CITY OF VANCOUVER

CITY CLERK'S DEPARTMENT
Access to Information & Privacy Division

File No.: 04-1000-20-2022-084

July 13, 2022

s.22(1)

Dear s.22(1)

Re: **Request for Access to Records under the Freedom of Information and Protection of Privacy Act (the "Act")**

I am responding to your request of February 18, 2022 under the ***Freedom of Information and Protection of Privacy Act, (the Act),*** for:

> **Records regarding the St. Paul's Medical Campus development, specifically:**
> 1. **Environmental or hazardous waste reports pertaining to the development;**
> 2. **Application and approval of the increase from 600,000 square feet to 800,000 square feet;**
>
> **Date range: January 1, 2019 to February 17, 2022.**

All responsive records are attached. Some information in the records has been severed, (blacked out), under s.15(1)(l) and s.22(1) of the Act. You can read or download these sections here: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96165_00

Please note, the Rezoning Centre informed our office that the numbers referenced in part two of your request do not match the floor area changes which were approved by Council on March 3, 2022, as part of a text amendment application for the New St Paul's Hospital site. The amendment did not include increases in the maximum allowable floor area but instead permitted floor space directly associated with the hospital's Energy Centre to be excluded from floor area calculations to a maximum of 246,397 sq. ft. This change facilitated a relocation of mechanical floor area from the hospital rooftop to level four.

A link to the March 3, 2022 Public Hearing minutes is available here:
https://council.vancouver.ca/20220303/documents/phea20220303min.pdf

Under section 52 of the Act, and within 30 business days of receipt of this letter, you may ask the Information & Privacy Commissioner to review any matter related to the City's response to your FOI request by writing to: Office of the Information & Privacy Commissioner, info@oipc.bc.ca or by phoning 250-387-5629.

If you request a review, please provide the Commissioner's office with: 1) the request number (#04-1000-20-2022-084); 2) a copy of this letter; 3) a copy of your original request; and 4) detailed reasons why you are seeking the review.

Yours truly,

[Signed by Cobi Falconer]

Cobi Falconer, MAS, MLIS, CIPP/C
Director, Access to Information & Privacy
cobi.falconer@vancouver.ca
453 W. 12th Avenue Vancouver BC V5Y 1V4

If you have any questions, please email us at foi@vancouver.ca and we will respond to you as soon as possible. Or you can call the FOI Case Manager at 604-871-6584.

FTP (Response Package)

:kt

From: "Rene Horn" <RHorn@pcl.com>
To: "Heinricks, Shelley" <Shelley.Heinricks@vancouver.ca>
CC: "Freeman, John" <John.Freeman@vancouver.ca>
"Villamin, Evett" <Evett.Villamin@vancouver.ca>
"Montgomery, Nicole" <nicole.montgomery@vancouver.ca>
"Paul Devriendt" <PRDevriendt@pcl.com>
Date: 8/10/2021 8:02:30 AM
Subject: [EXT] FW: HMRF Submission - 310 Prior Street, Vancouver
Attachments: WorkSafeBC-NOP-confirmation-896629.pdf
ACTES - Risk Assessment - Moderate Risk.pdf
ACTES - SWP & ECP - 310 Prior St. - July 30, 2021.pdf
Clearance Letter - ACTES - 4903; 310 Prior Street, Van.pdf
COV HMRF - 130 Prior St, Van.pdf
COV PAIR - 310 Prior St, Van.pdf
HMS Report 1 - 2018-06-14_DST_Pre-Demolition_HMS_-_310_Prior_Street_v01 (1).pdf
HMS Report 2 - 2105834-PCL HMR-310 Prior Street Vancouver_final.pdf
HMS Report 3 - 2105834-PCL-ACM Bulk Sample Test Results-final revised.pdf
Waste Shipping Doc - ACTES - ACTESSKM_C30821080910470.pdf

Good morning, Shelley.
I am not sure if this is currently with your department but the clearance letter together with additional documentation for the salvage and abatement permit has been submitted by the QP this morning. We will mobilize equipment on site and are awaiting the issuance of the demolition permit. Could you please let me know if there is anything else that you will need to issue the demo permit?

Thanks,

René Horn
Project Manager
PCL Constructors Westcoast Inc.
T: 604-241-5200
M: 778-318-4780

From: Harvey Wong <harvey@kineticohs.com>
Sent: Tuesday, August 10, 2021 5:49 AM
To: enviro.reporting@vancouver.ca
Cc: nav@dallaswattdemo.ca; klittle1@providencehealth.bc.ca; Rene Horn <rhorn@pcl.com>; Ramin Hamidnejad (Kinetic OHS) <ramin@kineticohs.com>
Subject: HMRF Submission - 310 Prior Street, Vancouver

[External Email]
Hi,

Attached are the documents for submission.

One roof vent with suspect asbestos mastic will remain and be removed during the demolition phase as the roof structure was not safe to walk on.
ACTES has attached a copy of their SWP & Risk Assessment (signed)

Please review and contact me if you have any questions.

Sincerely,

Harvey Wong, CRSP, ROHT
Director/Principal Consultant

Kinetic OHS Services Ltd.
#202 – 1520 Barrow Street
North Vancouver, BC V7J 1B7
Mobile: 604-816-1290 ▪ Office: 604-988-0099
Email: harvey@kineticohs.com ▪ Web: www.kineticohs.com [kineticohs.com]

Kinetic
OHS Services [kineticohs.com]
Moving Safety in the Right Direction

Notice of Project: 896629

Hazardous substances

Submitted: Friday, July 30, 2021 at 12:53 p.m. Pacific Time

Except as permitted by OHS regulation 20.2.1(6), WorkSafeBC must be provided with at least 48-hour written notice prior to the start of the work activity. Work on this project, including set-up activities, may begin on August 1, 2021, 12:53 p.m. Pacific Time, or on the start date indicated on the Notice of Project — whichever is later.

OHS regulation 20.2.1(5) requires that a copy of the notice of project is posted at the worksite for the duration of the project.

Worksite details

Worksite Location

	City	Location	Planned start date	Duration
1	Vancouver	310 Prior St, Vancouver, BC V6A, Canada 49.276702,-123.096832	8/4/2021	3 Days

Daily hours of work:
07:00 to 17:00

Workers at the worksite per shift:
3

Owner or agent representative of this worksite:
WorkSafeBC Account Number: 200141387
Dallas Watt Demolition Ltd.
1-211 Schoolhouse St
Coquitlam, British Columbia
Canada, V3K 4X9

Project information

Employer working with or in proximity to the hazardous substances:
WorkSafeBC Account Number: 200141387
Actes Environmental Ltd.
1-211 Schoolhouse St
Coquitlam, British Columbia
Canada, V3K 4X9

Person in charge of the planned activity:
Sundae Anota
Supervisor
604-700-8463

Consultants:
Kinetic OHS Services

Scope of work

Plan for the building or structure after the hazardous substances are removed:
Demolition

Planned activity involving asbestos-containing material:
Removal

Highest risk classification of this project as determined by a qualified person:
Moderate

Attachments

Attachments

	Category	File name	Comment
1	Hazardous material survey	2018-06-14_DST_Pre-Demolition_Hazardous_Materials_Assessment_-_310_Prior_Street_v01 (1).pdf	
2	Other	Directions to NSP Site.pdf	Site Directions
3	Safe work procedures	Exposure Control Safety Plan - 310 Prior St. - July 30 2021.pdf	

Other information

Submitted by:
Deepuk Kalkat
604-218-6063
dkalkat@actes.ca

Limitations
Neither the issuance of a Notice of Project number, nor the absence of follow-up action by WorkSafeBC indicates acceptance or approval of the information provided. If you have any safety concerns regarding this project, contact the person in charge of this project or WorkSafeBC prevention information line at 604.276.3100 or 1.888.621.7233.

Significant changes
If the information on the Notice of Project significantly changes, the new information must be submitted to WorkSafeBC as soon as possible and posted at the worksite.

To update the information, provide WorkSafeBC with the Notice of Project number, the worksite address, and a summary of the changes you want to make by either:

Email: prevnop@worksafebc.com
Fax: 604.276.3247

ACTES Environmental Ltd

Risk Assessment

Project Manager	Stefanie Vennard	**PROJECT #12610**	**Client & Contact**	Jimmy Sousa - Dallas Watt Demo	
Risk Assessment Date;	30-Jul-21		**Proj. Address;**	310 Prior Street, Vancouver	
Start Date, Times, Duration	TBD		**Consultant;**	N/A	

Scope of Work: This project will involve the "Moderate Risk" removal and disposal of roof metal flashing (460 linft) with asbestos containing mastic intact, as well as potential residual "assumed" mastic from the concrete frame where windows have been removed. Any windows remaining on the building will be removed with mastic intact. Workers will perform all work operating a boom lift. Actes will follow PCL's site-specific safety guidelines and Covid-19 protocols.

Hazardous Materials;	**Product**	**Type of Asb**	**Percentage**	**Friable (y/n)**	**Non-friable(y/n)**	**Condition**	**Risk Level**	**Eng. Controls**	**P.P.E**
Asbestos:	Grey Caulking/ Mastic (Windows) Roofing Caulking/Mastic	Chrysotile Chrysotile	4% 10-20%	N N	Y Y	Good	MR	Install6-mil barriers as needed, drop sheets, c/w signage, Banner tape. Razor Scrapers, keep wet, isolated zones with localized hepa-vac extraction, hepa-vac, use hepa vacuums, personal washstations with soap, fall protection.	half/full-face APR's c/w hepa filter, cut proof gloves and tyvek coveralls, safety glasses, Steel toe boot.
Concrete/Silica Products:	Dust	N/A	N/A	Y	N	POOR	MR	Same as Above	Same as Above
Lead Dust/Coatings:									
Rodent Droppings:									
Bird Droppings:									
Nuisance Dust:	Dust	N/A				Poor	MR	Same As Above	Same As Above
Mould		N/A							
Chemicals(ie paint stripper)									
OTHERS:									

Other Safety Risks and or Hazards	**Location/Type**	**Risks (y/n)**	**IDLH (y/n)**	**Tagging (y/n)**	**Tradesman (y/n)**	**Lockout (y/n)**	**Signage (y/n)**	**Eng Controls (y/n)**	**P.P.E (y/n)**
Electrical Hazards:									
Over head hazards:									
Elevated Working Heights:	Exterior of Building	Y	N					Fall Protection Equipment as per WorksafeBC Regulations, and PCL Requirements - When working from a boom-lift.	Same as Above
Confined Space:									
Excavated Site/trenches									
Mobile Heavy Equipment:									
Tools & Equipment:	Hand Tools	Y	N	N	N	N	N	Same as Above; All eletric tools will be ground fault protected and have all gaurds in place.	Same as Above
Broken Glass:	Windows	Laceration	N	NA	NA	NA	NA	Same as Above	Same as Above
Protruding nails:									
OTHERS:									

EXPOSURE CONTROL & SAFETY PLAN

FOR THE SAFE REMOVAL & DISPOSAL OF ASBESTOS CONTAINING MATERIALS

310 PRIOR STREET VANCOUVER, B.C

Prepared by:
Stefanie Vennard
July 30, 2021

Project Information:

Owner: General Contractor – Dallas Watt Demo – Jimmy Sousa

Project Address: 310 Prior Street, Vancouver

Abatement Contractor: Actes Environmental.

Actes Project Manager: Stefanie Vennard – 778-772-0873

Actes Supervisors: Sundae Anota – 604-700-8463

Dates & Times: August 4-6, 2021

Description of Work:

This project will involve the "Moderate Risk" removal and disposal of roof metal flashing with asbestos containing mastic intact, as well as potential residual "assumed" mastic from the concrete frame where windows have been removed. Any windows remaining on the building will be removed with mastic intact. Workers will perform all work operating a boom lift. Actes will follow PCL's site-specific safety guidelines and Covid-19 protocols.

Methodology:

Please refer to pages 5, 6, & 7 of this Exposure Control and Safety plan for specific details on engineering controls & personal protective equipment.

This building is structurally sound, and our work will not compromise the structural integrity of this building. All work will be completed while following this Exposure Control and Safety plan c/w site-specific work procedures. This Safety Plan must be on site and reviewed by each worker involved.

Site Documentation:

.1 **Required Documents;**

- Notice of Project
- Sample Results
- Exposure Control & Safety Plan c/w site specific work procedures & Risk Assessment
- **Covid19 employee pre-site entry notice, screening forms & protocols**
- First Aid Certificates & First Aid Record Book
- Emergency Procedures
- Material Safety Data Sheets
- Fit Test Forms
- Safety Start Meeting Minutes
- Training Acknowledgments
- W.H.M.I.S. and Certificates & Audiometric cards
- Hazardous Waste Transportation Manifests
- H.E.P.A Equipment D.O.P. Certification
- Corporate Health & Safety Program

Exposure Control & Safety Plan:

This Exposure Control & Safety Plan c/w site-specific work procedures was developed with the intent to reflect the way all asbestos materials abatement work will be performed. This ECSP is dynamic not static and may be subject to revisions because of changing work conditions and or scope of work. It is the supervisor's responsibility to identify changing site conditions and or scope of work and amend this plan to reflect all changes. The supervisor and or crew foremen will hold a safety meeting/toolbox with all workers, and or authorized sub-trade personnel and or authorized visitors to discuss changes made to this plan and or site-specific work procedures. The supervisor and or foreman will ensure that proper equipment and training is provided to all authorized persons with respect to the revised plan and work processes, prior to beginning work. **Ensure office is notified of changes to this plan. Hand-revised copies can be faxed to Worksafe BC @ (604-276-3247), and ACTES @ (604-421-6293), after regular hours. Approval to proceed with the revised work process must be obtained from ACTES Project Manager, prior to beginning work.**

Responsibilities:

Management;

Management has the responsibility to provide a safe working environment. This is accomplished by evaluating existing safety programs, developing new safety programs, training their workers, conducting hazard assessments, instituting exposure controls, and providing support for their workers.

- **ACTES development of COVID19 pre-entry procedures, protocols, and daily monitoring; and**
- ACTES will provide periodical reviews of their Corporate Health & Safety Program and when required provide revisions and or edits to all employees; and
- ACTES will develop site specific Exposure Control & Safety Plans (ECSP) that include scope of work, detailed description of work processes, methodologies, and engineering controls for the protection of its employees and or building occupants, and amend and issue revised ECSP's to project site(s); and
- ACTES will conduct ongoing site inspections and will endeavor to correct any unsafe condition or act immediately; and
- ACTES will provide all necessary safety equipment and will provide training on this equipment; and
- ACTES will offer and pay for Hepatitis B Vaccinations for their workers; and
- ACTES recommends that all employees receive periodical medical monitoring that should include pulmonary functions tests and blood tests; and
- ACTES will provide support to their employees to enable them to complete their assigned tasks in a safe manner; and
- ACTES reminds all employees of their right to refuse to undertake any task if they feel it is unsafe, even after reviewing the issue with the project manager and or supervisor; and.

Supervisor;

The Supervisor has the responsibility to ensure that the work to be accomplished on this site is completed in a safe manner.

- **To ensure all employees follow Covid19 safety protocols with respect to hand washing, wearing mask and social distancing; including the signing of the daily pre-site entry declaration; and**
- **To immediately contact project manager if scope of work unclear or additional material is found; including conflicting directives/instructions from building managers, tenants, contractors, owners etc.; and**
- To understand their assigned tasks completely; and
- Supervisors are reminded of their right to refuse to undertake any task if they feel it is unsafe, even after reviewing the issue with the project manager; and.
- To perform your duties safely and without placing workers in harm's way and at risk of injury; and
- To ensure that all workers and or authorized personnel have been provided with proper job training and orientation necessary; to enable workers to perform their work safely; and
- To perform a thorough pre-job inspection, prior to starting work that includes a 360-degree visual inspection of all work areas and or work surfaces, prior to starting work, to identify live electrical services, devices, lighting, components, etc and or other potentially unsafe conditions; and
- To ensure that electrical isolations, disconnects and or tagging has been completed by Qualified Tradesman prior to beginning work; and company lockout procedures are being implemented, and followed prior to starting work; and
- To ensure written confirmation of all electrical isolations and or disconnects have been received from qualified electrical tradesman prior to starting work; and
- To ensure all workers have received W.H.M.I.S training and are following and implementing the required PPE described in the MSDS sheets for products being used; and
- To ensure all necessary equipment is on site and being operated safely and ensuring that current DOP testing of all HEPA filter equipment, such as negative air units, and or vacuums have been recently tested. Testing for this equipment for Moderate Risk projects is within the past 12 months. For High Risk projects this is required for all HEPA equipment at the start of every High-Risk project; and
- To ensure that the removal of lead and or other designated substances is performed in a manner that maintains potential exposure levels "as low as reasonably achievable" (A.L.A.R.A.) and;
- To ensure all workers and or authorized personnel perform their work in strict accordance to the Workers Compensation Board regulations, ACTES 's Corporate Health & Safety Program, Exposure Control & Safety Plan c/w site-specific work procedures, and other safety programs as they apply; and
- **To work inside the containment zones with their workers and crew for proper supervision; and**
- **To provide instruction and supervision of all workers, when they are performing their assigned work tasks, and to correct any unsafe act or condition immediately, and revise as required and or warranted site-specific work procedures and or work processes**.
- **Supervisor will conduct daily site inspections of containments and equipment and continuously evaluate all work being performed, to ensure that the necessary PPE, tools and or equipment are on site and are maintained in good operational order.**

- **To strictly enforce and implement ACTES s Corporate Health & Safety Program requirements, Workers Compensation Board regulations; including step-by-step procedures and information contained within this Exposure Control & Safety Plan, and site-specific work procedures.**

Workers;

Workers have the responsibility to perform their assigned tasks in a safe manner. It is the responsibility of each worker to;

- **To comply with Covid19 safety protocols with respect to pre-screening prior to accessing site, hand washing, wearing masks and social distancing; including the signing of the daily pre-site entry declaration; and**
- **Understand their assigned tasks completely; and**
- **To ask for clarification when uncertain of task scope; and**
- **To not perform any work, that is not identified in this plan, WITHOUT PRIOR CONSENT FROM SUPERVISOR; and**
- All workers are reminded of their right to refuse to undertake any task if they feel it is unsafe, even after reviewing the issue with the site supervisor; and.
- To immediately report any unsafe acts or conditions to their supervisor; and
- To perform your duties safely and without placing other workers in harm's way and at risk of injury; and
- To perform a thorough pre-job inspection, prior to starting work that includes a 360-degree visual inspection of all work areas and or work surfaces, prior to starting work, to identify potentially unsafe conditions; and
- To ensure they have the required W.H.M.I.S training and are following and implementing the required PPE described in the MSDS sheets for products being used. W.H.M.I.S. certificates must be available on site for review; and
- To ensure their audiometric hearing cards are up to date and available on site for review; and
- To familiarize themselves with the ACTES 's Corporate Health & Safety Program, Exposure Control & Safety Plan c/w site-specific work procedures, and other safety programs as they apply; and
- To strictly follow ACTES 's Corporate Health & Safety Program rules and regulations, Workers Compensation Board regulation, all guidelines and or information contained within this Exposure Control & Safety Plan; and

The above noted responsibilities are not the only responsibilities that each group must accept and follow. Each worker, supervisor or manager employed by ACTES has the responsibility to continually work toward achieving a safe working environment. It is the responsibility of every employee to work in a safe manner and to ensure that they do not place any other worker at risk of injury.

Worker Protection:

.1 Prior to commencing work, ACTES 's supervisor will provide all employees and or authorized site personnel project safety orientation and instruction. **All workers will receive instruction on Covid-19 screening, procedures, and protocols for protection.** The startup safety meeting/orientation must include information pertaining to the potential hazards of exposure to asbestos materials, and the proper use of respirators, protective clothing, entry and exit procedures from work area, and all other requirements of the site-specific work procedures and protective measures. The site safety orientation will be documented on a startup safety minute form, and acknowledged by the workers, that they have received site safety orientation and comprehend all instruction.

.2 Workers' who fail to work safely and in strict accordance with these site-specific work procedures and or WCB regulations will be severely reprimanded.

.3 All unsafe acts and or conditions must be reported immediately to the site supervisor. Failure to report unsafe acts and or conditions will result in a severe reprimand.

.4 Workers cannot eat, drink, smoke and or chew gum within contaminated work areas. Workers must not under any circumstances remove any of their personnel protective equipment, while inside a contaminated work area. Workers who do not comply with this requirement and other requirements of this Exposure Control and Safety Plan will be subject to severe reprimand and or dismissal.

5 Reprimands may include either suspension, demotion, retraining and or a combination of these; or outright dismissal.

Hazard Identification and Risk Assessment:

A risk assessment has been done and the following hazards have been identified:

- Exposure to asbestos containing materials; and

- Physical injury from tools and or equipment; and
- Potential physical injury and or death falling from elevated working platforms; and
- Exposure to nuisance dust.

The potential risks involved in dealing with these hazards involve:

- Potential exposure to airborne asbestos fibres in amounts that may exceed the occupational exposure limits (OEL); and
- Potential physical injury and or death falling from elevated working platforms; and
- Potential physical injury from the misuse of tools and or equipment; and
- Potential exposure to nuisance dusts that may exceed the occupational exposure limits (OEL).

This Exposure Control & Safety Plan endeavors to address the known risks, however it must be pointed out that this plan is not static, and is subject to continuous review, and revisions to address any further hazard(s) that may arise from the work processes.

Hazard Assessment:

In accordance with the risk assessment, the following hazards have been recognized;

- Potential exposure to airborne asbestos fibres in amounts that may exceed the occupational exposure limits (OEL); and
- Potential physical injury from the misuse of tools and or equipment; and
- Potential exposure to nuisance dusts that may exceed the occupational exposure limits (OEL).

In addition to the above-named hazards, other hazards may present themselves as the work processes dictate. It is everybody's responsibility to recognize the hazards as they present themselves and to conduct themselves according to the hazards. This Plan addresses the known hazards and will be modified when required to address future hazards that may be encountered on this site.

Asbestos Exposure:

Asbestos fibers present a hazard to the worker when they exceed the Occupational Exposure Limits as defined by the Occupational Health and Safety Regulations. Their route of entry into the body system consists of ingestion or inhalation. Methods employed to control exposure will consist of engineering controls and personal protective equipment (PPE) when the levels of exposure are likely to exceed the O.E.L.

Engineering Controls;

Our engineering controls for removal of exterior metal roof flashing, roof vents, with asbestos containing mastic intact; and potential residual mastic around concrete frame where windows have been removed, workers will be performing all work activities from a boom lift with a platform complete with guardrails. Fall Protection is not required.

Boom lift will be protected with one layer of 6-mil poly drop sheets placed on standing platform and ground beneath work area. Delineators with banner guard will be used to create a control zone 10' from the base of the exterior walls around the perimeter of the building. Warning signs will be placed on barriers warning persons of the asbestos hazards beyond. Working from a boom lift, flashing & roof vents will be removed with mastic intact, by using hand tools and cutting in 8'-10' sections between the joints and lowering to the ground for wrapping. Any residual mastic around concrete window frames will be removed using hand-held power tools equipped with a HEPA-filtered vacuum/dust capture system. All waste will be packaged, wrapped and or bagged as soon as possible to avoid accumulation of waste within the work area.

HEPA filtered vacuums will be used during the removal processes described above and for final clean up following the completion of all work. All asbestos containing and or asbestos contaminated materials will be placed in to double 6-mil poly bags, labeled as asbestos waste for disposal. **Waste will be transferred to a lockable waste transportation bin for disposal.**

A personal decontamination/wash down station c/w wash pails and soap will be established adjacent to all work areas. **All workers** who are required to work inside the contaminated work area, will use the decontamination station whenever exiting the work area.

All HEPA filtered equipment used for "Moderate Risk" work must have been DOP tested within the last year. A copy of the DOP certificate must be kept on site and a copy must be forwarded to Office.

Personal Protective Equipment (PPE);

The Personal Protective Equipment for the removal of asbestos for the removal of asbestos containing mastic, teardown and waste handling are half face, air purifying respirators c/w dual HEPA filter cartridges. **A qualitative fit test (irritant smoke)**

will be performed on all persons that will be required to wear a respirator. The results of this test must be documented on fit test forms and the respirator used will be assigned to that worker tested. In the event this respirator requires maintenance or is damaged, this test must be repeated on any new respirator and or repaired respirator being assigned to the worker. There are no exceptions to this requirement. Work gloves, safety glasses and disposable Tyvek coveralls c/w with hoods/boot covers, taped at the wrists and neck, will be used by workers involved in the above noted activities. CSA approved leather steel-toed work boots, hardhats, high-viz vest are to be worn at all times as this is an active construction site. Each worker that is required to wear PPE will receive instruction in its use, care, maintenance, and limitations.

Coronavirus (Covid 19):

Refer to **Appendix A** for safety procedures and protocols

Tools and or Equipment:

During their work, workers will be required to use power tools and Hi-volume vacuum systems. Prior to using these tools and or equipment, all workers are to be trained in the safe and proper use of tools and or equipment and must be able to demonstrate their ability to use this equipment safely.

Engineering Controls;

All power tools used in a wet environment will be properly grounded and only be used with a ground fault protected extension cord. All power tools will have guards securely in place.

Personal Protective Equipment (PPE);

The Personal Protective Equipment will consist of eye protection & hearing protection when handling power tools and or loud equipment. Other Personal Protective Equipment, such as but not limited to Hard Hats, Hi-vis vests, steel toe work boots, gloves, protective coveralls, etc., will be worn by all as determined by work process. Each worker that is required to wear PPE will receive instruction in its use, care, maintenance, and limitations.

Nuisance Dust Exposure:

Nuisance dust may present a hazard to the workers when they exceed the Occupational Exposure Levels as defined in the Occupational Health and Safety Regulations. Its route entry into the body consists of inhalation. Methods employed to control exposure will consists of engineering controls and personal protective equipment (PPE) when the level of airborne nuisance dust is likely to exceed the O.E.L.

Engineering Controls;

Throughout this project, nuisance dust control consists of using HEPA filtered vacuums for the cleaning of all non-asbestos dust, silica dust and or other nuisance dust. **DO NOT DRY SWEEP**.

Personal Protective Equipment (PPE);

The Personal Protective Equipment will consist of single use respirators and or half-face Air Purifying Respirators c/w dual HEPA Filters cartridges for all dust cleanup activities of non-asbestos containing dust. Other Personal Protective Equipment, such as but not limited to Hard Hats, Hi-vis vests, steel toe work boots, gloves, protective coveralls, safety glasses, hearing protection etc., will be worn by all as determined by work process. Each worker that is required to wear PPE will receive instruction in its use, care, maintenance, and limitations.

Electrical Isolation:

No worker will remove or work near any electrical outlet or device until a qualified electrical tradesman has isolated the circuit. When required, the Qualified Electrician will isolate all affected electrical circuits prior to any removal of asbestos containing materials.

Any electrical affected by our work will be locked out or tagged as live-in accordance with Part 10 of the O.H.&S. Regulations. All lockout and tagging will be performed by a qualified electrician. No workers will be permitted to work with live electricity. The electrician, the crew foreman and the Safety officer will place locks on panels or services. All electrical systems have been deactivated and isolated. Ground fault interrupter breakers or receptacles will protect all electrical equipment used during asbestos removal, while in a wet environment and/or when required. **Please refer to Corporate Health & Safety Plan for electrical lockout policy and electrical lockout procedures**.

Equipment Maintenance:

Any maintenance or repair work on any piece of equipment where lock out is required will be done in accordance to ACTES Corporate Health and Safety Program Lock out Procedures. No worker will undertake any repair work to the hydraulic lifting components until the lifting component is effectively blocked or bled in accordance with the OH&S Regulations. If maintenance work requires the worker to place himself in a position of being potentially crushed, then wheels must be blocked to prevent the accidental movement of the equipment.

Any damaged equipment shall be appropriately tagged for repair and taken out of service. All equipment used inside the contaminated work area must be thoroughly cleaned prior to removal from work area. Any equipment that has been returned to service as repaired shall have documentation accompany the equipment showing the nature of the repair, the date of the repair and the name of the person or company that effected repair.

Worker, Sub-Trade & Visitor Protection & Training:

All workers when required shall receive training in the following disciplines such as, but not limited to, the use, care, limitations and maintenance of all Personal Protective Equipment, confined space work areas and safe entry protocols, site-specific asbestos abatement work procedures, decontamination procedures, elevated working heights, power tools and or Hi-volume vacuum systems. Only those workers that have demonstrated competence in completing the assigned task will be directed to complete the work task.

Authorized sub-trades personnel and or visitors will be provided with personal protective equipment, protective clothing, and approved respirators as warranted by site conditions**. Sub-trades personnel and or visitors will receive training and instruction on the use of all required protective equipment, clothing and respirators; including the proper entry and exit procedures. All orientation, training and or instruction that are provided to authorized sub-trades and or visitors must be documented in safety minutes.**

Waste Disposal:

- The asbestos waste shall be properly disposed of in an authorized disposal area in accordance with the requirements of the British Columbia Ministry of Environment, Special Wastes Division.
- The driver shall have a proper hazardous waste manifest, carry adequate spill provision as defined in their Waste Contingency Plan and carry a valid permit for the transport of special waste.
- All vehicles transporting asbestos waste shall clearly display Class 9 (1) Placards on all four sides of the vehicle. In addition, all loads being transported must be accompanied by a Hazardous Waste Transportation Manifests, which identifies the Product Identification Number. The PIN No. for chrysotile asbestos is UN2590

NOTE: If asbestos is less than 5 kg. Transportation placards will not be required, as per Transportation of Dangerous Goods Regulations.

Note: Refer to the following Site-Specific Work Procedures for a complete description of the work processes.

Moderate Risk
Work Procedures
For
Asbestos Containing Mastic

1 Site Preparation:

.1 Isolation of HVAC Systems;

N/A work will take place outside.

.2 Pre-cleaning;

No pre-cleaning is required for this work.

.3 Containment;

The boom lift will be defined by polyethylene drop sheets on working platform, poly drop sheets will be placed on the ground below the work area, delineators and banner tape will be set up to create a control zone 10’ from the base of the wall outwards around the perimeter of the building. Warning signs will be placed on barriers warning persons of the asbestos hazards beyond.

.4 Decontamination Facility (Moderate Risk);

A decontamination wash-down station c/w wash pail and water (**maximum one workers per wash pail**), will be provided for use by all personnel and equipment entering and exiting the work area as follows:

.1 Personnel Decontamination Procedures (Moderate Risk);

- One entrance and exit will be used and maintained by all authorized visitors to work area.
- Each time the worker leaves the work area; he/she will vacuum his/her disposable suit to remove visible debris.
- Remove coveralls and place in a 6-mil labeled polyethylene bag for disposal.

  DO NOT REMOVE RESPIRATOR AT THIS TIME.

- Still wearing the respirator, the worker must proceed to the wash down area provided.
- Thoroughly clean the outside of the respirator with water.
- Remove the respirator.
- Thoroughly wash hands and face.
- Wash and rinse the inside of the respirator.
- Filters will be covered with duct tape when respirator is not in use to prevent the release of entrapped asbestos fibers.

2 Roof Flashing, Roof Vents, and Residual Window Frame Mastic Removal:

.1 Set up containment to isolate work area as detailed in 1.3 site preparation-containment.

.2 Roof flashing will be cut in 8'-10' sections with mastic intact and lowered to the ground for wrapping.

.3 Before removing the mastic from concrete window frame use wetting/misting technique to control dust.

.4 Residual mastic will be removed using hand-held power tools equipped with a HEPA-filtered vacuum/dust capture system.

.5 All asbestos containing and or asbestos contaminated waste, such as coveralls, filters and or drop sheets, shall be placed into double 6 mil polyethylene bags labeled as asbestos waste for disposal.

.6 All asbestos waste will be transferred to a lockable waste transportation bin.

3 Final Cleanup & Inspection:

.1 Actes supervisor will perform a visual inspection to verify that all visible asbestos has been removed from the work area.

.2 A slow drying sealant shall be applied to exposed surfaces, to ensure all undetected, residual asbestos fibres are bonded to those surfaces and cannot be dislodged.

.3 Any equipment used inside a contaminated work area must be thoroughly cleaned by either wet wiping or HEPA vacuuming prior to being removed from the work area.

This EXPOSURE CONTROL & SAFETY PLAN has been read, explained, and understood, prior to work starting.

Print name, sign, and date.

Supervisor_____ Date_____

Worker _____ Date_____

Worker _____ Date_____

For all projects lasting longer than one week, this ECSP will be reviewed at the beginning of each successive week. By initialing and dating next to their original signature, the supervisor and each worker acknowledges their understanding of this ECSP.

This page is to be completed and returned to the office

Emergency Contact Numbers:

Emergency; **911**

Demo Contractor: Dallas Watt Demo	**Jimmy Sousa**	**Cellular: 604-655-5140**
General Contractor: PCL Constructors Westcoast Inc	**Paul Devriendt**	
ACTES's Site Supervisor:	**Sundae Anota**	**Cellular: 604-700-8463**
ACTES's Project Manager:	**Stefanie Vennard**	**Cellular: 778-772-0873**

Emergency Evacuation and Fire Protection Procedures:
Fire Protection:

The following fire protection procedures will be instituted on this site;

- All lunchroom and equipment trailers are to be equipped with a Class C fire extinguisher;
- A Class C fire extinguisher must be readily available around equipment operation;
- Other fire extinguishers will be placed in conspicuous areas on the site in accordance to the Site Superintendent's direction;
- All sub-trades must provide their own firefighting equipment on site.

If a fire starts, only designated worker(s) and or those who've been trained in fire suppressant methods will attempt to extinguish the fire. The Site Superintendent will immediately notify the Fire Department by calling **911** and evacuate the area. The Site superintendent will direct or appoint a worker to direct the Fire Department to the source of the fire. All workers will take direction from the designated worker or the fire department.

Classification of Emergency:

For this Plan, three levels of severity are defined:

Level 1 – No immediate danger to project and public

This level includes;

- Single minor injuries,
- Small, contained fire that can be controlled by site personnel,
- Small hazardous material spills that would have no immediate adverse effect on persons or property.

Level 2 – Potential hazard to the project and public

This level includes;

- Multiple injuries,
- Any fire that has the potential to spread beyond the immediate vicinity, or beyond the capabilities of the site personnel,
- Toxic gas leak,
- Large liquid spill.

Level 3 – Definite hazard to the project and public

This level includes;

- A large explosion,
- A situation which could create a chain reaction (e.g. A small fire near fuel tanks)
- Multiple injuries and/or fatalities
- Collapse of trench or shoring

Emergency Evacuation Procedures:

If it is determined by the Site Superintendent that the site must be evacuated, then the following procedures will apply;

- All workers will immediately report to the Marshalling Stations which will be established at the start-up meeting and indicated on the site drawing;
- All workers will report to the Site superintendent so that all workers can be accounted for;
- All sub-trades will report to the Site Superintendent, as soon as possible, as to account for their whereabouts;

- Any visitors will report to the Marshalling Stations and report their whereabouts to the Site Superintendent;
- **No person shall leave the site unless they have notified the Site Superintendent. Any person who leaves the site without notifying the Site Superintendent will be subject to any costs that may arise from attempting to locate them.**
- **Any employee who leaves the site and fails to notify the Site Superintendent will be terminated immediately.**

Evacuation of an Injured Worker from a Contaminated Area:

General;

All procedures named herein are to augment the procedures as outline by the First Aid Regulations of the Workers' Compensation Board of British Columbia and are not designed to replace them. The requirements of this Regulation will be in force and effect and these procedures are only designed to be clarification of this regulation.

First Aid Supplies and Equipment;

1. Level 1 First Aid Attendant.
2. Level 1 Kit consisting of the following:

- 3 -blankets
- 24- 14 cm x 19 cm antiseptic towelettes, individually wrapped
- 60- hand cleansing towelettes, individually packaged
- 100 - sterile adhesive dressings, assorted sizes, individually packaged
- 12 - 10 cm x 10 cm sterile gauze dressings, individually packaged
- 4 - 10 cm x 16.5 cm sterile pressure dressings, individually packaged
- 2 - 7.5 cm x 4.5 m crepe roller bandage
- 1 - 2.5 cm x 4.5 m adhesive tape
- 4 - 20 cm x 25 cm sterile abdominal dressings, individually packaged
- 6 - cotton triangular bandages, minimum length of base 1.25 m
- 4 - safety pins
- 1 - 14 cm stainless steel bandage scissors
- 1 - 11.5 cm stainless steel sliver forceps
- 12 - cotton tip applicators
- 1 - pocket mask with one-way valve
- 6 - pairs of latex gloves
- 1 - first aid record book, and pencil or pen.

3. 1 set of hard adjustable cervical collars.
4. 1 - 44 cm x 1.8 m x 2 cm spine board with handholds, acceptable to W.C.B. and seven (7) 1.8 m x 5 cm heavy Velcro straps or equivalent to secure an injured worker.

Note: The preceding items except for the blankets must be kept in a container that can readily be taken to the scene of an injury.

When working in a contaminated area, the following procedures will be used in conjunction with proper first aid procedures.

1) If a worker becomes injured while in a contaminated area, the First Aid Attendant will proceed directly to the injured worker. The First Aid Attendant will assess the degree of severity of the injuries. If the First Aid Attendant determines that the injury can be stabilized, and the worker can move under his own power, then the following will apply;

   - The First Aid Attendant will stabilize the worker and assist the worker through the decontamination stations.
   - The Attendant will assist the worker in removing any gross contamination prior to entering the wash down area.
   - Once the gross contaminate is removed by vacuuming or wiping down by wet sponge, the Attendant will assist the worker into the wash down area. The worker will rinse all exposed areas and make sure that all contaminate has been removed from their respirator.
   - After washing all exposed areas, the worker will exit the wash down area and procedure to the Triage Muster Station.
   - The First Aid Attendant will finish dressing any wound or injury at the Triage Station and then make a final assessment as to further treatment.
   - The First Aid Attendant will record any injuries and treatments in the First Aid Log and complete any necessary paperwork.

2) If the First Aid Attendant determines that the worker is unable to proceed under their own power the following procedures will be followed;

   - If the worker is not breathing on their own, the First Aid Attendant will immediately begin treatment to get the worker breathing on their own.

- If the worker is conscious but unable to move, the First Aid Attendant will stabilize the worker and direct another worker to immediately summon the ambulance service.
- The Attendant will begin to decontaminate the injured worker by wiping down the worker with a wet sponge.
- Workers will create a clear path from the containment wall and or decontamination facility to the injured worker, by emergency personnel.
- Additional respirators will be available for emergency personnel use.
- Once the Ambulance Attendants arrive, the Attendant will place the worker in the care of the Paramedics.

A dedicated wash bucket and sponge will be available for decontamination of injured workers who cannot egress through the decontamination stations.

A Triage Muster Station will be established to handle all injured workers who are able to egress the area through the decontamination stations.

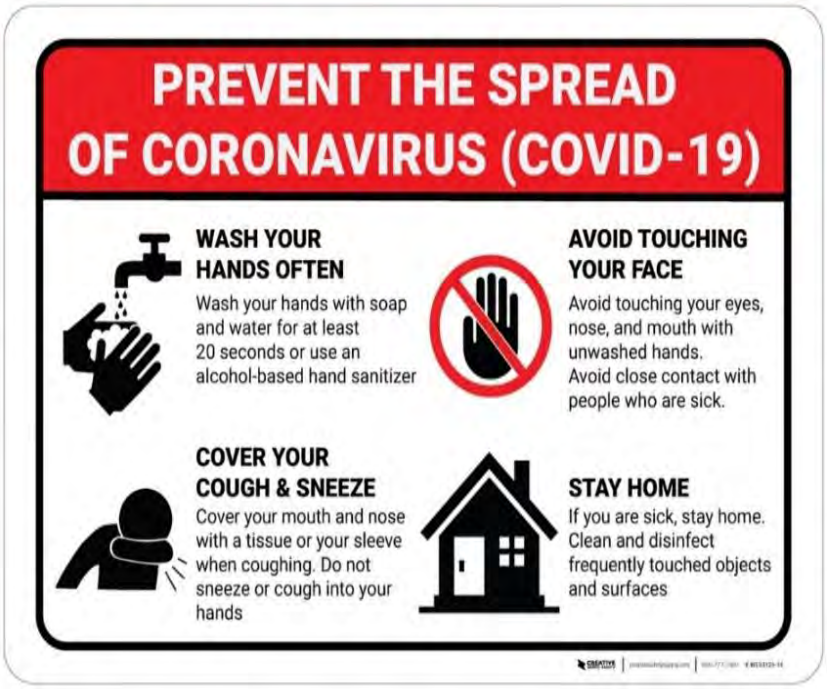
Summoning the Ambulance Service Procedures:

To summon an Emergency Transport Vehicle and the BC Ambulance Service, the following procedures will be followed;

- The Foreman or Supervisor will summon the First Aid Attendant, the Ambulance Service and notify Actes office of the injury,
- The First Aid Attendant will attend the accident scene immediately,
- The Foreman and or Supervisor will call for an ambulance by **telephoning #911**
- The Foreman and or Supervisor will stand by and direct the Paramedics to the injured worker and assist the Paramedics as they so direct.

Appendix A

Coronavirus (Covid 19)



COVID – 19 Pre site entry Procedures

- As per ACTES policy - You must be wearing an appropriate face mask or covering **BEFORE** you can enter the work site. Face mask maybe a surgical type, N95, cloth and or even a bandana. ACTES will fit test and provide multi use respirators to all employees for all hazmat work related tasks.
- All personnel must sanitize hands completely upon arrival on site. ACTES will provide hand sanitizer in liquid or wipe formats. This must be completed before you do any of the daily "sign in" requirements.
- Please always maintain 2m distance from your fellow co-workers throughout the shift and during lunch breaks.
- Place all your personal items in the allocated area assigned to you or leave in vehicle.
- Proceed to the site office for "signing in" to confirm you are eligible to work today, before reporting to your work location or collect and put on any of your PPE.

  If you are unable to complete the washing protocols, you cannot sign in and begin work on this site.

COVID 19 Worker Protection:

Further to the pre site entry Covid19 protocols (NOTED ABOVE) all workers are required to thoroughly wash their hands prior to entering the site office/lunchroom areas.

All workers are required to wash their hands prior to entering the lunchroom, and again after lunch, before heading back to the work area. These safety precautions are additional to decontamination procedures required at work area containments.

All equipment must be sprayed/ wiped down with a disinfectant such as Fosters 40-80 or Benefect prior to being taken into any work area, and must also not only be cleaned of asbestos, but also decontaminated again before being removed from any containment.

Social distancing within the containment (contaminated) work areas will not be required, as all personnel within containments are protected with respirators and coveralls. However, social distancing is required in the decon clean rooms and or wash stations.

All employees are responsible for and required to have and wear a face mask, scarf, or bandana of some sort for entry into the building and while working in the building for protection from covid19. These masks will not be removed until employees leave the building.

NOTE; Respirators for hazmat work will be provided by ACTES for those tasks only.

COVID – 19 Pre site entry screening: Sign In sheet

To prevent the spread of COVID-19 and reduce the potential risk of exposure to our workforce, please complete this questionnaire:

By providing your signature below, for each day on site, you are acknowledging and confirming your understanding the following questions as they pertain to the COVID – 19 virus situations:

I am not currently exhibiting flue like symptoms, such as coughing, fever, fatigue/ shortness of breath, congestion, diarrhea.

I acknowledge that I have not been advised by a medical professional, or public health official within the last 21 days to self-isolate.

I have not recently (Within the last 14 days) returned to Canada from overseas.

I have not been working in any location that has been shut down due to the COVID-19 virus.

I am not to the best of my knowledge, immune compromised in any way.

I have not, to the best of my knowledge, been in contact with anyone who either has been confirmed, or is suspected of, having the COVID – 19 viruses.

If you are unable to confirm ALL the above items, you cannot sign this form, and begin work on this site. Please seek the appropriate medical advice to assess your options.

HAVE ALL WORKERS SIGN BELOW *(PLEASE PRINT CLEARLY) – DATE;*_____

Name	Date	Signature

This form must be read and signed by <u>ALL</u> ACTES Environmental Ltd., employees at the start of their shifts without exception.

August 9, 2021

Dallas Watt Demo Ltd.
Jimmy Sousa
211 Schoolhouse Street
Coquitlam, BC

Certificate of Completion

RE: 310 Prior Street, Vancouver BC – Pre – Demolition Abatement

We are pleased to confirm that on August 5, 2021 we completed the "Moderate Risk" (removal and disposal of roof metal flashing, roof-top vents and residual mastic around window returns with asbestos containing mastic intact located at the address shown above as identified in the DST Consulting Engineers Pre-Demolition reports dated June 14th, 2018 & June 2, 2021.of the above address, in accordance with our Exposure Control & Safety Procedure dated July 30, 2021.

The final visual inspection was done by our site supervisor Sundae Anota.

All work was performed in accordance with WorkSafeBC and Ministry of Environment guidelines governing the safe removal of asbestos materials as per NOP # 896629 dated July 30, 2021. All asbestos containing and or asbestos contaminated waste was packaged and transported in accordance with the appropriate requirements and disposed of at an approved facility.

Thank you for the opportunity to be of service.

Sincerely,

ACTES Environmental Ltd.

Deepuk Kalkat
Operations Manager

File # 4903; 310 Prior Street, Vancouver BC

CITY OF VANCOUVER

DEVELOPMENT, BUILDINGS AND LICENSING
Office of the Chief Building Official and Environmental Services
Environmental Protection

BULLETIN 2015-008-EV *Revised March 31, 2016*

DEMOLITION AND ABATEMENT REPORTING REQUIREMENTS

This bulletin explains applicable by-laws and regulations, permit and reporting requirements for hazardous materials management in demolition and additional environmental requirements.

INTRODUCTION

In accordance with the City of Vancouver's green initiatives it is imperative that demolition materials be disposed of in a responsible manner: reusing as much as possible, recycling as much as possible, and disposing of hazardous materials safely. Exposure to hazardous materials such as asbestos can have serious health consequences including lung disease and cancer. Proper removal and disposal of hazardous materials is crucial for the health and safety of our workers, our community and the environment. It is essential to have a qualified professional available to ensure all hazardous materials are managed correctly.

HAZARDOUS MATERIALS MANAGEMENT

Hazardous materials include asbestos, lead, polychlorinated biphenyls (PCBs), mercury, ozone depleting substances, the contents of above ground or underground storage tanks (USTs), abandoned household chemicals and others as defined by the BC Hazardous Waste Regulation. Hazardous materials must be identified, removed and recycled or disposed of in accordance with all applicable regulations prior to demolition or renovation work. Non-asbestos drywall, while not hazardous on its own, is banned from landfills because it produces toxic hydrogen sulphide gas during decomposition. This drywall must be removed and recycled prior to demolition.

Applicable regulations may include and are not limited to the following: the Environmental Management Act, the Hazardous Waste Regulation, the Workers Compensation Act, and the Occupational Health and Safety Regulation (OHSR).

PERMIT REQUIREMENTS

Effective April 1, 2016 a separate Building Permit to salvage and abate (Salvage and Abatement Permit) will be issued for removal of both hazardous and salvageable building materials prior to demolition **As this permit is issued with a Building Permit to demolish or deconstruct (Demolition or Deconstruction Permit) there are no additional fees.** No other demolition work will be permitted at the site until the requirements of the Salvage and Abatement Permit have been met. The permit must be posted on site in a conspicuous area with the Construction Safety Plan as described in Article 8.1.3.3 of the 2014 City of Vancouver Building By-law 10908. Residential buildings constructed after 1990 are exempt.

WorkSafeBC (WSBC) requires a survey for hazardous materials be completed by a qualified person, as defined in OHSR 20.112, before any demolition or renovation work begins. Effective February 1, 2015 WSBC also requires written confirmation that all hazardous materials identified in the survey have been

either safely contained or removed. Both the Hazardous Materials Inspection Report (HMIR) and Post-Abatement Inspection Report (commonly known as a Clearance Letter) are required by WSBC to be available at the worksite. The HMIR, Post-Abatement Inspection Report and the City's 2015 Hazardous Materials Report Form (Attachment 1) must be submitted to the City for approval as condition of the Salvage and Abatement Permit. The Demolition or Deconstruction Permit will not be issued until all required documents have been satisfactorily completed and accepted by the City.

Depending on the scope of a renovation project, submission of the Hazardous Materials Report Form (Attachment 1) and supporting documentation may be required. A City Inspector may ask that the HMIR be produced prior to or during an inspection. If it cannot be produced, the Inspector may refuse the inspection and issue a Stop Work Order to ensure his/her safety and the safety of those around.

QUALIFIED PROFESSIONAL

The City's Hazardous Materials Report Form (Attachment 1) must be completed by a qualified professional, as defined by the City. The City defines a qualified professional (or QP) as a professional that is an active member of a recognized professional body and experienced in the recognition, evaluation, and control of hazardous materials that may be encountered during demolition or renovation work, including asbestos. Acceptable designations for a qualified professional include Certified Industrial Hygienist (CIH), Registered Occupational Hygienist (ROH), Certified Safety Professional (CSP), Canadian Registered Safety Professional (CRSP), or Professional Engineer (P. Eng.). Other professional designations with appropriate specializations (e.g. AScT with a specialization in Occupational Health & Safety) may be accepted upon approval by the City.

The QP is expected to provide a degree of project oversight such that they are able to ensure hazardous materials are being managed in accordance with all applicable regulations. The QP must be declared on the Building Permit Application Form and they must sign and seal the Qualified Professional Declaration Form. Their emergency contact information must be included in the Construction Safety Plan. Upon completion of salvage and abatement work the QP must sign and seal the Hazardous Materials Report Form (Attachment 1) certifying that, to the best of their knowledge, all hazardous materials have been identified and managed according to all applicable regulations.

In the event that the QP determines hazardous materials cannot be safely removed prior to demolition of the structure (e.g. a fire damaged building that is unsafe to enter) the QP must provide a risk assessment and detailed summary of the materials and how they should be managed at the demolition stage. Confirmation of disposal must be provided once complete.

SALVAGING BUILDING MATERIALS FOR REUSE

Non-structural building components may be salvaged prior to abatement work once the Salvage and Abatement Permit has been issued. A survey for hazardous materials must be completed prior to any salvage work. Proper procedure and controls must be in place to manage asbestos and lead hazards. If the salvage work has the potential to disturb asbestos containing materials (ACM) a Notice of Project Asbestos (NOPA) must be submitted to WorkSafeBC and the work must be performed in accordance with WSBC regulations.

Building components that may be salvaged include lighting, bathroom and kitchen fixtures, cupboards, wood trim and shelving, flooring, counters, doors, windows, radiators and household hardware. If windows and doors are removed, the building must be left secured by other means. During salvage and abatement the building interior is a worksite and must be in compliance with WSBC regulations. Items

that are required to maintain a safe work environment such as guardrails and handrails should not be removed unless a temporary replacement is constructed.

SITE CONDITION AND PROTECTION OF TREES

The site must be maintained in a neat and tidy condition. Procedures for waste management must be included in the Construction Safety Plan. Building materials may not be thrown out windows or haphazardly piled in yard. All hazardous areas on the site must be secured against unauthorized entry at all times when workers are not present on the site. All windows, doors and other openings must be secured with barricades or boarding. The interior of the building must be left in a safe condition, in compliance with WorkSafe BC regulations.

All trees on the site must be protected during work in compliance with the City of Vancouver Protection of Trees Bylaw 9958. All trees on adjacent properties or boulevard trees that are in danger of being damaged must be protected as well. No disposal bins, heavy equipment or vehicles are permitted to be placed on or driven over the City boulevard or private yard until tree protection barriers have been installed and inspected by a City Inspector.

Disposal bins placed on City streets require a Street Use Permit in compliance with the City of Vancouver Street and Traffic Bylaw 2849.

ENVIRONMENTAL REQUIREMENTS

Under section 40 of the Environmental Management Act, a person who knows or reasonably should know that a site has been used or is used for industrial or commercial purposes or activities must in certain circumstances provide a Ministry of Environment Site Profile. Schedule 2 of the Contaminated Sites Regulation sets out the types of industrial or commercial purposes or activities to which site profile requirements apply. Residential properties are not exempt if an activity listed in Schedule 2 has occurred on the site. Some activities that may have occurred on a residential property include controlled substance manufacturing or operations or contamination from an off-site source. This includes marijuana grow operations, clandestine drug labs, or contamination from a neighbouring property that has a leaking fuel UST. Permit application for demolition is a trigger for the site profile process, therefore if any Schedule 2 activities are known or suspected to have occurred, a Site Profile must be completed and submitted with the report form to the City.

USTs that have been out of service for two years must be removed immediately as per Section 5.3 of the Sewer and Watercourse By-law 8093. The by-law also requires that contaminated soil be removed and backfilled with clean fill. If a UST is present on a site being redeveloped (including USTs that have been abandoned in-place) it must be removed at the demolition stage. Any contaminated soil must be remediated prior to construction. This includes residual soil contamination from past UST removals. A separate Fire Permit is required to remove the UST and an environmental report confirming the site meets the Contaminated Sites Regulation applicable land use standards (e.g., residential, commercial) must be submitted to the City prior to construction. Presence of a UST or residual contamination must be reported on the Hazardous Materials Report Form (Attachment 1). For more information refer to Bulletin 2014-002-ECT Residential Underground Storage Tank Removal.

All documentation must be submitted electronically to: enviro.reporting@vancouver.ca

Failure to remove hazardous materials or provide documentation may result in a **Stop Work Order** or further action being taken by the City.

Information provided on the report form will be placed in the City's files and will be subject to the *Freedom of Information and Protection of Privacy Act*.

For further information contact Environmental Protection at 3-1-1 or 604-873-7000 outside of Vancouver

(Original signed by)

J. Smith, RPBio, CSAP
ASSISTANT MANAGER
ENVIRONMENTAL PROTECTION

(Original signed by)

P. Ryan, M.Sc., P.Eng.
CHIEF BUILDING OFFICIAL
DIRECTOR, BUILDING CODE & POLICY

Attachment 1

CITY OF VANCOUVER

DEVELOPMENT, BUILDINGS AND LICENSING
Office of the Chief Building Official and Environmental Services
Environmental Protection

BULLETIN 2015-008-EV-Attachment 1 *Revised November 7, 2016*

HAZARDOUS MATERIALS REPORT FORM

This report form must be completed by a Qualified Professional (QP) as defined by City of Vancouver Bulletin 2015-008-EV. The form must be submitted to the City of Vancouver with the Hazardous Materials Inspection Report, Post-Abatement Inspection Report, WSBC Notice of Project and other supporting documentation prior to issuance of a building permit to demolish or deconstruct.

Electronic submissions must be submitted by QP to: enviro.reporting@vancouver.ca

1. PROJECT INFORMATION

Salvage & Abatement Permit No. _____

Demolition Permit No. BP-2021-03377

Date of Application: 2021-06-16

Site Address: 310 Prior Street Vancouver BC, V6A 2E5

Building Type: ☐ Single Family ☐ Single Family w/ Secondary Suite ☐ Multiple Family
☐ Commercial ☐ Institutional ☒ Industrial ☐ Other _____

2. CONTACT INFORMATION

Owner Information:

Owner's Name: Providence Health Care Society c/o St. Paul's Hospital

Owner's Civic Address: 1081 Burrard Street Vancouver, BC Canada V6Z 1Y6

Telephone Number: (604) 980-5852 Alternate Number: _____

Email: klittle1@providencehealth.bc.ca Business License: 873465728

Applicant Information (Leave blank if same as above):

Applicant's Name: Dallas Watt (Navjot Sidhu)

Telephone Number: (604) 777-4887 Alternate Number: _____

Email: nav@dallaswattdemo.ca Business License: _____

Person Completing Form (Qualified Professional):

Consultant's Name: Harvey Wong, CRSP, ROHT

Company Name: Kinetic OHS Services Ltd.

Telephone Number: (604) 988-0099 Alternate Number: _____

Email: harvey@kineticohs.com Business License: 21-136072

3. AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

Answer the following questions to the best of your knowledge using the property owner as a reference.

a. Was this property present or previously use for commercial or industrial purposes?
Yes ☑ No ☐

b. Has this property previously been used for a controlled substance operation (e.g. marijuana grow operation or clandestine drug lab)?
Yes ☐ No ☑

c. Has a notification of likely or actual migration been issued for this property or suspected contamination by migration of substances from an offsite source?
Yes ☐ No ☑

If you answered yes to any of the above questions complete and attach a site profile: http://www.env.gov.bc.ca/epd/remediation/forms/pdf/electronic_forms_v2/csr_site_profile.pdf

d. To the best of your knowledge is there an underground storage tank (UST) used for **residential heating oil** present or previously removed from this property?

Yes ☐ No ☑

If you **checked present or abandoned**, the UST must be removed at the demolition stage. A separate fire permit is required from the Fire Prevention Office located at Suite 201, 456 West Broadway (telephone 604-873-7595).

a. If removed was there residual contamination remaining after removal?
Yes ☐ No ☐

If you checked yes, the residual contamination must be remediated at the demolition stage. An environmental report confirming the site meets the Contaminated Sites Regulation applicable land use standards (e.g. commercial, residential) must be submitted to Environmental Protection prior to construction. Refer to Bulletin 2015-007-EV *Residential Underground Storage Tank Removal* for reporting requirements.

4. BUILDING DESCRIPTION

Year Built: 1970 Major Renovation Year: _____ Size: 19,924 sq ft

Number of Floors: 2 Roof Type: Membrane

Heating System: HVAC Insulation? Yes ☑ No ☐ Type: Fiberglass

Exterior Finish: Concrete Drywall? Yes ☑ No ☐ Approx. Quantity: 3500 sq ft

5. HAZARDOUS MATERIALS SUMMARY

A Hazardous Materials Inspection Report completed by a qualified person, as defined in WSBC OHSR 20.112, **must** be submitted electronically with this form. Analytical lab report must be attached.

Hazardous Materials Inspector:

Consultant's Name and Company: Michael Chow - DST ConsultingEngineers Inc.

Telephone Number: (604) 754-8622 Email: _____

AHERA Certification No: _____ Business License: _____

Hazardous Materials Identified:

PCBs	Yes ☑ No ☐	Location:	In fluorescent light fixtures
Mercury	Yes ☑ No ☐	Location:	Thermostat & Fluorescent lights
Lead	Yes ☑ No ☐	Location:	All paint, ceramic tile & vent pipes
Ozone Depleting Substances	Yes ☑ No ☐	Location:	Refrigerator and AC Units
Silica	Yes ☑ No ☐	Location:	In concrete, grout, drywall, mortar
Radioactive Materials	Yes ☑ No ☐	Location:	Throughout - In smoke detectors
Household Chemicals	Yes ☑ No ☐	Location:	Various Locations

Asbestos Containing Materials:

Sample ID	Material Type	% Asbestos	Location	Homogeneous Area	Approximate Quantity
A20-A22	Mastic	10-20	Roof	Metal Flashing	200 Ln ft
1A,1B, 1C	Caulking	4	2nd Fl - Exterior Windows	Window Opening	10
A23-A25	Mastic	10-20	Roof	On Vents	2 vents

*Attach additional table as required

Total Number of Samples: 35

Laboratory Name: BC Asbestos Services, EM Analytical Method(s): NIOSH 9002; EPA 600/R-93/116

6. REMOVAL, RECYCLING AND DISPOSAL

Documentation providing evidence that all hazardous materials identified in this report have been removed and disposed of according to all applicable regulations must be submitted electronically with this form. WSBC Notice of Project, Post-Abatement Inspection Report and Air Monitoring Report must be attached where applicable.

Clean drywall must be removed and recycled prior to demolition.

Attached Document Checklist:

Hazardous Materials Inspection Report	☑	Mandatory
Post Abatement Inspection Report	☑	Mandatory (unless no hazmat identified)
WSBC Notice of Project	☑	NOPA #: 896629
Contractor Clearance Letter	☑	
Air Monitoring Report	☐	
Waste Manifest	☑	Reference #: Shipping Document
Disposal Receipts	☐	

Abatement Contractor (where applicable):

Contractor's Name and Company: Sundae Anota - Actes Environmental Ltd.

Telephone Number: (604) 700-8463 Business License: _____

Risk Assessment:

Risk Level: Low ☐ Moderate ☒ High ☐

Person Conducting Air monitoring (where applicable):

Consultant's Name and Company: _____

Telephone Number: _____ Business License: _____

Asbestos Waste Disposal (where applicable):

Receiver Name and Address: _____

Disposal Date: _____

7. ADDITIONAL INFORMATION

Please see ACTES Shipping Document (asbestos waste transported to their holding facility).

8. CERTIFICATION

To be completed by the qualified professional.

I, Harvey Wong, CRSP, ROHT, certify that the information provided on this form is consistent with the findings of the attached Hazardous Materials Inspection Report and supporting documentation. I have reviewed the Hazardous Materials Inspection Report, agree with its findings and confirm that all materials identified have been removed and disposed of in accordance with all applicable regulations.

Digitally signed by Harvey Wong
Date: 2021.08.10 05:35:35 -07'00'

Signature (with digital stamp or designation)

2021-08-10

Date

Save Submit Reset

Kinetic OHS
Post Abatement Inspection Report

Site Address:	310 Prior Street, Vancouver
Final Inspection Date:	August 6, 2021
Hazmat Contractor:	ACTES Environmental
Kinetic OHS Inspector(s):	Ramin Hamidnejad, CRSP

Hazardous Materials Report:	Pre-Demolition Hazardous Materials Assessment – 310 Prior Street, Vancouver, BC (File # TS-VC-33511 & Project #2105834)
Report Date:	June 14, 2018 & June 2, 2021 (Revised Addendum Report)
Company:	DST Consulting Engineers Inc.
Addendum(s):	Bulk Test Results (August 5, 2021)

SITE CONDITIONS:		
1	Site and structure safe prior to entry (e.g. sub-floor openings, damaged stairs, etc)?	YES ☒ NO ☐
2	Has HMS Report been compared with remaining building materials?	YES ☒ NO ☐
3	Were samples of additional suspect asbestos materials collected? (Refer to Addendum/Report)	YES ☒ NO ☐
4	Has all identified & suspect asbestos containing materials been removed from property?	YES ☐ NO ☒
	If not, what is reason for not removing? One Roof Vent with non-friable suspect asbestos mastic will be removed during the demolition phase due to unsafe roof structure which could not be walked on.	
5	Has all asbestos waste been removed from property?	YES ☒ NO ☐
6	Has all poly & barrier tape been removed from work areas?	YES ☒ NO ☐

COMMENTS:

- No cast iron bell & spigot drain pipes present. Drain pipes were determined to be black ABS pipes.
- No vermiculite debris was observed in the wall or ceiling cavities.
- No duct tape was observed on ductwork.
- Reasonable efforts were made to inspect the structure(s) for remaining confirmed and suspect asbestos containing materials. No confirmed or suspect asbestos containing materials remain in or on the structure(s).

.

Inspection Photos:

Photo 1	Location: Exterior Windows
Description: Removed Asbestos Window Caulking	

DST Consulting Engineers Inc.
Unit B – 4125 McConnell Drive
Burnaby, British Columbia
Office: 604.436.4588

PGL Environmental Consultants
1185 West Georgia Street, Suite 1500
Vancouver, British Columbia
V6E 4E6

June 14, 2018

Attention: Mr. Zayed Mohamed, *P. Ag., CSAP*
Environmental Consultant

Via e-mail: zmohamed@pggroup.com

Subject: Pre-Demolition Hazardous Building Materials Assessment
310 Prior Street, Vancouver, BC

DST File No.: TS-VC-33511

1.0 INTRODUCTION

DST Consulting Engineers Inc. (DST) was retained by PGL Environmental Consultants (PGL) to conduct a pre-demolition hazardous building material assessment of the abandoned commercial building located at 310 Prior Street in Vancouver, BC (herein referred to as the Subject Building).

The assessment was conducted by DST Project Manager, Balraj Ludu, on May 22 and June 6, 2018.

This report outlines the scope of work, regulations, methodologies, findings of the assessment, and based on those findings, states conclusions and appropriate recommendations.

2.0 SCOPE OF WORK

The assessment was limited to the building materials scheduled for demolition in preparation for building demolition activities to the Subject Building.

The survey was destructive in nature and focused on asbestos-containing materials (ACMs) and lead-based coats (LBCs), including a detailed inspection, sampling, and analysis of samples. The assessment also included a visual inspection for suspected ozone-depleting substances (ODSs), elemental mercury, and sources of polychlorinated biphenyls (PCBs), animal waste, controlled products, needles/sharps, and mould amplification.

3.0 REGULATIONS AND GUIDELINES

3.1. Provincial Regulations

In British Columbia, the management of hazardous building materials in the work place is regulated by WorkSafeBC under the Workers' Compensation Act (effective April 15, 1998), as amended by the Workers' Compensation (Occupational Health and Safety) Amendment Act (effective October 1, 1999). Specific requirements of the Occupational Health and Safety Amendment Act are prescribed in the British Columbia Occupational Health and Safety (BC OH&S) Regulation.

3.1.1. *Hazardous Materials & Demolition/Renovations*

Section 20.112 of the BC OH&S Regulation details the requirements that employers and owners are responsible for before beginning work on the demolition, renovation or salvage of machinery, equipment, buildings, or structures. The employer or owner must:

- Inspect the site to identify any asbestos, lead and/or other potentially hazardous materials that may be handled, disturbed, or removed;
- Have the inspection results available at the worksite; and,
- Ensure that the hazardous materials are safely contained or removed.

3.1.2. *Asbestos-Containing Materials (ACMs)*

ACMs are regulated under Part 6 (sections 6.1 to 6.32) of the BC OH&S Regulation.

WorkSafeBC's manual, "*Safe Handling of Asbestos, A Manual of Standard Practices*", outlines basic information on asbestos and asbestos products, health hazards requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of ACMs. This document provides a guide to current practices that are to be followed in the Province of British Columbia.

3.1.3. *Lead-Based Coatings (LBCs)*

Sections 6.59 to 6.69 of the BC OH&S Regulation describe specific requirements for workplace exposure to lead.

WorkSafeBC's manual, "*Lead-Containing Paints and Coatings – Preventing Exposure in the Construction Industry*", provides a guide to current practices that are to be followed in the Province of British Columbia, providing basic information on lead and lead products, health hazards and

requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of lead.

3.1.4. *Elemental Mercury*

Mercury-containing equipment is regulated under Part 5, section 5.49 of the BC OH&S Regulation.

3.1.5. *Hazardous Wastes*

In British Columbia, environmental matters pertaining to waste generally fall under the jurisdiction of the British Columbia Ministry of Environment (MoE), pursuant to the Environmental Management Act. The key waste regulation under the Environmental Management Act relating to hazardous building materials is the Hazardous Waste Regulation (HWR), as amended from time to time. The HWR provides the requirements for the proper handling, storage, transportation, treatment, recycling and disposal of hazardous wastes in the province. The regulation also outlines the materials and criteria to be used to characterize waste as hazardous.

