sur.)	2018/09/14			108	50 - 140	107	%				
9129691	Moisture	2018/09/05					<0.30	%	2.0	20		
9130136	1-Methylnaphthalene	2018/09/05	78	50 - 140	87	50 - 140	<0.050	mg/kg	NC	50		
9130136	2-Methylnaphthalene	2018/09/05	76	50 - 140	84	50 - 140	<0.020	mg/kg	NC	50		
9130136	Acenaphthene	2018/09/05	81	50 - 140	89	50 - 140	<0.0050	mg/kg	NC	50		
9130136	Acenaphthylene	2018/09/05	78	50 - 140	85	50 - 140	<0.0050	mg/kg	NC	50		
9130136	Acridine	2018/09/05	104	50 - 140	104	N/A	<0.050	mg/kg	NC	50		
9130136	Anthracene	2018/09/05	81	50 - 140	82	50 - 140	<0.0040	mg/kg	NC	50		
9130136	Benzo(a)anthracene	2018/09/05	72	50 - 140	82	50 - 140	<0.020	mg/kg	NC	50		
9130136	Benzo(a)pyrene	2018/09/05	72	50 - 140	79	50 - 140	<0.020	mg/kg	3.6	50		
9130136	Benzo(b&j)fluoranthene	2018/09/05	71	50 - 140	83	50 - 140	<0.020	mg/kg	NC	50		
9130136	Benzo(b)fluoranthene	2018/09/05	68	50 - 140	80	50 - 140	<0.020	mg/kg	NC	50		
9130136	Benzo(g,h,i)perylene	2018/09/05	73	50 - 140	81	50 - 140	<0.050	mg/kg	NC	50		
9130136	Benzo(j)fluoranthene	2018/09/05	74	50 - 140	88	N/A	<0.020	mg/kg	NC	50		
9130136	Benzo(k)fluoranthene	2018/09/05	75	50 - 140	85	50 - 140	<0.020	mg/kg	NC	50		
9130136	Chrysene	2018/09/05	73	50 - 140	87	50 - 140	<0.020	mg/kg	18	50		
9130136	Dibenz(a,h)anthracene	2018/09/05	76	50 - 140	80	50 - 140	<0.020	mg/kg	NC	50		
9130136	Fluoranthene	2018/09/05	81	50 - 140	89	50 - 140	<0.020	mg/kg	NC	50		

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Maxxam Job #: B874856
Report Date: 2018/09/17

QUALITY ASSURANCE REPORT(CONT'D)

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9130136	Fluorene	2018/09/05	73	50 - 140	79	50 - 140	<0.020	mg/kg	NC	50		
9130136	Indeno(1,2,3-cd)pyrene	2018/09/05	73	50 - 140	78	50 - 140	<0.020	mg/kg	NC	50		
9130136	Naphthalene	2018/09/05	75	50 - 140	85	50 - 140	<0.010	mg/kg	NC	50		
9130136	Phenanthrene	2018/09/05	77	50 - 140	86	50 - 140	<0.010	mg/kg	NC	50		
9130136	Pyrene	2018/09/05	80	50 - 140	89	50 - 140	<0.020	mg/kg	NC	50		
9130136	Quinoline	2018/09/05	107	50 - 140	111	50 - 140	<0.050	mg/kg	NC	50		
9130143	EPH (C10-C19)	2018/09/05	89	60 - 140	86	70 - 130	<100	mg/kg	NC	40		
9130143	EPH (C19-C32)	2018/09/05	90	60 - 140	89	70 - 130	<100	mg/kg	NC	40		
9130448	Benzene	2018/09/05	93	60 - 140	93	70 - 130	<0.0050	mg/kg	NC	40		
9130448	Ethylbenzene	2018/09/05	103	60 - 140	97	70 - 130	<0.010	mg/kg	NC	40		
9130448	m & p-Xylene	2018/09/05	103	60 - 140	97	70 - 130	<0.040	mg/kg	NC	40		
9130448	Methyl-tert-butylether (MTBE)	2018/09/05	89	60 - 140	89	70 - 130	<0.10	mg/kg	NC	40		
9130448	o-Xylene	2018/09/05	103	60 - 140	97	70 - 130	<0.040	mg/kg	NC	40		
9130448	Styrene	2018/09/05	107	60 - 140	100	70 - 130	<0.030	mg/kg	NC	40		
9130448	Toluene	2018/09/05	96	60 - 140	90	70 - 130	<0.020	mg/kg	NC	40		
9130448	VH C6-C10	2018/09/05			85	70 - 130	<10	mg/kg	NC	40		
9130448	Xylenes (Total)	2018/09/05					<0.040	mg/kg	NC	40		
9131469	Saturation %	2018/09/06					0	%	0.35	30	103	75 - 125
9131742	Soluble Chloride (Cl)	2018/09/06	112	75 - 125	106	80 - 120	<10	mg/L	24	30	78	75 - 125
9131910	Total Aluminum (Al)	2018/09/07					<100	mg/kg	3.2	40	113	70 - 130
9131910	Total Antimony (Sb)	2018/09/07	95	75 - 125	93	75 - 125	<0.10	mg/kg	1.8	30	113	70 - 130
9131910	Total Arsenic (As)	2018/09/07	102	75 - 125	95	75 - 125	<0.50	mg/kg	5.9	30	90	70 - 130
9131910	Total Barium (Ba)	2018/09/07	112	75 - 125	91	75 - 125	<0.10	mg/kg	3.2	40	100	70 - 130
9131910	Total Beryllium (Be)	2018/09/07	109	75 - 125	97	75 - 125	<0.20	mg/kg	3.3	30	112	70 - 130
9131910	Total Bismuth (Bi)	2018/09/07					<0.10	mg/kg	NC	30		
9131910	Total Boron (B)	2018/09/07					<1.0	mg/kg	21	30		
9131910	Total Cadmium (Cd)	2018/09/07	100	75 - 125	93	75 - 125	<0.050	mg/kg	16	30	97	70 - 130
9131910	Total Calcium (Ca)	2018/09/07					<100	mg/kg	7.9	30	105	70 - 130
9131910	Total Chromium (Cr)	2018/09/07	119	75 - 125	105	75 - 125	<1.0	mg/kg	6.2	30	117	70 - 130
9131910	Total Cobalt (Co)	2018/09/07	113	75 - 125	103	75 - 125	<0.30	mg/kg	1.5	30	107	70 - 130

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Maxxam Job #: B874856
Report Date: 2018/09/17

QUALITY ASSURANCE REPORT(CONT'D)

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9131910	Total Copper (Cu)	2018/09/07	111	75 - 125	100	75 - 125	<0.50	mg/kg	3.9	30	111	70 - 130
9131910	Total Iron (Fe)	2018/09/07					<100	mg/kg	0.11	30	114	70 - 130
9131910	Total Lead (Pb)	2018/09/07	95	75 - 125	99	75 - 125	<0.10	mg/kg	23	40	116	70 - 130
9131910	Total Lithium (Li)	2018/09/07	108	75 - 125	100	75 - 125	<5.0	mg/kg	12	30	104	70 - 130
9131910	Total Manganese (Mn)	2018/09/07	NC	75 - 125	102	75 - 125	<0.20	mg/kg	3.2	30	114	70 - 130
9131910	Total Mercury (Hg)	2018/09/07	101	75 - 125	90	75 - 125	<0.050	mg/kg	15	40	84	70 - 130
9131910	Total Molybdenum (Mo)	2018/09/07	99	75 - 125	93	75 - 125	<0.10	mg/kg	2.8	40	106	70 - 130
9131910	Total Nickel (Ni)	2018/09/07	114	75 - 125	104	75 - 125	<0.80	mg/kg	5.8	30	117	70 - 130
9131910	Total Phosphorus (P)	2018/09/07					<10	mg/kg	2.5	30	111	70 - 130
9131910	Total Potassium (K)	2018/09/07					<100	mg/kg	11	40	103	70 - 130
9131910	Total Selenium (Se)	2018/09/07	109	75 - 125	99	75 - 125	<0.50	mg/kg	18	30		
9131910	Total Silver (Ag)	2018/09/07	86	75 - 125	80	75 - 125	<0.050	mg/kg	0.30	40	95	70 - 130
9131910	Total Sodium (Na)	2018/09/07					<100	mg/kg	7.1	40	104	70 - 130
9131910	Total Strontium (Sr)	2018/09/07	107	75 - 125	96	75 - 125	<0.10	mg/kg	4.6	40	104	70 - 130
9131910	Total Thallium (Tl)	2018/09/07	100	75 - 125	93	75 - 125	<0.050	mg/kg	NC	30	88	70 - 130
9131910	Total Tin (Sn)	2018/09/07	103	75 - 125	94	75 - 125	<0.10	mg/kg	3.7	40	103	70 - 130
9131910	Total Tungsten (W)	2018/09/07					<0.50	mg/kg	NC	30		
9131910	Total Uranium (U)	2018/09/07	104	75 - 125	93	75 - 125	<0.050	mg/kg	0.30	30	99	70 - 130
9131910	Total Vanadium (V)	2018/09/07	NC	75 - 125	104	75 - 125	<2.0	mg/kg	5.7	30	115	70 - 130
9131910	Total Zinc (Zn)	2018/09/07	NC	75 - 125	105	75 - 125	<1.0	mg/kg	6.3	30	113	70 - 130
9131910	Total Zirconium (Zr)	2018/09/07					<0.50	mg/kg	NC	30		
9131916	Soluble (2:1) pH	2018/09/07			100	97 - 103			1.8	20		
9132193	Soluble Sodium (Na)	2018/09/06	NC	80 - 120	96	80 - 120	<5.0	mg/L	1.3	40	81	75 - 125
9142159	Final pH of Leachate	2018/09/14					4.94	pH				
9142159	Initial pH of Sample	2018/09/14					4.95	pH				
9142159	pH of Leaching Fluid	2018/09/14					4.95	pH				
9143103	Leachate 2-Methylnaphthalene	2018/09/14			96	50 - 140	<0.10	ug/L				
9143103	Leachate Acenaphthene	2018/09/14			95	50 - 140	<0.10	ug/L				
9143103	Leachate Acenaphthylene	2018/09/14			97	50 - 140	<0.10	ug/L				
9143103	Leachate Acridine	2018/09/14			106	50 - 140	<0.50	ug/L				

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Maxxam Job #: B874856
Report Date: 2018/09/17

QUALITY ASSURANCE REPORT(CONT'D)

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9143103	Leachate Anthracene	2018/09/14			102	50 - 140	<0.10	ug/L				
9143103	Leachate Benzo(a)anthracene	2018/09/14			98	50 - 140	<0.10	ug/L				
9143103	Leachate Benzo(a)pyrene	2018/09/14			98	50 - 140	<0.10	ug/L				
9143103	Leachate Benzo(b&j)fluoranthene	2018/09/14			102	50 - 140	<0.10	ug/L				
9143103	Leachate Benzo(g,h,i)perylene	2018/09/14			93	50 - 140	<0.20	ug/L				
9143103	Leachate Benzo(k)fluoranthene	2018/09/14			105	50 - 140	<0.10	ug/L				
9143103	Leachate Chrysene	2018/09/14			98	50 - 140	<0.10	ug/L				
9143103	Leachate Dibenz(a,h)anthracene	2018/09/14			92	50 - 140	<0.20	ug/L				
9143103	Leachate Fluoranthene	2018/09/14			105	50 - 140	<0.10	ug/L				
9143103	Leachate Fluorene	2018/09/14			93	50 - 140	<0.10	ug/L				
9143103	Leachate Indeno(1,2,3-cd)pyrene	2018/09/14			93	50 - 140	<0.20	ug/L				
9143103	Leachate Naphthalene	2018/09/14			108	50 - 140	<0.10	ug/L				
9143103	Leachate Phenanthrene	2018/09/14			98	50 - 140	<0.10	ug/L				
9143103	Leachate Pyrene	2018/09/14			108	50 - 140	<0.10	ug/L				
9143103	Leachate Quinoline	2018/09/14			114	50 - 140	<0.50	ug/L				
9143603	LEACHATE Antimony (Sb)	2018/09/14	102	75 - 125	98	75 - 125	<0.10	mg/L				
9143603	LEACHATE Arsenic (As)	2018/09/14	102	75 - 125	99	75 - 125	<0.10	mg/L				
9143603	LEACHATE Barium (Ba)	2018/09/14	96	75 - 125	92	75 - 125	<0.10	mg/L				
9143603	LEACHATE Beryllium (Be)	2018/09/14	97	75 - 125	94	75 - 125	<0.10	mg/L				
9143603	LEACHATE Boron (B)	2018/09/14					<0.10	mg/L				
9143603	LEACHATE Cadmium (Cd)	2018/09/14	101	75 - 125	96	75 - 125	<0.10	mg/L				
9143603	LEACHATE Chromium (Cr)	2018/09/14	96	75 - 125	93	75 - 125	<0.10	mg/L				
9143603	LEACHATE Cobalt (Co)	2018/09/14	98	75 - 125	96	75 - 125	<0.10	mg/L				
9143603	LEACHATE Copper (Cu)	2018/09/14	95	75 - 125	90	75 - 125	<0.10	mg/L				
9143603	LEACHATE Iron (Fe)	2018/09/14					<0.50	mg/L				
9143603	LEACHATE Lead (Pb)	2018/09/14	94	75 - 125	90	75 - 125	<0.10	mg/L				
9143603	LEACHATE Mercury (Hg)	2018/09/14	98	75 - 125	94	75 - 125	<0.0020	mg/L				
9143603	LEACHATE Molybdenum (Mo)	2018/09/14	103	75 - 125	99	75 - 125	<0.10	mg/L				
9143603	LEACHATE Nickel (Ni)	2018/09/14	95	75 - 125	93	75 - 125	<0.10	mg/L				
9143603	LEACHATE Selenium (Se)	2018/09/14	101	75 - 125	96	75 - 125	<0.10	mg/L				

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Maxxam Job #: B874856
Report Date: 2018/09/17

QUALITY ASSURANCE REPORT(CONT'D)

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9143603	LEACHATE Silver (Ag)	2018/09/14	87	75 - 125	83	75 - 125	<0.010	mg/L				
9143603	LEACHATE Thallium (Tl)	2018/09/14	98	75 - 125	93	75 - 125	<0.10	mg/L				
9143603	LEACHATE Uranium (U)	2018/09/14	96	75 - 125	92	75 - 125	<0.10	mg/L				
9143603	LEACHATE Vanadium (V)	2018/09/14	100	75 - 125	97	75 - 125	<0.10	mg/L				
9143603	LEACHATE Zinc (Zn)	2018/09/14	96	75 - 125	95	75 - 125	<0.10	mg/L				
9143603	LEACHATE Zirconium (Zr)	2018/09/14					<0.10	mg/L				

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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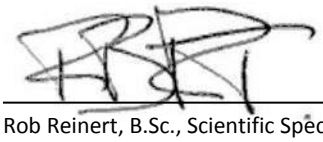
Maxxam Job #: B874856
Report Date: 2018/09/17

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Location: AMPHITRITE
Your P.O. #: VIC2924
Sampler Initials: N/A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Jose Cueva, Supervisor, Organics-VOC & HC



Rob Reinert, B.Sc., Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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B874856_COC

Bottle Order #: 564062

Chain Of Custody Record: C#564062-01-01

Project Manager: Namita Sahni

INVOICE TO:		Report Information		Project Information	
Company Name	#11223 SLR CONSULTING (CANADA) LTD	Company Name		Quotation #	B80422
Contact Name	Roberto Prieto	Contact Name	Roberto Prieto	P.O. #	VIC2924
Address	6-40 CADILLAC AVENUE	Address		Project #	205.03953.00000
	VICTORIA BC V8Z 1T2			Project Name	Amphitrite
Phone	(250) 475-9595 Fax (250) 475-9596	Phone	Fax	Site #	
Email	rprieto@slrconsulting.com; analytical@slrconsulting.co	Email	rprieto@slrconsulting.com	Sampled By	

Regulatory Criteria

Special Instructions

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool (< 10°C) from time of sampling until delivery to maxxam

