



January 18, 2022

Mr. Mike Linder CN Environment, Yard Office 13477 116th Avenue Surrey, BC V3R 6W4 Via email: mike.linder@cn.ca

Dear Mr. Linder:

Re: Performance Verification Plan for Certificate of Compliance Portion of 1563 River Road (Excel Parcel), Prince George, BC Keystone Environmental Project No. 7105 BC ENV Site ID 24332

Keystone Environmental Ltd. (Keystone Environmental) has prepared this Performance Verification Plan (PVP) in support of an application for a risk-based Certificate of Compliance (CofC) for a portion of the property referenced as 1563 River Road (herein referred to as the "Excel Parcel"). The Excel Parcel is considered to be an off-site affected parcel impacted by historical activities from a source parcel to the southeast. The source parcel is the north-central portion of the Canadian National Railway Company (CN) Prince George North Yard in the City of Prince George, BC (the "Site").

The PVP presents the principal risk management measures (i.e., the Schedule B key risk management controls) that apply and must remain in place at the Excel Parcel to ensure that the CofC for the Excel Parcel remains valid. The PVP was prepared in accordance with BC Ministry of Environment and Climate Change Strategy (ENV) guidance (BC ENV, 2022). The PVP was based on the findings of the Keystone Environmental (2022a) report titled *Report of Findings – Human Health and Ecological Risk Assessment, Portion of CN North Yard, Prince George, BC.*

DETERMINATION OF SITE TYPE

The principal risk controls which must be present or implemented and must be maintained at the Excel Parcel include the following:

- Soil contamination must remain at depths greater than 1 metre below ground surface (mbgs) or below a permanent barrier (e.g., asphalt or concrete pavement)
- Groundwater must not be used as drinking water

A groundwater monitoring program must be conducted to demonstrate continued plume stability1

These risk controls were put in place to prevent exposure to soil and groundwater contamination by human and terrestrial ecological receptors at the Site.

Based on these risk control measures for the Excel Parcel, the Excel Parcel is considered to be a Type 2 site. A Type 2 site is one that meets risk-based standards under current and future uses through use of institutional or engineered risk controls, apart from the risk controls included for Type 1 sites².

REQUIRED ACTIONS BY CN TO IMPLEMENT THE REQUIRED RISK CONTROLS

The following actions are required by CN to implement the risk control:

- Mandatory notification provided to the Excel Parcel owner/operator and workers involved in site redevelopment that soil contamination must remain at depths greater than 1.0 mbgs or below a permanent barrier within the area of concern shown in the attached Figure 1.
- Mandatory notification provided to the Excel Parcel owner/operator that groundwater drinking water wells are not to be installed within the area of concern shown in the attached Figure 1.
- Mandatory notification provided to the Excel Parcel owner/operator and workers involved in site redevelopment that if the soil contamination identified in Figure 1 is to be removed through excavation, a qualified environmental professional should be retained to characterize the material and advise on proper soil management and disposal.
- Mandatory notification provided to the Excel Parcel owner/operator that a groundwater monitoring program must be implemented to demonstrate continued groundwater plume stability.
- Mandatory notification provided to the Excel Parcel owner/operator that access must be granted to CN to access the on-site groundwater monitoring wells, as presented on Figure 2.
- Mandatory notification provided to the Excel Parcel owner/operator to keep and maintain records of risk control maintenance as these records may be submitted to BC ENV upon request in the future.
- Mandatory notification provided to the Excel Parcel owner/operator that the Director must be notified if performance verification actions indicate that there is a failure of the risk controls or if the contingency plan is triggered.

² Type 1 sites include those that have an institutional control for limiting the presence of future drinking water wells where the site is serviced by a treated municipal water supply and/or have an engineered control of a maintained and a paved cap covering soil contamination in a municipal roadway or sidewalk.



¹ The groundwater monitoring program is a BC ENV requirement provided in *Preapproval under Protocol 6* Application for Request to Not Remediate the Entire Extent of Contamination for the Source parcel [Letter], dated June 10, 2021, and attached to this document for reference.