3.2. Applicable Federal Legislation

3.2.1. *Halocarbon and Ozone Depleting Substances (ODS)*

Halocarbon and Ozone Depleting substances are regulated under the Canadian Environmental Protection Act (CEPA), "*Federal Halocarbon Regulations, 2003, (SOR/2003-289)".*

3.2.2. *Polychlorinated Biphenyl's (PCBs)*

PCBs are regulated under the Canadian Environmental Protection Act (CEPA), specifically under the *"PCB Regulations"* (SOR/2008-273), including amendments to December 8, 2011.

3.2.3. *Transportation of Dangerous Goods*

The transportation of hazardous wastes is governed under the Transportation of Dangerous Goods (TDG) Act and Regulations which outline the requirements for storage, handling, and transportation of hazardous waste, amongst other products.

4.0 METHODOLOGY

Suspect hazardous building materials were visually identified based on the surveyor's knowledge of historical composition of building products.

Visual identification of materials suspected to contain asbestos or lead (in coatings) was supported by the analysis of representative samples.

Suspect ACM samples were analyzed for asbestos content at BC Asbestos Services following the National Institute for Occupational Safety and Health (NIOSH) Method 9002.

Suspect LBC samples were analyzed for lead content using a Niton X-Ray Fluorescence (XRF) spectroscopy detector. The Niton XRF is designed to detect and quantify the amount of lead present in painted surfaces. Measurements were made following Niton XRF standard operating procedures for lead in surface coating measurements.

Painted surfaces that were identified to contain a concentration of lead equal to or greater than 0.05 mg/cm^2 were classified as having a hazardous level of lead and were considered a lead-based coating.

Suspected ozone-depleting substances (ODSs), elemental mercury, and sources of polychlorinated biphenyls (PCBs) were visually identified based on appearance, age, and knowledge of historic applications/locations.

Equipment that may contain PCBs (e.g. electrical transformers and fluorescent light ballasts) can often be identified by examining manufacturer’s labels. For safety reasons, DST personnel do not remove the ballast shields from fluorescent light fixtures to examine the ballast codes unless the electrical circuit for the lighting has been tagged and locked out by a qualified electrician.

4.1. Condition of Material Samples

The condition of the sampled materials were classified in the following format:

GOOD Surface of materials show no significant signs of damage, deterioration or delaminating. No repairs required.

FAIR Surface of materials show some significant signs of damage, deterioration or delaminating. Repairs required as soon as possible.

POOR Surface materials show significate signs of damage, delaminating or deterioration. Repairs required immediately and will require removal and/or significate alterations.

5.0 FINDINGS

The following sections outline the findings of DST's hazardous building material assessment.

5.1. Asbestos-Containing Materials (ACMs)

Through the assessment, twenty six (26) samples of suspect ACMs were collected and analyzed for asbestos content. Descriptions of the materials analyzed for asbestos content, their sample point locations, and the results of analysis are summarized in **Table 1**, on the following page.

Table 1: Analysis of Suspect ACMs
310 Prior Street, Vancouver, BC

Sample I.D.	Sample Location	Sample Description	Asbestos Content (%)	Condition
A1	2nd Floor Men's Washroom; Wall	Grout	None Detected	n/a
A2	2nd Floor Women's Washroom; Wall	Grout	None Detected	n/a
A3	2nd Floor Women's Washroom; Floor	Grout	None Detected	n/a
A4	1st Floor Men's Washroom; Floor	Grout	None Detected	n/a
A5	1st Floor Women's Washroom; Wall	Grout	None Detected	n/a
A6	1st Floor West Entrance; debris	Drywall Joint Compound	None Detected	n/a
A7	1st Floor West Entrance; debris	Drywall Joint Compound	None Detected	n/a
A8	1st Floor South Room; North Wall	Drywall Joint Compound	None Detected	n/a

Table 1: Analysis of Suspect ACMs 310 Prior Street, Vancouver, BC				
Sample I.D.	**Sample Location**	**Sample Description**	**Asbestos Content (%)**	**Condition**
A9	1st Floor South Room; South Wall	Drywall Joint Compound	None Detected	n/a
A10	1st Floor South Room; West Wall	Drywall Joint Compound	None Detected	n/a
A11	2nd Floor South Room	Ceiling Tile	None Detected	n/a
A12	1st Floor South Room	Ceiling Tile	None Detected	n/a
A13	1st Floor East Room	White Vinyl Siding	None Detected	n/a
A14	2nd Floor Women's Washroom	Vinyl Wall Covering	None Detected	n/a
A15	2nd Floor Men's Washroom	Vinyl Wall Covering	None Detected	n/a
A16	Roof; North	Tar and Gravel Roofing Material	None Detected	n/a
A17	Roof; South	Tar and Gravel Roofing Material	None Detected	n/a
A18	Roof; East	Tar and Gravel Roofing Material	None Detected	n/a
A19	Roof; West	Tar and Gravel Roofing Material	None Detected	n/a
A20	**Roof Flashing**	**Mastic**	**Chrysotile (10-20%)**	**Good**

Table 1: Analysis of Suspect ACMs 310 Prior Street, Vancouver, BC				
Sample I.D.	**Sample Location**	**Sample Description**	**Asbestos Content (%)**	**Condition**
A21	**Roof Flashing**	**Mastic**	**Chrysotile (10-20%)**	**Good**
A22	**Roof Flashing**	**Mastic**	**Chrysotile (10-20%)**	**Good**
A23	**Roof Vent**	**Mastic**	**Chrysotile (10-20%)**	**Good**
A24	**Roof Vent**	**Mastic**	**Chrysotile (10-20%)**	**Good**
A25	**Roof Vent**	**Mastic**	**Chrysotile (10-20%)**	**Good**
A26	Roof	Tar Paper Paper	None Detected None Detected	n/a n/a

Note: **Bold print** indicates an asbestos-containing material; n/a indicates non-applicable.

Based on the analytical sample results, the following **ACMs <u>were identified</u> within the Subject Building;**

- Black mastic throughout the roof of the Subject Building on metal flashing. The mastic was found to be in GOOD condition. The asbestos-containing mastic on roof-top metal flashing amounts to approximately 200 ft.; and,
- Black mastic throughout the roof of the Subject Building on vents. The mastic was found to be in GOOD condition. The asbestos-containing mastic on roof-top vents amounts to approximately 100 ft.

Due all windows of the Subject Building being boarded and tightly secured, DST was not able to collect samples of window mastics or caulking. These materials must be treated as asbestos-containing until proven otherwise by sampling and laboratory analysis.

5.2. Lead-Based Coatings (LBCs)

Through the assessment, nineteen (19) samples of suspect LBCs were analyzed for lead content. Descriptions of the materials analyzed for lead content, their sample point locations, and the results of analysis are summarized in **Table 2**, below.

Table 2: Analysis of Suspect LBCs
310 Prior Street, Vancouver, BC

Sample I.D.	Sample Location	Paint Description	Result (mg/cm^2)	Variance (mg/cm^2) +/-	Lead Based Yes/No
L1	2nd Floor	White Paint on Concrete Walls	0.01	0.02	No
L2	2nd Floor	Blue Paint on Wood Door	0.00	0.02	No
L3	2nd Floor	White Paint on Steel Structural Beam	0.00	0.02	No
L4	**2nd Floor**	**White Paint on Metal Pipes**	**0.182**	**0.02**	**Yes**
L5	2nd Floor Washrooms	Grey Ceramic Floor Tiles	0.01	0.02	No
L6	**2nd Floor Men's Washroom**	**Blue and White Ceramic Wall Tiles**	**0.102**	**0.02**	**Yes**
L7	2nd Floor Women's Washroom	Pink and White Ceramic Wall Tiles	0.00	0.02	No
L8	2nd Floor Stairwell	White Paint on Walls	0.01	0.02	No
L9	**2nd Floor Office Door**	**White Paint on Wood Door**	**0.467**	**0.02**	**Yes**

Table 2: Analysis of Suspect LBCs 5968 182 Street, Surrey, BC					
Sample I.D.	**Sample Location**	**Paint Description**	**Result (mg/cm^2)**	**Variance (mg/cm^2) +/-**	**Lead Based Yes/No**
L10	**Mezzanine Stairwell**	**White Paint on Metal Sprinkler Pipes**	**0.06**	**0.02**	**Yes**
L11	**Mezzanine Stairwell**	**Cream Paint on Wood Structural Beam**	**0.44**	**0.02**	**Yes**
L12	**Mezzanine Stairwell**	**Cream Paint on Wood Panelling**	**0.305**	**0.02**	**Yes**
L13	**1st Floor Walls Throughout**	**White Paint**	**0.059**	**0.02**	**Yes**
L14	**1st Floor Northeast Corner**	**White Paint on Wood Shelving**	**0.201**	**0.02**	**Yes**
L15	**1st Floor West Office**	**Brown Baseboard Paint**	**0.084**	**0.03**	**Yes**
L16	**1st Floor Garage Doors**	**White Paint on Metal Doors**	**0.383**	**0.02**	**Yes**
L17	**1st Floor Walls Throughout**	**Yellow Paint**	**0.823**	**0.03**	**Yes**
L18	**Exterior Concrete**	**Light Beige Paint**	**0.102**	**0.02**	**Yes**
L19	**Exterior Concrete**	**Beige Paint**	**0.146**	**0.02**	**Yes**

Note: **Bold print** indicates a coating containing potentially hazardous levels of lead (i.e. a lead-based coating).

Based on the analytical sample results listed above, LBCs were identified in the Subject Building:

- White metal pipes;
- Blue and white ceramic floor tiles;
- White wood doors;
- White sprinkler pipes;
- Cream wood structural beams;
- Cream wood panels;
- White interior walls;
- White wood shelving;
- Brown baseboards;
- White metal doors;
- Yellow interior walls;
- Exterior light beige concrete; and,
- Exterior beige concrete.

5.3. Ozone Depleting Substances (ODSs)

Refrigerator and freezer units were observed throughout the Subject Building. These units are suspected to contain ODSs.

5.4. Elemental Mercury

Mercury containing fluorescent light bulbs were identified throughout the Subject Building.

5.5. Polychlorinated Biphenyls (PCBs)

Suspect PCB containing fluorescent light ballasts were identified throughout the Subject Building.

5.6. Needles/Sharps

Needles/sharps were identified during the site assessments within the interior and surrounding the exterior of the Subject Building.

5.7. Animal Waste

No animal waste was observed during the site assessment within the Subject Building.

5.8. Mould Amplification

No mould amplification or staining was observed during the site assessments within the Subject Building.

5.9. Controlled Products

Controlled products such as toxic, flammable and explosive products were observed throughout the Subject Area. These products included the following:

- Gasoline; and,
- Propane tanks.

6.0 CONCLUSIONS

Based on the site assessment, sampling and analysis, the following hazardous building materials were identified within the Subject Building:

- ACMs;
- LBCs;
- ODS;
- Elemental Mercury;
- PCBs;
- Needles/sharps; and,
- Controlled Products.

7.0 RECOMMENDATIONS

If the demolition activities expand and/or if additional suspect hazardous building materials are identified during demolition activities, DST recommends stopping the work, until the materials can be sampled and analyzed.

7.1. Asbestos-Containing Materials (ACMs)

Prior to any renovation and/or demolition activities, identified ACMs should be removed in accordance with the requirements of WorkSafeBC, specifically but not limited to include those requirements prescribed through Parts 5.48-5.59 – Controlling Exposure, and Parts 6.1 - 6.32 – Asbestos.

DST recommends reference to WorkSafeBC publication "*Safe Handling of Asbestos, A Manual of Standard Practices"*. This document provides a guide to current practices that are to be followed in the Province of British Columbia, providing basic information on asbestos and asbestos products, health hazards and requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of ACMs.

Asbestos-containing wastes should be managed in accordance with the British Columbia Ministry of Environment and should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

7.2. Lead-Based Coatings (LBCs)

Control the disturbance of the identified LBCs through the remediation (renovation and/or demolition) of the Subject Building, using safe work procedures developed in accordance with the requirements of WorkSafeBC, specifically but not limited to include those requirements prescribed through Parts 5.48-5.59 – Controlling Exposure, and Parts 6.59-6.69 – Lead.

Toxicity Characteristic Leaching Procedure (TCLP) testing should be performed on identified lead-based paint, to facilitate the proper disposal of lead-containing wastes.

DST recommends reference to WorkSafeBC publication "*Lead – Preventing Exposure at Work"*. This document provides a guide to current practices that are to be followed in the Province of

British Columbia, providing basic information on lead and lead products, health hazards and requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of lead.

7.3. Ozone Depleting Substances

When taken out of service, ODS-containing equipment should be managed in accordance with the requirements prescribed in British Columbia's Ozone-Depleting Substances and Other Halocarbons Regulation, including amendments up to B.C. Reg. 4/2010, January 14, 2010 and transport ODS-containing wastes in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

7.4. Elemental Mercury

When taken out of service, mercury-containing equipment should be managed in accordance with the requirements of the British Columbia Ministry of Environment and should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

7.5. Polychlorinated Biphenyls

When taken out of service, the PCB-content of each fluorescent lamp ballast should be verified through comparison to the criteria outlined in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, “Identification of Lamp Ballasts Containing PCBs” to assess their likelihood of PCB content.

7.6. Needles/Sharps

All needles/sharps must be handled using cut-proof gloves and/or picking tools and placed in labelled rigid containers. These containers must be taken to the local needle disposal site for disposal.

7.7. Controlled Products

Controlled products such as gasoline, motor oil, propane, and acetylene tanks must be properly handled and transported following applicable WHMIS and Transportation of Dangerous Goods guidelines. Controlled products identified within the Project Areas must be disposed following British Columbia Ministry of Environment (MoE) guidelines, pursuant to the Environmental Management Act.

8.0 REPORT LIMITATIONS

This report is intended for client use only. Any use of this document by a third party, or any reliance on or decisions made based on the findings described in this report, are the sole responsibility of such third parties, and DST Consulting Engineers Inc. accepts no responsibility for damages, suffered by any third party as a result of decisions made or actions conducted based on this report. No other warranties are implied or expressed.

The data, conclusions and recommendations which are presented in this report, and the quality thereof, are based on a scope of work authorized by the client. The sampling program included asbestos bulk sampling and paint chip sampling in select representative areas for laboratory analysis. Note, however, that no scope of work, no matter how exhaustive, can guarantee to identify all contaminants. This report therefore cannot warranty that all building conditions are represented by those identified at specific locations.
Recommendations, when included, are made in good faith and are based on several successful experiences.

Note also that standards, guidelines and practices related to environmental investigations may change with time. Those which were applied at the time of this investigation may be obsolete or unacceptable at a later date.

Any comments given in this report on potential remediation problems and possible methods are intended only for the guidance of the designer. The scope of work may not be sufficient to determine all of the factors that may affect construction, clean-up methods and/or costs. Contractors bidding on this project or undertaking clean-ups should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the conditions may affect their work.

Any results from an analytical laboratory or other subcontractor reported herein have been carried out by others, and DST Consulting Engineers Inc. cannot warranty their accuracy. Similarly, DST cannot warranty the accuracy of information supplied by the client.

9.0 CLOSURE

We trust that the information contained herein meets your needs. Should you have any questions or comments, please do not hesitate to contact us.

DST Consulting Engineers Inc.

Prepared by:

Balraj Ludu, Dipl. OH&S
Project Manager

Reviewed by:

Christian J. Injates, CEC, CEM
Associate, Regional Manager

APPENDIX I

ANALYTICAL LABORATORY REPORT

BC ASBESTOS SERVICES Ltd. - *102 - 8299 129 St. Surrey BC V3W 0A6*

Bulk Asbestos Results

Client: DST Consulting Engineers - TS-VC- 33511

BCAS Sample #	Client Sample #	Date Analyzed	Sample Description	Material Type	Layer #	Layer Description	Other Materials Type & Amount	Asbestos Type & Amount
199156	A1	23-May-18	310 Prior St. Vancouver 2nd Floor Mens Washroom Wall	Grout	1	White Grout	Non-fibrous >99 %	None Detected
					2	Drywall	Cellulose 10 % Non-fibrous 90 %	None Detected
199157	A2	23-May-18	310 Prior St. Vancouver 2nd Floor Womens Washroom Wall	Grout	1	White Grout	Non-fibrous >99 %	None Detected
199158	A3	23-May-18	310 Prior St. Vancouver 2nd Floor Womens Washroom Floor	Grout	1	White Grout	Non-fibrous >99 %	None Detected
199159	A4	23-May-18	310 Prior St. Vancouver 1st Floor Mens Washroom Floor	Grout	1	White Grout	Non-fibrous >99 %	None Detected
199160	A5	23-May-18	310 Prior St. Vancouver 1st Floor Womens Washroom Wall	Grout	1	White Grout	Non-fibrous >99 %	None Detected
199161	A6	23-May-18	310 Prior St. Vancouver 1st Floor West Entrance Debris	Drywall Joint Compound	1	Filler Compound	Non-fibrous >99 %	None Detected
					2	Paper	Cellulose 90 % Non-fibrous 10 %	None Detected
					3	Drywall	Cellulose 10 % Non-fibrous 90 %	None Detected
199162	A7	23-May-18	310 Prior St. Vancouver 1st Floor West Entrance Debris	Drywall Joint Compound	1	Filler Compound	Non-fibrous >99 %	None Detected
					2	Paper	Cellulose 90 % Non-fibrous 10 %	None Detected

Analytical Method: NIOSH 9002 Analyst: David Whiteside Samples submitted by: DST

BC ASBESTOS SERVICES Ltd. - *102 - 8299 129 St. Surrey BC V3W 0A6*

Bulk Asbestos Results

Client: DST Consulting Engineers - TS-VC- 33511

BCAS Sample #	Client Sample #	Date Analyzed	Sample Description	Material Type	Layer #	Layer Description	Other Materials Type & Amount	Asbestos Type & Amount
199163	A8	23-May-18	310 Prior St. Vancouver 1st Floor South Room	Drywall Joint Compound	1	Filler Compound	Non-fibrous >99 %	None Detected
					2	Paper	Cellulose 90 % Non-fibrous 10 %	None Detected
					3	Drywall	Cellulose 10 % Non-fibrous 90 %	None Detected
199164	A9	23-May-18	310 Prior St. Vancouver 1st Floor South Room	Drywall Joint Compound	1	Filler Compound	Non-fibrous >99 %	None Detected
					2	Paper	Cellulose 90 % Non-fibrous 10 %	None Detected
					3	Drywall	Cellulose 10 % Non-fibrous 90 %	None Detected
199165	A10	23-May-18	310 Prior St. Vancouver 1st Floor South Room	Drywall Joint Compound	1	Filler Compound	Non-fibrous >99 %	None Detected
					2	Paper	Cellulose 90 % Non-fibrous 10 %	None Detected
199166	A11	23-May-18	310 Prior St. Vancouver 2nd Floor South Room	Ceiling Tile	1	Fibrous Tile	Glass Fibre 80 % Non-fibrous 20 %	None Detected
199167	A12	23-May-18	310 Prior St. Vancouver 1st Floor South Room	Ceiling Tile	1	Fibrous Tile	Cellulose 90 % Non-fibrous 10 %	None Detected

Analytical Method: NIOSH 9002

Analyst: David Whiteside

Samples submitted by: DST

BC ASBESTOS SERVICES Ltd. - *102 - 8299 129 St. Surrey BC V3W 0A6*

Bulk Asbestos Results

Client: DST Consulting Engineers - TS-VC- 33511

BCAS Sample #	Client Sample #	Date Analyzed	Sample Description	Material Type	Layer #	Layer Description	Other Materials Type & Amount	Asbestos Type & Amount
199168	A13	23-May-18	310 Prior St. Vancouver 1st Floor East Room	Siding (White)	1	Vinyl Material	Synthetic 40 % Non-fibrous 60 %	None Detected
199169	A14	23-May-18	310 Prior St. Vancouver 2nd Floor Womens Washroom	Vinyl Wall Covering	2	Hard Vinyl Material	Cellulose 40 % Non-fibrous 60 %	None Detected
					3	Paper	Cellulose 90 % Non-fibrous 10 %	None Detected
199170	A15	23-May-18	310 Prior St. Vancouver 2nd Floor Mens Washroom	Vinyl Wall Covering	1	Hard Vinyl Material	Cellulose 40 % Non-fibrous 60 %	None Detected

Analytical Method: NIOSH 9002

Analyst: David Whiteside

Samples submitted by: DST

BC ASBESTOS SERVICES Ltd. - 102 - 8299 129 St. Surrey BC V3W 0A6

Bulk Asbestos Results

Client: DST Consulting Engineers - TS-VC-33511

BCAS Sample #	Client Sample #	Date Analyzed	Sample Description	Material Type	Layer #	Layer Description	Other Materials Type & Amount	Asbestos Type & Amount
200673	A16	8-Jun-18	310 Prior St. Vancouver Roof - North	Tar & Gravel Roofing Material	1	Top Layer Tar Material	Cellulose 20 % Non-fibrous 80 %	None Detected
					2	Bottom Layer Tar Material	Cellulose 30 % Non-fibrous 70 %	None Detected
200674	A17	8-Jun-18	310 Prior St. Vancouver Roof - South	Tar & Gravel Roofing Material	1	Top Layer Tar Material	Cellulose 20 % Non-fibrous 80 %	None Detected
					1	Bottom Layer Tar Material	Cellulose 30 % Non-fibrous 70 %	None Detected
200675	A18	8-Jun-18	310 Prior St. Vancouver Roof - East	Tar & Gravel Roofing Material	1	Top Layer Tar Material	Cellulose 20 % Non-fibrous 80 %	None Detected
					2	Bottom Layer Tar Material	Cellulose 30 % Non-fibrous 70 %	None Detected
200676	A19	8-Jun-18	310 Prior St. Vancouver Roof - West	Tar & Gravel Roofing Material	1	Top Layer Tar Material	Cellulose 20 % Non-fibrous 80 %	None Detected
					2	Bottom Layer Tar Material	Cellulose 30 % Non-fibrous 70 %	None Detected
200677	A20	8-Jun-18	310 Prior St. Vancouver Roof Flashing	Mastic	1	Mastic	Non-fibrous 85 %	Chrysotile 10-20 %
200678	A21	8-Jun-18	310 Prior St. Vancouver Roof Flashing	Mastic	1	Mastic	Non-fibrous 85 %	Chrysotile 10-20 %
200679	A22	8-Jun-18	310 Prior St. Vancouver Roof Flashing	Mastic	1	Mastic	Non-fibrous 85 %	Chrysotile 10-20 %

Analytical Method: NIOSH 9002

Analyst: David Whiteside

Samples submitted by: DST

BC ASBESTOS SERVICES Ltd. - *102 - 8299 129 St. Surrey BC V3W 0A6*

Bulk Asbestos Results

Client: DST Consulting Engineers - TS-VC-33511

BCAS Sample #	Client Sample #	Date Analyzed	Sample Description	Material Type	Layer #	Layer Description	Other Materials Type & Amount	Asbestos Type & Amount
200680	A23	8-Jun-18	310 Prior St. Vancouver Roof Vent	Mastic	1	Mastic	Cellulose 10 % Non-fibrous 80 %	Chrysotile 5-10 %
200681	A24	8-Jun-18	310 Prior St. Vancouver Roof Vent	Mastic	1	Mastic	Cellulose 10 % Non-fibrous 80 %	Chrysotile 5-10 %
200682	A25	8-Jun-18	310 Prior St. Vancouver Roof Vent	Mastic	1	Mastic	Cellulose 10 % Non-fibrous 80 %	Chrysotile 5-10 %
200683	A26	8-Jun-18	310 Prior St. Vancouver Roof	Paper	1	Tar Paper	Cellulose 60 % Non-fibrous 40 %	None Detected
					2	Paper	Cellulose 90 % Non-fibrous 10 %	None Detected

Analytical Method: NIOSH 9002

Analyst: David Whiteside

Samples submitted by: DST

DST Consulting Engineers Inc.
A division of Englobe

Project Number: 2105834

PRE-DEMOLITION HAZARDOUS MATERIALS REPORT

310 PRIOR STREET,
VANCOUVER, BRITISH COLUMBIA

Report Prepared By:
DST Consulting Engineers Inc., A Division of Englobe
Unit B – 4125 McConnell Drive, Burnaby, BC

Report Prepared For:
PCL Constructors Westcoast Inc.
#310-13911 Wireless Way,
Richmond, British Columbia
V6V 3B9

June 2, 2021

DST Consulting Engineers Inc., a Division of Englobe

1.0 EXECUTIVE SUMMARY

This report details the results/findings of the pre-demolition, limited hazardous material survey that was completed on May 25, 2021 located at 310 Prior Street, Vancouver, British Columbia (herein referred to as the Subject Building). The investigation was conducted on behalf of PCL Constructors Westcoast Inc. (PCL) in preparation for demolition of the Subject Building.

DST previously provided a hazardous material survey of the property in the report titled, "*Pre-Demolition Hazardous Materials Assessment at 310 Prior Street, Vancouver, British Columbia*" dated June 14, 2018, DST File No. TS-VC-33511 (herein referred to the DST Report).

The purpose of the investigation was for overview of the interior and exterior of the Subject Building and identify any changes in hazardous materials conditions identified in the previous DST Report. However, at the time of the investigation, the roof, 2nd floor Mezzanine and the interior were deemed unsafe to reassess due to structural defects along the mezzanine floor and at the north side ceiling of the building as the Client reported portions of the roof had previously collapsed onto the 2nd Floor. As a result, the interior of the building was not assessed.

The results from the site investigation identified the following hazardous materials:

Asbestos-Containing Materials (ACM's):

- The grey caulking applied to the windowsill was determined to be asbestos-containing, approximately 70 linear meters.
- The ceramic tile mortars on the walls and floors in the 2nd Floor Women's Washroom and 2nd Floor Men's Washroom and walls of the 1st Floor South Washroom are presumed to be asbestos-containing, approximately 23 m^2.

Previously Identified Asbestos-Containing Materials (ACM's):

- The black mastic applied to the metal flashing of the Roof was determined to be asbestos-containing, approximately 19 m^2; and,
- The black vent mastic on the Roof was determined to be asbestos-containing, approximately 10 m^2

Previously Identified Lead-Containing Materials (LCM's):

Quantities of interior LCMs are approximated due to unsafe conditions within the building.

- The white paint applied to the metal pipes throughout the 2nd Floor within the Subject Building was determined to be lead containing, approximately 650 linear meters;
- The blue and white ceramic wall tiles in the 2nd Floor Men's Washroom was determined to be lead-containing, approximately 7 m^2;

- The white paint applied to the wood door of the 2nd Floor Office was determined to be lead-containing, approximately 9 m^2;
- The white paint applied to the metal sprinkle pipes of the Mezzanine Stairwell was determined to be lead-containing, approximately 100 linear meters;
- The cream paint applied to the wood structural beam of the Mezzanine Stairwell was determined to be lead-containing, approximately 37 m^2;
- The cream paint applied to the wood paneling of the Mezzanine Stairwell was determined to be lead-containing, approximately 7 m^2;
- The white paint applied to the walls throughout the Subject Building was determined to be lead-containing, approximately 55 m^2;
- The white paint applied to the wood shelving of the 1st Floor Northeast Corner was determined to be lead-containing, approximately 10 m^2;
- The brown paint applied to the baseboards of the 1st Floor West Office was determined to be lead-containing, approximately 10 linear meters;
- The white paint applied to the metal doors throughout the 1st Floor Garage Doors within the Subject Building was determined to be lead-containing, approximately 37 m^2; and,
- The yellow paint applied to the walls throughout the 1st Floor within the Subject Building was determined to be lead-containing, approximately 83 m^2.

Exterior LCMs

- The light beige paint applied to the concrete throughout the Exterior was determined to be lead-containing, approximately 218 m^2; and,
- The beige paint applied to the concrete throughout the Exterior was determined to be lead-containing, approximately 19 m^2.

Elemental mercury:

- Approximately fifty (50) Fluorescent light tubes and fluorescent light (CFL) bulbs suspected to contain elemental mercury were previously observed within the Subject Building.

Polychlorinated Biphenyls (PCBs)

- Approximately one hundred (100) fluorescent light ballasts suspected to contain PCBs were previously observed throughout the Subject Building.

Ozone-depleting substances (ODSs):

- Approximately two (2) refrigerators and one (1) air conditioning unit suspected to contain ODSs were previously observed throughout the Subject Building.

Silica:

- Potential sources of respirable silica were observed to be in the form of drywall (observed only in the interior) and exterior concrete within the Subject Building.
- Potential sources of respirable silica were presumed to be in the form of plaster, stucco, cinderblock building foundations, cinderblock mortar, brick, brick mortar and cementitious parging cement within the Subject Building.

Toxic, flammable, explosive or other hazardous materials:

- Sources of potentially toxic substances were identified throughout the Subject Building in the form of gasoline and five (5) propane tanks.

Biological Hazards:

- Mould was identified on drywall and wood building materials in the Entrance Foyer doorway and underside of the stairs of the westside Exterior, approximately 60 m^2.
    - Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity of mould growth within the remainder of the building, but based on the conditions observed, is expected to be present within the building.
- Needles and sharps were previously identified throughout the Subject Building.
- Based on the conditions observed, animal waste is expected.
    - Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity of animal waste.

No other potentially hazardous materials were identified.

2.0 INTRODUCTION

This report details the results/findings of the pre-demolition, limited hazardous material survey that was completed on May 25, 2021 located at 310 Prior Street, Vancouver, British Columbia (herein referred to as the Subject Building). The investigation was conducted on behalf of PCL Constructors Westcoast Inc. (PCL) in preparation for demolition of the Subject Building.

DST previously provided a hazardous material survey of the property in the report titled, "*Pre-Demolition Hazardous Materials Assessment at 310 Prior Street, Vancouver, British Columbia*" dated June 14, 2018, DST File No. TS-VC-33511 (herein referred to the DST Report).

This report provides an outline of applicable regulatory framework, purpose and methodology, findings, conclusions and based on the conclusions provides appropriate recommendations.

2.1 SUBJECT BUILDING OVERVIEW

The Subject Building, constructed in 1970, is a two-storey warehouse, with a mixture of drywall and concrete walls in the interior, metal q-deck ceiling on the 2nd Floor, wood panels ceiling on the 1st Floor, concrete flooring, a concrete building foundation and flat tar and gravel roof.

3.0 SCOPE OF WORK

The investigation included an overview of the interior and exterior of the Subject Building and identify any changes in hazardous materials conditions identified in the previous DST Report. However, at the time of the investigation, the roof, 2nd floor Mezzanine and the interior were deemed unsafe to reassess due to structural defects along the mezzanine floor and at the north side ceiling of the building as the Client reported portions of the roof had previously collapsed onto the 2nd Floor.

4.0 PURPOSE

The limited survey was completed to identify the presence of hazardous materials including but not limited to asbestos-containing materials (ACMs), lead-containing materials (LCMs), ozone-depleting substances (ODSs), polychlorinated biphenyls (PCBs), elemental mercury, toxic materials, flammable materials, explosive materials and biological hazards in preparation for demolition work that is scheduled to take place in the Project Area. The survey was requested to update the previous DST Report in the Project Area defined above.

5.0 PREVIOUS RENOVATIONS

No previous renovation work was reported by the client at the time of the investigation.

6.0 PREVIOUS REPORTS

DST previously provided a hazardous material survey of the property in the report titled, "*Pre-Demolition Hazardous Materials Assessment at 310 Prior Street, Vancouver, British Columbia*" dated June 14, 2018, DST File No. TS-VC-33511 (herein referred to the DST Report).

7.0 PROVINCIAL REGULATORY FRAMEWORK & APPLICABLE GUIDELINES

In British Columbia, the management of hazardous building materials in the work place is regulated by WorkSafeBC under the Workers' Compensation Act (effective April 15, 1998), as amended by the Workers' Compensation (Occupational Health and Safety) Amendment Act (effective October 1, 1999). Specific requirements of the Occupational Health and Safety Amendment Act are prescribed in the British Columbia Occupational Health and Safety (BC OH&S) Regulation.

7.1 Hazardous Materials & Demolition/Restorations

Section 20.112 of the BC OH&S Regulation details the requirements that employers and owners are responsible for identifying, and managing the presence of potentially hazardous materials prior to, and during demolition, restoration or salvage of machinery, equipment, buildings, or structures.

7.2 Provincial Hazardous Wastes Legislation & Regulations

In British Columbia, environmental matters pertaining to waste generally fall under the jurisdiction of the British Columbia Ministry of Environment (MoE), pursuant to the Environmental Management Act. The key waste regulation under the Environmental Management Act relating to hazardous building materials is the Hazardous Waste Regulation (HWR), as amended from time to time. The HWR provides the requirements for the proper handling, storage, transportation, treatment, recycling and disposal of hazardous wastes in the province. The regulation also outlines the materials and criteria to be used to characterize waste as hazardous.

7.3 Asbestos-Containing Materials (ACMs)

Current to the time of this writing, asbestos-containing materials are regulated under Part 6 (sections 6.1 to 6.32) of the BC OH&S Regulation. Under Part 6 Section 6.1, an asbestos containing material is defined as "*a manufactured article or other material, other than vermiculite insulation, that would be determined to contain at least 0.5% asbestos if tested in accordance with one of the following methods:*

(i) Asbestos, Chrysotile by XRD, Method 9000
(ii) Asbestos (bulk) by PLM, Method 9002
(iii) Test Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116)

WorkSafeBC Manual – "Safe Work Practices for Handling Asbestos"

This manual outlines basic information on asbestos and asbestos products, health hazard requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of ACMs. This document provides a guide to current practices that are to be followed in the Province of British Columbia.

7.3.1 ALARA Principle

Asbestos is a substance that is governed by the ALARA principle, meaning all exposures must be kept **a**s **l**ow **a**s **r**easonably **a**chievable. In effect, this means that although the BC OH&S Regulation provides explicit exposure limits, action levels and other significant criteria for asbestos, employers must also demonstrate further efforts (beyond those prescribed in the Regulation) to reduce, or eliminate worker exposure to asbestos, when it is considered reasonable to do so.

7.4 Lead & Lead-Containing Materials (LCMs)

Current to the time of this writing, lead is regulated under Part 6 (sections 6.59 to 6.69) of the BC OH&S Regulation.

WorkSafeBC Manual – "Safe Work Practices for Handling Lead"

This manual outlines basic information on lead and lead-based products, health hazard requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of lead containing paints and coatings. This document provides a guide to current practices that are to be followed in the Province of British Columbia.

7.4.1 ALARA Principle

Lead is a substance that is governed by the ALARA principle, meaning all exposures must be kept **a**s **l**ow **a**s **r**easonably **a**chievable. In effect, this means that although the BC OH&S Regulation provides explicit exposure limits, action levels and other significant criteria for lead, employers must also demonstrate further efforts (beyond those prescribed in the Regulation) to reduce, or eliminate worker exposure to lead, when it is considered reasonable to do so.

7.4.2 Silica

Exposure to silica dust is governed by the COHSR and BC Reg. 296/97. According to both legislative instruments, the time-weighted average exposure limit for airborne silica dust is 0.025 milligram per cubic meter (mg/m^3).

7.5 Ozone-Depleting Substances (ODSs)

Provincial regulatory framework providing the requirements for the safe management, storage and disposal of ozone-depleting substances are provided in British Columbia Regulation (BC Reg.) 387/99, as amended from time to time – Ozone-Depleting Substances Regulation respecting the appropriate management of ozone-depleting substances within the province of British Columbia.

8.0 FEDERAL REGULATORY FRAMEWORK & APPLICABLE GUIDELINES

8.1 Polychlorinated Biphenyls (PCBs)

The PCB Regulations SOR/2008-273 came into force on September 5, 2008. The purpose of the regulations is to improve the protection of Canada's environment and the health of Canadians by minimizing the risks posed by the use, storage and release of PCBs and by accelerating the elimination of these substances. The Regulations also set out end-of-use and end-of-storage dates for PCBs. These dates are listed in Environment Canada's fact sheet, "PCB Regulations: An Overview."

Additionally, Environment Canada has published a report entitled, "Identification of Lamp Ballasts Containing PCBs", revised in August 1991. This report can be referenced to determine the PCB-content in fluorescent lamp ballast.

8.2 Elemental Mercury

The *Products Containing Mercury Regulations* SOR/2014-254 (the Regulations) prohibit the manufacture and import of products containing mercury or any of its compounds, with some exemptions for essential products which have no technically or economically viable alternatives (e.g., certain medical

and research applications, and dental amalgam). In the case of lamps, rather than introducing a prohibition, the Regulations limit the amount of mercury contained in fluorescent and other types of lamps. The Regulations will come into force on November 8, 2015, one year after the day on which they are registered.

8.3 Transportation of Dangerous Goods

The transportation of hazardous wastes is governed under the Transportation of Dangerous Goods (TDG) Act and Regulations which outline the requirements for storage, handling, and transportation of hazardous waste, amongst other products.

9.0 METHODOLOGY

The survey was completed by DST on May 25, 2021 following AHERA sampling protocols in conjunction with WorkSafeBC recommended sampling procedures and the surveyor's previous experience. As part of the survey DST conducted a hazardous materials exposure risk assessment, to evaluate the current condition and accessibility of hazardous materials based on methods used by the United States Environmental Protection Agency (USEPA), which complies with federal and provincial jurisdictional requirements. A summary of the applicable criteria is provided in appendix I of this document.

Due to DSTs safety policy, confined spaces such as crawlspaces, attic spaces, etc. were not physically entered but were visually assessed to the best of the surveyor's ability. Demolition personnel must be aware that concealed, potentially hazardous materials may be present in these confined spaces and should ensure that persons familiar with the recognition and identification of these materials are present throughout the demolition. If materials are discovered that are deemed potentially hazardous, all work must cease, and further investigation must be performed by a qualified person.

Due to the structural integrity of the Subject Building, DST did not enter or assess the condition of previously identified hazardous materials, inspect for concealed conditions or sample within the interior of the building.

Due to inaccessibility issues, the surveyor was not able to perform investigation or sampling of concealed building materials, not limited to include materials located behind existing walls, within ceiling cavities, the roof, or beneath finish flooring materials. Suspect hazardous building materials were visually identified, based on the surveyor's knowledge of the historic composition of building products. Visual identification of materials suspected to contain asbestos or lead (in coatings) was supported by the analysis of representative samples (where accessible).

Bulk samples of suspected ACMs collected by DST during the site investigation were analyzed for their asbestos content by an accredited independent laboratory using the Polarized Light Microscopy (PLM)

EPA 600/R-93/116 method.

Bulk samples of suspected LCMs collected by DST during the site investigation were analyzed for their lead content by an accredited independent laboratory using the EPA 6010D-M Inductively Coupled Plasma-Atomic Emission Spectrometry method for acid extractable lead in a solid/paint.
Suspect sources of silica were identified based on the surveyor's knowledge of the historic composition of building products.

Suspect sources of ODSs and elemental mercury were identified based on appearance, age, and knowledge of historic applications. Suspect sources of PCBs were identified in electrical equipment only.

Equipment that may contain ODSs (e.g. air conditioning and refrigeration equipment) or PCBs (e.g. electrical transformers and fluorescent light ballasts) can often be identified by examining manufacturer's labels. For safety reasons, DST personnel do not remove the ballast shields from fluorescent light fixtures to examine the ballast codes unless the electrical circuit for the lighting has been tagged and locked out by a qualified electrician.

10.0 SUMMARY OF FINDINGS

The following sections outline the findings of the hazardous building material survey.

Analytical Reports for bulk asbestos and lead results are included in **Appendix I**.

Site maps, with sample locations, are included in **Appendix II**.

Site Photographs are included in **Appendix III**.

10.1 Site Observations

The following observations/communications were noted at the time of the survey:

- Client reported the Roof on the north side of the Subject Building had collapsed onto the 2nd Floor Mezzanine;
- Client reported observing used needles and sharps were primarily on the 2nd Floor;
- Client reported that the Subject Building was unsafe for entry and a structural engineer was to attend and assess;
- Drywall wall was observed on the 1st Floor South Wall;
- Wood paneled walls were observed in the Northwest and adjacent North Center Offices of the 2nd Floor Mezzanine;
- Concrete walls were observed on the West Wall;
- Refuse and personal items were observed throughout the 1st Floor;
- Drywall board and plywood sheets were observed around windows;

- No ceiling tiles were identified within the Mezzanine from the 2nd Floor windows. However, due to inaccessibility, they may be present in other areas;
- Pink fiberglass insulation was observed in the wall cavity and along the window of the 2nd Floor Northwest Office;
- Mould was observed on the underside of the stairs from the west side Exterior door; and,
- Animal waste in the form of rodent droppings or carcasses are likely to be found.

10.2 Asbestos-Containing Materials (ACMs)

Suspect ACMs were identified within the accessible areas of the Project Area. Representative samples of each suspect ACM were collected and analyzed for asbestos content. Sample descriptions and analytical results for each of the suspect ACMs are summarized in Table 1 below.

Sampling Notes:

- All unsampled potentially asbestos-containing materials must be presumed to be asbestos-containing within the Subject Building.
- Due to inaccessibility of the Subject Building, ceramic tile observed from the Exterior at the time of the current survey.
    - The ceramic tile mortar on the walls and floor of the 2nd Floor Men's and Women's Washrooms, as well as, the walls of the 1st Floor Washroom are **presumed asbestos-containing.**

Table 1: Analysis of Suspect ACMs

Sample #	Area or Room	Building[1] Material and Colour	Sampling Location	Asbestos[2] Percentage & Type	Friable	Current Condition[3]	Accessibility[4]	Approximate Quantity of Material	Current Risk of Exposure[5]
2105834-1A	Exterior 2nd Floor North Side	Residual Window Mastic – Grey	West Window	4% Chrysotile	Non-Friable	Poor	Low	70 m^2	Moderate
2105834-1B	Exterior 2nd Floor North Side	Residual Window Mastic – Grey	East Window	Positive Stop (Not Analyzed)	Non-Friable	Poor	Low	70 m^2	Moderate
2105834-1C	Exterior 2nd Floor West Side	Residual Window Mastic – Grey	Center Left Window	Positive Stop (Not Analyzed)	Non-Friable	Poor	Low	70 m^2	Moderate

[1] DJC-Drywall Joint Compound, VSF-Vinyl Sheet Floor, VFT-Vinyl Floor Tile, FLC-Floor Leveling Compound, ADH-Adhesive, CT-Ceiling Tile.

[2] An asbestos containing material is defined as a manufactured article or other material, other than vermiculite insulation, that would be determined to contain at least 0.5% asbestos.

[3] **Good** – Material has no visible damage or deterioration, or showing only very limited damage; **Fair** – Surface is crumbling, blistered, water-stained, gouged, marred, or otherwise abraded on less than 10% of the surface evenly distributed (25% if localized); **Poor** – Surface is crumbling or blistered over at least 10% of the surface if evenly distributed or 25% if localized; 10% (25% if localized) of material hanging from surface, deteriorated or showing adhesive failure; water stains, gouges, chalking or marks over at least 10% of the surface (25% if localized).

[4] **High** – easily accessible; **Moderate** – not easily accessible but in view; **Low** – not easily accessible, enclosed or obscured.

[5] **High** – Indicates that "High Risk" personal protective equipment and safe work procedures as outlined in the WorkSafeBC publication entitled "*Safe Work Practices for Handling Asbestos*", latest edition must be followed in order to **access the subject building**; **Moderate** – Indicates that "Moderate Risk" personal protective equipment and safe work procedures as outlined in the WorkSafeBC publication entitled "*Safe Work Practices for Handling Asbestos*", latest edition must be followed in order to be **in proximity to the material**; **Low** – Indicates that "Low Risk" safe work procedures as outlined in the WorkSafeBC publication entitled "*Safe Work Practices for Handling Asbestos*", latest edition must be followed in order to be **in proximity to the material**.

Sample #	Area or Room	Building[1] Material and Colour	Sampling Location	Asbestos[2] Percentage & Type	Friable	Current Condition[3]	Accessibility[4]	Approximate Quantity of Material	Current Risk of Exposure[5]
N/A	1st Floor Washrooms and 2nd Floor Men's and Women's Washroom	Ceramic Tile Mortar	Wall and Floors	Presumed Asbestos Containing	Non-Friable	Good-Poor	High	22 m^2	Low-Moderate
N/A	1st Floor Washrooms and 2nd Floor Men's and Women's Washroom	Ceramic Tile Mortar	Wall and Floors	Presumed Asbestos-Containing	Non-Friable	Good-Poor	High	22 m^2	Low-Moderate
N/A	1st Floor Washrooms and 2nd Floor Men's and Women's Washroom	Ceramic Tile Mortar	Wall and Floors	Presumed Asbestos-Containing	Non-Friable	Good-Poor	High	22 m^2	Low-Moderate

10.3 Elemental Mercury

Suspected sources of elemental mercury were previously observed throughout the Project Area in the form of approximately fifty (50) fluorescent light tubes.

Due to the inaccessibility of the Subject Building, sources of Elemental Mercury were not assessed for condition at the time of the survey. All sources of Elemental Mercury may range from good to poor condition as the interior was not assessed at the time of the survey.

10.4 Polychlorinated Biphenyls (PCBs)

Suspected sources of PCBs were previously observed throughout the Project Area in approximately one hundred (100) ballasts of the fluorescent light tube fixtures.

Due to the inaccessibility of the Subject Building, sources of PCBs were not assessed for condition at the time of the survey. All sources of PCBs may range from good to poor condition as the interior was not assessed at the time of the survey.

10.5 Ozone-Depleting Substances (ODSs)

Equipment suspected to contain ODSs were previously observed in the Project Area in the form of refrigerant in approximately two (2) refrigerators and one (1) air conditioning unit within the Project Area.

Due to the inaccessibility of the Subject Building, sources of ODSs were not assessed for condition at the time of the survey. All sources of ODSs may range from good to poor condition as the interior was not assessed at the time of the survey.

10.6 Silica

Potential sources of respirable silica were observed to be in the form of drywall and concrete within the Subject Building. The drywall (observed only in the interior) was judged to be in poor condition at the time of the survey. The exterior concrete was judged to be in good condition at the time of the survey.

Potential sources of respirable silica were presumed to be in the form of plaster, stucco, cinderblock building foundations, cinderblock mortar, brick, brick mortar and cementitious parging within the Subject Building. These other sources of silica may range from good to poor condition as the interior was not assessed at the time of the survey.

10.7 Toxic, Flammable, Explosive or Other Hazardous Materials

Based on the site investigation in 2018, potential sources of toxic, flammable, explosive or other hazardous materials were identified in the Project Area in the form of the following:

- Gasoline; and,
- Propane.

Five (5) propane tanks were observed within the rental gate on the west side Exterior. The propane tanks were found to be in fair condition at the time of the survey.

10.8 Biological Hazards

Needles and sharps were previously identified throughout the Subject Building.

The surveyor identified visible mould growth throughout the Subject Building at the time of the survey. At the time of the current survey, mould growth was identified around the wood and drywall building materials at the underside of the stairs and at the interior Foyer west. Based on the surface area impacted by the suspect visible mould growth, this fungal contamination poses a risk of exposure to persons accessing this area of the Subject Building and the use of a fit-tested half-face respirator with HEPA P-100 cartridges, impermeable gloves, disposable coveralls (covering head and boots) and eye protection is recommended as defined in the WorkSafeBC Guideline G4.79 – Indoor Air Quality and Mould, latest edition. **Note that demolition workers must report the discovery of any concealed mould found during the demolition process as this may affect the risk assessment for the Subject Building.**

- Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity or condition of the building materials that are impacted by the mould growth.

Based on the conditions observed, animal waste will be expected. Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity or location of the of the animal waste.

11.0 CONCLUSIONS

At the time of the survey, the Subject Building was deemed unsafe to enter; therefore, appropriate intrusive testing or an assessment of the hazardous materials identified could not be performed.

Based on the site investigation, sampling and analysis, the following hazardous materials were identified in the Project Area:

- ACMs;
- LCMs;
- Elemental Mercury;
- PCBs;
- ODSs;
- Silica;
- Toxic, flammable, explosive or other hazardous materials; and,
- Biological hazards.

11.1 Asbestos-Containing Materials (ACMs)

DST was unable to assess the interior of the Subject Building and concealed asbestos materials may be present.

The presumed asbestos-containing ceramic tile mortars on walls and floors of the 2nd Floor Men's and Women's Washrooms, as well as, the walls of the 1st Floor South Washroom within the Project Area may range from good to poor condition, posing moderate risk of exposure to persons accessing the Project Area.

The asbestos-containing grey window caulking on the windowsill of the 2nd Floor West Side Exterior within the Project Area was judged to be in poor condition at the time of the survey, posing a moderate risk of exposure to persons accessing the Project Area.

Previous Samples ACMs

The black mastic applied to the metal flashing of the Roof was previously determined to be asbestos-containing. Due to the inaccessibility of the Subject Building, the black flashing mastic may range from good to poor condition as the interior was not assessed at the time of the survey.

The black vent mastic on the Roof was previously determined to be asbestos-containing. Due to the inaccessibility of the Subject Building, the black vent mastic may range from good to poor condition as the interior was not assessed at the time of the survey.

11.2 Lead-Containing Materials (LCMs)

No additional LCMs were sampled at the time of the current survey.

The previously sampled LCMs are identified below. Based on the conditions observed, the lead-containing paint pose a moderate risk of exposure to persons accessing the Project Area:

Quantities of interior LCMs are approximated due to unsafe conditions within the building.

- The white paint applied to the metal pipes throughout the 2nd Floor, approximately 650 linear meters;
- The blue and white ceramic wall tiles in the 2nd Floor Men's Washroom, approximately 7 m^2;
- The white paint applied to the wood door of the 2nd Floor Office, approximately 9 m^2;
- The white paint applied to the metal sprinkle pipes of the Mezzanine Stairwell, approximately 100 linear meters;
- The cream paint applied to the wood structural beam of the Mezzanine, approximately 37 m^2;
- The cream paint applied to the wood paneling of the Mezzanine Stairwell, approximately 7 m^2;
- The white paint applied to the walls throughout the Subject Building, approximately 55 m^2;
- The white paint applied to the wood shelving of the 1st Floor Northeast Corner, approximately 10 m^2;
- The brown paint applied to the baseboards of the 1st Floor West Office, approximately 10 linear meters;
- The white paint applied to the metal doors throughout the 1st Floor Garage Doors, approximately 37 m^2; and,
- The yellow paint applied to the walls throughout the 1st Floor, approximately 83 m^2.

Exterior LCMs

- The light beige paint applied to the concrete throughout the Exterior, approximately 218 m^2; and,
- The beige paint applied to the concrete throughout the Exterior, approximately 19 m^2.

11.3 Elemental Mercury

Suspected sources of elemental mercury were previously observed throughout the Project Area in the form of fifty (50) fluorescent light tubes.

Due to the inaccessibility of the Subject Building, sources of Elemental Mercury were not assessed for condition at the time of the survey. DST presumes the Elemental Mercury may range from good to poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

11.4 Polychlorinated Biphenyls (PCBs)

Suspected sources of PCBs were previously observed throughout the Project Area in one hundred (100) ballasts of the fluorescent light tube fixtures.

Due to the inaccessibility of the Subject Building, sources of PCBs were not assessed for condition at the time of the survey. DST presumes the PCBs may range from good to poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

11.5 Ozone-Depleting Substances (ODSs)

Equipment suspected to contain ODSs were previously observed in the Project Area in the form of refrigerant in refrigerator and freezers within the Project Area.

Due to the inaccessibility of the Subject Building, sources of ODSs were not assessed for condition at the time of the survey. DST presumes the ODSs may range from good to poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

11.6 Silica

Potential sources of respirable silica were observed to be in the form of drywall and concrete within the Subject Building. The drywall (only observed in the interior) was judged to be in poor condition at the time of the survey, posing a moderate risk of exposure to persons accessing the Project Area. The exterior concrete was judged to be in good condition at the time of the survey, posing a low risk of exposure to persons accessing the Project Area.

Potential sources of respirable silica were presumed to be in the form of plaster, stucco, cinderblock building foundations, cinderblock mortar, brick, brick mortar and cementitious parging within the Subject Building.

Due to the inaccessibility of the Subject Building, all other sources of silica were not assessed for condition at the time of the survey. DST presumes the remaining sources of silica may range from good to poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

11.7 Toxic, Flammable, Explosive or Other Hazardous Materials

Needles and sharps were previously identified throughout the Subject Building. Due to the inaccessibility of the Subject Building, DST was unable to assess the condition of the needles and sharps. DST presumes the needles and sharps to be in poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

The surveyor identified visible mould growth throughout the Subject Building at the time of the survey. At

the time of the current survey, mould growth was identified around the wood and drywall building materials at the underside of the stairs and at the interior Foyer west. Based on the surface area impacted by the suspect visible mould growth, this fungal contamination poses a risk of exposure to persons accessing this area of the Subject Building and the use of a fit-tested half-face respirator with HEPA P-100 cartridges, impermeable gloves, disposable coveralls (covering head and boots) and eye protection is recommended as defined in the WorkSafeBC Guideline G4.79 – Indoor Air Quality and Mould, latest edition. Note that demolition workers must report the discovery of any concealed mould found during the demolition process as this may affect the risk assessment for the Subject Building. Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity or condition of the building materials that are impacted by the mould growth.

Based on the conditions observed, animal waste will be expected. Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity or location of the of the animal waste.

12.0 RECOMMENDATIONS

Upon providing safe access to the interior of the building, revise the hazardous materials report to update the condition or quantities of the hazardous materials identified, perform intrusive investigation and complete testing of any presumed asbestos-containing materials identified.

DST provides recommendations for each identified hazardous material in the Project Area, which are based on both regulatory compliance and best practice guidelines, in the following sections.

Additionally, and due to DSTs safety policy, confined spaces such as crawlspaces, attic spaces, etc. were not physically entered but were visually assessed to the best of the surveyor's ability. Demolition personnel must be aware that concealed, potentially hazardous materials may be present in these confined spaces and should ensure that persons familiar with the recognition and identification of these materials are present throughout the restoration. If materials are discovered that are deemed potentially hazardous, all work must cease, and further investigation must be performed by a qualified person.

12.1 Asbestos-Containing Materials (ACMs)

DST recommends reference to WorkSafeBC publication "*Safe Work Practices for Handling Asbestos*" latest edition. This document provides a guide to current practices that are to be followed in the Province of British Columbia, providing basic information on asbestos and asbestos products, health hazards and requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of ACMs.

Asbestos-containing wastes generated from the above-noted work should be analyzed for asbestos content. If the wastes are found to contain 0.5% asbestos, or greater, they should be disposed of as hazardous waste, in accordance with the requirements of the British Columbia Ministry of Environment

and transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

12.2 Lead-Containing Materials (LCMs)

Due to the presumed condition of the identified lead-containing materials, all persons in proximity of these materials should use **MODERATE RISK** PPE controls as referenced in the WorkSafeBC publication "*Safe Work Practices for Handling Lead*" latest edition.

When lead-containing equipment/materials within the Subject Building are to be disturbed and/or removed, including in instances where paint chip debris is removed and/or paint debris is created (e.g., preparing surfaces for re-painting), ensure compliance with the following:

- Exposure protection requirements of BC Reg. 296/97, including the provisions detailed in WorkSafeBC publication entitled, "*Safe Work Practices for Handling Lead*", dated 2020.
- Transportation and disposal requirements of BC Reg. 63/88.
- Transportation requirements of the Federal Transportation of Dangerous Goods Regulation.

Airborne lead dust or fumes should not exceed the BC Reg. 296/97 eight-hour occupational exposure limit (OEL) of 0.05 mg/m^3 during the removal of paints and products containing any concentration of lead. The use of personal protective equipment is recommended to reduce the potential for over-exposure to lead dust

Ultimately, the Contractor is responsible to complete a Risk Assessment, and to review the work tasks required and the ways in which materials (including those coated with paints/ceramic tiles that may contain lead in varying concentrations) will be impacted, as well as the individuals that will be present in the immediate vicinity of the work (i.e., potential for high-risk individuals) in order to determine the appropriate personal protective equipment (PPE—including respirators and protective clothing), containment and/or decontamination measures and work procedures that should be followed to protect workers from lead exposure.

Toxicity Characteristic Leaching Procedure (TCLP) testing should be performed on identified lead-based paint, to facilitate the proper disposal of lead-containing wastes.

Retain qualified professionals to assess and control the disturbance of the identified LCM's.

12.3 Elemental Mercury

When sources of elemental mercury are removed, the mercury-containing wastes should be managed in accordance with the requirements of the British Columbia Ministry of Environment and should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

12.4 Polychlorinated Biphenyls (PCBs)

When equipment suspected to contain PCBs is removed, and prior to removing the ballasts, the PCB-content of each fluorescent lamp ballast should be verified through comparison to the criteria outlined in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, "*Identification of Lamp Ballasts Containing PCBs"* to assess their likelihood of PCB content.

If identified to contain PCBs, the PCB-containing light ballasts should be removed in accordance with the requirements of WorkSafeBC. PCB-containing wastes should be managed in accordance with the requirements of the British Columbia Ministry of Environment and should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.
For fixtures that are operational and are to be sold for reuse, documentation is required confirming that the purchasers understand the ballasts are PCB-containing, and the purchaser assumes all liability and responsibility associated with the fixtures.

12.5 Ozone Depleting Substances (ODSs)

When equipment containing ODSs is removed, manage the equipment in accordance with the requirements prescribed in British Columbia's Ozone-Depleting Substances and Other Halocarbons Regulation, including amendments up to B.C. Reg. 4/2010, January 14, 2010 and transport ODS-containing wastes in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

12.6 Silica

If silica-containing materials are to be removed or destructively altered (drilled, chipped, abraded, etc.), ensure dust control measures are employed such that airborne silica dust concentrations do not exceed the exposure limit as stipulated by the COHSR and BC Reg. 296/97 (0.025 mg/m^3). This would include, but not be limited to, the following:

- Providing workers with respiratory protection.
- Wetting the surface of the materials to prevent dust emissions.
- Providing workers with facilities to properly wash prior to exiting the work area.
- Providing dust control to mitigate the potential for demolition dust to escape from the work area into public and/or adjacent areas.

12.7 Toxic, Flammable, Explosive or Other Hazardous Materials

When removing and disposing of the toxic, flammable, explosive or other hazardous materials, all work must be conducted with the appropriate PPE, and all hazardous wastes must be managed in accordance with the requirements of the British Columbia Ministry of Environment. The hazardous wastes should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

12.8 Biological Hazards

DST recommends all persons in proximity of the needles, sharps and chemical and biological agents reference WorkSafeBC OH&S Regulation Part 5 G5.80 and Part 6, Section 6.54. This guideline provides guidance on work procedures on how to handle needles, sharps, chemical and biological agents.

DST recommends reference to WorkSafeBC manual entitled, “Controlling Exposure: Protecting Workers from Infectious Disease”, latest edition. This guideline provides guidance on exposure control plans, safe work procedures and infectious disease engineering and administration controls.

DST recommends reference to WorkSafeBC Guideline Part 4 G4.79 – Indoor Air Quality and Mould. This guideline provides guidance for the assessment and remediation of indoor mould amplification/contamination, not limited to include risk assessment strategies, engineering and administrative controls, and proper personal protective equipment.

DST recommends reference to WorkSafeBC manual entitled, “A Hantavirus Exposure Control Program for Employers and Workers, latest edition. This guideline provides guidance for the assessment and remediation of rodent-borne contamination, not limited to include risk assessment strategies, engineering and administrative controls, and proper personal protective equipment.

12.9 Precautionary Recommendation

Due to the nature and variation of construction methods and materials and the restrictions imposed by the Client, it is impractical to assume that all areas either concealed or otherwise, were, or can be tested to ensure with absolute certainty the presence or absence of all hazardous materials. With this in mind, Part 20, Section 20.112 of the BC OH&S Regulation indicates that, if after written confirmation is provided, a person discovers material that may be hazardous material, all employers responsible for the workers, and the owner, must ensure that a “qualified person” repeats the inspection process” outlined above, and detailed in Subsection 3 of Part 20, Section 20.112 of the Regulation.

Should additional information become available, DST requests that this information be brought to our attention so that we may re-assess the findings, conclusions, and/or recommendations presented herein.

13.0 LIMITATIONS

The conclusions presented in this report represent the judgement of the assessor based on current environmental and health and safety standards, and on-site conditions on the date(s) cited in this report. The Client and DST determined the interior of the Subject Building was unsafe to enter and due to the nature of the investigation and the limited data available, the assessor cannot warrant against undiscovered environmental liabilities.

This report is intended for client use only. Any use of this document by a third party, or any reliance on or decisions made based on the findings described in this report, are the sole responsibility of such third parties, and DST Consulting Engineers Inc. accepts no responsibility for damages, suffered by any third party as a result of decisions made or actions conducted based on this report. No other warranties are implied or expressed.

The data, conclusions and recommendations which are presented in this report, and the quality thereof, are based on a scope of work authorized by the client. The sampling program included asbestos bulk sampling and paint chip sampling in select representative areas for laboratory analysis. Note, however, that no scope of work, no matter how exhaustive, can guarantee to identify all contaminants. This report therefore cannot warranty that all building conditions are represented by those identified at specific locations.

Recommendations, when included, are made in good faith and are based on several successful experiences.

Note also that standards, guidelines and practices related to environmental investigations may change with time. Those which were applied at the time of this investigation may be obsolete or unacceptable at a later date.

Any comments given in this report on potential remediation problems and possible methods are intended only for the guidance of the designer. The scope of work may not be sufficient to determine all of the factors that may affect construction, clean-up methods and/or costs. Contractors bidding on this project or undertaking clean-ups should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the conditions may affect their work.

Any results from an analytical laboratory or other subcontractor reported herein have been carried out by others, and DST Consulting Engineers Inc. cannot warranty their accuracy. Similarly, DST cannot warranty the accuracy of information supplied by the client.

Report prepared by:

Michelle Chow

Michelle Chow
Project Manager
604-754-8622

Report reviewed by:

Ketan Minhas, *B.Sc., B. Tech (Env)*
Senior Project Manager
778-788-9679

DST Consulting Engineers Inc., a Division of Englobe

APPENDIX I

ANALYTICAL LABORATORY REPORTS

EMSL Canada Inc.

7964 Winston Street Suite 200 Burnaby, BC V5A 2H5
Phone/Fax: (604) 757-3158 / (604) 757-4731
http://www.EMSL.com / vancouverlab@EMSL.com

EMSL Canada Order 692101156
Customer ID: 55DSTV42
Customer PO:
Project ID:

Attn: Michelle Chow
DST Consulting Engineers
4125 McConnell Drive
Unit B
Vancouver, BC V5A 3J7

Phone: (604) 436-4588
Fax:
Collected: 5/25/2021
Received: 5/26/2021
Analyzed: 5/26/2021

Proj: 2105834 / 310 PRIOR STREET, VANCOUVER, BC

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: 2105834-1A ***Lab Sample ID:*** **692101156-0001**

Sample Description: EXTERIOR 2ND FLOOR NORTH SIDE WEST MOST WINDOW/RESIDUAL WINDOW CAULKING - GREY

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	5/26/2021	Gray	0.0%	96.0%	4% Chrysotile	

Client Sample ID: 2105834-1B ***Lab Sample ID:*** **692101156-0002**

Sample Description: EXTERIOR 2ND FLOOR NORTH SIDE EAST MOST WINDOW/RESIDUAL WINDOW CAULKING - GREY

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	5/26/2021			Positive Stop (Not Analyzed)		

Client Sample ID: 2105834-1C ***Lab Sample ID:*** **692101156-0003**

Sample Description: EXTERIOR 2ND FLOOR WEST SIDE CENTER LEFT WINDOW/RESIDUAL WINDOW CAULKING - GREY

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	5/26/2021			Positive Stop (Not Analyzed)		

Analyst(s):

Nicole Yeo PLM (1)

Reviewed and approved by:

Nicole Yeo, Laboratory Manager
or Other Approved Signatory

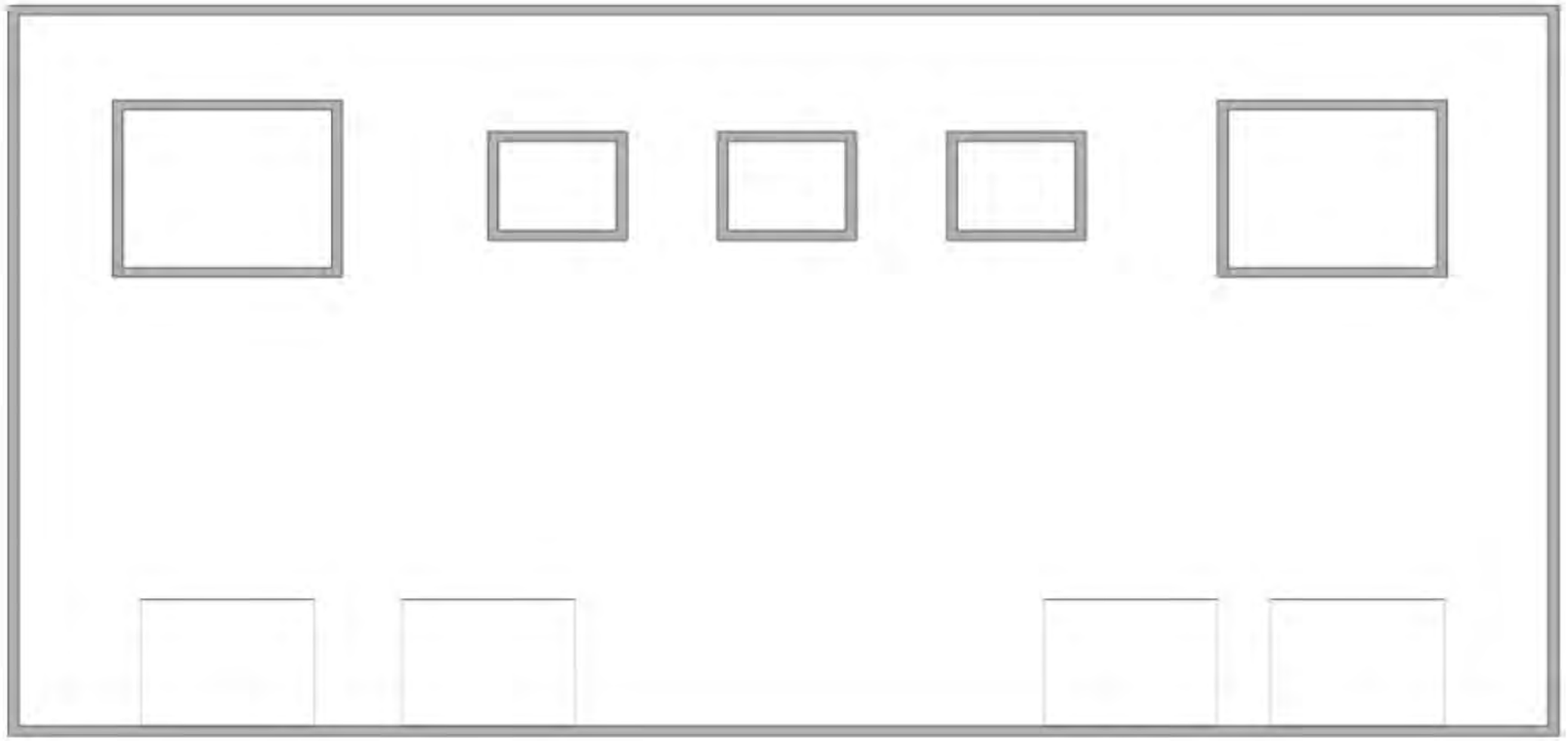
None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. Estimation of uncertainty available upon request. This report is a summary of multiple methods of analysis, fully compliant reports are available upon request. A combination of PLM and TEM analysis may be necessary to ensure consistently reliable detection of asbestos. This report must not be used to claim product endorsement by NVLAP of any agency or the U.S. Government.