Turnaround Time (TAT) Required

Please provide advance notice for rush projects

Regular (Standard) TAT ✓
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: _____ Time Required: _____
Rush Confirmation Number: _____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y/N)	Metals Field Filtered ? (Y/N)	CSR BTEX/VPH (Field Preserved)	CSR LEPH/HEPH with PAH	CSR Metals with Hg	Soluble Sodium and Chloride	TCLP PAHs - Soil/Solid	TCLP Metals	# of Bottles	Comments
1		PR900016-000-1808-SL001	2018/08/30	11:00	Soil			✓	✓	✓				5	All sample labels start with PR900016-000-1808 (like shown on first sample on COC)
2		-SL002	2018/08/30					✓	✓	✓					
3		-SL003	2018/08/31					✓	✓	✓					
4		-SL004						✓	✓	✓					
5		-SL005						✓	✓	✓	✓				
6		-SL006						✓	✓	✓	✓				
7		-SL007						✓	✓	✓					
8		-SL008						✓	✓	✓	✓				
9		-SL009						✓	✓	✓					
10		-SL010						✓	✓	✓					

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Roberto Prieto	2018/08/31	15:40	VIEW Chong	2018/09/01	09:05	NA

Lab Use Only

Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
✓	7, 7, 6	☐ Yes ☐ No NA

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

9

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Maxxam Analytics International Corporation o/a Maxxam Analytics
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B874856_COC

08457573

Bottle Order #: 564062

Project Manager: Namita Sahni

INVOICE TO:		Report Information		Project Information	
Company Name	#11223 SLR CONSULTING (CANADA) LTD	Company Name		Quotation #	B80422
Contact Name	Roberto Prieto	Contact Name	Roberto Prieto	P.O. #	VIC2924
Address	6-40 CADILLAC AVENUE VICTORIA BC V8Z 1T2	Address		Project #	205.03953.00000
Phone	(250) 475-9595 Fax: (250) 475-9596	Phone	Fax:	Project Name	Amphitrite
Email	rprieto@slrconsulting.com; analytical@slrconsulting.co	Email	rprieto@slrconsulting.com	Site #	
				Sampled By	

Regulatory Criteria

Special Instructions

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool (< 10°C) from time of sampling until delivery to maxxam

Turnaround Time (TAT) Required

Please provide advance notice for rush projects

Regular (Standard) TAT ✓
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: _____ Time Required: _____
Rush Confirmation Number: _____ (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	CSR BTEX/VPH (Field Preserved)	CSR LEPH/HEPH with PAH	CSR Metals with Hg	Soluble Sodium and Chloride	TCLP PAHs - Soil/Solid	TCLP Metals	# of Bottles	Comments
1		-SL011	2018/08/31	11:00	Soil			✓	✓	✓				5	All sample labels start
2		-SL012	"	"	"			✓	✓	✓				5	with PW400016-000-1808 (like shown on first sample on COC page 1)
3															
4															
5															
6															
7															
8															
9															
10															

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Roberto Prieto	2018/08/31	15:40	ICEW	2018/09/01	09:05	

Lab Use Only

Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
✓	7.7, C	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

9

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4634

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL001

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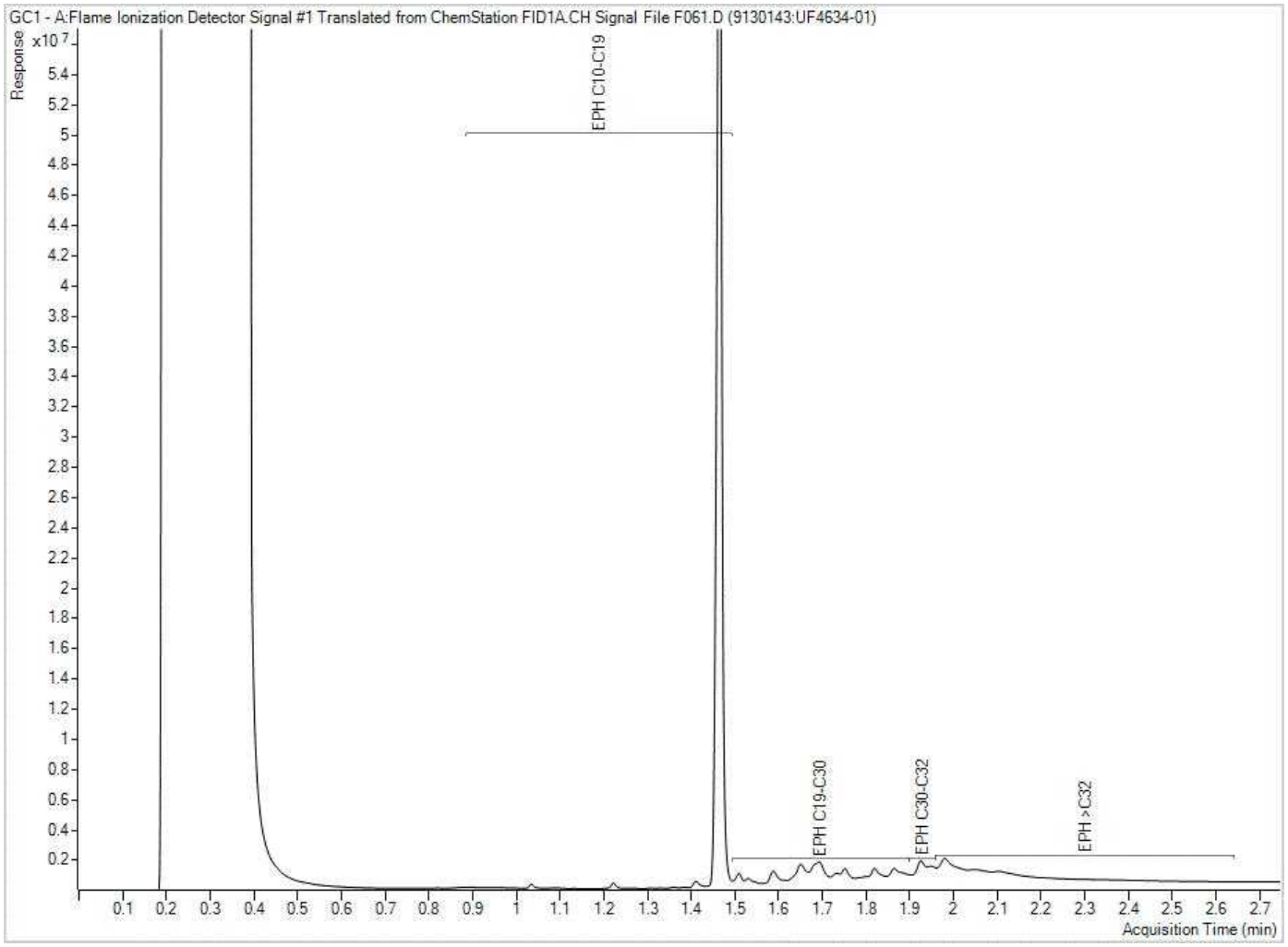

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4635

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL002

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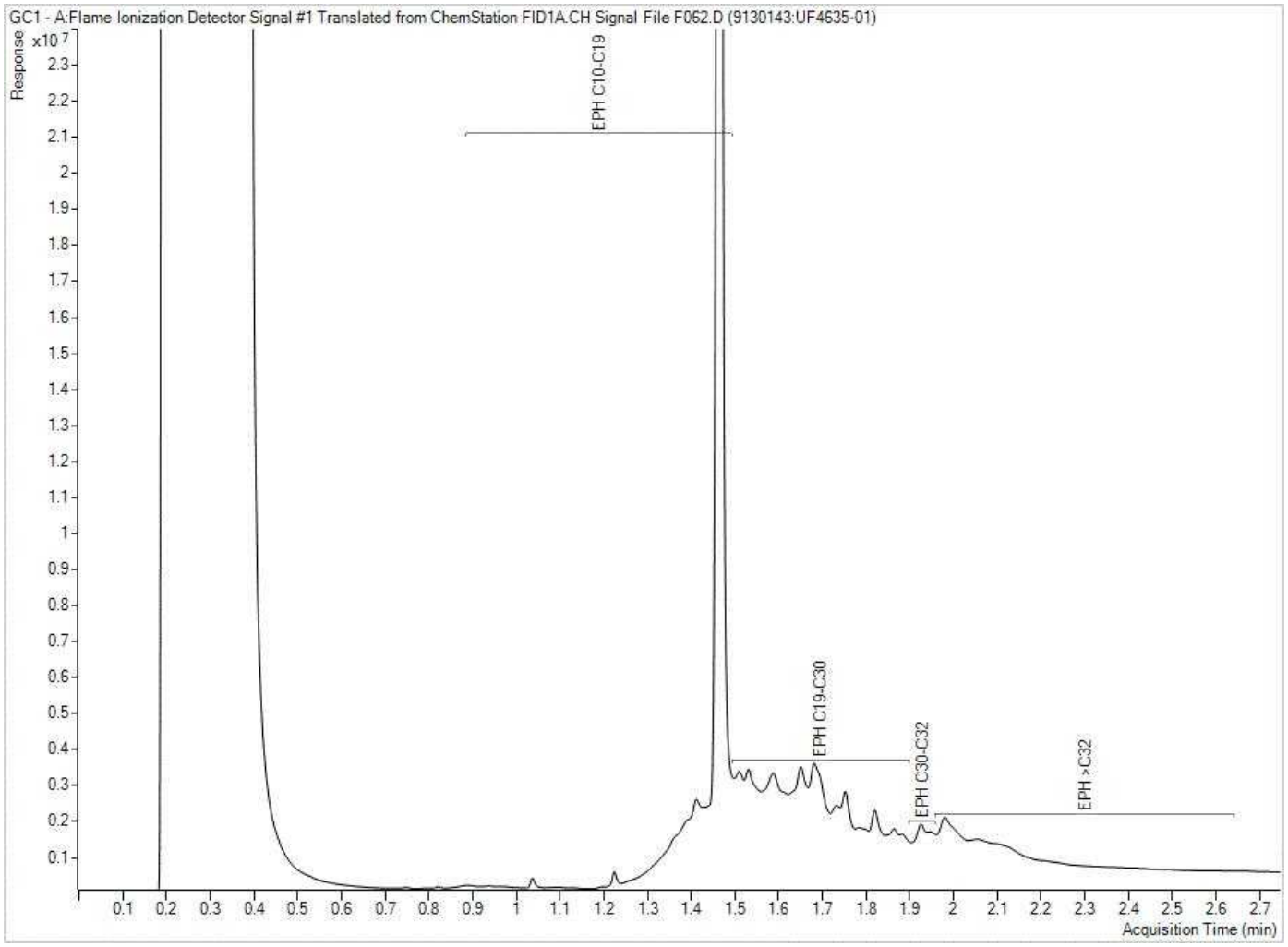

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Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4636

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL003

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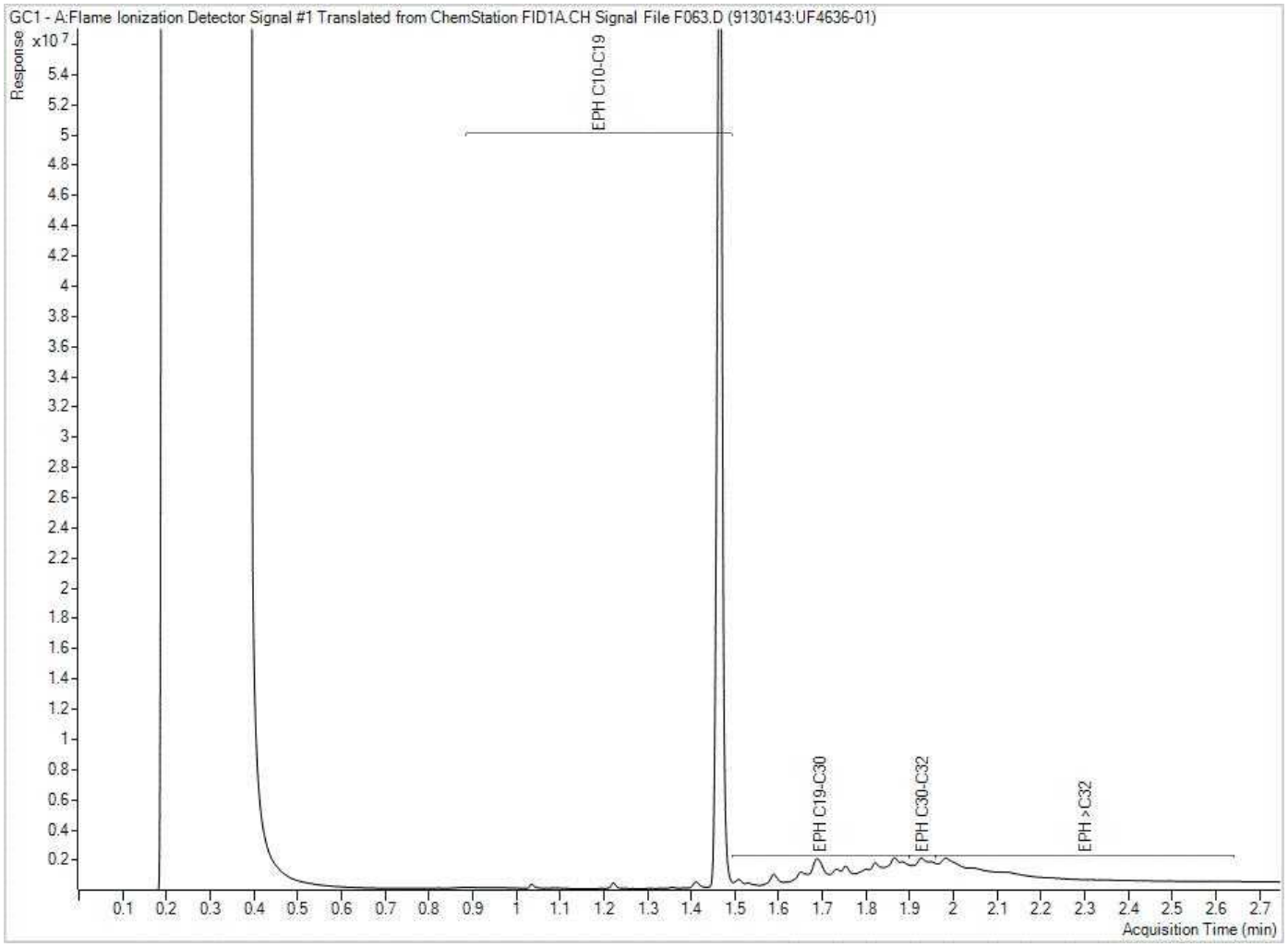

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Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4637

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL004

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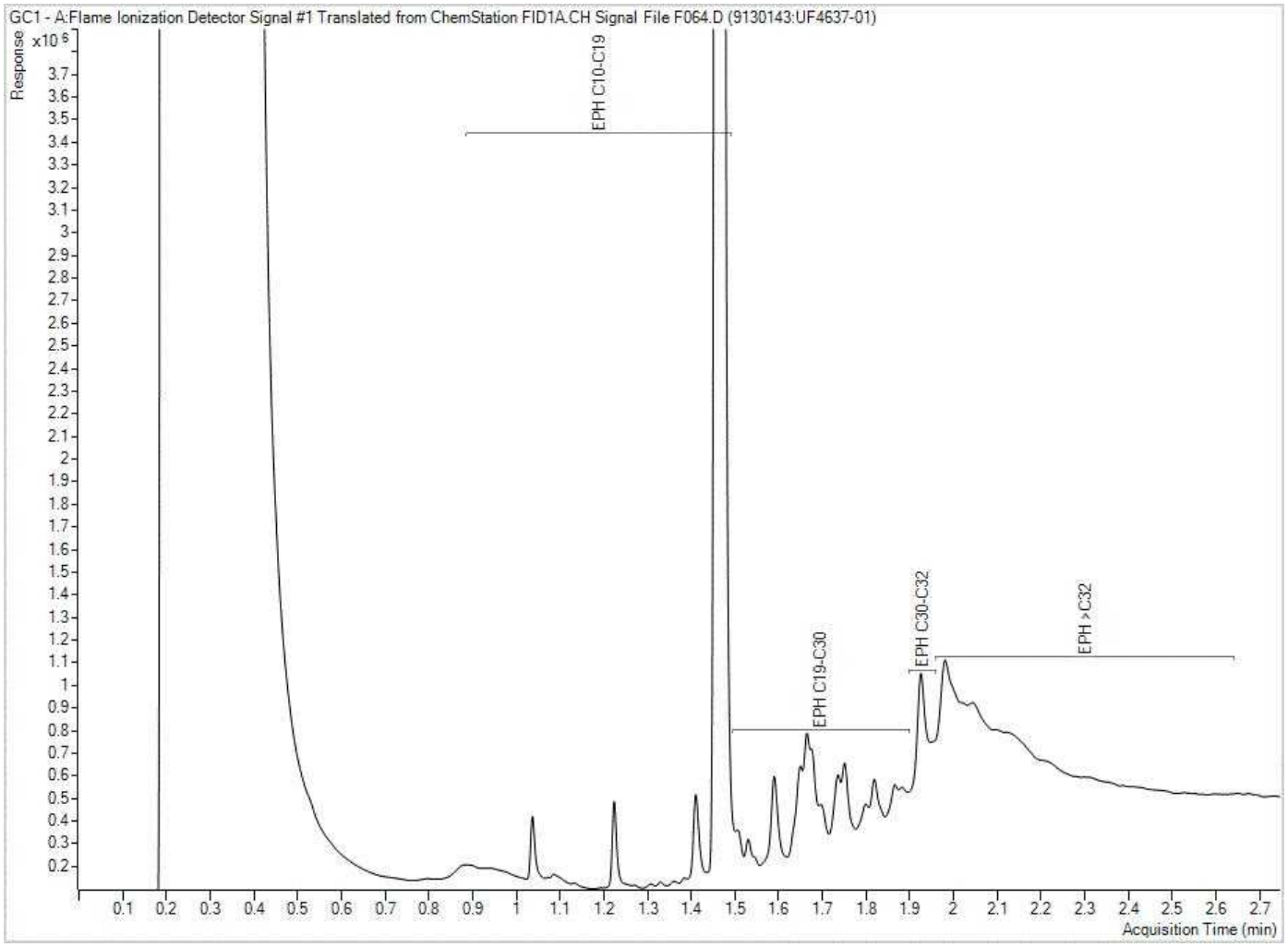

