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December 9, 2019 Project: 663179

BC Ministry of Transportation & Infrastructure
4C, 940 Blanshard Street
Victoria, BC V8W 3E6

ATTENTION: Paul Savinkoff, P.Geo.

REFERENCE: **Updated Scope of Work and Cost Estimate for Soil Characterization Sampling and Baseline Environmental Site Investigation, Louis Creek Passing Lane Project and Badger Creek Pullout, near Barriere, BC**

As requested by the BC Ministry of Transportation & Infrastructure (MoTI), SNC-Lavalin Inc. (SNC-Lavalin) prepared this updated proposed scope of work and cost estimate for soil characterization sampling and baseline environmental site investigation to support construction of the proposed Louis Creek Passing Lane and Badger Creek Commercial Vehicle Safety and Enforcement (CVSE) Pullout.

This updated scope of work and cost estimate supersedes the work plan prepared by SNC-Lavalin for MoTI dated June 18, 2019, and November 21, 2019, and will be conducted under As & When Contract No. 860 CS 5150 (dated May 24, 2019) between SNC-Lavalin and MoTI.

1 Site Information and Background

The Louis Creek Passing Lane is approximately 3 kilometres (km) long and located between Louis Creek and Barriere, BC. The Badger Creek CVSE Facility is approximately 620 m long and located on the north side of Highway 5 approximately 11 km south of Barriere. The general site location and specific work areas are shown on Drawing 663179-200.

SNC Lavalin understands that MoTI's Louis Creek Passing Lane construction design plans have been modified since SNC-Lavalin submitted a previous work plan in June 2019. MoTI's revised scope of project construction activities are expected to impact up to eight land parcels (i.e., seven PIDs and the MoTI ROW) across Project Areas 1 and 2 as defined below and shown in Table A and Drawings 200 and 201 through 203.

Project Area 1: Highway 5 from north of Russell Street at Station 62+108.955 to between Agate Bay Road and Hanson Road at Station 59+835.640 and including an extension off Hanson Road to intersect Agate Bay Road Station 200+56.355 to Station 202+24.209; and

Project Area 2: Highway 5 at the Badger Creek Pullout located approximately 6.5 km south of Project Area 2.

The impacted properties are numbered 1 through 8 for reference in this work plan and Table A lists the corresponding PIDs, legal description, and current ownership and project requirements for either partial or full acquisition, or a temporary license for construction access (TLCA).

Table A: List of Properties Impacted by Construction within Project Areas

Project Area	SNC ID	PID (Legal Description)	Current Land Use and Land Owner	R/W Required (ha)	Comment
1 and 2	1	n/a	Yellowhead Highway 5	n/a	Existing MoTI right-of-way (ROW)
1	2	012-955-680 (DL 58 Parcel 58)	Vacant (Wong)	0.0949	Partial acquisition
	3	013-301-675 (Plan KAP 832A Parcel 27)	BC Hydro ROW	0.1343	Partial acquisition
	4	013-301-641 (Plan KAP 832A Parcel 28)	BC Hydro ROW	0.0438	Partial acquisition
	5	013-028-499	CNR ROW	0.0467	TLCA required in two separate areas
	6	013-238-809	CNR ROW	0.1050	TLCA required
	7	010-933-336 (Plan KAP4702B)	Vacant (Tolko Industries)	2.373	Full property acquisition; located west of Highway 5
	8	029-245-362 (Plan EPP 12936)	Vacant (Simpcw Holdings)	0.3612	Partial acquisition

The locations of proposed cut and fill areas, and anticipated Type D soil and Type A rock excavations along the limits of construction are highlighted on Drawings 201, 202, and 203 for each Project Area (cut areas shown with red line; fill areas shown with green line) and attached MoTI design drawings.

SNC-Lavalin understands that approximately 60,000 m^3 of Type A rock, and approximately 53,000 m^3 of Type D soil may be disturbed during the project.

Summary of Contaminated Sites Overview Assessment (CSOA) Findings

SNC-Lavalin prepared a Contaminated Sites Overview Assessment (CSOA) for the Louis Creek Passing Lane (i.e., Project Areas 1) and the existing Badger Creek Pullout (i.e., Project Area 2). Results were presented on June 6, 2019 in a draft report titled "*Contaminated Sites Overview Assessment, Louis Creek Passing Lane and Badger Creek Pullout, Highway 5 near Louis Creek, BC*" (i.e., the "CSOA Report"). The scope of work included review of available information, historical and current activities, and a preliminary site reconnaissance completed on February 7 and 8, 2019 of Properties 1 to 8 in both project areas. In addition, the CSOA considered 15 additional properties located directly adjacent to (off-site) the limits of construction identified as Properties 10 to 19 (Project Area 1), Properties 28 to 31 (adjacent to Former Project Area 2), and Property 9 (adjacent to the proposed Badger Pullout).

Based on the findings of the CSOA for the Project Areas, two properties were identified as Tier 2 (Moderate Risk) warranting additional investigation as per MoTI's Terms of Reference for Geotechnical As & When Contracts (Version GTR-3, dated June 4, 2017 within the proposed limits of construction, including:

- Property 1: The existing Highway 5 ROW was identified as an area of potential environmental concern (APEC) based on potential for fill of unknown quality and soil impacts associated with historical application of road salt, and/or spillage of motor vehicle fluids (e.g., petroleum hydrocarbons).
- Property 8: Potential operation and/or storage of an asphalt batch plant, aggregate quarry or stockpiling of aggregate material south of Hanson Road. SNC-Lavalin understands that MoTI does not wish to proceed with further investigation at this property based on receipt of a Certificate of Compliance (CofC) from the Ministry of Environment for this property in spring 2011.

The remaining properties were identified as Tier 3 (Low Risk).

2 Objectives

As per the recommendations in the CSOA Report, the objectives of the proposed work program are to achieve the following:

1. Obtain and provide information to MoTI regarding environmental quality of shallow soils proposed to be excavated or removed during construction within the existing ROW (Property 1).
2. Provide an environmental baseline for proposed areas (Properties 5 and 6) to be used for Temporary License for Construction Access (TLCA) by MoTI; and
3. Conduct a Stage 1 Preliminary Site Investigation (PSI) for the full acquisition of Property 7.

3 Scope of Work

To support the project objectives, SNC-Lavalin proposes to conduct the following work program for Project Areas 1 and 2 as follows:

- Task 1: Project Planning, Coordination and Management;
- Task 2: Highway 5 ROW and Badger Creek Pullout Shallow Soil Characterization;
- Task 3: Retrieval and Analysis of Existing Geotechnical Borehole Samples;
- Task 4: Soil Characterization Reporting; and
- Task 5: Property 5 and 6 Baseline Assessment for TLCA

A detailed description of the above tasks is provided below.

As per discussion with MoTI, the current scope of the soil characterization program is limited to assessment of shallow soils (depth < 1 m) located within the highway ROW in proximity (within 10 m) from the existing highway (Task 2), and limited assessment of deeper soils available from existing

geotechnical boreholes advanced by MoTI in 2018 (Task 3). The results of this investigation will be used to determine whether additional soil characterization or investigation is required, and if required, provide an indication of specific areas, depths, and soil types that should be targeted to support adequate characterization and disposal options for excavated Type D soils during the project.

In addition, as requested by MoTI, confirmation of locations of private domestic water wells and septic fields located within or near project areas and any testing or evaluation will be deferred to a later phase of the project.

Task 1 – Project Planning, Coordination and Management

Project planning and coordination tasks throughout the program including preparation of this work plan and cost estimate; preparation of site-specific Health, Safety and Environment (HSSE) documentation; liaison with MoTI to confirm access and schedule field tasks; subcontracting and allocation/scheduling of field personnel; obtaining a traffic control plan and H1080 approval; obtaining MoTI Road Works permit; and completion of a BC OneCall prior to field activities.

This task also includes review of proposed sampling/drilling locations with respect to potential archaeological site boundaries, drainage features and utilities shown on design plans provided by MoTI for the project.

Project management will be conducted throughout the work program including budget and schedule tracking and providing regular updates to MoTI via email or telephone.

Task 2 – Highway 5 ROW and Badger Creek Pullout Shallow Soil Characterization

Shallow soil characterization will include the collection of up to 95 shallow soil samples from 50 locations at approximately 100 m spacing within proposed cut areas along the Highway 5 ROW located on both the east and west sides of Highway 5 between L100 Stations 598+35 to 621+09 and L200 on Hanson Road from 200+56 to 202+24,and the Badger Creek Pullout Area. SNC-Lavalin's proposed sample locations are shown on the attached set of design drawings (R2-1080-701 through 708). A detailed soil sampling plan is also attached.

The soil sampling program was developed to be consistent with MoTI's soil characterization protocol document is entitled: Draft MoTI Chemical Soil Characterization and CSOA Protocol Agreement. The samples will be collected from shoulder areas at distances of approximately 5 m to 10 m from the edge of highway pavement within limits of cut areas as shown MoTI design drawings. Samples will be collected at each location using a skid steer with post hole auger attachment. Samples will be collected from the upper 0.3 m to assess the organic stripping layer and underlying deeper soils to a depth of approximately 1 m or as digging conditions permit.