Samples analyzed by EMSL Canada Inc. Burnaby, BC NVLAP Lab Code 201068-0

Report amended: 06/01/202114:43:22 Replaces initial report from: 05/27/202111:38:06 Reason Code: Client-Change to Location

APPENDIX II

SITE MAPS



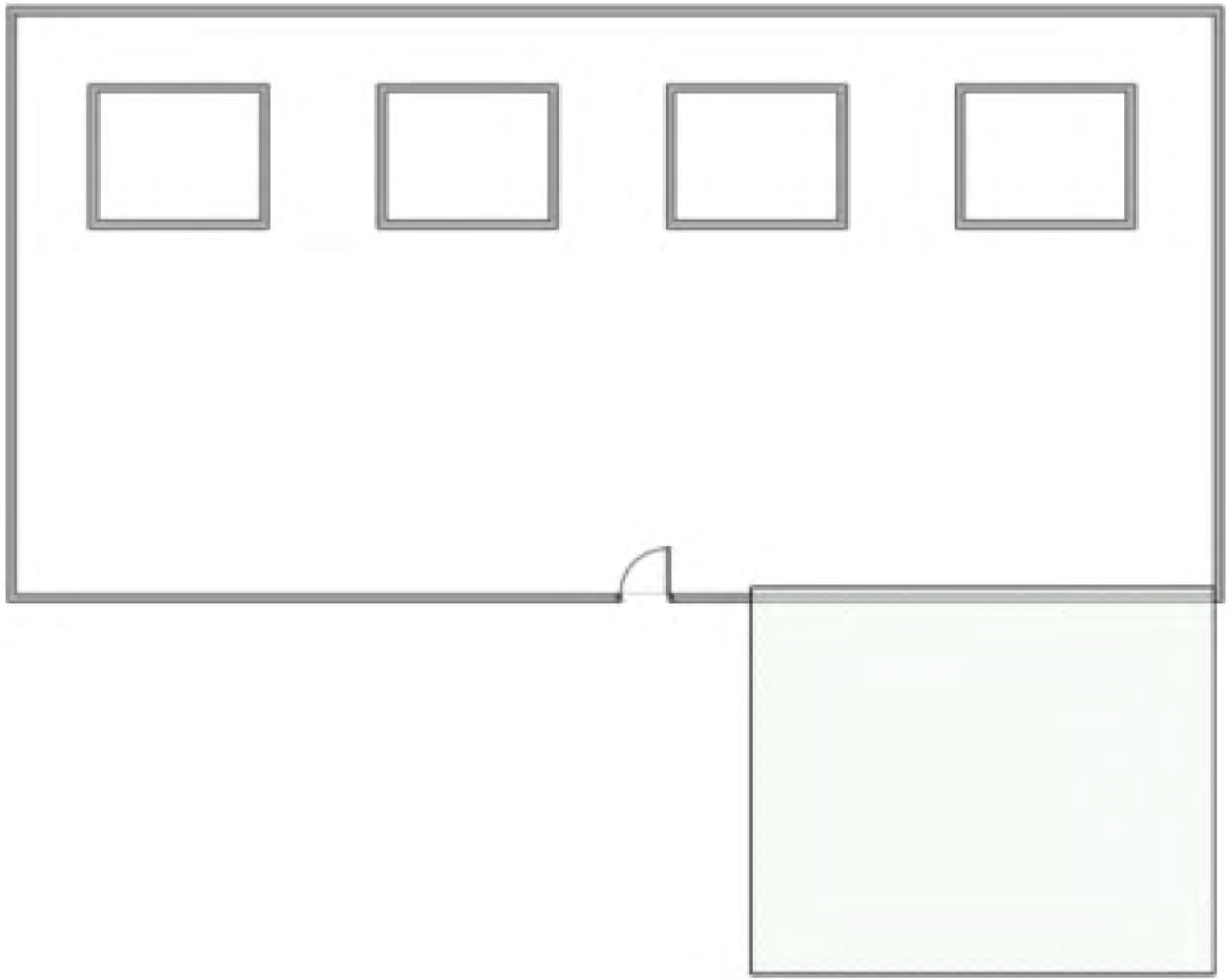
consulting engineers
a division of Englobe

1. This drawing shall be read in conjunction with the associated technical report.
2. Do not scale drawing.
3. Not all hazardous material shown.
4. Yellow indicates positive sample result.

Client	
Site	
Report Title	
Drawing Title	
Designed By	Scale
Drawn By	Date
Approved By	Project No.
Figure No.	

Drawing: TEMP.dwg Folder: C:\Users\npollard\Desktop\Nick\CAD\TEMPLATE Monday, November 23, 2020 @ 14:43 by Nicholas Pollard

Website: www.dstgroup.com



consulting engineers
a division of Englobe

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2. Do not scale drawing.
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Client	
Site	
Report Title	
Drawing Title	
Designed By	Scale
Drawn By	Date
Approved By	Project No.
Figure No.	

Drawing: TEMP.dwg Folder: C:\Users\npollard\Desktop\Nick\CAD\TEMPLATE Monday, November 23, 2020 @ 14:43 by Nicholas Pollard

Website: www.dstgroup.com

consulting engineers
a division of Englobe

1. This drawing shall be read in conjunction with the associated technical report.
2. Do not scale drawing.
3. Not all hazardous material shown.
4. Yellow indicates positive sample result.

Client	
Site	
Report Title	
Drawing Title	
Designed By	Scale
Drawn By	Date
Approved By	Project No.
Figure No.	

APPENDIX III

SITE PHOTOGRAPHS

Photo 1

Date: May 25, 2021

Description: View of poor condition asbestos-containing grey window caulking at the Exterior 2nd Floor center left window.

Photo 2

Date: May 25, 2021

Description: View of mould growth on damaged drywall on the underside of the stairwell at the Exterior doorway entrance.

Photo 3

Date: May 25, 2021

Description: View of poor condition lead-containing beige paint applied to the walls and doorway at the west side Exterior door.

Photo 4

Date: May 25, 2021

Description: Five (5) propane tanks located within the rental gate area along the Exterior of the Subject Building.

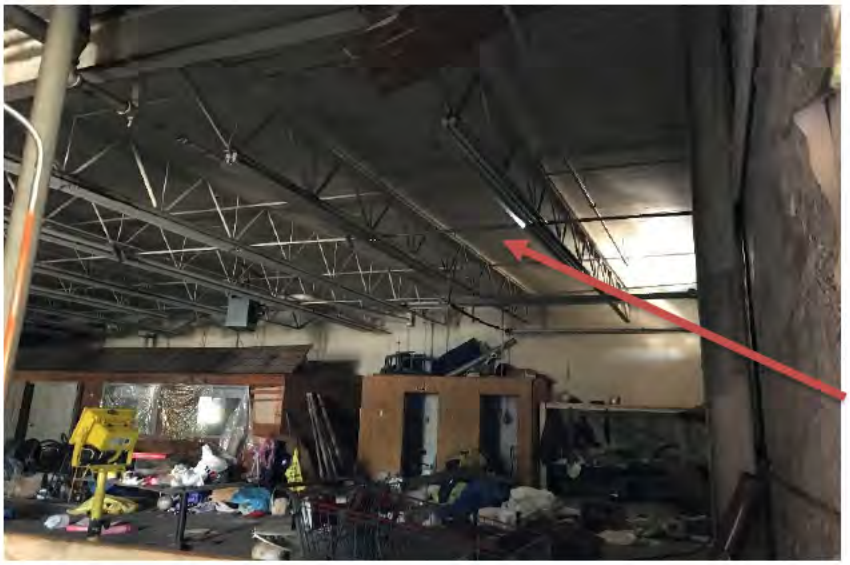

Photo 5

Date: May 25, 2021

Description: View of interior of the Subject Building.

PCBs and Elemental Mercury in the form of fluorescent light tubes and ballasts are observed from the west side Exterior door.

Photo 6

Date: May 25, 2021

Description: View of collapsed roof within interior of 2nd Floor North Center Office.

Photo 7

Date: May 25, 2021

Description: View of interior from the Northeast garage door from the Exterior.

DST Consulting Engineers Inc.
A Division of Englobe
Unit B – 4125
McConnell Drive
Burnaby, B.C
V5A 3J7

PCL Contractors Westcoast Inc.
#310-13911 Wireless Way,
Richmond, British Columbia
V6V 3B9

August 5, 2021

Attention: Mr. Rene Horn

Asbestos Bulk Sample Test Results
310 Prior Street, Vancouver, BC
DST Project #: 2105834

1.0 INTRODUCTION

DST Consulting Engineers Inc., A Division of Englobe was retained by PCL Contractors Westcoast Inc. (PCL) to collect and submit for analysis, bulk samples of suspect asbestos-containing building materials within two-storey warehouse located at 310 Prior Street, Vancouver, BC. Sample collection was performed by Michelle Chow on August 3, 2021.

The purpose of the sampling was to determine presence/absence of asbestos-containing building materials within the 1st Floor of the warehouse. Structural engineers had determined that the 2nd Floor Mezzanine was unsafe for entry. PCL's Health and Safety Officer restricted exploration past an estimated 15 feet from the west side doorway, due to the approximate location of the roof collapsing onto the 2nd Floor Mezzanine.

DST previously provided a pre-demolition hazardous material report titled, "*Pre-Demolition Hazardous Materials Assessment at 310 Prior Street, Vancouver, British Columbia"* dated June 2, 2021, DST File No. 2105834 (herein referred to the DST Report). The ceramic tile mortar on the walls and floors of the 1st and 2nd Floor Washrooms were presumed to be asbestos-containing.

The sample results were limited to the 1st Floor Washrooms due to safety issues. The 2nd Floor Washrooms have not been assessed or sampled for mortar.

2.0 SCOPE OF WORK

Sample collection was limited to suspect asbestos-containing ceramic wall and floor tiles and within 1st Floor Men's and Women's Washroom.

No other hazardous materials, including but not limited to, lead products, mercury, PCB's, halocarbons or mould were included in the sample collection.

3.0 METHODOLOGY

Asbestos bulk samples were collected as per the local regulations and/or guidelines. A minimum number of samples were collected and analyzed (depending on quantity, application and friability of the sampled materials) from each homogenous area, in order for the materials to be considered (non) asbestos. A homogenous sampling area is defined by the U.S. Environmental Protection Agency (EPA) as containing material that is uniform in texture and appearance, was installed at one time and is unlikely to consist of more than one type of formulation of material.

The surveyor used information obtained on-site by visual examination, available information on the phases of the construction and any information on renovations provided by the Client, to determine the extent of each homogenous area and the number of samples required.

The asbestos analysis was completed using a stop positive approach. Stop positive means samples in a homogenous materials sample set were analyzed consecutively and when a sample was identified as an asbestos-containing material (ACM), further sample analysis within that sample set was not completed.

An asbestos-containing material is defined as materials containing 0.5% asbestos by weight, or any amount of asbestos for vermiculite insulation.

4.0 RESULTS AND CONCLUSION

Sample Results are provided in Table 1. Asbestos-containing materials are highlighted in yellow. The full laboratory analysis report is attached within **Appendix I** of this report.

The white mortar associated with the white/blue 1”x1” ceramic wall tiles and speckled off-white/pink 1”x1” ceramic wall and floor tiles were identified as not asbestos-containing.

The yellow mortar associated with the white/blue 1”x1” ceramic floor tile was identified as not asbestos-containing.

Table 1 – Sample Results of Asbestos-Containing Materials

Sample No.	Locations and Quantity	Description	Sampling Location	Results
2105834-2A	1st Floor Women’s Washroom, 20 ft^2	Mortar associated with the speckled off-white/pink 1”x1” ceramic tile – White	Floor, Northwest Side	None Detected

2105834-2B	1st Floor Women's Washroom, 20 ft^2	Mortar associated with the speckled off-white/pink 1"x1" ceramic tile – White	West Wall, Center	None Detected
2105834-2C	1st Floor Men's Washroom, 20 ft^2	Mortar associated with the white/blue 1"x1" ceramic tile – White	West Wall, Center	None Detected
2105834-3A	1st Floor Men's Washroom, 20 ft^2	Mortar associated with the white/blue 1"x1" ceramic tile - Yellow	Floor, Northwest Side	None Detected
2105834-3B	1st Floor Men's Washroom, 20 ft^2	Mortar associated with the white/blue 1"x1" ceramic tile - Yellow	Floor, Northwest Side	None Detected
2105834-3C	1st Floor Men's Washroom, 20 ft^2	Mortar associated with the white/blue 1"x1" ceramic tile - Yellow	Floor, Northwest Side	None Detected

5.0 LIMITATIONS

The conclusions presented in this report represent the judgement of the assessor based on current environmental and health and safety standards, and on-site conditions on the date(s) cited in this report. Due to the nature of the investigation and the limited data available, the assessor cannot warrant against undiscovered environmental liabilities. The client acknowledges that subsurface and concealed conditions may vary from those encountered or inspected. The work is limited to those areas of concern identified by the Client or outlined in our proposal and/or direction on-site by the Client. Other areas of concern may exist but were not investigated within the scope of this project.

This report is intended for client use only. Any use of this document by a third party, or any reliance on or decisions made based on the findings described in this report, are the sole responsibility of such third parties, and DST Consulting Engineers Inc. accepts no

responsibility for damages, suffered by any third party as a result of decisions made or actions conducted based on this report. No other warranties are implied or expressed.

The data and conclusions which are presented in this report, and the quality thereof, are based on a scope of work authorized by the client. The sampling program included asbestos bulk sampling and paint chip sampling in select representative areas for laboratory analysis. Note, however, that no scope of work, no matter how exhaustive, can guarantee to identify all contaminants. This report therefore cannot warranty that all building conditions are represented by those identified at specific locations.

Note also that standards, guidelines and practices related to environmental investigations may change with time. Those which were applied at the time of this investigation may be obsolete or unacceptable at a later date.

The scope of work may not be sufficient to determine all of the factors that may affect construction, clean-up methods and/or costs. Contractors bidding on this project or undertaking clean-ups should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the conditions may affect their work.

Any results from an analytical laboratory or other subcontractor reported herein have been carried out by others, and DST Consulting Engineers Inc. cannot warranty their accuracy. Similarly, DST cannot warranty the accuracy of information supplied by the client.

This provided Results Letter makes no claim to satisfy the outlined provincial or federal requirements for the demolition or renovation of buildings. Hazardous materials include asbestos, lead, polychlorinated binphenyls (PCBs), mercury, ozone depleting substances and others that must be identified, quantified and adhere to the prescribed reporting requirements set out by the applicable authority. WorkSafeBC requires a survey for hazardous materials to be completed by a qualified person, as defined in OHSR 20.112 before any demolition or renovation work begins.

6.0 CLOSING

We trust this information meets your current requirements. Please contact the undersigned if you require additional information, or if you have any questions and/or concerns regarding the information presented herein.

Thank you for the opportunity to be of service to PCL.

Yours very truly,

DST Consulting Engineers Inc.

Report prepared by:

Michelle Chow
Project Manager
604-754-8622

Report reviewed by:

Ketan Minhas, *B.Sc., B. Tech (Env)*
Senior Project Manager
778-788-9679

APPENDIX I
LABORATORY REPORT

EMSL Canada Inc.

7964 Winston Street Suite 200 Burnaby, BC V5A 2H5
Phone/Fax: (604) 757-3158 / (604) 757-4731
http://www.EMSL.com / vancouverlab@EMSL.com

EMSL Canada Order 692101856
Customer ID: 55DSTV42
Customer PO:
Project ID:

Attn: Michelle Chow
DST Consulting Engineers
4125 McConnell Drive
Unit B
Vancouver, BC V5A 3J7

Proj: 310 PRIOR STREET, VANCOUVER, BC

Phone: (604) 436-4588
Fax:
Collected: 8/ 3/2021
Received: 8/03/2021
Analyzed: 8/03/2021

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: 2105834-2A **Lab Sample ID:** 692101856-0001
Sample Description: 1ST FLOOR WOMEN'S WASHROOM; FLOOR, NORTHWEST SIDE/MORTAR-WHITE

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	8/03/2021	White	0.0%	100.0%	None Detected	

Client Sample ID: 2105834-2B **Lab Sample ID:** 692101856-0002
Sample Description: 1ST FLOOR WOMEN'S WASHROOM; WEST WALL, CENTER/MORTAR-WHITE

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	8/03/2021	White	0.0%	100.0%	None Detected	

Client Sample ID: 2105834-2C **Lab Sample ID:** 692101856-0003
Sample Description: 1ST FLOOR MEN'S WASHROOM; WEST WALL, CENTER/MORTAR-WHITE

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	8/03/2021	White	0.0%	100.0%	None Detected	

Client Sample ID: 2105834-3A **Lab Sample ID:** 692101856-0004
Sample Description: 1ST FLOOR MEN'S WASHROOM; FLOOR, NORTHWEST SIDE/MORTAR-YELLOW

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	8/03/2021	Tan	10.0%	90.0%	None Detected	

Client Sample ID: 2105834-3B **Lab Sample ID:** 692101856-0005
Sample Description: 1ST FLOOR MEN'S WASHROOM; FLOOR, NORTHWEST SIDE/MORTAR-YELLOW

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	8/03/2021	Tan	10.0%	90.0%	None Detected	

Client Sample ID: 2105834-3C **Lab Sample ID:** 692101856-0006
Sample Description: 1ST FLOOR MEN'S WASHROOM; FLOOR, NORTHWEST SIDE/MORTAR-YELLOW

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	8/03/2021	Tan	10.0%	90.0%	None Detected	

EMSL Canada Inc.

7964 Winston Street Suite 200 Burnaby, BC V5A 2H5
Phone/Fax: (604) 757-3158 / (604) 757-4731
http://www.EMSL.com / vancouverlab@EMSL.com

EMSL Canada Order 692101856
Customer ID: 55DSTV42
Customer PO:
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Analyst(s):

Nicole Yeo PLM (6)

Reviewed and approved by:

Nicole Yeo, Laboratory Manager
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. Estimation of uncertainty available upon request. This report is a summary of multiple methods of analysis, fully compliant reports are available upon request. A combination of PLM and TEM analysis may be necessary to ensure consistently reliable detection of asbestos. This report must not be used to claim product endorsement by NVLAP of any agency or the U.S. Government.

Samples analyzed by EMSL Canada Inc. Burnaby, BC NVLAP Lab Code 201068-0

Initial report from: 08/04/202109:20:17

Actes Shipping Document

Generator of Waste ▼			Part A	Carrier			Part B	Receiver		Part C
ACTES ENVIRONMENTAL				Sundar Anota	License LT 1072			Receiver Number		Temp Storage
Company or Homeowner (Name) ▼			Job Number	Name				Same as Part A		
			4903	**Actes Environmental**						Yes
Address ▼	City	Province	Postal Code	Address	City	Province	Postal Code	Complete box below if		No
1-211 Schoolhouse	Coq.	BC		**7868 Venture Street**	**Burnaby**	**BC**	**V5A 1V3**	Name	Address	
Email				Vehicle License Plate ▼		Province ▼		Receiving Site Address		
Actes@info.ca				NB 0702		BC				
Project Shipping Address										
310 PRIOR ST.										
City		Province	Postal Code	Authorized Person (Print) ▼		Signature ▼		Quantity Received		
VANCOUVER		BC		Sundar Anota					kgs	
Intended Receiver	Registration #		Temp Storage	Date (yy/mm/dd) ▼		Phone Number ▼				
Name	Address	Province	Postal Code	21/08/05						
Actes Environmental 7868 Venture St. Burnaby BC V5A 1V3								Name of Authorized Person		
Receiving Address	City	Province	Postal Code					Print		
Receiving Site (Below)										
Email Address								Signature		Date
matthew@actesenvironmental.com										
								Phone Number		

Shipping Name	Class	UN #	Packing Grp	Quantity Shipped	Units/Kg	# Units	Code (Below)	Physical State		
Waste Asbestos	9	2590	III		Kg			Solid		
Waste Asbestos	9	2212	III	300	Kg	20	5	Solid		

Circle One **Drywall Waste** **or** **Mixed General Asbestos**

Generator Name of Authorized Person(Print)	Signature	Phone #	Date shipped (yy/mm/dd)	Scheduled Arrival
Sundar Anota		604 708 8463	21/08/05	21/08/05

In Case of Emergency	Contact 911- **If Asbestos has spilled, re-bag with protective gear**			Code ▶	1 Drum
					3 Bulk
Receiving Site					5 Bag
	931 Sherwood Ave	Coquitlam	BC	V3K 1A9	7 Other

January 2021

Hello Benson, Sarah and Alejandro ,

I would like to take this opportunity to introduce myself. My name is Jenny De Marchi and I am the Account Manager with GFL Environmental Inc. for your facilities. I will be happy to assist you with any questions you may have.

	Customer Service Contact & Hours *(provide site name and service details – no account # needed)*	
Contact	**Account Manager**	Jennifer Demarchi
	Office phone	604-529-4030 ex 113
	Cell phone	236-668-6836
	Email	jdemarchi@gflenv.com
Hours	**Monday to Friday**	8 am to 5 pm
	Saturday & Sunday	8 am to 4 pm
	Evenings & Weekends	Available by cell phone for urgent requests

Learn more about GFL Environmental Inc. via these links:

GFL Environmental Inc. https://vimeo.com/267481789

GFL Liquid Waste https://vimeo.com/292224930

GFL Safety https://vimeo.com/337385035

Please find enclosed your current schedule for your services. Thank you for choosing GFL Environmental Inc., we look forward to working with you.

Regards,

Jennifer Demarchi | Account Manager

C 236 668-6836 | jdemarchi@gflenv.com | www.gflenv.com

Waste – 7 X Week

Customer: 4150-PROVIDENCE HEALTH CARE
Site: 6-ST PAUL'S HOSPITAL (SPH)
Service: 9

GFL10 - WG COQUITLAM (HIT) 2021

Service Type: ROLLOFF WASTE PERM
Size: 37.00 YD

JANUARY 2021

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FEBRUARY 2021

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MARCH 2021

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APRIL 2021

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JULY 2021

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SEPTEMBER 2021

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OCTOBER 2021

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NOVEMBER 2021

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DECEMBER 2021

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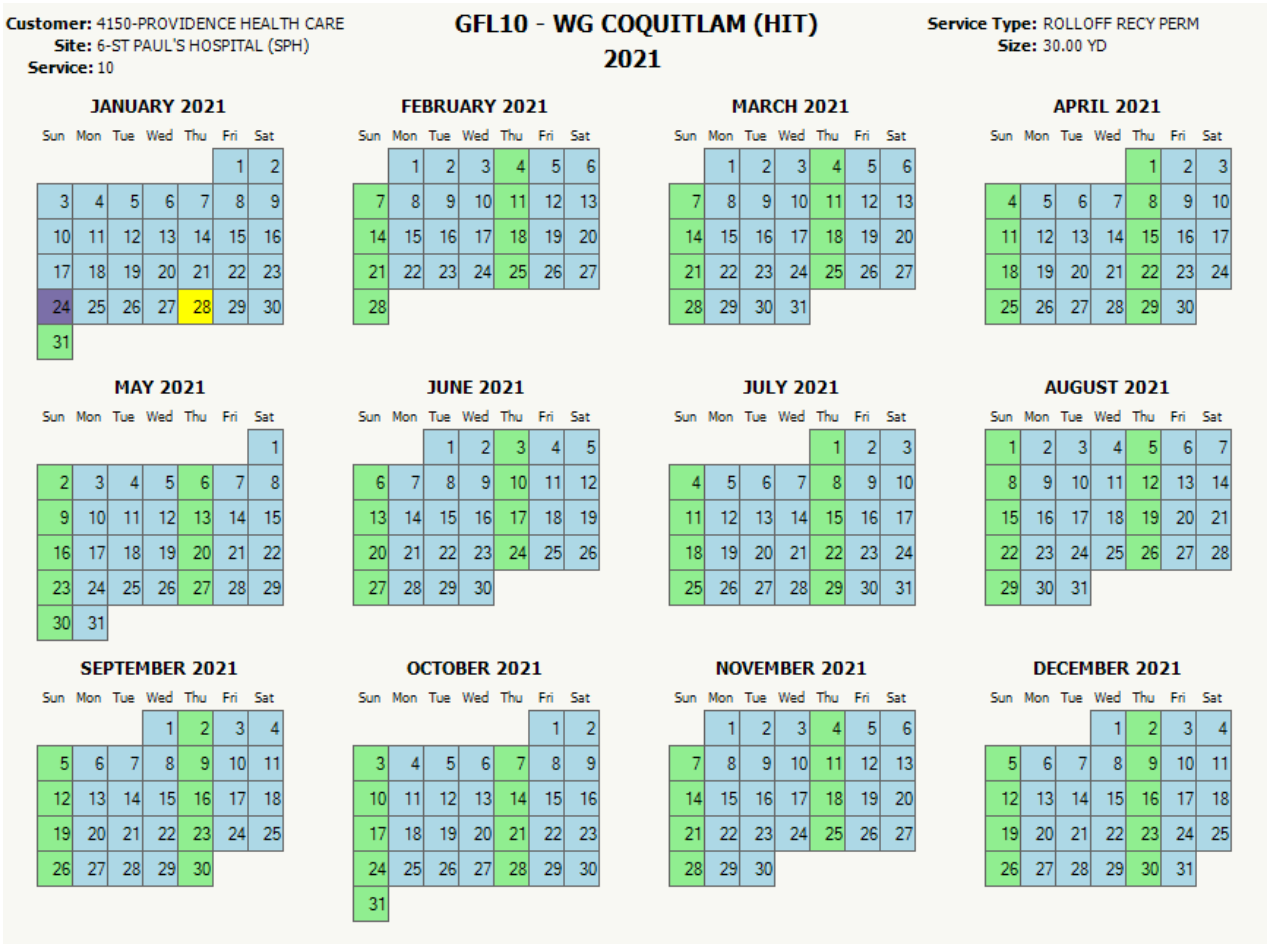
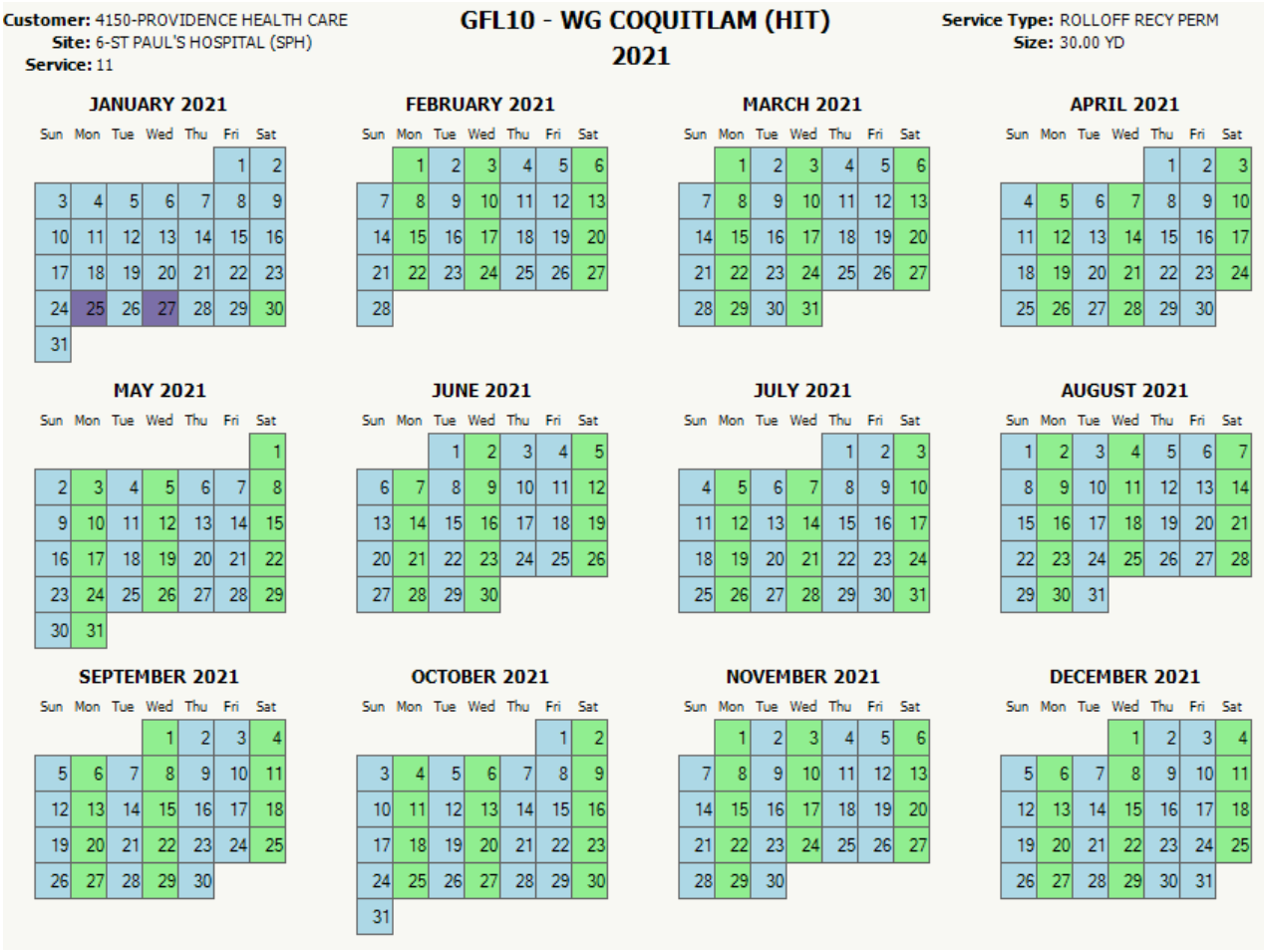
Cardboard – 2 X Week



Mixed Recycling – 3 X Week



Organics – 3 X Week

Customer: 4150-PROVIDENCE HEALTH CARE
Site: 6-ST PAUL'S HOSPITAL (SPH)
Service: 5

GFL10 - WG COQUITLAM (HIT) 2021

Service Type: COMM SIDELOAD ORGANIC
Size: 32.00 GA

JANUARY 2021

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FEBRUARY 2021

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MARCH 2021

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APRIL 2021

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JUNE 2021

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JULY 2021

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AUGUST 2021

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SEPTEMBER 2021

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OCTOBER 2021

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NOVEMBER 2021

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DECEMBER 2021

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Electronics – Every 8th Week

Customer: 4150-PROVIDENCE HEALTH CARE
Site: 6-ST PAUL'S HOSPITAL (SPH)
Service: 8

GFL10 - WG COQUITLAM (HIT) 2021

Service Type: CUBEVAN RECYCLING
Size: 1.50 YD

JANUARY 2021

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MARCH 2021

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AUGUST 2021

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SEPTEMBER 2021

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OCTOBER 2021

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NOVEMBER 2021

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DECEMBER 2021

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BRITISH COLUMBIA

VIA EMAIL

File: 26250-20/22656
SITE ID: 22656

April 3, 2020

Marc Dagneau
Providence Health Care
1500-1185 West Georgia Street
Vancouver, BC V6E 4E6
mdagneau1@providencehealth.bc.ca

Re: Water Use Determination
1002 Station Street, 250 and 310 Prior Street, Vancouver, BC

The Ministry of Environment and Climate Change Strategy (ENV) has reviewed the following reports prepared by PGL Environmental Consultants (PGL) in support of your Contaminated Sites Services application dated December 4, 2019 for a Director's decision of no drinking water use on 1002 Station Street, 250 and 310 Prior Street, Vancouver, BC (the Site):

- *Application for a Director's Water Use Determination – 1002 Station Street, 250 and 310 Prior Street, Vancouver, ENV Site ID: 1100, 6478, 6477* dated December 5, 2019; and
- Email correspondence: *Water use determination for 1002 Station Street (ENV Site IDs 1100, 6478 and 6477)*, dated January 31, 2020.

The legal description of the Site to which this water use decision applies is as follows:

Civic Address	1002 Station Street, Vancouver, BC	250 Prior Street, Vancouver, BC	310 Prior Street, Vancouver, BC
PID	018-550-185	008-776-300; 008-776-326; 010-813-217	008-126-780; 008-126-798
Legal Description	Lot A Plan LMP14138 District Lot 196 NWD & DL 2037	Lots C and D, Plan VAP12884, District Lot 196 NWD Blocks 15 to 18 & DL 2037	Lots E and F Plan 13449 District Lot 196 NWD & DL 2037
Parcel Owner	Providence Health Care	Providence Health Care	Providence Health Care

The Site is depicted in attached Figure 1 for reference.

Section 12(5) of the Contaminated Sites Regulation (CSR) specifies the water uses that may apply at sites in BC, including aquatic life, drinking, irrigation and livestock watering water uses, as well as the factors a Director must consider in determining current and reasonable potential future water uses at a site. Protocol 21 provides criteria for determining current and reasonable potential future water uses at specific sites.

Where drinking water use has been determined to apply at a site under Protocol 21 and site circumstances indicate that it is unlikely or unreasonable to anticipate that water would be used for drinking, a site-specific water use decision may be sought from the Director. Protocol 21, Appendix 1 "*Director's Decision Framework for Site-Specific Decisions of Water Use*" outlines a multiple-lines-of-evidence approach for seeking a Director's decision of no drinking water use at a specific site.

The letter request provided by PGL provides the following rationale to support their assertion that drinking water use should not apply to the Site:

- *The Site and surrounding area have a long history of industrial activities, multiple sources of contamination, and area-wide historical fill placement;*
- *No wells are located within a 500 m radius of the Site and no future groundwater use is planned;*
- *90% of the Site is filled marine foreshore;*
- *The direction of groundwater flow is towards the area of filled marine foreshore;*
- *Water for the Site and greater Vancouver area is supplied by Metro Vancouver. This is not expected to change over the long term;*
- *There is no registered aquifer below the Site;*
- *The area is not located in an area of known limited water resources;*
- *Former upland soil aquifers with hydraulic conductivities greater than 10^{-6} m/s are either composed of fill or have an average saturated thickness of 2 m or less;*
- *Deeper soil and bedrock aquifers underlying the Site have hydraulic conductivities and/or yields too low to supply water for a domestic well; and*
- *Most BC ENV sites in the area have not applied DW standards based on similar lines of evidence.*

Based on the arguments and supporting information provided by PGL, I concur with the conclusion that potential future use of groundwater for drinking water is unlikely on the Site for the following reasons:

- There is no current use of groundwater for drinking water use within a 500 m radius of the Site;
- 90 percent of the Site is filled marine foreshore, which is considered to have unsuitable water quality for domestic water supply;
- There are no viable aquifers below the site capable of supporting domestic water supply;

- The Site is not located in an area with known limited water resources;
- A municipal water supply is in place that does not rely on groundwater; and
- Determinations that drinking water use is not applicable have been granted by ENV for properties in the vicinity of the Site (False Creek area) based on similar characteristics.

Therefore, I hereby determine that drinking water use does not apply at the Site. I also confirm that aquatic life water use does apply.

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.

Please contact Janet Barrett at (236) 468-2228 if you require clarification regarding this letter.

Sincerely,

Annette Mortensen
For Director, *Environmental Management Act*

Attachment: Figure 1

cc: Janet Barrett, Ministry of Environment and Climate Change Strategy, Janet.Barrett@gov.bc.ca
Lucy Hewlett, Ministry of Environment and Climate Change Strategy, csp_cio@Victoria1.gov.bc.ca
Nicole Montgomery, City of Vancouver, nicole.montgomery@vancouver.ca
Zayed Mohamed, PGL Environmental Consultants, zmohamed@pggroup.com
Duncan Macdonald, PGL Environmental Consultants, dmacdonald@pggroup.com
Catherine Schachtel, CSAP, cschachtel@csapsociety.bc.ca
Clayton Wong, Providence Health Care, cwong56@providencehealth.bc.ca

Figure 1. Site Location Map (from PGL, 2019)

BRITISH COLUMBIA

REGISTERED MAIL AND EMAIL

Files: 26250-20/22656, 1100, 6477, 6478
Site IDs: 22656, 1100, 6477, 6478

July 20, 2020

PROVIDENCE HEALTH CARE SOCIETY
5th Floor, 1190 Hornby Street
Vancouver, BC V6Z 2KS

Attn: Clayton Wong

Dear Clayton Wong:

Re: Approval in Principle – 1002 Station Street, 250 Prior Street, and 310 Prior Street, Vancouver, British Columbia

Please find enclosed an Approval in Principle respecting the contaminated site referenced above and which supersedes those issued July 26, 1999 (1002 Station St; SITE 1100), April 28, 2000 (310 Prior St; SITE 6477) and June 12, 2000 (250 Prior St; SITE 6478).

In addition to the conditions set out in Schedule B of the enclosed Approval in Principle, please be advised of the following:

1. Information about the site will be included in the Site Registry established under the *Environmental Management Act.*

2. The provisions of this Approval in Principle are without prejudice to the right of the Director to make orders or impose requirements as the Director may deem necessary in accordance with applicable laws. Nothing in this Approval in Principle will restrict or impair the Director's powers in this regard.

3. A qualified environmental consultant must be available to identify, characterize and appropriately manage:
   (a) any environmental media that may be contaminated, or
   (b) soil which may exceed the standards triggering a Contaminated Soil Relocation Agreement set out in Part 8 of the Contaminated Sites Regulation

   and may be encountered during any future subsurface work at the site.

Ministry of Environment and Climate Change Strategy
Land Remediation Section
Environmental Emergencies and Land Remediation Branch
Environmental Protection Division
Mailing Address:
PO Box 9342 Stn Prov Govt
Victoria BC V8W 9M1
Telephone: 250 387-4441
Website: www.gov.bc.ca/env

4. This Approval in Principle does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the persons undertaking remediation. It is also the responsibility of those persons to ensure that all activities conducted under this Approval in Principle are carried out with due regard to the rights of third parties, and comply with other applicable legislation that may be in force.

5. Additional permits and approvals may be required before remediation begins.

6. All site materials (e.g., excavated soil, replaced soil, groundwater from dewatering, pumping, well development etc.) must be characterized and managed in accordance with applicable legislation and ministry guidance.

7. Groundwater wells that are no longer required must be properly decommissioned in accordance with the *Water Sustainability Act's* Groundwater Protection Regulation.

8. Please be advised that there are inherent health and safety risks associated with remediation activities at contaminated sites. Development of site-specific work procedures in accordance with WorkSafeBC regulations is warranted. Please direct related questions to the WorkSafeBC office at 604-276-3100 (Lower Mainland only) or 1-888-621-7233 (toll free in B.C.).

9. Any substantial modifications to the approved remediation plan, including substantial changes to the remediation schedule, conditions or circumstances described in the risk assessment upon which the remediation plan is based, or changes in land use, must be promptly identified by written submission to the Director.

10. If an application for a Certificate of Compliance is to be submitted for the site, the confirmation of remediation report accompanying the application must demonstrate compliance with the remediation standards and criteria in force at the time the application for the Certificate is made, which may differ from the remediation standards and criteria in force at the time of issuance of this Approval in Principle.

Issuance of this Approval in Principle is a decision that may be appealed under Part 8 of the *Environmental Management Act*.

If you require clarification of any aspect of this Approval in Principle, please contact csp_cio@Victoria1.gov.bc.ca .

Yours truly,

Alan W. McCammon
for Director, *Environmental Management Act*

Enclosure

cc: Christiaan Iacoe, P.Ag. City of Vancouver
453 West 12th Avenue, Vancouver, BC V5Y 1W4
Christiaan.Iacoe@vancouver.ca

Duncan Macdonald, Approved Professional, PGL Environmental Consultants
dmacdonald@pggroup.com

Client Information Officer, ENV, Victoria csp_cio@Victoria1.gov.bc.ca

CSAP Society, apopova@csapsociety.bc.ca

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

APPROVAL IN PRINCIPLE

(Pursuant to Section 53 of the *Environmental Management Act*)

THIS IS TO CERTIFY that the remediation plan described herein submitted by PROVIDENCE HEALTH CARE SOCIETY for the contaminated site identified in Schedule A of this document has been approved.

The remediation plan must be implemented in accordance with the requirements and conditions specified in Schedule B.

The substances for which remediation will be conducted and for which this Approval in Principle is valid are specified in Schedule C.

I have issued this Approval in Principle based on a review of the documents listed in Schedule D. I, however, make no representation or warranty as to the accuracy or completeness of that information.

A Director may rescind this Approval in Principle if conditions imposed in the Approval in Principle are not complied with or any fees payable under Part 4 of the Act or regulations are outstanding.

This Approval in Principle should not be construed as an assurance that there are no hazards present at the site.

2020-07-20
Date Issued

Alan W. McCammon
For Director, *Environmental Management Act*

Schedule A

The site covered by this Approval in Principle is located at 1002 Station Street, 250 Prior Street, and 310 Prior Street, Vancouver, British Columbia which is more particularly known and described as:

LOT A DISTRICT LOTS 196 AND 2037 PLAN LMP14138
PID: 018-550-185.
1002 Station Street, Vancouver, British Columbia.

LOT C BLOCKS 15 TO 18 DISTRICT LOTS 196 AND 2037 PLAN 12884
LOT D BLOCKS 15 TO 18 DISTRICT LOTS 196 AND 2037 PLAN 12884
LOT 19 DISTRICT LOTS 181, 196 AND 2037 PLAN 6780
PID: 008-776-300, 008-776-326, and 010-813-217.
250 Prior Street, Vancouver, British Columbia.

LOT E DISTRICT LOTS 196 AND 2037 PLAN 13449
LOT F DISTRICT LOTS 196 AND 2037 PLAN 13449
PID: 008-126-780 and 008-126-798
310 Prior Street, Vancouver, British Columbia

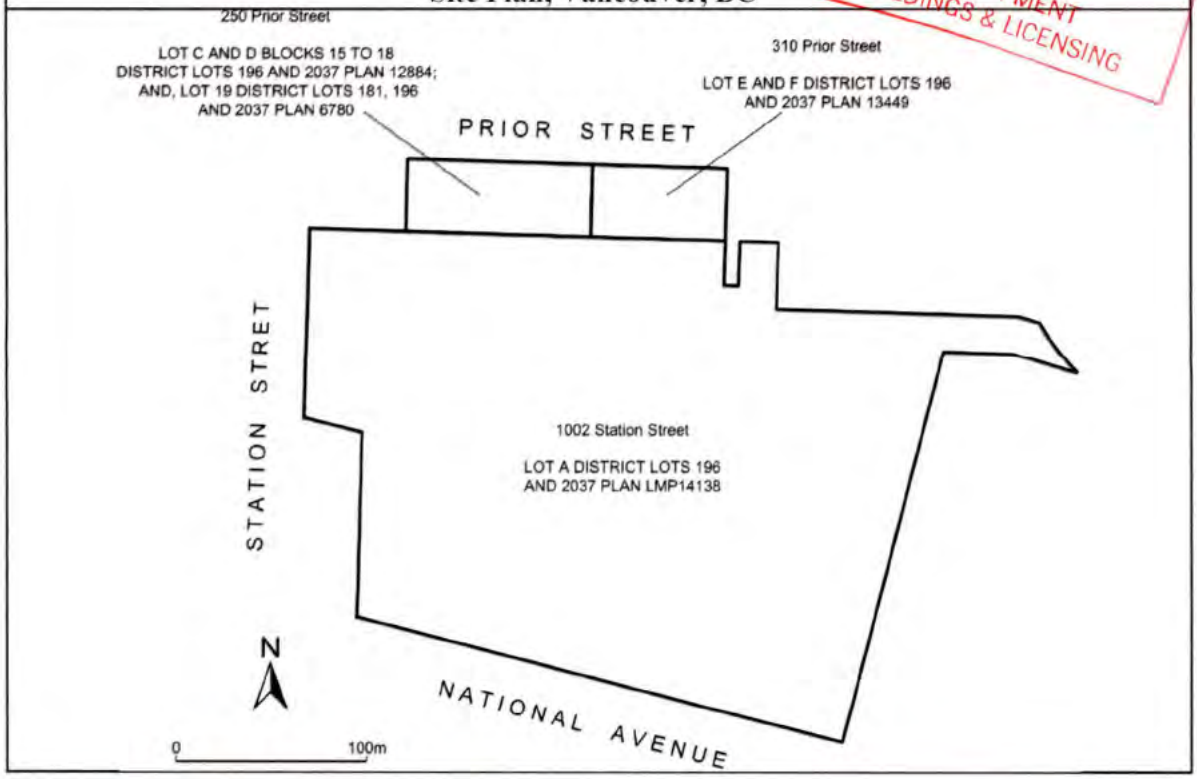
The approximate centre of the site using the NAD (North American Datum) 1983 convention is:

Latitude:	49°	16'	31.30"
Longitude:	123°	5'	47.60"

2020-07-20
Date Issued

Alan W. McCammon
For Director, *Environmental Management Act*

Site Plan, Vancouver, BC



Location Map, Vancouver, BC

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Schedule B

Requirements and Conditions

1. Remediation, including monitoring, inspections and maintenance of any works, must be undertaken by the responsible persons in the manner and schedule specified in the plan listed in Schedule D or as specified in a modification of the plan approved by the Director.

2. Any substantial modifications to the approved remediation plan, including substantial changes to the remediation schedule, conditions or circumstances described in the risk assessment upon which the remediation plan is based, or changes in land, vapour, water, or sediment use, must be promptly identified in a written submission by the responsible persons to the Director. An application for an amendment or new Approval in Principle may be necessary.

3. Up-to-date records of monitoring, inspections and maintenance of any works must be maintained by the responsible persons or their agent. The records must be available for inspection by the Director.

4. Remediation must be completed within five years of the date of issuance of this Approval in Principle.

5. Remediation must be confirmed in accordance with applicable legislation and ministry guidance. Within 90 days of completing remediation, a report summarizing confirmation of remediation must be prepared in accordance with section 49 (2) of the Contaminated Sites Regulation and submitted to the Director.

6. A statement signed by an Approved Professional must be submitted to the Director annually within 90 days of the anniversary of the date of issuance of this Approval in Principle. The statement must include the following:
   (a) A summary of remedial activities undertaken during the reporting period; and
   (b) An assessment comparing remediation progress to the actions and schedule set out in the plans referenced above. Refer to Condition 2 above if remedial progress differs substantially from the schedule set out in the approved plan.

   If requested by the Director, a report signed by an Approved Professional must be submitted for review to the Director and must include the following:
   (a) A summary of remedial activities undertaken to date;

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(b) An assessment comparing remediation progress to the actions and schedule set out in the plans referenced above. Refer to Condition 2 above if remedial progress differs substantially from the schedule set out in the approved plan; and,

(c) Supporting documentation (e.g., analytical reports, records of inspection, maintenance of treatment works, etc.).

7. The documents listed in Schedule D indicate that vapour attenuation factors were applied to meet Contaminated Sites Regulation numerical standards at and adjacent to the site. These vapour attenuation factors were selected based on assumptions about the structures, locations and depths of buildings existing or expected at and adjacent to the site. These assumptions include the following:

(a) Industrial land use standards and outdoor vapour attenuation factors apply to the site in its current configuration, except below the vacant onsite building at 310 Prior Street where sub-slab vapour attenuation factors apply. Soil vapour standards are not exceeded in the current configuration;

(b) Vapour concentrations at some areas onsite could exceed parkade standards and/or high-density residential land use standards when sub-slab vapour attenuation factors are applied. The remediation plan listed in Schedule D will be implemented before new buildings are constructed.

Any inconsistencies that arise between the structures, locations and depths of proposed or constructed buildings at or adjacent to the site and the range of structures, locations and depths of buildings assumed in the selection of vapour attenuation factors in the documents listed in Schedule D must be promptly identified by the responsible persons in a written submission to the Director. An application for an amendment or new Approval in Principle may be necessary.

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Schedule C

Substances and Uses

Substances to be remediated in soil for high density residential land soil use:

To meet numerical remediation standards:

anthracene	120-12-7	indeno(1,2,3-cd)pyrene	193-39-5
benz(a)anthracene	56-55-3	LEPHs	N/A
benzo(a)pyrene	50-32-8	naphthalene	91-20-3
benzo(b+j)fluoranthenes	205-99-2 & 205-82-3	phenanthrene	85-01-8

To meet risk-based remediation standards:

antimony	7440-36-0	iron	7439-89-6
arsenic	7440-38-2	lead	7439-9-1
cadmium	7440-43-9	nickel	7440-02-0
chromium	7440 47 3	selenium	7782-49-2
cobalt	7440-48-4	tin	7440-31-5
copper	7440-50-8	zinc	7440-66-6
HEPHs	N/A		

Substances to be remediated in water for marine aquatic life water use:

To meet numerical remediation standards:

pyrene	129-00-0

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For Director, *Environmental Management Act*

Schedule D

Documents

- *Summary of Site Condition*, prepared by PGL Environmental Consultants, dated April 3, 2020;
- *Water Use Determination,* prepared by Ministry of Environment and Climate Change Strategy, dated April 3, 2020;
- *Stage2 Preliminary and Detailed Site Investigation, Screening Level Risk Assessment, and Remediation Plan,* prepared by PGL Environmental Consultants, dated February 2020;
- *Application for a Directors Water Use Determination – 1002 Station Street, and 250 and 310 Prior Street, Vancouver, BC,* prepared by PGL Environmental Consultants, dated December 5, 2019;
- *Stage 1 Preliminary Site Investigation,* prepared by PGL Environmental Consultants, dated, March 2019;
- *Results of Groundwater Monitoring at the Former Freighthouse Lands Site, Vancouver, British Columbia – 2014 Monitoring Program,* prepared by Golder Associates Ltd., dated March 6, 2015;
- *Results of Groundwater Monitoring at the Former Freighthouse Lands/Tech-Park Development Site, Vancouver, British Columbia – 2009 Monitoring Program* prepared by Golder Associates Ltd., dated October 2009;
- *Groundwater Monitoring, Tech-Park Development, Vancouver, BC,* prepared by Golder Associates Ltd., dated June 8, 2008;
- *Annual Groundwater Monitoring, Former Tech-Park Development Site, Vancouver, BC,* prepared by Golder Associates Ltd., dated August 10, 2004;
- *Annual Groundwater Monitoring, Tech-Park Development, Vancouver, BC,* prepared by Golder Associates Ltd., dated August 28, 2003;
- *Annual Groundwater Monitoring, Tech-Park Development, Vancouver, BC,* prepared by Golder Associates Ltd., dated June 13, 2002;
- *Stage 1 Preliminary Site Investigation, The H.Y Louie Site, 250 Prior Street, Vancouver, BC,* prepared by Golder Associates Ltd., dated February 2000;
- *Detailed Environmental Site Investigation, 250 Prior Street, Vancouver, BC,* prepared by Golder Associates Ltd., dated February 2000;
- *Remediation Plan, 250 Prior Street, Vancouver, BC,* prepared by Golder Associates Ltd., dated February 2000;

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- *Stage 2 Preliminary Site Investigation, 310 Prior Street, Vancouver, BC,* prepared by Golder Associates Ltd., dated February 2000;
- *Remediation Plan, 310 Prior Street, Vancouver, BC,* prepared by Golder Associates Ltd., dated February 2000;
- *Remediation Plan Freighthouse Lands, Vancouver, B.C., Addendum No. 2,* prepared by Golder Associates Ltd., dated February 2000;
- *Approvals in Principle (1002 Station Street, 310 Prior Street, 250 Prior Street* prepared by Ministry of Environment, Lands and Parks, dated July 26, 1999, April 28, 2000 and June 12, 2000, respectively);
- *Groundwater Monitoring, Freighthouse Lands and H.Y Louie Site, Vancouver, B.C,* prepared by Golder Associates Ltd., dated January 12, 1999;
- *Meeting Agenda, Risk Assessment of Freighthouse and Sequence 1706 Lands,* prepared by Golder Associates Ltd., dated June 21, 1996;
- *Remediation Plan and Soil and Water Management Procedures for the Former BNR Station Street Site, Vancouver, B.C.,* prepared by Golder Associates Ltd., dated May 1994;
- *Summary Report: Former BNR Yard Site Assessments,* prepared by Glacier Park Company, dated March 1992;
- *Phase II Environmental Assessment, BN Railyard, Vancouver, BC,* prepared by MTR Consultant Ltd., dated April 1990;
- *Preliminary Environmental Assessment, B.N.R. Railyard, Vancouver, BC,* prepared by MTR Consultant Ltd., dated June 1989; and
- *Burlington Northern Rail, Station Street Railyard, Phase III – Environmental Assessment,* prepared by MTR Consultant Ltd., dated January 1982.

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For Director, *Environmental Management Act*

BRITISH COLUMBIA | Ministry of Environment

Summary of Site Condition

Date Completed: ____2020-04-03____
YYYY-DD-MM

Site ID: 22656

Version 2.3

Purpose of this Summary of Site Condition

This Summary of Site Condition will serve several purposes. It will provide the Ministry of Environment and Climate Change Strategy (the ministry) with a summary of key information that will be used to understand the status of investigations and remediation, the nature and extent of remediation that is proposed or has been undertaken, further work that will be required, or closure documentation requested that is authorized by legislation and regulations in B.C. The Summary of Site Condition will also provide information to persons with an interest in investigations and management of contaminants on or adjacent to a property or properties that are considered a site.

The information contained in this Summary of Site Condition is provided by or on behalf of the ministry to assist individuals to become familiar with conditions and issues at a site for which contaminant investigations and / or remediation has been carried out and reviewed under the guidance of the British Columbia Contaminated Sites Regulation (CSR), the Hazardous Waste Regulation (HWR), and the *Environmental Management Act (*EMA*).*

It is emphasized that this is a summary only and should in no cases, be the sole basis for important decisions about the site. Those with an interest in contaminant issues and the status of the site should seek more complete technical information as contained in site investigation, risk assessment, remediation plan and confirmation of remediation reports prepared by and signed by appropriately qualified individuals. Firms and individuals that rely on the information contained herein do so entirely at their own risk.

Notes and Instructions

A Summary of Site Condition is to be completed by the Approved Professional(s) making submission to the ministry with application for a regulatory instrument (e.g. Determination, Approval in Principle, Contaminated Soil Relocation Agreement or Certificate of Compliance).

This Summary of Site Condition will provide ministry regulatory officials with much of the information on which they will evaluate the recommendation of an Approved Professional(s).

A separate Summary of Site Condition is required for each service request submitted for a site.

All applicable parts of this Summary of Site Condition and required attachments (e.g., site plan; site plan showing areas of potential environmental concern, and / or areas of environmental concern) must be completed and submitted or it will be returned and processing of any application(s) will be delayed.

If the Summary of Site Condition is to accompany a recommendation by an Approved Professional that a service be provided as described in section 7.1 of the Contaminated Sites Regulation, the following must also be submitted with the package:

☒ a completed Contaminated Sites Service Application form
☒ a contaminated sites legal instrument cover letter (hard copy and electronic version)
☒ a completed draft contaminated sites legal instrument
☒ the applicable fees
☒ a signed Summary of Site Condition (hard copy and electronic version with PDF format preferred)

Failure to accurately fill out the Summary of Site Condition may result in delays issuing the legal instrument.

Part 1: Cover Page

(To be completed by the Approved Professional)

Current Site Owner: (*Attach additional sheets with names and contact information for additional site owners as required*)	**Mailing Address:** Company Name: Providence Health Care Society Address: 5th floor, 1190 Hornby Street City: Vancouver Postal Code: V6Z 2KS Contact Name: Clayton Wong Phone: 604-319-1466 Fax: E-mail: cwong56@providencehealth.bc.ca
Applicant *(If instrument is being applied for)* ☒ Same as above, or:	**Mailing Address:** Company Name: Address: City: Postal Code: Contact Name: Phone: Fax: E-mail:
Agent ☐ Same as applicant above, or:	**Mailing Address:** Company Name: PGL Environmental Consultants Address: 1500-1185 West Georgia City: Vancouver Postal Code: V6E 4E6 Contact Name: Zayed Mohamed Phone: 604-895-7640 Fax: E-mail: zmohamed@pggroup.com
Approved Professional(s) (*If making a recommendation under the CSR or another submission*)	**Mailing Address:** Company Name: PGL Environmental Consultants Address: 1500-1185 West Georgia City: Vancouver Postal Code: V6E 4E6 Contact Name: Duncan Macdonald Phone: 604-895-7639 Fax: E-mail: dmacdonald@pggroup.com Scope of review completed by Approved Professional: AIP to numerical and risk based (SLRA) standards. Company Name: Address: City: Postal Code: Approved Professional Name: Phone: Fax: E-mail: Scope of review completed by Approved Professional:

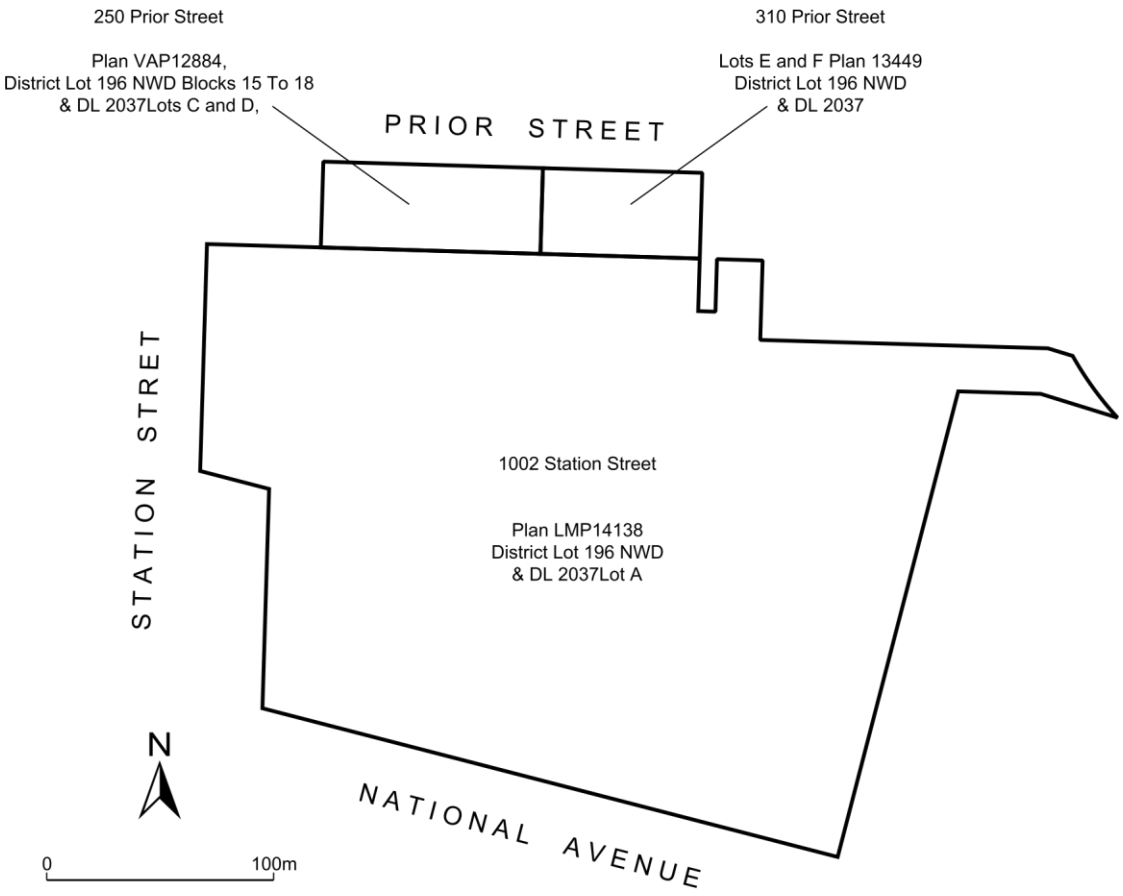
Reason for Completing this Summary ☒ Recommendation is being made, or: ☐ This is a submission without a recommendation under the CSR:	**Role of Approved Professional:** Reviews: ☒ Stage 1 preliminary site investigation report (Stage 1 PSI) ☒ Stage 2 preliminary site investigation report (Stage 2 PSI) ☒ Detailed site investigation report (DSI) ☐ Background substance concentrations report ☐ Remediation plan without risk assessment report ☒ Remediation plan with risk assessment report ☐ Confirmation of remediation report (CoR) ☐ Quantitative human health or ecological risk assessment report ☐ Screening level risk assessment report ☐ Other *(please specify)* Recommendation(s) (*With Regulatory Instrument)*: ☐ Determination *(Determination)* ☐ Approval in Principle, numerical standards *AiP numerical standards)* ☒ Approval in Principle, risk-based standards *(AiP risk-based standards)* ☐ Contaminated Soil Relocation Agreement *(CSRA)* ☐ Certificate of Compliance, numerical standards *(CoC numerical standards)* ☐ Certificate of Compliance, risk-based standards *(CoC risk-based standards)* ☐ Other *(please specify)* Section 4 of the Summary of Site Condition does not need to be completed with the request for Certificate of Compliance where an Approval in Principle exists for the site provided that no new information has been obtained for the site applicable to this section of the form.

Part 2: Executive Summary

(To be completed by the Approved Professional(s) reviewing site investigation, risk assessment, remediation or confirmation of remediation reports)

Site Location:

(*The site and location plans are to be provided as Schedule A of the draft instrument.)*



Subject Site: The Site is ENV Site 22656 this new Site has been amalgamated from previous ENV files: 1100, 6477, and 6478.	
Civic Address(s):	1002 Station Street, 250 Prior Street, and 310 Prior Street, Vancouver, BC
Site Common Name: *(if applicable)*	Future St. Paul's Hospital Complex
Legal description(s) *or* metes and bounds: *(add additional pages if needed)*	1002 Station Street: Lot A Plan LMP14138 District Lot 196 NWD & DL 2037. 250 Prior Street: Lots C and D, Plan VAP12884, District Lot 196 NWD Blocks 15 To 18, & DL 2037. 310 Prior Street: Lots E and F Plan 13449 District Lot 196 NWD & DL 2037.
PID(s): *(or PIN(s) if untitled Crown land)*	1002 Station Street: 018-550-185 250 Prior Street: 008-776-300; 008-776-326; and 010-813-217 310 Prior Street: 008-126-780; and 008-126-798
Centre of site: *(using NAD 83 convention)* *(accurate to ± 0.5 second)*	Latitude: 49 degrees 15 min 31.3 secs Longitude: 123 degrees 5 min 47.6 secs
Offsite impacted Properties *or* Receiving Site:	☐ Offsite impacted property(s) – provide information for each ☐ Receiving site for Contaminated Soil Relocation Agreement ☒ Not Applicable
Civic Address(s):	
Site Common Name: *(if applicable)*	
Legal description(s) *or* metes and bounds (if a portion of a site): *(add additional pages if needed)*	
PID(s): (*or PIN(s) if untitled Crown land)*	
BC Site ID *(if applicable)*:	
Approximate Centre of site: *(accurate to ± 0.5 second)*	Latitude: _ degrees _ min _ secs Longitude: _ degrees _ min _ secs

Part 3: Document Summary

(List of all known site investigation, risk assessment (including screening level risk assessment), remediation plan and confirmation of remediation reports completed and directly supporting correspondence submitted (subject site and offsite impacted sites).

#	Document Title	Author / Company	Document Date
1	*Water Use Determination*	Ministry of Environment and Climate Change Strategy	April 3, 2020
2	*Stage2 Preliminary and Detailed Site Investigation, Screening Level Risk Assessment, and Remediation Plan*	PGL Environmental	February 2020
3	*Water Use Determination*	PGL Environmental	December 5, 2019
4	*Stage 1 Preliminary Site Investigation*	PGL Environmental	March 2019
5	*Results of Groundwater Monitoring at the Former Freighthouse Lands Site, Vancouver, British Columbia – 2014 Monitoring Program.*	Golder Associates Ltd.	March 6, 2015
6	*Results of Groundwater Monitoring at the Former Freighthouse Lands/Tech-Park Development Site, Vancouver, British Columbia – 2009 Monitoring Program.*	Golder Associates Ltd.	October 2009
7	*Groundwater Monitoring, Tech-Park Development, Vancouver, BC.*	Golder Associates Ltd.	June 8, 2008
8	*Annual Groundwater Monitoring, Former Tech-Park Development Site, Vancouver, BC.*	Golder Associates Ltd.	August 10, 2004
9	*Annual Groundwater Monitoring, Tech-Park Development, Vancouver, BC.*	Golder Associates Ltd.	August 28, 2003
10	*Annual Groundwater Monitoring, Tech-Park Development, Vancouver, BC.*	Golder Associates Ltd.	June 13, 2002
11	*Stage 1 Preliminary Site Investigation, The H.Y Louie Site, 250 Prior Street, Vancouver, BC.*	Golder Associates Ltd.	February 2000
12	*Detailed Environmental Site Investigation, 250 Prior Street, Vancouver, BC.*	Golder Associates Ltd.	February 2000
13	*Remediation Plan, 250 Prior Street, Vancouver, BC.*	Golder Associates Ltd.	February 2000
14	*Stage 2 Preliminary Site Investigation, 310 Prior Street, Vancouver, BC.*	Golder Associates Ltd.	February 2000
15	*Remediation Plan, 310 Prior Street, Vancouver, BC.*	Golder Associates Ltd.	February 2000
16	*Remediation Plan Freighthouse Lands, Vancouver, B.C., Addendum*	Golder Associates Ltd.	July 1999

	No. 2.		
17	*Approval in Principal (1002 Station Street.*	Ministry of Environment, Lands and Parks	July 1999
18	*Groundwater Monitoring, Freighthouse Lands and H.Y Louie Site, Vancouver, B.C.*	Golder Associates Ltd.	January 12, 1999
19	*Meeting Agenda, Risk Assessment of Freighthouse and Sequence 1706 Lands.*	Golder Associates Ltd.	June 21, 1996
20	*Remediation Plan and Soil and Water Management Procedures for the Former BNR Station Street Site, Vancouver, B.C.*	Golder Associates Ltd.	May 1994
21	*Summary Report: Former BNR Yard Site Assessments.*	Glacier Park Company	March 1992
22	*Phase II Environmental Assessment, BN Railyard, Vancouver, BC.*	MTR Consultant Ltd.	April 1990
23	*Preliminary Environmental Assessment, B.N.R. Railyard, Vancouver, BC.*	MTR Consultant Ltd.	June 1989
24	*Burlington Northern Rail, Station Street Railyard, Phase III – Environmental Assessment.*	Piteau Associates	January 1982

Part 4: Investigation Summary

Investigations Completed

		Yes	No	n/a
Stage 1 PSI	Completed?	☒	☐	☐
	Includes Stage 1 PSI information as listed in CSR S.58 and any current applicable ministry protocols, guidelines, checklists, etc.?	☒	☐	☐
Stage 2 PSI	Completed?	☒	☐	☐
	Includes Stage 2 PSI information as listed in CSR S.58 and any current applicable ministry protocols, guidelines, checklists, etc.?	☒	☐	☐
DSI	Completed?	☒	☐	☐
	Includes DSI information as listed in CSR S.59 and any current applicable ministry protocols, guidelines, checklists, etc.?	☒	☐	☐
Other Reports	Completed? *(Specify in Notes below)*	☐	☐	☒
	According to other guidelines? *(Provide explanation in notes below. Indicate how reports assist understanding of conditions and remediation.)*	☐	☐	☒
Notes: N/A				

n/a – not applicable
If completed investigation reports are not adequate or if reports are titled differently or have a different scope than those listed above in accordance with the Contaminated Sites Regulation (i.e., PSI, DSI), complete Section 4.8 (Investigation or Interpretation Issues).