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Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4638

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL005

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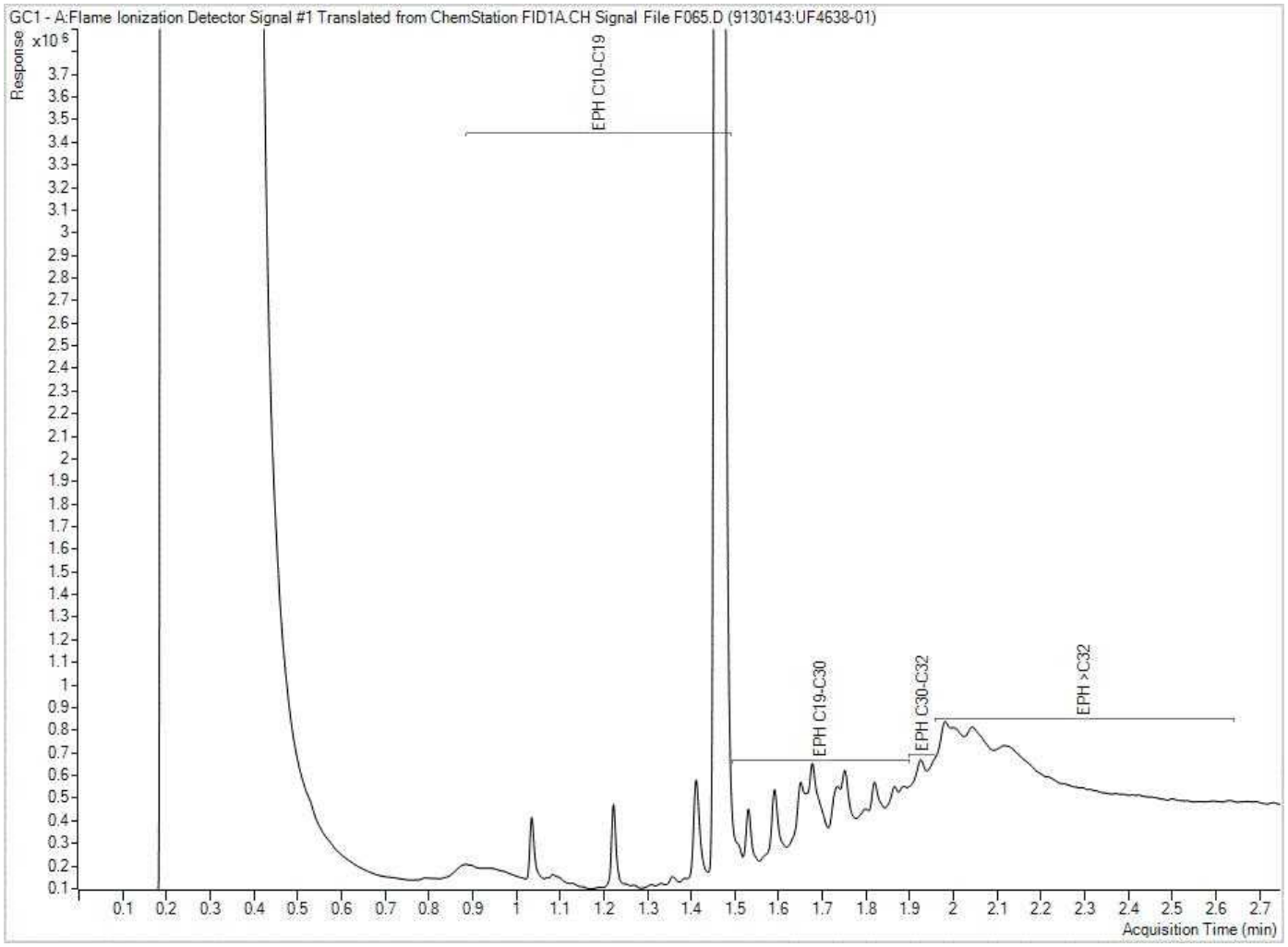

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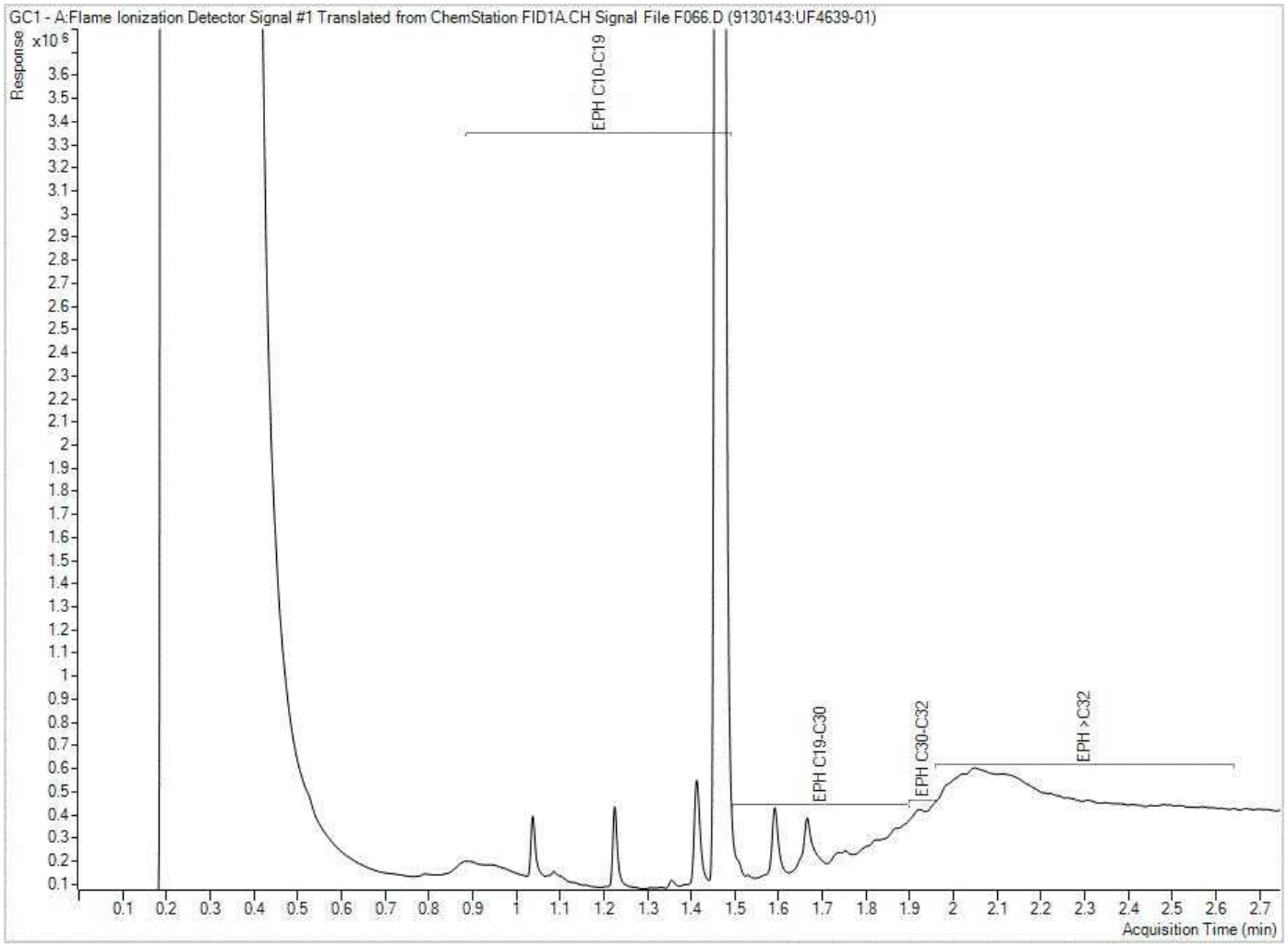
Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4639

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL006

EPH in Soil by GC/FID Chromatogram



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Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4640

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL007

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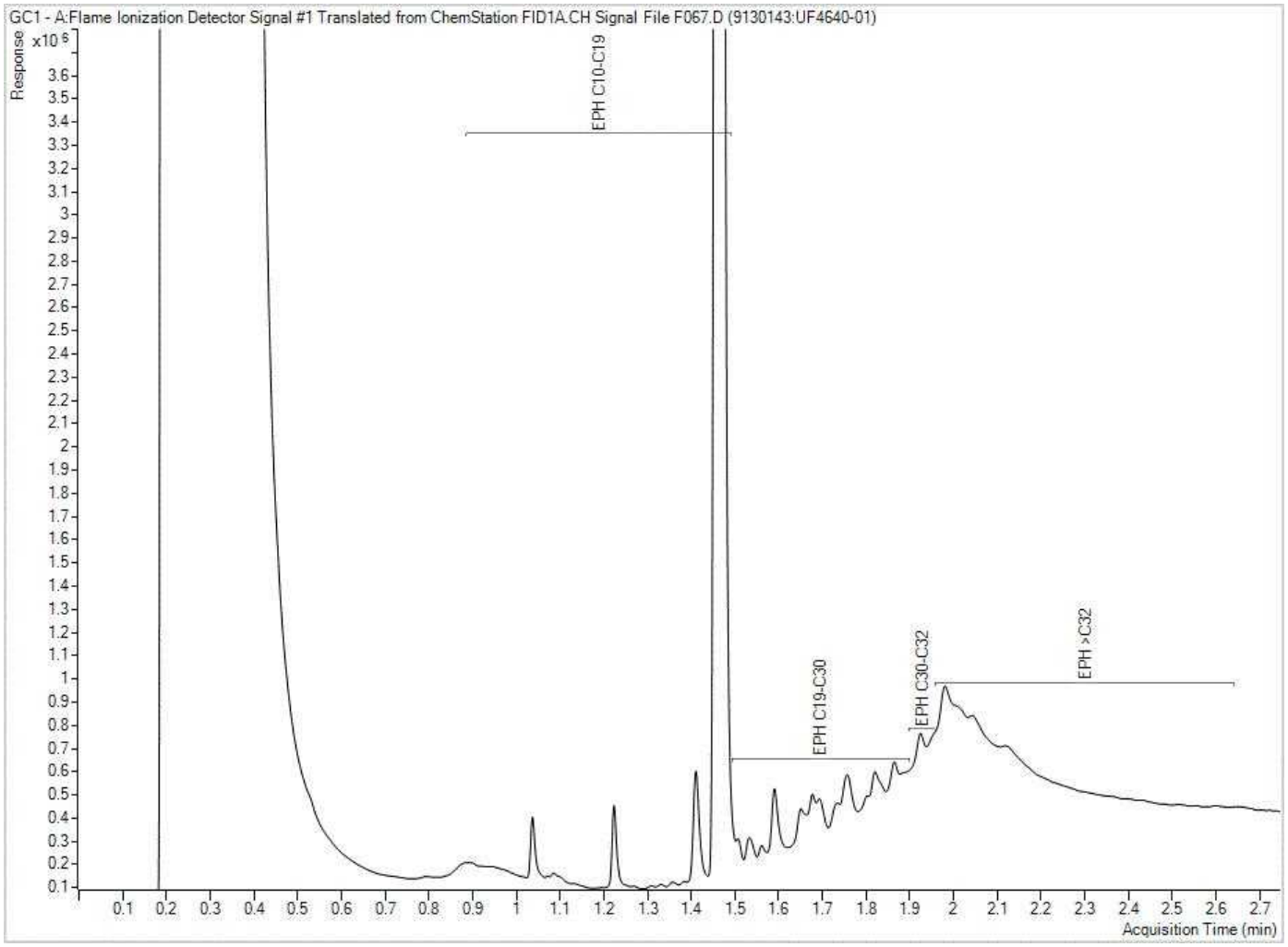

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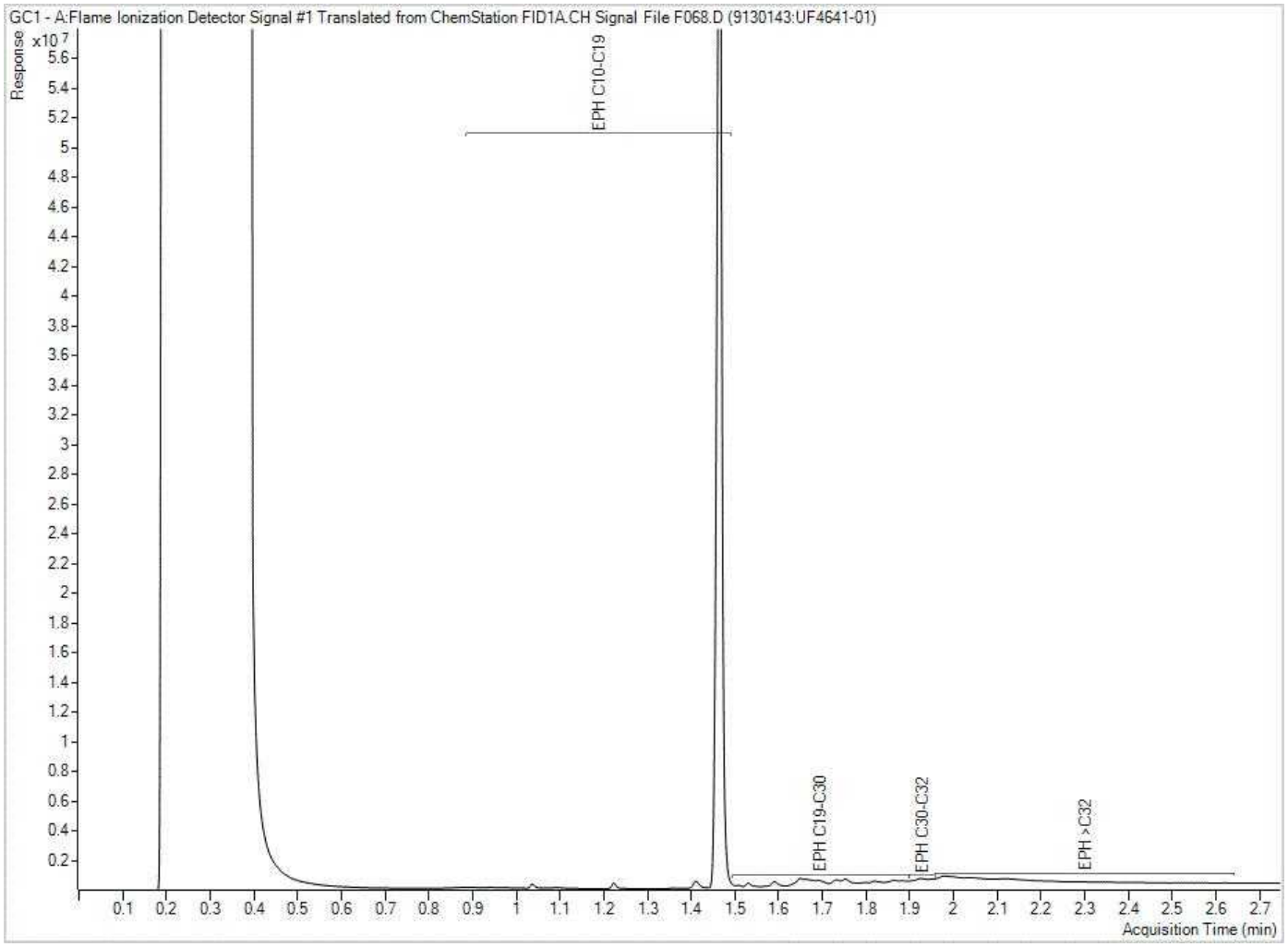
Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4641