If continued plume stability is demonstrated after the first year of groundwater/LNAPL monitoring program is complete, an annual report will be prepared by a qualified environmental professional hired by CN within **6 months** of the last sampling event. At that time, the monitoring report could be submitted to the Director to amend, modify, or remove the groundwater monitoring condition from the PVP.

If contingency measures are implemented during the groundwater/LNAPL monitoring program period, a Contingency Plan will be prepared by a qualified environmental professional hired by CN specifying the actions taken to mitigate or proposed to mitigate the condition related to the advancement of groundwater contamination or LNAPL, as necessary. Following notification of the director that contingency measures have been implemented, contingency plan reports will be prepared by a qualified environmental professional hired by CN every **6 months** or at the time frame specified by the Director until not required.

REQUIRED ACTIONS BY EXCEL PARCEL OWNER/OPERATOR

The following actions are required by Excel Parcel Owner/Operator to maintain the risk controls:

- Ensure soil contamination remain at depths greater than 1.0 mbgs or below a permanent barrier within the area of concern shown in the attached **Figure 1**.
- Ensure that groundwater drinking water wells are not installed at the Excel Parcel.
- Ensure that groundwater is not used for drinking water purposes at the Excel Parcel.

Records of risk control maintenance by the Excel Parcel owner/operator should include the following:

- Construction activities that have occurred within the boundaries of the Excel Parcel.
- Description and schedule of inspection and maintenance works conducted within the boundaries of the Excel Parcel.
- Detailed specifications on any engineering work implemented within the boundaries of the Excel Parcel.
- Quantity and quality of soil or waste managed or disposed of as part of the engineered works.
- Any identified failures in risk control performance along with the measures taken to restore the risk control(s).

Suitable forms of record documentation include inspection records, site photographic documentation, engineering drawings/details, communication documents, and related information, and should be recorded at least annually.

If periodic maintenance of sub-surface works (e.g. pipes, utilities, etc.) does not occur within the boundaries of the Excel Parcel or those contaminated soils have been removed through excavation, then photographs of the final development at the Excel Parcel and records indicating



documentation that future maintenance of sub-surface works would not be required at that depth would be sufficient for performance verification.

If periodic maintenance of sub-surface works (e.g., pipes, utilities, etc.) occurs within the boundaries of the Excel Parcel while the soil contamination remains within the boundaries of the Excel Parcel, then inspection/maintenance records will be needed until maintenance is not required.

SUMMARY RATIONALE

Soil contamination must remain at depths greater than 1 metre below ground surface (mbgs) or below a permanent barrier (e.g., asphalt or concrete pavement).

Soil contamination exceeding the Contaminated Sites Regulation (CSR) Schedule 3.1 commercial land use (CL) soil standards relevant to human and terrestrial ecological health are present in soil from depths ranging from 2.7 to 7.0 mbgs. The risk assessment assumed that the identified soil contamination would remain beneath the overlying soil with a minimum thickness of 1.0 m to prevent potential unacceptable risks to humans and/or on-site terrestrial ecological receptors.

As the identified contaminated soil is located at considerable depth, the soil contamination does not pose unacceptable risks to human health or the environment. Therefore, an immediate risk of exposure to the soil contamination by humans and terrestrial ecological receptors would not occur as long as the risk control does not become compromised. Retaining a qualified environmental professional to advise on the proper soil management during excavation, if any, would mitigate future unacceptable risks to human health and the environment. Consequently, a contingency action plan is not proposed in this PVP.

Maintaining communication and inspection records, at least annually, until maintenance is not required is considered a suitable risk management measure.

Groundwater must not be used as drinking water.

Groundwater contamination exceeding the CSR Schedule 3.2 standards for drinking water use is present at the Excel Parcel. Buildings are not currently present on the Excel Parcel, and groundwater at the Excel Parcel is not currently used as a drinking water source. The risk assessment assumed that groundwater drinking water wells would not be installed at the Excel Parcel in the future.