4.2 Site Conditions

Topography
Describe steepness and direction of slope and position of site in relation to surrounding land
The Site is essentially flat at roughly 4m above sea level. There are topographic highs to the west and north. There is no surface water. The nearest waterbody is False Creek, about 350m to the west.

Stratigraphy
Describe depth and thickness, grain size, etc. of typical stratigraphic components and note depth to cemented or very compact materials, bedrock / refusal, etc.

Subsurface geology can be separated into two areas generally described as:

- Former shoreline area on 250 and 310 Prior Street: 1m to 3m of fill material overlaying native glacial till and sandy shoreline deposits along the former shoreline of False Creek; and
- Former foreshore area on 1002 Station Street: Fill is variable consisting of sand, silt, and gravel mixed with anthropogenic debris in various amounts. Fill generally extends to 5.5m below grade. Marine sediments are below the fill to depths up to 14m, generally becoming thicker moving from north to south. Glacial deposits are below the marine deposits. Sandstone is likely present below the glacial deposits, but it has not been encountered during drilling.

Hydrogeology
Describe groundwater levels, confining / semi-confining layers, flow direction and velocity

The water table is around 2m below grade. Relative water table elevations indicate that shallow groundwater is drawn towards the storm sewer running through the centre-east of the Site. Generally, groundwater is expected to flow south through the infilled area of the False Creek Flats eventually discharging into False Creek. Hydraulic gradients in the filled area of the False Creek Flats are very low unless they are locally influenced by utility trenches.

We monitored groundwater levels in May 2018 and February 2019. Groundwater levels were similar with February levels being slightly higher. We reviewed Golder's monitoring data from 2001 through 2014. Groundwater levels were like those observed by PGL, with levels being lower in the summer and higher in the winter.

At locations where we installed shallow and deep wells, groundwater levels in deep wells were slightly lower than in shallow. This could indicate a downward gradient.

90% of the Site is filled marine foreshore, and therefore drinking water standards do not apply in these areas (See P21 Water Use Evaluation below).

We obtained a water use determination for the portions of the Site on 250 and 310 Prior Street that were above the former highwater mark of the False Creek Flats. The water use determination was based on:

- The Site and surrounding area have a long history of industrial activities, multiple sources of contamination, and area-wide historical fill placement;
- 90% of the Site is filled marine foreshore;
- The direction of groundwater flow is towards the area of filled marine foreshore;
- Water for the Site and greater Vancouver area is supplied by Metro Vancouver. This is not expected to change over the long term;
- There is no registered aquifer below the Site;
- The area is not located in an area of known limited water resources;
- Former upland soil aquifers with hydraulic conductivities greater than 10^{-6}m/s are either composed of fill or have an average saturated thickness of 2m or less.
- Deeper soil and bedrock aquifers underlying the Site have hydraulic conductivities and/or yields too low to supply water for a domestic well; and
- Most BC Ministry of Environment and Climate Change Strategy (ENV) sites in the area have not applied DW standards based on similar lines of evidence as presented in this application.

P21 Water Use Evaluation

AW use:

Q: Is the site located within 500 m of an aquatic receiving environment? ☒ **Yes** (go to 1) ☐ **No** (go to 2)

1 - Can it be demonstrated that site groundwater does not flow to that aquatic receiving environment? ☐ **Yes** (go to 2) ☒ **No** (AW applies) Rationale:

2 - Does groundwater with concentrations >AW standards have the potential to migrate within 500 m of an aquatic receiving environment? ☐**Yes** (AW applies) ☐ **No** (AW does not apply) Rationale:

Irrigation and Livestock use:

Q: Is site or contamination plume within 500 m of an irrigation or livestock water well or intake (100m if upgradient)? ☐ **Yes** (go to 1) ☒ **No** (IW or LW do not apply) Describe: No land use associated with irrigation and livestock watering is near the Site. Irrigation and livestock watering standards do not apply.

1 - Is a natural confining barrier protecting the aquifer? ☐ **Yes** (IW or LW applies to confined aquifer) ☐ **No** (go to 2) If Yes, describe in NCB section below.

2 - Can it be shown that site groundwater will not enter the capture zone of nearby irrigation or livestock wells?

☐**Yes** (IW or LW does not apply) ☐ **No** or ☐ **Unknown** (IW or LW applies to all aquifers) Rationale:

Natural Confining Barrier (NCB) ☒ N/A

Natural Confining Barrier type: ☐ Type A or ☐ Type B

K-value: m/s Kmax if <6 wells *or* m/s K90th percentile if ≥6 wells

Natural Confining Barrier thickness: > 5m ☐ (Type A) *or* > K x 5 x 10^7 = m (Type B)

Contaminant free depth: ☐ Soil m and/or ☐ Water m (both soil and water for Type B and DNAPL)

Check if confining unit is: ☐ continuous across extent and predicted migration pathway of contaminant plume
☐ uniform, and ☐ fracture free.

Current DW use evaluation for unconsolidated aquifers:

CDW Q1: Is water at or near the site currently used for drinking water? ☐ **Yes** (go to 1) ☒ **No** (go to Future DW use)

1 - Is a natural confining barrier protecting the drinking water aquifer? ☐ **Yes** (Current DW applies to confined aquifer) ☐ **No** (go to 2) Provide details in NCB section:

2 - Can it be shown that site groundwater will *not* enter the capture zone of nearby drinking water wells? ☐ **Yes** (Current DW does not apply to aquifer, evaluate Future Use) ☐ **No** or ☐ **Unknown** (Current DW applies) Rationale:

Future DW use evaluation for unconsolidated aquifers:

(Copy the FDW questions below to evaluate all aquifers in the subsurface; commence with deepest)

FDW Q1: Is the site located within filled former marine or estuarine foreshore? ☒ **Yes** (Future DW does not apply)
☐ **No** If YES, describe:

Is the site located within 500 metres of a marine or estuarine foreshore? **AND**

Does the aquifer contain naturally occurring chloride **and** sodium concentrations greater than the DW standards measured in wells spatially distributed across the site (located within the same geological unit)?

☐ **Yes** (Future DW does not apply) ☐ **No** (go to FDW Q2) If YES, describe:

FDW Q2 - Is the aquifer ***confined*** and protected by a natural confining barrier? ☐ **Yes** (go to 1) ☐**No** (go to FDW Q3) If YES, describe:

1 - Does the *confined* aquifer have a bulk hydraulic conductivity >10-6 m/s *or* a yield ≥1.3 L/min *or* is the aquifer mapped in the BC Water Resource Atlas? ☐ **Yes** (go to 2) ☐ **No** (Future DW does not apply) Rationale:

Confined aquifer properties: Bulk hydraulic conductivity (K) **-** m/s K**max** if <6 wells *or*
m/s K**geometric mean** if ≥6 wells

Yield **-** L/min

☐ Mapped in BC Water Resource Atlas **-** *Insert Aquifer Name Here*

2 - Is the average saturated thickness of the *confined* aquifer ≤1m? ☐ **Yes** (Future DW does not apply) ☐ **No** (go to 3) Provide details: *Confined* Aquifer saturated thickness **-** m

3 - Is the natural water quality of the *confined* aquifer unsuitable for domestic water supply? ☐ **Yes** (Future DW does not apply) ☐ **No** (Future DW applies to confined aquifer) Provide details:

☐ Aquifer in organic soils (**peat) or muskeg**; organic content: % organic matter by weight; or

☐ Aquifer has poor natural water quality (TDS(**>4000 mg/L**); TDS mg/L

:

FDW Q3 - Does drinking water use apply to an underlying aquifer? ☐ **Yes** (go to 1) ☐ **No** (go to FDW Q4)

1 - Is a natural confining barrier protecting the underlying aquifer? ☐ **Yes** (go to FDW Q4) ☐ **No** (Future DW applies to all aquifers at the site) If YES, provide details in NCB section.

FDW Q4 - Does the *unconfined* aquifer have a bulk hydraulic conductivity >10-6 m/s or a yield ≥1.3 L/min or is the aquifer mapped in the BC Water Resource Atlas? ☐ **Yes** (go to 1) ☐ **No** (Future DW use does not apply to unconfined aquifer. Evaluate other aquifers if present) Provide details:

Unconfined aquifer properties: Bulk hydraulic conductivity (K) **-** K**max** if <6 wells *or*
K**geometric mean** if ≥6 wells

Yield **-** L/min

☐ mapped in the BC Water Resource Atlas **-** *Aquifer Name*

1 - Is the *unconfined* aquifer comprised only of imported fill or present only seasonally or is the average saturated thickness ≤2m? ☐ **Yes** (Future DW does not apply to unconfined aquifer. Evaluate other aquifers if present) ☐ **No** (go to 2) Provide details:

Unconfined Aquifer is: ☐ **seasonal -**

☐ in imported **fill -**

☐ Saturated thickness **less than 2 m -** m

2 - Is the natural water quality of the *unconfined* aquifer *unsuitable* for domestic water supply? ☐ **Yes** (Future DW does not apply to unconfined aquifer. Evaluate other aquifers if present) ☐ **No** (Future DW applies to unconfined aquifer. Evaluate other aquifers if present) Provide details:

☐ Aquifer in organic soils (**peat) or muskeg**; organic content: % organic matter by weight; or

☐ Aquifer has poor natural water quality (TDS(**>4000 mg/L**); TDS mg/L

Current DW use evaluation for *Bedrock* aquifers:

CBDW Q1: Is water from bedrock at or near the site currently used for drinking water? ☐ **Yes** (go to 1) ☐ **No** (go to Future DW bedrock use)

1 - Is a natural confining barrier protecting the bedrock drinking water aquifer? ☐ **Yes** (Current DW applies to confined aquifer) ☐ **No** (go to 2) Provide details in NCB section above.

2 - Can it be shown that site groundwater will *not* enter the capture zone of nearby drinking water wells? ☐ **Yes** (Current DW does not apply to bedrock aquifer, evaluate Future Use) ☐ **No** or ☐ **Unknown** (Current DW applies) Rationale:

Future DW use evaluation for Bedrock aquifers:

FBDW Q1: Is the site located within filled former marine or estuarine foreshore? ☐ **Yes** (Future DW does not apply) ☐ **No** (go to FDW Q2) If YES, describe:

FBDW Q2 - Is the bedrock aquifer mapped in the BC Water Resource Atlas? ☐ **Yes** (Future DW use applies to the bedrock aquifer. Evaluate other aquifers if present) ☐ **No** (go to FDW Q3) If YES, provide details:

FBDW Q3 - Has contamination in soil and groundwater > DW standards reached the bedrock? ☐ **Yes** (go to 1) ☐ **No** (Assessment of bedrock for future drinking water use not required. Evaluate other aquifers if present) Provide details:

1 - Do in-situ bedrock investigations on the site or within 500 m show a bulk hydraulic conductivity >10-6 m/s and a yield ≥1.3 L/min? ☐ **Yes** (go to 3) ☐ **No** (Future DW use does not apply to the bedrock aquifer. Evaluate other aquifers if present) Provide details:

2 - Is the natural water quality of the bedrock aquifer *suitable* for domestic water supply? ☐ **Yes** (Future DW use applies to the bedrock aquifer. Evaluate other aquifers if present) ☐ **No** (Future DW use does not apply to the bedrock aquifer. Evaluate other aquifers if present) Rationale:

☐ Aquifer has poor natural water quality (TDS(**>4000 mg/L**); TDS mg/L

☐ Saturated unit is: located within 500 metres of a marine and estuarine foreshore; **and**

contains naturally occurring Cl and Na concentrations greater than the DW standards measured in wells spatially distributed across the site and located within the same geological unit. Provide details:

☒ a Director's **determination** of water use has been obtained for the site, please describe decision:

We obtained a water use determination for the portions of the Site that were above the former highwater mark of the False Creek Flats. The water use determination was based on:

- The Site and surrounding area have a long history of industrial activities, multiple sources of contamination, and area-wide historical fill placement;
- 90% of the Site is filled marine foreshore;
- The direction of groundwater flow is towards the area of filled marine foreshore;
- Water for the Site and greater Vancouver area is supplied by Metro Vancouver. This is not expected to change over the long term;

- There is no registered aquifer below the Site;
- The area is not located in an area of known limited water resources;
- Former upland soil aquifers with hydraulic conductivities greater than 10^{-6}m/s are either composed of fill or have an average saturated thickness of 2m or less.
- Deeper soil and bedrock aquifers underlying the Site have hydraulic conductivities and/or yields too low to supply water for a domestic well; and
- Most BC Ministry of Environment and Climate Change Strategy (ENV) sites in the area have not applied DW standards based on similar lines of evidence as presented in this application.

☐ a **background** groundwater decision has been obtained, please describe and indicate for what PCOCs:

Surface Water Features

List name, direction and distance to nearest surface water bodies and the characteristics (e.g., relative size / flow) of the water body

Freshwater:

There are no freshwater bodies that receive groundwater from the Site.

Marine waters:

The nearest marine water is False Creek, which is 350m to the west.

4.3 Land Use

Location		Description of Current Land Use(s) / Activities
Onsite	Subject site	Vacant building on 310 Prior Street and outdoor parking area
Offsite	North	Residential
	East	Trillium Park
	South	Rail yards
	West	Commercial

Proposed land use of subject site: ☐ same as above or ☒ other (*please specify*)
The planned future Site use is a mix of hospital, with commercial and possibly some high-density residential land use. Underground parking up to three levels will underlay much of the Site.

4.4 Applicable Numerical Concentration Standards and Criteria

(if more than one land or water use applies to the site, expand this section to specify additional land uses covered by the instrument, i.e. riparian areas, roadways, etc. Include a diagram to clearly show the areas with different standards)

Soil (CSR Schedule 3.1):

Property		CSR Land Use						
		AL	PL	RL_{LD}	RL_{HD}	CL	IL	Other
Subject site	Current	☐	☐	☐	☐	☐	☒	☐
	Proposed	☐	☐	☐	☒	☒	☒	☐
Receiving site *(if completed in support of a Contaminated Soil Relocation Agreement)*		☐	☐	☐	☐	☐	☐	☐
Offsite impacted property / management area		☐	☐	☐	☐	☐	☐	☐

If Other is specified above, please explain: *(WL_N, WL_R; applicable or excluded guidance, protocols or policies specific to the site)*

The exact form for the future development has not been determined, but, as described above, the planned future Site use is a mix of hospital, with commercial and possibly some high-density residential land use. Underground parking up to three levels will underlay much of the Site.

Different standards would apply to different areas of the Site. RLHD would apply to the hospital facilities and CL would apply to commercial developments.

IL standards apply to roads, but the City of Vancouver Remediation on City Streets Policy requires that soil below boulevards and street medians meet RLLD standards.


Malkin Ave.
Gore St.
Jackson St.
National Ave.

Water (CSR Schedule 3.2):
(Check all that apply)

	AW fresh	AW marine	IW	LW	DW	No Water Use
Groundwater (CSR Schedule 3.2)	☐	☒	☐	☐	☐	☐
	Ambient fresh	Ambient marine				
Surface Water (Ambient Guidelines and/or Criteria)	☐	☐	☐	☐	☐	

Vapour (CSR Schedule 3.3):
(Check all that apply)

	AL, PL, RL	CL	IL	Parkade	Other
Soil Vapour	☒	☒	☒	☒	☐

If Other is specified above, please explain: *(e.g. vapour attenuation factors, assumptions)*
For current use we apply IL vapour standards. Outdoor attenuation factors were applied to outdoor areas (most of the Site) and sub-slab attenuation factors were used with respect to the one onsite (derelict and vacant) building at 310 Prior Street. No exceedances were of these standards/VAF were found.

Sub-slab attenuation factors and commercial standards conservatively apply to neighbouring properties. Vapour impacts that exceed CL/sub-slab VAF were found onsite (in outdoor areas) but are delineated onsite with respect to neighbouring properties.

As discussed above, the exact specifications of the future development have not been determined. But,

- Parkade standards/subslab VAF will apply below most of the site.
- If slab on grade buildings are constructed, then CL or RL standards will apply with subslab VAF.
- IL standards and outdoor attenuation factors would apply to roads - currently, no vapours exceed this standard/VAF combination.

Sediment (CSR Schedule 3.4):

Type of Aquatic Life		Type of Habitat		
☐ Freshwater	☐ Marine/Estuarine	☐ Sensitive	☐ Typical	☒ Not applicable

4.5 APEC and PCOC Summary

(Not applicable for a receiving site in a Contaminated Soil Relocation Agreement)

Provide reference to a figure showing onsite and offsite areas of potential environmental concern (APEC) and contaminants of potential concern associated with each APEC: Report #4, Figure # 4 and 5 Page #

Area of Potential Environmental Concern (APEC)		Potential Contaminant of Concern (PCOC) *(indicate products, chemicals, waste type, etc. and / or analytical parameter)*	Check where analyses completed					
#	**Description** *(describe location in relation to process source, waste, filling, land use or activity, etc. giving rise to APEC, and if APEC is primary due to soil or water contamination)*		Soil	Sediment	Ground water	Surface Water	Vapour	Other (explain)
1	Imported fill (post-1912)	Metals	☒	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		HEPH	☒	☐	☐	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		Phenols (chlorinated and non-chlorinated)	☒	☐	☒	☐	☐	☐
		sodium ion and chloride ion	☒	☐	☒	☐	☐	☐
2	Metals and hydrocarbon impact in imported fill (pre-1912)	Metals	☒	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		HEPH	☒	☐	☐	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		Phenols (chlorinated and non-chlorinated)	☒	☐	☒	☐	☐	☐
3	Historical Repair and Maintenance Shops	Metals	☒	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		HEPH	☒	☐	☐	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
		Glycols	☐	☐	☒	☐	☐	☐
4	Historical Locomotive Maintenance Repair Area	Metals	☒	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		HEPH	☒	☐	☐	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
		Glycols	☒	☐	☒	☐	☐	☐
5	Historical Weigh Scale	LEPH	☒	☐	☒	☐	☐	☐
		HEPH	☒	☐	☐	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
6	Historical Boiler House and fuel oil shed	LEPH	☒	☐	☒	☐	☐	☐
		HEPH	☒	☐	☐	☐	☐	☐
7	Historical potentially leaking gasoline UST	BTEX	☒	☐	☒	☐	☒	☐
		LEPH	☒	☐	☒	☐	☐	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
8	Storage of TCE contaminated soils	trichloroethylene	☒	☐	☒	☐	☒	☐
9	Beam Manufacturing Co.	Metals	☒	☐	☒	☐	☐	☐

	Ltd.	LEPH	☒	☐	☒	☐	☐	☐
		HEPH	☒	☐	☐	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
		Phenols (chlorinated and non-chlorinated)	☒	☐	☒	☐	☐	☐
10	Canadian Junk Co. Ltd. and Atlas Iron and Metals Ltd.	Metals	☒	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		HEPH	☒	☐	☐	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
11	Great Western Smelter and Canada Metal Plant No. 2	Metals	☒	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		HEPH	☒	☐	☐	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
		Phenols (chlorinated and non-chlorinated)	☒	☐	☒	☐	☐	☐
12	Offsite manufacturing and sheet metal operations and imported fill. At 950, and 1024 Station Street	Metals	☐	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
13	Offsite dry-cleaning operations. At 823 Main Street, 237 Prior Street, and 210, 255, 274, and 328 Union Street.	VPH	☒	☐	☒	☐	☒	☒
		VOC	☒	☐	☒	☐	☒	☒
14	Offsite upgradient service station and garage. At 219 Prior Street.	Metals	☐	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
15	Offsite upgradient salvage/auto wrecking. At 241 and 269 Prior Street.	Metals	☐	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
16	Offsite upgradient salvage/auto wrecking. At 413 Prior Street.	Metals	☐	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
17	Offsite electroplating, boat building and trucking operations. At 249 Prior Street	Metals	☐	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐

18	Offsite fuel storage at 408 Prior Street.	LEPH	☒	☐	☒	☐	☐	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
19	Offsite gasoline UST at 410 and 456 Prior Street.	LEPH	☒	☐	☒	☐	☐	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
20	Offsite ink manufacturing at 496 Prior Street	Metals	☐	☐	☒	☐	☐	☐
		VOC	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
21	Offsite locomotive repair and maintenance and imported fill at 580 Malkin Avenue	Metals	☐	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐
22	Offsite rail Maintenance Centre at 1100 and 1150 Station Street	Metals	☐	☐	☒	☐	☐	☐
		LEPH	☒	☐	☒	☐	☐	☐
		PAH	☒	☐	☒	☐	☒	☐
		BTEX	☒	☐	☒	☐	☒	☐
		VPH	☒	☐	☒	☐	☒	☐
		VOC	☒	☐	☒	☐	☒	☐

Legend:

BTEX in soil include:

benzene	71-43-2
ethylbenzene	100-41-4
styrene	100-42-5
toluene	108-88-3
xylenes	1330-20-7

BTEX in groundwater and soil vapour include:

benzene	71-43-2
ethylbenzene	100-41-4
styrene	100-42-5
toluene	108-88-3
xylenes, total	1330-20-7

VPH in soil include

VPHs	

VPH in groundwater include

VHw6-10	VPHw

VPH in soil vapour include

VPHv	

LEPH, HEPH in soil include

LEPHs	HEPHs

LEPH in groundwater include

LEPHw	$EPHw_{10-19}$

PAHs in soil include:

acenaphthene	83-32-9	fluoranthene	206-44-0
anthracene	120-12-7	fluorene	86-73-7
benzo(a)anthracene	56-55-3	indeno(1,2,3-cd)pyrene	193-39-5
benzo(b+j)fluoranthenes	205-99-2 & 205-82-3	methylnaphthalene, 2-	91-57-6
benzo(k)fluoranthene	207-08-9	naphthalene	91-20-3
benzo(a)pyrene	50-32-8	phenanthrene	85-01-8
chrysene	218-01-9	pyrene	129-00-0
dibenz(a,h)anthracene	53-70-3		

PAHs in **groundwater** include:

acenaphthene	83-32-9	fluoranthene	206-44-0
acridine	260-94-6	fluorene	86-73-7
anthracene	120-12-7	naphthalene	91-20-3
benz(a)anthracene	56-55-3	phenanthrene	85-01-8
benzo(a)pyrene	50-32-8	pyrene	129-00-0
chrysene	218-01-9	quinoline	91-22-5

PAHs in **soil vapour** include:

naphthalene	91-20-3		

Phenols (chlorinated and non-chlorinated) in soil include:

chlorophenol, 2-	95-57-8	methylphenol, 4-	106-44-5
chlorophenol, 3-	108-43-0	methylphenol, 4-chloro-3-	59-50-7
chlorophenol, 4-	106-48-9	pentachlorophenol	87-86-5
dichlorophenol, 2,3-	576-24-9	phenol	108-95-2
dichlorophenol, 2,6-	87-65-0	tetrachlorophenol, 2,3,4,5-	4901-51-3
dichlorophenol, 3,4-	95-77-2	tetrachlorophenol, 2,3,4,6-	58-90-2
dichlorophenol, 3,5-	591-35-5	tetrachlorophenol, 2,3,5,6-	935-95-5
dimethylphenol, 2,4-	105-67-9	trichlorophenol, 2,3,4-	15950-66-0
dimethylphenol, 2,6-	576-26-1	trichlorophenol, 2,3,5-	933-78-8
dimethylphenol, 3,4-	95-65-8	trichlorophenol, 2,3,6-	933-75-5
hydroquinone	123-31-9	trichlorophenol, 2,4,5-	95-95-4
methylphenol, 2-	95-48-7	trichlorophenol, 2,4,6-	88-06-02
methylphenol, 3-	108-39-4		

Phenols (chlorinated and non-chlorinated) in groundwater include:

chlorophenol, 2-	95-57-8	pentachlorophenol	87-86-5
chlorophenol, 3-	108-43-0	phenol	108-95-2
chlorophenol, 4-	106-48-9	tetrachlorophenol, 2,3,4,5-	4901-51-3
dichlorophenol, 2,3-	576-24-9	tetrachlorophenol, 2,3,4,6-	58-90-2
dichlorophenol, 2,6-	87-65-0	tetrachlorophenol, 2,3,5,6-	935-95-5

dichlorophenol, 3,4-	95-77-2	trichlorophenol, 2,3,4-	15950-66-0
dichlorophenol, 3,5-	591-35-5	trichlorophenol, 2,3,5-	933-78-8
hydroquinone	123-31-9	trichlorophenol, 2,3,6-	933-75-5
methylphenol, 2-	95-48-7	trichlorophenol, 2,4,5-	95-95-4
methylphenol, 3-	108-39-4	trichlorophenol, 2,4,6-	88-06-02
methylphenol, 4-	106-44-5	trichlorophenol, 3,4,5-	609-19-08

Glycols in soil and groundwater include:

Diethylene glycol	111-46-6
Ethylene glycol	107-21-1
Propylene glycol, 1,2-	623-84-7

Metals in **soil** include:

aluminum	7429-90-5	copper	7440-50-8	selenium	7782-49-2
antimony	7440-36-0	iron	7439-89-6	silver	7440-22-4
arsenic	7440-38-2	lead	7439-9-1	strontium	7440-24-6
barium	7440-39-3	lithium	7439-93-2	thallium	7440-28-0
beryllium	7440-41-7	manganese	7439-96-5	tin	7440-31-5
cadmium	7440-43-9	mercury	7439-97-6	uranium	7440-61-1
chromium	7440 47 3	molybdenum	7439-98-7	vanadium	7440-62-2
cobalt	7440-48-4	nickel	7440-02-0	zinc	7440-66-6

Dissolved Metals in **groundwater** include:

antimony	7440-36-0	chromium,	16065-83-1	selenium	7782-49-2
arsenic	7440-38-2	cobalt	7440-48-4	silver	7440-22-4
barium	7440-39-3	copper	7440-50-8	thallium	7440-28-0
beryllium	7440-41-7	lead	7439-9-1	titanium	7440-32-6
boron	7440-42-8	mercury	7439-97-6	uranium	7440-61-1
cadmium	7440-43-9	molybdenum	7439-98-7	zinc	7440-66-6
chromium,	18540-29-9	nickel	7440-02-0		

VOC in **soil** include

bromobenzene	108-86-1	dichloroethylene (trans), 1,2-	156-60-5
bromodichloromethane	75-27-4	dichloroethylene, 1,1-	75-35-4
bromoform	75-25-2	dichloromethane	75-09-2
bromomethane	74-83-9	dichloropropane, 1,2-	78-87-5
carbon tetrachloride	56-23-5	dichloropropene, 1,3- (cis +	542-75-6
chlorobenzene	108-90-7	methyl tert-butyl ether (MTBE)	1634-04-4
chloroform	67-66-3	tetrachloroethane, 1,1,1,2-	630-20-6
dibromochloromethane	124-48-1	tetrachloroethane, 1,1,2,2-	79-34-5
dichlorobenzene, 1,2-	95-50-1	tetrachloroethylene	127-18-4
dichlorobenzene, 1,3-	541-73-1	trichloroethane, 1,1,1-	71-55-6
dichlorobenzene, 1,4-	106-46-7	trichloroethane, 1,1,2-	79-00-5
dichloroethane, 1,1-	75-34-3	trichloroethylene	79-01-6
dichloroethane, 1,2-	107-06-2	trichlorofluoromethane	75-69-4
dichloroethylene (cis), 1,2-	156-59-2	vinyl chloride	78-01-4

VOC in **groundwater** include:

bromodichloromethane	75-27-4	dichloropropane, 1,2-	78-87-5
bromoform	75-25-2	dichloropropene, 1,3- (cis +	542-75-6
carbon tetrachloride	56-23-5	hexachlorobutadiene	87-68-3
chlorobenzene	108-90-7	methyl tert-butyl ether [MTBE]	1634-04-4
chloroform	67-66-3	tetrachloroethane, 1,1,1,2-	630-20-6
dibromochloromethane	124-48-1	tetrachloroethane, 1,1,2,2-	79-34-5
dichlorobenzene, 1,2-	95-50-1	tetrachloroethylene	127-18-4
dichlorobenzene, 1,3-	541-73-1	trichlorobenzene, 1,2,3-	87-61-6
dichlorobenzene, 1,4-	106-46-7	trichlorobenzene, 1,2,4-	120-82-1
dichloroethane, 1,1-	75-34-3	trichloroethane, 1,1,1-	71-55-6
dichloroethane, 1,2-	107-06-2	trichloroethane, 1,1,2-	79-00-5
dichloroethylene, 1,1-	75-35-4	trichloroethylene	79-01-6
dichloroethylene, 1,2-cis-	156-59-2	trichlorofluoromethane	75-69-4
dichloroethylene, 1,2-trans-	156-60-5	vinyl chloride	75-01-04
dichloromethane	75-09-2		

VOC in **soil vapour** include:

benzene	71-43-2	dichloropropane, 1,2-	78-87-5
bromodichloromethane	75-27-4	dichloropropene, 1,3- (cis +	542-75-6
bromoform	75-25-2	ethylbenzene	100-41-4
bromomethane	74-83-9	isopropylbenzene	98-82-8
butadiene, 1,3-	106-99-0	methyl isobutyl ketone (MIBK)	108-10-1
carbon tetrachloride	56-23-5	naphthalene	91-20-3
chlorobenzene	108-90-7	n-decane	124-18-5
chloroethane	75-00-3	n-hexane	110-54-3
chloroform	67-66-3	tetrachloroethane, 1,1,1,2-	630-20-6
chloromethane	74-87-3	tetrachloroethane, 1,1,2,2-	79-34-5
dibromochloromethane	124-48-1	tetrachloroethylene	127-18-4
dibromoethane, 1,2-	106-93-4	toluene	108-88-3
dibromomethane	74-95-3	trichloroethane, 1,1,1-	71-55-6
dichlorobenzene, 1,2-	95-50-1	trichloroethane, 1,1,2-	79-00-5
dichlorobenzene, 1,3-	541-73-1	trichloroethylene	79-01-6
dichlorobenzene, 1,4-	106-46-7	trichlorofluoromethane	75-69-4
dichloroethane, 1,1-	75-34-3	trimethylbenzene, 1,2,4-	95-63-6
dichloroethane, 1,2-	107-06-2	trimethylbenzene, 1,3,5-	108-67-8
dichloroethylene, 1,1-	75-35-4	vinyl chloride	75-01-4
dichloroethylene, 1,2 cis-	156-59-2	xylenes, total	1330-20-7
dichloroethylene, 1,2 trans-	156-60-5		
dichloromethane	75-09-2		

Other (please explain): N/A

APEC #	N/A

4.6 AEC and Contaminant Summary

Stage 2 PSI - Provide reference to figure(s) showing the areas of environmental concern (AEC) and contaminants of concern associated with each AEC in onsite and offsite soil, water, sediment and/or vapour. Sample locations and corresponding analytical results shall be shown on each figure and in tabular form with reference to applicable standards:

Environmental medium Soil Report # 1 Figure #7-11 Page #
Environmental medium Water Report # 1 Figure #12-17 Page #
Environmental medium Vapour Report # 1 Figure #18-19 Page #

DSI – Provide references to figures (plan and section), with contours, showing the specific lateral and vertical distribution of each contaminant of concern in onsite and offsite soil, sediment, water and vapour. Sections shall be longitudinal and transverse with respect to groundwater flow and include physical conditions (e.g. stratigraphy, water table etc.). Sample locations with corresponding analytical results used to develop each figure shall be shown on the figure and in tabular form with reference to applicable standards:

Environmental medium Soil Report # 1 Figure #7-11 and 20, 23-26 Page #
Environmental medium Water Report # 1 Figure #12-17 and 21, 23-26 Page #
Environmental medium Vapour Report # 1 Figure #18-19 and 22, 23-26 Page #

AEC / APEC # *(Use same #s as for APECs in Table above)*	**Contaminant of Concern**	**Medium** *(e.g., soil, groundwater, sediment, vapour, surface water, other)*	**Maximum Measured Concentration (indicate units)**	**Extent of Contamination**	
				Area (m^2)	**Depth Range (m)**
1	arsenic	Soil	179ug/g	40	0-1.5
	chromium		99.9ug/g	20	0-0.5
	copper		886ug/g	20	0-0.5
	iron		42000ug/g	20	0-0.5
	lead		808ug/g	40	0-1.0
	zinc		2040ug/g	10,000	0-1.5
2	antimony	Soil	5,890ug/g	17500	0-3.0
	arsenic		234ug/g	17500	0–7.5
	cadmium		79.9ug/g	17500	0-1.1
	chromium		487ug/g	17500	0–5.5
	cobalt		37ug/g	17500	0-5.0
	copper		82,600ug/g	17500	0-5.5
	iron		137,000ug/g	17500	0-6.6
	lead		35,000ug/g	17500	0-6.6
	nickel		560ug/g	17500	0-1.1
	selenium		70.8ug/g	17500	0-1.1
	tin		29,800ug/g	17500	0-5.5

2	zinc	Soil	34,800ug/g	17500	0-5.5
	anthracene		33ug/g	7000	2.0-3.0
	benz(a)anthracene		34ug/g	7000	2.0-3.0
	benzo(a)pyrene		30ug/g	7000	2.0-3.0
	benzo(b+j)fluoranthenes		47ug/g	7000	2.0-3.0
	Indeno(1,2,3-cd)pyrene		15ug/g	7000	2.0-3.0
	naphthalene		30ug/g	7000	2.0-3.0
	phenanthrene		120ug/g	7000	2.0-3.0
2	Pyrene	Groundwater	0.532ug/L	13000	-
3	HEPHs	Soil	12,800ug/g	8500	0-2.5
	LEPHs		7,360ug/g	8500	1-0.5

Notes:
Risk Type: 1A ☐, 1B ☐, 2 ☐, 3 ☐ or N/A ☒

- Not high risk
- Drinking water standards not applied
- Future risk type will likely be “2” – engineered cover (imported uncontaminated soil or concrete or asphalt surface will need to be maintained)

4.7 Offsite Migration

	Yes	No
Is there evidence that one or more substances has migrated or is likely to have migrated to a neighbouring site and is or is likely causing contamination of the neighbouring property?	☐	☒
Has any sampling occurred offsite for PCOCs in any media?	☒	☐
Have preferential pathways been assessed? (including assessment of all neighbouring underground utility rights-of-way)	☒	☐

If yes to the first question, complete the following:

There is evidence of ☐ historical, or ☐ current offsite transport of contaminants from the site in:

- ☐ groundwater;
- ☐ surface water;
- ☐ vapours; and/or
- ☐ other

Briefly describe the nature of and evidence for offsite migration (either known, suspected or potential)
N/A

The impacted offsite lands are categorized as:

- ☐ having a potable groundwater source;
- ☐ being aquatic habitat, as formally defined;
- ☐ agricultural lands
- ☐ wildlands
- ☐ residential or urban parklands
- ☐ commercial land
- ☐ industrial land

4.8 Investigation or Interpretation Issues to be Addressed

Identify any issues regarding investigations or interpretations if the PSI and DSI information may not satisfy the requirements of CSR Sections 58 and 59 and applicable protocols and guidance documents. Briefly describe how these deficiencies will be addressed (examples include destroyed wells, completion of detailed delineation following building demolition or other proposed work at a later stage of remediation).

- A water use determination was obtained exempting the Site from applying drinking water standards.
- Concentrations of arsenic in deeply buried former marine sediments were not delineated offsite as they were considered a wide area issue, not capable of migrating, and possibly naturally occurring. ENV agreed with this approach (email communication, December 2019).

Part 5: Remediation Summary

5.1 Remediation Reporting Summary

		Yes	No	n/a
Risk Assessment	Completed?	☒	☐	☐
	Includes quantitative human health and ecological risk assessment report information or screening level risk assessment per EMA, CSR and current applicable ministry protocols, guidelines, checklists?	☒	☐	☐
Remediation Plan	Completed?	☒	☐	☐
	Includes CSR specified information for a Remediation Plan *(see CSR S.1, 16, 47)* and current applicable ministry protocols, guidelines, checklists, etc.?	☒	☐	☐
Confirmation of Remediation	Completed?	☐	☒	☐
	Includes CSR specified information *(see CSR S.49)* and any current applicable ministry protocols, guidelines, checklists for COR reports?	☐	☐	☒
Other Reports	Completed?	☐	☒	☐
	According to other guidelines? *(Provide explanation in notes below. Indicate how reports assist understanding of conditions and / or remediation.)*	☐	☐	☒
Notes: Risk Type: 1A ☐, 1B ☐, 2 ☐, 3 ☐ or N/A ☒ - Future risk type will likely be "2" – engineered cover (imported uncontaminated soil or concrete or asphalt surface will need to be maintained)				

If completed remediation reports are not adequate or if reports have a different scope than those listed above in accordance with the CSR complete Section 5.6 - Outstanding Remediation Issues.

5.2 Proposed or Completed Remedial Activities

(*Describe all aspects of remediation, including regulatory actions and activities to comply with numerical and/or risk-based standards)*

Regulatory

(Notification of Independent Remediation, Approval in Principle, Certificate of Compliance, Determination, Restrictive Covenant, etc.)

This summary of site condition accompanies a submission for an Approval in Principal.

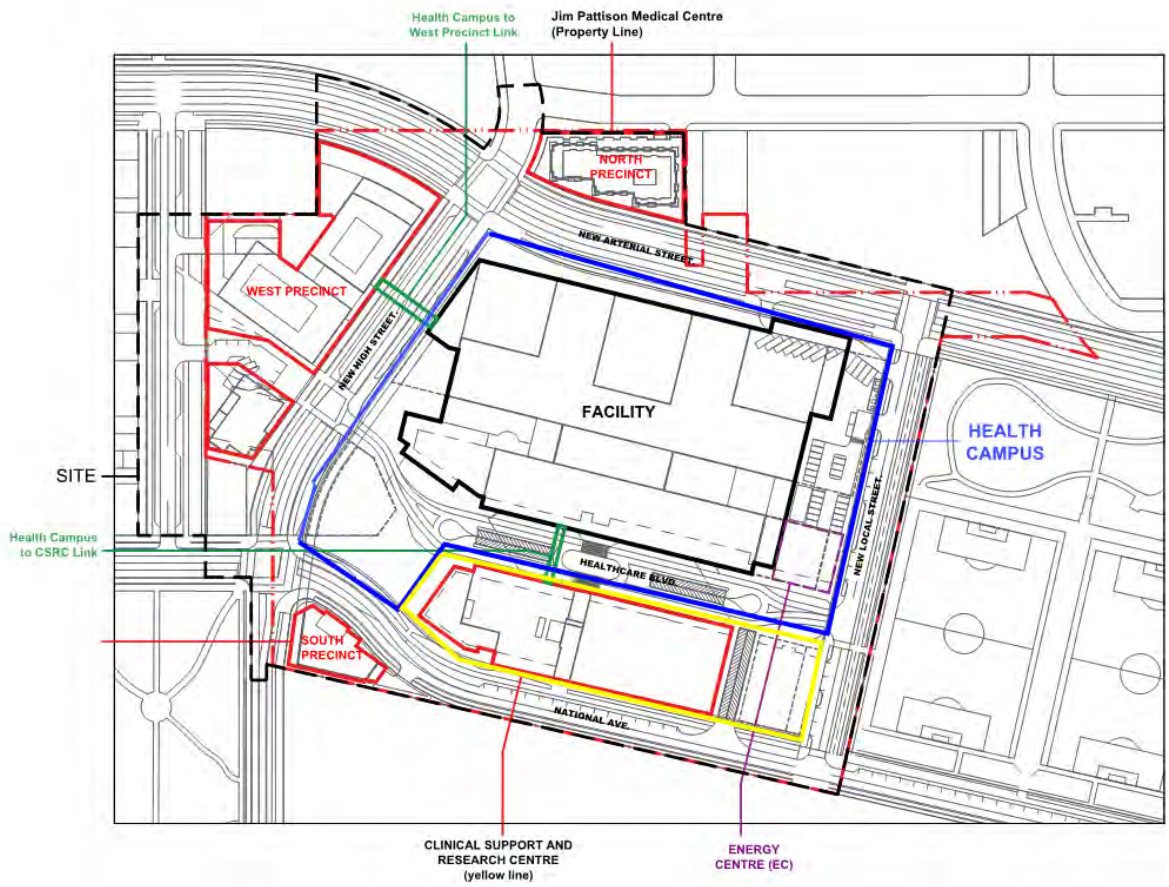
If commitments or conditions to be met are included in an Approval in Principle issued for the site, list these conditions and identify how they were met though remedial activities.

N/A

Remediation to comply with numerical standards/criteria

(Excavation / disposal of soil, Treatment of soil; Treatment of groundwater, etc.)

Most of the Site will be remediated through excavation and landfill disposal of contaminated soil. Most areas of the Site have planned three levels of underground parking. Contaminated soil will be remediated to numerical standards in these areas. Soil below roads will remain in place subject to the requirements of the City of Vancouver. SLRA indicates that soil concentrations have acceptable risk, so long as they remain covered or greater than 1m below ground surface.



Groundwater will be treated before discharge during construction. Groundwater concentrations of pyrene that exceed standards protecting marine life will be remediated by removing the source in soil.

Vapour impacts that currently exceed after indoor/subslab VAF are applied will likely be removed during excavations. However, vapour compliance may require validation as described in Report #1.

Remediation to comply with risk-based standards

Portions of the Site that will be road in the future will be capped with asphalt or 1m of CL quality soil (or RL as required by the City of Vancouver Remediation on City Streets Policy). It is unlikely that specific remediation to comply with risk-based standards (other than exposure cut-offs) will be required.

Are either of the following intended for use at the site, or have they been carried out?

	Intended		Carried Out	
Screening Level Risk Assessment	☐ Yes	☐ No	☒ Yes	☐ No
Quantitative Risk Assessment	☐ Yes	☒ No	☐ Yes	☒ No

If yes for any above, complete Section 5.5 (Summary of Residual Contamination)

Describe risk management / exposure reduction methods intended or implemented and indicate the status of any measures. *(e.g.,* Physical / engineering*: monitoring, capping or barriers to exposure;* Institutional: *registration of restrictive covenants, financial security, etc.)*

Portions of the Site that will be road in the future will be capped with asphalt or 1m of CL quality soil (or RL as required by the City of Vancouver Remediation on City Streets Policy).

These measures are not currently in place, but would be implemented prior to applying for a Certificate of Compliance(s)

Provide a reference to signed and stamped design drawings provided by a professional engineer for works installed at site boundaries to prevent recontamination of a site.

Report # N/A Page # _____ or Appendix # _____ _____

5.3 Summary of Remediation Plan

	AEC #	Contaminant(s) of Concern	Remediated to the following standard *(proposed or completed)*				Remediation Schedule		
	(Use same #s as for APECs in Table above)		Numerical (Standard, guideline or criteria)	Back-ground (attach CSR Protocol 4 or 9 approval if applic-able)	Hazardous Waste standard	Risk-based	Remediation Complete? Yes	Remediation Complete? No	Proposed or Actual completion date
Soil	1	arsenic	X					X	Sept 2022
		chromium	X					X	Sept 2022
		copper	X					X	Sept 2022
		iron	X					X	Sept 2022
		lead	X					X	Sept 2022
		zinc				X		X	Sept 2022
Soil	2	antimony				X		X	Sept 2022
		arsenic				X		X	Sept 2022
		cadmium				X		X	Sept 2022
		chromium				X		X	Sept 2022
		cobalt				X		X	Sept 2022
		copper				X		X	Sept 2022
		iron				X		X	Sept 2022
		lead				X		X	Sept 2022
		nickel	X					X	Sept 2022
		selenium				X		X	Sept 2022
		tin				X		X	Sept 2022
		zinc				X		X	Sept 2022
		anthracene	X					X	Sept 2022
		benz(a)anthracene	X					X	Sept 2022
		benzo(a)pyrene	X					X	Sept 2022
		benzo(b+j)fluoranthenes	X					X	Sept 2022
		Indeno(1,2,3-cd)pyrene	X					X	Sept 2022
		naphthalene	X					X	Sept 2022
		phenanthrene	X					X	Sept 2022

	AEC #	Contaminant(s) of Concern	Remediated to the following standard *(proposed or completed)*				Remediation Schedule		
	(Use same #s as for APECs in Table above)		Numerical (Standard, guideline or criteria)	Back-ground (attach CSR Protocol 4 or 9 approval if applic-able)	Hazardous Waste standard	Risk-based	Remediation Complete? Yes	Remediation Complete? No	Proposed or Actual completion date
	3	HEPHs				X		X	Sept 2022
		LEPHs	X					X	Sept 2022
Groundwater	2	pyrene	X					X	Sept 2022
Sediment	NA								
Surface Water	NA								
Soil Vapour	NA								

In the AEC column, specify as N/A (not applicable) if remediation or assessment is not required in this environmental medium.

5.4 Summary of Contaminant Treatment or Removal

(Identify and describe all contamination removed from or treated on-site. Ensure section 6.2 is completed if no CSRA is required or only required for a portion of soil removed)

N/A

Provide references to figure(s) showing the lateral and vertical extent of any treated or removed contamination. Confirmatory sample locations and corresponding analytical results shall be shown on each figure and in tabular form with reference to applicable standards:

Environmental medium N/A Report # N/A Figure # N/A Page # N/A

AEC / APEC # *(Use same #s as for APECS in Table above)*	**Contaminant(s) of Concern**	**Medium** *(e.g., soil, groundwater, sediment, surface water, vapour, other)*	**Material Removed**	
			Volume (m^3 or L)	**Disposal Location** *(indicate if treated on-site)*
N/A	N/A	N/A	N/A	N/A

5.5 Summary of Residual Contamination after Remediation

(Identify and describe all contamination that exceeds CSR numerical standards, after the remediation described above has been implemented.)

AEC / APEC # *(Use same #s as for APECS in Table above)*	**Contaminant of Concern**	**Medium** *(e.g., soil, groundwater, sediment, surface water, vapour, other)*	**Maximum Measured Concentration (indicate units)**	**Extent of Contamination**	
				Area (m^2)	**Depth Range (m)**
N/A	N/A	N/A	N/A	N/A	

5.6 Remediation Issues

Identify remaining issues if the remediation plan, confirmation of remediation report or risk assessment report does not include CSR specified information and current applicable ministry protocols, guidelines, checklists, etc. for these documents..

N/A

Part 6: Summary of Soil Relocation

6.1 Relocation with a Contaminated Soil Relocation Agreement

N/A

Source Site

(Soil to be relocated under the CSRA (from Table 4.6). Investigation information may be limited to the soil that is the subject of the relocation agreement)

APEC # *(Use same #s as for APECS in Table above)*	**Contaminant of Concern** *(List separately)*	**Classification of the soil to be Relocated** *(</> WL_N, WL_R,, AL, PL, RL_{LD}, RL_{HD}, CL, IL; Columns 2 through 9)*		**Volume m^3**
		Schedule 3.1 (µg/g)	**Schedule 3.1 (µg/m^3)**	
N/A	N/A	N/A		N/A

Receiving Site

Soil to be relocated has been adequately characterized?							☐ Yes	☐ No
Total Volume of soil to be relocated?								m^3
Applicable CSR Land Use at receiving site	WL_N ☐	WL_R ☐	AL ☐	PL ☐	RL_{LD} ☐	RL_{HD} ☐	CL ☐	IL ☐

Contaminant	**Maximum Contaminant Concentration in soil to be relocated (µg/g)**	**Applicable CSR Schedule 3.1 (µg/g) or 3.3 (µg/m3) standard at receiving site**
N/A	N/A	N/A

Sufficient data on receiving site?	☐ Yes	☐ No

(Ensure to assess any modifying factors for the receiving site soils such as soil pH)

Conditions pertaining to relocation (CSR, Sec. 44):

Will the source and receiving municipality be notified before soil is relocated?	☐ Yes	☐ No
Will at least 4 business days be allowed to pass before soil is relocated?	☐ Yes	☐ No

6.2 Relocation without a Relocation Agreement

Other soil relocation not requiring a Contaminated Soil Relocation Agreement (CSRA):

Has or will contaminated soil be relocated without a CSRA?	☒ Yes	☐ No
Do exemptions apply? *(indicated below; see CSR Sec. 41)*		
Relocation of contaminated soil on the site at which the contaminated soil originates?	☐ Yes	☒ No
Relocation of contaminated soil which is contaminated due only to the presence of the local background concentration?	☐ Yes	☒ No
Relocation of contaminated soil within an area subject to a wide area remediation plan?	☐ Yes	☒ No
Relocation of contaminated soil originating from emergency cleanup of a spill?	☐ Yes	☒ No
Relocation of soil to an authorized hazardous waste storage or treatment facility? If yes, provide BC Generator Registration #	☐ Yes	☒ No
Relocation of contaminated soil to a destination outside of British Columbia?	☐ Yes	☒ No
Relocation of contaminated soil from a specific site not exceeding 5 cubic metres in volume?	☐ Yes	☒ No
Relocation of contaminated soil to federal property?	☐ Yes	☒ No
Relocation to an authorized landfill that is exempt from a CSRA?	☒ Yes	☐ No
Relocation of contaminated soil which does not exceed a site-specific soil standard protective of groundwater? (Protection of groundwater soil standard only numeric exceedance)	☐ Yes	☒ No
Relocation of contaminated soil which does not exceed a water standard for groundwater, based on the concentration resulting from a leachate? (Protection of groundwater soil standard only numeric exceedance)	☐ Yes	☒ No
Relocation of contaminated soil which does not exceed the background concentration in the soil of the receiving site, as determined in accordance with a director's protocol?	☐ Yes	☒ No
Relocation of contaminated soil which satisfies a director's interim standard for soil or vapour?	☐ Yes	☒ No

Part 7: Recommendation of Approved Professional(s)

7.1 Regulatory Instrument and Summary Recommendation

Based on the detailed technical information available for the site, as summarized in this Summary of Site Condition, I Duncan Macdonald recommend that the following instrument be issued for the Subject Site.

☐ A Determination under section 44 of *EMA*
☒ An AiP under section 53(1) of *EMA*
☐ A CoC under section 53(3) of *EMA*
☐ A CSRA under section 55(2) of *EMA*
☐ Other (specify)

Although I understand that the basis of such recommendations should only be formally evaluated by reference to detailed technical guidance, the primary basis of this recommendation or these recommendations is as follows:

- A Preliminary Site Investigation addressing all identified areas of potential environmental concern (APECs) and potential contaminants of concern (PCOCs) was completed. One or more substances were identified at concentrations exceeding applicable standards in CSR Schedules 3.1, 3.2, 3.3, and 3.4.
- A Detailed Site Investigation addressing the locations and extent of all identified areas of environmental concern (AECs) and contaminants of concern was completed and forms the basis of a remediation plan or risk assessment.
- When this Summary of Site Condition was prepared a remediation, plan had been prepared that provides for remediating all identified locations and respective extent of all contaminants to either CSR numerical or risk-based standards.

7.2 Substances Remediated and Standards or Criteria

Contaminants have been remediated to comply with standards or criteria listed in the following table:

(If the site required remediation and has been remediated.)

	Substances Remediated for Each Type of Standard / Criteria	
	Numerical Standards (Criteria for Sediments, Vapour)	**Risk based Standards (Criteria for Sediments, Vapour)**
Soil	N/A	N/A
Water	N/A	N/A
Sediments	N/A	N/A
Soil Vapour	N/A	N/A
Other	N/A	N/A

Use specific compound names as listed in the Contaminated Sites Regulation schedules

The Director may accept the recommendations of an Approved Professional(s) involved in the review and submission of investigation, risk assessment or remediation reports based in part on the understanding that:

- As of April 6, 2020, the date of signing of this report the Approved Professional, or Approved Professionals if more than one, is/are member(s) in good standing of the Roster of Approved Professionals, as maintained by the ministry, and member(s) of the Contaminated Sites Approved Professionals Society (CSAP Society);
- The Approved Professionals signing this Summary of Site Condition have reviewed Table 1, Protocol 6 for Contaminated Sites (*Eligibility of Applications for Review by Approved Professionals*) and confirm that the *Application for Contaminated Sites Services* may be processed in the manner for non-high risk sites under the Roster of Approved Professionals process;
- That the reviewer has no obligation to undertake any inquiry into the validity, accuracy or precision of what is reported in the documents reviewed, beyond that which there is reasonable cause to believe that there could be errors or oversights in those reports;
- The subject site has been satisfactorily investigated for all areas of environmental concern and contaminants of concern to determine the lateral and vertical extents of contamination with due regard to the EMA, the CSR, and the HWR;
- The submitted documentation meets the requirements of Sections 1, 47, 49, 58 and 59 of the CSR;
- The Screening Level Risk Assessment meets the requirements of Protocol 13;
- The submitted remediation plan, if implemented in accordance with the specified conditions imposed in its draft Schedule "B" of the AIP, will result in the subject site being remediated in accordance with the applicable standards of the CSR and the HWR;
- It is feasible to implement all provisions of the Remediation Plan and to achieve its objectives and the conditions of the AIP within 5 years of issuance of the AIP;

The opinions, advice and recommendations expressed in this Summary of Site Condition are made in accordance with generally accepted principles and practices as recognized by members of the applicable profession or discipline practising at the same time and in the same or similar locations. This Summary of Site Condition does not provide a legal opinion or guarantee regarding compliance with applicable laws.

Name(s) of Approved Professional(s):	**Signature(s) of Approved Professional(s):**	**Date:**
Duncan Macdonald	_____	April 6, 2020
_____	_____	_____
_____	_____	_____
_____	_____	_____

7.3 Arm's Length Review

There may have been an arm's length review of one or more of the following recommendations to the Director of Waste Management:

1. Making a recommendation to a Director in support of an application for an Approval in Principle based on remediation to numerical standards or a screening level risk assessment where there is offsite migration at the site.
2. Making a recommendation to a director in support of an application for an Approval in Principle based on a risk assessment (other than a screening level risk assessment) and remediation to risk-based standards
3. Making a recommendation to a Director in support of an application for a Certificate of Compliance based on remediation to numerical standards or a screening level risk assessment where there is offsite migration at the site.
4. Making a recommendation to a Director in support of an application for a Certificate of Compliance based on a risk assessment (other than a screening level risk assessment) and remediation to risk-based standards
5. Making a recommendation to a Director in support of an application for a Contaminated Soil Relocation Agreement based on a screening level risk assessment for the parcel at which the soil is to be deposited where there is offsite migration at the source site
6. Making a recommendation to a Director in support of an application for a Contaminated Soil Relocation Agreement based on a risk assessment (other than a screening level risk assessment) for the parcel at which the soil is to be deposited
7. Making a recommendation to a Director in support of any other application based on risk assessment or risk management (other than a screening level risk assessment) not otherwise described in any other row in this list, as required under a protocol signed by a Director.

If this is the case please have the Approved Professional who carried out the arm's length review to sign below, specifying the type of arm's length review done for the site.

Type of Arm's Length Review (Insert number from list)	**Name(s) of Approved Professional(s):**	**Signature(s) of Approved Professional(s):**	**Date:**
N/A	Duncan Macdonald	_____	April 6, 2020
		_____	

Part 8: Statement of Site Owner / Agent / Lessee

Offsite Migration Notification

If it is known that one or more substances has migrated or is likely to have migrated to a neighbouring site and is or is likely causing contamination of the neighbouring site, have notifications been given?

(See CSR Sec. 57 and 60.1 for requirements)

	Yes	No
Have owners of impacted offsite properties been formally notified?	☐	☐
Has the ministry been formally notified?	☐	☐

Confirmations by Owner / Agent / Lessee Regarding Approved Professional

This is to acknowledge that as <the owner ~~/ responsible party / as the agent on behalf of the owner / lessee~~> *(strike out and initial that which does not apply – if signing as the agent of the owner or lessee, written consent from the owner or lessee authorizing signature of this Summary of Site Condition must be attached)* of the site I have engaged *Duncan Macdonald* as the Approved Professional(s) to review site investigation, risk assessment and remediation reports and to make submission and application with recommendations, if applicable, for the regulatory instrument(s) as indicated in this Summary of Site Condition.

I agree to comply with any requirements on the site regarding monitoring and maintenance of works as documented in schedule B of the draft contaminated sites legal instrument.

I accept that if a risk assessment has been applied at the site, that the risk assessment is only valid as long as conditions at the site do not change.

I have undertaken reasonable inquiry into the previous ownership and uses of the property and to the best of my knowledge I have provided to the Approved Professional, information relevant to the investigation and remediation of the environmental condition of the site, in the preparation of this document.

I acknowledge that this Summary of Site Condition becomes a public document after it has been received and acknowledged by the Director of Waste Management. Any party intending to purchase, lease, take a security interest in, or occupy the site may review this document and any supporting documents to satisfy themselves with respect to the environmental condition of the site, and the extent of responsibility and liability that may arise from taking ownership, taking a security interest, or occupying the site.

I have made no modifications to this document except as allowed by the form.

Name: Clayton Wong

Address: 5th Floor, 1190 Hornby Street, Vancouver, B.C., V6Z 2K5

Signature: Clayton Wong

Date: April 6, 2020

DST Consulting Engineers Inc.
A division of Englobe

Project Number: 2105834

PRE-DEMOLITION HAZARDOUS MATERIALS REPORT

310 PRIOR STREET,
VANCOUVER, BRITISH COLUMBIA

Report Prepared By:
DST Consulting Engineers Inc., A Division of Englobe
Unit B – 4125 McConnell Drive, Burnaby, BC

Report Prepared For:
PCL Constructors Westcoast Inc.
#310-13911 Wireless Way,
Richmond, British Columbia
V6V 3B9

June 2, 2021

1.0 EXECUTIVE SUMMARY

This report details the results/findings of the pre-demolition, limited hazardous material survey that was completed on May 25, 2021 located at 310 Prior Street, Vancouver, British Columbia (herein referred to as the Subject Building). The investigation was conducted on behalf of PCL Constructors Westcoast Inc. (PCL) in preparation for demolition of the Subject Building.

DST previously provided a hazardous material survey of the property in the report titled, "*Pre-Demolition Hazardous Materials Assessment at 310 Prior Street, Vancouver, British Columbia*" dated June 14, 2018, DST File No. TS-VC-33511 (herein referred to the DST Report).

The purpose of the investigation was for overview of the interior and exterior of the Subject Building and identify any changes in hazardous materials conditions identified in the previous DST Report. However, at the time of the investigation, the roof, 2nd floor Mezzanine and the interior were deemed unsafe to reassess due to structural defects along the mezzanine floor and at the north side ceiling of the building as the Client reported portions of the roof had previously collapsed onto the 2nd Floor. As a result, the interior of the building was not assessed.

The results from the site investigation identified the following hazardous materials:

Asbestos-Containing Materials (ACM's):

- The grey caulking applied to the windowsill was determined to be asbestos-containing, approximately 70 linear meters.
- The ceramic tile mortars on the walls and floors in the 2nd Floor Women's Washroom and 2nd Floor Men's Washroom and walls of the 1st Floor South Washroom are presumed to be asbestos-containing, approximately 23 m^2.

Previously Identified Asbestos-Containing Materials (ACM's):

- The black mastic applied to the metal flashing of the Roof was determined to be asbestos-containing, approximately 19 m^2; and,
- The black vent mastic on the Roof was determined to be asbestos-containing, approximately 10 m^2

Previously Identified Lead-Containing Materials (LCM's):

Quantities of interior LCMs are approximated due to unsafe conditions within the building.

- The white paint applied to the metal pipes throughout the 2nd Floor within the Subject Building was determined to be lead containing, approximately 650 linear meters;
- The blue and white ceramic wall tiles in the 2nd Floor Men's Washroom was determined to be lead-containing, approximately 7 m^2;

- The white paint applied to the wood door of the 2nd Floor Office was determined to be lead-containing, approximately 9 m^2;
- The white paint applied to the metal sprinkle pipes of the Mezzanine Stairwell was determined to be lead-containing, approximately 100 linear meters;
- The cream paint applied to the wood structural beam of the Mezzanine Stairwell was determined to be lead-containing, approximately 37 m^2;
- The cream paint applied to the wood paneling of the Mezzanine Stairwell was determined to be lead-containing, approximately 7 m^2;
- The white paint applied to the walls throughout the Subject Building was determined to be lead-containing, approximately 55 m^2;
- The white paint applied to the wood shelving of the 1st Floor Northeast Corner was determined to be lead-containing, approximately 10 m^2;
- The brown paint applied to the baseboards of the 1st Floor West Office was determined to be lead-containing, approximately 10 linear meters;
- The white paint applied to the metal doors throughout the 1st Floor Garage Doors within the Subject Building was determined to be lead-containing, approximately 37 m^2; and,
- The yellow paint applied to the walls throughout the 1st Floor within the Subject Building was determined to be lead-containing, approximately 83 m^2.

Exterior LCMs

- The light beige paint applied to the concrete throughout the Exterior was determined to be lead-containing, approximately 218 m^2; and,
- The beige paint applied to the concrete throughout the Exterior was determined to be lead-containing, approximately 19 m^2.

Elemental mercury:

- Approximately fifty (50) Fluorescent light tubes and fluorescent light (CFL) bulbs suspected to contain elemental mercury were previously observed within the Subject Building.

Polychlorinated Biphenyls (PCBs)

- Approximately one hundred (100) fluorescent light ballasts suspected to contain PCBs were previously observed throughout the Subject Building.

Ozone-depleting substances (ODSs):

- Approximately two (2) refrigerators and one (1) air conditioning unit suspected to contain ODSs were previously observed throughout the Subject Building.

Silica:

- Potential sources of respirable silica were observed to be in the form of drywall (observed only in the interior) and exterior concrete within the Subject Building.
- Potential sources of respirable silica were presumed to be in the form of plaster, stucco, cinderblock building foundations, cinderblock mortar, brick, brick mortar and cementitious parging cement within the Subject Building.

Toxic, flammable, explosive or other hazardous materials:

- Sources of potentially toxic substances were identified throughout the Subject Building in the form of gasoline and five (5) propane tanks.

Biological Hazards:

- Mould was identified on drywall and wood building materials in the Entrance Foyer doorway and underside of the stairs of the westside Exterior, approximately 60 m^2.
    - Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity of mould growth within the remainder of the building, but based on the conditions observed, is expected to be present within the building.
- Needles and sharps were previously identified throughout the Subject Building.
- Based on the conditions observed, animal waste is expected.
    - Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity of animal waste.

No other potentially hazardous materials were identified.

2.0 INTRODUCTION

This report details the results/findings of the pre-demolition, limited hazardous material survey that was completed on May 25, 2021 located at 310 Prior Street, Vancouver, British Columbia (herein referred to as the Subject Building). The investigation was conducted on behalf of PCL Constructors Westcoast Inc. (PCL) in preparation for demolition of the Subject Building.

DST previously provided a hazardous material survey of the property in the report titled, "*Pre-Demolition Hazardous Materials Assessment at 310 Prior Street, Vancouver, British Columbia*" dated June 14, 2018, DST File No. TS-VC-33511 (herein referred to the DST Report).

This report provides an outline of applicable regulatory framework, purpose and methodology, findings, conclusions and based on the conclusions provides appropriate recommendations.

2.1 SUBJECT BUILDING OVERVIEW

The Subject Building, constructed in 1970, is a two-storey warehouse, with a mixture of drywall and concrete walls in the interior, metal q-deck ceiling on the 2nd Floor, wood panels ceiling on the 1st Floor, concrete flooring, a concrete building foundation and flat tar and gravel roof.

3.0 SCOPE OF WORK

The investigation included an overview of the interior and exterior of the Subject Building and identify any changes in hazardous materials conditions identified in the previous DST Report. However, at the time of the investigation, the roof, 2nd floor Mezzanine and the interior were deemed unsafe to reassess due to structural defects along the mezzanine floor and at the north side ceiling of the building as the Client reported portions of the roof had previously collapsed onto the 2nd Floor.

4.0 PURPOSE

The limited survey was completed to identify the presence of hazardous materials including but not limited to asbestos-containing materials (ACMs), lead-containing materials (LCMs), ozone-depleting substances (ODSs), polychlorinated biphenyls (PCBs), elemental mercury, toxic materials, flammable materials, explosive materials and biological hazards in preparation for demolition work that is scheduled to take place in the Project Area. The survey was requested to update the previous DST Report in the Project Area defined above.

5.0 PREVIOUS RENOVATIONS

No previous renovation work was reported by the client at the time of the investigation.

6.0 PREVIOUS REPORTS

DST previously provided a hazardous material survey of the property in the report titled, "*Pre-Demolition Hazardous Materials Assessment at 310 Prior Street, Vancouver, British Columbia*" dated June 14, 2018, DST File No. TS-VC-33511 (herein referred to the DST Report).

7.0 PROVINCIAL REGULATORY FRAMEWORK & APPLICABLE GUIDELINES

In British Columbia, the management of hazardous building materials in the work place is regulated by WorkSafeBC under the Workers' Compensation Act (effective April 15, 1998), as amended by the Workers' Compensation (Occupational Health and Safety) Amendment Act (effective October 1, 1999). Specific requirements of the Occupational Health and Safety Amendment Act are prescribed in the British Columbia Occupational Health and Safety (BC OH&S) Regulation.

7.1 Hazardous Materials & Demolition/Restorations

Section 20.112 of the BC OH&S Regulation details the requirements that employers and owners are responsible for identifying, and managing the presence of potentially hazardous materials prior to, and during demolition, restoration or salvage of machinery, equipment, buildings, or structures.

7.2 Provincial Hazardous Wastes Legislation & Regulations

In British Columbia, environmental matters pertaining to waste generally fall under the jurisdiction of the British Columbia Ministry of Environment (MoE), pursuant to the Environmental Management Act. The key waste regulation under the Environmental Management Act relating to hazardous building materials is the Hazardous Waste Regulation (HWR), as amended from time to time. The HWR provides the requirements for the proper handling, storage, transportation, treatment, recycling and disposal of hazardous wastes in the province. The regulation also outlines the materials and criteria to be used to characterize waste as hazardous.