The soil samples will be submitted to the project laboratory for laboratory analysis of potential contaminants of concern (PCOC) that are typically identified in roadside soils. The following chemical parameters will be analyzed:

› Metals (up to 95 samples plus 10% QA/QC);

- Saturated paste sodium and chloride (95 samples plus 10% QA/QC). In the event very high salt concentrations are measured, additional cyanide analysis may be warranted but is not included under this scope;
- Petroleum hydrocarbon (PHC) constituents will be analyzed at a frequency of approximately 25% of the samples collected (24 samples for LEPH/HEPH and PAH) only where warranted depending on field observations (e.g., visual staining, olfactory screening, and Gastech/PID reading findings);
- Lighter fraction PHC constituents will be analyzed only when warranted in the event high Gastech/PID readings and/or other field screening results are detected;
- Samples from each test hole will also be field screened for hydrocarbon vapours and observed for visual or olfactory evidence of contamination; and
- Soil descriptions will be documented in field notes and sample locations will be recorded using a hand-held GPS.

The scope of work assumes the soil sampling can be completed by one field staff in up to 4 days. Traffic control will be utilized during the work (under H1080 Permit).

A BC One Call will be initiated prior to sampling and an on-site utility locate will be completed prior to intrusive work.

Task 3 – Retrieval and Analysis of Existing Geotechnical Borehole Samples (for Deep Soil Characterization)

Based on review of available geotechnical boreholes logs, up to nine soil samples from 12 existing boreholes (TH18-06, 07, 09, 13, 14, 15, 17, 19, 20, 22, 23) located within or in proximity to Project Area 1 along Highway 5. We understand from MoTI that the samples can be retrieved from MoTI's storage in Kamloops.

This task includes retrieval of the samples by SNC-Lavalin personnel and preparation of samples for laboratory analysis of potential contaminants of concern including metals (9 samples) and sodium and chloride (2 samples).

Task 4 – Soil Characterization Reporting (Tasks 2 and 3)

Upon receipt of laboratory results, SNC-Lavalin will prepare a preliminary soil characterization report summarizing the findings/results of Tasks 2 and 3. Attachments will include tabulated analytical results compared to *Contaminated Sites Regulation*[1] (CSR) industrial land use (IL) standards; borehole and soil sample logs; photographs; and a marked-up version of the design drawings showing stationing and investigation locations with summary analytical results (as colored halos and/or tables).

The report will include recommendations for additional soil characterization for delineation of contamination or further assessment of deeper soils, if required.

[1] *Contaminated Sites Regulation* (CSR), B.C. Reg. 375/96, includes amendments up to B.C. Reg. 13/2019, January 24, 2019.

Task 5 – Property 5 and 6 Baseline Assessment for TLCA

It is understood that MoTI requires a TLCA for roughly linear portions of Properties 5 and 6 (PIDs 013-028-809 and 013-238-809). It is proposed that shallow soil quality be assessed as a pre-construction baseline in these two areas for comparison to post-construction conditions. Soil descriptions will be documented in field notes and soil sample locations will be recorded using a hand-held GPS.

A total of eight shallow samples from 0.1 to 0.3 m depth will be collected by hand or auger drilling equipment depending on access. Collected soil samples will be submitted for laboratory analysis of potential contaminants of concern associated with construction activities including: metals, petroleum hydrocarbons (EPH, PAHs), and VOCs, VPH, BETX, and MTBE.

The proposed scope of work assumes the shallow soil sampling program can be completed concurrent with completion of Task 2.

The findings of the TLCA baseline assessment on Properties 5 and 6 will be summarized in a brief standalone letter report suitable for MoTI to provide to CN Rail.

4 Provisional or Optional Tasks

Task A – Additional Soil Characterization Investigation and Reporting (If Required)

Depending on the results of the initial phase of soil characterization, additional investigation and reporting may be required under the following scenarios:

- Delineation of identified soil impacts in order to reduce estimated volumes of any contaminated soils requiring management or off-site disposal;
- Additional characterization of soils from deeper Type D excavations to ensure sufficient characterization of anticipated volumes of excavated material. This may be completed in conjunction with additional geotechnical drilling at the project site.
- Evaluation of site specific standards using Protocol 2 methods (leachate testing or Grondwater Protection Model), and/or obtaining ENV approval for a Protocol 4 background release, Contaminated Soil Relocation Agreement (CSRA), or Waste Discharge Authorization (WDA) to allow on-site management or off-site relocation of contaminated soils, and minimize the volume of contaminated soils requiring disposal.

It should be noted that the locations of deeper or larger volume Type D soil cuts are primarily located on steep side slopes to the east of Highway 5 which pose access issues for conventional drilling equipment (i.e., slopes are too steep for rig access). Portable drilling equipment or use of angle drilling may be required for obtaining additional representative samples to characterize Type D soils in some areas.

Task B – Stage 1 PSI for Property 7 (Optional Task)

SNC-Lavalin understands that MoTI may wish to receive a standalone Stage 1 PSI report to support full acquisition of PID 010-933-336 (Property 7). We note that some aspects of the Stage 1 PSI tasks have already been completed as part of the CSOA Report. These include the following:

- Review of historical aerial photographs and current land titles;
- Review of site registry information maintained by the BC Ministry of Environment and Climate Change Strategy (ENV); and
- Review of information from other provincial online databases (iMapBC, BC Water Resources Atlas).

Since there is no change in land use from the time of completion of the CSOA Report, SNC-Lavalin will rely on the existing information to complete the Stage 1 PSI (i.e., effort and cost for these tasks will not be duplicated).

The scope of work will include a detailed reconnaissance to record observations of current land use and, if present, visible indicators of contamination. In addition, SNC-Lavalin may also conduct interviews with landowners and other knowledgeable persons familiar with property's history if contacts are made available. Key findings of the detailed site reconnaissance and desktop information obtained will be summarized and reported to MoTI in standalone Stage 1 PSI report including recommendations for additional investigation to address any identified potential environmental concerns via a limited Stage 2 PSI. Costs for a proposed Stage 2 program if required will be provided under a separate cover.

Task C - Soil Management Plan (Optional Task)

Depending on the findings of the soil characterization program and if MoTI retains ownership of excavated Type D soils during construction (versus the contractor retains ownership), SNC-Lavalin can prepare a standalone Soil Management Plan (SMP) to provide guidance regarding tracking, handling and appropriate disposal options for any contaminated Type D excavated material encountered during construction activities in Project Areas 1 and 2. Any identified contaminated soil that requires either relocation on-site or off-site and/or off-site disposal to a permitted facility may be necessary in accordance with the *Environment Management Act (EMA),* the *Contaminated Sites Regulation (CSR),* and the *Hazardous Waste Regulation (HWR).* The scope of this task does not include preparation of Contaminated Soil Relocation Agreement should this be required.

Cost Estimate and Assumptions

The estimated cost for the proposed tasks above is **$65,275** excluding GST. The costs for each task are summarized in Table D, below and a detailed cost estimate is provided in Attachment 1.

Table B: Estimated Costs

Proposed Task	Estimated Costs (excluding taxes)				
	Fees	SNC Disbursements	Sub-Contractor	Lab Fees	Subtotal
Task 1 - Project Planning and Management	$7,595	$0	$0	$0	$7,595
Task 2 - Hwy 5 ROW Shallow Soil Characterization	$12,272	$3,630	$15,107	$12,743	$43,752
Task 3 - Retrieval and Analysis of Existing Geotechnical Borehole Samples (for Deep Soil Characterization)	$868	$0	$0	$749	$1,617
Task 4 – Soil Characterization Reporting	$7,536	$0	$0	$0	$7,536
Task 6 - Property 5 and 6 Baseline Assessment for TLCA	$2,861	$0	$0	$1,913	$4,774
Tasks Sub-totals	**$31,132**	**$3,630**	**$15,107**	**$15,405**	
				Total	**$65,275**

Provisional or Optional Tasks	Cost Estimate
Task A - Additional Soil Characterization Investigation or Reporting (if required to delineate and reduce contaminated soil volumes, and/or to support options for on-site management or off-site relocation of contaminated soils)	TBD $5,000 to >$50,000
Task B - Property 7 Stage 1 PSI (if required, to support full property acquisition)	$3,500
Task C - Preparation of Soil Management Plan (if required, to support Type D contaminated soil management)	$5,000

The scope of work for this project will be charged according to terms and rates in As & When Contract No. 860 CS 5150. Laboratory testing will be charged according to the quoted rates in Attachment 1; charges for laboratory test work will be invoiced to MoTI on a cost basis with no markup.

Other assumptions related to this work plan and cost estimate include:

- The above estimated costs do not include applicable taxes or any contingency costs;
- All laboratory analysis costs assume a regular five-day turnaround time;
- Geotech Drilling will be the sub-contractor and operator of the drill rig. Cost estimate is based on quote dated December 4, 2019;

- Task 2 assumes collection of samples from a post hole auger attachment on a Fraste MDXL track-mounted drilling rig;
- SNC-Lavalin will be provided unobstructed access to all areas of the Site as required to complete the proposed scope of work;
- The recommended scope of work is based on the current available MoTI design drawings for the project and property acquisition plan; and
- Costs assume completion of proposed work in five (5) field days using one SNC-Lavalin field, and drilling contractor's helper staff for the shallow soil sampling programs under Tasks 2 and 6 from SNC-Lavalin's Burnaby office;

The above is a cost estimate only. Actual costs will be charged based on the time and disbursements actually and necessarily expended to complete the project as defined. Changes in scope of work and costs will be provided to MoTI in a timely manner and the total project budget will not be exceeded without the prior written authorization of MoTI.