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL008

EPH in Soil by GC/FID Chromatogram

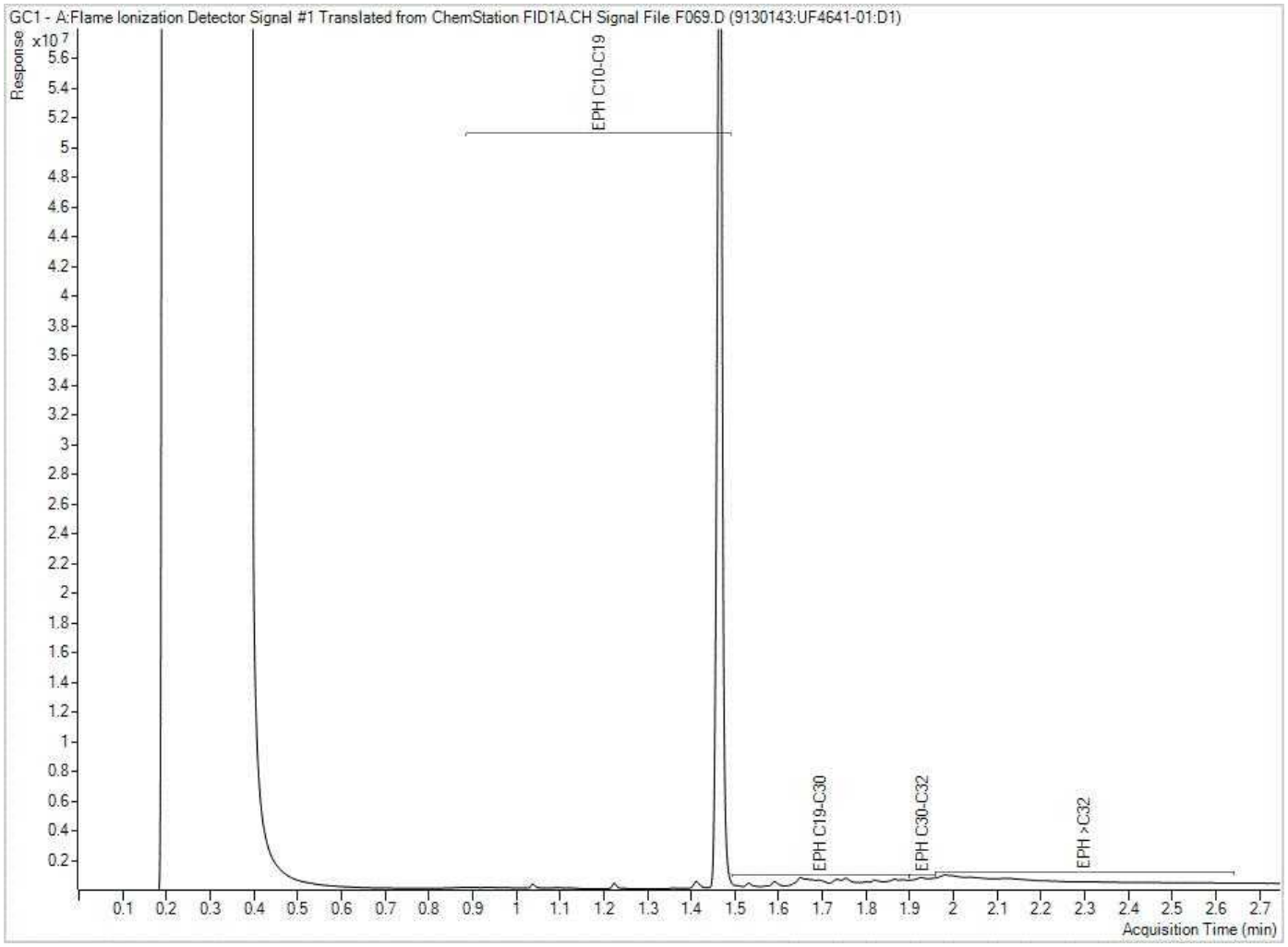


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4641 Lab-Dup

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL008

EPH in Soil by GC/FID Chromatogram



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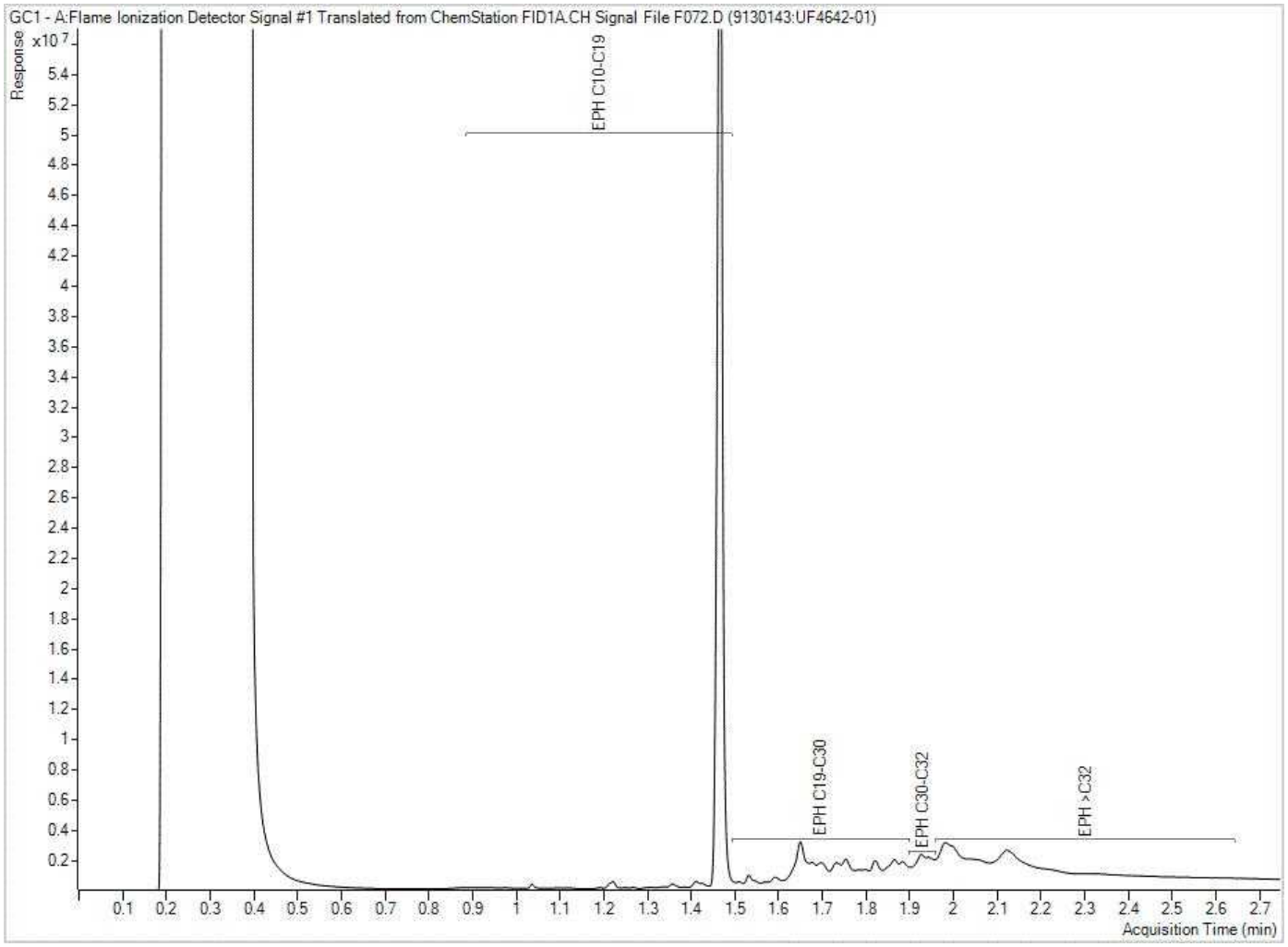
Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4642

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL009

EPH in Soil by GC/FID Chromatogram



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Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4643

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL010

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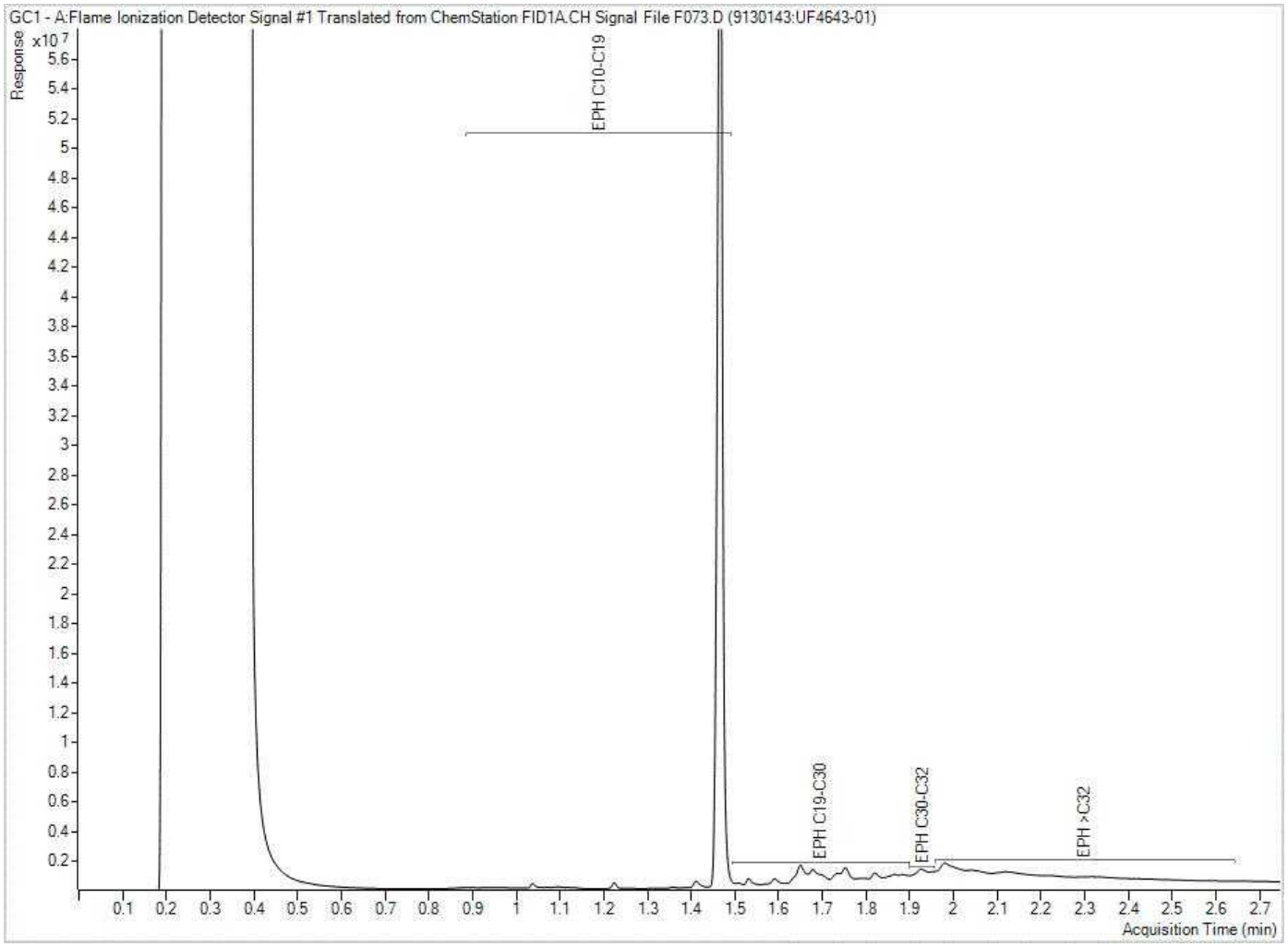

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Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4644

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL011

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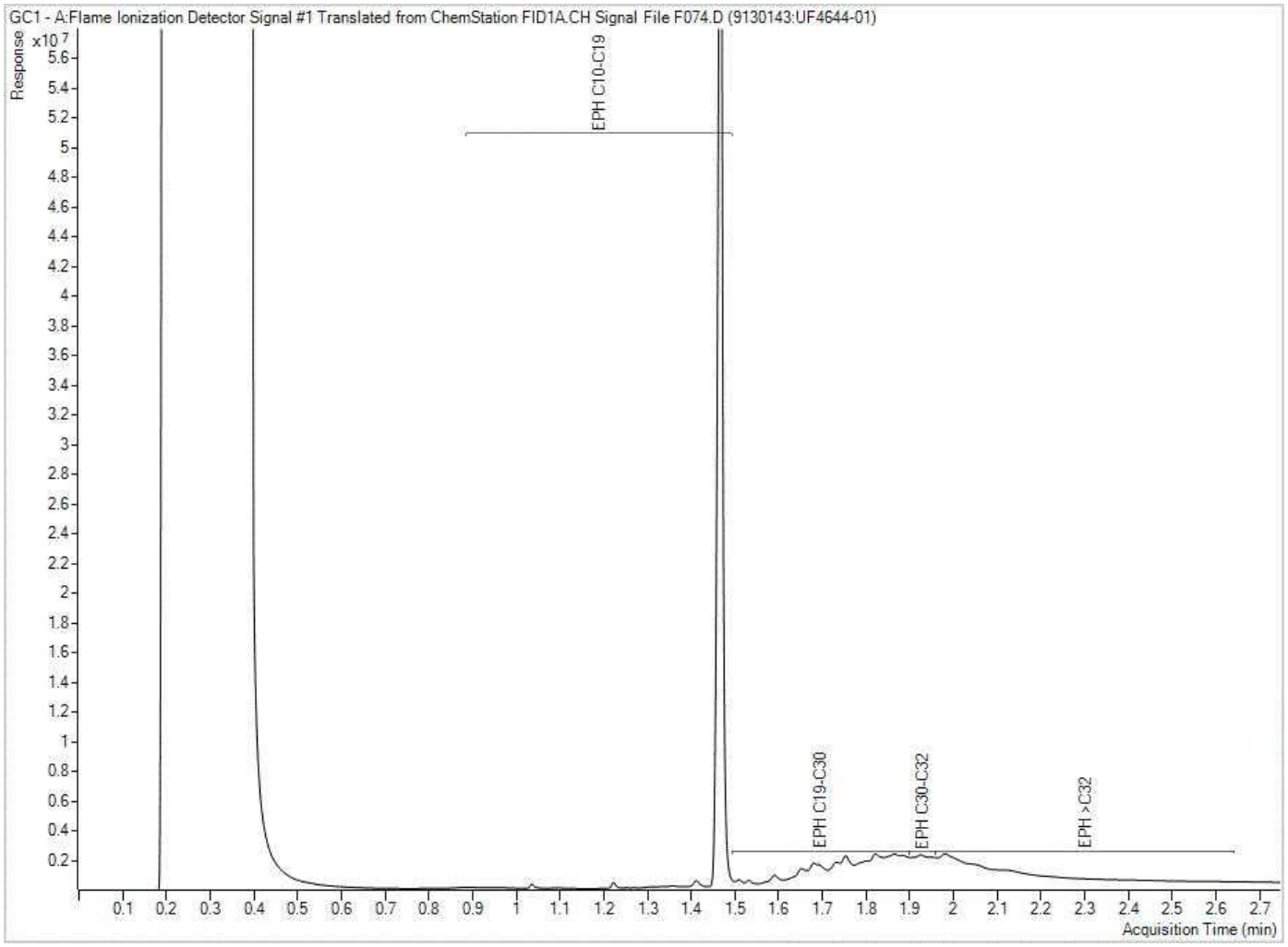

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Maxxam Job #: B874856
Report Date: 2018/09/17
Maxxam Sample: UF4645

SLR CONSULTING (CANADA) LTD
Client Project #: 205.03953.00000.0001
Site Reference: AMPHITRITE
Client ID: PK900016-000-1808-SL012