7.3 Asbestos-Containing Materials (ACMs)

Current to the time of this writing, asbestos-containing materials are regulated under Part 6 (sections 6.1 to 6.32) of the BC OH&S Regulation. Under Part 6 Section 6.1, an asbestos containing material is defined as "*a manufactured article or other material, other than vermiculite insulation, that would be determined to contain at least 0.5% asbestos if tested in accordance with one of the following methods:*

(i) Asbestos, Chrysotile by XRD, Method 9000
(ii) Asbestos (bulk) by PLM, Method 9002
(iii) Test Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116)

WorkSafeBC Manual – "Safe Work Practices for Handling Asbestos"

This manual outlines basic information on asbestos and asbestos products, health hazard requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of ACMs. This document provides a guide to current practices that are to be followed in the Province of British Columbia.

7.3.1 ALARA Principle

Asbestos is a substance that is governed by the ALARA principle, meaning all exposures must be kept **a**s **l**ow **a**s **r**easonably **a**chievable. In effect, this means that although the BC OH&S Regulation provides explicit exposure limits, action levels and other significant criteria for asbestos, employers must also demonstrate further efforts (beyond those prescribed in the Regulation) to reduce, or eliminate worker exposure to asbestos, when it is considered reasonable to do so.

7.4 Lead & Lead-Containing Materials (LCMs)

Current to the time of this writing, lead is regulated under Part 6 (sections 6.59 to 6.69) of the BC OH&S Regulation.

WorkSafeBC Manual – "Safe Work Practices for Handling Lead"

This manual outlines basic information on lead and lead-based products, health hazard requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of lead containing paints and coatings. This document provides a guide to current practices that are to be followed in the Province of British Columbia.

7.4.1 ALARA Principle

Lead is a substance that is governed by the ALARA principle, meaning all exposures must be kept **a**s **l**ow **a**s **r**easonably **a**chievable. In effect, this means that although the BC OH&S Regulation provides explicit exposure limits, action levels and other significant criteria for lead, employers must also demonstrate further efforts (beyond those prescribed in the Regulation) to reduce, or eliminate worker exposure to lead, when it is considered reasonable to do so.

7.4.2 Silica

Exposure to silica dust is governed by the COHSR and BC Reg. 296/97. According to both legislative instruments, the time-weighted average exposure limit for airborne silica dust is 0.025 milligram per cubic meter (mg/m^3).

7.5 Ozone-Depleting Substances (ODSs)

Provincial regulatory framework providing the requirements for the safe management, storage and disposal of ozone-depleting substances are provided in British Columbia Regulation (BC Reg.) 387/99, as amended from time to time – Ozone-Depleting Substances Regulation respecting the appropriate management of ozone-depleting substances within the province of British Columbia.

8.0 FEDERAL REGULATORY FRAMEWORK & APPLICABLE GUIDELINES

8.1 Polychlorinated Biphenyls (PCBs)

The PCB Regulations SOR/2008-273 came into force on September 5, 2008. The purpose of the regulations is to improve the protection of Canada's environment and the health of Canadians by minimizing the risks posed by the use, storage and release of PCBs and by accelerating the elimination of these substances. The Regulations also set out end-of-use and end-of-storage dates for PCBs. These dates are listed in Environment Canada's fact sheet, "PCB Regulations: An Overview."

Additionally, Environment Canada has published a report entitled, "Identification of Lamp Ballasts Containing PCBs", revised in August 1991. This report can be referenced to determine the PCB-content in fluorescent lamp ballast.

8.2 Elemental Mercury

The *Products Containing Mercury Regulations* SOR/2014-254 (the Regulations) prohibit the manufacture and import of products containing mercury or any of its compounds, with some exemptions for essential products which have no technically or economically viable alternatives (e.g., certain medical

and research applications, and dental amalgam). In the case of lamps, rather than introducing a prohibition, the Regulations limit the amount of mercury contained in fluorescent and other types of lamps. The Regulations will come into force on November 8, 2015, one year after the day on which they are registered.

8.3 Transportation of Dangerous Goods

The transportation of hazardous wastes is governed under the Transportation of Dangerous Goods (TDG) Act and Regulations which outline the requirements for storage, handling, and transportation of hazardous waste, amongst other products.

9.0 METHODOLOGY

The survey was completed by DST on May 25, 2021 following AHERA sampling protocols in conjunction with WorkSafeBC recommended sampling procedures and the surveyor's previous experience. As part of the survey DST conducted a hazardous materials exposure risk assessment, to evaluate the current condition and accessibility of hazardous materials based on methods used by the United States Environmental Protection Agency (USEPA), which complies with federal and provincial jurisdictional requirements. A summary of the applicable criteria is provided in appendix I of this document.

Due to DSTs safety policy, confined spaces such as crawlspaces, attic spaces, etc. were not physically entered but were visually assessed to the best of the surveyor's ability. Demolition personnel must be aware that concealed, potentially hazardous materials may be present in these confined spaces and should ensure that persons familiar with the recognition and identification of these materials are present throughout the demolition. If materials are discovered that are deemed potentially hazardous, all work must cease, and further investigation must be performed by a qualified person.

Due to the structural integrity of the Subject Building, DST did not enter or assess the condition of previously identified hazardous materials, inspect for concealed conditions or sample within the interior of the building.

Due to inaccessibility issues, the surveyor was not able to perform investigation or sampling of concealed building materials, not limited to include materials located behind existing walls, within ceiling cavities, the roof, or beneath finish flooring materials. Suspect hazardous building materials were visually identified, based on the surveyor's knowledge of the historic composition of building products. Visual identification of materials suspected to contain asbestos or lead (in coatings) was supported by the analysis of representative samples (where accessible).

Bulk samples of suspected ACMs collected by DST during the site investigation were analyzed for their asbestos content by an accredited independent laboratory using the Polarized Light Microscopy (PLM)

EPA 600/R-93/116 method.

Bulk samples of suspected LCMs collected by DST during the site investigation were analyzed for their lead content by an accredited independent laboratory using the EPA 6010D-M Inductively Coupled Plasma-Atomic Emission Spectrometry method for acid extractable lead in a solid/paint.
Suspect sources of silica were identified based on the surveyor's knowledge of the historic composition of building products.

Suspect sources of ODSs and elemental mercury were identified based on appearance, age, and knowledge of historic applications. Suspect sources of PCBs were identified in electrical equipment only.

Equipment that may contain ODSs (e.g. air conditioning and refrigeration equipment) or PCBs (e.g. electrical transformers and fluorescent light ballasts) can often be identified by examining manufacturer's labels. For safety reasons, DST personnel do not remove the ballast shields from fluorescent light fixtures to examine the ballast codes unless the electrical circuit for the lighting has been tagged and locked out by a qualified electrician.

10.0 SUMMARY OF FINDINGS

The following sections outline the findings of the hazardous building material survey.

Analytical Reports for bulk asbestos and lead results are included in **Appendix I**.

Site maps, with sample locations, are included in **Appendix II**.

Site Photographs are included in **Appendix III**.

10.1 Site Observations

The following observations/communications were noted at the time of the survey:

- Client reported the Roof on the north side of the Subject Building had collapsed onto the 2nd Floor Mezzanine;
- Client reported observing used needles and sharps were primarily on the 2nd Floor;
- Client reported that the Subject Building was unsafe for entry and a structural engineer was to attend and assess;
- Drywall wall was observed on the 1st Floor South Wall;
- Wood paneled walls were observed in the Northwest and adjacent North Center Offices of the 2nd Floor Mezzanine;
- Concrete walls were observed on the West Wall;
- Refuse and personal items were observed throughout the 1st Floor;
- Drywall board and plywood sheets were observed around windows;

- No ceiling tiles were identified within the Mezzanine from the 2nd Floor windows. However, due to inaccessibility, they may be present in other areas;
- Pink fiberglass insulation was observed in the wall cavity and along the window of the 2nd Floor Northwest Office;
- Mould was observed on the underside of the stairs from the west side Exterior door; and,
- Animal waste in the form of rodent droppings or carcasses are likely to be found.

10.2 Asbestos-Containing Materials (ACMs)

Suspect ACMs were identified within the accessible areas of the Project Area. Representative samples of each suspect ACM were collected and analyzed for asbestos content. Sample descriptions and analytical results for each of the suspect ACMs are summarized in Table 1 below.

Sampling Notes:

- All unsampled potentially asbestos-containing materials must be presumed to be asbestos-containing within the Subject Building.
- Due to inaccessibility of the Subject Building, ceramic tile observed from the Exterior at the time of the current survey.
    - The ceramic tile mortar on the walls and floor of the 2nd Floor Men's and Women's Washrooms, as well as, the walls of the 1st Floor Washroom are **presumed asbestos-containing.**

Table 1: Analysis of Suspect ACMs

Sample #	Area or Room	Building[1] Material and Colour	Sampling Location	Asbestos[2] Percentage & Type	Friable	Current Condition[3]	Accessibility[4]	Approximate Quantity of Material	Current Risk of Exposure[5]
2105834-1A	Exterior 2nd Floor North Side	Residual Window Mastic – Grey	West Window	4% Chrysotile	Non-Friable	Poor	Low	70 m^2	Moderate
2105834-1B	Exterior 2nd Floor North Side	Residual Window Mastic – Grey	East Window	Positive Stop (Not Analyzed)	Non-Friable	Poor	Low	70 m^2	Moderate
2105834-1C	Exterior 2nd Floor West Side	Residual Window Mastic – Grey	Center Left Window	Positive Stop (Not Analyzed)	Non-Friable	Poor	Low	70 m^2	Moderate

[1] DJC-Drywall Joint Compound, VSF-Vinyl Sheet Floor, VFT-Vinyl Floor Tile, FLC-Floor Leveling Compound, ADH-Adhesive, CT-Ceiling Tile.

[2] An asbestos containing material is defined as a manufactured article or other material, other than vermiculite insulation, that would be determined to contain at least 0.5% asbestos.

[3] **Good** – Material has no visible damage or deterioration, or showing only very limited damage; **Fair** – Surface is crumbling, blistered, water-stained, gouged, marred, or otherwise abraded on less than 10% of the surface evenly distributed (25% if localized); **Poor** – Surface is crumbling or blistered over at least 10% of the surface if evenly distributed or 25% if localized; 10% (25% if localized) of material hanging from surface, deteriorated or showing adhesive failure; water stains, gouges, chalking or marks over at least 10% of the surface (25% if localized).

[4] **High** – easily accessible; **Moderate** – not easily accessible but in view; **Low** – not easily accessible, enclosed or obscured.

[5] **High** – Indicates that "High Risk" personal protective equipment and safe work procedures as outlined in the WorkSafeBC publication entitled "*Safe Work Practices for Handling Asbestos*", latest edition must be followed in order to **access the subject building**; **Moderate** – Indicates that "Moderate Risk" personal protective equipment and safe work procedures as outlined in the WorkSafeBC publication entitled "*Safe Work Practices for Handling Asbestos*", latest edition must be followed in order to be **in proximity to the material**; **Low** – Indicates that "Low Risk" safe work procedures as outlined in the WorkSafeBC publication entitled "*Safe Work Practices for Handling Asbestos*", latest edition must be followed in order to be **in proximity to the material**.

Sample #	Area or Room	Building[1] Material and Colour	Sampling Location	Asbestos[2] Percentage & Type	Friable	Current Condition[3]	Accessibility[4]	Approximate Quantity of Material	Current Risk of Exposure[5]
N/A	1st Floor Washrooms and 2nd Floor Men's and Women's Washroom	Ceramic Tile Mortar	Wall and Floors	Presumed Asbestos Containing	Non-Friable	Good-Poor	High	22 m^2	Low-Moderate
N/A	1st Floor Washrooms and 2nd Floor Men's and Women's Washroom	Ceramic Tile Mortar	Wall and Floors	Presumed Asbestos-Containing	Non-Friable	Good-Poor	High	22 m^2	Low-Moderate
N/A	1st Floor Washrooms and 2nd Floor Men's and Women's Washroom	Ceramic Tile Mortar	Wall and Floors	Presumed Asbestos-Containing	Non-Friable	Good-Poor	High	22 m^2	Low-Moderate

10.3 Elemental Mercury

Suspected sources of elemental mercury were previously observed throughout the Project Area in the form of approximately fifty (50) fluorescent light tubes.

Due to the inaccessibility of the Subject Building, sources of Elemental Mercury were not assessed for condition at the time of the survey. All sources of Elemental Mercury may range from good to poor condition as the interior was not assessed at the time of the survey.

10.4 Polychlorinated Biphenyls (PCBs)

Suspected sources of PCBs were previously observed throughout the Project Area in approximately one hundred (100) ballasts of the fluorescent light tube fixtures.

Due to the inaccessibility of the Subject Building, sources of PCBs were not assessed for condition at the time of the survey. All sources of PCBs may range from good to poor condition as the interior was not assessed at the time of the survey.

10.5 Ozone-Depleting Substances (ODSs)

Equipment suspected to contain ODSs were previously observed in the Project Area in the form of refrigerant in approximately two (2) refrigerators and one (1) air conditioning unit within the Project Area.

Due to the inaccessibility of the Subject Building, sources of ODSs were not assessed for condition at the time of the survey. All sources of ODSs may range from good to poor condition as the interior was not assessed at the time of the survey.

10.6 Silica

Potential sources of respirable silica were observed to be in the form of drywall and concrete within the Subject Building. The drywall (observed only in the interior) was judged to be in poor condition at the time of the survey. The exterior concrete was judged to be in good condition at the time of the survey.

Potential sources of respirable silica were presumed to be in the form of plaster, stucco, cinderblock building foundations, cinderblock mortar, brick, brick mortar and cementitious parging within the Subject Building. These other sources of silica may range from good to poor condition as the interior was not assessed at the time of the survey.

10.7 Toxic, Flammable, Explosive or Other Hazardous Materials

Based on the site investigation in 2018, potential sources of toxic, flammable, explosive or other hazardous materials were identified in the Project Area in the form of the following:

- Gasoline; and,
- Propane.

Five (5) propane tanks were observed within the rental gate on the west side Exterior. The propane tanks were found to be in fair condition at the time of the survey.

10.8 Biological Hazards

Needles and sharps were previously identified throughout the Subject Building.

The surveyor identified visible mould growth throughout the Subject Building at the time of the survey. At the time of the current survey, mould growth was identified around the wood and drywall building materials at the underside of the stairs and at the interior Foyer west. Based on the surface area impacted by the suspect visible mould growth, this fungal contamination poses a risk of exposure to persons accessing this area of the Subject Building and the use of a fit-tested half-face respirator with HEPA P-100 cartridges, impermeable gloves, disposable coveralls (covering head and boots) and eye protection is recommended as defined in the WorkSafeBC Guideline G4.79 – Indoor Air Quality and Mould, latest edition. **Note that demolition workers must report the discovery of any concealed mould found during the demolition process as this may affect the risk assessment for the Subject Building.**

- Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity or condition of the building materials that are impacted by the mould growth.

Based on the conditions observed, animal waste will be expected. Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity or location of the of the animal waste.

11.0 CONCLUSIONS

At the time of the survey, the Subject Building was deemed unsafe to enter; therefore, appropriate intrusive testing or an assessment of the hazardous materials identified could not be performed.

Based on the site investigation, sampling and analysis, the following hazardous materials were identified in the Project Area:

- ACMs;
- LCMs;
- Elemental Mercury;
- PCBs;
- ODSs;
- Silica;
- Toxic, flammable, explosive or other hazardous materials; and,
- Biological hazards.

11.1 Asbestos-Containing Materials (ACMs)

DST was unable to assess the interior of the Subject Building and concealed asbestos materials may be present.

The presumed asbestos-containing ceramic tile mortars on walls and floors of the 2nd Floor Men's and Women's Washrooms, as well as, the walls of the 1st Floor South Washroom within the Project Area may range from good to poor condition, posing moderate risk of exposure to persons accessing the Project Area.

The asbestos-containing grey window caulking on the windowsill of the 2nd Floor West Side Exterior within the Project Area was judged to be in poor condition at the time of the survey, posing a moderate risk of exposure to persons accessing the Project Area.

Previous Samples ACMs

The black mastic applied to the metal flashing of the Roof was previously determined to be asbestos-containing. Due to the inaccessibility of the Subject Building, the black flashing mastic may range from good to poor condition as the interior was not assessed at the time of the survey.

The black vent mastic on the Roof was previously determined to be asbestos-containing. Due to the inaccessibility of the Subject Building, the black vent mastic may range from good to poor condition as the interior was not assessed at the time of the survey.

11.2 Lead-Containing Materials (LCMs)

No additional LCMs were sampled at the time of the current survey.

The previously sampled LCMs are identified below. Based on the conditions observed, the lead-containing paint pose a moderate risk of exposure to persons accessing the Project Area:

Quantities of interior LCMs are approximated due to unsafe conditions within the building.

- The white paint applied to the metal pipes throughout the 2nd Floor, approximately 650 linear meters;
- The blue and white ceramic wall tiles in the 2nd Floor Men's Washroom, approximately 7 m^2;
- The white paint applied to the wood door of the 2nd Floor Office, approximately 9 m^2;
- The white paint applied to the metal sprinkle pipes of the Mezzanine Stairwell, approximately 100 linear meters;
- The cream paint applied to the wood structural beam of the Mezzanine, approximately 37 m^2;
- The cream paint applied to the wood paneling of the Mezzanine Stairwell, approximately 7 m^2;
- The white paint applied to the walls throughout the Subject Building, approximately 55 m^2;
- The white paint applied to the wood shelving of the 1st Floor Northeast Corner, approximately 10 m^2;
- The brown paint applied to the baseboards of the 1st Floor West Office, approximately 10 linear meters;
- The white paint applied to the metal doors throughout the 1st Floor Garage Doors, approximately 37 m^2; and,
- The yellow paint applied to the walls throughout the 1st Floor, approximately 83 m^2.

Exterior LCMs

- The light beige paint applied to the concrete throughout the Exterior, approximately 218 m^2; and,
- The beige paint applied to the concrete throughout the Exterior, approximately 19 m^2.

11.3 Elemental Mercury

Suspected sources of elemental mercury were previously observed throughout the Project Area in the form of fifty (50) fluorescent light tubes.

Due to the inaccessibility of the Subject Building, sources of Elemental Mercury were not assessed for condition at the time of the survey. DST presumes the Elemental Mercury may range from good to poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

11.4 Polychlorinated Biphenyls (PCBs)

Suspected sources of PCBs were previously observed throughout the Project Area in one hundred (100) ballasts of the fluorescent light tube fixtures.

Due to the inaccessibility of the Subject Building, sources of PCBs were not assessed for condition at the time of the survey. DST presumes the PCBs may range from good to poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

11.5 Ozone-Depleting Substances (ODSs)

Equipment suspected to contain ODSs were previously observed in the Project Area in the form of refrigerant in refrigerator and freezers within the Project Area.

Due to the inaccessibility of the Subject Building, sources of ODSs were not assessed for condition at the time of the survey. DST presumes the ODSs may range from good to poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

11.6 Silica

Potential sources of respirable silica were observed to be in the form of drywall and concrete within the Subject Building. The drywall (only observed in the interior) was judged to be in poor condition at the time of the survey, posing a moderate risk of exposure to persons accessing the Project Area. The exterior concrete was judged to be in good condition at the time of the survey, posing a low risk of exposure to persons accessing the Project Area.

Potential sources of respirable silica were presumed to be in the form of plaster, stucco, cinderblock building foundations, cinderblock mortar, brick, brick mortar and cementitious parging within the Subject Building.

Due to the inaccessibility of the Subject Building, all other sources of silica were not assessed for condition at the time of the survey. DST presumes the remaining sources of silica may range from good to poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

11.7 Toxic, Flammable, Explosive or Other Hazardous Materials

Needles and sharps were previously identified throughout the Subject Building. Due to the inaccessibility of the Subject Building, DST was unable to assess the condition of the needles and sharps. DST presumes the needles and sharps to be in poor condition, posing a moderate risk of exposure to persons accessing the Project Area.

The surveyor identified visible mould growth throughout the Subject Building at the time of the survey. At

the time of the current survey, mould growth was identified around the wood and drywall building materials at the underside of the stairs and at the interior Foyer west. Based on the surface area impacted by the suspect visible mould growth, this fungal contamination poses a risk of exposure to persons accessing this area of the Subject Building and the use of a fit-tested half-face respirator with HEPA P-100 cartridges, impermeable gloves, disposable coveralls (covering head and boots) and eye protection is recommended as defined in the WorkSafeBC Guideline G4.79 – Indoor Air Quality and Mould, latest edition. Note that demolition workers must report the discovery of any concealed mould found during the demolition process as this may affect the risk assessment for the Subject Building. Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity or condition of the building materials that are impacted by the mould growth.

Based on the conditions observed, animal waste will be expected. Due to the inaccessibility of the Subject Building, DST was unable to estimate the quantity or location of the of the animal waste.

12.0 RECOMMENDATIONS

Upon providing safe access to the interior of the building, revise the hazardous materials report to update the condition or quantities of the hazardous materials identified, perform intrusive investigation and complete testing of any presumed asbestos-containing materials identified.

DST provides recommendations for each identified hazardous material in the Project Area, which are based on both regulatory compliance and best practice guidelines, in the following sections.

Additionally, and due to DSTs safety policy, confined spaces such as crawlspaces, attic spaces, etc. were not physically entered but were visually assessed to the best of the surveyor's ability. Demolition personnel must be aware that concealed, potentially hazardous materials may be present in these confined spaces and should ensure that persons familiar with the recognition and identification of these materials are present throughout the restoration. If materials are discovered that are deemed potentially hazardous, all work must cease, and further investigation must be performed by a qualified person.

12.1 Asbestos-Containing Materials (ACMs)

DST recommends reference to WorkSafeBC publication "*Safe Work Practices for Handling Asbestos*" latest edition. This document provides a guide to current practices that are to be followed in the Province of British Columbia, providing basic information on asbestos and asbestos products, health hazards and requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of ACMs.

Asbestos-containing wastes generated from the above-noted work should be analyzed for asbestos content. If the wastes are found to contain 0.5% asbestos, or greater, they should be disposed of as hazardous waste, in accordance with the requirements of the British Columbia Ministry of Environment

and transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

12.2 Lead-Containing Materials (LCMs)

Due to the presumed condition of the identified lead-containing materials, all persons in proximity of these materials should use **MODERATE RISK** PPE controls as referenced in the WorkSafeBC publication "*Safe Work Practices for Handling Lead*" latest edition.

When lead-containing equipment/materials within the Subject Building are to be disturbed and/or removed, including in instances where paint chip debris is removed and/or paint debris is created (e.g., preparing surfaces for re-painting), ensure compliance with the following:

- Exposure protection requirements of BC Reg. 296/97, including the provisions detailed in WorkSafeBC publication entitled, "*Safe Work Practices for Handling Lead*", dated 2020.
- Transportation and disposal requirements of BC Reg. 63/88.
- Transportation requirements of the Federal Transportation of Dangerous Goods Regulation.

Airborne lead dust or fumes should not exceed the BC Reg. 296/97 eight-hour occupational exposure limit (OEL) of 0.05 mg/m^3 during the removal of paints and products containing any concentration of lead. The use of personal protective equipment is recommended to reduce the potential for over-exposure to lead dust

Ultimately, the Contractor is responsible to complete a Risk Assessment, and to review the work tasks required and the ways in which materials (including those coated with paints/ceramic tiles that may contain lead in varying concentrations) will be impacted, as well as the individuals that will be present in the immediate vicinity of the work (i.e., potential for high-risk individuals) in order to determine the appropriate personal protective equipment (PPE—including respirators and protective clothing), containment and/or decontamination measures and work procedures that should be followed to protect workers from lead exposure.

Toxicity Characteristic Leaching Procedure (TCLP) testing should be performed on identified lead-based paint, to facilitate the proper disposal of lead-containing wastes.

Retain qualified professionals to assess and control the disturbance of the identified LCM's.

12.3 Elemental Mercury

When sources of elemental mercury are removed, the mercury-containing wastes should be managed in accordance with the requirements of the British Columbia Ministry of Environment and should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

12.4 Polychlorinated Biphenyls (PCBs)

When equipment suspected to contain PCBs is removed, and prior to removing the ballasts, the PCB-content of each fluorescent lamp ballast should be verified through comparison to the criteria outlined in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, "*Identification of Lamp Ballasts Containing PCBs"* to assess their likelihood of PCB content.

If identified to contain PCBs, the PCB-containing light ballasts should be removed in accordance with the requirements of WorkSafeBC. PCB-containing wastes should be managed in accordance with the requirements of the British Columbia Ministry of Environment and should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.
For fixtures that are operational and are to be sold for reuse, documentation is required confirming that the purchasers understand the ballasts are PCB-containing, and the purchaser assumes all liability and responsibility associated with the fixtures.

12.5 Ozone Depleting Substances (ODSs)

When equipment containing ODSs is removed, manage the equipment in accordance with the requirements prescribed in British Columbia's Ozone-Depleting Substances and Other Halocarbons Regulation, including amendments up to B.C. Reg. 4/2010, January 14, 2010 and transport ODS-containing wastes in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

12.6 Silica

If silica-containing materials are to be removed or destructively altered (drilled, chipped, abraded, etc.), ensure dust control measures are employed such that airborne silica dust concentrations do not exceed the exposure limit as stipulated by the COHSR and BC Reg. 296/97 (0.025 mg/m^3). This would include, but not be limited to, the following:

- Providing workers with respiratory protection.
- Wetting the surface of the materials to prevent dust emissions.
- Providing workers with facilities to properly wash prior to exiting the work area.
- Providing dust control to mitigate the potential for demolition dust to escape from the work area into public and/or adjacent areas.

12.7 Toxic, Flammable, Explosive or Other Hazardous Materials

When removing and disposing of the toxic, flammable, explosive or other hazardous materials, all work must be conducted with the appropriate PPE, and all hazardous wastes must be managed in accordance with the requirements of the British Columbia Ministry of Environment. The hazardous wastes should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

12.8 Biological Hazards

DST recommends all persons in proximity of the needles, sharps and chemical and biological agents reference WorkSafeBC OH&S Regulation Part 5 G5.80 and Part 6, Section 6.54. This guideline provides guidance on work procedures on how to handle needles, sharps, chemical and biological agents.

DST recommends reference to WorkSafeBC manual entitled, “Controlling Exposure: Protecting Workers from Infectious Disease”, latest edition. This guideline provides guidance on exposure control plans, safe work procedures and infectious disease engineering and administration controls.

DST recommends reference to WorkSafeBC Guideline Part 4 G4.79 – Indoor Air Quality and Mould. This guideline provides guidance for the assessment and remediation of indoor mould amplification/contamination, not limited to include risk assessment strategies, engineering and administrative controls, and proper personal protective equipment.

DST recommends reference to WorkSafeBC manual entitled, “A Hantavirus Exposure Control Program for Employers and Workers, latest edition. This guideline provides guidance for the assessment and remediation of rodent-borne contamination, not limited to include risk assessment strategies, engineering and administrative controls, and proper personal protective equipment.

12.9 Precautionary Recommendation

Due to the nature and variation of construction methods and materials and the restrictions imposed by the Client, it is impractical to assume that all areas either concealed or otherwise, were, or can be tested to ensure with absolute certainty the presence or absence of all hazardous materials. With this in mind, Part 20, Section 20.112 of the BC OH&S Regulation indicates that, if after written confirmation is provided, a person discovers material that may be hazardous material, all employers responsible for the workers, and the owner, must ensure that a “qualified person” repeats the inspection process” outlined above, and detailed in Subsection 3 of Part 20, Section 20.112 of the Regulation.

Should additional information become available, DST requests that this information be brought to our attention so that we may re-assess the findings, conclusions, and/or recommendations presented herein.

13.0 LIMITATIONS

The conclusions presented in this report represent the judgement of the assessor based on current environmental and health and safety standards, and on-site conditions on the date(s) cited in this report. The Client and DST determined the interior of the Subject Building was unsafe to enter and due to the nature of the investigation and the limited data available, the assessor cannot warrant against undiscovered environmental liabilities.

This report is intended for client use only. Any use of this document by a third party, or any reliance on or decisions made based on the findings described in this report, are the sole responsibility of such third parties, and DST Consulting Engineers Inc. accepts no responsibility for damages, suffered by any third party as a result of decisions made or actions conducted based on this report. No other warranties are implied or expressed.

The data, conclusions and recommendations which are presented in this report, and the quality thereof, are based on a scope of work authorized by the client. The sampling program included asbestos bulk sampling and paint chip sampling in select representative areas for laboratory analysis. Note, however, that no scope of work, no matter how exhaustive, can guarantee to identify all contaminants. This report therefore cannot warranty that all building conditions are represented by those identified at specific locations.

Recommendations, when included, are made in good faith and are based on several successful experiences.

Note also that standards, guidelines and practices related to environmental investigations may change with time. Those which were applied at the time of this investigation may be obsolete or unacceptable at a later date.

Any comments given in this report on potential remediation problems and possible methods are intended only for the guidance of the designer. The scope of work may not be sufficient to determine all of the factors that may affect construction, clean-up methods and/or costs. Contractors bidding on this project or undertaking clean-ups should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the conditions may affect their work.

Any results from an analytical laboratory or other subcontractor reported herein have been carried out by others, and DST Consulting Engineers Inc. cannot warranty their accuracy. Similarly, DST cannot warranty the accuracy of information supplied by the client.

Report prepared by:

Michelle Chow

Michelle Chow
Project Manager
604-754-8622

Report reviewed by:

Ketan Minhas, *B.Sc., B. Tech (Env)*
Senior Project Manager
778-788-9679

DST Consulting Engineers Inc., a Division of Englobe

APPENDIX I

ANALYTICAL LABORATORY REPORTS

EMSL Canada Inc.

7964 Winston Street Suite 200 Burnaby, BC V5A 2H5
Phone/Fax: (604) 757-3158 / (604) 757-4731
http://www.EMSL.com / vancouverlab@EMSL.com

EMSL Canada Order 692101156
Customer ID: 55DSTV42
Customer PO:
Project ID:

Attn: Michelle Chow
DST Consulting Engineers
4125 McConnell Drive
Unit B
Vancouver, BC V5A 3J7

Phone: (604) 436-4588
Fax:
Collected: 5/25/2021
Received: 5/26/2021
Analyzed: 5/26/2021

Proj: 2105834 / 310 PRIOR STREET, VANCOUVER, BC

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: 2105834-1A ***Lab Sample ID:*** **692101156-0001**

Sample Description: EXTERIOR 2ND FLOOR NORTH SIDE WEST MOST WINDOW/RESIDUAL WINDOW CAULKING - GREY

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	5/26/2021	Gray	0.0%	96.0%	4% Chrysotile	

Client Sample ID: 2105834-1B ***Lab Sample ID:*** **692101156-0002**

Sample Description: EXTERIOR 2ND FLOOR NORTH SIDE EAST MOST WINDOW/RESIDUAL WINDOW CAULKING - GREY

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	5/26/2021			Positive Stop (Not Analyzed)		

Client Sample ID: 2105834-1C ***Lab Sample ID:*** **692101156-0003**

Sample Description: EXTERIOR 2ND FLOOR WEST SIDE CENTER LEFT WINDOW/RESIDUAL WINDOW CAULKING - GREY

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	5/26/2021			Positive Stop (Not Analyzed)		

Analyst(s):

Nicole Yeo PLM (1)

Reviewed and approved by:

Nicole Yeo, Laboratory Manager
or Other Approved Signatory

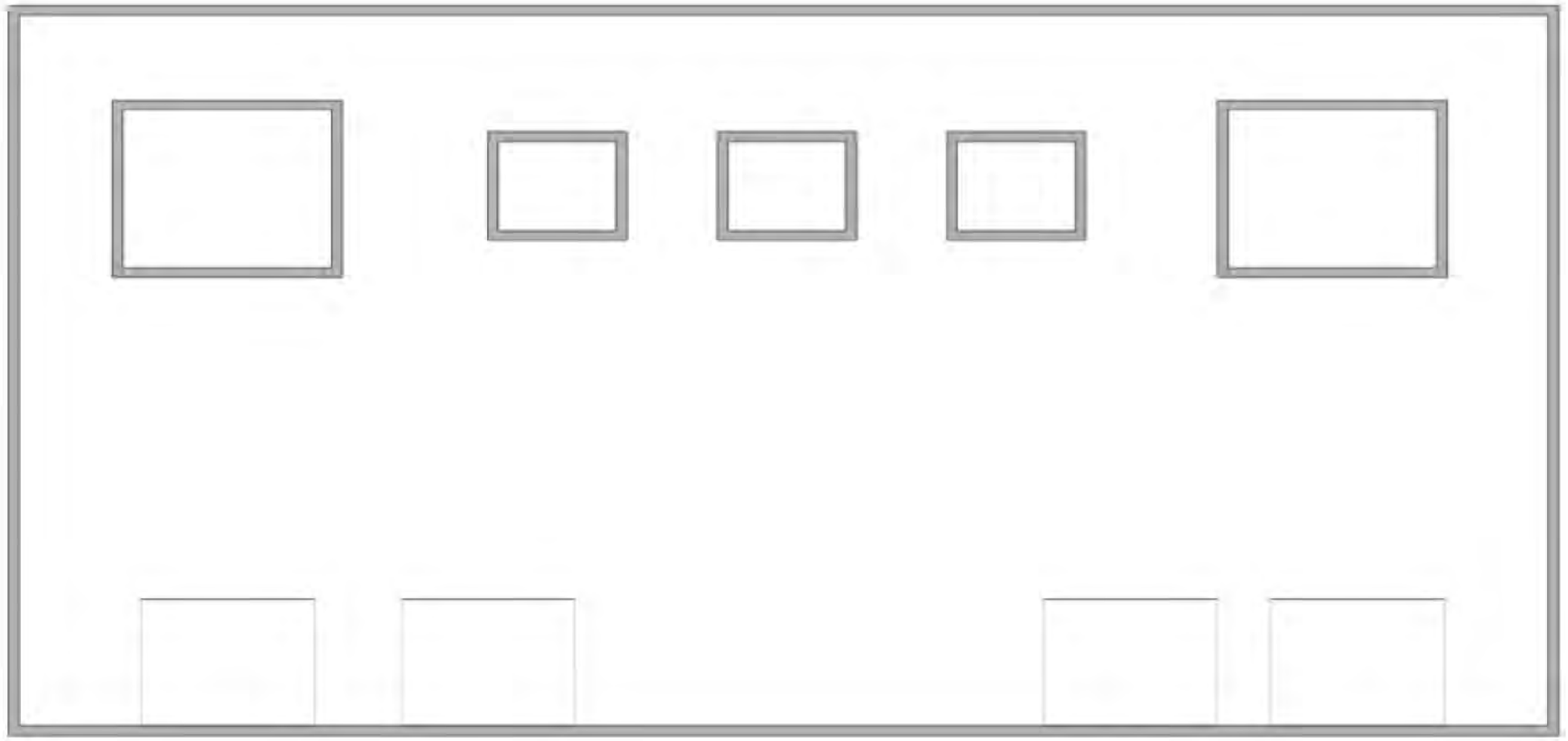
None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. Estimation of uncertainty available upon request. This report is a summary of multiple methods of analysis, fully compliant reports are available upon request. A combination of PLM and TEM analysis may be necessary to ensure consistently reliable detection of asbestos. This report must not be used to claim product endorsement by NVLAP of any agency or the U.S. Government.

Samples analyzed by EMSL Canada Inc. Burnaby, BC NVLAP Lab Code 201068-0

Report amended: 06/01/202114:43:22 Replaces initial report from: 05/27/202111:38:06 Reason Code: Client-Change to Location

APPENDIX II

SITE MAPS



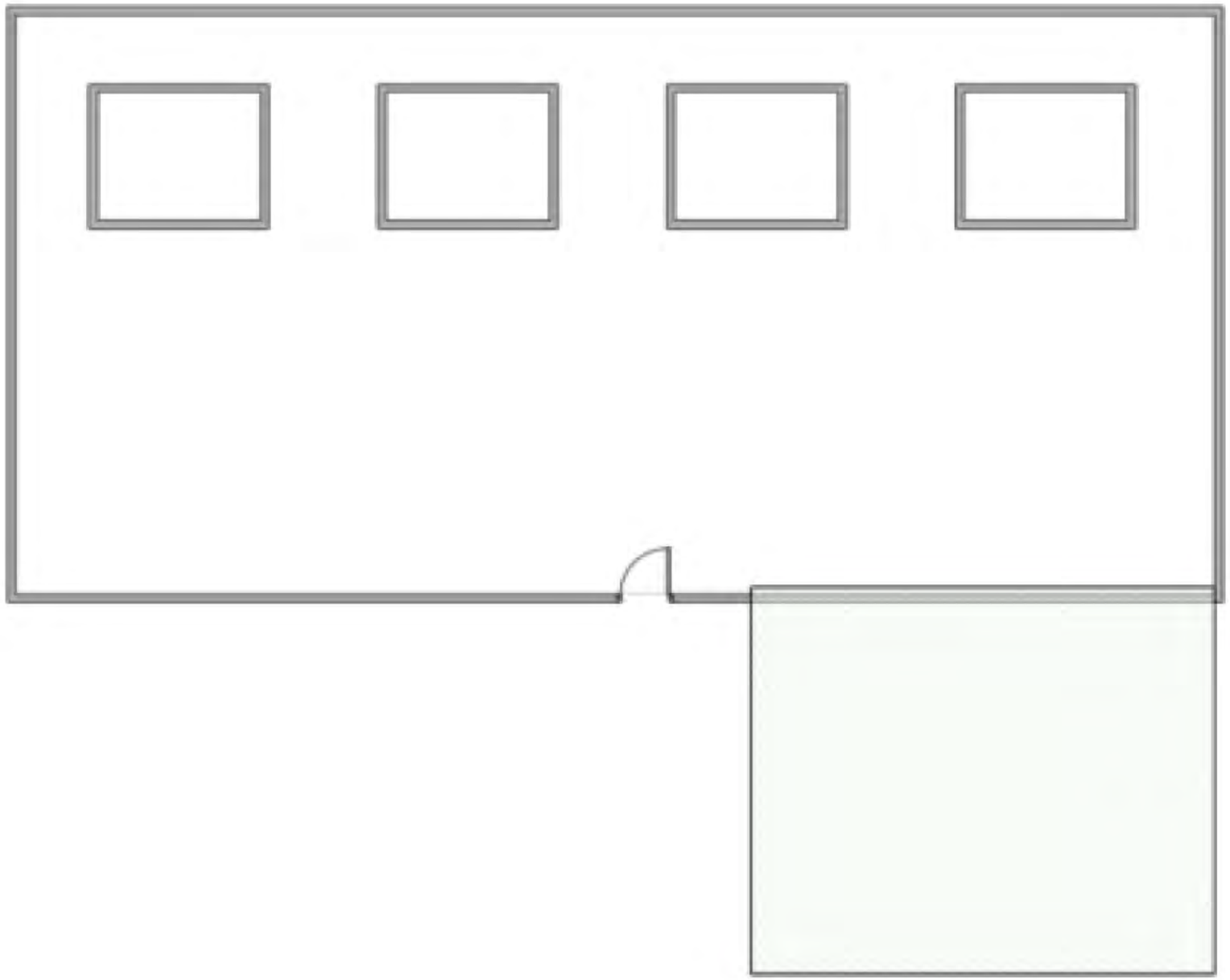
consulting engineers
a division of Englobe

1. This drawing shall be read in conjunction with the associated technical report.
2. Do not scale drawing.
3. Not all hazardous material shown.
4. Yellow indicates positive sample result.

Client	
Site	
Report Title	
Drawing Title	
Designed By	Scale
Drawn By	Date
Approved By	Project No.
Figure No.	

Drawing: TEMP.dwg Folder: C:\Users\npollard\Desktop\Nick\CAD\TEMPLATE Monday, November 23, 2020 @ 14:43 by Nicholas Pollard

Website: www.dstgroup.com



consulting engineers
a division of Englobe

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Client	
Site	
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Designed By	Scale
Drawn By	Date
Approved By	Project No.
Figure No.	

Drawing: TEMP.dwg Folder: C:\Users\npollard\Desktop\Nick\CAD\TEMPLATE Monday, November 23, 2020 @ 14:43 by Nicholas Pollard

Website: www.dstgroup.com

consulting engineers
a division of Englobe

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Client	
Site	
Report Title	
Drawing Title	
Designed By	Scale
Drawn By	Date
Approved By	Project No.
Figure No.	

Drawing: TEMP.dwg Folder: C:\Users\npollard\Desktop\Nick\CAD\TEMPLATE Monday, November 23, 2020 @ 14:43 by Nicholas Pollard

Website: www.dstgroup.com

APPENDIX III

SITE PHOTOGRAPHS

Photo 1

Date: May 25, 2021

Description: View of poor condition asbestos-containing grey window caulking at the Exterior 2nd Floor center left window.

Photo 2

Date: May 25, 2021

Description: View of mould growth on damaged drywall on the underside of the stairwell at the Exterior doorway entrance.

Photo 3

Date: May 25, 2021

Description: View of poor condition lead-containing beige paint applied to the walls and doorway at the west side Exterior door.

Photo 4

Date: May 25, 2021

Description: Five (5) propane tanks located within the rental gate area along the Exterior of the Subject Building.

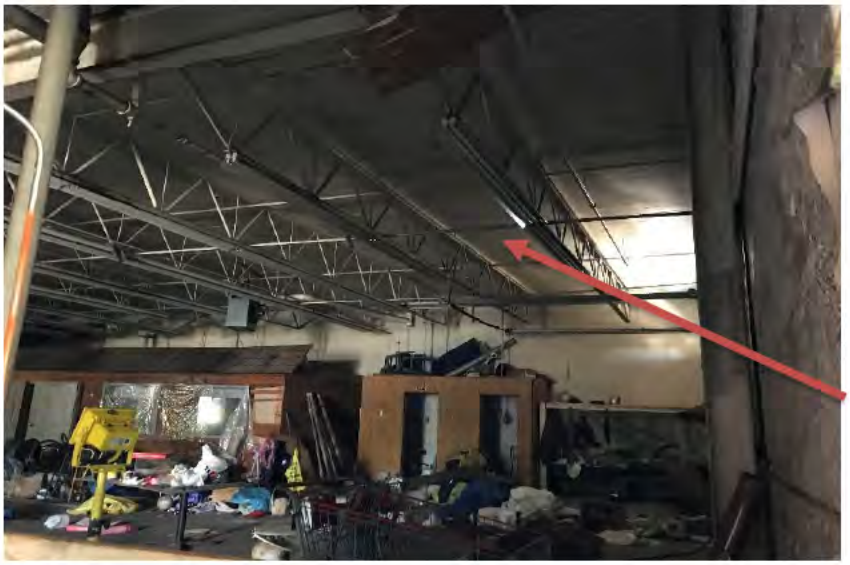


Photo 5

Date: May 25, 2021

Description: View of interior of the Subject Building.

PCBs and Elemental Mercury in the form of fluorescent light tubes and ballasts are observed from the west side Exterior door.

Photo 6

Date: May 25, 2021

Description: View of collapsed roof within interior of 2nd Floor North Center Office.

Photo 7

Date: May 25, 2021

Description: View of interior from the Northeast garage door from the Exterior.

CITY OF VANCOUVER

REAL ESTATE & FACILITIES MANAGEMENT
Environmental Services

Environmental Services
453 West 12th Avenue
Vancouver BC V5Y 1V4

vancouver.ca Tel: 3-1-1
(outside Vancouver) 604.873.7000

WASTE DISCHARGE PERMIT NO. SC-101234-VSA

Pursuant to:

Greater Vancouver Sewerage & Drainage District Sewer Use Bylaw No. 299, 2007 (as amended)

and the BC Environmental Management Act, S.B.C. 2003, c.53

Issued by the City of Vancouver to:

PCL Constructors Westcoast Inc.

doing business as PCL Constructors Westcoast Inc

(the "Permittee")

To Authorize:

the discharge of Wastewater to Sewer from

a site excavation project

Located at:

1000-1200 Station Street, Vancouver, BC V6A 0B5

Effective Period:

The terms and conditions set out in the Permit apply to the existing or planned works as of February 01, 2022 and this Permit will expire on January 31, 2023.

Issued: January 28, 2022

Nicole Montgomery
Deputy Sewage Control Manager

CITY OF VANCOUVER

SCHEDULE A

This Schedule sets out requirements for the quantity and quality of the discharge to Sewer.

1. AUTHORIZED DISCHARGE SOURCE

Wastewater from a site excavation project located at 1000-1200 Station Street, Vancouver, BC V6A 0B5.

The authorized discharge points are the existing sanitary sewers along 1000-1200 Station Street, 200-400 Prior Street, and adjacent to the Thornton Park Pump Station (refer to site plan for list of authorized discharge points), and are the approved discharge points from the City of Vancouver Sewers and Drainage Design Department.

No discharge is permitted to points along Prior St during wet weather conditions.

2. DISCHARGE SAMPLING AND ANALYSES: Effective February 01, 2022

Sample collection time(s), date(s) and discharge flows shall be recorded during the period that the samples are taken.

a) The Permittee shall continuously measure and record the discharge flow rate to sanitary sewer during each month of operation using the method(s) authorized in Section 5 and record for reporting purposes, the following:

- Total discharge volume for the month (m^3)
- Number of days of discharge to sewer during the month
- Maximum daily discharge flow rate during the month (m^3/d)
- Total daily discharge volume on the date of sampling (m^3)
- Maximum instantaneous flow rate during the month (L/s)

On one normal operating day once per month collect 1 set of grab samples and analyze for:

- pH
- Total Suspended Solids
- Oil & Grease Hydrocarbon
- Heavy Extractable Petroleum Hydrocarbons (HEPH)
- Light Extractable Petroleum Hydrocarbons (LEPH)
- Polycyclic Aromatic Hydrocarbons
- Total Metals by ICP Scan including:
  Aluminum, Arsenic, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Zinc

CITY OF VANCOUVER

SCHEDULE A

3. AUTHORIZED RATE OF DISCHARGE

- Maximum daily discharge volume: **501.00 m^3/d**
- Maximum instantaneous peak flow rate: **5.80 L/s**
- Maximum total discharge volume over Permit term: **45000 m^3**

Additional Conditions: Discharge to sanitary sewer along Prior St (discharge locations 3, 4, 5, 6 and 7) during dry weather only.

Site Runoff: Provisions must be implemented to prevent site runoff from entering the sanitary sewer system via the excavation.

4. AUTHORIZED DISCHARGE CRITERIA

a) The Permittee shall not discharge Prohibited Waste, Storm Water or Uncontaminated Water, as defined in the Bylaw.

b) The Permittee shall not discharge Hazardous Waste, or effluent from the treatment of Hazardous Waste which exceeds the Effluent Standards for Hazardous Waste Facilities, as stipulated in Schedule 1.2, Column 3, of the BC Environmental Management Act Hazardous Waste Regulation.

c) The Permittee shall not discharge Restricted Waste or other Waste, as defined in the Bylaw, including but not limited to the following (regardless of sample type):

Parameter	Authorized Limit	Notes
pH	5.5 - 10.5 pH Units	
Total Suspended Solids	600 mg/L	
Oil & Grease Hydrocarbon	15 mg/L	
Polycyclic Aromatic Hydrocarbons	0.05 mg/L	
Aluminum - total	50 mg/L	
Arsenic - total	1 mg/L	
Boron - total	50 mg/L	
Cadmium - total	0.2 mg/L	
Chromium - total	4 mg/L	
Cobalt - total	5 mg/L	
Copper - total	2 mg/L	
Iron - total	10 mg/L	
Lead - total	1 mg/L	
Manganese - total	5 mg/L	
Molybdenum - total	1 mg/L	

SCHEDULE A

Parameter	Authorized Limit	Notes
Nickel - total	2 mg/L	
Selenium - total	1 mg/L	
Silver - total	1 mg/L	
Zinc - total	3 mg/L	

d) The Permittee shall not discharge Restricted Waste or other Waste, as defined in the Bylaw, with the following exceptions (regardless of sample type):

Parameter	Authorized Limit	Notes
Heavy Extractable Petroleum Hydrocarbons (HEPH)	No Limit	
Light Extractable Petroleum Hydrocarbons (LEPH)	No Limit	

5. AUTHORIZED WORKS AND PROCEDURES

The authorized works and procedures to treat and/or control the discharges are:

Source: Groundwater

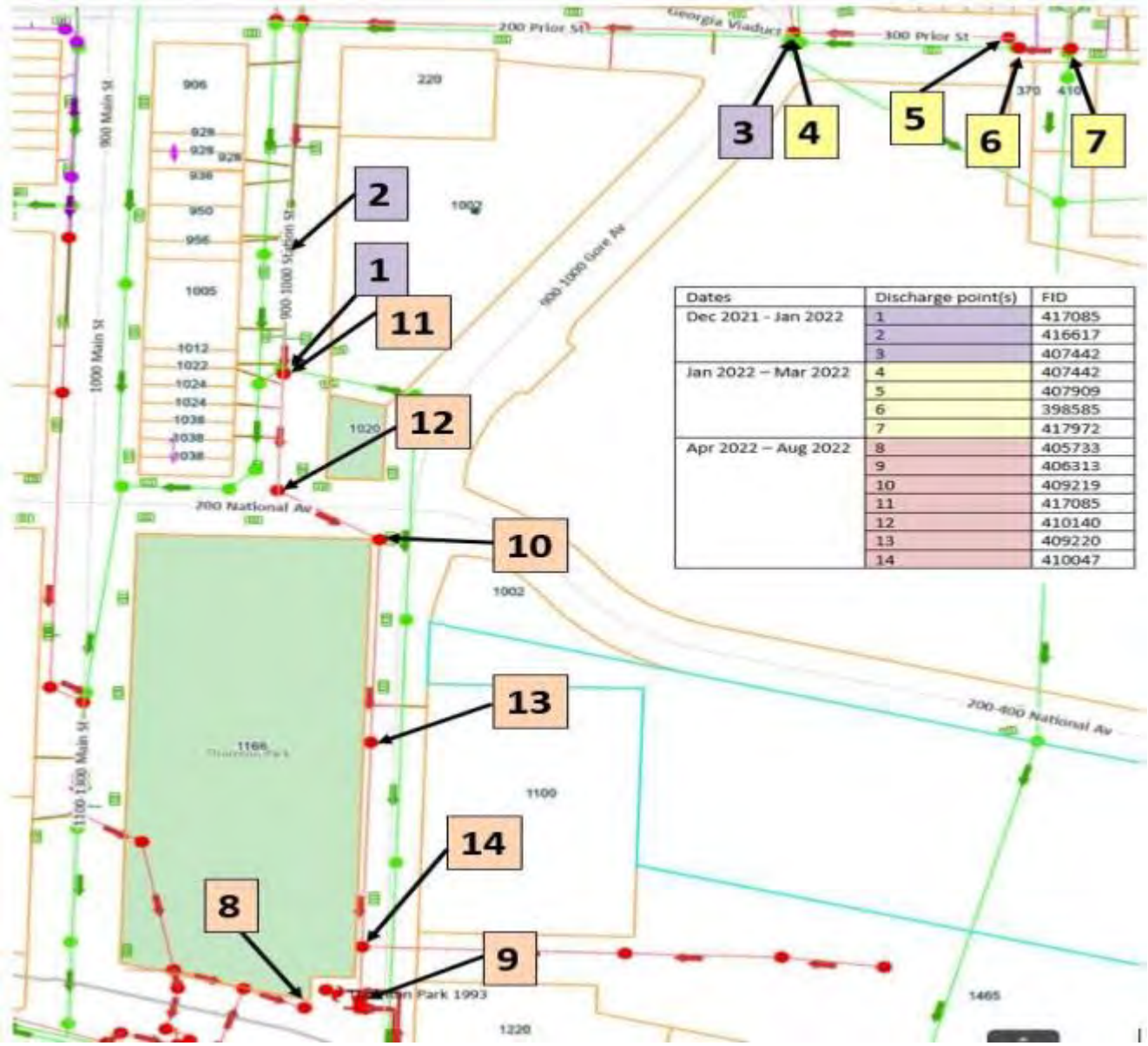
Type: Continuous

Works and Procedures	Completion Date
Coagulant and flocculant addition	Completed
Flow meter	Completed
pH adjustment	Completed
Sand filtration	Completed
Settling tank	Completed
Two granular activated carbon vessels in series	Completed
Data logger	Completed
Good operating practices	Completed

CITY OF VANCOUVER

SCHEDULE A

6. SITE PLAN(S)



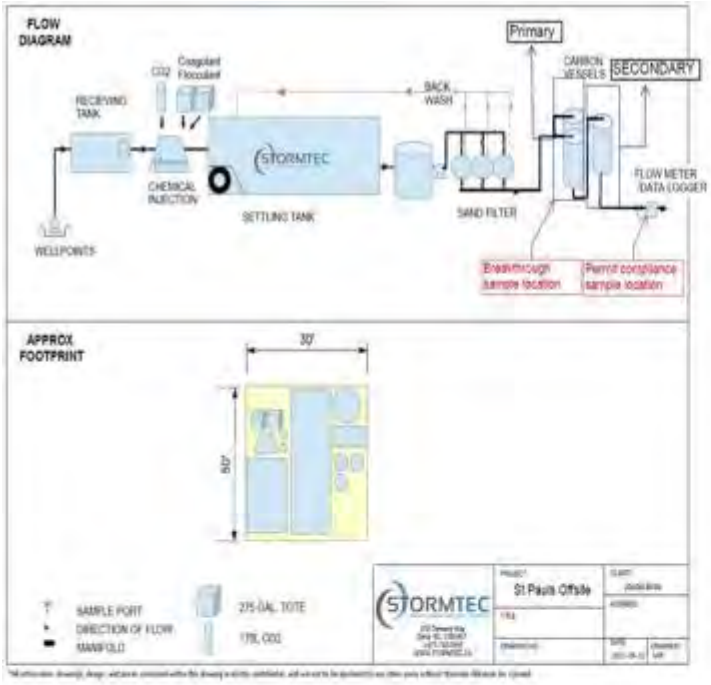
Issued: January 28, 2022

Waste Discharge Permit No. SC-101234-VSA

Nicole Montgomery
Deputy Sewage Control Manager

CITY OF VANCOUVER

SCHEDULE A



Issued: January 28, 2022

Waste Discharge Permit No. SC-101234-VSA

Nicole Montgomery
Deputy Sewage Control Manager

CITY OF VANCOUVER

SCHEDULE A

7. REPORTING REQUIREMENTS

By March 31, April 30, May 31, June 30, July 31, August 31, September 30, October 31, November 30, December 31, 2022, January 31 and February 28, 2023:

The Permittee shall submit a report detailing the results of the discharge sampling and analyses program, as specified, for the previous month including lab reports. This information shall be submitted electronically using the supplied password-enabled web based application.

Should a violation of any term or condition of the Permit be noted, the report shall include a summary of the investigation into the cause of the violation and the corrective actions taken or proposed to prevent future violations. This does not preclude the immediate notification requirements specified in Schedule B.

CITY OF VANCOUVER

SCHEDULE B

This Schedule sets out standard conditions and requirements for emergency procedures.

1. STANDARD CONDITIONS

a) Except as otherwise provided in this Permit, all terms, conditions and definitions stipulated in the Bylaw shall apply to this Permit.
b) Pursuant to the Bylaw, the Sewage Control Manager (the Manager) may amend the terms and conditions of this Permit.
c) All records required by this permit shall be kept available for a minimum period of one year.

2. WORKS AND PROCEDURES

a) All authorized works, procedures and requirements shall be employed at all times during any discharge to sewer. As applicable, all such works shall be inspected and calibrated regularly and maintained in good working condition.
b) The Manager may require that additional works be installed if the existing works do not provide an acceptable level of treatment. The Manager must authorize new works or alterations to existing works. The Manager must authorize new waste sources.

3. NOTIFICATION PROCEDURES

The Permittee shall immediately report to City of Vancouver Environmental Protection Branch at 604-450-3493 (24 hours):

a) Spills with the potential to be discharged to the Sanitary Sewer.
b) Failure of authorized works or conditions and/or failure to carry out authorized procedures that will or have the potential to result in a Permit limit being exceeded.
c) Discharge pH less than 2 or greater than 12.5.

4. BY-PASSES

The discharge of Wastes that by-pass any authorized works or is not in accordance with procedures designated by the Permit is prohibited, unless prior authorization of the Manager is obtained.

5. DISCHARGE MONITORING

a) All sampling and sample handling of wastewater discharges, including sample containers, storage, preservation and hold time requirements shall be carried out in accordance with all prescribed requirements stated within the latest edition of the “British Columbia Environmental Laboratory Manual” published by the Ministry of Environment, Province of British Columbia or "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, or an alternate standard authorized by the Manager.
b) With the exception of pH measurements, all samples shall be analyzed by an independent laboratory accredited through the latest version of ISO/IEC 17025 unless otherwise authorized by the Manager.

Issued: January 28, 2022

Nicole Montgomery
Deputy Sewage Control Manager

Waste Discharge Permit No. SC-101234-VSA

SCHEDULE B

c) Laboratories used by the Permittee must also be accredited by the Canadian Association for Laboratory Accreditation and/or the Standards Council of Canada for all parameters analyzed and must participate in relevant proficiency testing programs for each parameter.
d) Any changes in method or location of monitoring must be authorized by the Manager.
e) Additional monitoring and/or reporting shall be undertaken by the Permittee when required by the Manager.

CITY OF VANCOUVER

REAL ESTATE & FACILITIES MANAGEMENT
Environmental Services

Environmental Services
453 West 12th Avenue
Vancouver BC V5Y 1V4

vancouver.ca Tel: 3-1-1
(outside Vancouver) 604.873.7000

WASTE DISCHARGE PERMIT NO. SC-101211-VSA

Pursuant to:

Greater Vancouver Sewerage & Drainage District Sewer Use Bylaw No. 299, 2007 (as amended)

and the BC Environmental Management Act, S.B.C. 2003, c.53

Issued by the City of Vancouver to:

Providence Health Care Society

(the "Permittee")

To Authorize:

the discharge of Wastewater to Sewer from

a groundwater remediation and site excavation project

Located at:

1002 Station Street, Vancouver, BC V6A 0B5

Effective Period:

The terms and conditions set out in the Permit apply to the existing or planned works as of

June 01, 2021 and this Permit will expire on May 31, 2022.

Issued: June 01, 2021

Nicole Montgomery
Deputy Sewage Control Manager

CITY OF VANCOUVER

SCHEDULE A

This Schedule sets out requirements for the quantity and quality of the discharge to Sewer.

1. AUTHORIZED DISCHARGE SOURCE

Wastewater from a groundwater remediation and site excavation project located at 1002 Station Street, Vancouver, BC V6A 0B5.

The authorized discharge point is the sanitary maintenance manhole (ID 409219) at the SW corner of the intersection of Station St. and National Ave. and is the approved discharge point from the City of Vancouver Sewers and Drainage Design department.

2. DISCHARGE SAMPLING AND ANALYSES: Effective June 01, 2021

Sample collection time(s), date(s) and discharge flows shall be recorded during the period that the samples are taken.

a) The Permittee shall continuously measure and record the discharge flow rate to sanitary sewer during each month of operation using the method(s) authorized in Section 5 and record for reporting purposes, the following:

- Total discharge volume for the month (m^3)
- Number of days of discharge to sewer during the month
- Maximum daily discharge flow rate during the month (m^3/d)
- Total daily discharge volume on the date of sampling (m^3)
- Maximum instantaneous flow rate during the month (L/s)

On one normal operating day once per month collect 1 set of grab samples and analyze for:

- pH
- Total Suspended Solids
- Oil & Grease Hydrocarbon
- Heavy Extractable Petroleum Hydrocarbons (HEPH)
- Light Extractable Petroleum Hydrocarbons (LEPH)
- Volatile Organic Compounds (VOC)
- Volatile Petroleum Hydrocarbons (VPH)
- Chlorophenols
- Phenols
- Polycyclic Aromatic Hydrocarbons
- Total BETX
- Trichloroethylene

- Total Metals by ICP Scan including:
  Aluminum, Arsenic, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Zinc
- Dissolved Metals including:
  Aluminum, Antimony, Arsenic, Barium, Boron, Cadmium, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc

3. AUTHORIZED RATE OF DISCHARGE

- Maximum daily discharge volume: **358.00 m^3/d**
- Maximum instantaneous peak flow rate: **4.14 L/s**
- Maximum total discharge volume over Permit term: **42200 m^3**

Site Runoff: Provisions must be implemented to prevent site runoff from entering the sanitary sewer system via the excavation.

4. AUTHORIZED DISCHARGE CRITERIA

a) The Permittee shall not discharge Prohibited Waste, Storm Water or Uncontaminated Water, as defined in the Bylaw.

b) The Permittee shall not discharge Hazardous Waste, or effluent from the treatment of Hazardous Waste which exceeds the Effluent Standards for Hazardous Waste Facilities, as stipulated in Schedule 1.2, Column 3, of the BC Environmental Management Act Hazardous Waste Regulation.

c) The Permittee shall not discharge Restricted Waste or other Waste, as defined in the Bylaw, including but not limited to the following (regardless of sample type):

Parameter	Authorized Limit	Notes
pH	5.5 - 10.5 pH Units	
Total Suspended Solids	600 mg/L	
Oil & Grease Hydrocarbon	15 mg/L	
Chlorophenols	0.05 mg/L	
Phenols	1 mg/L	
Polycyclic Aromatic Hydrocarbons	0.05 mg/L	
Total BETX	1 mg/L	
Aluminum - total	50 mg/L	
Arsenic - total	1 mg/L	
Boron - total	50 mg/L	

CITY OF VANCOUVER

SCHEDULE A

Parameter	Authorized Limit	Notes
Cadmium - total	0.2 mg/L	
Chromium - total	4 mg/L	
Cobalt - total	5 mg/L	
Copper - total	2 mg/L	
Iron - total	10 mg/L	
Lead - total	1 mg/L	
Manganese - total	5 mg/L	
Molybdenum - total	1 mg/L	
Nickel - total	2 mg/L	
Selenium - total	1 mg/L	
Silver - total	1 mg/L	
Zinc - total	3 mg/L	

d) The Permittee shall not discharge Restricted Waste or other Waste, as defined in the Bylaw, with the following exceptions (regardless of sample type):

Parameter	Authorized Limit	Notes
Aluminum - dissolved	2 mg/L	
Antimony - dissolved	0.5 mg/L	
Arsenic - dissolved	0.3 mg/L	
Barium - dissolved	2.5 mg/L	
Boron - dissolved	15 mg/L	
Cadmium - dissolved	0.1 mg/L	
Chromium - dissolved	1 mg/L	
Cobalt - dissolved	0.3 mg/L	
Copper - dissolved	0.3 mg/L	
Fluoride - dissolved	18 mg/L	
Iron - dissolved	No Limit	
Lead - dissolved	0.3 mg/L	
Manganese - dissolved	1 mg/L	
Mercury - dissolved	0.01 mg/L	
Molybdenum - dissolved	1 mg/L	
Nickel - dissolved	1 mg/L	
Selenium - dissolved	0.1 mg/L	
Silver - dissolved	No Limit	
Tin - dissolved	1 mg/L	
Zinc - dissolved	0.5 mg/L	
Heavy Extractable Petroleum Hydrocarbons (HEPH)	No Limit	

CITY OF VANCOUVER

SCHEDULE A

Parameter	Authorized Limit	Notes
Light Extractable Petroleum Hydrocarbons (LEPH)	No Limit	
Volatile Organic Compounds (VOC)	No Limit	
Volatile Petroleum Hydrocarbons (VPH)	No Limit	
Trichloroethylene	0.5 mg/L	

5. AUTHORIZED WORKS AND PROCEDURES

The authorized works and procedures to treat and/or control the discharges are:

Source: Groundwater

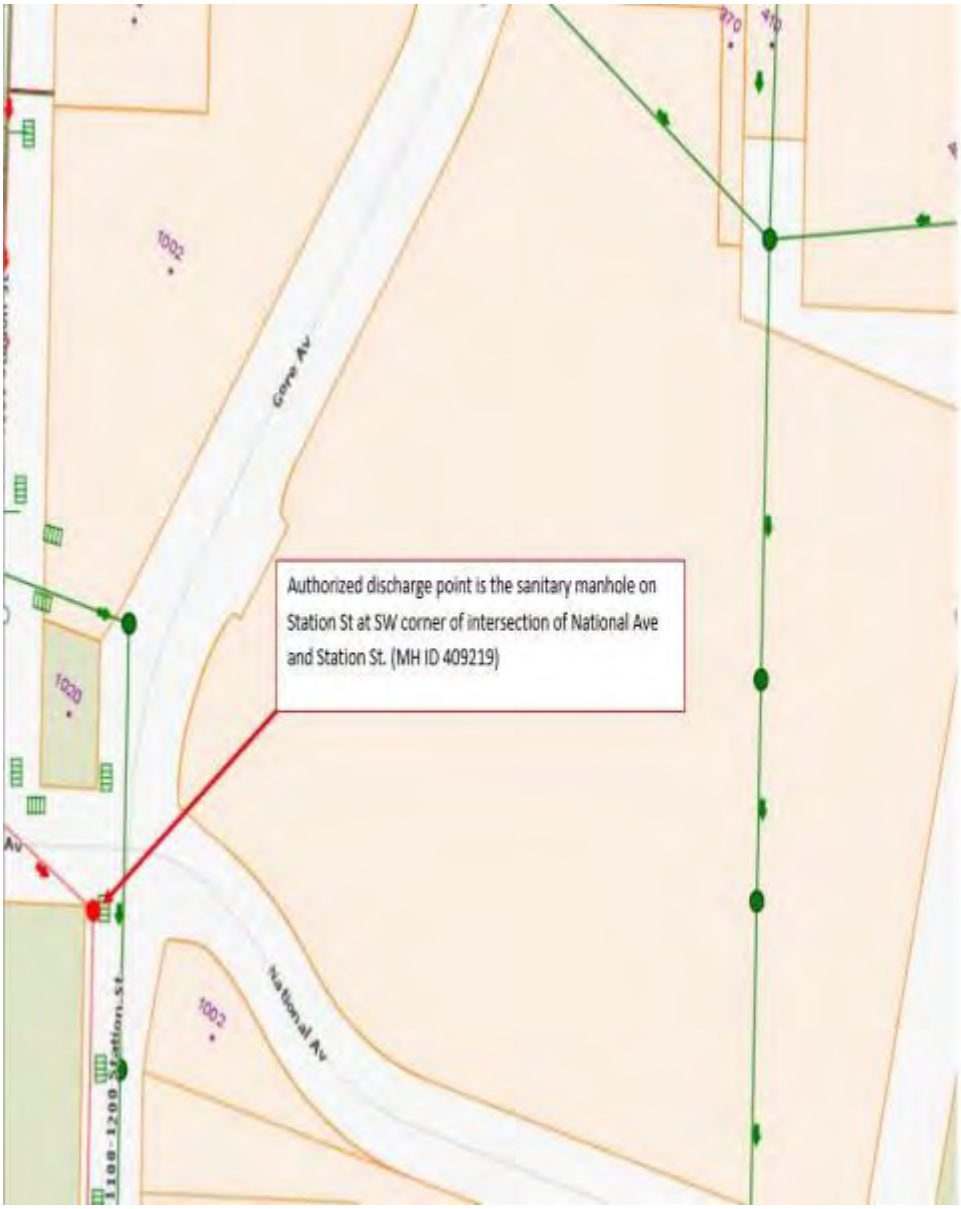
Type: Continuous

Works and Procedures	Completion Date
Sedimentation pond	Completed
Dewatering pump	Completed
Chemical and coagulation/flocculation addition	Completed
Settling tank	Completed
Transfer tanks	Completed
Sand filter	Completed
Two granular activated carbon vessels in series	Completed
Flow meter	Completed
Good operating practices	Completed

CITY OF VANCOUVER

SCHEDULE A

6. SITE PLAN(S)



Issued: June 01, 2021

Waste Discharge Permit No. SC-101211-VSA

Nicole Montgomery
Deputy Sewage Control Manager

CITY OF VANCOUVER

SCHEDULE A

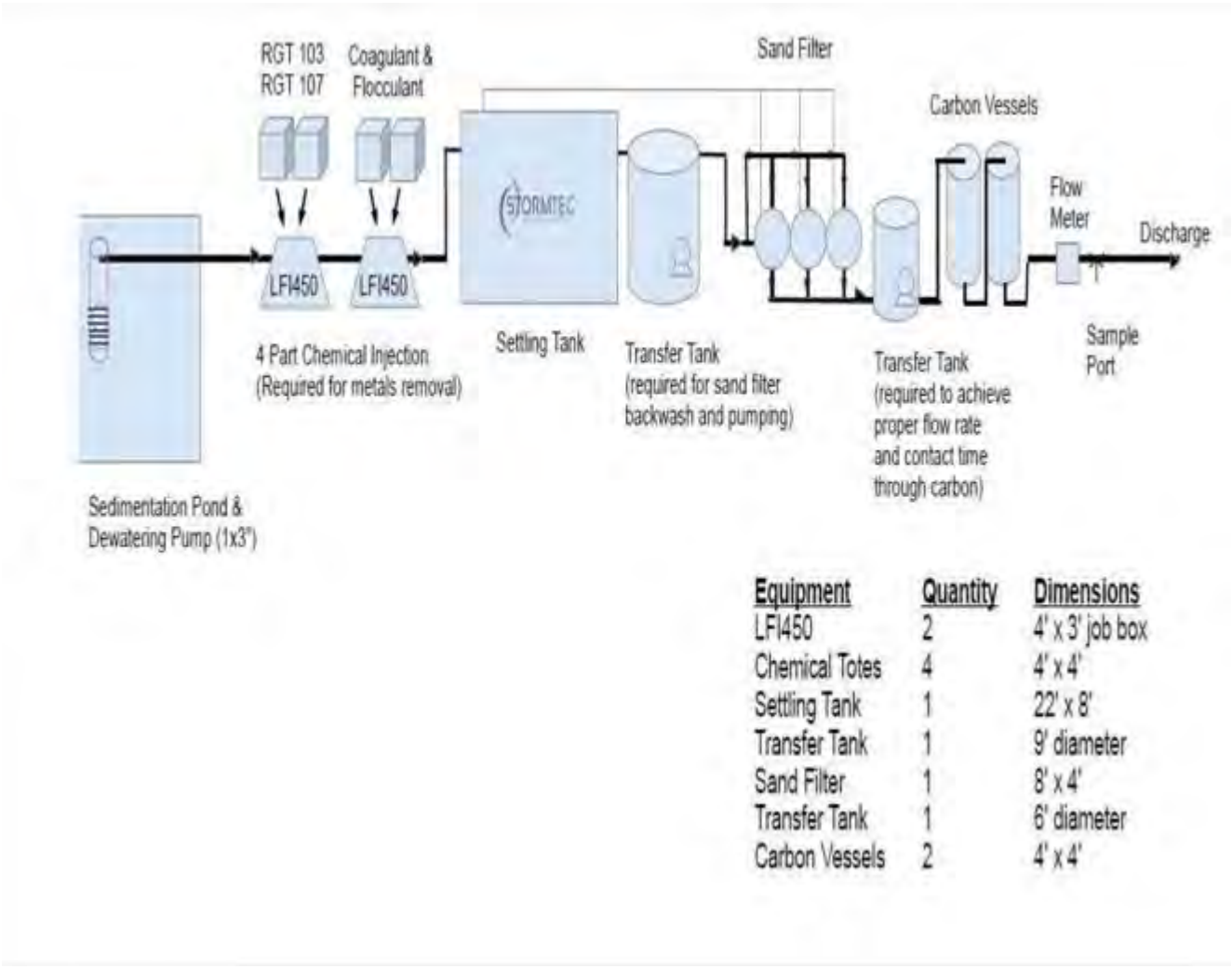
Issued: June 01, 2021

Waste Discharge Permit No. SC-101211-VSA

Nicole Montgomery
Deputy Sewage Control Manager

CITY OF VANCOUVER

SCHEDULE A



Equipment	Quantity	Dimensions
LFI450	2	4' x 3' job box
Chemical Totes	4	4' x 4'
Settling Tank	1	22' x 8'
Transfer Tank	1	9' diameter
Sand Filter	1	8' x 4'
Transfer Tank	1	6' diameter
Carbon Vessels	2	4' x 4'

CITY OF VANCOUVER

SCHEDULE A

7. REPORTING REQUIREMENTS

By July 31, August 31, September 30, October 31, November 30, December 31, 2021, January 31, February 28, March 31, April 30, May 31 and June 30, 2022:

The Permittee shall submit a report detailing the results of the discharge sampling and analyses program, as specified, for the previous month including lab reports. This information shall be submitted electronically using the supplied password-enabled web based application.