5 Schedule

SNC-Lavalin intends to complete Task 2 and 6 field work during the week of December 9, 2019.

SNC-Lavalin estimates the field assessment portion can be completed in approximately five days in the field. Routine turnaround (i.e., one week) will be requested for laboratory analysis of soil samples. Assuming routine turnaround, we will provide draft reports to MoTI within four weeks (20 business days) from completion of the field assessment.

6 Closure

We trust this work plan and cost estimate provides the information you require at this time. Please contact the undersigned if you have any questions or wish to discuss any additional details.

Dave Bridger, MBA, M.Sc., P.Geo.
Senior Project Manager

Environment & Geoscience
Engineering, Design & Project Management

RW/tr
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enc.

Drawings

- 663179-200 – Project Overview
- 663179-201 – Site Plan – Project Area 1
- 663179-202 – Site Plan – Project Area 2 (Badger Creek Pullout)
- MoTI Design Drawings R2-1080-701 through 708 Showing Proposed Test Hole Locations

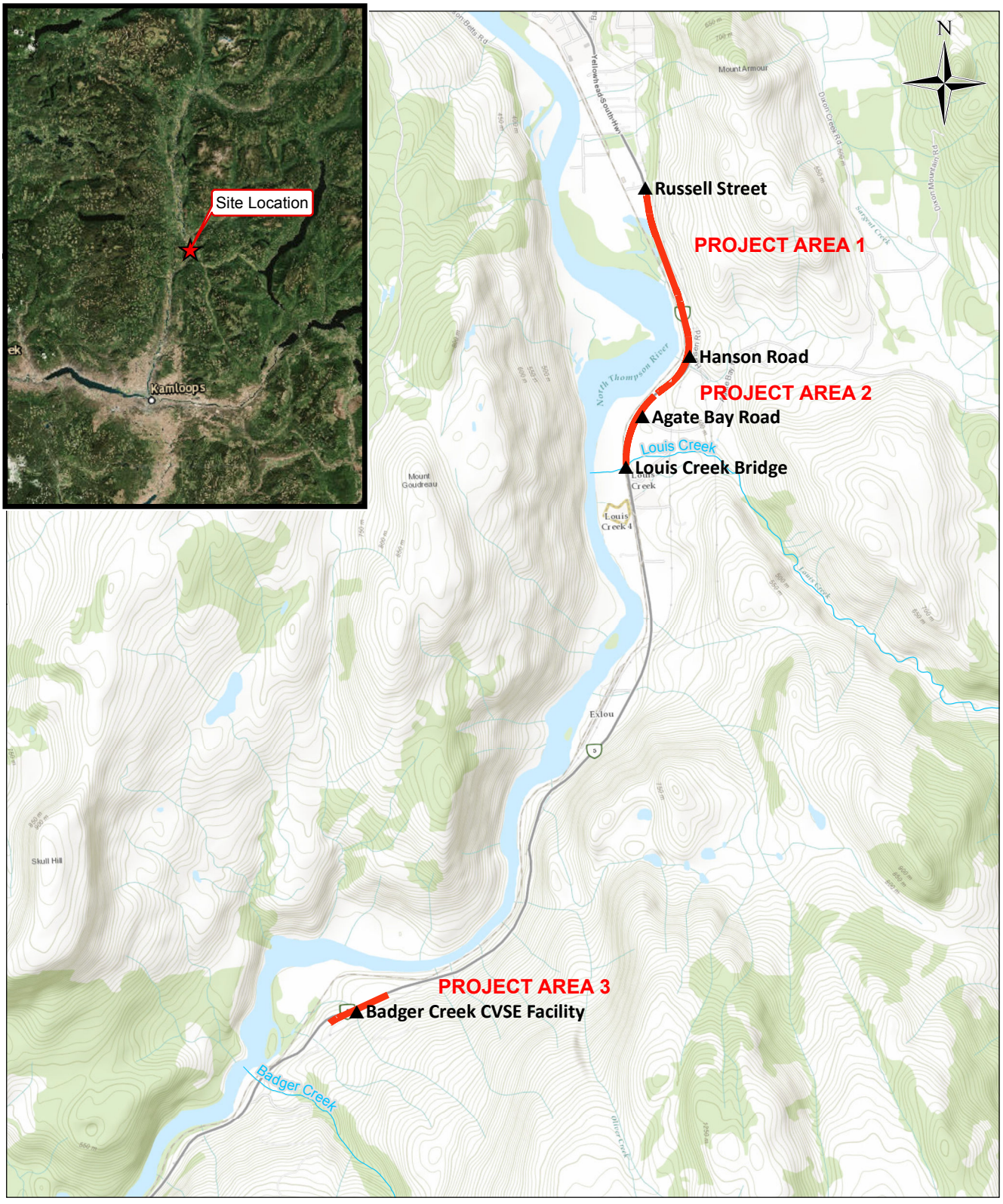
Attachments

1: Proposed Shallow Soil Characterization Sampling Program (Phase 1) - Louis Creek Passing Lane Project and Badger Creek Pullout

2: Detailed Cost Estimate for Soil Characterization Program - Louis Creek Passing Lane and Badger Creek CVSE Pullout

Drawings

- 663179-200 – Project Overview – Project Areas 1 and 2
- 663179-201 – Site Plan – Project Area 1
- 663179-202 – Site Plan – Project Area 2 (Badger Creek Pullout)
- MoTI Design Drawings R2-1080-701 through 708 Showing Proposed Test Hole Locations



Legend

- ▲ Site Benchmark
- Project Extent

Notes:
1. Intended for Illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, © OpenStreetMap

PROJECT LOCATION:
Highway 5,
Louis Creek, BC

CLIENT NAME:
Ministry of Transportation and Infrastructure

SNC·LAVALIN

Project Overview - Project Areas 1 to 3

0 550 1,100 2,200 3,300 4,400 Meters

CHK'D: MG | DATE: 2019/05/17 | SCALE: 1:50,000 | Ref Num: REV: 0
BY: DRMM | COORD SYS: NAD 1983 UTM Zone 10N | 663179-200

MXD Path: D:\MoT-663179-LouisCreek-CSOA\GIS\MapSeries\663179-200_Overview.mxd

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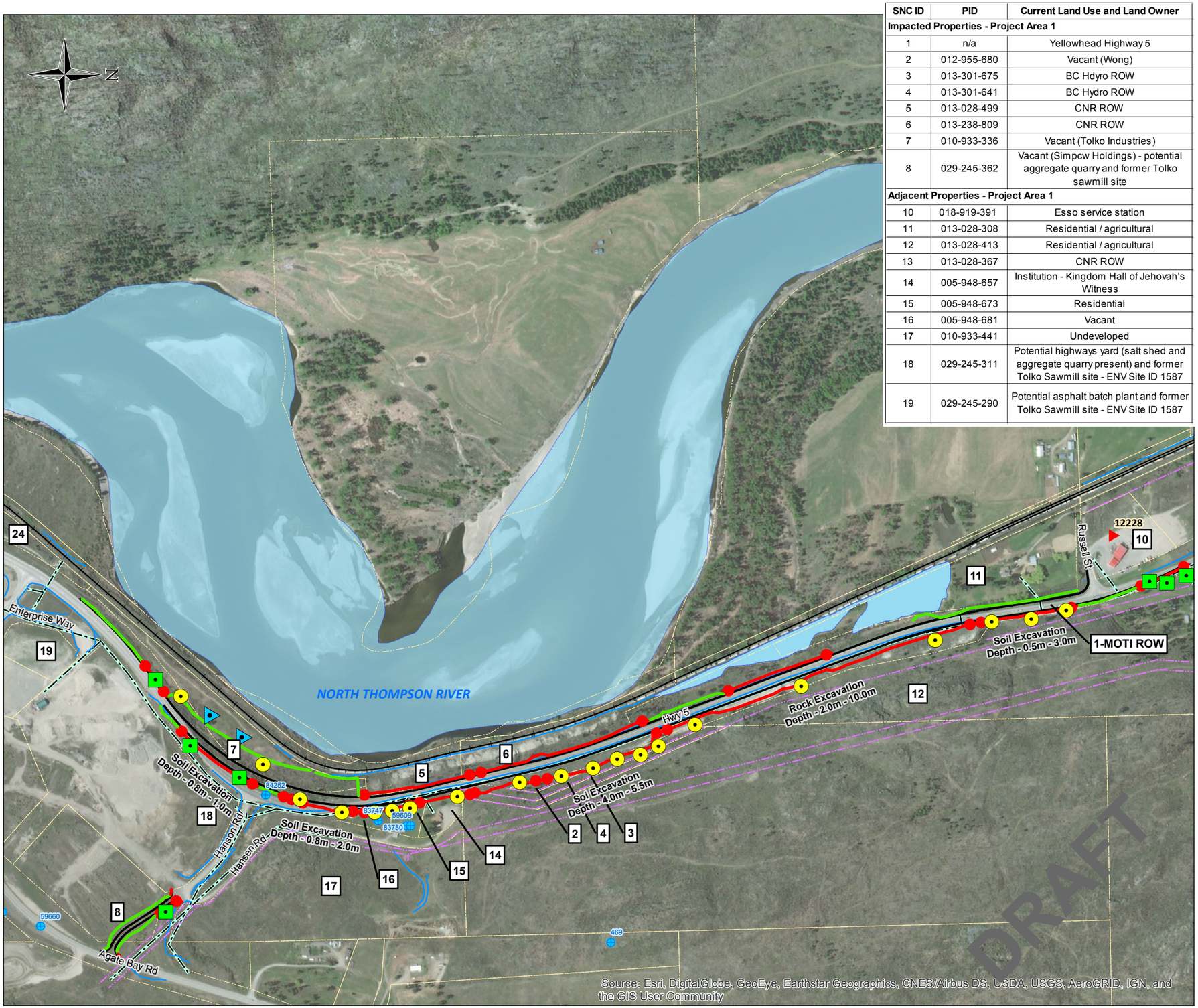