Maintaining communication and inspection records, at least annually, until maintenance is not required is considered a suitable risk management measure.

A groundwater and LNAPL monitoring program must be conducted to demonstrate continued plume stability.

Groundwater contamination exceeding the CSR Schedule 3.2 standards for drinking water and freshwater aquatic life use is present at the Excel Parcel, and groundwater plume stability must



be demonstrated for risk assessment to be considered as a viable remedial strategy. As documented in the Keystone Environmental (2022b) Detailed Site Investigation (DSI) report, light non-aqueous phase liquid (LNAPL) stability was demonstrated in accordance with *Protocol 16* (BC ENV, 2021a) and dissolved phase stability was demonstrated in accordance with *Technical Guidance 8* (BC ENV, 2021b). Although plume stability has been demonstrated for the Excel Parcel, the *Protocol 6* preapproval obtained from BC ENV on June 10, 2021, for the Excel Parcel was issued with the condition that a groundwater monitoring program must be conducted to demonstrate continued plume stability of the identified groundwater contamination for the Site and Excel Parcel. It was also indicated that a contingency plan with action levels/thresholds to address observed departures in plume stability also be included.

The identified groundwater contamination is considered to be stable in concentration and extent, as already demonstrated in conformance with BC ENV protocols and guidance, and is expected to remain stable in the future based on empirical data for petroleum hydrocarbon sites and concepts that are industry state of practice as supported by an expert panel review of the Site.

Groundwater Monitoring Program

The groundwater monitoring program to be implemented by CN is as follows:

- Groundwater monitoring wells MW-247, MW-319, MW18-341S, MW-334, MW19-365 MW19-359 and MW18-337 (refer to **Figure 2**) are to be sampled on a quarterly basis for one year.
- Groundwater samples would be analyzed for light extractable petroleum hydrocarbon (LEPH_w) and polycyclic aromatic hydrocarbons (PAHs). If there is a potential for groundwater transport modelling to be conducted (i.e. increasing trends are identified), then additional sample analysis would include nitrate, sulphate, chloride, alkalinity, manganese, and iron, along with field parameters pH, temperature, electrical conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity.
- The analytical results would be correlated with field measurements such as LNAPL mobility.

The monitoring wells selected for the groundwater monitoring program are located along approximate transects3 from the leading edge of identified LNAPL, through dissolved phase contamination, to an area hydraulically down-gradient of the defined extent of dissolved phase contamination. The analytical results from each transect would be evaluated independently and compared through Mann-Kendall trend analysis with previous groundwater analytical results from the last five years (post-shutdown of historical groundwater treatment system).

Based on the groundwater analytical results, the groundwater monitoring program may be amended or terminated after one year following the submission of the CofC, as follows:

Decrease in dissolved concentrations or LNAPL extent:

➤ If Mann-Kendall trend analysis of analytical results demonstrates decreasing trends at groundwater monitoring wells and in spatial extent of LNAPL (>2 mm measured)

Transect 1 includes MW18-337, MW19-359, and MW19-365; Transect 2 includes MW-334, MW18-341S, MW-319, and MW-247.



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o Then terminate groundwater monitoring after 1 year of implementation

Stable dissolved concentrations or LNAPL extent:

- ➤ If Mann-Kendall trend analysis of analytical results demonstrates stable trends at groundwater monitoring wells and in spatial extent of LNAPL (>2 mm measured)
 - Then terminate groundwater monitoring **after 1 year** of implementation

Minor increasing trend:

- ➤ If Mann-Kendall trend analysis of analytical results demonstrates increasing trends at groundwater monitoring wells and in spatial extent of LNAPL (>2 mm measured), and groundwater transport modelling demonstrates that dissolved phase contamination would not advance beyond the boundary(s) of the institutional risk control
 - Then re-sample groundwater monitoring wells that show minor increasing trend within
 2 months of analytical results and re-evaluate results and continue as needed.