Should a violation of any term or condition of the Permit be noted, the report shall include a summary of the investigation into the cause of the violation and the corrective actions taken or proposed to prevent future violations. This does not preclude the immediate notification requirements specified in Schedule B.

CITY OF VANCOUVER

SCHEDULE B

This Schedule sets out standard conditions and requirements for emergency procedures.

1. STANDARD CONDITIONS

a) Except as otherwise provided in this Permit, all terms, conditions and definitions stipulated in the Bylaw shall apply to this Permit.
b) Pursuant to the Bylaw, the Sewage Control Manager (the Manager) may amend the terms and conditions of this Permit.
c) All records required by this permit shall be kept available for a minimum period of one year.

2. WORKS AND PROCEDURES

a) All authorized works, procedures and requirements shall be employed at all times during any discharge to sewer. As applicable, all such works shall be inspected and calibrated regularly and maintained in good working condition.
b) The Manager may require that additional works be installed if the existing works do not provide an acceptable level of treatment. The Manager must authorize new works or alterations to existing works. The Manager must authorize new waste sources.

3. NOTIFICATION PROCEDURES

The Permittee shall immediately report to City of Vancouver Environmental Protection Branch at 604-450-3493 (24 hours):

a) Spills with the potential to be discharged to the Sanitary Sewer.
b) Failure of authorized works or conditions and/or failure to carry out authorized procedures that will or have the potential to result in a Permit limit being exceeded.
c) Discharge pH less than 2 or greater than 12.5.

4. BY-PASSES

The discharge of Wastes that by-pass any authorized works or is not in accordance with procedures designated by the Permit is prohibited, unless prior authorization of the Manager is obtained.

5. DISCHARGE MONITORING

a) All sampling and sample handling of wastewater discharges, including sample containers, storage, preservation and hold time requirements shall be carried out in accordance with all prescribed requirements stated within the latest edition of the “British Columbia Environmental Laboratory Manual” published by the Ministry of Environment, Province of British Columbia or "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, or an alternate standard authorized by the Manager.
b) With the exception of pH measurements, all samples shall be analyzed by an independent laboratory accredited through the latest version of ISO/IEC 17025 unless otherwise authorized by the Manager.

Issued: June 01, 2021

Waste Discharge Permit No. SC-101211-VSA

Nicole Montgomery
Deputy Sewage Control Manager

SCHEDULE B

c) Laboratories used by the Permittee must also be accredited by the Canadian Association for Laboratory Accreditation and/or the Standards Council of Canada for all parameters analyzed and must participate in relevant proficiency testing programs for each parameter.
d) Any changes in method or location of monitoring must be authorized by the Manager.
e) Additional monitoring and/or reporting shall be undertaken by the Permittee when required by the Manager.

CITY OF VANCOUVER

PLANNING AND DEVELOPMENT SERVICES
Mailing Address:
453 West 12th Avenue, Vancouver BC V5Y 1V4
tel: 604.873.7611

Development and / or Building Application Form

To help expedite submission of your application, please fill out BOTH sides of this information sheet prior to attending the Application Preview counter located in the Development and Building Services Centre, Ground Floor, 515 West 10th Avenue (West Annex, City Hall).

JOB LOCATION (Correct and complete addressing is important. Complete this section carefully.)

Address: 1002 Station St. (PID 018-550-185) Specifics: The New St. Paul's - Phase 1A

Floor Level: N/A Suite No: N/A

Legal Description:

Lot(s) Lot A Block(s) N/A District Lot(s) 196,2037 Plan Number(s) LMP14138

Are you aware of the presence of any contaminated soils on the subject property? ☑ Yes ☐ No

Are you aware of the existence of any contaminated soils studies, reports, soil agreements, or Ministry of Environment orders or letters with respect to the subject property? ☑ Yes ☐ No

Is the building being converted to strata-title ownership? ☐ Yes ☑ No

Note: If you intend to convert an existing building to strata title ownership, please contact Subdivision and Strata Title staff at 604.871.6627 for information on the strata conversion process in advance of the issuance of any permits.

This area must be completed by the person signing the application form

Your Name: Jackie Trach

Mailing Address: 310 - 13911 Wireless Way

City: Richmond, BC Postal Code: V6V 3B9

E-mail Address: jmtrach@pcl.com

Phone Number: 604-220-6934 Fax Number:

Company Name: PCL Constructors Westcoast Inc.

Business License *Account* Number: 1377791

You are the:

- 01 ☐ Property Owner
- 02 ☑ Contractor
- 03 ☐ Certified Professional
- 04 ☐ Design Professional
- 05 ☐ Tenant
- 06 ☑ Agent for Owner
- 07 ☐ Agent for Tenant
- 08 ☐ Consultant
- 09 ☐ Non-profit Association Cert. No:
- 10 ☐ Civic Department
- 98 ☐ Other

Note: Contractors/design professionals/consultants MUST have a valid Business License to do work in the City of Vancouver. You may obtain current business license account numbers from the Business License Counter.

Complete the following for ALL applications

Property Owner's Name: Providence Health Care Society c/o St. Paul's Hospital	
Address: 1081 Burrard Street	City: Vancouver
Postal Code: V6Z 1Y6	Phone Number: 604-980-5852
Is the owner aware of this application? ☑ Yes ☐ No	
Contractor's Name: PCL Constructors Westcoast Inc.	
Address: 310 - 13911 Wireless Way	City: Richmond, BC
Postal Code: V6V 3B9	Phone Number: 604-220-6934
Business License Account Number: 1377791	
Tenant's Name: N/A	
Address:	City:
Postal Code:	Phone Number:
Job Contact:	
Address:	City:
Postal Code:	Phone Number:
Qualified Professional Contact Name (required for Salvage & Abatement):	
Address:	City: Postal Code:
Phone Number:	Business License Account Number:

Please continue application on reverse

This application is to: (Check applicable boxes)

- 001 ☐ Construct a new building(s)
- 002 ☐ Add to an existing building
- 003 ☐ Alter the interior/exterior
- 004 ☐ Add to a building and alter the existing portion
- 005 ☐ Add to a building and change the use
- 006 ☐ Add to the building, alter existing portion and change use
- 007 ☐ Interior/exterior alterations and change of use
- 008 ☐ Enclose an area of an existing building (balcony enclosures)
- 011 ☐ Project/Site Permit
- 014 ☐ Change of use
- 015 ☐ Retain use
- 016 ☐ Alter grade (raise or lower grade)
- 022 ☐ Alterations to legalize a suite
- 023 ☐ Alterations for a new suite
- 026 ☐ Demolish
  - ☐ Commercial
  - ☐ Fire damaged building
  - ☐ Non-rental one-family dwelling
  - ☐ Heritage building
  - ☐ Residential rental building
- 028 ☐ Temporary tents
- 030 ☐ Construct a garage/carport
- 031 ☐ Add/alter/demo garage/carport
- 038 ☐ Construct partial - framing, etc.
- 040 ☑ Excavate - valid for project address et al.
- 041 ☐ Move building from another site
- 042 ☐ Move building on the same site
- 043 ☐ Install a pool, fence, tennis court, boat ramp, sign, or similar
- 044 ☐ Upgrade seismic and/or sprinkler
- 045 ☐ Mechanical kitchen exhaust, roof top unit, satellite dish
- 046 ☐ Prefabricated structure placed on site
- 047 ☐ Fire damage repair
- 048 ☐ Flood damage repair
- 050 ☐ Landscape only
- 053 ☐ Building envelope repair

Is this a new tenant? ☑ Yes ☐ No

What is the existing use? Vacant Lot

What is the proposed use? Healthcare

How many storeys? 11, Varies

How many levels of underground parking? 4

How many new rooftop units? N/A

Describe work to be done:

(Complete carefully, Your application will be based on your written description.)

The scope of work is to remediate the existing contaminated soil as part of the construction of the New St. Paul's Hospital and Health Campus.

What is the value of the work proposed? (Include cost of plans, material and labour)

$ 35.7 Million

Will any of the following be altered/repaired/installed?
Select all that apply:

☐ Electrical ☐ Gas ☐ Drain Tile
☐ Plumbing ☐ Sprinkler ☐ Fire Alarm

Sprinkler Contractor's Name: N/A

Note: If the sprinkler contractor noted on this application changes, please notify the City of Vancouver in writing within 24 hours.

Special Sprinkler Inspection Number SP N/A

Complete the following for all residential buildings

	Existing	Proposed
Total number of dwelling units:	-	-
Total number of housekeeping units:	-	-
Total number of sleeping units:	-	-

Complete the following related permit information

Development Permit/Application Number DE DP-2021-0085

Minor Amendment Number DE

Building Permit/Application Number BU

Board of Variance Appeal Number Z

Combined Permit Application Number DB

Office Use Only

Office Use Only Invoice #

BU

DE

Office Use Only

BU (WWOP?)

DE

DT

BG f/m

ENV. PROT. Site Profile

SUBTOTAL

SP

TOTAL

As owner or owner's agent, I have verified that the information contained within this document and associated applications and plans is correct, and describes a use, a building or a work which complies with all relevant by-laws and statutes. I understand that personal information contained in this form will not be released to the public except as required by law; however, all associated applications and plans will be made publicly available during the development or building application process. I acknowledge that responsibility for by-law compliance rests with the owner and the owner's employees, agents and contractors. I will indemnify and save harmless the City of Vancouver, its officials, employees and agents against all claims, liabilities and expenses of every kind, in respect to anything done or not done pursuant to this application or fact sheet or ensuing permit, including negligence and/or the failure to observe all by-laws, acts or regulations.

SIGNED AT VANCOUVER, B.C. THIS 19 DAY OF March 20 21

SIGNATURE OF APPLICANT

From: "Carswell, Kelly" <Kelly.Carswell@vancouver.ca>
To: "Craig, Cheryl" <cheryl.craig@vancouver.ca>
Date: 5/7/2021 3:12:21 PM
Subject: RE: Facilities Notification 10501267 assigned

Hi Cheryl,

Thanks for the additional info!

The files reviewed did not indicate that contaminated soil is likely to be encountered at this location, as we have soil analytical along Prior Street in the area that indicate it is clean. That said, it is in an area were contamination in fill can be encountered and operations crews should follow the procedures outlined in our contamination management SOP and fact sheet. If they encounter anything unexpected like gasoline /solvent odours, unexpected fill materials, etc., they can contact me s.15(1)(l) in Environmental Services.

I'll update in SAP as well.

Thanks,
Kelly

Kelly Carswell | Contaminated Sites Specialist
m: s.15(1)(l)

-----Original Message-----
From: Craig, Cheryl <cheryl.craig@vancouver.ca>
Sent: Friday, May 7, 2021 11:44 AM
To: Carswell, Kelly <Kelly.Carswell@vancouver.ca>
Subject: RE: Facilities Notification 10501267 assigned

Hi Kelly,
The work will be performed on the 200 Blk Prior St. The water main is on the north side of Prior St.
I have attached the Vanmap showing the 300mm CI water main location on Prior St.
Please let me know if you require further information.

Cheryl

-----Original Message-----
From: Carswell, Kelly <Kelly.Carswell@vancouver.ca>
Sent: Friday, May 07, 2021 11:39 AM
To: Craig, Cheryl <cheryl.craig@vancouver.ca>

Subject: RE: Facilities Notification 10501267 assigned

Hi Cheryl,

Happy Friday to you too!

Yes, I'll get back to you on this early next week. From the figure you provided it's difficult for me to tell if the work is being done on 1002 Station St or below the sidewalk /Prior Street. Are you able to confirm?

Thanks,
Kelly

Kelly Carswell | Contaminated Sites Specialist
m: s.15(1)(l) [redacted]

-----Original Message-----
From: Craig, Cheryl <cheryl.craig@vancouver.ca>
Sent: Friday, May 7, 2021 11:17 AM
To: Carswell, Kelly <Kelly.Carswell@vancouver.ca>
Subject: RE: Facilities Notification 10501267 assigned

Hi Kelly,
Happy Friday, I hope you are doing well.
Would it be possible to receive the Contaminated Soils for 1001 Station by the end of next week?

Cheryl

-----Original Message-----
From: s.15(1)(l) [redacted]@vancouver.ca s.15(1)(l) [redacted]@vancouver.ca>
Sent: Wednesday, April 28, 2021 4:12 PM
To: Craig, Cheryl <cheryl.craig@vancouver.ca>
Subject: Facilities Notification 10501267 assigned

DO NOT REPLY TO THIS MESSAGE

Your facilities work request has been assigned to the appropriate work group to complete:

Work Group: Contaminated Sites
Notification: 10501267
Order Number: 700345925
Description: 1002 Station St - Contaminated Soils
Priority: Low

Estimated Finish Date: 2021/05/27

For updates or questions, please feel free to contact the Work Control Centre at 604-665-3456 with your notification number.

This message was automatically generated.

February 25, 2021

PCL Constructors Westcoast Inc.
13911 Wireless Way, Suite 310
Richmond, British Columbia, V6V 3B9

E-mail: rhorn@pcl.com

Attention: René Horn
Project Manager

Re: Soils Remediation Plan
St. Paul's Project, 1002 Station Street, 250 and 310 Prior Street, Vancouver, British Columbia
Pinchin File: 285732.000

Pinchin Ltd. (Pinchin) is pleased to provide a Soils Remediation Plan (SRP) to PCL Constructors Westcoast Inc. (Client) for the properties located at 1002 Station Street, 250 and 310 Prior Street in Vancouver, British Columbia (Site). For the purposes of this SRP, the focus of the SRP will be within the boundaries defined by the Client, as related to the proposed development of the new hospital (hereafter referred to as 'Hospital Project Footprint') and associated on-site roadways (hereafter referred to as 'Site Roadways' or 'Dedicated Lands'). In addition, the City of Vancouver (CoV) has requested adjacent off-site roadways affected by the redevelopment be included in the SRP.

Pinchin was advised by the Client that the purpose of the SRP was to review all environmental reports, including CoV Remediation Agreements and the Site Approval in Principal (AIP) as part of the Site redevelopment. It is Pinchin's understanding that the CoV and ownership requested the SRP prior to the commencement of the redevelopment activities.

REPORTS REVIEWED

The Client provided Pinchin with the following relevant documents:

- Site Profile – Schedule 1 Contaminated Sites prepared by PGL Environmental (PGL) for Providence Health Care Society, INC NO S41359 and dated: October 24, 2017;
- Letter entitled: "*Extent of Contaminated Soil at the St. Paul's Hospital Redevelopment Project*", prepared by PGL for Providence Health Care Society and dated: February 13, 2019;
- Report entitled: "*Stage 1 Preliminary Site Investigation*", prepared by prepared by PGL for Providence Health Care Society and dated March 2019;
- Report entitled: "*Stage 2 Preliminary Site Investigation and Detailed Site Investigation*", prepared by prepared by PGL for Providence Health Care Society and dated April 2019;

- Report entitled: "*Stage 2 Preliminary Site Investigation and Detailed Site Investigation, Screening Level Risk Assessment, and Remediation Plan*", prepared by prepared by PGL for Providence Health Care Society and dated February 2020 (Attachment 2);
- Remediation Agreement with City of Vancouver (Attachment 3);
- *"Risk Assessment Approach for Roadway Contamination Adjacent to the Proposed St. Paul's Hospital Development Site at 1002 Station Street and 250-310 Prior Street, Vancouver, BC (The "Lands)"*, prepared by the City of Vancouver and dated: June 20, 2020 (Attachment 4); and
- Site Approval In Principal issued by the BC Ministry of Environment and Climate Change Strategy (ENV) and dated: July 20, 2020 (Attachment 5).

Additional reports were provided and reviewed by Pinchin. As the relevant content of these reports are summarized in the above listed reports, the list of additionally reviewed reports has not been included here.

SUMMARY OF SITE BACKGROUND AND ENVIRONMENTAL SITE CONDITIONS

Based on Pinchin's review of the above-referenced reports, several areas of potential environmental concern (APECs) / areas of environmental concern (AECs) were identified in the PGL Stage 1 PSI report. Figure 1 of Attachment 1 indicates all the APECs and AECs. These notably include the presence of imported fill of poor quality with known impacts, the presence of hydrocarbon-impacted soil resulting from former on-site maintenance activities and soil impacted with metals as a result of former on-site rail yard use. Historically, the fill material on-site has been placed in various stages (described as pre- and post-1912 by PGL) and therefore is present at varying depths and quality throughout the Site.

Petroleum Hydrocarbons in Soil (Fill Material)

Concentrations of light/heavy extractable petroleum hydrocarbons (LEPH/HEPH), volatile petroleum hydrocarbons (VPH) and/or polycyclic aromatic hydrocarbons (PAHs) were identified in excess of the applicable standards in various locations of the Site at varying depths up to 6.0 mbgs. In most areas, vertical delineation has been achieved at depths shallower than 3.5 mbgs. However, additional impacts were identified at borehole locations 20-BH132, 20-BH134 and 20-BH135 at depths of 4.7 to at least 6.0 mbgs, 2.7 to 3.5 mbgs, and at 5.5 mbgs, respectively. Vertical delineation was not achieved at 20-BH132 as impacts were present at the maximum depth of the borehole, 6.0 mbgs. However, the exceedances noted at this location were found in a layer of "wood waste", which was identified at several boreholes throughout the Site. The maximum encountered depth of this layer is 6.5 mbgs and soil impacts related to this layer have been vertically delineated at borehole 20-BH135. As such, delineation has been inferred at location 20-BH132.

Metals and Inorganics in Soil (Fill Material)

Several metal parameters exceed the applicable standards throughout the Site, including some areas in the northern portion of the Site that have concentrations of select metals exceeding the toxicity characteristic leaching procedure (TCLP) criteria indicating the presence of soils that would be classified as hazardous waste as per the British Columbia (BC) *Hazardous Waste Regulation* (HWR). This soil is largely delineated, including the areas in the south portion of the Site. Vertical delineation had largely been completed throughout the Site.

Soil Quality of Native Material

PGL identified concentrations of arsenic and iron that exceeded their respective CSR standards in the native material, specifically within material suspected as marine sediments. PGL conducted statistical analysis of the results which indicated that iron concentrations statistically meet the standards, however, arsenic concentrations statistically exceed the standard. PGL was of the opinion that the arsenic concentrations in marine sediment were independent of arsenic concentrations measured in the fill material. In addition, concentrations of arsenic, cadmium, copper, iron, lead and zinc all exceed the applicable standards from the soil collected at 20-BH112 a depth of 7.4 mbgs. These impacts were vertically delineated at a depth of 8.0 mbgs. No other parameters of concern were detected at concentrations above the CSR standards. Soil samples collected from within the native material at these three locations meets the applicable standards, with the exception of arsenic at 20-BH127 at a depth of 6.2 mbgs (delineated at 6.6 mbgs).

Groundwater Conditions

Investigations have identified the presence of PAH-contaminated groundwater on Site. No other parameters in groundwater have been identified above the applicable standards.

During excavation activities, groundwater within the excavation will initially be pumped and either treated or disposed of at a suitable facility that will accept PAH-impacted groundwater. Any on-site discharge will occur in accordance with appropriately obtained permits. When a Qualified Professional (QP) determines that groundwater meets all appropriate standards, the QP may sign a Contaminated Site Groundwater Quality Declaration that groundwater impacts are not present in the water intended to be discharged. If that occurs, PCL may seek to modify their groundwater discharge plan. Any changes to this plan will be conducted in accordance with the rules, and approvals as needed, of all appropriate regulatory bodies with jurisdictional authority.

Groundwater impacts that remain on-site will be managed through a risk-assessment approach.

BC REGULATORY SITE STATUS

On July 20, 2020, the Site was issued an Approval In Principal (AIP) by the BC ENV. The AIP included the submission of a Stage 1 and 2 Preliminary Site Investigation, Screening Level Risk Assessment and Remediation Plan. The Remediation Plan (Provided in Attachment 4) was approved as an appropriate remedial strategy for the Site by the BC ENV. Although the configuration of the proposed hospital building has been altered, the general remediation strategy is consistent with that described in the AIP application. Further, the remediation plan adheres to the CoV Remediation agreement requirements.

REMEDIATION PLAN

The Site remedial works will be conducted in a manner to efficiently match construction works with remedial works. The goal of the remedial works at the Site is to meet all the requirements of the AIP, qualify each area to obtain a Certificate of Compliance (CoC), and meet each of the CoV's requirements for Site remediation as stipulated in the Remedial Agreement.

The primary mechanism for remediation of the Site will be the mass excavation of significant portions of the Site, placement of capping fill on some portions of the Site, and ENV approved risk-assessment for portions of the Site.

The Remediation Plan includes the following three separate areas:

1. Hospital Footprint Area

Soil from the Hospital Footprint Area will be excavated, and contaminated soil will be relocated to an approved landfill facility. Pinchin will be on-site to collect confirmation soil samples, characterize contaminated soil, and advise on appropriate contaminated soil handling. All sampling will adhere to ENV Technical Guidance 1. Groundwater recovered as part of dewatering activities will be treated and discharged under the terms of an appropriate discharge permit. Following confirmation sampling of the groundwater influent and effluent sampling confirming that the groundwater quality meets BC Contaminated Sites Regulations (CSR) standards, a Contaminated Site Groundwater Quality Declaration signed by a QP may be sought. This area will likely seek a standards based CofC as the complete removal of impacted soils and groundwater in this area is considered likely. The excavation activities will occur during the early stages of the redevelopment construction plan and it is anticipated that this will be the first CoC requested for the Site.

2. On-site Roadways (Dedicated Lands)

In accordance with the grading plan, the on-site roadways will have clean soil (meet applicable BC CSR Site standards) in the top 1.0 m below finished grade. Contaminated soil within this depth will be relocated to an approved waste facility. In addition, any hazardous waste concentration soils (within the on-site roadways) will be excavated and relocated to an approved hazardous waste facility. Per the final Project Agreement, this scope will be managed through a change order to the Contract. Clean fill material will replace the excavated roadways and any remaining residual contamination (in soil or groundwater) will be risk assessed in-situ. Pinchin will be on-site to collect confirmation soil samples, characterize contaminated soil, and advise on appropriate contaminated soil handling. The area containing on-site roadways will seek a risk-based CoC.

3. Off-site Roadways

We understand that the CoV has requested that a legal instrument be obtained for the off-site roadways. Further subsurface investigation may be required in order to obtain a legal instrument.

The CoV owned off-site roadways have not yet been fully investigated and only a portion of the lands are part of the existing AIP. To obtain a CoC for this land a subsurface investigation along Prior Street to fill data gaps will be necessary. It is likely that this assessment will determine that risk assessed in place is the best option due to safety as well as minimizing public disturbance. Remediation, if necessary, may be completed in conjunction with any utility works or road re-alignment works, as feasible, in order to meet CoV remedial requirements for roadways. The off-site roads will seek a risk-based CoC. Per the final Project Agreement, this scope will be managed through a change order to the Contract.

Japanese Beetle

The Site has been identified as being located within the regulated area for Japanese Beetle around the False Creek area of Vancouver by the Canadian Food Inspection Agency (CFIA). Pinchin has been in contact with the CFIA and will be seeking a soil movement certificate as required by the CFIA. Any soil or vegetation requiring deep burial according to the CFIA, will be disposed of at the Vancouver Landfill via deep burial. Pinchin will be the QP for monitoring appropriate soil management for Japanese Beetle during excavations works.

TERMS AND LIMITATIONS

This SRP was generated for PCL Constructors Westcoast Inc. (Client) in order to provide a summary of remedial plans associated with the property at 1002 Station Street, 250 and 310 Prior Street in Vancouver, British Columbia (Site), based on information collected and provided by others. The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property. This SRP does not quantify the extent of the current and/or recognized environmental condition or the cost of any remediation.

This letter was prepared for the exclusive use of the Client, subject to the terms, conditions and limitations contained within the duly authorized work plan for this project. Any use which a third party makes of this letter, or any reliance on or decisions to be made based on it, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

If additional parties require reliance on this letter, written authorization from Pinchin will be required. Pinchin disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this letter should not be construed as legal advice. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law.

This SRP was performed in general accordance with currently acceptable practices for environmental site investigations, as applicable to the Site. The information provided in this letter is based upon analysis of available documents, records and drawings and personal interviews. In evaluating the Site, Pinchin has relied in good faith on information provided by other individuals noted in this letter.

Pinchin has assumed that the information provided is factual and accurate. In addition, the findings in this letter are based, to a large degree, upon information provided by the Client. Pinchin accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this letter as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this letter, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

CLOSING REMARKS

We trust that the foregoing information is satisfactory for your present needs. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Pinchin Ltd.

Reviewed by:

Reviewed by:

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Encl.: Appendix I – Figures
Appendix II – PGL Stage 2 PSI, DSI, Screening Level Risk Assessment and Remediation Plan
Appendix III – City of Vancouver Remediation Agreement
Appendix IV – City of Vancouver Dedicated Lands Letter
Appendix V – Approval In Principal

\\fsrmd\job\285000s\0285732.000 PCL,250PriorSt,Vancouver,EDR,GenCons\Deliverables\285732 FINAL REV V1 Remediation Plan, St. Paul's Hospital Project, Vancouver, BC, PCL, Feb 25, 2021.docx

Template: Master Template for Peer Review Letter, EDR, May 28, 2019

APPENDIX I

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- APEC 2: METALS AND HYDROCARBON IMPACTS IN IMPORTED FILL (PRE-1912)
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- APEC 23: EXISTING ON-SITE CONCRETE PAD AND OIL-WATER SEPARATOR
- APEC: AREA OF POTENTIAL ENVIRONMENTAL CONCERN

LEGEND IS COLOUR DEPENDENT.
NON-COLOUR COPIES MAY ALTER INTERPRETATION.

PINCHIN

PROJECT NAME:
SOILS REMEDIATION PLAN

CLIENT NAME:
PCL CONSTRUCTORS WESTCOAST INC.

PROJECT LOCATION:
1002 STATION STREET AND 250 AND 310 PRIOR STREET, VANCOUVER, BRITISH COLUMBIA

FIGURE NAME:
SITE LOCATION PLAN SHOWING AREAS OF ENVIRONMENTAL CONCERN

SOURCE:	PROJECT NUMBER:	SCALE:
2019 PGL DSI REPORT, GOOGLE EARTH, ESRI	285732.000	1:3,500
	DRAWN BY: JK	REVIEWED BY: SJ
0 25 50 100 m	DATE: FEB 2021	FIGURE NUMBER: 1

APPENDIX II

PGL Stage 2 PSI, DSI, Screening Level Risk Assessment and Remediation Plan

Proposed St. Paul's Hospital Site
1002 Station Street & 250 and 310 Prior Street
Vancouver, BC

Stage 2 Preliminary and Detailed Site Investigation, Screening Level Risk Assessment, and Remediation Plan

PREPARED FOR:
Providence Health Care
5th Floor, 1190 Hornby Street
Vancouver, BC V6Z 2K5

PREPARED BY:
PGL Environmental Consultants
#1500 – 1185 West Georgia Street
Vancouver, BC V6E 4E6

PGL ENVIRONMENTAL CONSULTANTS

solve and simplify

PGL File: 5355-01.01

February 2020

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Executive Summary

Providence Health Care retained PGL Environmental Consultants (PGL) to conduct a Stage 2 Preliminary Site Investigation and Detailed Site Investigation of the proposed future site of Saint Paul's Hospital in Vancouver, BC (the Site).

The Site is in the False Creek area of Vancouver and has historically been used for industrial purposes, including a rail yard and various metal works. This report is intended to support a release and will eventually form part of an application for a Certificate of Compliance (CofC) from the BC Ministry of Environment and Climate Change Strategy. The CofC will support development of the future hospital and surrounding lands.

The investigation consisted of drilling boreholes to collect soil samples and installing and sampling groundwater and soil-vapour wells. Where Preliminary Site Investigation work identified contamination, areas of potential environmental concern (APECs) were redefined as areas of environmental concern (AEC) and we conducted Detailed Site Investigation work to delineate and characterize them.

We conclude that multiple areas of the Site are contaminated above the applicable BC Contaminated Sites Regulation numerical standards:

APEC #		Contaminants of Concern	Description
1	Imported fill (post-1912)	Metals in soil (See Table H in Report)	Soil in the top 1.5m exceeded standards in areas of the east and west portions of the Site. Groundwater and vapour did not exceed standards.
2	Metals and hydrocarbon impact in imported fill (pre-1912).	Metals and polycyclic aromatic hydrocarbons in soil and groundwater (See Table I in Report)	Fill soil commonly exceeded standards throughout the north and central portions of the Site. Groundwater exceeded standards for metals in the past but did not exceed standards for metals in the most recent sampling event. Some locations near buried creosote treated wood exceeded the stringent groundwater standard for pyrene.
3	Historical Repair and Maintenance Shops	Hydrocarbons in soil and vapour and chlorinated solvents in vapour (See Table J in Report)	Soil exceeds standards for hydrocarbons (mostly heavy extractable petroleum hydrocarbons). Soil also exceeds standards for metals, but these might be sourced from AEC 1 and AEC 2. Groundwater did not exceed standards. Vapour exceeded standards for hydrocarbons and some chlorinated solvents.

Contaminated areas have been characterized and delineated. After excavation for construction, post-remedial sampling, and completion of a risk assessment, the Site will be eligible for a CofC. This report can be used to support a permit release and, in the future, an application for a regulatory instrument along with a Confirmation of Remediation report and a Risk Assessment.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

PGL ENVIRONMENTAL CONSULTANTS

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List of Acronyms

AEC	-	area of environmental concern
APEC	-	area of potential environmental concern
BH##	-	borehole
BH##M	-	monitoring well
BTEX	-	benzene, toluene, ethylbenzene and xylenes
CL	-	CSR Commercial Land use Standards
CofC	-	Certificate of Compliance
CSM	-	Conceptual Site Model
CSR	-	BC Contaminated Sites Regulation
DSI	-	Detailed Site Investigation
DW	-	CSR Drinking Water Standard
ENV	-	BC Ministry of Environment and Climate Change Strategy
HEPH	-	heavy extractable petroleum hydrocarbons
HWR	-	Hazardous Waste Regulation
LEPH	-	light extractable petroleum hydrocarbons
LNAPL	-	light non-aqueous phase liquid
MW##	-	monitoring well
NAPL	-	non-aqueous phase liquid
PAH	-	polycyclic aromatic hydrocarbons
PCOC	-	potential contaminant of concern
PGL	-	PGL Environmental Consultants
ppm	-	parts per million
PSI	-	Preliminary Site Investigation
QA/QC	-	quality assurance/quality control
RL	-	CSR Residential Land use Standard
SLRA	-	Screening-Level Risk Assessment
SV##	-	soil vapour
SWEP	-	special waste extraction procedure
TCE	-	trichloroethene
TCLP	-	Toxicity Characteristic Leaching Procedure
TEH	-	total extractable petroleum hydrocarbons
UST	-	underground storage tank
VOC	-	volatile organic compound
VPH	-	volatile petroleum hydrocarbons

PGL ENVIRONMENTAL CONSULTANTS

1.0 INTRODUCTION

Providence Health Care retained PGL Environmental Consultants (PGL) to conduct a Stage 2 Preliminary Site Investigation (PSI) and Detailed Site Investigation (DSI) of the proposed future site of Saint Paul's Hospital in Vancouver, BC (the Site; Figure 1).

The Site is in the False Creek Flats area of Vancouver and has historically been used for industrial purposes, including a rail yard and various metal works. This report is intended to support a release. It will eventually form part of an application for a Certificate of Compliance (CofC) from the BC Ministry of Environment and Climate Change Strategy (ENV). The CofC will support development of the future hospital and surrounding lands.

The Stage 2 PSI assessed the presence or absence of potential contaminants of concern (PCOCs) at areas of potential environmental concern (APECs) identified in the Stage 1 PSI. Where contamination was identified, we characterized it and assessed the extent by DSI.

We investigated soil, groundwater, and soil vapour. The investigation identified:

- Metals and polycyclic aromatic hydrocarbon (PAH) contamination from historically imported fill; and
- Soil hydrocarbon and metals contamination, likely due to maintenance activities at the former rail yard.

This report was prepared, and the investigations were carried out, according to the requirements of the *Environmental Management Act* and the BC Contaminated Sites Regulation (CSR). This report may be submitted as part of an application for a Release or CofC, under the Roster of Approved Professionals provisions of the *Environmental Management Act* and CSR. The ENV and the Contaminated Sites Approved Professionals Society may rely on it for this purpose.

2.0 SITE INFORMATION

The Site consists of six legal lots in the False Creek area of Vancouver (Figure 1). The Site is improved with a vacant building, and parking area. The surrounding land use is commercial or light industrial except to the north, where it is residential. General information regarding location, land use, and ownership is in Table A. Current title information is in Appendix 1.

Table A: Site Information

Civic Address	1002 Station Street, 250 Prior Street, and 310 Prior Street, Vancouver, BC
PID	1002 Station Street: 018-550-185 250 Prior Street: 008-776-300; (three tied legal lots 008-776-326; and 010-813-217 310 Prior Street : 008-126-780; and (two legal lots) 008-126-798

Legal Description	1002 Station Street: Lot A Plan LMP14138 District Lot 196 NWD & DL 2037. 250 Prior Street: Lots C and D, Plan VAP12884, District Lot 196 NWD Blocks 15 To 18, & DL 2037. 310 Prior Street: Lots E and F Plan 13449 District Lot 196 NWD & DL 2037.
Owner	Providence Health Care Society
Land Use	Industrial
Zoning	I1 – Light Industrial
Proposed Land Use	Institutional/Commercial
Latitude*	49º 16' 31.25"
Longitude*	123º 5' 47.55"
Site Area	Total: 74,318m^2 1002 Station Street: 68,003m^2 250 Prior Street: 1,157m^2, 866m^2, and 1,637m^2 310 Prior Street: 805m^2 and 1850m^2
ENV Site #	1002 Station Street: 1100 250 Prior Street: 6478 310 Prior Street: 6477

* *Source: Google Earth*

2.1 Future Site Use

The planned future Site use is a mix of hospital, with commercial and possibly some high-density residential land use. Underground parking up to three levels will underlay much of the Site. No groundwater use is planned. PGL reviewed the Vancouver community plans for the False Creek and Downtown East Side areas. The future surrounding land use is consistent with existing uses, with Trillium Park to the east, mixed commercial and residential land use to the west, and Union Station to the south.

Figure A: Proposed Commercial and Hospital Land Use

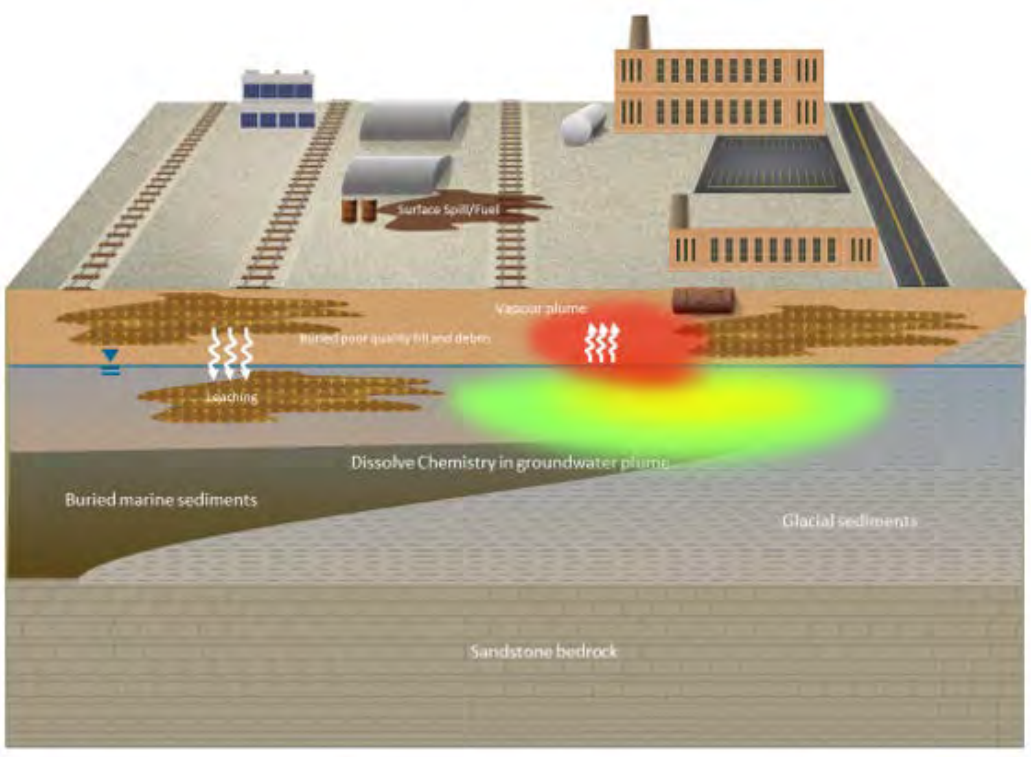
3.0 AREAS OF POTENTIAL ENVIRONMENAL CONCERN

APECs were determined by Stage 1[1]. APECs and their associated PCOCs were determined by reviewing archival records and inspecting the Site.

No CSR Schedule 2 uses or other land use of environmental risk is currently present onsite. The Site is mostly gravel-covered and unimproved and is used to park cars and as a staging area for film production. 310 Prior Street is occupied by a two-storey, warehouse-type building that had been vacant and unused for years.

Much of the Site was originally salt marsh and mud flats on the perimeter of False Creek that were filled starting in the early 1900s. Around 1915, the 1002 Station Street portion of the Site was developed as the west portion of the Burlington Northern Railway yards property. The Burlington Northern Railway property included freight sheds, repair and machine shops, a locomotive maintenance area, and other rail-related features. Historical operations at 250 Prior Street included scrap metal, metal handling, and railway-related operations. Historical operations at 310 Prior Street included Great Western Smelter and Canada Metal Plant No. 2 (Figure 2 and Figure 3).

Figure B: Past Rail Yard and Industrial Land Use



PGL identified 22 APECs, as listed in Table B and shown on Figure 3 and Figure 4. These APECs were carried forward and were assessed in this Stage 2 PSI/DSI.

[1] PGL Environmental Consultants (2019). Stage 1 Preliminary Site Investigation – Proposed St. Paul's Hospital Site.

Table B: Areas of Potential Environmental Concern

APEC	Description	Location	Details
1	Imported fill (post-1912)	Site-wide	Generally dredged marine sediments and soils from the Grandview Cut rail line. Some wood waste and debris. Gravel imported during the construction of the rail yard.
2	Metals and hydrocarbon impacts in imported fill (pre-1912).	250 and 310 Prior Street and extending onto 1002 Station Street	The fill in the centre of the Site contains more debris and higher metals concentrations than the balance of fill. Fire insurance maps show this material was imported as early as 1912, before the rest of the Site was filled.
3	Historical repair and maintenance shops	Historical 940 Station Street (now northern portion of 1002 Station Street)	The associated buildings have been removed from Site. Prior investigations did not identify contamination in this area.
4	Historical locomotive maintenance repair area	Near the intersection of Atlantic Street and Malkin Avenue.	The actual repair facilities were offsite to the east (APEC 21), but surficial staining reportedly extended west onto the Site. Offsite, hydrocarbon contamination (TEH, BTEX, and PAH) was identified at the surface ("few inches") in previous reports.
5	Historical weigh scale	East of the former freight shed at 940 Station Street	Hydrocarbon (TEH) and tin contamination was identified in soil in this area.
6	Historical boiler house and fuel oil shed	Southeast quadrant of the Site, west of storm sewer main.	The associated structures have been removed from Site. Prior investigations do not reference contamination in this area.
7	Historical potentially leaking gasoline UST	Southeast quadrant of the Site, east of storm sewer main.	A 1992 Phase III assessment states that this tank had leaked but subsequent investigations do not reference contamination in this area. It is not clear if the tank had been removed.
8	Historical temporary storage of TCE-contaminated soils	On a concrete pad inferred to be the former platform east of Union Station.	TCE-contaminated soils were excavated from an offsite area farther east and temporarily stored onsite. Prior investigations do not reference contamination in this area, but vapour sampling was never conducted.
9	Former Beam Manufacturing Co. Ltd. (Sawmill)	Appears to have overlapped the east end of 250 Prior and the west end of 310 Prior at the turn of the century	A planning mill, sash and door factory, dry kiln, and sawmill were onsite.
10	Former Canadian Junk Co. Ltd. and Atlas Iron and Metals Ltd.	250 Prior Street	Scrapyard and metal sales operation at 250 Prior Street from the 1930s to 1970s.

APEC	Description	Location	Details
11	Former Great Western Smelter and Canada Metal Plant No. 2	310 Prior Street	Two metal works operations historically operated at 310 Prior Street: Canadian Metal (1956 to 1961) and Great West Smelting Co. (1930 to 1951). There is hazardous waste soil metals contamination on 310 Prior Street. It is not clear if this is sourced from the smelter operations or from historical filling (APEC 2).
Offsite			
12	Historical Manufacturing and sheet metal operations.	Two properties west of the Site along Station Street (950, and 1024 Station Street)	Listed in directory searches. No additional details.
13	Inferred historical dry-cleaning operations	Six properties north of the Site at 823 Main Street, 237 Prior Street, and 210, 255, 274, and 328 Union Street	These properties are listed in directories as cleaners or laundry operations which may include dry cleaning.
14	Former service station and garage	219 Prior	Listed in directory searches. No additional details.
15	Historical upgradient salvage/auto wrecking	Two properties at 241 and 269 Prior Street	Listed in directory searches. No additional details.
16	Historical upgradient salvage/auto wrecking	413 Prior Street.	Listed in directory searches. No additional details.
17	Historical electroplating, boat building and trucking operations	249 Prior Street	Listed in directory searches. No additional details.
18	Former fuel operation	408 Prior Street, north and east of the Site	Listed in directory searches. No additional details.
19	Former leaking gasoline UST	410 and 456 Prior Street.	This property corresponds with a notice of offsite migration indicating that contamination may have migrated onto the 1002 Station Street Site.
20	Historical ink manufacturing	496 Prior Street	Listed in directory searches. No additional details.
21	Historical rail operations and imported fill	580 Malkin Avenue	This is the former eastern continuation of the 1002 Station Street property.
22	Historical rail maintenance centre	1100 and 1150 Station Street	This property is downgradient of the Site, but close enough that contamination could migrate if a significant plume were present.

Notes: BTEX = benzene, toluene, ethylbenzene and xylenes
PAH = polycyclic aromatic hydrocarbons
TCE = trichloroethene
TEH = total extractable petroleum hydrocarbons
UST = underground storage tank

4.0 POTENTIAL CONTAMINANTS OF CONCERN

PCOCs are sourced from activities at each APEC. PCOCs for each APEC are summarized in Table C.

Generally, if the APEC is onsite, we will consider soil, groundwater, and soil vapour at risk. The highest risk of contamination being where contaminants were used or stored.

Where groundwater or vapour transport from offsite sources is possible, we do not consider the soil matrix at risk unless the PCOC is a NAPL[2]. This is a reflection that dissolved contamination in groundwater does not result in much mass transport. For NAPL contaminants, which can move independently of groundwater, we consider soil a matrix of concern if groundwater contamination is present exceeding standards. Vapour contamination is a concern if volatile contaminants are present in soil or groundwater. Vapour contamination from offsite properties is considered if the offsite vapour source is within 30m or volatile contaminants have migrated in groundwater.

Table C: PCOCs

APEC			Typical Contaminant Source	PCOC	Media at Risk
#	Description				
1	Imported fill (post-1912)	Site-wide	Demolition debris, treated and untreated wood debris, rail track ballast, marine dredgate	Metals, LEPH, HEPH, PAH, phenols (chlorinated and non-chlorinated), sodium and chloride.	Soil and water
2	Metals and hydrocarbon impacts in imported fill (pre-1912).	250 and 310 Prior Street and extending onto 1002 Station Street	Demolition debris, industrial waste, treated and untreated wood debris	Metals, LEPH, HEPH, PAH, phenols (chlorinated and non-chlorinated)	Soil and water
3	Historical Repair and Maintenance Shops	Former 940 Station Street (northwest 1002 Station Street)	Fuel, new and used oil, metals (from waste oil, engine wear and welding), solvents.	Metals, LEPH, HEPH, PAH, BTEX, VPH, VOC, glycols	Soil, water and vapour
4	Historical Locomotive Maintenance Repair Area	Intersection of Atlantic Street and Malkin Avenue	Fuel, new and used oil, metals (from waste oil, engine wear and welding), solvents.	Metals, LEPH, HEPH, PAH, BTEX, VPH, VOC, glycols	Soil, water and vapour
5	Historical Weigh Scale	East of the former freight shed at 940 Station Street	Historical surface hydrocarbon staining and TEH contamination noted in previous reports	LEPH, HEPH, PAH	Soil and water
6	Historical Boiler House and fuel oil shed	Southeast quadrant of the Site	Fuel oil	LEPH, HEPH	Soil and water

[2] Non-aqueous phase liquid

APEC			Typical Contaminant Source	PCOC	Media at Risk
#	Description				
7	Historical potentially leaking gasoline UST	Southeast quadrant of the Site	Gasoline	BTEX, LEPH, VPH, Fuel parameters	Soil, water and vapour
8	Storage of TCE contaminated soils	Inferred to be the former platform east of Union Station.	Residual TCE leached from contaminated soil	Trichloroethene (TCE)	Vapour
9	Beam Manufacturing Co. Ltd.	East end of 250 Prior and west end of 310 Prior	Machine shops, lubricants, fuel, solvents, phenolic binding resins, wood preservatives, wood waste	Metals, LEPH, HEPH, PAH, BTEX, VOC, phenols (chlorinated and non-chlorinated)	Soil, water and vapour
10	Canadian Junk Co. Ltd. and Atlas Iron and Metals Ltd.	250 Prior Street	Scrap metal, lubricants, hydraulic oils	Metals, LEPH, HEPH, PAH	Soil, water and vapour
11	Great Western Smelter and Canada Metal Plant No. 2	310 Prior Street	Slag and casting waste, lubricants, solvents, phenolic resins.	Metals, LEPH, HEPH, PAH, BTEX, VPH, VOC, phenols	Soil, water and vapour
12	Manufacturing and sheet metal operations and imported fill.	950, and 1024 Station Street	Lubricants, solvents, metals	Metals, LEPH, HEPH, PAH, BTEX, VPH, VOC	Soil, water and vapour
13	Inferred dry cleaning operations	823 Main Street, 237 Prior Street, and 210, 255, 274, and 328 Union Street.	Dry-cleaning solvents (stoddard solvent and tetrachloroethylene)	VPH, VOC (tetrachloroethylene and breakdown products)	Water and vapour
14	Upgradient service station and garage	219 Prior Street.	Fuels, new and used lubricating oil, solvents.	Metals, LEPH, PAH, BTEX, VPH, VOC	Water and vapour
15	Upgradient salvage/auto wrecking	241 and 269 Prior Street.	Fuels, new and used lubricating oil, solvents, scrap metal	Metals, LEPH, PAH, BTEX, VPH, VOC	Water and vapour
16	Upgradient salvage/auto wrecking	413 Prior Street.	Fuels, new and used lubricating oil, solvents, scrap metal	Metals, LEPH, PAH, BTEX, VPH, VOC	Water and vapour
17	Electroplating, boat building and trucking operations	249 Prior Street	electroplating waste, solvents, lubricants, fuel	Metals, BTEX, LEPH, VPH, VOC	Water and vapour
18	Fuel operation	408 Prior Street	Gasoline, diesel, fuel oil	BTEX, LEPH, VPH, Fuel additives	Water and vapour
19	Leaking gasoline UST	410 and 456 Prior Street.	Gasoline	BTEX, LEPH, VPH, Fuel additives	Water and vapour
20	Ink manufacturing	496 Prior Street	Metals, solvents	Metals, VOC, VPH	Water and vapour

APEC			Typical Contaminant Source	PCOC	Media at Risk
#	Description				
21	Locomotive repair and maintenance and imported fill	580 Malkin Avenue	Fuel, metals (from waste oil, engine wear and welding), solvents	Metals, LEPH, PAH, BTEX, VPH, VOC	Water and vapour
22	Rail Maintenance Centre	1100 and 1150 Station Street	Fuel, metals (from waste oil, engine wear and welding), solvents	Metals, LEPH, PAH, BTEX, VPH, VOC	Water and vapour

Notes: LEPH/HEPH = light/heavy extractable petoleum hydrocarbons PAH = polycyclic aromatic hydrocarbons
BTEX = benzene, toulene, ethylbenzene and xylenes VPH = volatile petroleum hydrocarbons
VOCs = volatile organic compounds TCE = trichloroethene TEH = total extractable hydrocarbons

5.0 REGULATORY CONTEXT

CSR standards are based on specific exposure pathways, and standards are applicable if there is a complete pathway between the contaminant source and potential receptors. Under Section 11 (2) of the CSR, a site is not a contaminated site if the soil, surface, groundwater, and soil vapour do not exceed the site-specific standards.

The following standards are applied:

Table D: Applicable Standards

Media	CSR Standard
Water	Schedule 3.2 – Protection of Marine Aquatic Life Protocol 7 – Mandatory numerical water standards for VH_{W6-10} and EH_{W10-19}
Soil (High Density Residential - Institutional)	Schedule 3.1 Part 2 and 3 – Generic numerical soil standards
	Schedule 3.1 Part 1 – Intake of contaminated soil
	Schedule 3.1 Part 1 – Toxicity to soil invertebrates and plants
	Schedule 3.1 Part 1 – Groundwater flow to surface water used by marine aquatic life
Soil-Vapour (High/Low Density Residential/ Parkade)	Schedule 3.3 – Generic numerical vapour standards

5.1 Soil Standards

Soil standards are based on site use and location with respect to environmental and human receptors. The future proposed land use is institutional, so results are compared to High-Density Residential Standards. Commercial Standards are applied to locations more than 3.0m below grade. Commercial Standards are applied to most neighbouring offsite areas. Residential standards apply to homes across Prior Street to the north.

Some standards are matrix-dependant and are specific to exposure pathways that contaminants can travel from soil to receptors and vary due to environmental factors like pH. Matrix-dependant standards for a specific pathway are not applied if the exposure pathway is not operable:

- Standards to protect livestock and irrigation are not applied because there is no nearby livestock or irrigation land use; and
- Drinking water standards are not applied because there is no current drinking water use, and conditions at the Site and surrounding area would preclude the use of drinking water wells.

In some cases, standards can be adjusted based on regional background estimates as described in CSR Protocol 4. Background concentrations apply to regional non-point sources and not anthropogenic point-source releases. Contamination sourced from imported fill is anthropogenically generated and arguably a point source release, so we have not used regional background concentrations to decide contamination.

5.2 Groundwater Standards

The CSR includes groundwater standards for drinking water, aquatic life, irrigation, and livestock watering.

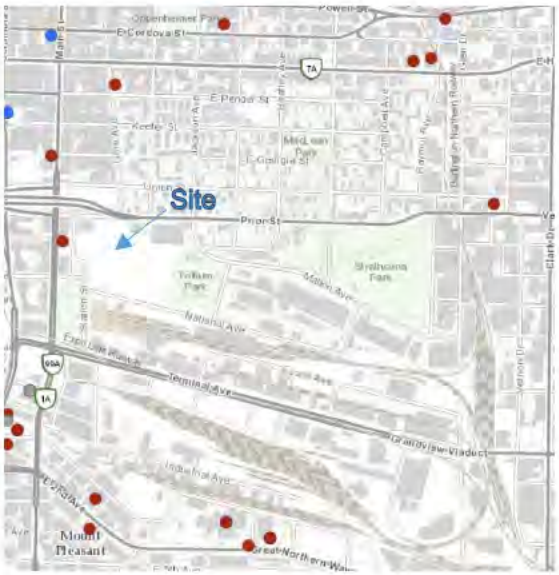
5.2.1 Drinking Water Standards

The CSR Drinking Water (DW) standards are applied by default unless Site-specific factors demonstrate that DW standards do not apply. Applicability of DW standards is determined as laid out in CSR Protocol 21. As specified in Protocol 21 DW standards do not apply to 1002 Station Street (most of the Site) because it is former filled marine foreshore.

DW standards are not applied at the former shoreline area on 250 and 310 Prior Street either. DW use could not be eliminated by following the steps laid out in Protocol 21. However, we obtained a drinking water standards exemption from ENV in February 2020 based on the following rationale:

- The Site and surrounding area have a long history of industrial activities, multiple sources of contamination, and area-wide historical fill placement;
- 90% of the Site is filled marine foreshore;
- The direction of groundwater flow is towards the area of filled marine foreshore;
- Water for the Site and greater Vancouver area is supplied by Metro Vancouver. This is not expected to change over the long term;
- There is no registered aquifer below the Site;
- The area is not located in an area of known limited water resources;
- Former upland soil aquifers with hydraulic conductivities greater than 10^{-6}m/s are either composed of fill or have an average saturated thickness of 2m or less.
- Deeper soil and bedrock aquifers underlying the Site have hydraulic conductivities and/or yields too low to supply water for a domestic well; and
- Most BC Ministry of Environment and Climate Change Strategy (ENV) sites in the area have not applied DW standards based on similar lines of evidence as presented in this application.

Figure C: Sites in Surrounding Area That Have Not Applied DW Standards (Red)



5.2.2 Aquatic Life Water Standards

Aquatic Life Standards are applicable to groundwater within 500m of surface water containing aquatic life. The Site is 340m from False Creek; therefore, Marine Aquatic Life Standards have been applied. No freshwater bodies receive groundwater from the Site.

5.2.3 Irrigation and Livestock Watering Standards

No land use associated with irrigation and livestock watering is near the Site. Irrigation and livestock watering standards do not apply.

5.3 Soil-vapour Pathways and Standards

The CSR requires soil-vapour assessment at sites with volatile PCOCs. Numerical standards for soil-vapour are based on land use. Vapour data is compared to standards after attenuation factors are applied. Attenuation factors account for exposure differences between the vapour source area and the expected breathing space. Attenuation factors are selected based on indoor or outdoor exposure, and the barriers/distance between the vapour source and exposure, such as the depth of the soil or concrete slabs.

The proposed land use is institutional with underground parking; therefore, Institutional/Residential and Parkade Standards are applied.

Commercial Standards apply to most offsite areas. Properties across Prior Street to the north of the Site (20m away) are residential. Urban Park Standards (the same as Residential Standards) apply to Trillium Park to the east.

5.3.1 Attenuation Factors

Outdoor attenuation factors are currently applied to most of the Site. Sub-slab attenuation factors arguably apply to the vacant and derelict building at 310 Prior Street. Sub-slab attenuation factors (with Parkade standards) or outdoor attenuation factors (with Residential Standards) will apply to the future development.

We assume that sub-slab attenuation factors apply to nearby buildings. Industrial buildings on Prior Street are slab on grade, residential buildings on Prior Street are either slab on grade or have half-basements above the water table. Buildings on Station Street are either slab-on-grade or are newer buildings with underground parking constructed equivalent to the 2012 BC Building code with sub-slab gravel and drain tile. Future construction in the area is expected to be similar.

5.4 Hazardous Waste Regulation

The CSR and Hazardous Waste Regulation (HWR) were 'decoupled' in 2016, removing the requirement to characterize Site media against HWR Standards. HWR Standards are considered when Site media (soil in this case) is transported offsite. However, understanding the distribution of hazardous waste onsite is important for remediation planning since costs to dispose of this material are much higher than other contaminated media.

Hazardous Waste Standards are not always compared to total contaminant concentrations. At the Site two tests are important: leachable metals by Toxicity Characteristic Leaching Procedure (TCLP) and total PAH toxicity equivalent (PAH TEQ).

6.0 METHODOLOGY

PGL investigated and delineated contamination in soil, groundwater, and soil vapour.

Work was conducted according to ENV guidance and PGL's standard field methods. PGL's standard field methods are attached in Appendix 2.

We conducted drilling and sampling programs from 2016 through 2018:

- August 2016 (BH01M through BH05M) – Boreholes drilled on Prior Street to assess potential offsite migration of metals-impacted groundwater and potential impacts from offsite APECs;
- May 2018 (BH100M through BH158; SV01 through SV08) – PSI boreholes drilled to assess APECs and provide additional coverage of the known areas of contaminated fill; and
- August/September 2018 (BH160 through BH185; SV09 through SV19) – DSI boreholes to delineate areas of soil and vapour contamination identified during the May 2018 PSI drilling at AEC 3 and provide additional coverage of contamination in fill (AEC 1 and AEC 2)

6.1 Preliminary Site Investigation Rationale

The PSI assessed APECs identified in our Stage 1 PSI report. We advanced boreholes at each APEC and extracted data from historical environmental reports to enhance investigation coverage.

Most boreholes were advanced to provide coverage within APECs, since, in most cases, locations of specific facilities, storage areas, or work areas are not known. Investigation locations were generally spaced between 25m and 50m apart as preferred in CSR Technical Guidance 1. Investigation spacing is smallest in areas where historical reports indicated contamination (e.g., APEC 2). Where contamination was identified we advanced boreholes and wells to delineate it or, in the case of heterogeneous fill, provided enough coverage to characterize it.

Table E: Summary of PSI Investigation Locations and Rationale

APEC #	Key Locations and Rationale
1	Samples at most borehole locations were analyzed for metals, which were identified as the primary concern during historical investigations. LEPH/HEPH/PAH analysis was conducted at most locations, but particularly where we observed hydrocarbon or creosote odour. Phenols were analyzed where significant wood waste was observed. Sodium and chloride were analyzed at some locations
2	All locations inside the area of APEC 2 on Figure 5. Rationale is similar to APEC 1. Groundwater coverage in the centre of the APEC is lighter than suggested by ENV guidance. This is not a limitation because the areas with the highest (and most leachable) metals contamination in soil have good groundwater coverage and likely represent the worst onsite conditions.
3	BH119M, BH125, BH132, BH133, BH134, BH136, BH139; SV06, SV07, and SV03 The exact layout of the maintenance facilities is not known. Boreholes were dispersed for coverage across the APEC.
4	BH111 through BH118; SV01, and SV02 Boreholes were advanced in an area where historical surface staining was reported. Actual maintenance facilities were offsite to the east.
5	BH106M through BH109, and TH34 Boreholes were advanced in an area where staining was historically reported and around TH34, which had TEH hydrocarbon impacts during historical investigations.
6	BH121M One well installed at APEC location
7	BH122M, MW98-4, TH32, and SV04 Boreholes were advanced near the reported location of a gasoline UST. No contamination was identified during historical investigations.
8	BH126 through BH128; SV05 Boreholes were installed at the APEC location. We did not sample groundwater since there was no evidence of impact in soil or soil vapour.
9	BH100M, BH103M, BH105, BH125M, BH135M, HYMW98-3, MW99-1, MW98-1, MW98-2, TH95-19, TH95-22; SV08, SV11, and SV12 The exact facility layout is not known so boreholes were advanced for coverage. Non-PGL boreholes were advanced to assess APEC 2.
10	BH103M, BH104M, and HYMW98-1 through HYMW98-12 The facility layouts are not known so boreholes were advanced for coverage.
11	BH100M, BH101M, BH102M, AH99-4 through AH99-8, and MW99-1 through MW99-3 The layouts of the facilities are not known, so boreholes were advanced for coverage.
12	BH130M and BH131M Boreholes advanced at the nearest property boundary.
13	BH01M through BH05M Boreholes advanced on Prior Street, downgradient of the risks.

APEC #	Key Locations and Rationale
14	BH04M Downgradient of the risk.
15	BH04M and BH05M Downgradient of the risk.
16	BH01M, BH101M, and BH129M Downgradient of the risk.
17	BH04M and BH05M Downgradient of the risk.
18	MW99-2 (adjacent) and BH101M, BH129M onsite and downgradient of the risk. More information about investigation and remediation on this property provided in Keystone Environmental's report (Appendix 3)
19	
20	BH115M Downgradient of the risk.
21	BH110M and BH115M Boreholes advanced at the nearest property boundary.
22	BH124M and BH123M Boreholes advanced at the nearest property boundary.

6.2 Detailed Site Investigation Rationale

The primary goal of the DSI was to delineate contamination. Delineation is often accomplished by stepping out from areas of contamination and collecting samples until clean limits are reached. However, most contamination at the Site is associated with historically imported poor-quality fill (AEC 1 and AEC 2). Because of the heterogeneous nature of poor-quality fill, 'step-outs' are not the best characterization approach. DSI investigation concentrated on characterizing fill populations and providing enough coverage to facilitate remediation and development planning. Soil characterization spacing is generally less than 20m in AECs, as preferred in CSR Technical Guidance 1. Areas with more heterogeneity or higher concentrations were investigated with a greater density of boreholes (e.g., at the north end of AEC 2).

Characterization spacing is wider in some cases, particularly at the south end of AEC 2. This is not considered a limitation since the AEC is grossly delineated and historical mapping (Section 7.5.2) gives information about the likely boundary. More characterization may be warranted to support efficient remediation of this area in the future.

For point-source contamination (e.g., contamination sourced from a former land use) or contamination that can migrate (e.g., contamination in groundwater or soil vapour) we use the step-out approach (e.g., AEC 3). Step-out distances were between 10m and 20m, which is more than the distances recommended by CSR Technical guidance. The larger step-outs are justified based on the size of the AECs. Investigation spacing is tight enough that the distribution of contaminants is understood and unlikely to migrate through a gap in delineation locations.

Fill-related contamination has not been delineated on offsite properties (except for Prior Street). Fill was placed on the Site and surrounding area historically; therefore, we do not consider the presence of contaminated fill on neighbouring properties to be a "migration" that the Site is responsible for as per CSR Administrative Guidance 15 – Scenario 5A..