SNC ID	PID	Current Land Use and Land Owner
Impacted Properties - Project Area 1		
1	n/a	Yellowhead Highway 5
2	012-955-680	Vacant (Wong)
3	013-301-675	BC Hdyro ROW
4	013-301-641	BC Hydro ROW
5	013-028-499	CNR ROW
6	013-238-809	CNR ROW
7	010-933-336	Vacant (Tolko Industries)
8	029-245-362	Vacant (Simpcw Holdings) - potential aggregate quarry and former Tolko sawmill site
Adjacent Properties - Project Area 1		
10	018-919-391	Esso service station
11	013-028-308	Residential / agricultural
12	013-028-413	Residential / agricultural
13	013-028-367	CNR ROW
14	005-948-657	Institution - Kingdom Hall of Jehovah's Witness
15	005-948-673	Residential
16	005-948-681	Vacant
17	010-933-441	Undeveloped
18	029-245-311	Potential highways yard (salt shed and aggregate quarry present) and former Tolko Sawmill site - ENV Site ID 1587
19	029-245-290	Potential asphalt batch plant and former Tolko Sawmill site - ENV Site ID 1587

Legend

- Properties SNC IDs
- Proposed Borehole
- Proposed Monitoring Well
- Proposed Test Pit
- Water wells
- ENV Site Registry Site
- Proposed Edge of Pavement
- Cut Line
- Fill Line
- Exiting Ditch
- Existing Overhead Power Line
- Existing Rail Track
- Existing Right-Of-Way
- Parcels
- Roads
- River / Water Pond

NOTES:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.
4. ROW = Right of Way

REFERENCES:
1. Parcels and River delination from BC Catalogue
2. Site Features from EXCAVATION-ZONES.dwg
3. Cut and Fill Lines from Hwy5_Barriere_SB Passing Lane-Excavation Depths.pdf on 2019-02-15

REVISIONS:
0 - DRMM - 2019-05-14 - DRAFT - TP/RW

0 80 160 320 480 640 Meters

CLIENT:
Ministry of Transportation and Infrastructure

PROJECT LOCATION:
Highway 5,
Louis Creek, BC

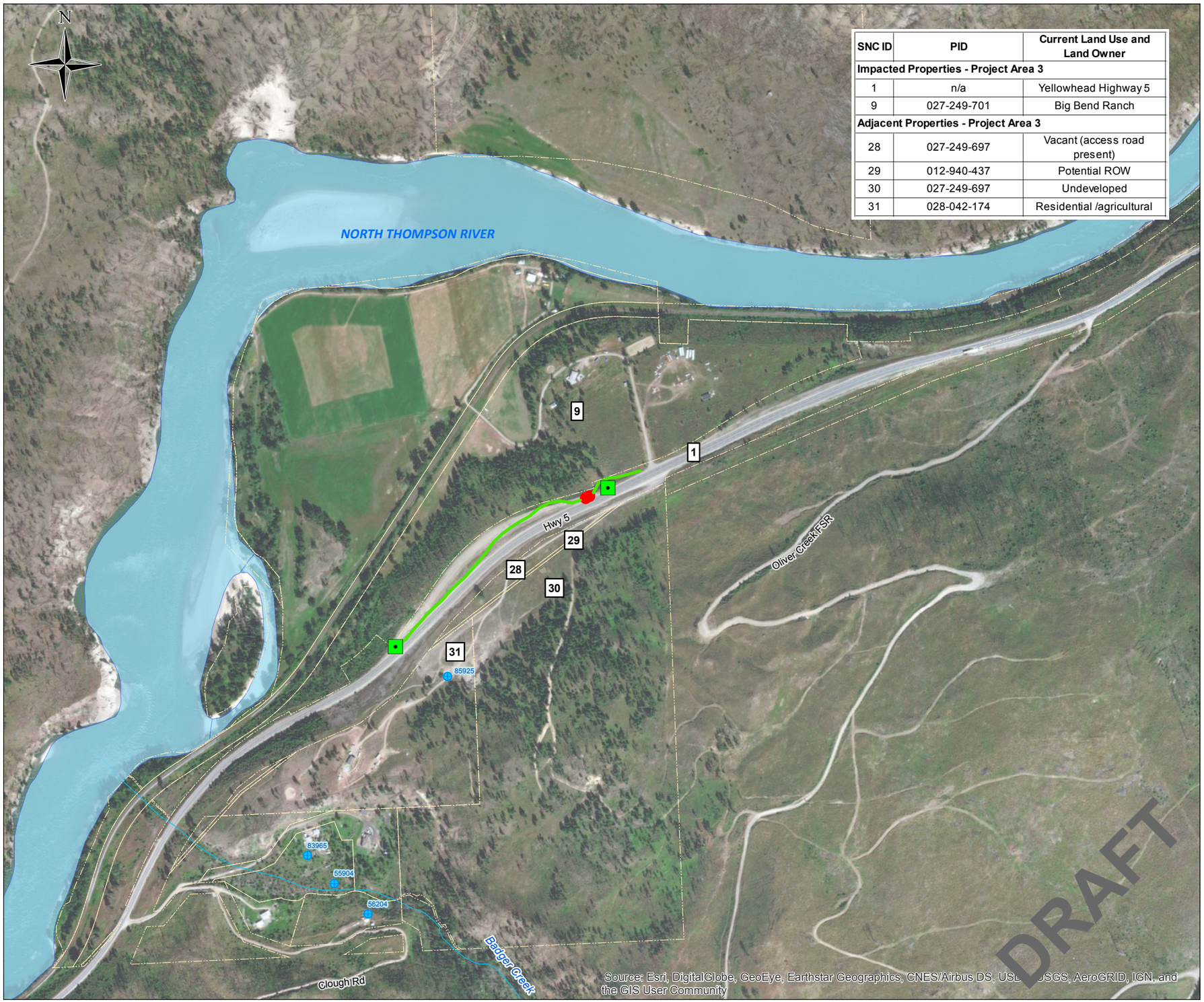
SNC·LAVALIN

Site Plan - Project Area 1

BY:	SCALE:	DATE:	REF No:	REV:
DRMM	1:7,500	2019/05/17	663179-201	0
CHK'D: MG	Proj Coord Sys: NAD 1983 UTM Zone 10N			

MXD Path: D:\MoT-663179-LouisCreek-CSOA\GIS\MapSeries\663179-201_LocPlan_RussellRoad.mxd

Project Path:



SNC ID	PID	Current Land Use and Land Owner
Impacted Properties - Project Area 3		
1	n/a	Yellowhead Highway 5
9	027-249-701	Big Bend Ranch
Adjacent Properties - Project Area 3		
28	027-249-697	Vacant (access road present)
29	012-940-437	Potential ROW
30	027-249-697	Undeveloped
31	028-042-174	Residential /agricultural

Legend

- 1 Properties SNC IDs
- Proposed Borehole
- Proposed Monitoring Well
- Proposed Test Pit
- Water wells
- Cut Line
- Fill Line
- Parcels

NOTES:
1. Original in colour.
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REFERENCES:
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2. Site Features from EXCAVATION-ZONES.dwg
3. Cut and Fill Lines from Hwy5_Barriere_SB Passing Lane-Excavation Depths.pdf on 2019-02-15

REVISIONS:
0 - DRMM - 2019-05-14 - DRAFT - TP/RW

0 80 160 320 480 640 Meters

CLIENT:
Ministry of Transportation and Infrastructure

PROJECT LOCATION:
Highway 5,
Louis Creek, BC

SNC·LAVALIN

Site Plan -
Project Area 2 Badger Creek Pullout

BY:	SCALE:	DATE:	REF No:	REV:
DRMM	1:7,500	2019/05/17	663179-202	0
CHK'D: MG	Proj Coord Sys: NAD 1983 UTM Zone 10N			

MXD Path: D:\MoT-663179-LouisCreek-CSOA\GIS\MapSeries\663179-203_LocPlan_BadgerCreek.mxd

Project Path:

FOR PROFILES SEE DWG R2-1080-201 to R2-1080-203

FOR GEOMETRICS AND LANING SEE DWG R2-1080-401 to R2-1080-408

FOR SPOT ELEVATIONS SEE DWG R2-1080-501 to R2-1080-501

FOR PLAN DRAWINGS SEE DWG R2-1080-101 to R2-1080-108

THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN HEREON IS APPROXIMATE ONLY AND PREDOMINANTLY BASED ON AS-BUILT INFORMATION. THE CONTRACTOR WILL CONFIRM THE FIELD LOCATIONS OF THESE UTILITIES WITH THE UTILITY STAKEHOLDERS.