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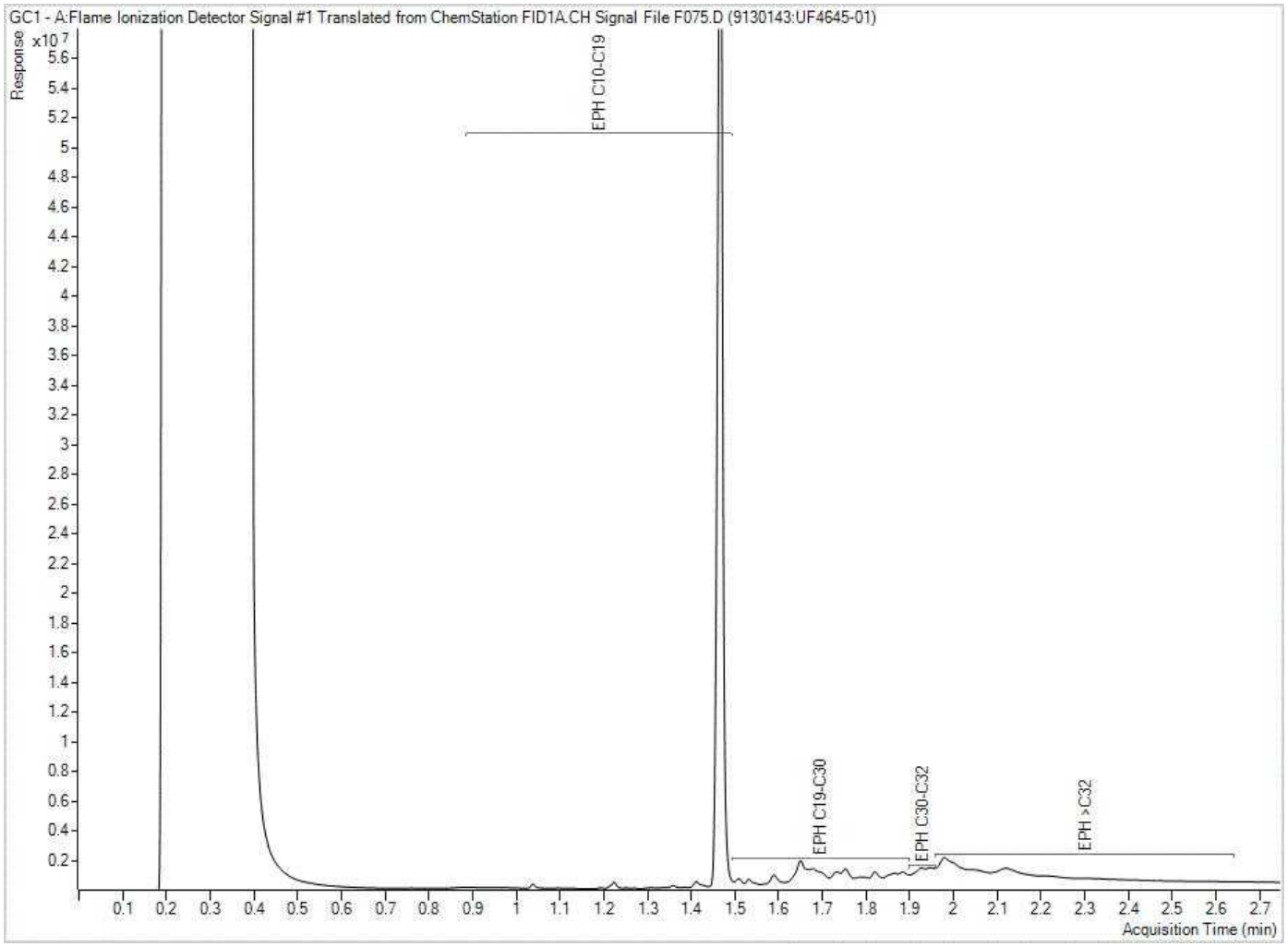

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APPENDIX C

FISHERIES AND OCEANS ENVIRONMENTAL BEST PRACTICES BULLETINS

Bulletin 1: General Operations

Background

Without the implementation of appropriate mitigation measures, construction activities have the potential to affect the biophysical environment (e.g., fish habitat, vegetation, wildlife) directly and indirectly, and may result in adverse environmental effects. Through the use of mitigation measures, potential effects associated with construction activities can be reduced or avoided. The mitigation measures included in this document are intended to provide easy reference to staff and contractors onsite during construction activities and are designed to limit adverse environmental effects. Project personnel have a responsibility to protect environmental, heritage and socio-economic values while undertaking construction work.

Biophysical Environment

Physical work, associated with operations activities, has the potential to upset the balance of healthy aquatic, and terrestrial ecosystems. Natural water quality or quantity can be affected whenever there is a disruption of water flow, loss of vegetation, increase of sediment in the water, or pollution from harmful substances (such as petroleum products and hazardous washwater) that could contaminate groundwater and soils, and could enter storm drains which discharge to water bodies (EPA 2012). Impacts may include alteration or destruction of habitat, changes in water chemistry leading to potential die-offs of aquatic or other organisms, reproductive failure, disruption of local food chains, the creation of migration barriers, and contamination of local drinking water (DFO 2010, BC MWLAP 2004). Operating heavy equipment can affect local air quality and introduces noise pollution that could disrupt normal wildlife behaviour. Work with machines could also compromise soil structure and vegetation, which may lead to soil erosion or project failures.

Therefore, it is important to have measures in place that minimize the environmental effects of the project. Many mitigation measures apply to all phases of construction activities; such measures are included in this document and

should be implemented on Fisheries and Oceans Canada (DFO) and Canadian Coast Guard (CCG) projects, where applicable.

Federal and Provincial Legislation

The following table summarizes some of the key federal and provincial environmental legislation that may apply to construction activities carried out by DFO or CCG.

Federal Legislation	Provincial Legislation
Canadian Environmental Assessment Act	*British Columbia Environmental Assessment Act*
Canadian Environmental Protection Act	*Environmental Management Act*
Fisheries Act	*Heritage Conservation Act*
Species at Risk Act	*Land Act*
Migratory Birds Convention Act	*Parks Act*
Navigation Protection Act	*Water Sustainability Act*
Canada Shipping Act	*Fish Protection Act*
Transportation of Dangerous Goods Act	*Wildlife Act*
	Waste Management Act
	Forest and Ranges Practices Act
	Dike Maintenance Act
	Drainage, Ditch and Dike Act

Best Management Practices

Permits

- Consult with appropriate Qualified Professionals, as needed, to confirm permitting requirements.
- Copies of all issued permits or approvals issued by regulatory agencies (e.g., DFO, Transport Canada and BC Ministry of Forests, Lands and Natural Resource Operations) must be kept on site (e.g., site trailer, construction barge, accommodation vessel) and readily available. This includes permits and approvals issued directly to DFO or CCG, as well as any issued to contractors or subcontractors.
- Construction-related restrictions, conditions or mitigation measures that are included in regulatory permits should be communicated to the field crew(s).

Timing

- Choose appropriate timing of works (weather conditions, regional timing windows for species at risk). Have contingency plans designed and in place to address unforeseen weather events.
- Permits and approvals may include construction timing restrictions. Refer to regulatory permits to see if construction timing is restricted.

- In-water work should aim to occur within the DFO (DFO 2015) or Provincially (BC MOE 2017a) identified least-risk work window for the area, where practicable. Where in-water work cannot be conducted within the least-risk window, additional mitigation measures may be needed and should be developed in consultation with the appropriate regulatory authority.
- Construction timing should be planned to occur outside of the nesting periods for raptors, migratory birds and seabirds, whenever possible. General nesting periods of migratory birds in Canada are provided by Environment and Climate Change Canada (ECCC 2016a). Breeding seasons are provided by ECCC (ECCC 2016b) and Atlas of Breeding Birds of British Columbia (ABBBC n.d.). If unavoidable, mitigation measures must reflect the necessary protocols for avoiding or mitigating harm to birds, nests, and fledglings (ECCC 2016c).

Training

- Project personnel will be adequately trained and will use appropriate personal protective equipment.

Tailgate Meetings

- Applicable Environmental Management Plans (EMP) and regulatory permit conditions will be reviewed by the RPSS Project Manager, Site Manager and Environmental Monitor (EM; where applicable)
- The author of the EMP (or the delegate) will provide a briefing to the crews.

Stop Work

- Where an EM is onsite, they will have authority to issue a Stop Work Order where activities are harming, or may imminently harm the biophysical environment. The EM will make recommendations in the field as needed, to limit or avoid damage to the environment.
- Work will stop and the EM will be contacted for assistance prior to starting or continuing with activities that may pose any environmental or archaeological risk not addressed in project health, safety or environment documents (e.g., EMP, environmental regulatory permit requirements).

Public Notice

- If applicable, proper notice should be given to transportation and navigation authorities to warn of potential disruptions during works.
- Construction areas will be clearly marked and, to the extent necessary, isolated from the public to prevent public access to the active construction site.

Site Cleanliness

- Aesthetic effects created by construction activities will be short-term and localized. The site should be kept tidy during activities and left in a good condition at the end of the project.
- Garbage in the form of coffee cups, lunch wrappers, cigarette butts, and other such items will be placed in covered trash containers at all times.

- Waste or miscellaneous unused materials will be recovered for either disposal in a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown into the aquatic or terrestrial environments.
- Where practicable, recyclable materials, such as drink containers, plastics and paper will be separated onsite and recycled at an appropriate offsite facility.
- Onsite personnel will make best efforts to prevent debris from entering the aquatic and terrestrial environment outside of the worksite.

Wastewater

- Sewage from portable toilets will be disposed of in an approved sewage disposal facility on an as-needed basis.

Contractors/Subcontractors

- Contractors and subcontractors must comply with the mitigation measures outlined in this bulletin and measures identified within applicable regulatory permits or approvals.

Noise and Air Quality

- Machinery must be operated efficiently, to limit noise and air quality effects.
- Noise abatement fittings (e.g., mufflers) on equipment and machinery will be kept in good working order.
- Painting activities should be completed in such a way as to limit fumes entering the environment.
- Smoking will only be permitted in designated areas.
- Fire suppressing equipment must be present at designated smoking areas.
- Fires and burning of rubbish and vegetation is not permitted on work sites.
- Dust will be controlled via the application of water or similar dust control measures.
- Chemical dust suppressants are prohibited.
- To prevent unnecessary local air pollution, anti-idling measures should be put in place when vehicles and machines are not in use.

Paint

- The amount of paint used should be limited and unused containers must be covered.
- Wash water from equipment should be contained and disposed of appropriately.

Safety Data Sheets

- Chemical products must have their applicable Safety Data Sheets onsite and readily available to all construction crew members.

Stock Piles/Laydown Areas

- Stockpiling of material will be conducted in accordance with Best Management Practices (BMPs) and limited to material staging areas and barges, where practicable.
- Stockpiles should remain covered during inclement weather.
- Temporary stockpiling areas located adjacent to the aquatic environment will be approved by the EM and materials will be removed prior to inundation by the tide or high water levels. These sites should be identified in advance of construction.

Soils

- Care should be taken to prevent soils from being exposed and eroded into waterbodies.

Deleterious Substances

- Harmful substances (e.g., fine sediments, hydrocarbons, contaminants) will not be deposited into aquatic environments.
- Storage of fuels and petroleum products will comply with safe operating procedures, including secondary containment devices (e.g., drip trays) in case of a leak or spill.
- Routinely inspect heavy equipment for lubricant and fuel leaks
- Onsite crews will have emergency spill equipment available and readily accessible, and will know how to use it properly.
- Refuel diesel-powered equipment at least 30m from the water.
- Work will be conducted such that no contaminated water or other effluent potentially harmful to aquatic life enters the marine environment. Examples of contaminated water or effluent may include silt laden water, wash water containing concrete, site run off, oil or fuel spills, and sewage.

Sediment

- Where necessary, sediment control measures (e.g., silt curtains) will be used to limit the dispersal of sediments and sediment-laden waters beyond the immediate work area.
- Intertidal work should be conducted at low tide and in the dry where practicable.
- Prop wash should be limited in shallow aquatic environments in such a way to reduce disturbance of sediment.

Power Washing

- Power washing should be limited to the immediate construction area.

Spudding/Anchoring

- Where practicable, crews will position barges and vessels in a way that minimizes damage to sensitive aquatic habitat (e.g., surfgrass, eelgrass, kelp beds, spawning gravels, large woody debris) and alternative

methods will be employed (e.g., use of anchors instead of spuds, flat deck barge rather than spud barge) as needed. In the event that sensitive habitats cannot be avoided, the EM (or appropriate delegate) must approve the location of the spudding or anchoring to construction crews in order to limit disturbance.

- Prop-wash and scouring will be avoided within 30 m of kelp, eelgrass or surfgrass beds, where practicable.

Grounding

- Barge grounding will be avoided to the extent practicable.
- Rock drilling must be conducted conservatively so that physical changes to rock remain small and localized.
- Rock drilling is to be done in the dry (i.e., not in-water).
- Dust and fines entering the water must be avoided (e.g., vacuum or otherwise collect fines and dust).

Blasting

- Blasting will follow the *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright and Hopky 1998).
- In the marine environment, use a protection shield, such as a bubble curtain, around the blast area to limit shockwaves.
- In the terrestrial environment, place rubber mats over the blasting area to limit flying debris.
- Using a sounder, monitor fish movement; if schools of fish are present, blasting may be halted until the fish move out of the area.

Water Quality

- Before allowing water to leave the work site, crews will verify that the following water turbidity criteria are achieved (MOE 2017b):
    - Change from background of 8 NTU at any one time for a duration of 24 h in all waters during clear flows or in clear waters
    - Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters
    - Change from background of 5 NTU at any time when background is 8–50 NTU during high flows or in turbid waters
- Change from background of 10% when background is >50 NTU at any time during high flows or in turbid watersBefore allowing water to leave the work site, crews will verify that water is within the pH range of 7.0–8.7 pH units unless it can be demonstrated that such a pH is a result of natural processes (MOE 2017b).
- Before allowing water to leave the work site, crews will verify that water does not have detectable oil and grease (detectable by sight or smell).

Flora and Fauna (General)

- Activities should be completed in such a way as to limit stress and disturbance to resident flora and fauna (aquatic or terrestrial).
- Construction footprints should be limited to the area necessary to safely complete the works, to reduce effects to nearby soils, vegetation, and resident species.
- Feeding of wildlife is not permitted.
- If dead, sick or injured animals are observed, report to the EM (or delegate) immediately. Also, contact DFO's Observe, Record, Report phone line (1800-465-4336).
- Site-access routes should consider resident flora and fauna, especially during times of the year when they are most sensitive.
- Foot traffic on riparian and foreshore areas will be limited to prevent trampling flora and fauna.
- All activities should be completed in a way that reduces stress and disturbance to resident flora and fauna.
- The project footprint should be clearly defined by construction crews. Equipment presence within the aquatic environment (e.g., intertidal, riparian areas, stream banks) will be restricted to the immediate work area. The establishment of approved work areas will reduce disturbance and the potential to alter, damage, or destroy fish habitat.
- Locations where project activities may occur (e.g., Fixed Aid footprint, barge landing, laydown areas, watercourse crossings, or in-water components) should be inspected for sensitive habitats and species at risk before and during work.
- Work in and around the marine foreshore environment (e.g., tide pools, intertidal areas) that may be affected by project activities will be reviewed in consultation with a Qualified Professional.
- If intakes are used to withdraw water from the aquatic environment, they will be appropriately screened to prevent the entrainment and impingement of fish. Intake screens will be monitored every half hour while in use for fish entrainment and impingement.
- Any instances of fish kill must be reported to the EM promptly. It is the EMs responsibility to inform the relevant regulatory agency (DFO or Ministry of Forests, Lands and Natural Resource Operations)
- Site- or project-specific mitigation measures may be needed to limit or avoid damage to sensitive habitats or species (e.g., abalone presence, herring spawn in the marine environment; spawning gravels in the freshwater environment). A Qualified Professional should be consulted to identify sensitive habitats in advance of construction, where appropriate.

Birds

- When travelling near seabird colonies, travel parallel to shore rather than approaching a colony directly.
- Avoid travelling through areas where concentrations of seabirds are observed on water.
- Avoid sharp loud noises, blowing whistles or horns, and maintain constant engine noise levels when within 300 m of seabird colonies.
- If breeding birds, seabird colonies or nests are encountered at the construction site, contact the EM (or delegate) for guidance. If work is expected to occur during the nesting window for raptors, migratory

birds or seabirds, construction should not go ahead until given approval by the EM and, if required, under applicable regulatory permits. If allowable, work must be conducted as efficiently as possible and not disturb birds, nests, and their fledglings. Walk with care as nests and juveniles can be camouflaged on the ground.

- Site- or project-specific mitigation measures (e.g., no-disturbance buffers)) may be required where breeding birds, seabird colonies or nests are encountered at the construction site; attempts should be made to identify these resources ahead of construction.

