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**PERFORMANCE VERIFICATION PLAN
RESIDUAL CONTAMINATION AT
FORMER ALLISON PASS HIGHWAY WORKS YARD, MANNING PARK, BC**

**July 31, 2017
SLR Project No.: 219.05062.00005**



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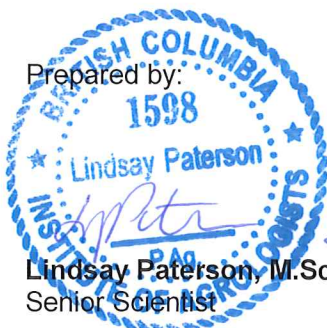
SLR Project No.: 219.05062.00005

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July 31, 2017

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DRAWINGS

Drawing 1	Site Location Map
Drawing 2	Site Plan - Overall

1.0 INTRODUCTION

SLR Consulting (Canada) Ltd. (SLR) was retained by Ministry of Transportation and Infrastructure (MOTI) to prepare this Performance Verification Plan (PVP) for a portion of the Allison Pass Highway Works Yard lands in E.C. Manning Provincial Park (Manning Park), BC (refer to Drawing 1). The Allison Pass Highway Works Yard are currently under the custodianship of MOTI but a portion of the lands (specifically those lands associated with the former Highways Works Yard facilities) will be transferred to the custodianship of the Ministry of Environment (BC Parks) in the future; these lands are referred to as “the Site” within this report and are the subject of this PVP. The remainder of the Allison Pass Highway Works Yard lands will remain in the custodianship of MOTI as part of the current/active Allison Pass Highways Works Yard operations and are referred to as the “Active Yard” within this report; the Active Yard is not the subject of this PVP. The Site and Active Yard are depicted on Drawing 2.

This PVP was prepared to address residual contamination within the Site in excess of Contaminated Sites Regulation (CSR) numerical standards in support of an application for a risk-based Certificate of Compliance (CofC). The PVP presents risk management measures to be implemented for the Site to ensure the CofC remains valid. This report was prepared in accordance with BC Ministry of Environment (MOE) Procedure 12: Procedures for Preparing and Issuing Contaminated Sites Legal Instruments (BC MOE, 2015).

2.0 BACKGROUND

The Site encompasses a portion of the Allison Pass Highway Works Yard (Drawing 1). The Site is vacant and gravel surfaced and covers an area of 14.28 hectares (Drawing 2).

The legal description of the parcel on which the Site is situated, as well as the Site metes and bounds description, are as follows:

Legal Parcel Description-	District Lot 1720, Yale Division Yale District, Crown Lands PIN 4647020
Site Metes and Bounds Description-	<p>All and singular that certain parcel or tract of land and premises situated, lying and being in E.C. Manning Provincial Park, British Columbia, adjacent to Provincial Highway No. 3, more particularly described as:</p> <p>All of District Lot 1720, Yale Division Yale District, except: That part of District Lot 1720, Yale Division, Yale District, described as Commencing at a point on the north eastern boundary of District Lot 1720, distant 55.41 metres southeasterly from survey monument #215 shown on Plan H215, thence S70° 28'10"E for 45.71 metres along the said north eastern boundary of District Lot 1720; thence S1° 55' 21"W for 12.70 metres; thence S12° 13' 53"E for 20.44 metres; thence S28° 51' 10"W for 25.15 metres; thence S19° 23' 32"W for 20.56 metres; thence S5° 49' 08"W for 23.08 metres; thence S7° 45' 37"E for 14.57 metres; thence S2° 38' 04"E for 17.36 metres;</p>

thence S5° 24' 19"W for 43.82 metres;
thence S86° 55' 23"W for 31.03 metres;
thence N58° 09' 00"W for 20.59 metres;
thence N54° 49' 28"W for 34.32 metres;
thence S83° 45' 09"W for 37.48 metres;
thence N54° 07' 53"W for 27.11 metres;
thence N8° 32' 07"E for 67.70 metres;
thence N10° 25' 20"E for 27.70 metres;
thence N29° 28' 51"W for 10.89 metres;
thence N22° 50' 57"E for 28.59 metres;
thence S80° 56' 36"E for 9.18 metres;
thence N84° 03' 43"E for 28.65 metres;
thence S56° 39' 01"E for 12.65 metres;
thence S67° 56' 33"E for 10.46 metres;
thence N62° 47' 52"E for 6.25 metres;
thence N62° 21' 57"E for 8.25 metres;
thence N52° 53' 04"E for 22.62 metres;
thence N17° 40' 05"E for 6.27 metres more or less, to the point of commencement.