6.3 Drilling and Soil Sampling

Boreholes were advanced using an auger drill by Southland Drilling (August 2016) and Vanmars Drilling (May to September 2018). During drilling, PGL logged soil stratigraphy and collected soil samples. We measured soil sample headspace vapours with an organic vapour monitor. Specific details of well stratigraphy, backfill and construction, and headspace vapours are presented in the borehole logs (Appendix 4). Investigation locations were geolocated using a Trimble GPS accurate to within 0.8m.

We employed different sampling strategies depending on the APEC:

- In areas of historical fill, we collected samples in each significant zone where we observed visibly different material. Areas of odour, debris, or staining were targeted. Most samples were analyzed for metals, but we added analysis for hydrocarbons at select samples that were odorous or where warranted for coverage. We collected phenols and PAH samples where wood waste was observed;
- In APECs related to former onsite land use we targeted samples in near surface soil (below the current gravel surface) or near the water table. Areas of odour, debris, or staining were targeted. Most contamination from historical onsite land use is expected to be sourced from surface activities. Hydrocarbons or other LNAPL[3] contaminants that are missed in near-surface samples are expected to have higher concentrations near the water table because they float and can be more reliably identified because they spread; and
- Where historical investigations identified contamination, we targeted similar depths in step-out samples or nearby coverage locations.

Soil samples were delivered to ALS Laboratories in Burnaby, BC for analysis.

6.4 Groundwater Monitoring, and Sampling

Monitoring wells were installed where there was a risk of groundwater contamination. Wells were mostly installed to intercept the groundwater table. Water table wells were preferred because the highest concentrations of LNAPL contaminants are likely to be near the water table as well as contamination of groundwater caused by leaching of overlying materials. For fill characterization, most metals contamination is in the top 3m, which is the depth of most wells. Deeper nested wells (BH100M-D, BH101M-D, BH102M-D, and BH105M-D) were installed in areas where shallow groundwater samples have historically exceeded standards.

All monitoring wells were developed using dedicated inertial pumps with an attached surge block. Well development involved stressing the aquifer by inducing turbulent flow and rapid removal of water from the well. This is intended to restore the aquifer conditions to a pre-drilling state by removing excessive fine particles and restoring aquifer permeability.

PGL water samples were collected after purging each well with a peristaltic pump using low-flow methods. Glycol samples collected in March 2019 were collected after purging three times the standing well volume. Some historical groundwater samples were also collected after purging three times the standing well volume.

Samples were delivered to ALS Laboratories in Burnaby, BC and analyzed for PCOCs associated with each APEC.

[3] Light non-aqueous phase liquid

6.5 Vapour Sampling

PGL collected vapour samples using thermal desorption tubes and calibrated air pumps. We used PGL's standard field methods and the protocols outlined in ENV Technical Guidance on Contaminated Sites 4 and ENV Protocol 22 for Contaminated Sites.

Most vapour wells were installed between 0.7m and 0.9m to avoid excessive soil moisture near the water table and not be installed too far below vapour sources, which were expected to be near the surface. Well construction and leak testing were conducted as per CSAP vapour guidance for shallow wells[4].

One sample was collected from a monitoring well (BH02M). The water level was low enough that there was more than 0.5m of exposed screen above the water table. Prior to sampling we purged three times the well air volume.

6.6 Hydrogeology

Depth to groundwater and the groundwater surface gradient was measured during groundwater sampling. We also conducted hydraulic conductivity tests.

The groundwater surface was determined by measuring the depth to groundwater from the top of the well pipe and calculating a groundwater elevation for each well. PGL surveyed the Site with a laser level and leveling rod on February 4, 2019. We used Surfer™ software to estimate the groundwater flow direction (Figure 6). We used nearby City of Vancouver manhole covers and the elevations recorded in Vanmaps[5] as a rough elevation datum.

Hydraulic conductivity was evaluated by bail tests. We conducted bail tests at BH102-D, BH102-S, BH105M, BH115M, BH121M, and BH129M. Bail tests involve removing water from the well and then measuring the rate of water recharge. The recharge measurements were analyzed using the Bouwer Rice analytical solutions for using Aqtesolv™ software (Appendix 5).

6.7 Data from Historical Reports

PGL used soil and groundwater data from historical reports mostly for additional coverage of the fill APECs (AEC 1 and AEC 2). PSI coverage of other APECs was obtained through PGL Investigation. DSI delineation was accomplished through PGL investigation locations.

Historical reports were obtained through an ENV information request. Data from historical reports is summarized in our tables and figures. Full reports are appended in the Stage 1 PSI. PGL has reviewed prior interpretations but formed our own conclusions from historical data. We rely on the data quantitatively, but with an understanding of the uncertainties. For example:

[4] CSAP Soil Vapour Advice and Practice Guidelines Development – Stage 1 prepared by the CSAP Soil Vapour Advice and Practice Guidelines Development Panel (2009).
[5] <http://vanmapp.vancouver.ca/pubvanmap_net/default.aspx>

- In some cases, detection limits from older data are above current standards. In these situations, we look at the data in context with newer data. If parameters commonly exceed standards in newer data, we do not accept a below detection limit result as evidence of the absence of that parameter (e.g., in delineation). However, we also do not automatically assume contamination if the detection limit is above the standard;
- Some older hydrocarbon analysis was conducted as TEH or Mineral Oil and Grease. These parameters do not have CSR standards, but we have conservatively applied the standard for LEPH to flag where these parameters were detected;
- In some cases, only Total PAH data was collected instead of data for specific PAH parameters. Total PAH does not have a CSR Standard, but we conservatively assume that Total PAH concentrations over 20ug/g might exceed for a specific PAH parameter;
- Older investigations determined the presence of hazardous waste by the special waste extraction procedure (SWEP). However, the TCLP is now used to determine hazardous waste. SWEP results are a conservative measure of leachability compared to TCLP, so we conservatively compared SWEP data to current HWR standards;
- Groundwater sample collection techniques have changed over time. For example, most past groundwater data was collected after purging three times the volume of water in the well. This technique increase can result in higher sample turbidity, which can increase measured contaminant concentrations. PGL uses a low-flow sample method to avoid this; and
- Historical investigation locations were transferred to our figures from scanned copies. We do not know how the original locations were surveyed, and in some cases investigation locations had been repeatedly transferred to newer figures from older reports. Overall accuracy of historical investigation locations is likely within 10m.

The contents of historical reports are most completely summarized in PGL's Stage 1 PSI report. The main groups of historical sample locations are:

- Soil samples collected in 1990 and 1991 by MTR Consultants and Piteau Associates. These samples were collected on 1002 Station Street as part of a larger investigation that included the former railway land use to the east. Samples targeted the fill and some former rail facilities. Coverage was loose by current standards, and the investigation used composite samples frequently. We have only included discrete samples in our tables;
- Soil and groundwater samples collected by Golder Associates from 1993 through 2014. At different times samples were collected at 250 and 310 Prior Street and 1002 Station Street and were mostly focused on characterizing fill;
- Thurber conducted an extensive test-pitting program in 1995. The goal of the investigation was to characterize the fill. Most samples were analyzed for metals. Data from this investigation was appended to the agenda for a 1996 meeting with ENV. No report or borehole logs accompanies the data. Test pit locations were obtained from figures in subsequent Golder reports; and
- Golder conducted repeated groundwater monitoring at select locations between 2001 and 2014.

The origin of each investigation location is summarized on Figure 5.

6.8 Quality Assurance/Quality Control

Precision, accuracy, representativeness, and completeness are addressed in the quality assurance/quality control (QA/QC) program. Generally, there were no issues identified with our data or methodologies that affect the conclusions of this report. The detailed evaluation is presented in Appendix 6.

Specifically, the QA/QC program was implemented to:

- Confirm that field sampling methods and laboratory analyses were reliable;
- Ensure that the sampling methods produced representative samples of environmental media using standard operating procedures; and
- Verify that the quality of reported results was suitable to support decisions and interpretation based on the data.

Quality assurance measures applicable to this report included:

- Data QA/QC reviews by designated personnel;
- Preferred use of electronically transferred data in all tables;
- Analysis of duplicate sample results and internal laboratory QA/QC; and
- Review of methodologies and procedures.

Our ability to assess the quality of historical data is limited in some cases. However, as discussed above, most critical conclusions like the presence or absence of contamination or delineation have been made based on PGL data. That said, historical investigations were conducted by reputable companies and most historical reports have documented QA/QC procedures. Thurber and Golder's data has been submitted to the ENV as the basis for issuing regulatory instruments (an Approval in Principle) in the past.

7.0 RESULTS

We identified three AEC: two areas concerning the fill (AEC 1 and AEC 2) and one area of primarily hydrocarbon contamination (AEC 3). In this report, AECs have the same number as the associated APEC (e.g., APEC 1 became AEC 1).

7.1 Geology

The Site is essentially flat at roughly 4m above sea level. There are topographic highs to the west and north. There is no surface water. The nearest waterbody is False Creek, about 350m to the west.

The subsurface geology is well understood. Hundreds of boreholes have been advanced at the Site to facilitate environmental and geotechnical investigation. Subsurface geology can be separated into two areas generally described as:

- Former shoreline area on 250 and 310 Prior Street: 1m to 3m of fill material overlaying native glacial till and sandy shoreline deposits along the former shoreline of False Creek; and

- Former foreshore area on 1002 Station Street: Fill is variable consisting of sand, silt, and gravel mixed with anthropogenic debris in various amounts. Fill generally extends to 5.5m below grade. Marine sediments are below the fill to depths up to 14m, generally becoming thicker moving from north to south. Glacial deposits are below the marine deposits. Sandstone is likely present below the glacial deposits, but it has not been encountered during drilling.

From a soil quality perspective, it is helpful to further divide these areas into the following:

- APEC/AEC 1 (entire Site excluding AEC 2) top 1.5m – Silty sand with occasional anthropogenic debris, mostly dimensional wood and brick. Most of this material met applicable standards, but metals exceeded standards in some areas (AEC 1);
- APEC/AEC 1 below 1.5m – Sand, generally coarser than the material above it with no anthropogenic debris. This material meets the applicable standards;
- AEC 2 (0m to about 5.5m) – Fill more irregular in quality than fill at APEC/AEC 1. AEC 2 generally contains more anthropogenic debris - mostly construction debris consisting of dimensional wood, brick, cinder, metal, and ceramics. There are areas of wood waste (mulch) fill, some of which contain creosote. Metals exceedances are common, and PAH exceedances were found where creosote odour was observed;
- Native marine salt marsh/foreshore sediments – Marine sediments underly most of the Site on 1002 Station Street below 5.5m and are generally described as a sandy silt with organics, often with shells. This material mostly meets the applicable standards but has elevated arsenic concentrations (Section 7.5.4); and
- Upland native soils on 250 and 310 Prior Street – Glacial tills sometimes overlain by organics below fill. Native soils generally meet standards except for some samples collected at the interface between the fill and native soil.

More details from each investigation location are in PGL's borehole logs. We have also extracted stratigraphy information from previous reports (Appendix 4).

7.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater elevations were measured at groundwater-monitoring wells on the Site (Figure 6 and associated table). Measurements indicate a static water table around 2m below grade. Relative water table elevations indicate that shallow groundwater is drawn towards the storm sewer running through the centre-east of the Site. Generally, groundwater is expected to flow south through the infilled area of the False Creek Flats around the denser glacial till formation to the west, then move west and discharge into False Creek. Hydraulic gradients in the filled area of the False Creek Flats are very low unless they are locally influenced by utility trenches.

We monitored groundwater levels in May 2018 and February 2019 (Table for Figure 6). Groundwater levels were similar with February levels being slightly higher. We reviewed Golder's monitoring data from 2001 through 2014 (Appendix 5). Groundwater levels were like those observed by PGL, with levels being lower in the summer and higher in the winter.

At locations where we installed shallow and deep wells, groundwater levels in deep wells were lower than in shallow. This could indicate a downward gradient. Differences in water level were largest at BH101M (fill over dense till) and decreased moving south toward the foreshore area.

7.3 Aquifer Performance Tests

Single well rising head response tests were conducted at five locations to estimate the hydraulic conductivity of the subsurface. The results of these tests were analyzed using the Bouwer-Rice Solution for an unconfined aquifer (Appendix 5). Results are summarized in Table C below.

Table F: Hydraulic Conductivity Test Results

Well	Test	K (m/s)	Average K (m/s)	Screen Depth (m)	Screened Material
BH102M-D	1	1.6E-06	1.6E-06	5.2-6.7	Native Silty Sand
	2	1.6E-06			
BH102M-S	1	4.5E-06	4.5E-06	1.4-2.9	Fill Sand
BH105M-D	1	3.2E-07	3.2E-07	5.2-6.7	Native Silty Sand
	2	3.2E-07			
BH115M	1	5.3E-06	4.9E-06	1.5-3	Fill Silty Sand
	2	4.5E-06			
BH121M	1	1.2E-05	1.2E-05	2.4-3.9	Fill Sand
	2	1.1E-05			
BH129M	1	2.2E-07	2.8E-07	1.7-3.2	Fill Silty Sand with wood debris
	2	3.5E-07			

Hydraulic conductivities vary by orders of magnitude, which is unsurprising given the heterogeneous nature of the fill material. However, conductivities, while variable, were in the expected range for the type of fill material observed. Based on our observations and our experience at other sites in False Creek we expect that a hydraulic conductivity (K) of 5E-6m/s will be representative of conductivities in the area.

7.4 Field Observations of Contamination

Field indicators of contamination were debris and odour. As discussed above, anthropogenic debris were most common in AEC 2 and in the top 1.5m of APEC/AEC 1. Debris was mostly construction debris consisting of dimensional wood, brick, metal debris, ceramics, and areas of wood waste (mulch). There is hydrocarbon odour associated with LEPH/HEPH contamination found at AEC 3. Creosote odour is associated with some buried wood debris and areas of PAH contamination.

Headspace vapour measurements were generally low or not detected, but some significant vapours were measured at 310 Prior Street (BH100M, BH101M) and at AEC 3 (BH105M). Measurements from BH105M correspond with LEPH/HEPH contamination in that location, but no volatile contaminants exceed standards at BH100M or BH101M. The highest vapour measurement was 400parts per million (ppm) at BH100M. Measurements at BH101M and BH105M were below 300ppm. All other measurements were below 200ppm, and most were not detected.

Detailed observations at each drilling location are in the borehole logs (Appendix 4).

7.5 Chemical Results

Contaminant concentrations exceeded applicable standards in soil, groundwater, and soil vapour. General chemical results for each APEC are summarized in the table below.

Chemical results are presented in the attached tables and figures. Soil results are presented in Figure 7 through Figure 11 and associated tables. Groundwater results are presented in Figure 12 through Figure 17. Vapour results are presented in Figure 18 and Figure 19. AECs are outlined on Figure 20 through Figure 22. Cross-Sections are shown on Figure 23 through Figure 26. Laboratory certificates of analysis are attached in Appendix 7.

Table G: Chemical Results Summary

APEC #	Description	PCOCs	Results
1	Imported fill (post-1912)	Metals, LEPH, HEPH, PAH, phenols (chlorinated and non-chlorinated), sodium and chloride.	Soil in the top 1.5m on the eastern portion of the Site exceeded the standards for metals. Soil at BH150 and TH95-45 exceeded standards on the western portion of the Site. Groundwater and vapour did not exceed standards. **RETAINED AS AEC 1**
2	Metals and hydrocarbon impact in imported fill (pre-1912).	Metals, LEPH, HEPH, PAH, phenols (chlorinated and non-chlorinated)	Fill soil commonly exceeded standards throughout this area. Concentrations on 310 Prior Street and the north-central portion of 1002 Station Street were commonly hazardous waste (leachable metals). Groundwater exceeded standards for metals in the past but did not exceed standards for metals in the most recent sampling event. Some locations near buried creosote treated wood exceeded the stringent groundwater standard for pyrene. Vapour exceeded standards on the northern portion of the APEC, but we attribute this to AEC 3. **RETAINED AS AEC 2** The area of potential hazardous waste is defined as AEC 2b.
3	Historical Repair and Maintenance Shops	Metals, LEPH, HEPH, PAH, BTEX, VPH, VOC, glycols	Soil exceeds standards for hydrocarbons (mostly HEPH). Soil also exceeds standards for metals, but these might be sourced from AEC 1 and AEC 2. Groundwater did not exceed standards. Vapour exceeded standards for benzene and some chlorinated solvents. **RETAINED AS AEC 3**
4	Historical Locomotive Maintenance Repair Area	Metals, LEPH, HEPH, PAH, BTEX, VPH, VOC, glycols	Some soils exceeded standards for metals, but we attribute this to AEC 1. Surficial hydrocarbon staining was historically reported in the area, but we did not observe staining during drilling and samples did not exceed standards for hydrocarbons. Groundwater and vapour did not exceed standards.

APEC #	Description	PCOCs	Results
5	Historical Weigh Scale	LEPH, HEPH, PAH	TH34 had TEH impacts (in 1991) that would exceed standards if conservatively compared to the LEPH standard. However, recent boreholes did not detect hydrocarbons in the area. We do not retain this area as an AEC. Groundwater and vapour did not exceed standards.
6	Historical Boiler House and fuel oil shed	LEPH, HEPH	BH121M exceeded standards for metals, but not hydrocarbons. Metals exceedances were attributed to AEC 2. Groundwater and vapour did not exceed standards.
7	Historical potentially leaking gasoline UST	BTEX, LEPH, VPH, Fuel additives	Soil, groundwater, or vapour did not exceed standards. Electromagnetic and ground-penetrating radar scans did not find a tank.
8	Storage of TCE contaminated soils	Trichloroethene (TCE)	Soil, groundwater, or vapour did not exceed standards.
9	Beam Manufacturing Co. Ltd.	Metals, LEPH, HEPH, PAH, BTEX, VOC, phenols (chlorinated and non-chlorinated)	Metals commonly exceeded standards in soil, but we attribute this to AEC 2. Hydrocarbons exceeded standards in soil, but we attribute this to AEC 3. Groundwater did not exceed standards during the most recent sampling but has exceeded standards in the past. However, the risk of groundwater exceedance in this area is attributed to AEC 2. Vapour exceeded standards for some hydrocarbons and chlorinated solvents. Hydrocarbon exceedances are likely due to AEC 3. Chlorinated solvents could be due to APEC 9, APEC 11, or AEC 3, but without specific evidence either way we assign them to AEC 3.
10	Canadian Junk Co. Ltd. and Atlas Iron and Metals Ltd.	Metals, LEPH, HEPH, PAH	
11	Great Western Smelter and Canada Metal Plant No. 2	Metals, LEPH, HEPH, PAH, BTEX, VPH, VOC, phenols	
Offsite APECs			
12 -22	Sample results do not show any contamination migrating onto the Site from offsite sources. The one exception is MW99-2 where LEPH concentration in groundwater was at the standard (500ug/L) in 1999. This would likely have been from the leaking fuel tank on the adjacent property (APEC 18/19). This tank was removed, and remediation conducted in 2015 (Appendix 3).		

7.5.1 AEC 1 – Chemical Results

Only soil samples for metals parameters exceeded standards at AEC 1. Exceedances were found only in the top 1.5m, which is qualitatively different from deeper fill soil.

There are potentially two parts to this APEC, one at the east side of AEC 2 and one on the west side:

- East of AEC 2 there is enough data to characterize impacts. Most locations exceed for zinc only, but other metals also exceed standards at BH176 and BH178. There were no visible or odour indicators associated with metals exceedances. Zinc impacts seem to be relatively continuous, but other exceedances are discontinuous; and
- West of AEC 2, BH150 (zinc) and TH95-45 (lead and zinc) exceed the applicable standards. However, investigation coverage in this area is light so it is not possible to conclude there is an area of continuous contamination. However, in absence of data we assume this area is part of AEC 1.

Because exceedances are in relatively shallow soil, it is possible that impacts result from the former rail yard rather than the fill, especially since other areas of APEC 1 do not exceed standards. AEC 1 east and west would roughly line up with the northern tracks of the rail yard. However, because the impacts are only metals, somewhat random in depth and not obviously related to any particular rail yard facility, we assume they are related to fill.

Groundwater and vapour did not exceed standards.

Table H: Chemical Results AEC 1

Matrix	Parameter	Highest Concentration	Depth (m)	Area/Comments
Soil	Arsenic	179ug/g (BH176-01)	0-1.5	Only at BH176 and BH178
	Chromium	99.9ug/g (BH178-01)	0-0.5	Only at BH178
	Copper	886ug/g (BH178-01)	0-0.5	Only at BH178
	Iron	42,000ug/g (BH178-01)	0-0.5	Only at BH178
	Lead	808ug/g (BH178-01)	0-1.0	Only at BH176 and BH178
	Zinc	2040ug/g (BH178-01)	0-1.5	Entire extent of AEC 1

7.5.1.1 Delineation at AEC 1

AEC 1 is defined by surrounding boreholes that meet applicable standards, by its boundary with AEC 2, and by the boundaries of the Site to the east and west. Contamination in the top 1.5m is delineated by deeper samples that meet applicable standards. As discussed in Section 6.2, we do not consider a continuation of placed fill to be a migration that the Site is responsible for. Where surficial impacts might continue offsite to the east at BH110M, the historical continuation of the rail yard on the neighbouring property is also a potential source. The neighbouring property to the east received a risk-based Certificate of Compliance in 2010.

7.5.2 AEC 2 – Chemical Results

Soil and groundwater exceeded standards at AEC 2. Vapour did not exceed standards. Metals are the primary concern with PAH parameters exceeding standards near areas with buried creosote-treated wood.

Soil results commonly exceed standards in AEC 2. Exceedances can be found through the entire soil profile down to the native soil below the fill. Contaminants are mostly metals – particularly copper, lead, tin, and zinc. Highest concentrations and most parameters exceeding standards are present at the north end of the Site, particularly on 310 Prior Street and the north end of 1002 Station Street, where leachable hazardous waste is common (Figure 9a and Figure 9b). PAH parameters exceeded standards where creosote-treated wood was buried.

Table I: Chemical Results AEC 2

Parameter	Highest Concentration	Depth (m)	Area/Comments
Soil			
Antimony	5,890ug/g (MW99-3)	0-3.0	Antimony only exceeds standards on 250 and 310 Prior Street. Multiple locations exceed.
Arsenic	234ug/g (TH95-48)	0–7.5	Many locations exceed over the entire area of AEC 2. Arsenic is present in the fill but is also present in deeper marine sediments. Arsenic in marine sediments may have a natural origin (Section 7.5.4).
Cadmium	79.9ug/g (BH-11)	0-1.1	Only at BH-11
Chromium	487ug/g (TH95-68)	0–5.5	Mostly in shallow soil on 250 and 310 Prior Street and the north end of 1002 Station Street.
Cobalt	37ug/g (NW5, TH95-17, TH95-59)	0-5.0	Mostly in shallow soil on 250 Prior Street and the north end of 1002 Station Street.
Copper	82,600ug/g (BH101M)	0-5.5	Many locations exceed over the entire area of AEC 2.
Iron	137,000ug/g (BH104M)	0-6.6	Locations exceed over the entire area of AEC 2. There is less coverage than other parameters since some historical samples were not analyzed for iron. Similar to arsenic, some of the deeper marine sediments may have naturally high iron.
Lead	35,000ug/g (AH99-4)	0-6.6	Many locations exceed over the entire area of AEC 2. Lead is the most widespread contaminant. Most exceedances are in the fill above 5.5m, but three locations (BH154, BH120M, BH146) have samples that exceed standards at the fill/native interface in native sediments.
Nickel	560ug/g (TH95-48)	0-1.1	Mostly in shallow soil on 310 Prior Street and the north end of 1002 Station Street.
Selenium	70.8ug/g (NW5)	0-1.1	Mostly in shallow soil on 250 and 310 Prior Street and the north end of 1002 Station Street. Most historical sample locations have detection limits above the standard. However, in more recent samples other metals parameters always exceed where selenium exceeds, so we don't expect any soils are incorrectly classified as non-contaminated due to detection limits.

Parameter	Highest Concentration	Depth (m)	Area/Comments
Tin	29,800ug/g (AH99-4)	0-5.5	Many locations exceed over the entire area of AEC 2.
Zinc	34,800ug/g (TH95-74)	0-5.5	Many locations exceed over the entire area of AEC 2.
Anthracene	33ug/g	2.0-3.0m	Only at MW96-1 and TH95-28. TH95-38 and TH95-63 don't have data for specific PAHs but have high total PAH concentrations and are likely contaminated.
Benz(a)-anthracene	34ug/g		
Benzo(a)-pyrene	30ug/g		
Benzo(b)-fluoranthene	47ug/g		
Indeno(1,2,3-cd)pyrene	15ug/g		
Naphthalene	30ug/g		
Phenanthrene	120ug/g		
TEH or Mineral Oil and Grease	>1,000ug/g	0-3.0m	TH95-62, TH95-38, and TH34 in AEC 2 historically had concentrations greater than the current LEPH standard (a conservative comparison). These locations may not exceed standards now. For example, soil near TH34 was resampled at BH109 and no contamination was found.
Groundwater			
pyrene	0.532ug/L (BH129M)	-	Present at BH119M, BH129M, and BH135M

Many locations on 310 Prior Street and the northern part of 1002 Station Street exceed HWR Standards for leachable metals. No metal exceeded HWR Standards unless lead also exceeded. Total metals results and TCLP results are not well correlated, but most samples did not exceed HWR Standards for TCLP if total lead was below 1,000ug/g. High total PAH concentrations at TH95-63 and MW96-1 likely indicate Hazardous Waste exceeding PAH TEQ.

7.5.2.1 AEC 2 Groundwater Results

Groundwater results mostly did not exceed standards during the latest groundwater sampling event except for pyrene at some locations. Pyrene in groundwater and historical PAH exceedances are clustered in the central north portion of 1002 Station Street near the area where PAH parameters exceed soil standards.

Some historical locations have exceeded standards for metals and PAHs on and off in the past but were not sampled during this work because they were not found or were destroyed. Most historical groundwater data was collected after purging three times the volume of water in the well. This technique can result in higher sample turbidity, which can increase measured contaminant concentrations. PGL uses a low-flow sample method to avoid this, and our most recent replacement

results show lower concentrations than have been measured historically. However, some areas near historical exceedances may need to be sampled again to confirm these results and we consider them potentially exceeding.

Locations that historically exceeded groundwater standards are summarized below.

- HYMW98-1: Exceeded standards for zinc once in 1998 but subsequent samples up to 2009 met standards. Groundwater meets standards at this location;
- MW98-2: Exceeded standards for zinc on and off in samples collected between 2001 to 2014. Copper exceeded once in 2009. We conclude that this area has the potential to exceed standards now;
- MW99-1: Exceeded standards for zinc on and off in samples collected between 2001 and 2014. Copper exceeded standards once in 2014. We conclude that this area has the potential to exceed standards now;
- MW99-2: Was below standards for zinc from 2001 until 2009 when zinc concentrations exceeded the standards. Zinc exceeded standards again in 2014 (the last time this location was sampled). We conclude this area has the potential to exceed standards;
- MW99-3: Exceeded standards for copper, nickel, and zinc in every sample collected between 2001 and 2014. Lead exceeded standards in 2009 and 2014 and Cadmium exceeded standards in 2009 only. This well was destroyed and replaced by BH101M. BH101M (both shallow and deep) met standards during the latest sampling, but this area has the potential to exceed standards; and
- MW96-1 and MW98-2 historically exceeded standards for PAH parameters. However, three samples collected after 2004 have mostly been below detection limits for these parameters. We consider the PAH groundwater standards met at these locations.

Despite some uncertainty over whether groundwater exceeds numerical standards or not, the results demonstrate that groundwater quality is likely stable, although variable. The fill material that is the expected source of groundwater impacts at the north end of the Site has been in-place for over 100 years, long enough to impact groundwater to the full extent and reach an equilibrium. The data over an extended period support this.

The specific uncertainties outlined above do not affect delineation because they are “interior” samples (i.e., confirmed to be within the extent of a soil AEC that is well defined), as discussed in Section 7.5.2.3.

7.5.2.2 Volatile Contaminants at AEC 2

There are several locations where volatile contaminants are detectable in soil and groundwater. These areas are mostly close to soil-vapour wells and vapour concentrations are directly assessed. However, tetrachloroethylene was detected in groundwater at BH120M and BH121M. There are no nearby APECs where large volumes of VOCs are expected, so these marginal detections are likely sourced from the rail yard use, possibly degreasers.

While concentrations are low compared to the standard (1.1ug/L and 1.2ug/L compared to the standard of 1,100ug/L and a detection limit of 1.0ug/L) these represent a potential vapour source and there are no soil-vapour wells nearby to directly confirm presence or absence of vapour contamination. We assessed potential soil vapour at BH120M and BH121M using partitioning

equations[6] as per CSR Technical Guidance 4 (Appendix 8). Predicted result after applying a sub-slab attenuation factor is 26ug/m^3, which is below the applicable standards. Further, the future development will remove most of the potential source material in this area and the excavation will likely be tanked to stop groundwater infiltration to the parking levels. We conclude that vapour concentrations are unlikely to exceed standards in the current or future Site configuration.

7.5.2.3 Delineation at AEC 2

AEC 2 is defined by surrounding boreholes that meet applicable standards and by the boundaries of the Site. The boundaries of AEC 2 are somewhat fuzzy owing to larger spacing between boreholes especially toward the southwest portion of the APEC. For this report we assume that the area of AEC 2 corresponds to the area of fill imported before 1912 according to fire insurance maps (Figure D). This is supported by qualitative observations of the fill during drilling and that most soil exceedances associated with fill (particularly in deeper soil) are in this area.

AEC 2 soil is vertically delineated by deeper samples in the native sediments. Most locations do not exceed standards below 5.5m below grade. Some samples in native sediments exceed the applicable standards for arsenic and iron. We expect these results are due to natural processes and were not delineated deeper as discussed in Section 7.5.4.

Figure D: Imported Fill Shown on 1912 Fire Insurance Plan

Soil results from BH141 and BH142 (inside APEC 2) are below standards and show stratigraphy like APEC 1 (silty sand over medium sand), which might suggest that the southwest portion of the APEC 2 is better quality than the rest of the APEC. However, given the heterogeneous nature of fill, more characterization would be needed to conclude this. For now, we assume that all soil in APEC 2 is part of AEC 2, but we differentiate between the confirmed and possible extent of AEC 2 (Figure 20).

[6] Health Canada (2010). Federal Contaminated Risk Assessment in Canada: Guidance for Soil Vapour Intrusion Assessment at Contaminated Sites, Exhibit 2.

We did not tightly delineate TEH and Mineral Oil and Grease concentrations over 1,000ug/g. This is because the comparison to the LEPH standard is conservative and there is enough hydrocarbon data for gross delineation. Due to the nature of the fill and the rail yard use, we expect some localized hydrocarbons may still exist in AEC 2 but that metals will likely drive remediation.

PAH exceedances were also not tightly delineated. Like hydrocarbons, we expect pockets of PAH exceedances in AEC 2 fill, but that remediation will be driven by metals contamination.

Delineation to HWR Standards is not required by the CSR, but the area of HWR exceedances is delineated by samples that meet HWR Standards for metals TCLP and PAH TEQ.

Considering both current and historical results, groundwater impacts are only associated with hazardous waste metals or PAH in soil. Groundwater metals impacts are delineated. While the most recent groundwater samples met standards, results at some locations in AEC 2 on 310 Prior Street and the northern portion of 1002 Station Street have historically exceeded standards. Monitoring wells surrounding historically exceeding wells met standards. Depth delineation wells installed below historically exceeding wells also met standards. Investigation locations on 410 Prior Street show that hazardous waste metals contamination in soil does not extend to that property and that groundwater is not contaminated with metals (Appendix 3). PAH impacts are only loosely delineated, but there is enough information to show that PAH parameters are unlikely exceed standards in groundwater outside of AEC 2

7.5.3 AEC 3 – Chemical Results

Soil and soil vapour results exceed standards at AEC 3. Hydrocarbons were the primary concern, with some VOCs detectable in soil and groundwater and exceeding standards in soil vapour. The exact source of contamination at AEC 3 is not known. Because of the mix of contamination (hydrocarbons, metals and VOCs) and the near surface position of most of the impacts, the contamination is likely due to repair and maintenance work performed near the surface. Other APECs in the area share the same PCOCs (APEC 9 through APEC 11), but the contamination is not due to APEC 9 since that operation existed before some of the AEC was filled. The center of the APEC is in 1002 Station Street, which leads us to conclude that contamination originated there.

VOCs (specifically chlorinated solvents) only exceeded standards in soil vapour (SV10 and SV15). Chlorinated solvents like tetrachloroethylene, trichloroethylene, carbon tetrachloride, and vinyl chloride are not contaminants of concern in soil and groundwater. These parameters were not detected in soil, and only low concentrations of tetrachloroethylene were detected in groundwater at BH102M (and BH120 and BH121, Section 7.5.2.2). At BH102M surrounding monitoring wells and deeper monitoring wells have concentrations below detection limits, making it unlikely that the detections are part of an undiscovered groundwater plume. The source of chlorinated solvents is unknown, but their proximality to hydrocarbon impacts, and low concentrations in soil and groundwater indicate that they were likely deployed in small volumes. It is possible that chlorinated solvent vapour impacts are from APEC 11 except that SV10 is 100m away and outside the APEC (with higher concentrations of tetrachloroethylene). There may be multiple vapour sources, but since the specific sources are unknown we combine the vapour impacts with AEC 3.

Table J: Chemical Results AEC 3

Parameter	Highest Concentration	Depth (m)	Area/Comments
HEPH	12,800ug/g (BH105M)	0-2.5	Most soil exceeds the HEPH standard in this area. Most exceedances are above 1.5m. Only one location (HYBH98-12) exceeds standards at 2.5m.
LEPH	7,360ug/g (BH105M)	0-0.5	Only at BH105M
Soil-Vapour			
Benzene	3.02ug/m^3 (SV08)	0.90	SV08 and SV18 Exceeds RL but meets CL and Parkade Standards
Carbon tetrachloride	2.82ug/m^3 (SV10)	0.95	SV10 Exceeds RL but meets CL and Parkade Standards
VPHv	30,800ug/m^3 (SV11)	0.95	SV11 and SV12 SV11 exceeds RL, CL and Parkade Standards, SV12 only exceeds RL Standards.
tetrachloroethylene	490ug/m^3 (SV10)	0.95	SV10 and SV15 SV10 exceeds RL, CL and Parkade Standards, SV15 exceeds RL and CL Standards but not Parkade.
trichloroethylene	17.92ug/m^3 (SV15)	0.85	SV10 and SV15 SV10 exceeds RL and CL Standards but not Parkade, SV15 exceeds RL, CL, and Parkade Standards
Vinyl chloride	5ug/m^3 (SV16)	0.85	SV16 Exceeds RL and CL Standards but not Parkade.

Note: Sub-slab attenuation factors are applied to vapour concentrations. No vapour results exceed standards assuming outdoor attenuation.
CL = CSR Commercial Land use Standards RL = CSR Residential Land use Standards

7.5.3.1 Delineation at AEC 3

AEC 3 soil hydrocarbon contamination defined by boreholes that meet applicable standards around the perimeter of the contaminated area. Hydrocarbon contamination does not extend offsite. Hydrocarbon contamination is vertically delineated by deeper samples that meet applicable standards.

Soil vapour concentrations are delineated onsite (Parkade standards and sub-slab attenuation factors) and with respect to offsite receptors (CL or RL, depending on the direction, and sub-slab attenuation factors. Only one set of vapour samples was collected, but this was deemed sufficient since vapour concentrations in delineation wells were low enough that any expected variation would not cause an exceedance of the standard. Where vapour impacts were identified, further vapour characterization is warranted post remediation to assess any remaining impacts with respect to the future development.

7.5.4 Arsenic and Iron in Buried Marine Sediments

Arsenic and iron concentrations sometimes exceed the standards in native sediments. but these are likely naturally occurring or an area-wide issue. We assessed iron and arsenic concentrations in natural sediments using statistical techniques from CSR Technical Guidance 2 (Appendix 9).

Table K: Statistical Characterization of Iron and Arsenic Concentrations in Marine Sediments

Condition	Iron (Standard: 35,000ug/g)	Arsenic (Standard: 10ug/g)
Data from one population	Yes – data are from similar soil and statistically one population.	
Upper 90th Percentile less than the standard	Yes – 34,900ug/g	**No – 14.05ug/g**
The upper 95% confidence limit of the mean is less than the standard	Yes – 31,797ug/g	**No – 11.26ug/g**
No sample is more than twice the standard	Yes – highest is 37,300ug/g	Yes – highest is 16.5ug/g

- Iron concentrations in native sediments below the fill statistically meet applicable standards.
- Arsenic concentrations in native sediments statistically exceed standards protecting aquatic life, but meet standards protecting human health and plants.

We expect that arsenic is naturally occurring, or at least occurs separate of contamination in the fill. While there is arsenic contamination in the fill, there is no clear relation between those concentrations and arsenic exceedances in marine sediments. Buried marine sediments were sampled at 14 locations, 6 of which exceeded the Marine Standard:

- Two locations (BH141 and BH149) did not exceed for any other parameter at any depth. The highest concentrations of arsenic in marine sediment occur at BH141.
- Three other locations (BH119, BH120, BH155) had shallow arsenic impacts in the fill, but samples between the shallow contamination and marine sediments met standards.
- BH146 only exceeds arsenic standards in the marine sediments, but these standards also exceed for lead and zinc, which are likely contamination.

Except for BH146, only arsenic (and iron) exceeded standards in marine sediment. If arsenic were anthropogenically sourced, we would expect more metals to exceed in the same samples as arsenic.

Arsenic is often concentrated in marine sediment where it is pulled from solution by biotic uptake, adsorption to particulates, and precipitation. Arsenic is deposited in sediment attached to organic and inorganic particulates.[7] The former False Creek tidal marshes would have facilitated these processes. Several studies have investigated high natural arsenic concentrations in groundwater in the Fraser Delta and found correlations between high arsenic and buried marine and glaciomarine sediments[8],[9].

PGL has conducted drilling programs at other properties in the False Creek Flats and found similar concentrations of arsenic in buried marine sediments.

We did not pursue delineation of arsenic concentrations in marine sediments because we believe they are either naturally occurring or an area-wide issue and are not able to migrate. The ENV approved this approach in email correspondence (December 2019, Appendix 9).

8.0 SCREENING LEVEL RISK ASSESSMENT

The objective of Risk Assessment is to evaluate the potential for chemical contamination to pose adverse health effects to human and ecological receptors that may utilize the Site. There are two types of risk assessment:

- Screening-Level Risk Assessment (SLRA), which evaluates risk through a simple assessment of the presence or absence of exposure pathways and receptors; and
- Detailed Human Health and Environmental Risk Assessment, which assesses risk through calculating the potential dose that a Site receptor may be exposed to and comparing that dose to published toxicity reference values. Where intake dose may result in unacceptable risk, then steps are taken to remove or reduce exposure.

The Site will be eligible for management through SLRA, meaning that rather than calculating potential doses, the risk assessment will focus on eliminating exposure pathways either through installing surface caps or by strategically excavating or adding shallow soil.

8.1 Precluding Conditions

No precluding conditions apply (Table L).

Table L: SLRA Precluding Conditions

Precluding Condition	Site Conditions
Inorganic substances in soil or groundwater with a pH<5	Soil and groundwater have pH >5.
Bioaccumulative substances	Contaminants of concern are not bioaccumultive

[7] Environment Canada (1993). *Arsenic and its Compounds*, Canada Communications Group. Ottawa, ON.
[8] J E Wilson, S. Brown , H. Schreier , D. Scovill & M. Zubel (2008), "Arsenic in Groundwater Wells in Quaternary Deposits in the Lower Fraser Valley of British Columbia", *Canadian Water Resources Journal*, 33:4, 397-412
[9] Cavalcanti de Albuquerque, Rafael (2011), *Hydrogeochemical Evolution and Arsenic Mobilization in Confined Aquifers Formed Within Glaciomarine Sediments.* Simon Fraser University, Burnaby, BC.

Precluding Condition	Site Conditions
Contaminated vapour	Vapour contamination exists, but can be managed as per CSR Protocol 22 and Technical Guidance 4
Contaminated sediment or surface water	There is no sediment or surface water on the Site
Deep-rooting plants or trees (root structures extending below 1 m depth) in areas of soil or groundwater contamination at sites where wildlands (natural or reverted), agricultural or low-density residential land uses apply.	There are no deep rooting plants on the Site now, and the future use of the Site will be commercial or high-density residential.
Very high permeability soil (e.g. cobbles) or complex hydrogeologic units (e.g. fractured bedrock, karst terrain)	There are no complex hydrogeologic units below the Site
Preferential pathways that transport contaminated groundwater directly to a receiving environment or water well	There are no preferential pathways, and sub-grade levels of the future development will be 'tanked' so that groundwater is not pumped to the storm sewer
Groundwater contamination that extends beyond a source parcel boundary and is not demonstrated to be stable or decreasing	Contamination does not extend beyond the source parcel. Groundwater concentrations are stable.

8.2 Beneficial Use Exemption

No contaminants qualify for the beneficial use exemption.

8.3 Problem Formulation

Previous sections of this report provide information on the Site conceptual site model, which describes:

- The source and distribution of contaminants with consideration of seasonal effects and plume stability;
- Fate and transport pathways; and,
- Receptors.

Areas where PCOCs exceed the applicable standards have been characterized and delineated.

8.4 Evaluation of Potential Exposure Scenarios

Currently, the human exposure pathway to near surface contaminated soil shows unacceptable risk. Possible management measures that need to be implemented are surface cover or excavation of the top 1m of contaminated material.

Table M: SLRA Pathway Assessment (Current Conditions)

Receptor	Site Conditions
Human Exposure to Contaminated Soils	
Do substance concentrations in soil exceed the applicable standards?	Yes
Are contaminated soils located within, or may contaminants in soil migrate to within, 1 m of ground surface?	Yes
Is the ground surface above contaminated soils uncovered?	Yes – conclude unacceptable risk
Human Exposure to Contaminated Groundwater	
Does drinking water use apply at the site?	No
Terrestrial Exposure to Contaminated Soils	
Do substance concentrations in soil exceed the applicable standards?	Yes
Are contaminated soils located within, or may contaminants in soil migrate to within, 1 m of ground surface?	Yes
Is the ground surface above contaminated soils uncovered?	Yes
Is there potential terrestrial habitat present?	Yes – Site is adjacent to municipal parks
Does the site contain suitable habitat for specific local species?	Provisionally yes – conclude unacceptable risk – re-evaluate with future use.
Exposure of aquatic biota to contaminated groundwater	
Does aquatic life water use apply at the site?	Yes - Marine
Do substance concentrations in soil or groundwater exceed the standards for the protection of aquatic life?	Yes
Is there the potential for soil leachate or contaminated groundwater to migrate to a receiving environment on the parcel or to migrate beyond the parcel boundary, at concentrations greater than the Aquatic Life water standards?	No – potential groundwater impacts are delineated and stable.

8.5 Determination of Risk

As shown in Table M above, shallow soil contamination is considered an unacceptable risk. Areas with shallow soil contamination will require installation of a surface cap, or remediation to numerical standards as described in the Remediation Plan below.

9.0 REMEDIATION PLAN

Remediation will occur through a combination of excavation of contaminated soil and Risk Assessment. The objective of this section is to develop options that can be undertaken to remediate risks to human health and the environment for all contaminants of concern and demonstrate that remediation can be accomplished by these methods. Specific remediation actions will be evaluated in future Risk Assessment and Confirmation of Remediation reports once the final configuration of the future development is known. Once all media meets the applicable numerical or risk-based standards, then the Site will be eligible to apply for a CofC.

9.1 Contamination Requiring Remediation

Contamination requiring remediation consists of metals, PAH parameters, and hydrocarbons in soil, as summarized in Tables H, I, and J and detailed in the attached tables and figures. The areas requiring remediation (AEC 1 through AEC 3) are illustrated on Figure 20 through Figure 22. Soil AECs with respect to the future development are shown on Figure 26.

9.2 Remediation Methodology

Plans for the future of the Site include buildings, roadways, and landscaped areas. Remediation methodology will depend on what will be present on a specific area of the Site (e.g., whether an area will be excavated for underground parking and how it is surfaced). Soil under buildings will likely be excavated during construction, but contaminated soil may be managed in place in some areas and require risk assessment. Summaries of excavation and risk assessment methods are in the sections below, followed by possible remediation methods at each of the future Site parcels.

Figure E: Proposed Commercial and Hospital Land Use

9.2.1 Excavation of Contaminated Soil

Remediation by excavation is simply the removal of contaminated soil from the Site. Contaminated soil is sent to landfills that are permitted to accept it or to properties where less stringent standards apply. Most excavation is likely to occur coincidently with development of underground parking. In some areas where contaminant concentrations are high, soil may need to be excavated to meet risk-based standards or the City of Vancouver's Remediation on City Streets Policy. After soil is removed, additional soil samples are collected to confirm that the area meets the numerical or risk-based standards.

Remediation by excavation is primarily an exercise in soil management. How soil is managed after excavation depends on its category:

Table N: Soil Quality Categories

Soil Category	Description
RL-	Soil that meets the applicable Residential Standards. Material can be relocated to a residential, commercial, or industrial property with no restrictions.
RL+	Soil better than the applicable Commercial Standards but exceeding Residential Standards. RL+ material could be sent to a commercial or industrial property provided it meets the applicable standards but is often sent to a permitted land fill if a suitable receiving site is not available.
CL+	Soil better than the applicable Industrial Standards but exceeding Commercial Standards. CL+ material could be sent to an industrial property provided it meets the applicable standards but is often sent to a permitted land fill if a suitable receiving site is not available.
IL+/Waste	Soil exceeding Industrial Standards. Soil exceeding these standards is normally disposed of at a permitted landfill.
HW+	Soil exceeding the leachability test (TCLP) or PAH TEQ defined in the HWR is defined as Hazardous Waste. HW+ soil must be disposed of at a landfill designed to contain hazardous waste.

As discussed in Section 5.1, there are multiple standards within each land use category. Standards that protect a water use for drinking or aquatic life are the same across all categories. For example, if a parameter exceeds the RL DW Standard it also exceeds the IL DW Standard. Soil that exceeds a water protection standard can still be moved to a non-permitted receiving site provided that the water protection standard that was originally exceeded does not apply at the receiving site. For example, zinc may exceed the marine standard at the Site, but could be deposited at a property where marine standards do not apply, provided all other standards are met.

The soil categories at each AEC are summarized below.

Table O: Soil Quality by AEC

Area	Description	Metrics
AEC 1 (IL+, possibly RL+)	Near surface metals contamination likely resulting from fill or from rail yard use.	Impacts are in the top 1.5m. The most common exceedance is zinc. AEC 1 (east) - ~4500m^2 AEC 1 (west - ~5000m^2 Most of this material is IL+ because it exceeds a water use standard, but some soil could be placed in a less stringent category under the right conditions. The zinc standards up to 450ug/g are pH dependant water use standards. Most results in AEC 1 are below this level. It may be possible to apply a less stringent standard at a non-landfill disposal site if soil meets the standard after leachate testing in accordance with a director's protocol.

Area	Description	Metrics
AEC 2 (RL+, CL+, IL+/Waste)	Mostly metals-contaminated fill extending from the north property boundary into the centre of the Site. Most of this material was imported in the 1900s as part of the bulk infilling of the False Creek Flats. The area has been roughly defined but seems to correspond to an area of historical filling shown on the 1912 fire insurance plan (Figure D). The confirmed and possible extents are shown on Figure 20. The fill in this area is heterogeneous, meaning that while many samples exceed IL Standards, about 30% of the soil does not. Some wood and building debris were encountered.	Fill depth is 1.5m-3m on 250 and 310 Prior Street and roughly 5.5m on 1002 Station Street. Most contamination is present between 0m and 5.5m below grade. AEC 2 (confirmed) - ~27,000m^2 AEC 2 (possible) - ~32,500m^2 Contains a mix of metals. Lead is the most-wide spread contaminant. Because of the mix of contaminants, it will likely be difficult to segregate soil that is RL+ or CL+ from IL+ material, but like AEC 1 it may be possible to move some of this soil to IL properties.
AEC 2b (Suspect HW+)	Mostly metals contaminated fill on 310 Prior Street extending onto 1002 Station Street. A portion of the soil in this area is potentially HW+ (60% - 80%), mostly in the top 1.5m, the remaining fill is IL+. This material is likely from the same historical infilling as the rest of AEC 2, but it is possible that some of the shallow contaminated soil has been impacted by the former smelter at this location.	Like the rest of AEC 2, fill depth is 1.5m-3m on 250 and 310 Prior Street and roughly 5m on 1002 Station Street. AEC 2b - ~6,000m^2.
AEC 3 (RL+ and IL+)	Hydrocarbon and metals contamination likely resulting maintenance or other rail yard activities on the northern portion of 1002 Station Street extending onto 250 and 310 Prior Street.	Hydrocarbon impacts are mostly in the top 1m but extend past 2m in some areas. About 2/3 of the area intersects with AEC 2 and has IL+ metals. The southern portion of the AEC is RL+ due to hydrocarbons. AEC 3 - ~5,500m^2 (about 3,400m^2 of which intersects AEC 2).
Arsenic in marine sediments	Arsenic exceeds standards in some samples of marine sediment on 1002 Station Street. The upper 90th percentile and 95th UCL exceed the standard.	This material exceeds standards for protection of aquatic life and drinking water standards. It could be relocated to a property where these standards do not apply or where background concentrations of arsenic are elevated.

In some cases, soil can be confirmed as better quality than its suspect class and disposed of as less contaminated. This approach is likely to be cost-effective when managing AEC 2b, since disposal rates for HW+ material are much higher than those for IL+. Soil that is not confirmed HW+ could be stockpiled and sampled, then individual stockpiles managed according to their confirmed class. A similar approach could also work at the remainder of AEC 2. It is not clear that the effort of segregating material and stockpile sampling all material from AEC 2 will yield significant cost savings, but we assume that perhaps 20%-30% of the soil can be segregated into a better category. Continuous volumes of RL- or RL+ material inside of AEC 2 could be confirmed through additional drilling or test pitting.

HW+ material is often treated onsite by mixing it with cement. The resulting mix does not exceed the HWR leachability standards and can be disposed of at a lower rate. If the schedule allows it and there is enough room onsite to stage the mixing operation, this is likely the most cost-effective method to manage hazardous waste.

Treated HW+ material (or any other material) could also be moved to other areas of the Site provided it can be accommodated by the development plan (e.g., as landscape features) and meets the risk-based standards. IL+ or HW+ material may require a Waste Discharge Authorization from ENV to relocate onsite.

Where excavation is intended to extend to or beyond the boundaries of an AEC, confirmation of remediation samples should be collected at the excavation perimeter.

9.2.2 Groundwater Remediation

Based on current data, groundwater is unlikely to require remediation outside of risk assessment. However, groundwater will need to be carefully monitored during excavations because hydrocarbons and metals (some leachable) contamination in soil could be mobilized into groundwater by these activities. The risk of mobilizing contamination into groundwater could be lessened by pumping the groundwater table lower before beginning excavation. Post-remediation groundwater wells should be installed to assess post-excavation groundwater quality.

9.2.3 Vapour Remediation

Vapour remediation/management steps will on depend vapour concentrations and whether future developments will have underground parking at their lowest level.

- If a future development has underground parking and intersects an area of soil vapour contamination (Figure 18, Figure 19, and Figure 22), then sub-slab samples should be collected below the building during construction. The additional excavation for sub-grade parking may have improved vapour quality by removing contaminated soil. If sub-slab samples continue to exceed standards below the building, our results indicate that normal operation of the parkade ventilation system and application of the corresponding parkade attenuation adjustment divisor (PAAD)[10] will likely be sufficient to reduce concentrations in the breathing zone below applicable standards.

[10] As referenced in CSR Protocol 22 - Application of Vapour Attenuation Factors to Characterize Vapour Contamination

- If a future development is of slab-on-grade construction without an underlying parkade and intersects an area of soil vapour contamination, then engineering measures may need to be installed to protect the building from vapour intrusion.

    - If the building is constructed near surface and above the water table then ventilation pipes and/or a membrane barrier should be placed below the foundation slab to reduce vapour concentrations directly below the building.

    - If buildings are constructed with foundations below the water table then sub-slab vapour samples should be collected from below the building during construction. The additional excavation for sub-grade levels may have improved vapour quality by removing contaminated soil. Barriers to prevent groundwater infiltration could be assessed to determine if they could prevent vapour infiltration as well. Developers may wish to install ventilation piping below the foundation slab as a precaution against sub-slab vapours exceeding the standard after excavation.

9.2.4 Risk Assessment

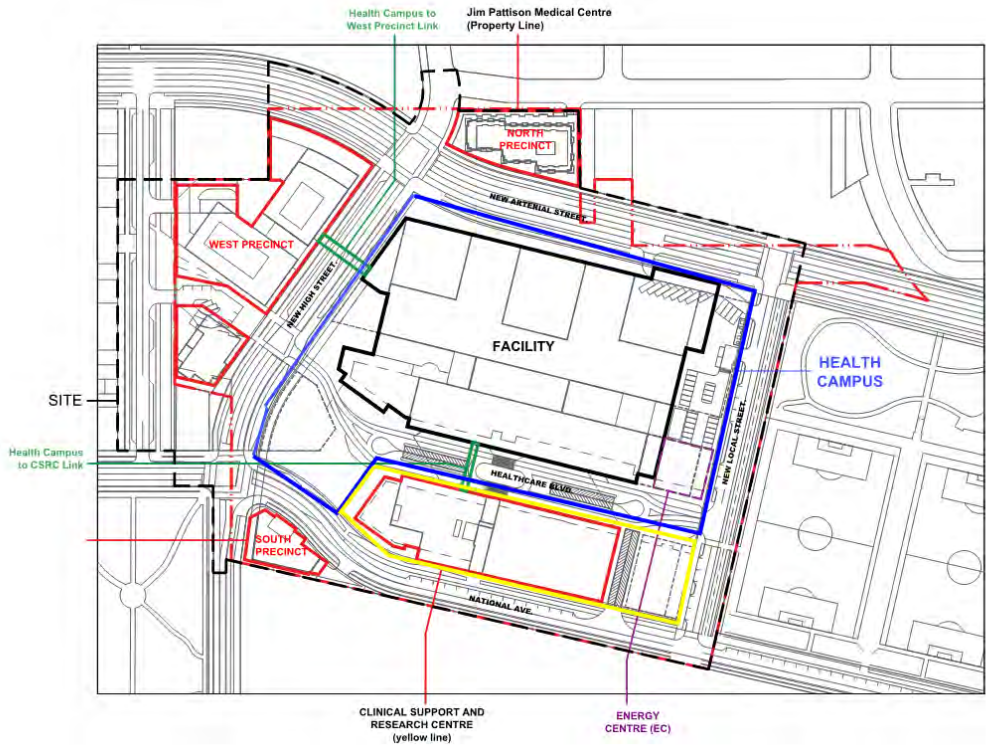
As described in Section 8 above, shallow soil contamination is considered an unacceptable risk. Areas with shallow soil contamination can be managed by installing a surface cap, or by excavating the top 1m and replacing it with commercial quality soil.

9.2.5 Remediation Methods at Future Parcels

In the future the Site will be sub-divided into several parcels. Each of these will likely be developed separately. We have summarized the soil quality and remediation challenges at each parcel. There are six main areas of the future development:

- The Core Hospital/Health Campus;
- The North Precinct;
- The West Precinct;
- The South Precinct; and,
- Clinical Support and Research Centre.

Figure F: Parcels of the Future Development



9.2.5.1 Core Hospital Development

The core hospital development intersects parts of AEC 1, AEC 2, and AEC 3 (Figure 26). We understand that most of this material will be excavated to accommodate underground parking. Soil at the southwest corner of the parcel that may not be excavated meets RL standards.

For planning purposes, we estimated the volumes and categories of soil that will be excavated for the Core Hospital development. We assume:

- The area that will be excavated is the portion of the Site bounded by the future positions of Gore Street, Malkin Avenue, Jackson Street, and Healthcare Boulevard (Figure 26). The area will be excavated to about 11m below grade;
- Impacts within AEC 1 are limited to the top 1.5m;
- AEC 2 is the larger 'suspected area' rather than the confirmed area of contamination and extends from 0 to 5.5m below grade; and
- Potentially arsenic containing marine sediments underlie 80% of the parcel down to the bottom of the excavation (a conservative assumption).

Table P: Soil Potentially Excavated from the Core Hospital Development.

Area	Area Intersecting Footprint	Estimated Volume
AEC 1	6,000m^2	9,000m^3
AEC 2 (excluding AEC 2b)	15,000m^2	82,500m^3
AEC 2b	2,500m^2	13,800m^3
AEC 3 (excluding AEC 1 or AEC 2)	300m^2	300m^3
Arsenic in Marine Sediment	21,500m^2	119,000m^3

No vapours were measured that require remediation or management. However, post-remediation soil and groundwater samples should be assessed for the presence or absence of volatile PCOCs.

9.2.5.2 Future Roads

The future road network intersects most APECs. Most areas of the road network would meet the applicable numerical standards, but future roads at the north end of the Site will intersect with AEC 2 and AEC 3 (Figure 26). IL+ metals associated with AEC 2 are the primary concern in this area.

We assume that soil will be mostly left in-place except where excavation is required for road construction and to accommodate utilities. The road surface will protect potential receptors from contacting contaminated soil. Where the road design calls for uncapped boulevards, contaminated soil exceeding standards for the protection of people and plants could be excavated to a depth of 1.0m.

The future roads will likely be dedicated to the City of Vancouver who will have a say in the remediation strategy.

9.2.5.3 North Precinct

The North Precinct intersects AEC 2b and some of the highest metal concentrations. Future development on this parcel has not been decided. Given the smaller size the parcel and relatively shallow depth of contamination (an average of about 2.5m) we assume that most contaminated soil on this parcel will be excavated for offsite disposal.

Table Q: Soil Potentially Excavated from the North Precinct

AEC	Area	Estimated Volume
AEC 2b	2,000m^3	5,000m^3

There are vapour risks on this parcel. SV15 exceeds RL, CL, and Parkade standards after application of a sub-slab attenuation factor. If buildings on this parcel will have underground parking, then vapour concentrations would likely meet standards after excavation and applying the Parkade Attenuation Adjustment Divisor. If the future building will be slab-on-grade, then some form of vapour protection should be installed below the building (e.g., a barrier or sub-slab ventilation).

9.2.5.4 West Precinct

The West Precinct intersects portions of AEC 1 (west), AEC 2, and AEC 3. Future development on this parcel has not been decided. For estimating soil volumes, we assume that all contaminated soil will be removed from the footprint of this parcel. This is a reasonable assumption since most contamination in this parcel is relatively shallow (top 1.5m) except for areas of AEC 2 where impacts extend to 5m.

Table R: Soil Potentially Excavated from the West Precinct

AEC	Area	Estimated Volume
AEC 1	500m^2	750m^3
AEC 2	1,700m^2	8,500m^3
AEC 3	700m^2	700m^3

There are vapour risks on the northern portion of this parcel. SV10 exceeds RL, CL, and Parkade standards after application of a sub-slab attenuation factor. If buildings on this parcel will have underground parking, then vapour concentrations would likely meet standards after excavation and applying the Parkade Attenuation Adjustment Divisor. If the future building will be slab-on-grade, then some form of vapour protection should be installed below the northern portion of the building e.g. a barrier or sub-slab ventilation.

9.2.5.5 South Precinct

The south Precinct is outside of any known AEC. No remediation is expected in this area.

9.2.5.6 Clinical Support and Research Centre

The Clinical Support and Research Centre parcel is mostly outside of known AECs. It only intersects a small portion of the confirmed extent of AEC 2, but significantly overlaps the possible extent of AEC 2 as shown in fire insurance maps. For estimating soil volumes, we assume that the possible extent of AEC 2 is contaminated as per Table M (a conservative assumption) and that all contaminated soil will be removed from the footprint of this parcel.

Table S: Soil Potentially Excavated from the Clinical Support and Research Centre

AEC	Area	Estimated Volume
AEC 2 (confirmed)	500m^2	2,800m^3
AEC 2 (possible, excluding confirmed)	2,000m^2	11,000m^3

9.2.6 Limitations of the Area Estimates

While the amount of information is more than is usually available at this stage of development, it is important to keep in mind the limitations of the data:

As is the case with all environmental investigations, AECs are based on interpolation between investigation locations. On some areas of the Site, particularly on 250 and 310 Prior and the northern portion of 1002 Station Street, there are enough boreholes that contaminated areas can be determined relatively accurately, but further south on 1002 Station Street, the space between drill locations widens, which increases uncertainty in our estimates.

9.3 Remediation Alternatives

Our recommended remediation methods consider cost and practicality. As discussed above, overall remediation of the Site will likely be a mix of methods, the precise details of which will be determined by the needs of the development. In most cases, alternative remediation methods are expensive, impractical, or not necessary to achieve remediation goals. Some discussion is provided below.

9.3.1 Soil Remediation Alternatives

In most cases soil excavation is necessary to construct sub-grade parking. Remaining contaminated soil can be managed through risk assessment. We considered scenarios where contaminated soil could be excavated instead of risk assessed, but generally the added cost makes this approach undesirable. Remediation by excavation would be especially difficult at AEC 2, where contaminated soil is located deep below the water table. In addition to soil disposal costs, excavations to address deep contamination would require extensive groundwater management and importation of backfill material. Soil excavation instead of risk assessment might be more practical at AEC 1, AEC 2b, or AEC 3 where contamination is above the water table; however, excavation would still require considerably more effort and expense than a risk-based approach.

Remediation through chemical injection, or bio-remediation is impractical since most contaminants are metals and the area of contamination is large. Hydrocarbons might be susceptible to enhanced bio-remediation or chemical treatment; however, most hydrocarbon contamination is relatively shallow and easily managed through excavation if risk assessment is not acceptable.

9.3.2 Groundwater Remediation Alternatives

Based on our current data it is debatable whether groundwater requires remediation. If some improvement of groundwater quality was attempted, it would be difficult to accomplish without also removing all sources of contamination in soil. Since removing all soil contamination is impractical and expensive, specific remediation of groundwater is not recommended.

Beyond source removal, groundwater quality could be managed through pump and treat systems or installation of a permeable reactive barrier. However, because the rest of the False Creek Flats contains groundwater with similar contaminants of concern, the value of conducting a dedicated groundwater remediation program is low. The effect of extra water treatment on the overall groundwater quality of the False Creek Flats would be minimal and unnecessary since groundwater impacts can be managed through risk assessment.

Modest improvement of groundwater quality, particularly PAH concentrations, will likely be achieved when PAH contaminated soil is removed to accommodate underground parking areas.

9.3.3 Vapour Remediation Alternatives

Vapour is normally remediated by removing sources (soil or groundwater). Excavation could remediate vapour sources incidentally. Otherwise engineered solutions are proposed to protect buildings against vapour intrusion. Where a development does not want to rely on engineered solutions, additional excavation could be conducted to attempt vapour source removal. However, vapour sources can be quite subtle and hard to identify because of the stringent standards. Our experience is that unless a vapour source is very localized, excavation to remove vapour may not be successful. Further, additional excavation will often be more expensive than a lower risk, low cost engineered solution.

Developments may need to choose between engineered solutions. Typically, we recommend sub-slab ventilation systems, as our experience has shown them to be effective at relatively low cost. The minor downside is that they may require a small powered fan or blower that needs to be maintained for the life of the building. Membrane barriers can also provide protection but can degrade over time and cannot be modified (e.g. by adding a bigger fan) after they are installed. High integrity barriers (i.e., without significant leaks) are also difficult to achieve and so expensive. Some developments choose to install both ventilation piping and a barrier as a “belt and suspenders” approach, but this does have a significant cost.

9.4 Schedule

Excavation of the core hospital facility is scheduled to commence winter/spring 2021. Re-alignment of roads is expected for follow a similar timetable. Most remediation is expected to be completed by Fall 2022. Timelines from some of the auxiliary developments (e.g. west and north precincts) could be extended, but remediation within five years is feasible.

10.0 CONCLUSIONS

Based on the information collected during this Stage 2 PSI/DSI, we conclude that multiple areas of the Site are contaminated above the applicable CSR numerical standards:

Table T: AECs

APEC #		Contaminants of Concern	Description
1	Imported fill (post-1912)	Metals in soil (See Table H)	Soil in the top 1.5m exceeded standards in areas of the east and west portions of the Site. Groundwater and vapour did not exceed standards.
2	Metals and hydrocarbon impact in imported fill (pre-1912).	Metals and PAHs in soil and groundwater (See Table I)	Fill soil commonly exceeded standards throughout the north and central portions of the Site. Groundwater exceeded standards for metals in the past but did not exceed standards for metals in the most recent sampling event. Some locations near buried creosote treated wood exceeded the stringent groundwater standard for pyrene.
3	Historical Repair and Maintenance Shops	Hydrocarbons in soil and vapour and chlorinated solvents in vapour (See Table J)	Soil exceeds standards for hydrocarbons (mostly heavy extractable petroleum hydrocarbons). Soil also exceeds standards for metals, but these might be sourced from AEC 1 and AEC 2. Groundwater did not exceed standards. Vapour exceeded standards for hydrocarbons and some chlorinated solvents.

Contaminated areas have been characterized and delineated. After excavation for construction, post-remedial sampling, and completion of a risk assessment, the Site will be eligible for a CofC. This report can be used to support a permit release and, in the future, an application for a regulatory instrument along with a Confirmation of Remediation report and an SLRA.

11.0 PROFESSIONAL STATEMENT

Pursuant to the requirements of Part 16 of the CSR, PGL affirms that:

- This documentation has been prepared in accordance with all requirements of the *Environmental Management Act* and Regulations; and
- The persons signing this report have demonstrable experience with this type of investigation and the Site conditions.

The Stage 1 and 2 PSI report was prepared by Zayed Mohamed, P.Ag., CSAP, and was reviewed by Will Gaherty, P.Eng. Zayed Mohamed more than 10 years of experience working on contaminated site investigations, and Will Gaherty has been has more than 30 years of experience working on contaminated site investigations.

12.0 LIMITATIONS

This report is accurate at a high level for reasonably foreseeable conditions. The limitations of the work are not always obvious, and the best way to understand them is discussion with the authors in the context of your intended use. This work is a snapshot in time, so any use must consider that conclusions may change materially because of changes in site condition or regulatory context.

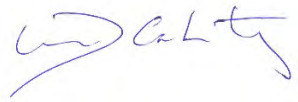
Only the addressee, our client and their agents, ENV, and the CSAP Society may rely on this report for the stated purpose. We warrant only that the work was done as described and is similar to the work that would be done by other qualified consultants in this area.

Respectfully submitted,

PGL ENVIRONMENTAL CONSULTANTS

Per:

Zayed Mohamed, B.Sc., P.Ag.
Environmental Consultant



William Gaherty, M.S., P.Eng.
President

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Figures and Tables

PGL Environmental Consultants
Standard Table Notes
Soil Samples

Soil sample results are presented as mg/kg (ppm) on a dry weight basis.