Brushing/ Falling

- No falling will occur without the EM's (or delegate) prior knowledge and approval and must follow applicable regulations.
- Prior to brushing and falling, the area will be inspected for bird nests, wildlife dens and culturally modified trees. Trees containing these features will not be removed without approval from the EM (or delegate) and under appropriate permits, if applicable.
- Prior to brushing and falling, the EM (or delegate) will monitor trees and understory vegetation within 30 m of the construction site for nesting activity. The EM should monitor the active trees and branches identified for brushing and falling, including the path for falling, for a minimum of 15 minutes (or longer, if necessary) to assess nesting activity.
- If an active raptor, migratory bird, or seabird nest or cavity is identified directly at a construction site (i.e., at or within 10 m of the site), brushing and falling activities should be stopped and the EM should consult with a wildlife biologist.
- If an active raptor, migratory bird, or seabird nest or cavity is identified near a construction site, the EM (or delegate) should initiate monitoring activities (described below) for the duration of construction at those sites.
- If an inactive active raptor, migratory bird, or seabird nest or cavity is identified at a construction site, brushing and falling activities can be completed as scheduled.
- If an inactive bald eagle, peregrine falcon, osprey, or great blue heron nest is present in a tree that is proposed to be fallen or within the pathway for falling the EM will determine how to proceed as unoccupied nests of these birds are protected year round.
- Physical injury to tree roots, bark, trunk and crown (e.g., from machinery) will be avoided.
- Use discretion when deciding whether to remove cut debris or leave it on site. In remote sites, cut or brushed debris may be left above highest high water or top of bank to decompose. Remove debris from sites that are not remote.
- Do not dispose of or leave cut vegetation debris in the aquatic environment.

Archaeological and Heritage Resources

- Archaeological and heritage sites in remote locations are not likely to have been previously identified. Care should be taken to avoid archaeological deposits while work is being completed. If an archaeological

or heritage resource is encountered during construction, the work should be stopped in the vicinity of the find and the work crew the EM (or delegate) notified.

- Inspect the proposed construction site footprint (including laydown areas, temporary work areas, and barge landings) for archaeological evidence (e.g., rock art pictographs and petroglyphs) before construction activities (e.g., power washing, rock drilling, concrete pour). If project activities will impact an archaeological site, stop work and contact the EM (or delegate). Trees should be inspected for cultural modification prior to brushing or falling.
- The location of Aboriginal communities and information pertaining to their potential or established Aboriginal or Treaty rights can be found on ATRIS (INAC 2017).

References

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Bulletin 4: Machinery Operation

Background

Project activities often require machinery such as excavators, drilling equipment, and large trucks. Such equipment introduces the potential for harm to the environment from such things as soil erosion and sedimentation, and the release of harmful chemicals (e.g., hydraulic fluids). Best management practices (BMPs) serve as planning tools that, when implemented successfully, will avoid or reduce these adverse environmental effects and should be considered prior to the start of work.

Best Management Practices

In addition to the BMPs outlined below, refer also to the "GENERAL OPERATIONS" bulletin.

- Be familiar with, and follow, relevant Acts and Regulations.
- Limit the construction footprint to the area needed to safely complete the work, thus reducing effects on nearby soils, vegetation, and resident species.
- Machinery should be clean when it arrives on site and will be maintained free of fluid leaks, invasive species, and noxious weeds (DFO 2016).
- Machinery must be operated efficiently to limit noise and air quality issues.
- Carry out work during appropriate timing of works (weather conditions, species at risk regional timing windows) (BC MOE 2017a; DFO 2015).
- Have contingency plans designed and in place to address unforeseen weather events.
- Wash, refuel and service machinery and store fuel and other materials for the machinery in a way that prevents them from entering the water.
- Store fuels and petroleum products in accordance to safe operating procedures and have a spill response plan and emergency spill kits on-hand.

- In addition to the spill kits on site, each piece of mobile equipment (e.g., cranes, concrete trucks) should have a vehicle spill kit. The suggested contents of the spill kit include:
  a) 25 x Oil Only/Marine Pads (White)
  b) 2 x Oil Only/Marine Absorbent Socks (White)
  c) 2 x Nitrile Gloves
  d) 2 x Disposable Non-Latex Gloves
  e) 2 x Splash Goggles
  f) 2 x Waste Labels/Zip Ties
  g) 2 x Hazmat Disposal Bags
  h) 1 x Sharpie- Permanent Black Marker
  i) 1 x Jug Universal or Oil Only/Marine Floor Dry (3lbs)
  j) 1 x Hand Broom, Dustpan and Hand Shovel
  k) 1 x 10 oz Plug'n'Dike
  l) 1 Laminated Contents Listing Sheet

- Vehicles should not be operated below the line of Highest High Water in marine environments (BC MPDCA 2003) or the High Water Mark in freshwater environments (DFO 2016). Vehicles should be operated from the land, on ice, or on a floating vessel above the Highest High Water or the High Water Mark in a way that limits disturbance to the banks, shorelines, or bed of a water body.
- Avoid crossing a watercourse or water body with machinery to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are needed, build a temporary crossing structure (DFO 2016).
- Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
- Do not ford, place crossing materials, or operate machinery on the bed of a waterbody where *Species at Risk Act* (SARA)-listed shellfish occur, or critical habitat or residences of freshwater SARA-listed aquatic species occur.
- At the discretion of the Environmental Monitor (EM), or delegate, drip trays that can contain 150% of the fuel will be placed beneath machinery, equipment and fuel storage facilities that are within 30 m of the Highest High Water mark (or on vessels) or within 30 m of the High Water Mark in freshwater environments.
- Hydraulic hoses and couplings should be inspected and be kept free of leaks and excess hydrocarbons before use near aquatic environments.
- Containers will be sealed with a properly fitting cap or lid when not in use.
- Select environmentally sensitive hydraulic oils when feasible.
- Refer also to "FUEL TANK SECONDARY CONTAINMENT" bulletin.

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Bulletin 5: Power Washing and Surface Cleaning

Background

Power washing is often used when cleaning surfaces of heavy equipment, vehicles, building exteriors, sidewalks, and parking lots. These surfaces may be coated in pollutants such as fine sediment, oil or grease, detergents, paint, or other chemicals that may contaminate soil and water. Best management practices (BMPs) serve as planning tools that, if implemented successfully, will avoid or mitigate harmful environmental effects and should be considered prior to the commencement of work.

(County of Sacramento, 2008)

Biophysical Environment

(County of Sacramento, 2008)

Power washing has the potential to mobilize contaminants and other substances that may harm the surrounding environment. Waste water generated during power washing that is not properly contained may flow directly into soil, watercourses and waterbodies (including marine systems) or indirectly via drainage systems such as storm drains. Unlike sewer systems, storm drains discharge into watercourses and waterbodies without treatment. Wastewater containing pollutants or hazardous materials can harm aquatic ecosystems and contaminate local drinking water. Contaminated water should be appropriately contained and treated.

Best Management Practices

Refer also to the 'GENERAL OPERATIONS' bulletin.

(County of Sacramento, 2008)

Pre-plan

- Be familiar with and adhere to relevant Acts and Regulations. Obtain necessary permits and approvals for wastewater disposal.
- Identify storm drains and natural watercourses and waterbodies in the area where runoff from power washing could enter.
- Determine appropriate wastewater containment, collection,

and disposal methods in advance of power washing.

Pre-clean and Site Preparation

- Dry sweep or spot clean (e.g., use oil absorbent pads for oily deposits) whenever possible to remove debris before power washing surfaces.
- Block, or otherwise protect, storm drains or natural watercourses that may be impacted by activities (e.g., using berms or storm drain covers).

Washing

(County of Sacramento, 2008)

- Limit water usage and use bio-friendly products to the extent practicable.
- Avoid mixing hazardous and non-hazardous wastewater to limit disposal costs.
- Work will be conducted such that contaminated water or other effluent potentially harmful to aquatic life does not enter the aquatic environment. Contaminated water or effluent may include silt-laden water, oil or grease, detergents, and other chemicals.
- Limit and isolate the portion of the site subject to power washing.

Collection

- Contain and collect wastewater using appropriate measures and equipment (e.g., berms, storm drain covers, vacuums, pumps).
- Harmful substances (e.g., fine sediments, hydrocarbons, paint, contaminants) will not be deposited into fish habitat.
- Use oil absorbent pads on top of collected wastewater to limit recontamination of cleaned surface.
- Avoid leaving behind residues and visible solids.

(County of Sacramento, 2008)

Disposal

- Evaluate collected wastes and wastewater to determine appropriate disposal methods.

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Bulletin 6: Rock Drilling and Excavation

Background

Projects often require the use of heavy equipment such as rock drills and excavators. The use of these machines can cause harm to the biophysical environment through soil contamination, soil erosion, site flooding, or sediment-laden storm water runoff. Best management practices (BMPs) serve as planning tools that, if implemented successfully, will avoid or mitigate harmful environmental effects and should be considered before the start of work.

Best Management Practices

Refer also to the 'General Operations' and Machinery Operations' bulletins.

- Be familiar with, and adhere to, the relevant Acts and Regulations.
- Always call **BC One Call at 1-800-474-6886**, before digging or drilling, and confirm the location of any underground facilities through use of a locator. Unexpected damages could result in personal injury, loss of life, environmental damages, or the disruption of essential services to the local community (BC One Call 2017).
- Choose appropriate timing of works (weather conditions, species at risk regional timing windows) (BC MOE 2017b; DFO 2015).
- Have contingency plans designed and in place to address unforeseen weather events (BC MOE 2017a).
- Ensure contractor is bringing in clean/ non-contaminated materials and verify documentation is provided.
- Rock drilling and excavation activities must be conducted conservatively so that physical changes to rock are limited in size and are localized.
- Limit the amount of dust and fines entering the water (e.g., water spray, vacuum, collect fines, reduce dust). Increased sedimentation can cause turbidity in the water column and stress aquatic life
- Rock drilling is to be done on land (i.e., not in-water), to the extent practicable.

- Loose material at excavation sites should be managed to avoid excessive migration of silt and debris to nearby waters, especially during heavy rainfall events
- Blasting will follow the *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*.
- Unless previous assessments indicate the area is not likely to have potential contaminants of concern, excavated materials removed from site should be evaluated for contamination prior to re-use or disposal (Yale EH&S 2017). Contact the RPSS Regional Office of Environmental Coordination or consult with an environmental consultant.
- Archeological sites in remote locations are not likely to have been previously identified. Care should be taken to look out for archaeological deposits while work is being completed. Consult RPSS's First Nations Engagement Coordinator or a Qualified Professional if archaeological or heritage resources are identified, or if there is uncertainty.
- Work must be stopped if evidence shows a potential archaeological artifact or deposit.
- Excavated materials stockpiled on site should be protected from weather exposure and run-off, to prevent sediment migration (e.g., ground tarp and covers, store away from water courses)

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Bulletin 9: Concrete Works

Background

(Burton Marine Pile Driving Inc. 2017)

Concrete is made up of cement, water, and other aggregate materials. Cement is a mixture of limestone and clay which contain oxides of calcium, aluminum, silicon and other metals (EPA 2012). Best management practices (BMPs) serve as planning tools that, if implemented successfully, will avoid or mitigate adverse environmental effects associated with the use of concrete, and should be considered prior to the commencement of work.

Best Management Practices

In addition to the BMPs outlined below, refer also to the "GENERAL OPERATIONS" bulletin.

Mixing and Pouring

- Schedule concrete work during dry weather, when feasible.
- Carefully estimate the quantity of concrete required to avoid excess waste.
- Consider alternative foundations that may require less concrete (e.g., pre-cast concrete systems).
- Limit the use of chemical additives.
- If concrete is to be mixed on the worksite, store cement bags in a leak-proof, covered container to provide protection from wind or rain/snow and other influences (e.g., waves).
- During mixing operations, once cement bags are opened, take all necessary precautions to limit dispersal of dry cement by the wind.
- When pouring concrete, spills of fresh concrete must be prevented. If concrete is discharged from the transit mixer directly to the form work or placed by wheelbarrow, proper sealed chutes should be constructed to avoid spillage. If the concrete is being placed with a concrete pump, all hose and pipe connections must be sealed and locked properly to limit the chance of leaks or uncoupling.
- If concrete is transported and discharged by crane and hopper, hopper will be inspected for structural integrity prior to being elevated by crane.
- Crews will monitor that concrete forms are not filled to overflowing.
- If scribe work is required, crew will ensure that forms are fitted tight to the rock surface to avoid concrete escape from the bottom of the form.

Pouring Concrete Near Water

- In the marine environment, concrete pouring work that must occur below the Highest High Water Mark should be scheduled to occur during periods of low tide, when the site is exposed or dry.

(Concrete Washout Filter (EPA 2012), *Mark Shaw, Ultra Tech International, Inc.*)

- In freshwater environments, concrete pouring work that must occur below the High Water Mark should be scheduled to occur during periods of low water levels (e.g., summer low flows).
- Operators should be familiar with spill response procedures, and have the appropriate spill response equipment on hand, in case of an environmental emergency to limit any deleterious impact on the surrounding environment.
- Prevent water (e.g., rain/snow) that contacts uncured or partly cured concrete (during activities such as exposed aggregate wash-off, wet curing, or equipment washing) from entering aquatic environments (directly or indirectly).
- Once pouring has ceased, forms should be wrapped in plastic for two tidal cycles or until cured (e.g., 72 hours) to isolate the wet/setting concrete from weather (e.g., rain and snow).
- Concrete forms will be constructed and sealed in a manner which will prevent fresh concrete or cement laden water from leaking into surrounding water.
- The integrity of the form work should be routinely inspected prior to, during and immediately after the pour. Deficiencies should be addressed immediately.
- Keep a CO_2 tank with regulator, hose and gas diffuser available and train staff to neutralize spills.
- Monitor runoff for acceptable pH levels and contain and neutralize, if necessary. (Ensure a pH monitor is accessible to measure the pH levels.)
- Onsite concrete tests (e.g., slump tests) will be conducted in a contained area (e.g., a leak proof tray) to prevent the deposition of deleterious substances into the aquatic environment.

Spills

- Accidental release of concrete will be, appropriately, cleaned up prior to curing.
- Spill clean-up materials, such as tarps and shovels should be readily available on site.
- Immediately report any spills of uncured concrete, concrete fines, wash or contact water of reportable quantities to the onsite Environmental Monitor (EM; or delegate). It is the contractor's legal responsibility to notify the BC Environmental Emergency Management Branch of any reportable spills, hotline 1-800-663-3456.
- Immediately implement emergency mitigation and clean-up measures (such as use of carbon dioxide gas, if required, and immediate removal of the material).

Washwater Recycling, Treatment and Disposal

- The cleaning of concrete and cement laden materials (e.g., tools and equipment) must be conducted in a contained area to prevent the release of deleterious substances (e.g., washwater) into the marine and terrestrial environments.

- Collect and contain washwater from tools, pumps, pipes, hoses and trucks in leak proof containers. Workers will be made aware of all washout locations and will be watchful for improper dumping of material.
- Tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh concrete must be washed off in such a way as to prevent the wash off water from entering the aquatic environment.
- Sealed, leak-proof containers for washwater from concrete delivery trucks, concrete pumping equipment, and other tools and equipment must be provided to prevent the release of deleterious substances into the receiving environment.
- Water that contacts uncured or partly cured concrete shall be isolated and held until the pH is between 7.0 and 8.7 and the turbidity is less than 100 nephelometric turbidity units (NTU), or other level approved by the onsite EM, before being released into waters frequented by fish and other marine organisms.
- Do not completely fill washwater containment basins; allow for sufficient freeboard. Washout containers will not exceed 75 percent capacity to prevent overflows.
- Filtered washwater can be reused for making concrete or to continue cleaning equipment. Concrete washwater will be contained and removed offsite to a designated facility or at the manufacturer's place of business. In the event that the washwater must be disposed of on site, the washwater must be neutralized (e.g., Carbon dioxide tank with regulator, hose and gas diffuser) and filtered through a sediment control device, under the supervision of an EM.

Waste Control

- Filtered aggregate can be reused in making fresh concrete at the construction site or returned to the concrete mixing facility.
- If concrete cutting occurs on site, concrete dust will be collected (e.g., vacuum, wet sweeping) and disposed of appropriately.
- Excess/unused concrete will be removed from the site and disposed of/recycled offsite, appropriately, at an approved facility.
- Collect and dispose of concrete chips at an approved disposal site. Other waste materials collected during the concrete pouring operations should be retained for disposal at a municipal landfill. Waste materials must not be deposited into the aquatic environment, including riparian zones and marine foreshore.
- Waste deposited in exposed (dry) intertidal areas will be collected daily before the area is inundated by the tide.
- Depositing of concrete waste into the unexposed (wet) subtidal areas during demolition will be avoided, and deposited waste will otherwise be recovered from these areas where safely possible.
- Cured concrete waste, such as waste created during base demolition, will be collected and disposed of at an appropriate offsite facility.