And in addition:

All that part of E.C. Manning Provincial Park, lying immediately adjacent to the northwest boundary of District Lot 1720, Yale Division Yale District, described as

Commencing at a point on the northwest boundary of District Lot 1720, distant 101.53 metres southwesterly from the northwest corner of said District Lot, as witnessed by survey monument #231 shown on Plan H215,

thence S47° 50' 50"W for 13.00 metres;
thence N22° 57' 55"W for 58.15 metres;
thence N47° 51' 13"E for 6.82 metres;
thence N13° 32' 28"W for 9.94 metres;
thence N43° 36' 57"E for 12.67 metres;
thence S48° 41' 52"E for 10.58 metres;
thence S29° 29' 38"E for 11.96 metres;
thence S32° 22' 09"W for 16.26 metres;
thence S22° 57' 55"E for 40.30 metres more or less, to the point of commencement.

In all, containing 14.28 hectares, more or less.¹

Investigations were conducted at the Site by various consultants (including SLR) between 1998 and 2016; a remedial excavation program was also conducted at the Site by SLR in 2014. Following completion of the confirmation of remediation investigations, the following parameters remained within the Site at concentrations exceeding the applicable BC CSR standards:

¹ Bearings are astronomic, referenced to the original survey of District Lot 1720, Yale Division Yale District

Soil - Benzene, ethylbenzene, toluene, xylenes, volatile petroleum hydrocarbons (VPHs), light extractable petroleum hydrocarbons (LEPHs), heavy extractable petroleum hydrocarbons, trichloroethylene (TCE) and chloride at concentrations exceeding the BC CSR standards for Wildlands land use (i.e. Urban Park land use soil standards at depths less than 3 m below grade and Commercial land use soil standards at depths equal to or greater than 3 m below grade). Contaminants were largely associated with the former infrastructure at the Site (e.g. fuel, waste oil and heating oil handling/storage and equipment maintenance activities). However, select contamination (i.e. soil chloride contamination) appears to be related to surface runoff from adjacent Highway 3 where road salt has been applied as a beneficial use. The residual soil contamination at the Site has been horizontally and vertically delineated with the exception of the delineation of the soil chloride contamination in the direction of Highway 3; a Protocol 6 pre-approval to not delineate the soil chloride contamination based on the beneficial use of chloride has been approved by BC MOE (correspondence dated May 26, 2017).

Groundwater - Concentrations of benzene, ethylbenzene, toluene, xylenes, VPHw, volatile hydrocarbons in water (VHw), LEPHw, extractable hydrocarbons in water (EPHw) and naphthalene exceeding the CSR Drinking Water and/or CSR freshwater Aquatic Life (AWf) standards is present at the Site. Residual LNAPL is also present in a localized portion of the Site. The dissolved phase and free-phase groundwater contamination have been delineated to more than 130 m from the nearest aquatic receiving environment and current surface water intake (Memaloose Creek) and have been demonstrated to be stable through repeated groundwater monitoring and sampling.

As future use of the Site is expected to be Wildlands land use, no vapour standards are considered to apply at the Site under current environmental regulations. However, direction provided by BC MOE in their published Questions and Answers (www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/contaminated-sites/cs_q-a.pdf) states the following:

Consultants are not required to characterize vapour contamination when conducting site investigations at wildlands sites since there are no Schedule 11 standards for wildlands land use. However, consultants are required to assess human health vapour exposure risks at wildlands sites when conducting a risk assessment.