Increasing trend at rate exceeding Action Level/Threshold (Contingency Plan):

- ➤ If Mann-Kendall trend analysis of analytical results demonstrates increasing trends at groundwater monitoring wells and in spatial extent of LNAPL (>2 mm measured), and groundwater transport modelling demonstrates that dissolved phase contamination has the potential to advance beyond the boundary(s) of the institutional risk control (i.e., Action Level/Threshold is exceeded), then this would be a trigger for action, as follows:
 - Increase groundwater monitoring well sampling from quarterly to monthly for one more year, or as determined by a qualified environmental professional, to gauge changes in groundwater plume stability
 - CN will implement the Contingency Plan, which would consist of evaluating the
 potential remedial options specific to the condition identified, and may include, but is
 not limited to, in situ treatment for enhancing attenuation, localized reactive barrier,
 and/or installing an interception trench.

As previously mentioned, a groundwater monitoring report will be prepared by a qualified environmental professional hired by CN within **6 months** following demonstration of groundwater plume stability. Furthermore, Contingency Plan reports will be prepared by a qualified environmental professional hired by CN every **6 months** following notification of the Director that contingencies have been implemented, unless otherwise instructed.

Considering that the groundwater contamination is located at depths greater than 1.0 mbgs and unlikely to result in exposure, has been demonstrated to be stable or decreasing in concentration and extent, and predicted concentrations of potential volatile or semi-volatile substances in vapour overlying areas of highest identified concentrations of dissolved phase COCs and LNAPL were less than CSR standards for indoor air, the groundwater contamination does not pose unacceptable risks to human health or the environment. Therefore, an immediate risk of exposure to the groundwater contamination by humans and ecological receptors would not occur as long as continued groundwater plume stability, or even minor variability, is demonstrated.



CONCLUSION

It is our opinion that the actions identified in this report are sufficient to ensure performance verification of the risk controls required for the Excel Parcel.

GENERAL LIMITATIONS

The findings presented in this report are based upon the field work conducted by Keystone Environmental for Canadian National Railway Company. Keystone Environmental has prepared this document in good faith and has relied upon information provided by others. Keystone Environmental has assumed that the information provided by third parties is both complete and accurate. This report was completed in a manner consistent with that level of care and skill normally exercised by other environmental professionals, practicing under similar circumstances in the same locale at the time of the performance of the work.

This report has been prepared solely for the internal use of 617568 BC Ltd., Inc. No. 617568 and Canadian National Railway Company, and for review by BC Ministry of Environment and Climate Change Strategy pursuant to the agreement between Keystone Environmental Ltd. and Canadian National Railway Company. By using this report, 617568 BC Ltd., Inc. No. 617568, Canadian National Railway Company, and BC Ministry of Environment and Climate Change Strategy agree that they will review and use the report in its entirety. Any use which other parties make of this report, or any reliance on or decisions made based on it, are the responsibility of such parties. Keystone Environmental Ltd. accepts no responsibility for damages, if any, suffered by other parties as a result of decisions made or actions based on this report.

Sincerely,

Keystone Environmental Ltd.

Kevin Hall, B.Sc., R.P.Bio. Risk Assessor

Adam Radlowski, M.Sc., R.P.Bio. Senior Environmental Risk Assessor

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ATTACHMENTS:

- References
- BC ENV Protocol 6 Preapproval, dated June 10, 2021
- Figures



REFERENCES



REFERENCES

- BC ENV. (2021a). Protocol 16 for Contaminated Sites, Determining the Presence and Mobility of Nonaqueous Phase Liquids and Odorous Substances, Version 3.0 (February 1, 2021). Victoria, BC: BC ENV. Retrieved from https://www2.gov.bc.ca/assets/gov/environment/airland-water/site-remediation/docs/protocols/protocol_16.pdf
- BC ENV. (2021b). Technical Guidance 8 on Contaminated Sites, Groundwater Investigation and Characterization, Version 3 (January 5, 2021). Victoria, BC: BC ENV. Retrieved from https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/technical-guidance/tg08.pdf
- BC ENV. (2022). *Performance Verification Plans*. Retrieved January 18, 2022, from https://www2.gov.bc.ca/gov/content/environment/air-land-water/site-remediation/guidance-resources/performance-verification-plans
- Keystone Environmental Ltd. (2022a). Report of Findings Human Health and Ecological Risk Assessment, Portion of CN North Yard, Prince George, BC (January 18, 2022). Burnaby, BC: Keystone Environmental Ltd.
- Keystone Environmental. (2022b). Report of Findings Stage 1 Preliminary Site Investigation, Detailed Site Investigation, and Remediation Summary, Portion of CN North Yard, Prince George, BC (January 18, 2022). Burnaby, BC: Keystone Environmental.