ISSUED FOR 100% FUNCTIONAL DESIGN REVIEW
2019-04-30
urbansystems.ca

URBAN systems

SCALE

CAD FILENAME SEE SIDE BAR
DATE

REV	DATE	REVISIONS	SIGNATURE

BRITISH COLUMBIA

MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE
SOUTHERN INTERIOR REGION

SENIOR DESIGNER
DATE

DESIGNED K. MANN DATE 2019-02-15
QUALITY CONTROL J. WILKISON DATE 2019-02-15
QUALITY ASSURANCE I. MACMILLAN DATE 2019-02-15
DRAWN K. MANN DATE 2019-12-05

DRAINAGE & UTILITIES
YELLOWHEAD HIGHWAY No. 5
BARRIERE SOUTHBOUND
PASSING LANE
STA. 599+55.558 TO 600+60.000

FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV
1961.0427.03	24772-0001	2	R2-1080-701	

CANCEL PRINTS BEARING PREVIOUS LETTER

CNR

STORM WATER MANAGEMENT AREA

MIN. 800mm DEPTH DRAINAGE DITCH @ 0.5% MIN GRADE TO STORM WATER MANAGEMENT AREA

350mm MIN THICKNESS OF CLASS 10kg RIP RAP ON GEOSYNTHETIC FABRIC

3:1 SIDE SLOPES ALL AROUND

3:1 SIDE SLOPES

KAP4702B
DL 1319

20.0m 400Ø CSP 1.6 WT

SIC 601+37.543

KAP749H

2.8m BOTTOM WIDTH X 4.2m BOTTOM LENGTH
1.5m CLEAR DEPTH BETWEEN BOTTOM AND INVERT OF CULVERT. 250kg RIP RAP
1.0m MIN. THICKNESS OF RIP RAP ON GEOSYHTHETIC FABRIC

ABANDON EXISTING CULVERT, PLUG BOTH ENDS WITH SANDBAGS. AT INLET END FILL AND CAP WITH LOW STRENGTH CONCRETE AND BACKFILL.

54.0m 1400Ø CSP 2.8 WT

23.0m 900Ø CSP 2.0 WT
WILDLIFE CROSSING CULVERT

601+00

601+60

602+00

602+80

603+00

603+40

L100

TH18-09

YELLOWHEAD HIGHWAY No. 5

CLOSED

RE-GRADE EXISTING HANSON ROAD AND HIGHWAY 5 BY BACK FILLING DEPRESSION AT FORMER CULVERT INLET LOCATION.

REMOVE EX. LUMINAIRES AND ABANDON EXISTING UNDERGROUND ELECTRICAL

PROPOSED DITCHING THROUGH FORMER HANSON ROAD TO CONNECT TO HIGHWAY 5 CROSSING CULVERT

HANSON ROAD

P5908B

MATCHLINE SEE DWG No. R2-1080-708

MATCHLINE SEE DWG No. R2-1080-703

MATCHLINE SEE DWG No. R2-1080-701

POLE RELOCATION LEGEND

- EXISTING HYDRO POWER POLE TO BE RELOCATED
- EXISTING TELEPHONE POLE TO BE RELOCATED
- EXISTING HYDRO POWER/TELEPHONE POLE TO BE RELOCATED

701 702 703 704 705 706 707 708

FOR PROFILES SEE DWG R2-1080-201 to R2-1080-203

FOR GEOMETRICS AND LANING SEE DWG R2-1080-401 to R2-1080-408

FOR SPOT ELEVATIONS SEE DWG R2-1080-501 to R2-1080-501

FOR PLAN DRAWINGS SEE DWG R2-1080-101 to R2-1080-108

THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN HEREON IS APPROXIMATE ONLY AND PREDOMINANTLY BASED ON AS-BUILT INFORMATION. THE CONTRACTOR WILL CONFIRM THE FIELD LOCATIONS OF THESE UTILITIES WITH THE UTILITY STAKEHOLDERS.

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BRITISH COLUMBIA

MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE
SOUTHERN INTERIOR REGION

SENIOR DESIGNER
DATE

DESIGNED	K. MANN	2019-02-15
QUALITY CONTROL	J. WILKISON	2019-02-15
QUALITY ASSURANCE	I. MACMILLAN	2019-02-15
DRAWN	K. MANN	2019-12-05

DRAINAGE & UTILITIES

YELLOWHEAD HIGHWAY No. 5
BARRIERE SOUTHBOUND
PASSING LANE
STA. 600+60.000 TO 604+00.000

FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV
1961.0427.03	24772-0001	2	R2-1080-702	

CANCEL PRINTS BEARING PREVIOUS LETTER

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TCLA-P5-A

Property 5 TLCA

TCLA-P5-B

Property 6 TLCA

CS 76.383

CNR ST 606+56.383

TCLA-P6-B

TH18-13

606+40

607+00

TCLA-P6-A

605+60

606+20

YELLOWHEAD HIGHWAY No. 5

604+40

605+00

L100

606+00

606+25

605+20

CLOSED

20.0m 250Ø CSP 1.6 WT

KAP17671

WET AREA (SPRING)

KAP24388 LOT C

KAP24388 LOT B

KAP24388 LOT A

DL 58 PARCEL 28

TH18-14

KAP2886A BC HYDRO AND POWER AUTHORITY

POWER GOES UNDERGROUND TO HOUSE

MATCHLINE SEE DWG No. R2-1080-702

MATCHLINE SEE DWG No. R2-1080-704

701 702 703 704 705 706 707 708

FOR PROFILES SEE DWG R2-1080-201 to R2-1080-203

FOR GEOMETRICS AND LANING SEE DWG R2-1080-401 to R2-1080-408

FOR SPOT ELEVATIONS SEE DWG R2-1080-501 to R2-1080-501

FOR PLAN DRAWINGS SEE DWG R2-1080-101 to R2-1080-108

THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN HEREON IS APPROXIMATE ONLY AND PREDOMINANTLY BASED ON AS-BUILT INFORMATION. THE CONTRACTOR WILL CONFIRM THE FIELD LOCATIONS OF THESE UTILITIES WITH THE UTILITY STAKEHOLDERS.

POLE RELOCATION LEGEND

- EXISTING HYDRO POWER POLE TO BE RELOCATED
- EXISTING TELEPHONE POLE TO BE RELOCATED
- EXISTING HYDRO POWER/TELEPHONE POLE TO BE RELOCATED

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DRAWN K. MANN DATE 2019-12-05

DRAINAGE & UTILITIES

YELLOWHEAD HIGHWAY No. 5

BARRIERE SOUTHBOUND

PASSING LANE

STA. 604+000.000 TO 607+40.000

FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV
1961.0427.03	24772-0001	2	R2-1080-703	

CANCEL PRINTS BEARING PREVIOUS LETTER

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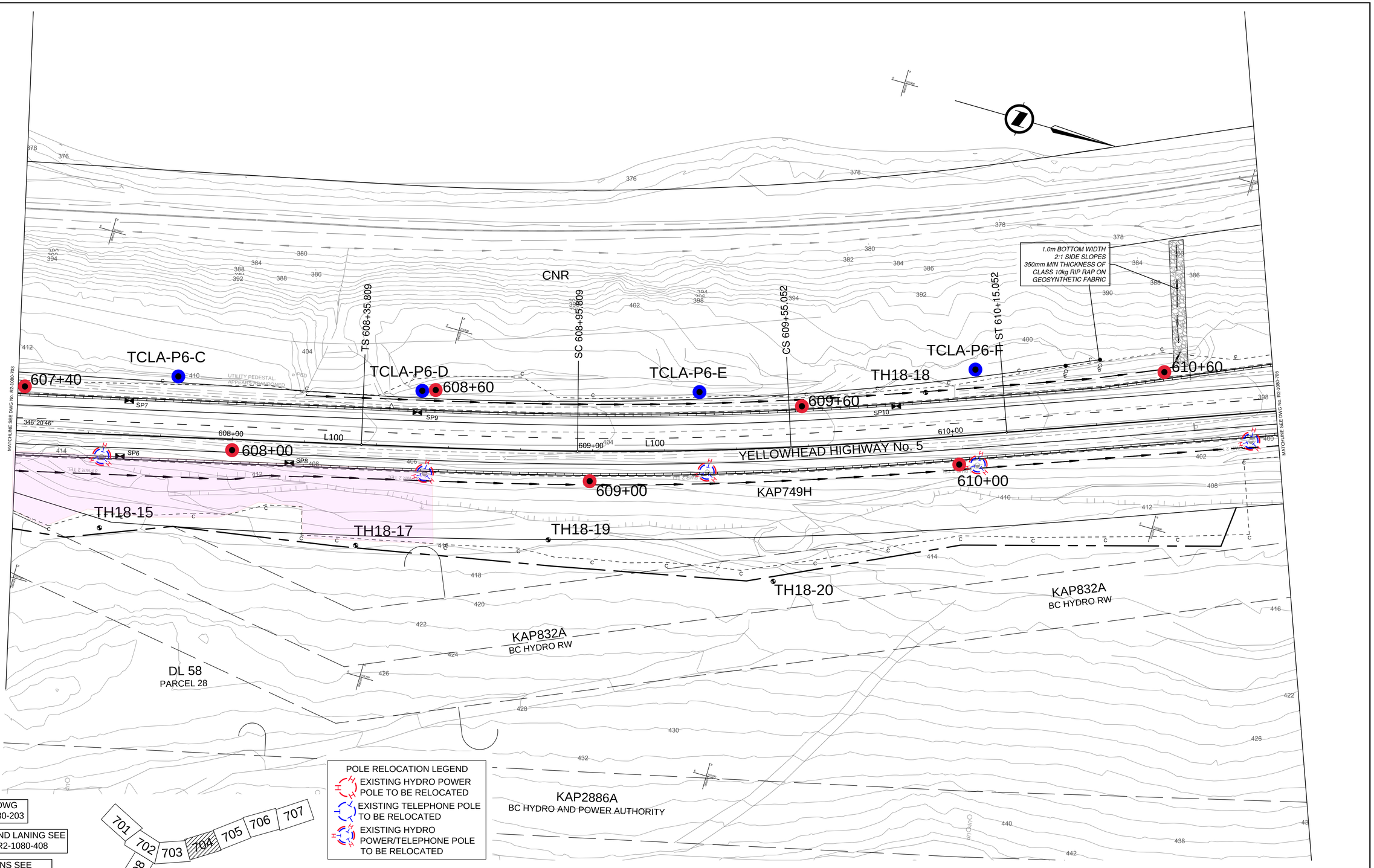