The HHERA Problem Formulation was completed by SLR (SLR, 2017) to estimate potential risk to human and ecological receptors from possible exposure to residual contaminants. The Problem Formulation was conducted under the assumption that no enclosed structures intended for occupation by humans would be constructed at the Site in the future. Furthermore, the Problem Formulation assumed that groundwater at the Site would not be used for potable water purposes in the future.

Human receptors of concern included BC Parks Employees and Contractors, members of the general public, off-site receptors (including workers at the adjacent Active Yard) and future drinking water users based on current and probable future land use. Aside from the future drinking water scenario, no complete or significant exposure pathways were identified for these receptors and quantification of potential human health risks was not warranted. Although the potential for groundwater within the Site to be used as a drinking water source exists in the

future, risks were not quantified due to the understanding that risk controls would be implemented to prevent exposure (see Section 3.0).

Terrestrial ecological receptors of concern included soil invertebrates, lichens, mosses, vascular plants including deep rooted trees, amphibians, birds and mammals. No complete or significant exposure pathways were identified for these receptors and risks were not quantified.

Aquatic ecological receptors of concern included aquatic invertebrates, aquatic plants, fish, birds, amphibians and mammals. The dissolved phase and free-phase groundwater contamination have been delineated to more than 130 m from the nearest aquatic receiving environment and have been demonstrated to be stable through repeated groundwater monitoring and sampling. On this basis, no complete exposure pathways were identified for the aquatic receptors and risks were not quantified.

3.0 REQUIRED RISK CONTROLS

The required controls to manage potential risks within the Site included the following:

- Groundwater from the Site must not be used as a drinking water source.

4.0 REQUIRED ACTIONS TO IMPLEMENT THE REQUIRED RISK CONTROLS

Based on consideration of current/future land use within the Site and the results of HHERA (SLR, 2017), the following performance verification actions are recommended and will be the responsibility of MOTI. No associated inspection, monitoring/maintenance or other performance verification actions are required.

1. Inclusion of an advisory (as item (b) in clause 2 of Schedule B of any Certificate of Compliance issued for the site) that "Groundwater from the site must not be used as a drinking water source".

Notification to the Director is required if the subject of this advisory is breached. That obligation to notify the Director is the responsibility of MOTI. The listing of the risk management measure in Schedule B of the CofC meets this requirement.

5.0 SUMMARY RATIONALE FOR SELECTING REQUIRED PVP ELEMENTS

Site vapour assessment completed at the Site indicated that predicted indoor air concentrations exceeded BC CSR Urban Park vapour standards in the vicinity of SV 14. However, there are currently no habitable buildings at the Site and construction of permanent new buildings is not expected upon transfer of the Site to the custodianship of BC Parks within the management of E.C. Manning Provincial Park.

Multiple contaminants remain in groundwater at concentrations exceeding the BC CSR Drinking Water standards; as well, residual LNAPL remains in a localized portion of the Site. Although the potential use of groundwater within the Site as a drinking water source exists in the future, it is considered to be unlikely due to the availability of water from a surface water intake located on Memaloose Creek at the adjacent Active Yard. Per the guidance provided by the BC MOE in Technical Guidance 7: Supplemental Guidance for Risk Assessments (BC MOE, 2015), the use of and exposure to groundwater beneath the Site via potable water use pathways is considered to be inoperative and future drinking water risks were not calculated. Based on this assessment

approach and considering contaminants remain within Site groundwater, risk control recommendations were developed to limit future drinking water exposure pathways.

The Site is classified as a Risk-Based Remediation Type 2 Site on the basis that risk management measures are required, but failure of risk management measures will not result in the imminent exposure of site contaminants to humans, or discharge of contaminants to the aquatic receiving environment at concentrations above BC water quality guidelines, or contaminant spreading at concentrations above upper cap concentrations.

6.0 REFERENCES

British Columbia Ministry of Environment (BC MOE). Technical Guidance 7: Supplemental Guidance for Risk Assessments. Version 4.0. November 2015.