BC ENV PROTOCOL 6 PREAPPROVAL, DATED JUNE 10, 2021





VIA EMAIL ENV Files: 26250-20/4629

26250-20/584

26250-20/24332

Site IDs: 4629, 584, 24332

June 10, 2021

Stella Karnis Canadian National Railway Company Floor 3 – 935 de la Gauchetiere Street West Montreal, QC H3B 2M9 Stella.Karnis@cn.ca

Dear Stella Karnis,

Re: Preapproval under Protocol 6 Application for Request to Not Remediate the Entire Extent of Contamination for the Source parcel CN Prince George North Yard, 855 River Road, Prince George, BC (PID: 005-549-663)

This letter provides my decision on your April 17, 2020 application to the Ministry of Environment and Climate Change Strategy (ENV or the ministry) for preapproval under Protocol 6 for relief from the requirement to remediate the entire extent of contamination attributable to the historic diesel fuel spill area of contamination located on a portion of the Canadian National Railway Company (CN) Prince George North Yard contaminated site (CN Railyard) located at 855 River Road, Prince George, BC and on portions of two adjacent affected properties identified as 1563 River Road, Prince George, BC (Site ID 24332) and 1325 Foley Crescent, Prince George, BC (Site ID 584). The application is specifically to request preapproval from the director to not seek a legal instrument, at this time, for the source parcel CN Railyard, contaminated site # 4629. There is a commitment as described below to obtain Certificates of Compliance for the two affected properties, contaminated site #s 24332 and 584.

The Legal Description (LD) and PID of the CN Railyard is as follows:

855 River Road, Prince George, BC (CN Railyard)

LD: That Part of Parcel District Lots 343, 662, 1511 and 4736 Cariboo District Plan

29245 as shown on Plan 31924, Except Plan PGP40122

PID: 005-549-663

The Legal Descriptions, PIDs and metes and bounds descriptions for the portions of the two adjacent affected properties (identified as Area 1 and Area 2) contaminated by offsite migration of contamination from the CN Railyard are as follows:

Area 1: Site ID 24332

1563 River Road (Excel Transportation)

Parcel Identifier:	023-465-018
Legal Description:	Lot 7 Except: Part Subdivided by Plan BCP11244; District Lots 343 and 662 Cariboo District Plan PGP40122
Current Registered Owner:	617568 BC Ltd., Inc. No. 617568
Metes and Bounds:	Starting at The Southeast Corner of Lot 7, Except: Part Subdivided by Plan Bcp11244; District Lots 343 And 662 Cariboo District Plan PGP40122: the Point of Commencement.
	 thence 295° 22' 15" for 49.023 metres;
	 thence 28° 39' 58" for 14.258 metres;
	 thence 58° 09' 55" for 21.658 metres;
	 thence 71° 57' 34" for 42.324 metres;
	 thence 64° 59' 44" for 52.583 metres;
	 thence 62° 30' 51" for 25.705 metres;
	 thence 133° 22' 28" for 3.617 metres;
	 thence easterly being an arc of a 109.667 metre radius curve having a radial bearing of 145° 00' 29" to the centre of said curve and a radial bearing of 135° 31' 07" to the end of said curve an arc distance of 18.163 metres;
	 thence 225° 49' 15" for 112.003 metres;
	returning to the Point of Commencement.