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Bulletin 12: Vegetation Brushing

Background

The clearing of vegetation is sometimes necessary to create enough workable space for construction activities or for safety (e.g., clearing vegetation around helicopter-landing areas). Vegetation is an important component of local ecosystems as it, among other things, provides habitat for other living organisms, moderates local temperatures and ground moisture, limits soil erosion, and provides nutrients to surrounding soils and water bodies. Best management practices (BMPs) serve as planning tools that, if implemented successfully, will avoid or mitigate harmful environmental impacts resulting from vegetation brushing and should be considered prior to the commencement of work.

Best Management Practices

In addition to the BMPs below, refer also to the 'GENERAL OPERATIONS' and 'IN-WATER WORKS' bulletins.

Preparation

- Species at risk must be considered before brushing activities occur; contact your Environmental Officer.
- Brushing activities that are not part of maintenance or repair of existing physical work require an Environmental Assessment under the Canadian Environmental Assessment Act.

Brushing Activities

- Complete all activities in such a way that minimizes stress and disturbance to surrounding ecosystems (e.g., soil, noise etc.) (CCG, 2009).
- Avoid the removal of wildlife trees and other vegetation that would affect birds and other wildlife that are breeding or roosting (BC MWLAP, 2004).
- Removal, relocation or destruction of bird nests is prohibited without prior approval. When topping or removing trees within riparian areas, have them assessed by a qualified professional biologist. Fall away from the channel if safe to do so and clean up all woody debris (BC MWLAP, 2004).

- When removing hazardous trees, consult with a professional arborist (BC MWLAP, 2004).

Riparian Areas

- Minimize riparian vegetation removals. If unavoidable, use proper clearing techniques and protect retained vegetation (Coker, Ming & Mandrak, 2010).
- Methods such as selective or phased vegetation removal or species management should be used to maintain or reduce shade on stream and provide specialized riparian communities or habitats (Coker et al., 2010).
- Prohibit or limit access to banks or areas adjacent to waterbodies, to the extent required to protect the structural integrity of banks or shorelines (Coker et al., 2010).
- Use sediment and erosion control methods to minimize the erosion of exposed soils to adjacent waterbody (e.g., erosion control fencing, fabrics, straw) (Coker et al., 2010).
- Use in-water silt curtains to contain suspended sediments, if required (Coker et al., 2010).
- Properly store and dispose of all generated debris (e.g., organics, soils, woody debris, temporary stockpiles, construction debris) during all phases of operation in a manner that mitigates their entry to waterbody (Coker et al., 2010).

Site Clean Up

- Use discretion when deciding whether to remove cut debris or leave it on site. In remote sites, cut debris may be left above highest high water to decompose. Remove debris in sites that are not remote or when there is a copious amount of debris (CCG, 2009).

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APPENDIX D

RDH BUILDING CODE REVIEW SUMMARY

RDH BUILDING SCIENCE

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Making Buildings Better™

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BE Consulting

DATE October 2, 2018

REGARDING **Summary of Building Code Requirements**

Dear Mr. Childs,

This letter summarizes our review of the building code requirements for the planned equipment building at the Amphitrite Point Coast Guard Facility in Ucluelet, BC. The building code analysis is based on the requirements of the 2015 National Building Code of Canada (NBCC), on the design drawings issued on September 30, 2018, and on subsequent information provided about design changes provided by Fisheries and Oceans Canada.

Building Code Summary

Applicable Building Code:	NBCC 2015
Type of Work:	New Construction
Basis for Code Analysis: Requirements (Division B) Part 3	Acceptable Solutions and Prescriptive
Building Area:	232.81 square meters

Occupant Loads (Table 3.1.17.1.)

Electronics Equipment Room:	7.0 persons [65.0m2(1 person / 9.30m2)]
Electronics Equipment Storage	0.2 persons [10.00m2(1 person / 46.00m2)]
Washroom	N/A
Entry/Mud Room	N/A
Storage Garage:	1.1 persons [51.60m2(1 person / 46.00m2)]
Service Room:	3.4 persons [31.5m2(1 person / 9.3m2)]
Helicopter Gear Storage:	0.4 persons [18.10m2(1 person / 46.00m2)]
Total Occupant Load:	12.1 (12) persons

Building Size and Construction

Major Occupancies:	F-3
Subsidiary Occupancies:	None
Streets Facing:	2 streets
Building Height:	1 storey
Governing Article:	3.2.2.80. Group F, Division 3, One Storey
Automatic Sprinklers:	No
Fire Alarms:	Not Required (3.2.4.1.)
Permitted Type of Construction:	Combustible or non-combustible [3.2.2.81.(1)]
Fire Suppression:	Halon in server room

Combustible Insulation and Its Protection

Foamed Plastic Insulation:

Foamed plastics that form part of a wall assembly shall be protected from adjacent spaces by interior finish described in Subsections 9.29.4 to 9.29.9 or any thermal barrier that meets the requirements of Sentence 3.1.5.15.(3).

This includes minimum 12.7 mm thick gypsum board mechanically fastened to a supporting assembly independent of the insulation and with all joints either backed or taped and filled, and plywood meeting the requirements of Table D-3.1.1.A. (see below under Interior Finishes).

Interior Finishes

Flame Spread Rating:

Maximum 150 [3.1.13.2.(1)] Most common plywoods meet this requirement (see excerpt from Table D-3.1.1.A. below)

Table D-3.1.1.-A
Assigned Flame-Spread Ratings and Smoke Developed Classifications for Combinations of Wall and Ceiling Finish Materials and Surface Coatings(1)

Materials	Applicable Material Standard	Minimum Thickness, mm	Surface Coating	
			Unfinished	Paint or Varnish not more than 1.3 mm Thick, Cellulosic Wallpaper not more than One Layer(2)(3)
Douglas Fir plywood(4) Poplar plywood(4) Plywood with Spruce face veneer(4)	CSA O121 CSA O153 CSA O151	11	150/100	150/300
Douglas Fir plywood(4)	CSA O121	6	150/100	150/100

Fire Resistance Rating of Building Components

Roof	None (3.2.2.80.)
Load Bearing Elements:	None (3.2.2.80.)

Safety Within Floor Areas (3.3)

Separation of Suites:	Min 45mins [3.3.1.1.(2).]
Fire Separations Between Major Occupancies:	N/A
Fire Separation Within Occupancies:	
Service Room (Emergency Gen)	2 hours [3.6.2.8.(1)]
Service Room (Electrical)	45 mins [3.3.1.1.(2).] If equipment is limited and neither constitutes a fire hazard nor is essential to the operation of life safety systems [3.6.2.8.(1)]
Storage Garage	1.5 hours [3.3.5.6.(1)]
Equipment Storage	45 mins [3.3.1.1.(2).]
Server Room	1.0 hours (NFPA75)
Mud Room	45 mins [3.3.1.1.(2).]
Fire-Protection Rating of Doors:	As per Table 3.1.8.4. Fire Protection Rating of Closures

Fire Resistance Ratings of Fire Separations and Doors

Wall Assemblies

Several wall assemblies that meet the fire resistance ratings for the required fire separations can be found in table A-9.10.3.1.A of the NBCC. Below are steel stud framed options for non-load bearing conditions.

45 Min Wall Assembly	31 x 64 mm steel studs @ 400 mm or 600mm o.c. 1 layer 15.9 mm Type X gypsum board both sides [A-9.10.3.1.A (S1c)] Or 31 x 92 mm steel studs @ 400mm o.c. 1 layer 15.9 mm Type X gypsum board both sides [A-9.10.3.1.A (S4d)]
1.0 Hour Wall Assembly:	31 x 64 mm steel studs @ 600mm o.c. 1 layer 15.9 mm thick Type X gypsum board one side 2 layers 15.9 mm thick Type X gypsum board other side [A-9.10.3.1.A (S2e)] Or 31 x 92 mm steel studs @ 600mm o.c. 1 layer 15.9 mm thick Type X gypsum board one side 2 layers 15.9 mm thick Type X gypsum board other side [A-9.10.3.1.A (S5e)]
1.5 Hour Wall Assembly:	31 x 64 mm steel studs @ 600mm o.c. 2 layers 12.7 mm thick Type X gypsum board both sides [A-9.10.3.1.A (S3i)] Or 31 x 92 mm steel studs @ 600mm o.c. 2 layers 12.7 mm thick Type X gypsum board both sides [A-9.10.3.1.A (S6i)]
2.0 Hour Wall Assembly:	31 x 64 mm steel studs @ 600mm o.c. 2 layers 15.9 mm thick Type X gypsum board both sides [A-9.10.3.1.A (S3g)] Or 31 x 92 mm steel studs @ 600mm o.c. 2 layers 15.9 mm thick Type X gypsum board both sides [A-9.10.3.1.A (S6g)]

Gypsum board to conform to NBCC Article 9.29.52(1)(b): ASTM C 1396/C 1396M, “Gypsum Board,” except that the flame-spread rating of gypsum board shall be determined in accordance with CAN/ULC-S102, “Test for Surface Burning Characteristics of Building Materials and Assemblies.”

The outer layer of finish on both sides of the wall must have its joints taped and finished.

Fastener types and spacing must conform to CSA A82.31-M, “Gypsum Board Application.”

Egress Requirements of Areas

Maximum Travel Distance:	30m [3.4.2.5.(1)(f)]
Service Room (Emergency Gen)	19.8m (Actual)
Service Room (Electrical)	9.5m (Actual)
Storage Garage	19.8m (Actual)
Electronics Equipment Room	19.8m (Actual)
Electronics Equipment Storage	9.5m (Actual)
Washroom	7.8m (Actual)
Entry/Mud Room	5.2m (Actual)
Minimum Width of Exit Door Opening:	800mm

Other Safety Requirements

Emergency Lighting Required:	At exits and access to exits 3.2.7.3.(1)(a) and (b)
Emergency Power for Lighting:	30 minutes [3.2.7.4.(1)(a) and (b)(iv)]
NFPA Sprinkler Standard:	N/A
Exit Signs Required:	No [3.4.5.1.(1)(a)(b) and (c)]

2018-10-02

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Nicola Alexander | B.Arch.Sci.
Technologist
Reviewed by

CC Christy Love, RDH Building Science Inc. EMAIL clove@rdh.com

APPENDIX E

HISTORIC UNDERGROUND LOCATE INFORMATION

ScanPlus
Locating Ltd.

Office: 778-352-4770
Toll Free: 884-480-7226
Email: info@scanplus.ca

Address:
950 Coast Guard Road
Ucleulet, BC

Job/Po Number:

Date: February 14, 2018

Comments and Marking:

BC One Call Reviewed. Utilities painted on the ground and flagged.

Legend Additional:

Communications	com	Gas	G	Storm / Sewer	S
Water	W	Hydro / Power	H	Unknown ???	???

Stake out:

N
W E
S

Please see Page #2 for map.

Not to Scale

Disclaimer: The location of the marked utility is approximate only. This locate is **valid for up to 10 business days so long as the markings are visible.** All ground disturbances in proximity to buried utilities must follow WorkSafe BC regulation 20.79 Excavations, Underground Utilities. ScanPlus Locating Ltd will not accept any liability for damages incurred as a result of this locate

You are responsible for any damages caused to the facility by your operations

Located by: Kelby Wittich

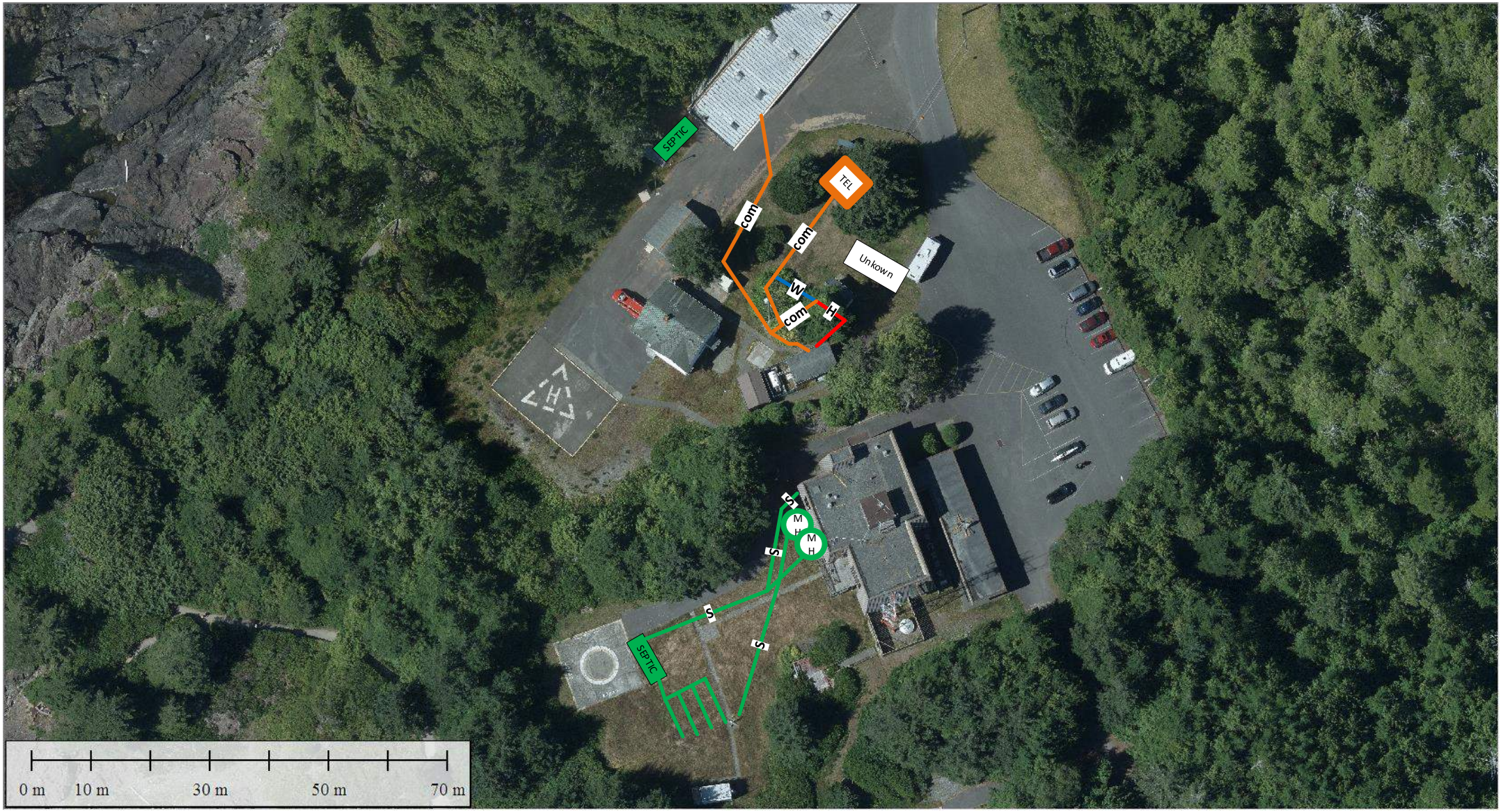
☑ Email ☐ Left on Site

Client Name: Corinne Couture

Client Company Name : SLR Consulting

Signature: _____

ScanPlus
Locating Ltd.



ScanPlus
Locating Ltd.

Office: 778-352-4770
Toll Free: 884-480-7226
Email: info@scanplus.ca

Address:
950 Coast Guard Road
Ucleulet, BC

Job/Po Number:

Date: July 26, 2018

Comments and Marking:

No BC One Call provided. All utilities marked with paint on the ground.

Legend Additional:

Communications	com	Gas	G	Storm / Sewer	S
Water	W	Hydro / Power	H	Unknown ???	???

Stake out:

See page 2 of 4 for locate map.