British Columbia Ministry of Environment (BC MOE). 2015. British Columbia Ministry of the Environment. Procedure 12: Procedures for Preparing and Issuing Contaminated Sites Legal Instruments. Version 3.0. December, 2015. Effective date: February 1, 2016.

British Columbia Ministry of Environment (BC MOE). 2015. British Columbia Ministry of the Environment. Administrative Guidance 14: Performance Verification Plans, Contingency Plans, and Operations and Maintenance Plans. Version 3.0. December, 2015.

SLR Consulting (Canada) Ltd. (SLR). 2017. Human Health and Ecological Risk Assessment., BC. July 2017.

7.0 STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR Consulting (Canada) Ltd. (SLR) for Ministry of Transportation and Infrastructure hereafter referred to as the "Client". It is intended for the sole and exclusive use of Ministry of Transportation and Infrastructure. Other than by the Client and as set out herein, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted unless payment for the work has been made in full and express written permission has been obtained from SLR.

This report has been prepared for specific application to this site and 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 expresses no warranty with respect to the toxicity data presented in various references or the validity of

toxicity studies on which it was based. Scientific models employed in the evaluations were selected based on accepted scientific methodologies and practices in common use at the time and are subject to the uncertainties on which they are based.

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.

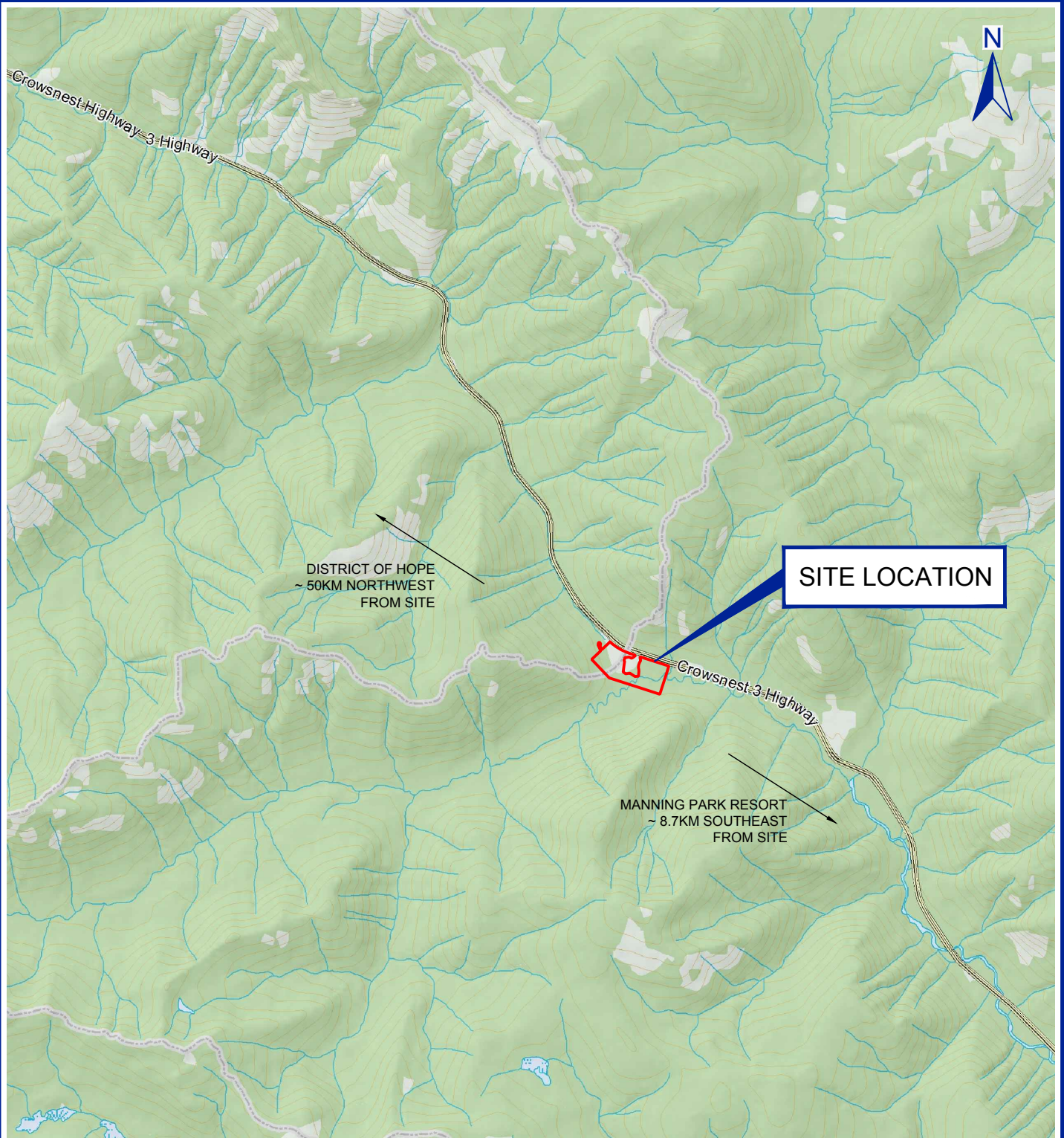
The Client may submit this report to the British Columbia Ministry of Environment and/or related British Columbia environmental regulatory authorities or persons for review and comment purposes. The BC MOE may rely on the information contained in this report regarding the Suncor property, as described in this report. The BC MOE may copy the report as required to fulfil regulatory obligations.