POLE RELOCATION LEGEND

- EXISTING HYDRO POWER POLE TO BE RELOCATED
- EXISTING TELEPHONE POLE TO BE RELOCATED
- EXISTING HYDRO POWER/TELEPHONE POLE TO BE RELOCATED

701 702 703 704 705 706 707 708

FOR PROFILES SEE DWG R2-1080-201 to R2-1080-203

FOR GEOMETRICS AND LANING SEE DWG R2-1080-401 to R2-1080-408

FOR SPOT ELEVATIONS SEE DWG R2-1080-501 to R2-1080-501

FOR PLAN DRAWINGS SEE DWG R2-1080-101 to R2-1080-108

THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN HEREON IS APPROXIMATE ONLY AND PREDOMINANTLY BASED ON AS-BUILT INFORMATION. THE CONTRACTOR WILL CONFIRM THE FIELD LOCATIONS OF THESE UTILITIES WITH THE UTILITY STAKEHOLDERS.

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DRAINAGE & UTILITIES
YELLOWHEAD HIGHWAY No. 5
BARRIERE SOUTHBOUND
PASSING LANE
STA. 607+40.000 TO 610+90.000

FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV
1961.0427.03	24772-0001	2	R2-1080-704	

CANCEL PRINTS BEARING PREVIOUS LETTER

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MATCHLINE SEE DWG No. R2-1080-704

MATCHLINE SEE DWG No. R2-1080-706

3.5m 200Ø CSP 1.6 WT

SP11

611+40

612+60

613+60

KAP749H

1.0m BOTTOM WIDTH
2:1 SIDE SLOPES
350mm MIN THICKNESS OF
CLASS 10kg RIP RAP ON
GEOSYNTHETIC FABRIC

611+00

612+00

339°30'50"

613+00

L100

614+00

YELLOWHEAD HIGHWAY No. 5

SP12

SP13

SP14

SP15

611+00

611+95

613+00

614+00

28.0m 900Ø CSP 2.0 WT
WILDLIFE CROSSING CULVERT

REPLACE EXISTING CULVERT

25.0m 900Ø CSP 2.0 WT

EPP13142

D.L. 1318

701 702 703 704 705 706 707 708

POLE RELOCATION LEGEND

- EXISTING HYDRO POWER POLE TO BE RELOCATED
- EXISTING TELEPHONE POLE TO BE RELOCATED
- EXISTING HYDRO POWER/TELEPHONE POLE TO BE RELOCATED

FOR PROFILES SEE DWG R2-1080-201 to R2-1080-203

FOR GEOMETRICS AND LANING SEE DWG R2-1080-401 to R2-1080-408

FOR SPOT ELEVATIONS SEE DWG R2-1080-501 to R2-1080-501

FOR PLAN DRAWINGS SEE DWG R2-1080-101 to R2-1080-108

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DRAINAGE & UTILITIES

YELLOWHEAD HIGHWAY No. 5
BARRIERE SOUTHBOUND
PASSING LANE
STA. 610+90.000 TO 614+50.000

FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV
1961.0427.03	24772-0001	2	R2-1080-705	

CANCEL PRINTS BEARING PREVIOUS LETTER

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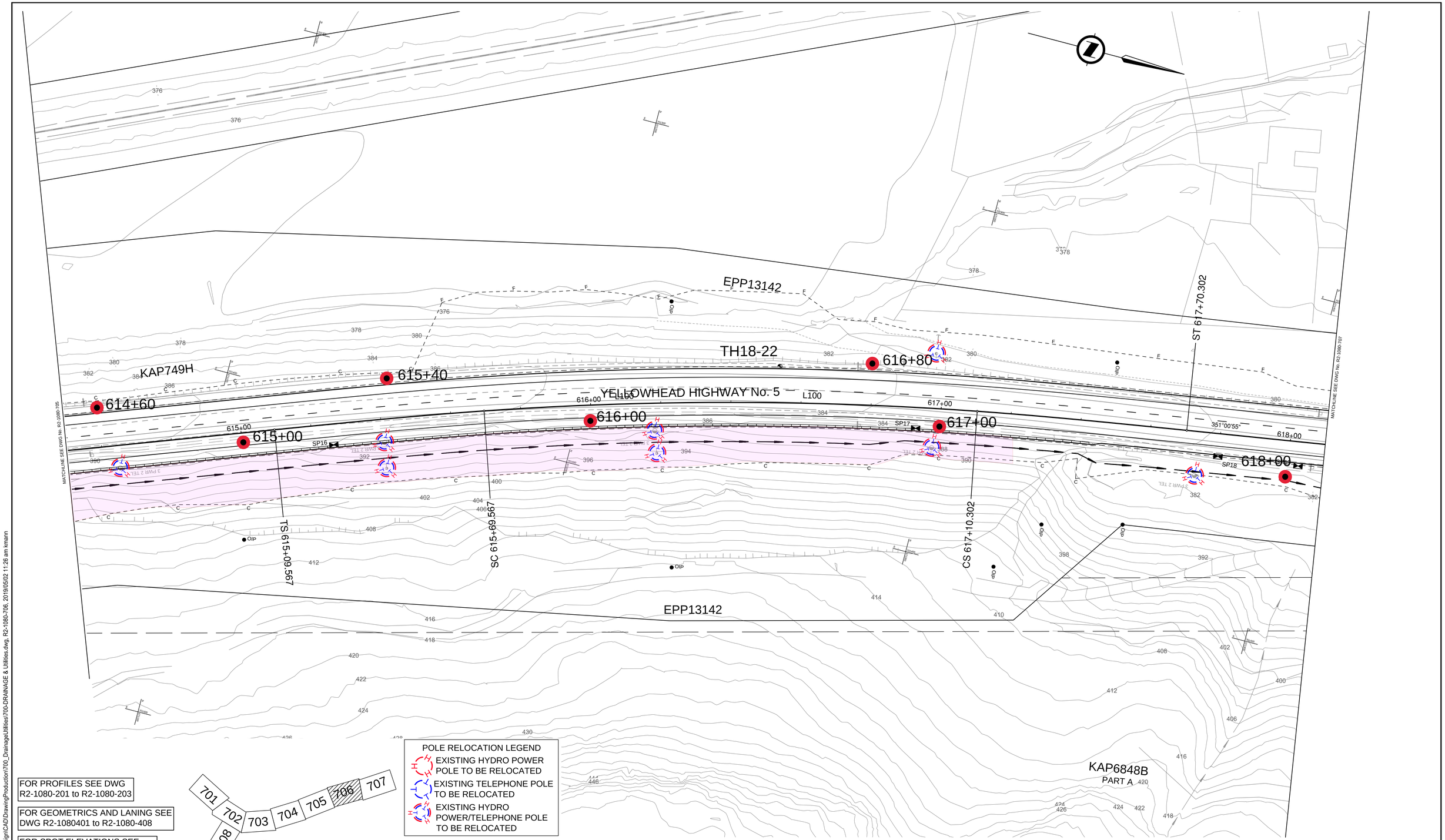

FOR PROFILES SEE DWG R2-1080-201 to R2-1080-203

FOR GEOMETRICS AND LANING SEE DWG R2-1080401 to R2-1080-408

FOR SPOT ELEVATIONS SEE DWG R2-1080-501 to R2-1080-501

FOR PLAN DRAWINGS SEE DWG R2-1080-101 to R2-1080-108

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SCALE SCALE 0 5 1:500 25m

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DRAWN K. MANN DATE 2019-12-05

DRAINAGE & UTILITIES

YELLOWHEAD HIGHWAY No. 5
BARRIERE SOUTHBOUND
PASSING LANE
STA. 614+50.000 TO 618+10.000

FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV
1961.0427.03	24772-0001	2	R2-1080-706	

CANCEL PRINTS BEARING PREVIOUS LETTER

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EXCAVATE DITCH TO DAYLIGHT

KAP6848B
PARCEL A

KAP45640
ROAD

KAP26542
LOT 1

KAP53040
LOT A

LIMIT OF CONSTRUCTION
P.O.T. 621+08.955
TIE TO EXISTING

89C028 (MN)
N 6717708.570
E 701230.453
EL 379.755

TS 618+26.217

SC 618+86.217

450mm MIN THICKNESS OF CLASS 25kg RIP RAP BOTTOM AND SIDES OF DITCH FOR 10m DOWNSTREAM OF CULVERT

KAP749H

619+00

618+30

TH18-23

SP20

L100

620+00

621+00

621+05

CS 621+29.326

ST 621+89.326

YELLOWHEAD HIGHWAY No. 5

TO BARRIERE

EPP13142

33.0m 900Ø CSP 2.0 WT
WILDLIFE CROSSING CULVERT

42.0m 1000Ø CSP
2.0 WT

REMOVE EXISTING CULVERT

619+40

KAP832A

BC HYDRO RW

MATCHLINE SEE DWG No. R2-1080-706

701 702 703 704 705 706 707 708

2

POLE RELOCATION LEGEND

- EXISTING HYDRO POWER POLE TO BE RELOCATED
- EXISTING TELEPHONE POLE TO BE RELOCATED
- EXISTING HYDRO POWER/TELEPHONE POLE TO BE RELOCATED