Area 2: Site ID 584

1325 Foley Crescent (Lakeland Mills)

Parcel Identifier:	007-737-319
Legal Description:	Lot 1 District Lots 343 662 1511 Cariboo District plan 32219
Current Registered Owner:	Lakeland Mills Ltd., Inc. No. 115260
Metes and Bounds:	Starting at the southwest corner of Lot 1, District Lots 343, 662, and 1511, Cariboo District Plan PGP32219: the Point of Commencement.
	 thence 25° 22' 02" for 85.631 metres;
	 thence 118° 16' 52" for 14.354 metres;
	 thence 186° 29' 35" for 64.100 metres;
	 thence 206° 14' 33" for 24.253 metres;
	 thence 295° 22' 15" for 34.701 metres;
	returning to the Point of Commencement.

A Location Plan and Site Plan are provided in Attachments A and B, respectively, for reference.

In reaching my decision I have relied on information provided in the following supporting documents:

- "Report of Findings Stage 1 Preliminary Site Investigation and Detailed Site Investigation, Portion of CN Prince George North Yard, Prince George, BC", Keystone Environmental Ltd, August 10, 2020;
- "Letter of Commitment, Protocol 6 Pre-approval Request for Applications for Portions of a Site, Source Site ID #6984 and 4629, Prince George, BC", Canadian National Railway Company, April 15, 2020; and
- "Protocol 6 Preapproval Application, CN Prince George North Yard, Prince George, BC", Canadian National Railway Company, April 15, 2020.

The primary rationale and supporting information presented in the above documents is summarized below:

- *CN* is subject to applicable federal legislation. The railyard will remain in operation and therefore a CoC for the source parcel (railyard) will not be pursued.
- Offsite migration of contamination has occurred onto the 1563 River Road and 1325 Foley Crescent properties. The CN-related contamination on portions of these properties has been fully delineated in soil and groundwater.
- Migration of contamination onto other adjacent properties has not been identified.
- Groundwater contamination is interpreted to be stable or decreasing in concentration and extent.

• CN is committed to completing environmental investigation reports, a human health and ecological risk assessment, and applying for risk-based Certificates of Compliance (CofC) for the two affected off-site parcels...

Based on the information presented in the application documents referred to above, I advise that it is not necessary to make a Certificate of Compliance application for the CN Railyard source area at the same time as the committed-to Certificate of Compliance applications for the two adjacent affected properties. I preapprove under Protocol 6 that legal instruments may be sought for a part of the contaminated site. I make this decision based primarily on the following:

- 1. The CN Railyard will remain in operation for the foreseeable future. Remediation of the CN Railyard may be better addressed following cessation of operational activities.
- 2. CN has committed to obtaining Certificates of Compliance for the CN-attributable contamination on the two adjacent affected properties using a risk-based approach.
- 3. Further to item 2 above, as a requirement for any risk-based Certificate of Compliance application, CN advises that the groundwater contamination on the CN Railyard and two adjacent affected properties is stable or decreasing in concentration and extent.

In making this decision, I impose the following conditions for the upcoming Certificate of Compliance application(s) for the two adjacent affected properties:

- 1. Plume stability must be demonstrated, as this informs the potential for recontamination at the affected properties; and
- 2. Based on the mass and areal extent of LNAPL remaining on the source property, a Performance Verification Plan (PVP) must be recommended by an Approved Professional and give consideration to, in addition to any other requirements, a groundwater monitoring program for the source and affected properties to demonstrate continued plume stability. A contingency plan with action levels/thresholds to address any observed departures in plume stability must also be included in the PVP.
 - It is possible that at the end of the monitoring period, the monitoring results and plume stability could be evaluated and modifications to the monitoring program considered, as may be warranted, at the discretion of the director.

Please ensure that a copy of this letter is included in the future application(s) for Certificates of Compliance for the adjacent affected properties.

This decision is based on the most recent information available to the ministry regarding the above referenced site. The ministry, however, makes no representation or warranty as to the accuracy or completeness of this information. The ministry expressly reserves the right to change or substitute different requirements where circumstances warrant.

If you have any questions about this decision letter, please contact the undersigned at Heather.Osachoff@gov.bc.ca.