LP/lp

PVP_Allison Pass Works Yard_July 2017.docx

DRAWINGS

Performance Verification Plan
Residual Contamination at
Former Allison Pass Highway Works Yard, Manning Park, BC
SLR Project No.: 219.00562.00005



BASEDATA:
 © Department of Natural Resources Canada, All rights reserved;
 National Road Network, National Railway Network Geobase®,
 Downloaded March 2014; Aboriginal Lands, Geobase®,
 Downloaded March, 2014; BC regional Districts and Municipalities,
 GeoBC, Downloaded March 2014; Fresh Water Atlas,
 GeoBC®, Downloaded December 2014

- Site Location
- Contour (20m)
- Watercourse
- Wetlands
- Wooded Area
- Expressway / Highway

0 0.5 1 2 3 km

SCALE 1:50,000

WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
 NAD 1983 UTM Zone 10 U

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL
 LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

MINISTRY OF TRANSPORTATION AND
 INFRASTRUCTURE
 FACILITY NAME
 ALLISON PASS WORKS YARD, HIGHWAY 3
 MANNING PARK, BC

HUMAN HEALTH AND ECOLOGICAL RISK
 ASSESSMENT

SITE LOCATION MAP

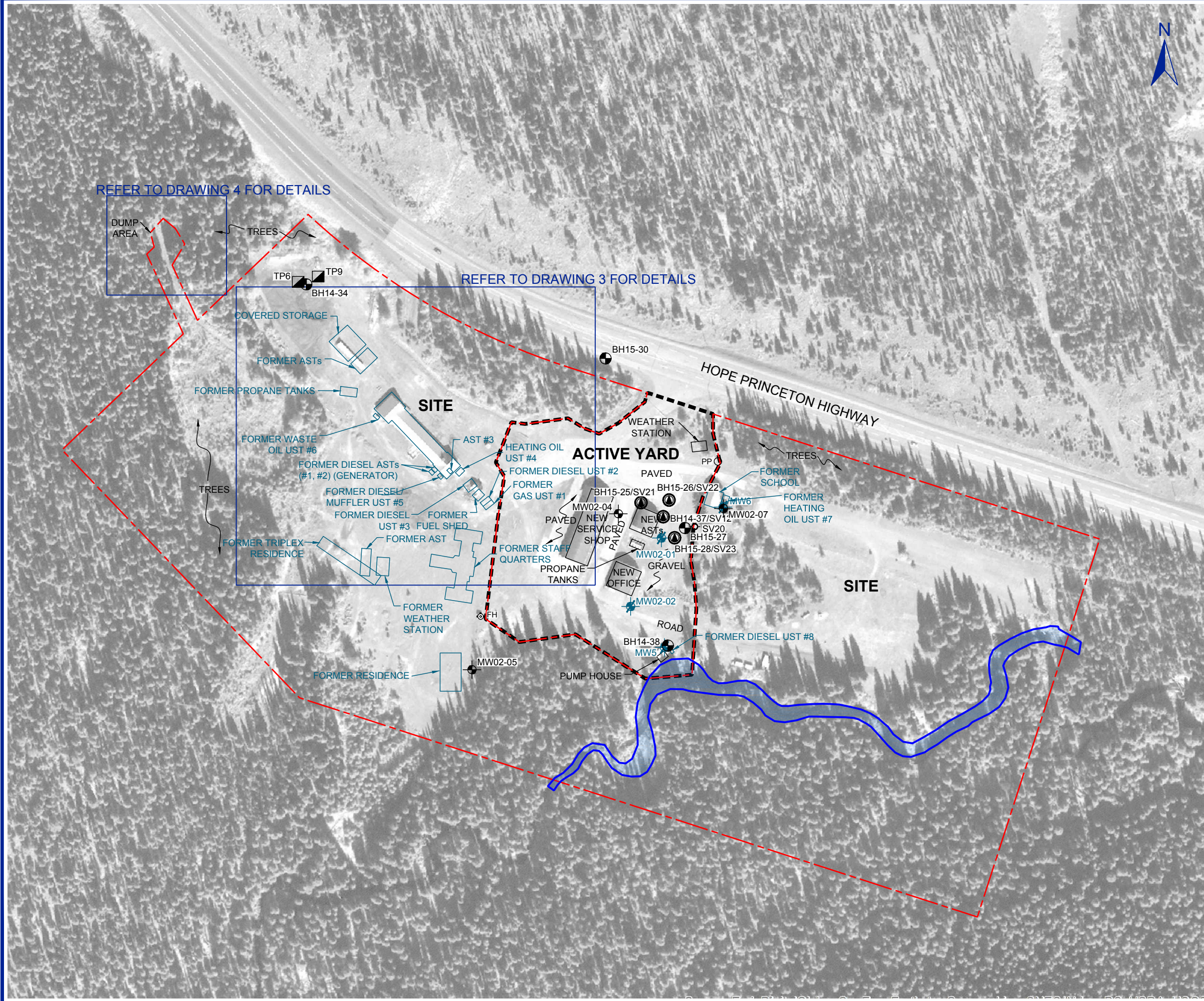
Date: May 30, 2017

Project No. 219.05062.00005

Drawing No.

1

Cadfile name: S_219-05062-00005-A8.dwg