FOR PROFILES SEE DWG R2-1080-201 to R2-1080-203

FOR GEOMETRICS AND LANING SEE DWG R2-1080-401 to R2-1080-408

FOR SPOT ELEVATIONS SEE DWG R2-1080-501 to R2-1080-501

FOR PLAN DRAWINGS SEE DWG R2-1080-101 to R2-1080-108

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DRAWN	K. MANN	2019-12-05

DRAINAGE & UTILITIES

YELLOWHEAD HIGHWAY No. 5
BARRIERE SOUTHBOUND
PASSING LANE
STA. 618+10.000 TO 621+35.000

FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV
1961.0427.03	24772-0001	2	R2-1080-707	

CANCEL PRINTS BEARING PREVIOUS LETTER

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FOR PROFILES SEE DWG R2-1080-201 to R2-1080-203

FOR GEOMETRICS AND LANING SEE DWG R2-1080-401 to R2-1080-408

FOR SPOT ELEVATIONS SEE DWG R2-1080-501 to R2-1080-501

FOR PLAN DRAWINGS SEE DWG R2-1080-101 to R2-1080-108

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DRAINAGE & UTILITIES

YELLOWHEAD HIGHWAY No. 5
BARRIERE SOUTHBOUND
PASSING LANE
STA. 200+00.000 TO 201+70.000

FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV
1961.0427.03	24772-0001	2	R2-1080-708	

CANCEL PRINTS BEARING PREVIOUS LETTER

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Attachment 1

Detailed Cost Estimate

Attachment 2: Detailed Cost Estimate for Soil Characterization Program - Louis Creek Passing Lane and Badger Creek CVSE Pullout

Task	Description	Qty	Unit	Rate	Fees	Disburs.	Contractor	Analytical	TASK SUBTOTAL
Task 1 - Project Planning and Management									
Scope: Includes preparation of detailed work plan, scheduling/coordination for Phase 1 additional field investigation, and project management									
Sr. Project Manager	Review work plan, planning, project management, client liason	25	hr	$184	$4,600				
Intermed. Scientist/Geoscientist	Prepare work plan, project coordination/scheduling, field prep	20	hr	$125	$2,500				
Field Supervisor	HSSE Planning, field preparation	4	hr	$105	$420				
Office Support	Project initiation	1	hr	$75	$75				
				Subtotals	**$7,595**	**$0**	**$0**	**$0**	**$7,595**
Task 2 - Highway 5 ROW and Badger Creek Pullout Shallow Soil Characterization									
Scope: Includes collection up to 50 locations; lab analysis up to 95 samples plus field dups samples									
Sr. Project Manager	Field support, updates	8	hr	$184	$1,472				
Intermed. Scientist/Geoscientist	Includes mob/demob (1 day)	12	hr	$125	$1,500				
Field Supervisor	Includes mob/demob (1 day)	12	hr	$105	$1,260				
Intermed. Scientist/Geoscientist	Execute field sampling program (2 days), incl site recon	24	hr	$125	$3,000				
Field Supervisor	Execute field sampling program (4 days), incl site recon	48	hr	$105	$5,040				
<u>Disbursements</u>									
Vehicle Rental (Including Fuel)		5	day	$125		$625			
Flight	Flight from Van to Kamloops (2 staff)	2	LS	$750		$1,500			
Accomodation	4 nights in Barriere	6	each	$120		$720			
LOA	5 days	8	each	$49		$392			
Gastech		1	week	$195		$195			
Nitrile Gloves		2	box	$55		$110			
Resealable Bags		2	box	$12		$24			
Ice for samples		16	bag	$4		$64			
<u>Sub-Contractors</u>									
Drilling Contractor (Geotech Drilling)	Geotech Quote Dec 4								
Mobilizatio/Demob	Mob-demob	2	LS	$950			$1,900		
Operator		40	hr	$69			$2,760		
OT		8	hr	$35			$280		
Safety Meeting / Crew Travel		2.5	hr	$99			$248		
Crew Subsistence		5	hr	$199			$995		
Pick Up		4	shift	$199			$796		
Skid Steer		4	shift	$725			$2,900		$9,879
Private Utility Contractor	Covers tme for TCLA and Pull Out Area	1	LS	$2,000			$2,000		
Traffic Control Contractor	Covers tme for TCLA and Pull Out Area	4	Day	$807			$3,229		
<u>Laboratory - Soil Only (Caro)</u>									
Volatiles Sampling Kit: 2 MeOH vials&1 cut-off syringe sampler		0	Sample	$4.50				$0	
VPH + BETX	Includes 10% QA/QC @ < 20% frequency of total of 71 samples	0	Sample	$47				$0	
LEPH/HEPH, PAH	Includes 10% QA/QC @ 25% frequency of total of 71 samples	29	Sample	$102				$2,931	
Metals	Includes 10% QA/QC	105	Sample	$50				$5,225	
Na/Cl by Saturated Paste	Includes 10% QA/QC	105	Sample	$33				$3,464	
Sample Disposal		105	Sample	$5				$523	
Shipping		6	cooler	$100				$600	
				Subtotals	**$12,272**	**$3,630**	**$15,107**	**$12,743**	**$43,752**
Task 2 - Highway 5 ROW and Badger Creek Pullout Shallow Soil Characterization									
Scope: Includes collection up to 50 locations; lab analysis up to 95 samples plus field dups samples									
Sr. Project Manager	Coordination, review of geotech BH logs	2	hr	$184	$368				
Intermed. Scientist/Geoscientist	Sample retreival, shipping	4	hr	$125	$500				
<u>Disbursements</u>									
Vehicle Rental (Including Fuel)	Included in Task 2	0	day	$125		$0			
<u>Laboratory - Soil Only (Caro)</u>									
Metals	Includes 10% QA/QC	10	Sample	$50				$500	
Na/Cl by Saturated Paste	Includes 10% QA/QC	3	Sample	$33				$99	
Sample Disposal		10	Sample	$5				$50	
Shipping		1	cooler	$100				$100	
				Subtotals	**$868**	**$0**	**$0**	**$749**	**$1,617**
Task 4 - Soil Characterization Reporting (Tasks 3 and 4)									
Scope: Includes data reduction/management, preparation of brief results report/update									
Sr. Project Manager	Review/prepare report/ work plan	5	hr	$184	$920				
Sr. Geoscientist	Data analysis and prepare report	30	hr	$150	$4,500				
Junior Field Professional	QA/QC soil logs	8	hr	$105	$840				
GIS	Mapping of locations, summary analytical results	4	hr	$94	$376				
Office Support	Project support / data mgmt (tables, logs, POP dwgs)	12	hr	$75	$900				
				Subtotals	**$7,536**	**$0**	**$0**	**$0**	**$7,536**
Task 5 - Property 5 and 6 Baseline Assessment for TLCA									
Field Program Scope: Includes collection up to 8 locations with hand auger lab; analysis up to 8 samples									
Field Supervisor	Execute field sampling program (1 day) = Total 1 day	7	hr	$105	$735				
<u>Disbursements</u>									
Vehicle Rental (Including Fuel)	Incl in Task 1	0	day	$125		$0			
Accomodation	Incl in Task 2	0	each	$120		$0			
LOA	Incl in Task 2	0	each	$49		$0			
Gastech	Incl in Task 2	0	week	$195		$0			
Nitrile Gloves	Incl in Task 3	0	box	$55		$0			
Resealable Bags	Incl in Task 4	0	box	$12		$0			
Ice for samples	Incl in Task 5	0	bag	$4		$0			
<u>Laboratory - Soil Only (Caro)</u>									
Volatiles Sampling Kit: 2 MeOH vials&1 cut-off syringe sampler		4	Sample	$4.50				$18	
VPH + BETX	Includes 10% QA/QC @ < 20% frequency of total of 71 samples	4	Sample	$47				$188	
LEPH/HEPH, PAH	Includes 10% QA/QC @ 25% frequency of total of 71 samples	9	Sample	$102				$918	
Metals	Includes 10% QA/QC	9	Sample	$50				$450	
Na/Cl by Saturated Paste	Includes 10% QA/QC	9	Sample	$33				$298	
Sample Disposal		9	Sample	$5				$41	
Shipping			cooler	$100				$0	
<u>Report Includes data reduction/management, preparation of brief results report</u>									
Sr. Project Manager	Review/prepare report/ work plan	2	hr	$184	$368				
Intermed. Scientist/Geoscientist	Data analysis and prepare report/ work plan	8	hr	$125	$1,000				
Junior Field Professional	QA/QC soil logs, tables	4	hr	$105	$420				
GIS	Mapping of locations, summary analytical results	2	hr	$94	$188				
Office Support	Project support / data mgmt (tables, logs, POP dwgs)	2	hr	$75	$150				
				Subtotals	**$2,861**	**$0**	**$0**	**$1,913**	**$4,774**
				Project Subtotals	**$31,132**	**$3,630**	**$15,107**	**$15,405**	
								Project Total	**$65,275**

Notes:

Amounts above are estimates only. All proposed work will be carried out by approved staff and invoiced in accordance with MoTI As and When Contract 860 CS 5150

The above estimated costs do not include applicable taxes.