Yours truly,

Heather Osachoff

Heather Osachuff

for *Director*, *Environmental Management Act* Manager, Risk Assessment and Remediation

Attachment A: Location Plan Attachment B: Site Plan

cc: Francisco Perello, Keystone Environmental Ltd.

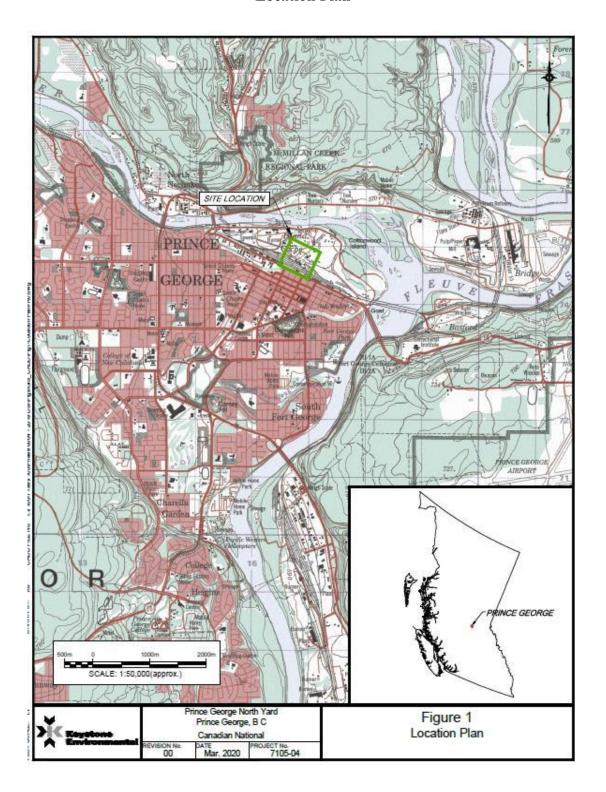
fperello@keystoneenvironmental.ca Keith Brandner, Excel Transportation Inc., 1563 River Road, Prince George, BC <u>kbrandner@exceltransportation.ca</u>

Darcy Goodkey, Lakeland Mills Ltd., 1325 Foley Crescent, Prince George, BC darcy.goodkey@sinclar.com

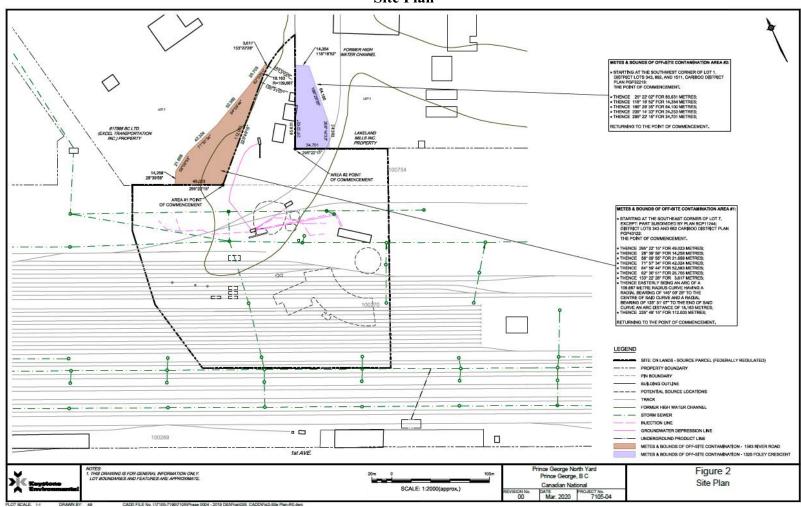
George Szefer, Senior Contaminated Sites Officer, ENV George.Szefer@gov.bc.ca Client Information Officer, ENV csp cio@victorial.gov.bc.ca

Society of Contaminated Sites Approved Professionals of BC c/o Anna Popova apopova@csapsociety.bc.ca

Attachment A Location Plan



Attachment B Site Plan



FIGURES