NOTES:
REFERENCED FROM ALL TERRA LAND SURVEYING LTD. DRAWING: SITE PLAN SHOWING MONITORING POINTS ON AND ADJACENT TO DISTRICT LOT 1720, YDYP. (NOVEMBER, 2015). IMAGERY: ESRI WMS 2016 © DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS, USDA, USGS, AEX. ACCESSED, MAY 2016.

LEGAL DESCRIPTION:
DL1720 YDYP

LEGEND:

- SITE BOUNDARY
- CURRENT ACTIVE YARD BOUNDARY
- FORMER FACILITY/ FEATURE
- ⊕ BOREHOLE LOCATION
- ⊕ BOREHOLE LOCATION (OTHERS)
- ⊕ BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- ⊕ BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (OTHERS)
- ⊕ BOREHOLE COMPLETED AS A MONITORING WELL (DESTROYED)
- ⊕ SOIL VAPOUR AND GROUNDWATER EXTRACTION
- ⊕ TEST PIT LOCATION
- ⊕ TEST PIT LOCATION (OTHERS)
- UTILITIES AND SYMBOLS
- PP ○ POWER POLE
- FH ⊕ FIRE HYDRANT

0 25 50 100 150 m
SCALE 1:2,500
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 U

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE
ALLISON PASS WORKS YARD, HIGHWAY 3
MANNING PARK, BC

HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

SITE PLAN - OVERALL

Date: May 30, 2017	Drawing No. 2
Project No. 219.05062.00005	

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