Attachment 2

Detailed Sampling Plan

TABLE 1: Proposed Shallow Soil Characterization Sampling Program (Phase 1) - Louis Creek Passing Lane Project and Badger Creek Pullout

Location ID (STA ID)	Location		Type - Cut or Fill (Depth)	Sample Depth(s) (m)	Sample Analysis				Notes (Sampling Method, Access, etc)
	Side of Hwy	Dist from Hwy			Metals	Salt	PHCs	VOCs/VPH	
Badger Creek									
526+73	W	5-10	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger
528+80	W	5-10	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger
530+80	W	5-10	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger
532+30	W	5-10	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger
Property 5									
TLCA-P5-A	W	37 m	TCLA for CNR Property	0.1-0.3	1	1	1	1	Hand dig on CN property adjacent to Property 7; retaining wall to be constructed
TLCA-P5-A	W	25 m	TCLA for CNR Property	0.1-0.3	1	1	1	1	Hand dig on CN property adjacent to Property 7; retaining wall to be constructed
Property 6									
TLCA-P6-A	W	5 m	TCLA for CNR Property	0.1-0.3	1	1	1	1	Hand dig on CN property adjacent to cut area
TLCA-P6-B	W	5 m	TCLA for CNR Property	0.1-0.3	1	1	1	1	Hand dig on CN property adjacent to cut area
TLCA-P6-C	W	5 m	TCLA for CNR Property	0.1-0.3	1	1	1	1	Hand dig on CN property adjacent to cut area
TLCA-P6-D	W	5 m	TCLA for CNR Property	0.1-0.3	1	1	1	1	Combine with Location 608+60
TLCA-P6-E	W	5 m	TCLA for CNR Property	0.1-0.3	1	1	1	1	Hand dig on CN property adjacent to cut area
TLCA-P6-F	W	5 m	TCLA for CNR Property	0.1-0.3	1	1	1	1	Hand dig on CN property adjacent to cut area
L100 Barriere- Louis Creek 598+35 to 621+09									
598+60	W	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; small cut proposed at top of slope on west side of existing highway
598+80 (TH18-06)	E	15 m	Beyond cut area						Geotechnical borehole TH18-06; no samples required
599+40	W	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; small cut proposed at top of slope on west side of existing highway
599+95 (TH18-07)	E	30 m	Beyond cut area						Geotechnical borehole TH18-07; no samples required
600+40	W	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; small cut proposed at top of slope on west side of existing highway
601+00	E	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; small cut area on east side of highway
601+60	W	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; minor cut at top of slope above fill area
602+80	W	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; cut at location of culvert
603+05 (TH18-09)	W	5 m	Stripping and Cut (1m)	1.2-1.8 (1)	1	1			Geotechnical borehole TH18-09 (Sample 01 from 1.2-1.8 m)
603+40	W	5-10	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; cut at location of wildlife crossing
604+40	W	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; locate BH in shoulder area west of existing hwy
604+90 (TH18-14)	E	40 m	Beyond edge of cut						Geotechnical borehole TH18-14
605+20	E	< 5	Stripping and Cut (4m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; cut on east side of highway, location can be moved but **stay south and west of PP to avoid arch**
605+60	W	< 5	Stripping and Cut (2m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; 2 m deep cut on west side of highway
606+00 (TH18-13)	W	5 m	Beyond edge of cut	1.2-1.8 (1)					Geotechnical borehole TH18-13 (Sample 01 from 1.2-1.8 m)
606+20	E	< 5	Stripping and Cut (2m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; driveway from residences into existing highway (move to side of driveway)
606+25	E	15 m	Stripping and Cut (2m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; cut area approx 15 m east of existing edge of highway, **stay near Power pole to avoid arch**
606+40	W	< 5	Stripping and Cut (2m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; 2 m deep cut on west side of highway
607+00	E	5 m	Stripping and Cut up to 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; approx 5 m from edge of existing hwy, outer edge of existing ditch line
607+40	W	< 5	Stripping and Cut (2m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; approx 2 m cut at edge of existing hwy for new ditch
607+65 (TH18-15)	E	25 m	Beyond edge of cut	No samples collected					Geotechnical borehole TH18-15; no samples collected
608+00	E	5 m	Stripping and Cut up to 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; approx 5 m from edge of existing hwy, beyond existing ditch line
608+30 (TH18-17)	E	30 m	Beyond edge of cut	1.2-1.8 (1), 2.6-3.3 (2)	2				Geotechnical borehole TH18-17, samples 01 and 02
608+60	W	5-10	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	2	2	Bobcat auger; same location as TLCE-P6-D location; shallow cut 10 m from west side of existing highway
608+90 (TH18-19)	E	25 m	Within cut	1.5-1.6 (1), 2.7-2.95 (2)	2	1			Geotechnical borehole TH18-19, samples 01 and 02, bedrock at 4.6 m
609+00	E	10 m	Stripping and Cut up to 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; approx 10 m from edge of existing hwy at proposed barrier
609+50 (TH18-20)	E	35 m	Beyond cut	1.25-1.6 (1)	1				Geotechnical borehole TH18-20, sample 01
609+60	W	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; shallow cut for new ditch on west side of existing highway
609+95 (TH18-18)	W	< 5	Within cut	1.2-1.8 (1)	1				Geotechnical borehole TH18-18, Sample 01
610+00	E	10 m	Stripping and Cut up to 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; approx 10 m from edge of existing hwy at proposed barrier
610+60	W	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; shallow cut on west side of highway
611+00	E	10 m	Stripping and Cut up to 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; approx 10 m from edge of existing hwy at proposed barrier
611+40	W	< 5	Stripping Only	0.1-0.3	1	1	1		Bobcat auger; clear and grub for filling only at this location
611+95	E	10 m	Stripping and Cut up to 2 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; approx 10 m from edge of existing hwy at proposed wildlife crossing. Between PPs
612+60	W	< 5	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; small cut on west side
613+00	E	10 m	Stripping and Cut > 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; approx 10 m from edge of existing hwy at proposed barricade. 10 m S of PP
613+60	W	< 5	Stripping and Cut (< 1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger, shallow cut on west side
614+00	E	10 m	Stripping and Cut > 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; approx 10 m from edge of existing hwy at proposed barricade. 10 m N of PP
614+60	W	< 5	Stripping and Cut (< 1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger, shallow cut on west side
615+00	E	5-10	Stripping and Cut > 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; advance hole on outer side of existing ditch
615+40	W	< 5	Stripping and Cut (< 1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger, shallow cut on west side
616+00	E	5-10	Stripping and Cut > 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; advance hole on outer side of existing ditch
616+50 (TH18-22)	W	< 5	Within fill zone	1.2-1.8	1				Geotechnical borehole TH18-22
616+80	W	< 5	Stripping only	0.1-0.3	1	1	1		Bobcat auger, stripping for fill zone on west side
617+00	E	5-10	Stripping and Cut > 5 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; advance hole on outer side of existing ditch
618+00	E	5-10	Stripping and Cut to 1-2 m	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; shallow cut beyond existing ditch line in new proposed ditch
618+30	E	<5	Cut and Wildlife Culvert	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; cut zone and wildlife culvert across road
616+50 (TH18-23)	W	< 5	Within fill zone	1.2-1.8	1				Geotechnical borehole TH18-23
619+00	W	< 5	Stripping only	0.1-0.3	1	1	1		Bobcat auger; stripping depth only
619+40	E	10 m	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; cut zone for new ditch and culvert
621+05	W	10 m	Stripping and Cut (1m)	0.1-0.3, 0.5-1	2	2	1		Bobcat auger; cut zone for new ditch and culvert
L200 Hanson Rd 200+56 to 202+24									
200+60	N	< 5	Stripping and Cut (0.5 m)	0.1-0.3, 0.3-0.5	2	2	1		Hand dig or Bobcat auger; shallow cut north of Hanson Rd
200+65	S	< 5	Stripping and Cut (0.5 m)	0.1-0.3, 0.3-0.5	2	2	1		Hand dig or Bobcat auger; shallow cut south of Hanson Rd
201+00	N	< 5	Stripping and Cut (0.5 m)	0.1-0.3, 0.3-0.5	2	2	1		Hand dig or Bobcat auger; shallow cut north of Hanson Rd
201+40	N	< 5	Stripping only	0.1-0.3	1	1	1		Hand dig; stripping north of Hanson Rd
201+50	S	< 5	Stripping only	0.1-0.3	1	1	1		Hand dig; stripping south of Hanson Rd
202+20	N	< 5	Stripping and Cut (0.5 m)	0.1-0.3, 0.3-0.5	2	2	1		Hand dig or Bobcat auger; small cut north of Hanson Rd
202+20	S	< 5	Stripping and Cut (0.5 m)	0.1-0.3, 0.3-0.5	2	2	1		Hand dig or Bobcat auger; small cut south of Hanson Rd
Total Locations	50	(Excludes TLCA at Prop 5 and 6)		**QA/QC Samples (10% Frequency)**	**11**	**11**	**6**	**1**	
				Totals	**123**	**116**	**65**	**11**	
				soil jars	**246**		**104**		**VIALS**
				flats of soil jars	**10**				