Not to Scale

Disclaimer: The location of the marked utility is approximate only. This locate is **valid for up to 10 business days so long as the markings are visible.** All ground disturbances in proximity to buried utilities must follow WorkSafe BC regulation 20.79 Excavations, Underground Utilities. ScanPlus Locating Ltd will not accept any liability for damages incurred as a result of this locate

You are responsible for any damages caused to the facility by your operations

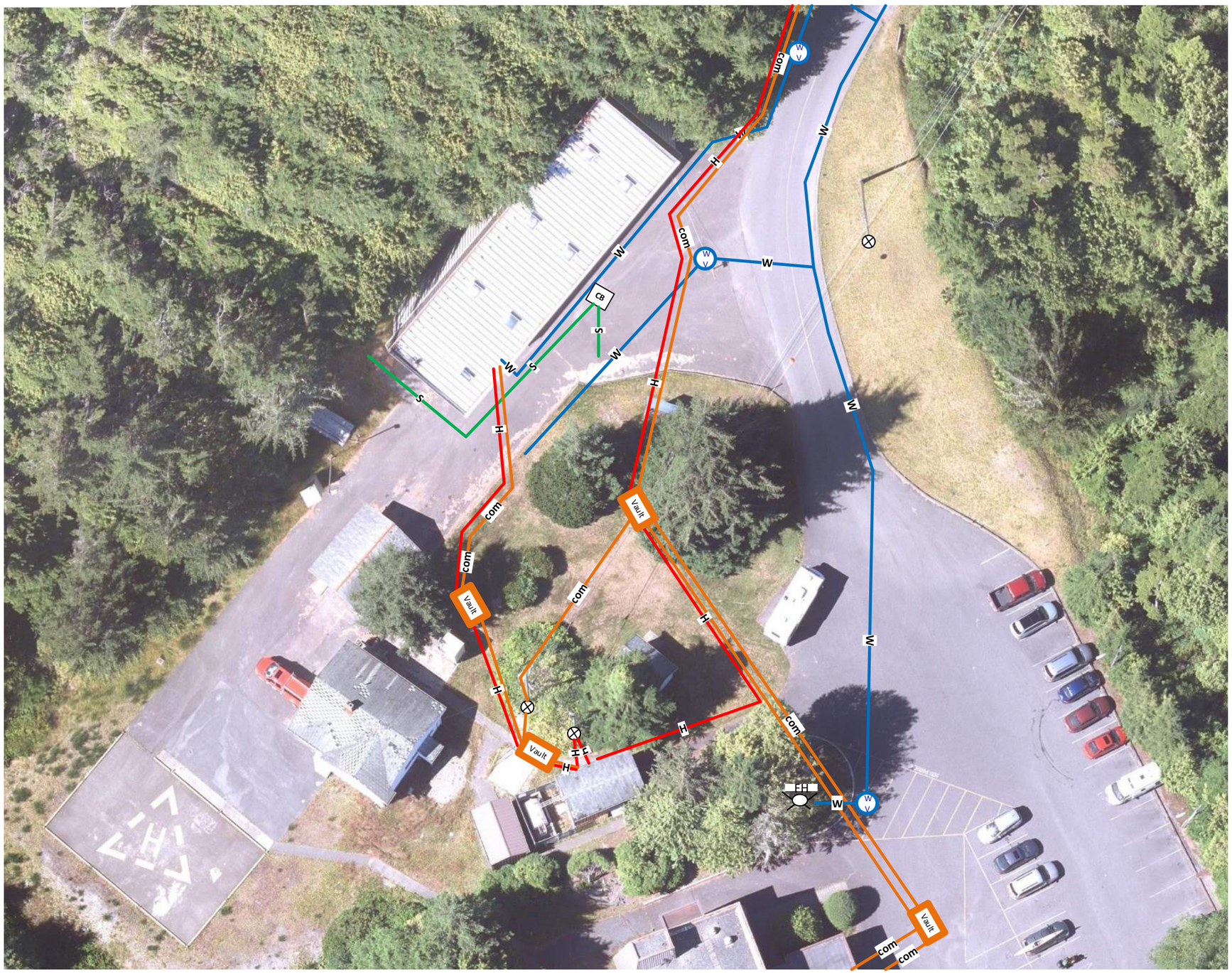
Located by: Kelby Wittich

☑ Email ☐ Left on Site

Client Name: Stephen Childs

Client Company Name : Fisheries and Oceans Canada - DFO

Signature: _____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SUBSURFACE SURVEYS

Address: 225 Lake Park Rd., Lake Cowichan, BC, V0R 2GD
Phone: 250.891.9364
Email: info@geoscan.ca
Web: www.geoscan.ca

Utility Locating	J130215-01
Customer Information: OCEAN NETWORKS CANADA	Site Address: VICTORIA - AMPHITRITE L/H
Customer P.O #	Date:
Time In/Out 1330 - 1430	Travel Time: 5 hrs.
BC ONE INFORMATION PROVIDED BY: GeoScan ☐ Client ☐ ID#	Technician(s): D. PALMER
Utilities marked with: Paint ☒ Flag ☐ Stake ☐	Job Site Contact: RYAN. Phone #: 250-503-7197
DIGITAL MAP REQUESTED? ☐	POST-PROCESSING REQUIRED? ☐ CONCRETE SCANNING REQUIRED? ☐
# VAPOUR PROBE INSTALLED	TOTAL TIME CONCRETE SCANNING FOR VAPOUR PROBES

Utility Locating Drawing Legend

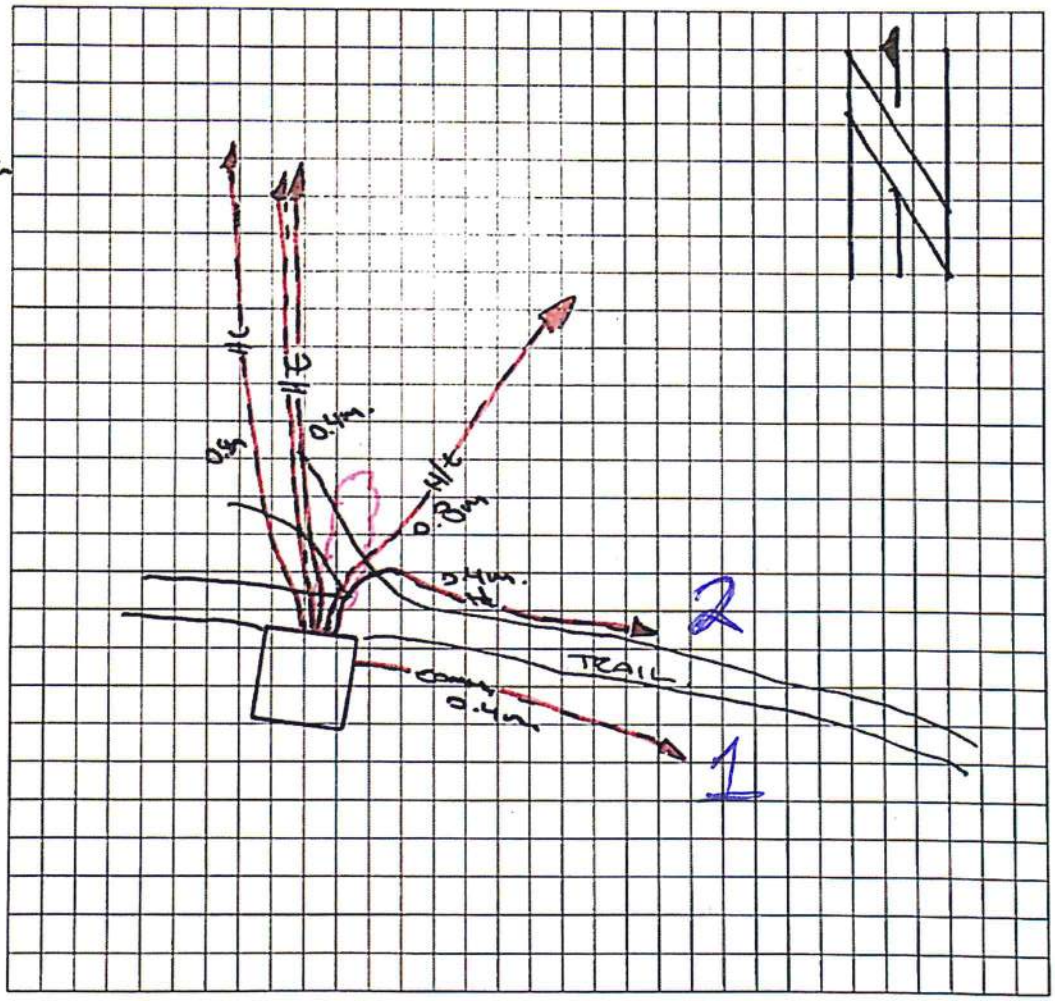
--G-- (Yellow)	Gas / Oil / Steam	--S-- (Green)	Radar Lines / Sanitary - Sewer
-E- (Red)	Electrical	--?--	Unknown Utility
-C- (Orange)	Communications	--A--	GPR Anomaly
--W-- (Blue)	Water	⊕	Client Borehole

Located Utilities

Utility	Drawing Provided?	Located?	Signal Quality	Equipment Used
Gas	☐ N/A	☐		
Water	☐ N/A	☐		
Electrical	☐	☑	Good	GPR/EM
Communications	☐	☑	Good	GPR/EM
Storm Sewer	☐ N/A	☐		
Sanitary Sewer	☐ N/A	☐		

NOTES

- LOCATED ALL HYDRO/COMM CABLES LEAVING COMM BUILDING.
- AREA OF EXCAVATION.
- ALL CABLES HOADED TOWARDS ANTENNA'S.



Technician's Signature D. Palmer

Customer's Signature

By signing, the customer acknowledges that he/she has read and understands the following terms and conditions, and agrees to be bound by them. The customer is responsible for marking all areas to be scanned and for clearing these areas of all debris before the work is performed. GeoScan Subsurface Surveys Inc. is not responsible for any loss or damage arising out of the use of, or reliance on, the subsurface data collected or the report presented. GPR signal depth penetration varies from site to site depending on the water table and ground material. GPR sweeping around a borehole location will survey an area around that

APPENDIX F

CCG ARCHAEOLOGICAL CHANCE FIND PROTOCOL

CHANCE FIND PROTOCOL: ARCHAEOLOGICAL SITES IN BRITISH COLUMBIA'S COASTAL REGION

Chance Find Protocol

Archaeological Sites in British Columbia's Coastal Region

This document presents a descriptive summary of archaeological sites commonly found in British Columbia's coastal region and provides contractors with a protocol should archaeological sites be encountered during the course of ground disturbing activities. It is recommended that all people involved in ground disturbing activities become familiar with the types of archaeological sites present in the region of development and what to do in the event of a chance find.

What is an archaeological site?

Heritage sites and objects on private and Provincial Crown Land in British Columbia that predate 1846 are protected under the *Heritage Conservation Act* (HCA), which is administered by the Archaeology Branch of the Ministry of Forests, Lands and Natural Resource Operations. Heritage resources specifically protected by the Act include Provincial heritage sites, burial places with historical or archaeological value, aboriginal rock paintings or carvings, sites with evidence of human habitation or use before 1846 and heritage wrecks.

Common archaeological sites in the region:

Shell midden: Shell midden is typified by the presence of shellfish (clam, mussel, scallop, etc.) shells discarded after the consumption of shellfish. Shell midden also commonly contains charcoal, ash and burnt sediments, fire-broken rock, and stone, bone and antler artifacts. Shell midden deposits vary from small pockets to very large sites many hundreds of metres long. They are usually but not only found along or near the shoreline. Shell midden sites often represent villages or seasonal encampments where shellfish were consumed in quantity. Shell midden deposits are unique inasmuch as the shells neutralize soil acidity, such that archaeological materials that usually degrade quickly are preserved. Artifacts of bone and antler, faunal remains, and human bone all preserve in shell midden.

> Tools manufactured from bone/antler: Tools manufactured from the bones of land and sea mammals or of antler from land mammals vary in size, form and function but on the coast are largely associated with fishing economies. These are known to have served as parts of spears, gaffs, fish hooks, harpoons, etc. Others were used as multipurpose tools like awls or as wedges/chisels for woodworking and some bone/antler artifacts were simply fashioned as decorative items. These types of artifacts may be found along the ground surface or buried, often within shell midden.

Human remains and burial features: Respect is paramount when dealing with human remains. It must be remembered at all times that human remains are exactly that – human remains – and should be shown the proper respect and dignity due any human being, living or deceased. Mortuary features represent deliberate depositional events and can be identified by a number of different practices some of which include barrows/mounds, burial cairns, box and crevice burials or interment within shell midden.

Lithic (stone) scatters: Lithic scatters are sites comprised of stone tools, stone tool fragments, and *debitage*—the flakes of stone that are produced when stone tools are manufactured. These stone artifacts may be found scattered across the ground surface or may have been buried since their original

deposition. These sites may vary from a single, isolated artifact—a stone arrowhead, knife, or hide-scraper, for example—to extensive scatters of hundreds of tools, tool fragments and debitage flakes.

Culturally Modified Trees (CMTs): In the most general sense, CMTs are any trees having evidence of human modification. In a more specific and commonly used sense, CMTs are trees that have been modified by aboriginal people for traditional purposes such as removal of bark or wood for traditional building materials, and removal of cambium for consumption. Provincial guidelines suggest most CMTs should be recorded as traditional use sites unless they pre-date AD 1846. The majority of CMTs recorded in the study region are western red cedars although other species such as western hemlock, Douglas-fir, spruce, and western yew have also been reported. CMTs, especially recently modified trees, may have visible cut marks on the scar from the tools used in cultural modification.

Rock art: Rock art pictographs (paintings) and petroglyphs (carvings) are located on the surfaces of rock walls in caves/shelters or on rocky outcrops or boulders. They are often found in association with geographic locations thought to hold spiritual power and are common in mountainous areas or near water sources. They are also found in areas where groups were known to congregate for fishing and for trade in places of economic and environmental diversity and to mark significant past occurrences. Pictographs and petroglyphs often display anthropomorphic (human) or zoomorphic (animal) figures, but may also be entirely abstract designs.

Shipwrecks: Unlike terrestrial archaeological sites, all abandoned vessels (ships, aircraft, submarine, etc.) located in a submerged or intertidal setting older than 2 years are considered provincial heritage resources under the HCA. The condition and significance of these sites can vary greatly based on age, exposure and method of deposit. The variety of sites along the Pacific Northwest coast makes a precise definition difficult. However, any vessel remains identified should be considered and the instructions below followed.

If you encounter archaeological or heritage resources:

If you encounter possible archaeological or heritage resources in the course of work, or if in doubt, the following steps are recommended:

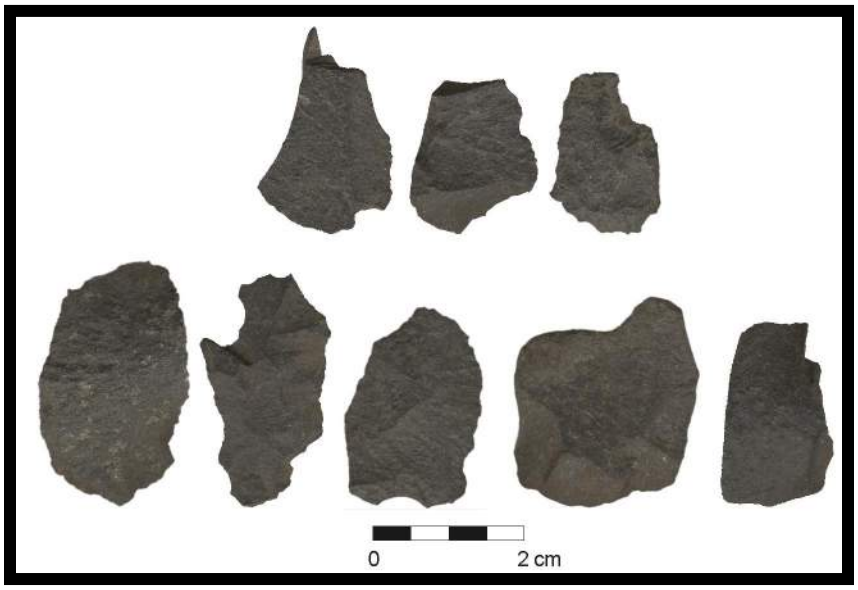
- Cease all ground disturbance in the vicinity of the find and leave all possible archaeological or heritage materials in place
- Briefly note the type of archaeological materials you think you've encountered, and their location, including, if applicable, the depth below surface of the find
- Cordon off a no-work-zone, no less than 30 m in diameter, with flagging tape. Photograph the material, preferably with a scale, and record the location with GPS
- Notify your Project Manager who will then contact an archaeological consultant for advice, the applicable First Nations and the Archaeology Branch at 250-953-3334. In the unlikely event that possible human remains are encountered the Project Manager will also contact the RCMP.

Shell Midden

Exposed Shell Midden

Burial Cairn

Lithic (Stone) Scatter



Debitage (waste material from stone tool manufacturing)

Projectile Points

Bone and antler artifacts

Culturally Modified Tree (CMT)

Pictograph

Petroglyph