EPH	Extractable Petroleum Hydrocarbons, not corrected for PAH
LEPH	Light Extractable Petroleum Hydrocarbons, corrected for PAH
HEPH	Heavy Extractable Petroleum Hydrocarbons, corrected for PAH
PAH	Polycyclic Aromatic Hydrocarbons
MAH	Monocyclic aromatic hydrocarbons (benzene, ethylbenzene, toluene and xylenes)
VH C6-C10	Volatile hydrocarbons
VPH C6-C10	Volatile petroleum hydrocarbons excluding benzene, ethylbenzene, toluene and xylenes
MTBE	Methyl tert-butyl ether
VOC	Volatile organic compounds
RDL	Reportable detection limit
m	Metres
BH	Borehole
BH_M	Monitoring Well
TP	Test Pit
GW	Groundwater
SW	Surfacewater
Z	Replicate/Duplicate Sample
<	Less than the stated detection limit
-	Not analyzed
B(A)P Total Potency Equivalent	Benzo(a)pyrene Total Potency Equivalent
CSR	Contaminated Sites Regulation (1997, and amendments)
RL_{HD}	Residential High Density land use
CL	Commercial land use
~	No Standard
1	LEPH/HEPH Standard has been applied to EPH
2	The standard is pH dependant. The sample-specific standard has been applied
3	Most stringent Cr Standard has been applied
Bold	Detection limit greater than standard
Shaded & Bold	Greater than the most stringent of the applicable RL -HD CSR Standard below 3.0m bgs
Shaded & Bold	Greater than the most stringent of the applicable CSR Standard

PGL Environmental Consultants
Standard Table Notes
Soil Samples

pH-Dependant Soil Standards

	Beryllium	Cadmium	Copper	Lead	Nickel	Zinc	Pentachlorophenol (PCP)
Residential High Density land use							
CSR Sch3.1 Part 1 RL_{HD} (GW used for drinking water)	pH <5.5 = 1 pH 5.5 - <6.0 = 1.5 pH 6.0 - <6.5 = 4 pH 6.5 - <7.0 = 20 pH 7.0 - <7.5 = 150 pH 7.5 - <8.0 = 1 000 pH >= 8.0 = 2 500	pH <7.0 = 1 pH 7.0 - <7.5 = 4.5 pH 7.5 - <8.0 = 30 pH >=8.0 = 70	pH <5.0 = 250 pH 5.0 - <5.5 = 500 pH 5.5 - <6.0 = 2 000 pH 6.0 - <6.5 = 10 000 pH 6.5 - <7.0 = 50 000 pH >= 7.0 = 100 000	pH <5.5 = 120 pH 5.5 - <6.0 = 150 pH 6.0 - <6.5 = 800 pH 6.5 - <7.0 = 3 500 pH 7.0 - <7.5 = 7 500 pH >= 7.5 = 8 500	pH <7.5 = 70 pH 7.5 - <8.0 = 250 pH >=8.0 = 500	pH <5.0 = 200 pH 5.0 - <5.5 = 250 pH 5.5 - <6.0 = 300 pH 6.0 - <6.5 = 450 pH 6.5 - >7.0 = 600 pH 7.0 - >7.5 = 1 000 pH 7.5 - <8.0 = 3 000 pH >=8.0 = 5 500	pH <5.0 = 300 pH 5.0 - <5.5 = 200 pH 5.5 - <6.0 = 75 pH 6.0 - <6.5 = 9 pH 6.5 - <7.0 = 2.5 pH >= 7.0 = 1.5
CSR Sch3.1 Part 1 RL_{HD} (GW flow to freshwater SW used by aquatic life)	pH <6.5= 1 pH 6.5 - <7.0 = 4 pH 7.0 - <7.5 = 30 pH 7.5 - <8.0 = 250 pH >=8.0 = 500	pH <7.0 = 1 pH 7.0 - <7.5 = 3 pH 7.5 - <8.0 = 20 pH >=8.0 = 50	pH <5.5 = 75 pH 5.5 - <6 = 100 pH 6.0 - <6.5 = 700 pH 6.5 - <7.0 = 3000 pH 7.0 - <7.5 = 6500 pH >=7.5 = 7500	pH <5.0 = 200 pH 5.0 - <5.5 = 350 pH 5.5 - <6.0 = 1500 pH 6.0 - <6.5 = 8500 pH 6.5 - <7.0 = 35000 pH 7.0 - <7.5 = 80000 pH >= 7.5 = 90000	pH <5.0 = 90 pH 5.0 - <5.5 = 100 pH 5.5 - <6.0 = 150 pH 6.0 - <6.5 = 200 pH 6.5 - <7.0 = 300 pH 7.0 - <7.5 = 900 pH 7.5 - <8.0 = 5 000 pH >= 8.0 = 9 500	pH <6.0 = 150 pH 6.0 - <6.5 = 250 pH 6.5 - <7.0 = 350 pH 7.0 - >7.5 = 600 pH 7.5 - <8.0 = 1 500 pH >=8.0 = 3 000	pH <5.0 = 300 pH 5.0 - <5.5 = 150 pH 5.5 - <6.0 = 2 pH 6.0 - <6.5 = 0.25 pH >= 6.5 = 0.1
CSR Sch3.1 Part 1 RL_{HD} (GW flow to marineSW used by aquatic life)	pH <5.0 = 85 pH 5.0 - <5.5 = 100 pH 5.5 - <6.0 = 200 pH 6.0 - <6.5 = 550 pH 6.5 - <7.0 = 2500 pH 7.0 - <7.5 = 20 000 pH 7.5 - <8.0 = 150 000 pH >= 8.0 = 350 000	pH <5.5 = 1 pH 5.5 - <6.0 = 1.5 pH 6.0 - <6.5 = 2 pH 6.5 - <7.0 = 3.5 pH 7.0 - <7.5 = 15 pH 7.5 - <8.0 = 95 pH >=8.0 = 200	pH <6.0 = 75 pH 6.0 - <6.5 = 150 pH 6.5 - <7.0 = 650 pH >=7.0 = 1500	pH <5.5 = 120 pH 5.5 - <6.0 = 300 pH 6.0 - <6.5 = 1 500 pH 6.5 - <7.0 = 6 500 pH >=7.0 = 15 000	pH <7.5 = 70 pH 7.5 - <8.0 = 250 pH >=8.0 = 500	pH <8.0 = 150 pH >=8.0 = 200	pH <5.0 = 300 pH 5.0 - <5.5 = 150 pH 5.5 - <6.0 = 2 pH 6.0 - <6.5 = 0.25 pH >= 6.5 = 0.1
Commercial land use							
CSR Sch3.1 Part 1 CL (GW used for drinking water)	pH <5.5 = 1 pH 5.5 - <6.0 = 1.5 pH 6.0 - <6.5 = 4 pH 6.5 - <7.0 = 20 pH 7.0 - <7.5 = 150 pH 7.5 - <8.0 = 1 000 pH >= 8.0 = 2 500	pH <7.0 = 1 pH 7.0 - <7.5 = 4.5 pH 7.5 - <8.0 = 30 pH >=8.0 = 70	pH <5.0 = 250 pH 5.0 - <5.5 = 500 pH 5.5 - <6.0 = 2 000 pH 6.0 - <6.5 = 10 000 pH 6.5 - <7.0 = 50 000 pH >= 7.0 = 100 000	pH <5.5 = 120 pH 5.5 - <6.0 = 150 pH 6.0 - <6.5 = 800 pH 6.5 - <7.0 = 3 500 pH 7.0 - <7.5 = 7 500 pH >= 7.5 = 8 500	pH <7.5 = 70 pH 7.5 - <8.0 = 250 pH >=8.0 = 500	pH <5.0 = 200 pH 5.0 - <5.5 = 250 pH 5.5 - <6.0 = 300 pH 6.0 - <6.5 = 450 pH 6.5 - >7.0 = 600 pH 7.0 - >7.5 = 1 000 pH 7.5 - <8.0 = 3 000 pH >=8.0 = 5 500	pH <5.0 = 300 pH 5.0 - <5.5 = 200 pH 5.5 - <6.0 = 75 pH 6.0 - <6.5 = 9 pH 6.5 - <7.0 = 2.5 pH >= 7.0 = 1.5
CSR Sch3.1 Part 1 CL (GW flow to freshwater SW used by aquatic life)	pH <6.5= 1 pH 6.5 - <7.0 = 4 pH 7.0 - <7.5 = 30 pH 7.5 - <8.0 = 250 pH >=8.0 = 500	pH <7.0 = 1 pH 7.0 - <7.5 = 3 pH 7.5 - <8.0 = 20 pH >=8.0 = 50	pH <5.5 = 75 pH 5.5 - <6 = 100 pH 6.0 - <6.5 = 700 pH 6.5 - <7.0 = 3000 pH 7.0 - <7.5 = 6500 pH >=7.5 = 7500	pH <5.0 = 200 pH 5.0 - <5.5 = 350 pH 5.5 - <6.0 = 1500 pH 6.0 - <6.5 = 8500 pH 6.5 - <7.0 = 35000 pH 7.0 - <7.5 = 80000 pH >= 7.5 = 90000	pH <5.0 = 90 pH 5.0 - <5.5 = 100 pH 5.5 - <6.0 = 150 pH 6.0 - <6.5 = 200 pH 6.5 - <7.0 = 300 pH 7.0 - <7.5 = 900 pH 7.5 - <8.0 = 5 000 pH >= 8.0 = 9 500	pH <6.0 = 150 pH 6.0 - <6.5 = 250 pH 6.5 - <7.0 = 350 pH 7.0 - >7.5 = 600 pH 7.5 - <8.0 = 1 500 pH >=8.0 = 3 000	pH <5.0 = 300 pH 5.0 - <5.5 = 150 pH 5.5 - <6.0 = 2 pH 6.0 - <6.5 = 0.25 pH >= 6.5 = 0.1
CSR Sch3.1 Part 1 CL (GW flow to marine SW used by aquatic life)	pH <5.0 = 85 pH 5.0 - <5.5 = 100 pH 5.5 - <6.0 = 200 pH 6.0 - <6.5 = 550 pH 6.5 - <7.0 = 2500 pH 7.0 - <7.5 = 20 000 pH 7.5 - <8.0 = 150 000 pH >= 8.0 = 350 000	pH <5.5 = 1 pH 5.5 - <6.0 = 1.5 pH 6.0 - <6.5 = 2 pH 6.5 - <7.0 = 3.5 pH 7.0 - <7.5 = 15 pH 7.5 - <8.0 = 95 pH >=8.0 = 200	pH <6.0 = 75 pH 6.0 - <6.5 = 150 pH 6.5 - <7.0 = 650 pH >=7.0 = 1500	pH <5.5 = 120 pH 5.5 - <6.0 = 300 pH 6.0 - <6.5 = 1 500 pH 6.5 - <7.0 = 6 500 pH >=7.0 = 15 000	pH <7.5 = 70 pH 7.5 - <8.0 = 250 pH >=8.0 = 500	pH <8.0 = 150 pH >=8.0 = 200	pH <5.0 = 300 pH 5.0 - <5.5 = 150 pH 5.5 - <6.0 = 2 pH 6.0 - <6.5 = 0.25 pH >= 6.5 = 0.1

PGL Environmental Consultants
Standard Table Notes
Groundwater Samples

Groundwater sample results are presented as µg/l (ppb).

EPH	Extractable Petroleum Hydrocarbons, not corrected for PAH
LEPH	Light Extractable Petroleum Hydrocarbons, corrected for PAH
HEPH	Heavy Extractable Petroleum Hydrocarbons, corrected for PAH
PAH	Polycyclic Aromatic Hydrocarbons
MTBE	Methyl tert-butyl ether
VH C6-C10	Volatile hydrocarbons
VPH C6-C10	Volatile petroleum hydrocarbons excluding benzene, ethylbenzene, toluene and xylenes
MAH	Monocyclic aromatic hydrocarbons (benzene, ethylbenzene, toluene and xylenes)
VOC	Volatile organic compounds
TDS	Total dissolved solids
RDL	Reportable detection limit
BH_M	Monitoring Well
MW	Monitoring Well
Z	Replicate/Duplicate Sample
<	Less than the stated detection limit
-	Not analyzed
CSR	Contaminated Sites Regulation (1997, and amendments)
AW	Aquatic Life Use
IW	Irrigation water use
~	No Standard
1	Standards for Phenols varies with pH, temperature and substance isomer. Consult a director for further advice
2	Standard for Ammonia vaires with pH, temperature and salinity. 10C and 10 practical salinity units (psu) assumed. Consult a director for further advice.
Bold	Detection limit greater than standard
Shaded & Bold	Greater than the most stringent applicable CSR Standard

	CSR Sch 3.2 AW Marine pH Dependent Standards (ug/L)
	2 300 @ pH >=8.5 **6 850 @ pH 8.0 - <8.5** **20 000 @ pH 7.5 - <8.0** **64 000 @ pH 7.0 - <7.5** **200 000 @ pH <7.0**
Parameter	**CSR Sch 3.2 AW Chloride (Cl) Dependent Standards (ug/L)**
Nitrite (as N)	**200 @ Cl < 2 mg/L** **400 @ Cl 2 - <4 mg/L** **600 @ Cl 4 - <6 mg/L** **800 @ Cl 6 - <8 mg/L** **1 000 @ Cl 8 - < 10 mg/L** **2 000 @ Cl >= 10 mg/L**

PGL Environmental Consultants
Standard Table Notes
Soil Vapour Samples

Soil Vapour results are presented as µg/m³

MAH	Monocyclic aromatic hydrocarbons (benzene, ethylbenzene, toluene and xylenes)
VPHv	Volatile petroleum hydrocarbons excluding benzene, ethylbenzene, toluene and xylenes (vapour)
VHv	Volatile hydrocarbons (vapour)
PAH	Polycyclic Aromatic Hydrocarbons
VOC	Volatile organic compounds
RDL	Reportable detection limit
CSR	Contaminated Sites Regulation (1997 and amendments)
SV__	Soil Vapour well or probe
CL	Commercial use
Z	Duplicate sample
m bgs	metre below grade surface
<	Less than the stated detection limit
~	No standard or factor
Bold	Detection limit greater than standard
Shaded & Bold	Greater than the most stringent CSR Standard before attenuation factor applied
Shaded & Bold	Greater than the most stringent CSR Standard after attenuation factor applied

0 500 m

Parcel and Ortho Image from The City of Vancouver's Open Data Catalouge

0 200 m

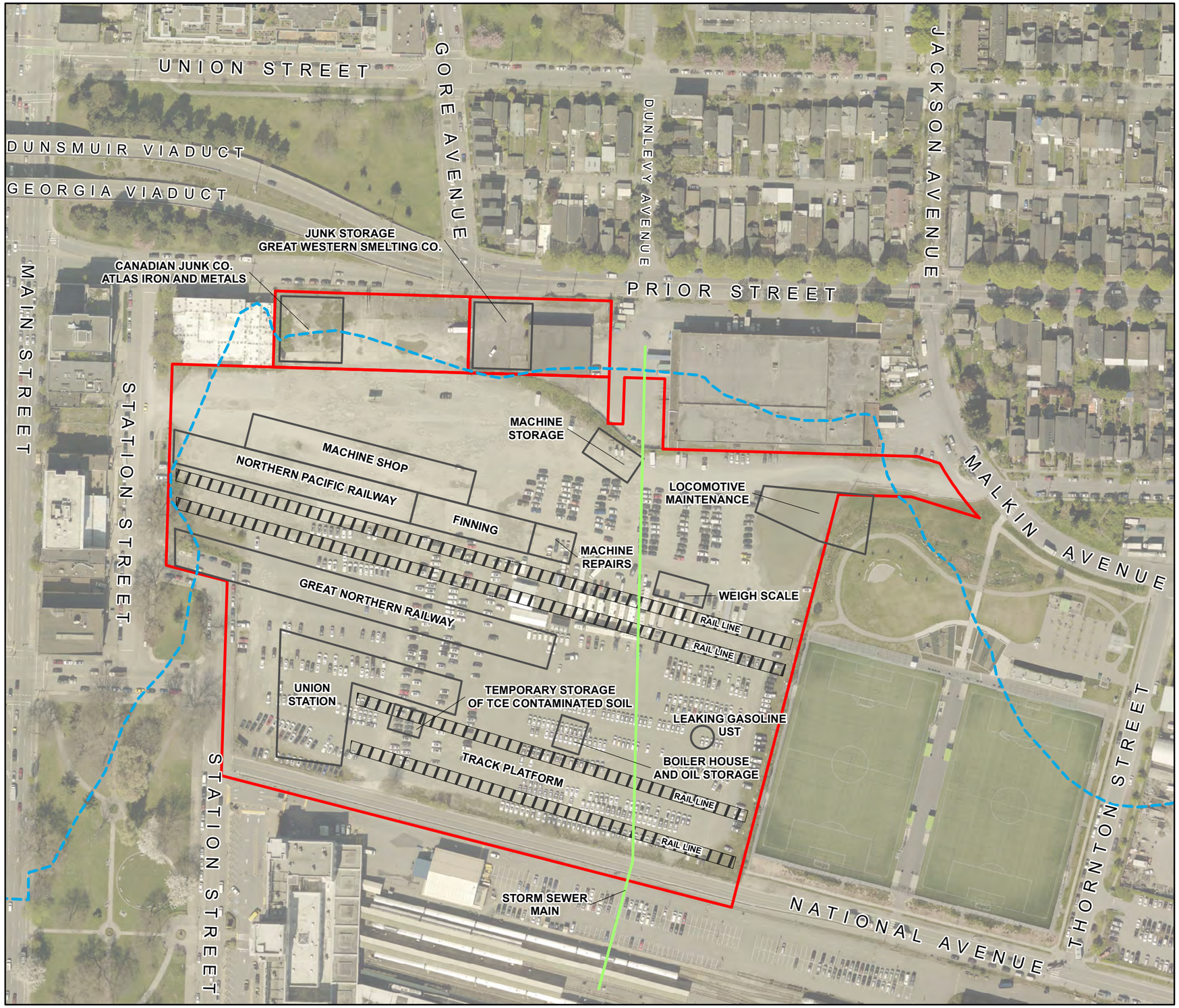
SITE LOCATION

250 and 310 Prior Street and 1002 Station Street, Vancouver, BC

PROVIDENCE HEALTH CARE

N

PGL ENVIRONMENTAL CONSULTANTS	File No.:	Date:	Dwg No.:	Drawn by:	FIGURE
	5355-01.01	MAR 2019	53550101-F11	DPL	1



Ortho Image and Parcel Boundary from The City of Vancouver's Open Data Catalogue

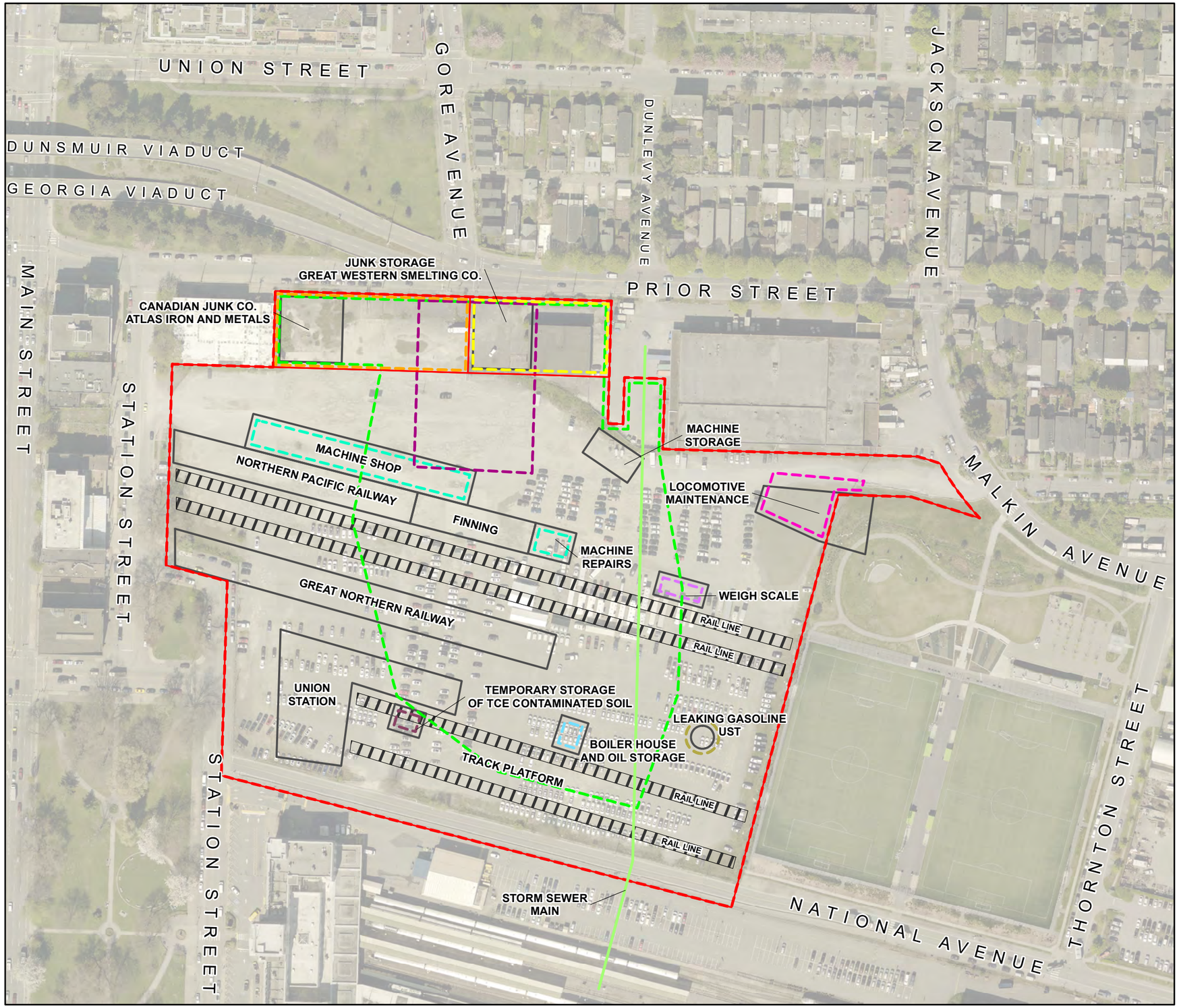
HISTORICAL SITE FEATURES

250 and 310 Prior Street and 1002 Station Street, Vancouver, BC

PROVIDENCE HEALTHCARE

PGL ENVIRONMENTAL CONSULTANTS	File No.:	Date:	Dwg No.:	Drawn by:	FIGURE
	5355-01.01	MAR 2019	53550101-F21	DPL	**2**

Original in colour



- Site Boundary (Approximate)
- APEC 1 - Imported fill (post-1912)
- APEC 2 - Metals and hydrocarbon impacts in imported fill (pre-1912)
- APEC 3 - Historical repair and maintenance shops
- APEC 4 - Historical locomotive maintenace repair area
- APEC 5 - Historical weigh scale
- APEC 6 - Historical boiler house and fuel oil shed
- APEC 7 - Historical leaking gasoline UST
- APEC 8 - Historical temporary storage of TCE contaminated soils
- APEC 9 - Former Beam Manufacturing Co. Ltd. (Sawmill)
- APEC 10 - Former Canadian Junk Co. Ltd. and Atlas Iron and Metals Ltd.
- APEC 11 - Former Great Western Smelter and Canada Metal Plant No. 2

N 0 20 40 80 m
1:2,000

Ortho Image and Parcel Boundary from The City of Vancouver's Open Data Catalogue

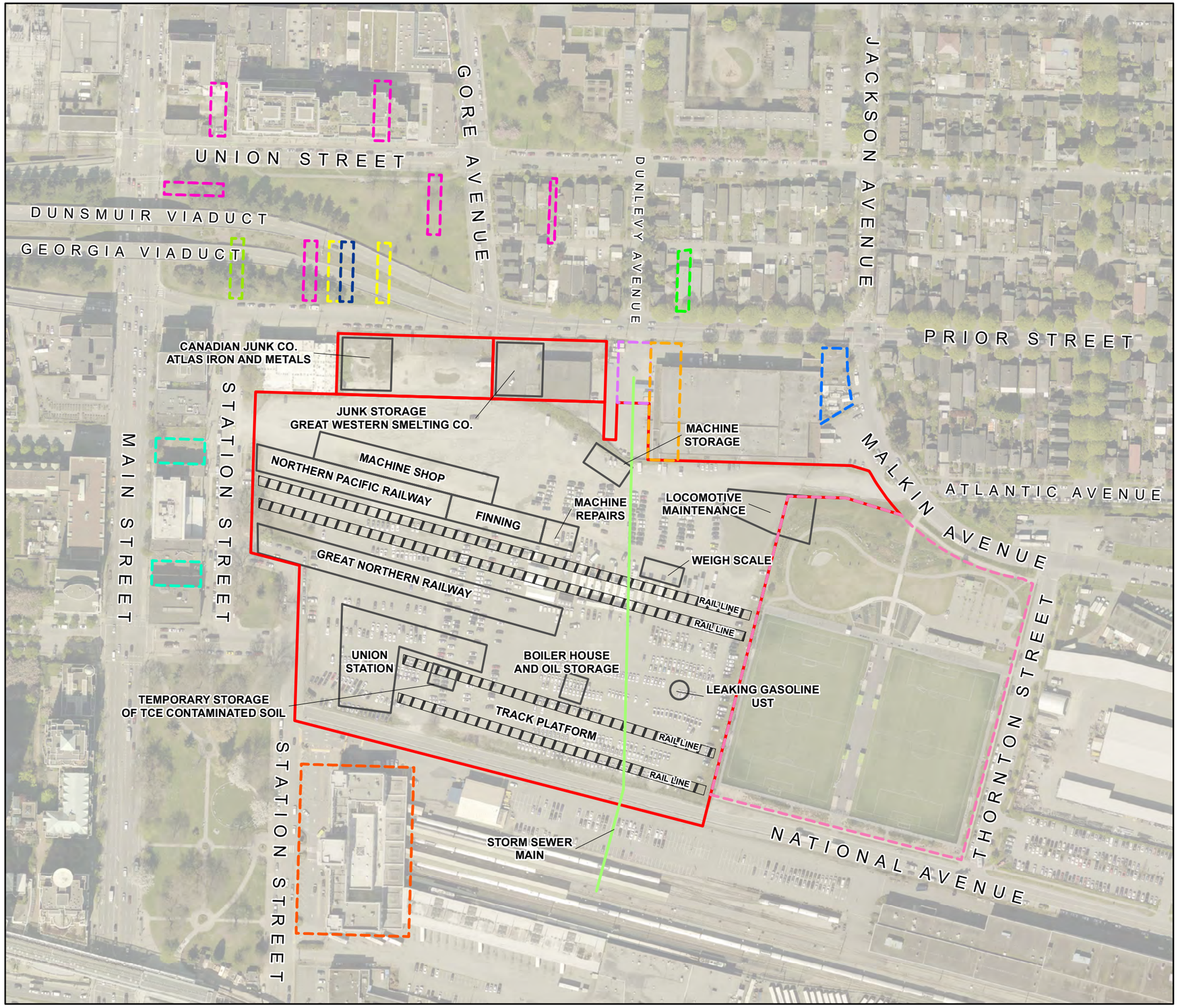
ONSITE AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

250 and 310 Prior Street and 1002 Station Street, Vancouver, BC

PROVIDENCE HEALTHCARE

PGL ENVIRONMENTAL CONSULTANTS	File No.:	Date:	Dwg No.:	Drawn by:	FIGURE
	5355-01.01	MAR 2019	53550101-F31	DPL	3

Original in colour



- Site Boundary (Approximate)
- APEC 12 - Historical machinery and sheet metal operations (946-948, 950, and 1024 Station Street)
- APEC 13 - Inferred dry cleaning operations (823 Main Street, 237 Prior Street, 210, 255, 274 and 328 Union Street)
- APEC 14 - Former service station and garage (219 Prior Street)
- APEC 15 - Historical upgradient salvage/auto wrecking (241, 269 Prior Street)
- APEC 16 - Historical upgradient salvage/auto wrecking (413 Prior Street)
- APEC 17 - Historical electroplating, boat building and trucking operations (249 Prior)
- APEC 18 - Former fuel operation (408 Prior Street)
- APEC 19 - Former leaking gasoline UST (410 and 456 Prioir Street)
- APEC 20 - Historical ink manufacturing (496 Prior Street)
- APEC 21 - Historical rail operations and imported fill (580 Malkin Avenue)
- APEC 22 - Historical rail maintenance centre (1100, 1150 Station Street)

N

0 25 50 100 m

1:2,500

Ortho Image and Parcel Boundary from The City of Vancouver's Open Data Catalogue

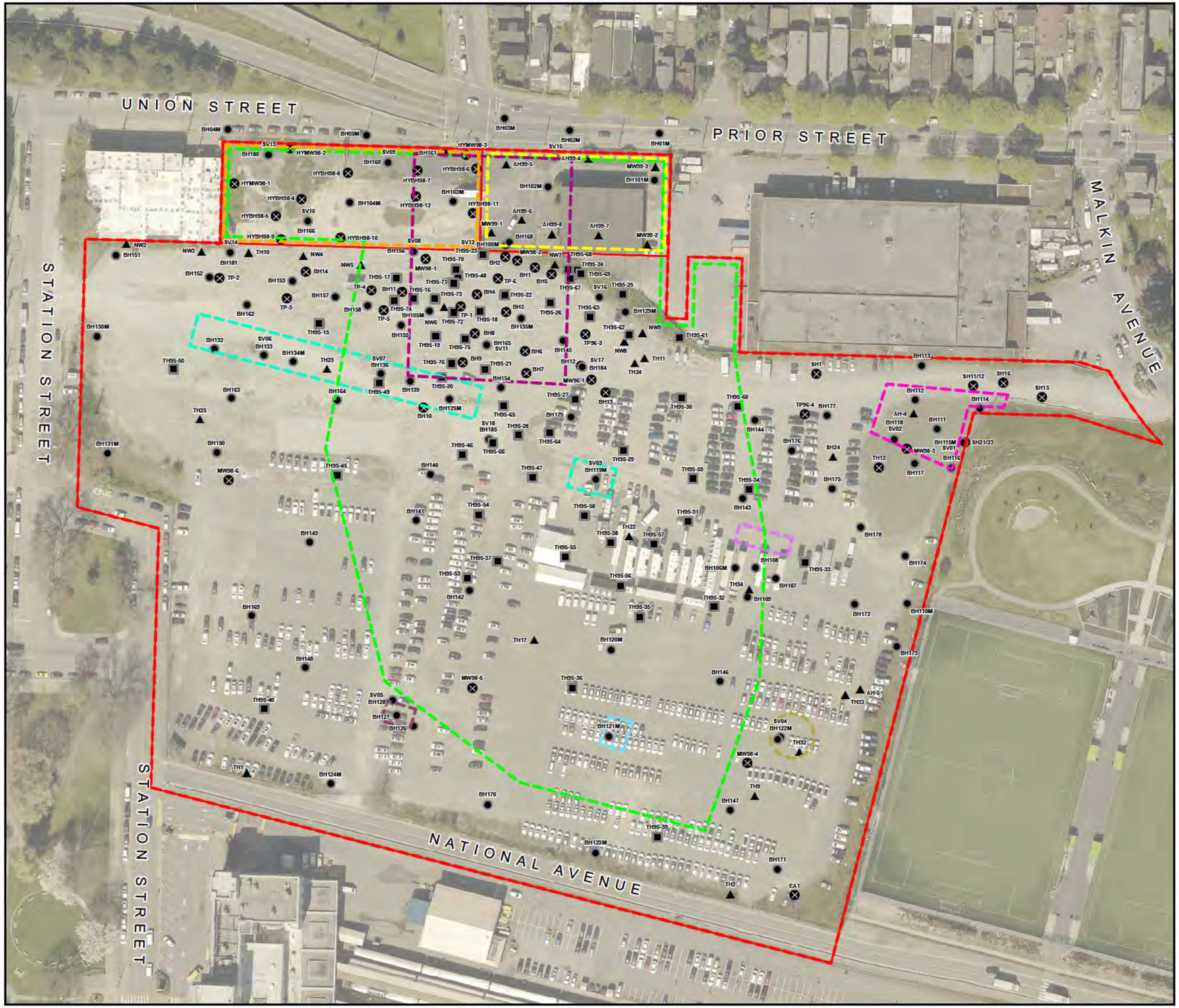
OFFSITE AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

250 and 310 Prior Street and 1002 Station Street, Vancouver, BC

PROVIDENCE HEALTHCARE

PGL ENVIRONMENTAL CONSULTANTS	File No.:	Date:	Dwg No.:	Drawn by:	FIGURE
	5355-01.01	MAR 2019	53550101-F51	DPL	4

Original in colour



- Site Boundary (Approximate)
- APEC 1 - Imported fill (post-1912)
- APEC 2 - Metals and hydrocarbon impacts in imported fill (pre-1912)
- APEC 3 - Historical repair and maintenance shops
- APEC 4 - Historical locomotive maintenace repair area
- APEC 5 - Historical weigh scale
- APEC 6 - Historical boiler house and fuel oil shed
- APEC 7 - Historical leaking gasoline UST
- APEC 8 - Historical temporary storage of TCE contaminated soils
- APEC 9 - Former Beam Manufacturing Co. Ltd. (Sawmill)
- APEC 10 - Former Canadian Junk Co. Ltd. and Atlas Iron and Metals Ltd.
- APEC 11 - Former Great Western Smelter and Canada Metal Plant No. 2

Investigation Locations (Installing Consultant Indicated)

- PGL Environmental Consultants
- Golder Associates
- Piteau Associates
- Thurber Engineering Ltd.

N

0 12.5 25 50 m

1:1,500

NAD 1983 UTM Zone 10N

Ortho Image and Parcel Boundary from The City of Vancouver's Open Data Catalogue

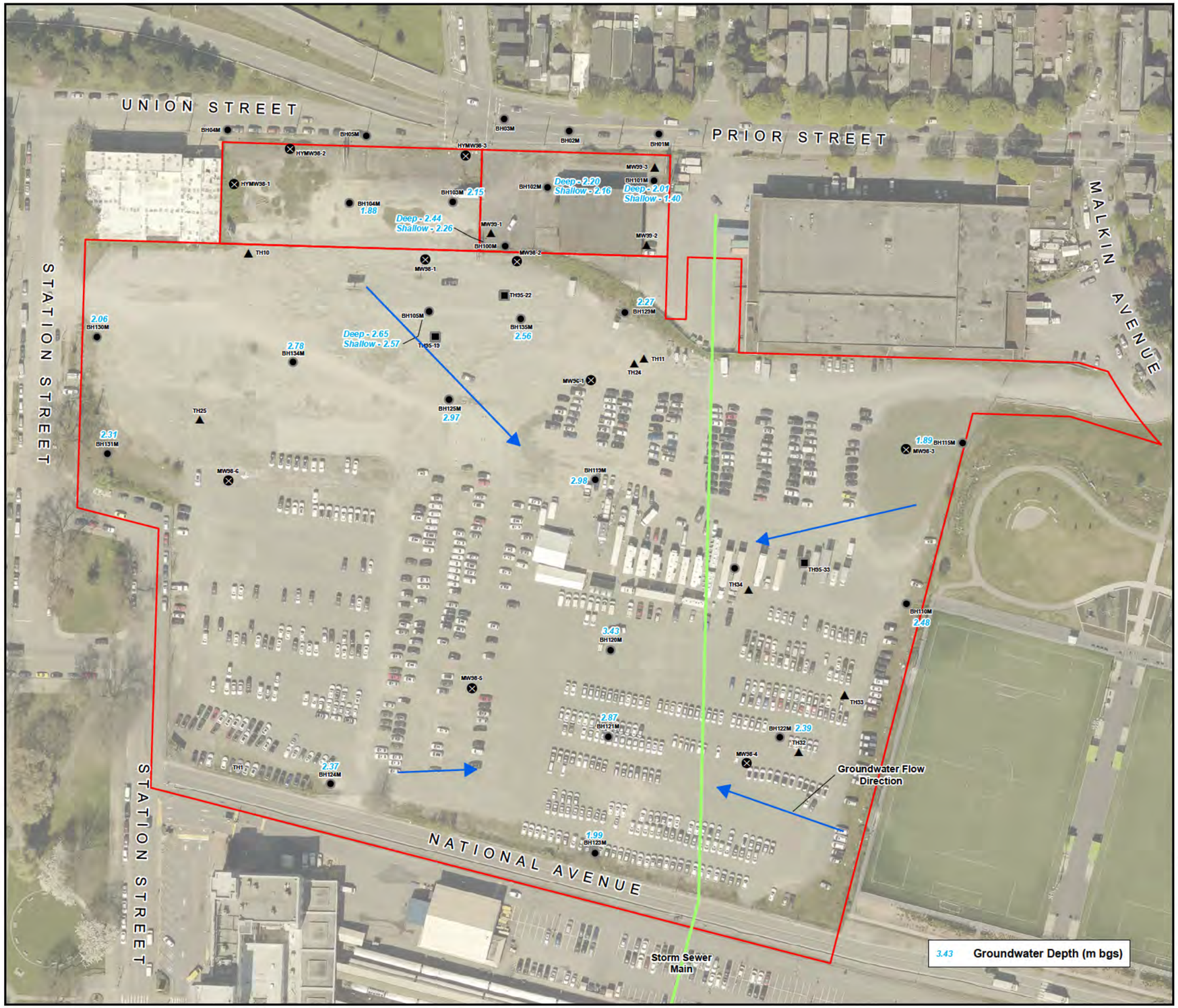
INVESTIGATION LOCATIONS WITH ONSITE APECs

250 and 310 Prior Street and 1002 Station Street, Vancouver, BC

PROVIDENCE HEALTH CARE

PGL ENVIRONMENTAL CONSULTANTS	File No.:	Date:	Dwg No.:	Drawn by:	FIGURE
	5355-01.01	MAR 2019	53550101_F51	DPL	5

Original in colour



Site Boundary (Approximate)

Investigation Locations
(Installing Consultant Indicated)

- PGL Environmental Consultants
- Golder Associates
- Piteau Associates
- Thurber Engineering Ltd.

N

0 12.5 25 50 m

1:1,500

NAD 1983 UTM Zone 10N

Ortho Image and Parcel Boundary from The City of Vancouver's Open Data Catalogue

GROUNDWATER DEPTHS AND FLOW DIRECTION
May 18, 2018

250 and 310 Prior Street and 1002 Station Street, Vancouver, BC

PROVIDENCE HEALTH CARE

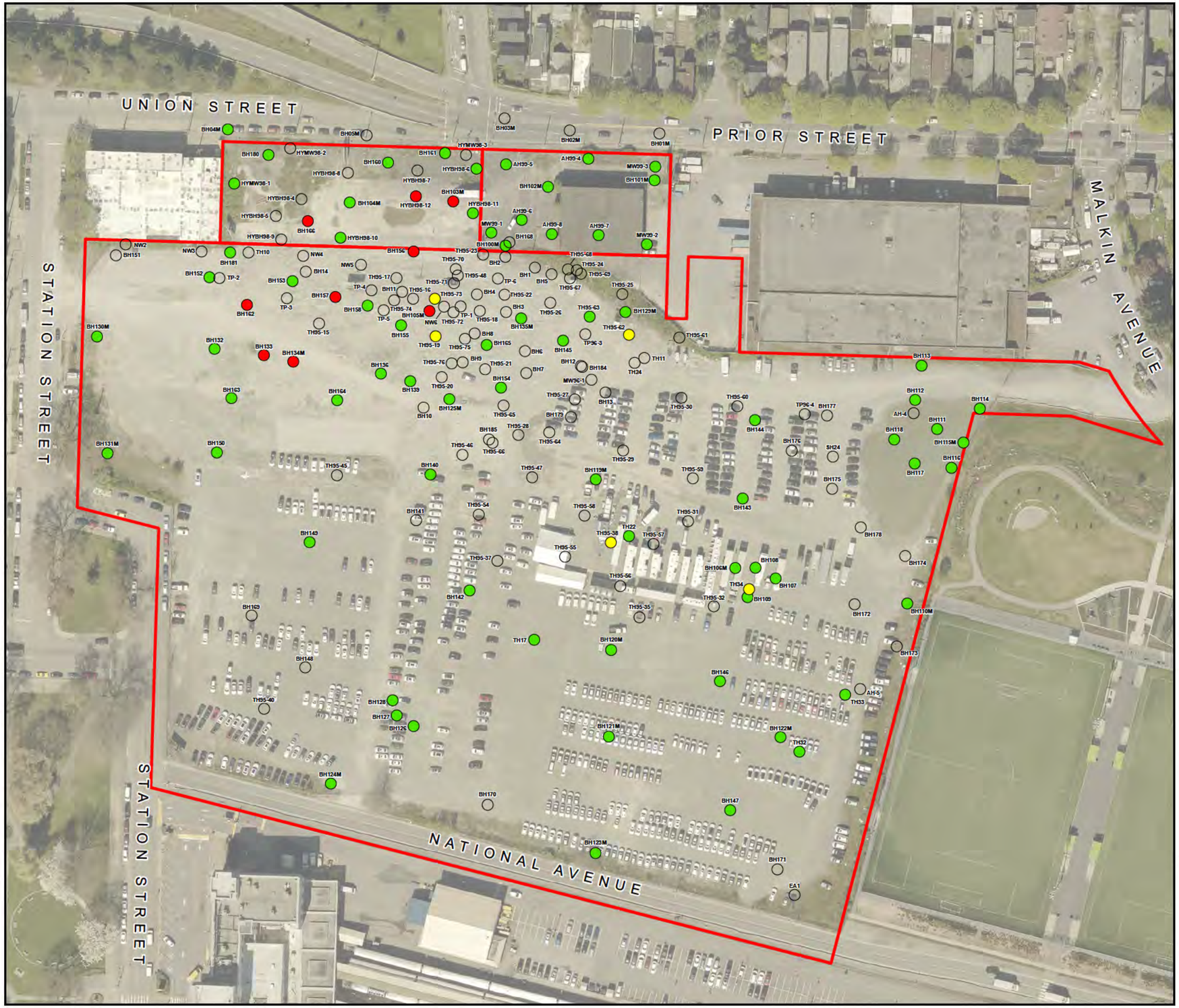
PGL ENVIRONMENTAL CONSULTANTS	File No.:	Date:	Dwg No.:	Drawn by:	FIGURE
	5355-01.01	MAR 2019	53550101_F61	DPL	6

Original in colour

Table for Figure 6
Groundwater Observations
1002 Station St., 250 and 310 Prior St., Vancouver, BC
Providence Health Care, PGL File 5355-01.01

Well	Date	Depth	Elevation
BH100M-D	May 18, 2018	2.444	1.178
	February 4, 2019	2.193	1.429
BH100M-S	May 18, 2018	2.255	1.367
	February 4, 2019	2.235	1.387
BH101M-D	May 18, 2018	2.005	1.497
	February 4, 2019	1.448	2.054
BH101M-S	May 18, 2018	1.4	2.102
	February 4, 2019	1.063	2.439
BH102M-D	May 18, 2018	2.203	1.279
	February 4, 2019	1.99	1.492
BH102M-S	May 18, 2018	2.156	1.326
	February 4, 2019	1.983	1.499
BH103M	May 18, 2018	2.15	1.388
	February 4, 2019	1.991	1.547
BH104M	May 18, 2018	1.883	1.565
	February 4, 2019	1.702	1.746
BH105M-D	May 18, 2018	2.651	1.451
	February 4, 2019	2.563	1.539
BH105M-S	May 18, 2018	2.566	1.536
	February 4, 2019	2.409	1.693
BH106M	May 18, 2018	Dry up to 2.90mbg	
BH110M	May 18, 2018	2.481	1.659
	February 4, 2019	2.063	2.077
BH115M	May 18, 2018	1.891	1.779
	February 4, 2019	1.361	2.309
BH119M	May 18, 2018	2.979	1.159
	February 4, 2019	2.924	1.214
BH120M	May 18, 2018	3.425	1.121
	February 4, 2019	3.363	1.183
BH121M	May 18, 2018	2.874	1.328
	February 4, 2019	2.808	1.394
BH122M	May 18, 2018	2.385	2.077
	February 4, 2019	2.189	2.273
BH123M	May 18, 2018	1.985	1.748
	February 4, 2019	1.572	2.161
BH124M	May 18, 2018	2.371	1.683
	February 4, 2019	2.033	2.021
BH125M	May 18, 2018	2.968	1.1*
BH129M	May 18, 2018	2.269	1.224
BH130M	May 18, 2018	2.06	1.456
	February 4, 2019	1.785	1.731
BH131M	May 18, 2018	2.313	1.413
	February 4, 2019	2.106	1.62
BH134M	May 18, 2018	2.775	1.501
	February 4, 2019	2.611	1.665
BH135M	May 18, 2018	2.561	2.3*

* Grade elevation interpolated



Site Boundary (Approximate)
Sample meets applicable Standards
Sample exceeds applicable Standards
Mineral oil and Grease or Total Extractable Hydrocarbon result historically exceeded LEPH standard
Not Analyzed

N 0 20 40 80 m
1:1,500
NAD 1983 UTM Zone 10N

Ortho Image and Parcel Boundary from The City of Vancouver's Open Data Catalogue

SOIL HYDROCARBON RESULTS

250 and 310 Prior Street and 1002 Station Street, Vancouver, BC

PROVIDENCE HEALTH CARE

PGL ENVIRONMENTAL CONSULTANTS	File No.:	Date:	Dwg No.:	Drawn by:	FIGURE
	5355-01.01	MAR 2019	53550101_F71	DPL	7

Original in colour

PGL ENVIRONMENTAL CONSULTANTS

Table for Figure 7
Soil Results - Hydrocarbons
1002 Station St., 250 and 310 Prior St., Vancouver, BC
Providence Health Care, PGL File 5355-01.01

	EPH				MAH							
	EPH C10-C19	EPH C19-C32	LEPH	HEPH	Benzene	Ethylbenzene	Toluene	Styrene	Xylenes, total	VHw6-10	VPH	Methyl tert-butyl ether [MTBE]
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RDL	200	200	200	200	0	0	0	0	0.00075	100	100	0.2
CSR Sch 3.1 Part 1 CL (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 CL (Intake of Contam Soil)	~	~	~	~	1000	25000	20000	~	50000	~	~	~
CSR Sch 3.1 Part 1 CL (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 1 RL-HD (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Intake of Contam Soil)	~	~	~	~	350	8500	6500	~	15000	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 2 CL Human Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50000	~	~	200	20000
CSR Sch 3.1 Part 2 RLHD Human Health	1000[1]	1000[1]	1000[1]	1000[1]	~	~	~	15000	~	~	200	8000
CSR Sch 3.1 Part 3 CL Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
CSR Sch 3.1 Part 3 RLHD Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
Location	**Date**	**Depth (m)**										
TH-17-1	1990-01-09	1.5	-	-	-	-	<0.005	<0.005	<0.005	-	<0.015	-	-	-
TH-17-4	1990-01-09	2.4	-	-	-	-	<0.005	<0.005	<0.005	-	<0.015	-	-	-
TH-22-S	1990-01-09	0	-	-	-	-	<0.005	<0.005	<0.005	-	<0.015	-	-	-
TH27 (2.5-4)	1991-12-18	0.8-1.2	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-
TH30 (1)	1991-12-18	0.3	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-
TH32 (5-6.5)	1991-12-19	1.5-2	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-
TH32 (10-11.5)	1991-12-19	3-3.5	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-
TH33 (5-6.5)	1991-12-19	1.5-2	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-
TH33 (12.5-14)	1991-12-19	3.8-4.3	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-
TH34 (2.5-4)	1991-12-19	0.8-1.2	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-
TH34 (15-16.5)	1991-12-19	4.6-5	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-
MW98-1(Sa3) (HY)	1998-09-22	2.3	-	-	200	200	-	-	-	-	-	-	-	-
HYBH98-6 (0.6m)	1998-09-23	0.6	-	-	<200	352	-	-	-	-	-	-	-	-
HYBH98-10 (3.6m)	1998-09-23	3.6	-	-	<200	1440	-	-	-	-	-	-	-	-
HYBH98-11 (0.6m)	1998-09-23	0.6	-	-	<200	215	-	-	-	-	-	-	-	-
HYBH98-12 (2.5m)	1998-09-23	2.5	-	-	<200	2480	-	-	-	-	-	-	-	-
MW99-1	1999-11-17	3-3.6	<200	<200	-	-	-	-	-	-	-	-	-	-
MW99-2	1999-11-17	0.6-1.2	<200	298	<200	293	<0.04	<0.05	<0.05	<0.05	-	<100	<100	-
MW99-2	1999-11-17	3-3.6	<200	<200	-	-	-	-	-	-	-	-	-	-
MW99-3	1999-11-17	0.6-1.2	<200	794	<200	791	-	-	-	-	-	-	-	-
MW99-3	1999-11-17	1.2-1.8	<1000	<1000	-	-	<0.2	<0.3	<0.3	<0.3	-	-	<500	-
MW99-3	1999-11-17	2.1-2.7	-	-	-	-	<0.01	<0.01	<0.01	<0.01	-	-	-	-
AH99-4	1999-11-17	1.5-2.1	<200	<200	-	-	-	-	-	-	-	-	-	-
AH99-5	1999-11-17	0-0.6	<200	<200	<200	<200	<0.01	<0.01	0.01	<0.01	-	-	-	-
AH99-5	1999-11-17	1.5-1.8	<200	<200	-	-	<0.04	<0.05	<0.05	<0.05	-	<100	<100	-
AH99-6	1999-11-19	0-0.6	<200	<200	-	-	<0.01	<0.01	<0.01	<0.01	-	-	-	-
AH99-6	1999-11-19	1.5-2.1	259	605	232	554	-	-	-	-	-	-	-	-
AH99-7	1999-11-19	1.5-2.1	<200	<200	<200	<200	-	-	-	-	-	-	-	-

Table for Figure 7
Soil Results - Hydrocarbons
1002 Station St., 250 and 310 Prior St., Vancouver, BC
Providence Health Care, PGL File 5355-01.01

	EPH				MAH							
	EPH C10-C19	EPH C19-C32	LEPH	HEPH	Benzene	Ethylbenzene	Toluene	Styrene	Xylenes, total	VHw6-10	VPH	Methyl tert-butyl ether [MTBE]
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RDL	200	200	200	200	0	0	0	0	0.00075	100	100	0.2
CSR Sch 3.1 Part 1 CL (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 CL (Intake of Contam Soil)	~	~	~	~	1000	25000	20000	~	50000	~	~	~
CSR Sch 3.1 Part 1 CL (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 1 RL-HD (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Intake of Contam Soil)	~	~	~	~	350	8500	6500	~	15000	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 2 CL Human Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50000	~	~	200	20000
CSR Sch 3.1 Part 2 RLHD Human Health	1000[1]	1000[1]	1000[1]	1000[1]	~	~	~	15000	~	~	200	8000
CSR Sch 3.1 Part 3 CL Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
CSR Sch 3.1 Part 3 RLHD Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
Location	**Date**	**Depth (m)**										
AH99-7	1999-11-19	2.1-2.7	<200	522	-	-	<0.01	<0.01	0.01	<0.01	-	-	-	-
AH99-8	1999-11-19	0-0.6	-	-	-	-	<0.04	<0.05	<0.05	<0.05	-	<100	<100	-
AH99-8	1999-11-19	1.1-1.7	<200	<200	-	-	-	-	-	-	-	-	-	-
AH99-8	1999-11-19	2.1-2.7	<200	522	-	-	<0.01	<0.01	0.01	<0.01	-	-	-	-
BH04M-2	2016-08-08	1-1.5	<200	<200	-	-	-	-	-	-	-	-	-	-
Z02 (Duplicate of BH04M-2)	2016-08-08	1-1.5	<200	<200	-	-	-	-	-	-	-	-	-	-
BH100M-01	2018-05-03	0.7-1.1	<200	<200	-	-	-	-	-	-	-	-	-	-
BH100M-03	2018-05-03	1.8-2.1	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH100M-04	2018-05-03	2.6-2.9	<260	300	<260	300	-	-	-	-	-	-	-	-
BH101M-02	2018-05-03	0.9-1.1	<200	230	<200	220	-	-	-	-	-	-	-	-
BH101M-03	2018-05-03	1.6-1.9	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH101M-05	2018-05-03	3.1-3.4	-	-	-	-	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH102M-01	2018-05-03	0.6-1.1	<200	<200	<200	<200	-	-	-	-	-	-	-	-
Z100 (Dup of BH102M-01)	2018-05-03	0.6-1.1	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH102M-03	2018-05-03	2.1-2.4	-	-	-	-	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH103M-01	2018-05-03	0.4-0.7	660	**1760**	660	**1750**	-	-	-	-	-	-	-	-
Z101 (Dup of BH103M-01)	2018-05-03	0.4-0.7	<200	<200	-	-	-	-	-	-	-	-	-	-
BH103M-03	2018-05-03	1.5-1.8	<200	<200	-	-	-	-	-	-	-	-	-	-
BH104M-01	2018-05-04	0.3-0.6	<200	200	-	-	-	-	-	-	-	-	-	-
BH104M-03	2018-05-04	1.5-1.8	<200	<200	<200	<200	-	-	-	-	-	-	-	-
Z103 (Dup of BH104M-03)	2018-05-04	1.5-1.8	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH104M-05	2018-05-04	3-3.5	<200	<200	-	-	-	-	-	-	-	-	-	-
BH105M-02	2018-05-04	1.1-1.4	**7360**	**12,800**	**7360**	**12,800**	0.116	<0.6	0.349	<0.05	1.53	1200	**1200**	<0.2
BH105M-03	2018-05-04	1.5-1.8	450	980	450	980	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH105M-06	2018-05-04	5.1-5.4	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH106M-01	2018-05-04	0.3-0.6	<200	<200	-	-	-	-	-	-	-	-	-	-
BH106M-02	2018-05-04	1-1.3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH107-01	2018-05-04	0.4-0.6	<200	<200	-	-	-	-	-	-	-	-	-	-

PGL ENVIRONMENTAL CONSULTANTS

Table for Figure 7
Soil Results - Hydrocarbons
1002 Station St., 250 and 310 Prior St., Vancouver, BC
Providence Health Care, PGL File 5355-01.01

	EPH				MAH							
	EPH C10-C19	EPH C19-C32	LEPH	HEPH	Benzene	Ethylbenzene	Toluene	Styrene	Xylenes, total	VHw6-10	VPH	Methyl tert-butyl ether [MTBE]
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RDL	200	200	200	200	0	0	0	0	0.00075	100	100	0.2
CSR Sch 3.1 Part 1 CL (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 CL (Intake of Contam Soil)	~	~	~	~	1000	25000	20000	~	50000	~	~	~
CSR Sch 3.1 Part 1 CL (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 1 RL-HD (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Intake of Contam Soil)	~	~	~	~	350	8500	6500	~	15000	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 2 CL Human Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50000	~	~	200	20000
CSR Sch 3.1 Part 2 RLHD Human Health	1000[1]	1000[1]	1000[1]	1000[1]	~	~	~	15000	~	~	200	8000
CSR Sch 3.1 Part 3 CL Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
CSR Sch 3.1 Part 3 RLHD Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
Location	**Date**	**Depth (m)**										
BH107-02	2018-05-04	1-1.3	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH107-05	2018-05-04	3-3.3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
Z105 (Dup of BH107-05)	2018-05-04	3-3.3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH107-06	2018-05-04	4-4.3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH107-08	2018-05-04	5.6-5.9	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH108-01	2018-05-04	0.3-0.6	<200	<200	-	-	-	-	-	-	-	-	-	-
BH108-02	2018-05-04	1.2-1.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH109-01	2018-05-04	0.3-0.6	<200	<200	-	-	-	-	-	-	-	-	-	-
BH109-02	2018-05-04	1-1.3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH110M-02	2018-05-07	1-1.3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH111-02	2018-05-07	1.2-1.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH112-01	2018-05-07	0.4-0.7	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH113-01	2018-05-07	0.6-0.9	<200	<200	-	-	-	-	-	-	-	-	-	-
BH114-02	2018-05-07	0.8-1.1	<200	<200	-	-	-	-	-	-	-	-	-	-
BH115-01	2018-05-07	0.4-0.7	<200	<200	-	-	-	-	-	-	-	-	-	-
BH115-02	2018-05-07	1.2-1.5	<200	<200	-	-	-	-	-	-	-	-	-	-
Z106 (Dup of BH115-02)	2018-05-07	1.2-1.5	<200	<200	-	-	-	-	-	-	-	-	-	-
BH116-02	2018-05-07	1.2-1.5	<200	650	-	-	-	-	-	-	-	-	-	-
BH117-02	2018-05-07	0.7-1	<200	<200	-	-	-	-	-	-	-	-	-	-
BH118-01	2018-05-07	0.5-0.8	<200	<200	-	-	-	-	-	-	-	-	-	-
BH119M-03	2018-05-07	1.7-2	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH119M-05	2018-05-07	3-3.3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH120M-06	2018-05-07	3.9-4.2	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH120M-07	2018-05-07	5.7-6	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH121M-01	2018-05-08	0.4-0.7	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH121M-03	2018-05-08	1.6-1.9	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH122M-04	2018-05-08	2.5-2.8	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH123M-02	2018-05-08	1.1-1.4	<200	<200	<200	<200	-	-	-	-	-	-	-	-

Table for Figure 7
Soil Results - Hydrocarbons
1002 Station St., 250 and 310 Prior St., Vancouver, BC
Providence Health Care, PGL File 5355-01.01

	EPH				MAH							
	EPH C10-C19	EPH C19-C32	LEPH	HEPH	Benzene	Ethylbenzene	Toluene	Styrene	Xylenes, total	VHw6-10	VPH	Methyl tert-butyl ether [MTBE]
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RDL	200	200	200	200	0	0	0	0	0.00075	100	100	0.2
CSR Sch 3.1 Part 1 CL (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 CL (Intake of Contam Soil)	~	~	~	~	1000	25000	20000	~	50000	~	~	~
CSR Sch 3.1 Part 1 CL (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 1 RL-HD (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Intake of Contam Soil)	~	~	~	~	350	8500	6500	~	15000	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 2 CL Human Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50000	~	~	200	20000
CSR Sch 3.1 Part 2 RLHD Human Health	1000[1]	1000[1]	1000[1]	1000[1]	~	~	~	15000	~	~	200	8000
CSR Sch 3.1 Part 3 CL Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
CSR Sch 3.1 Part 3 RLHD Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
Location	**Date**	**Depth (m)**										
BH124M-02	2018-05-09	1.2-1.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH125M-01	2018-05-09	0.3-0.6	<200	<200	-	-	-	-	-	-	-	-	-	-
BH125M-02	2018-05-09	1.1-1.4	<200	<200	<200	<200	0.0088	0.024	<0.05	<0.05	0.1	<100	<100	<0.2
BH125M-04	2018-05-09	2-2.3	-	-	-	-	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH125M-05	2018-05-09	3-3.3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH126-01	2018-05-09	0.3-0.6	-	-	-	-	<0.005	<0.015	<0.05	<0.05	0.093	-	-	<0.2
BH127-01	2018-05-09	0.3-0.6	-	-	-	-	<0.005	<0.015	<0.05	<0.05	<0.075	-	-	<0.2
BH127-02	2018-05-09	1.2-1.5	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	-	-	<0.2
BH128-02	2018-05-09	1.2-1.5	-	-	-	-	<0.005	<0.015	<0.05	<0.05	<0.075	-	-	<0.2
Z113 (Dup of BH128-02)	2018-05-09	1.2-1.5	-	-	-	-	<0.005	<0.015	<0.05	<0.05	<0.075	-	-	<0.2
BH129M-02	2018-05-09	1.1-1.4	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH129M-04	2018-05-09	2.7-3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH130M-02	2018-05-10	1.1-1.4	<200	290	<200	290	-	-	-	-	-	-	-	-
BH130M-05	2018-05-10	3.4-3.7	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH131M-02	2018-05-10	1.2-1.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH132-01	2018-05-10	0.2-0.5	<200	<200	-	-	-	-	-	-	-	-	-	-
BH132-02	2018-05-10	1-1.3	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH133-01	2018-05-10	0.2-0.5	260	**3660**	-	-	-	-	-	-	-	-	-	-
BH133-02	2018-05-10	1.2-1.5	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH134M-01	2018-05-10	0.2-0.5	<200	**1620**	-	-	-	-	-	-	-	-	-	-
BH134M-02	2018-05-10	1-1.3	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH134M-04	2018-05-10	2.5-2.8	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH135-01	2018-05-10	0.3-0.6	<200	<200	-	-	-	-	-	-	-	-	-	-
Z112 (Dup of BH135-01)	2018-05-10	0.3-0.6	<200	<200	-	-	-	-	-	-	-	-	-	-
BH135-02	2018-05-10	1.2-1.5	<200	250	<200	250	0.008	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH136-01	2018-05-10	0.2-0.5	<200	240	-	-	-	-	-	-	-	-	-	-
BH136-02	2018-05-10	1.2-1.5	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH139-01	2018-05-15	0.2-0.5	<200	<200	-	-	-	-	-	-	-	-	-	-

PGL ENVIRONMENTAL CONSULTANTS

Table for Figure 7
Soil Results - Hydrocarbons
1002 Station St., 250 and 310 Prior St., Vancouver, BC
Providence Health Care, PGL File 5355-01.01

	EPH				MAH							
	EPH C10-C19	EPH C19-C32	LEPH	HEPH	Benzene	Ethylbenzene	Toluene	Styrene	Xylenes, total	VHw6-10	VPH	Methyl tert-butyl ether [MTBE]
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RDL	200	200	200	200	0	0	0	0	0.00075	100	100	0.2
CSR Sch 3.1 Part 1 CL (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 CL (Intake of Contam Soil)	~	~	~	~	1000	25000	20000	~	50000	~	~	~
CSR Sch 3.1 Part 1 CL (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 1 RL-HD (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Intake of Contam Soil)	~	~	~	~	350	8500	6500	~	15000	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 2 CL Human Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50000	~	~	200	20000
CSR Sch 3.1 Part 2 RLHD Human Health	1000[1]	1000[1]	1000[1]	1000[1]	~	~	~	15000	~	~	200	8000
CSR Sch 3.1 Part 3 CL Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
CSR Sch 3.1 Part 3 RLHD Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
Location	**Date**	**Depth (m)**										
BH139-02	2018-05-15	1.2-1.5	<200	470	<200	470	0.0689	0.214	0.227	<0.05	1.07	<100	<100	<0.2
BH139-03	2018-05-15	2.2-2.5	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH139-05	2018-05-15	5.6-5.9	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH140-06	2018-05-15	6.5-6.8	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH142-02	2018-05-15	1.2-1.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
Z118 (Dup of BH142-02)	2018-05-15	1.2-1.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH143-01	2018-05-14	0.2-0.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH143-03	2018-05-14	2.5-2.8	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH144-03	2018-05-14	2.5-2.8	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH145-02	2018-05-15	1-1.3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH145-04	2018-05-15	2.3-2.5	<200	230	<200	220	0.0082	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH146-03	2018-05-14	2.5-2.8	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH147-01	2018-05-14	0.2-0.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH149-01	2018-05-14	0.2-0.6	<200	<200	<200	<200	-	-	-	-	-	-	-	-
Z116 (Dup of BH149-01)	2018-05-14	0.2-0.6	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH150-02	2018-05-15	1.1-1.4	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH152-01	2018-05-17	0.2-0.5	<200	<200	-	-	-	-	-	-	-	-	-	-
BH153-01	2018-05-17	0.7-1	<200	<200	-	-	-	-	-	-	-	-	-	-
BH153-02	2018-05-17	1.8-2.1	<200	<200	-	-	-	-	-	-	-	-	-	-
BH153-03	2018-05-17	2.6-2.9	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH154-01	2018-05-17	0.5-0.8	<200	<200	-	-	-	-	-	-	-	-	-	-
BH154-02	2018-05-17	1.2-1.5	<200	<200	-	-	-	-	-	-	-	-	-	-
BH154-03	2018-05-17	2.2-2.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
Z121 (Dup of BH154-03)	2018-05-17	2.2-2.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH154-04	2018-05-17	2.7-3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH155-01	2018-05-17	0.2-0.5	<200	460	<200	460	-	-	-	-	-	-	-	-
BH155-02	2018-05-17	1.5-1.8	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH155-03	2018-05-17	2.5-2.8	<200	<200	<200	<200	-	-	-	-	-	-	-	-

Table for Figure 7
Soil Results - Hydrocarbons
1002 Station St., 250 and 310 Prior St., Vancouver, BC
Providence Health Care, PGL File 5355-01.01

	EPH				MAH							
	EPH C10-C19	EPH C19-C32	LEPH	HEPH	Benzene	Ethylbenzene	Toluene	Styrene	Xylenes, total	VHw6-10	VPH	Methyl tert-butyl ether [MTBE]
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RDL	200	200	200	200	0	0	0	0	0.00075	100	100	0.2
CSR Sch 3.1 Part 1 CL (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 CL (Intake of Contam Soil)	~	~	~	~	1000	25000	20000	~	50000	~	~	~
CSR Sch 3.1 Part 1 CL (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 1 RL-HD (GW flow to marine SW used by aquatic life)	~	~	~	~	6.5	200	200	~	20	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Intake of Contam Soil)	~	~	~	~	350	8500	6500	~	15000	~	~	~
CSR Sch 3.1 Part 1 RL-HD (Toxicity to soil invertebrates and plants)	~	~	~	~	250	650	450	~	600	~	~	~
CSR Sch 3.1 Part 2 CL Human Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50000	~	~	200	20000
CSR Sch 3.1 Part 2 RLHD Human Health	1000[1]	1000[1]	1000[1]	1000[1]	~	~	~	15000	~	~	200	8000
CSR Sch 3.1 Part 3 CL Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
CSR Sch 3.1 Part 3 RLHD Ecological Health	2000[1]	5000[1]	2000[1]	5000[1]	~	~	~	50	~	~	200	~
Location	**Date**	**Depth (m)**										
BH156-01	2018-05-17	0.2-0.5	<200	**1260**	<200	**1250**	-	-	-	-	-	-	-	-
BH156-02	2018-05-17	1.2-1.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH156-04	2018-05-17	3-3.3	<200	240	<200	230	-	-	-	-	-	-	-	-
BH156-05	2018-05-17	4.2-4.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH157-01	2018-05-17	0.2-0.5	660	**2990**	660	**2990**	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH157-02	2018-05-17	1.2-1.5	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH157-03	2018-05-17	1.5-1.8	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH157-04	2018-05-17	3.5-3.8	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH157-05	2018-05-17	5.2-5.5	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH158-01	2018-05-17	0.3-0.6	220	980	-	-	-	-	-	-	-	-	-	-
BH158-02	2018-05-17	1.2-1.5	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH158-03	2018-05-17	1.6-1.9	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
Z122 (Dup of BH158-03)	2018-05-17	1.6-1.9	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH158-04	2018-05-17	2.7-3	<200	<200	<200	<200	<0.005	<0.015	<0.05	<0.05	<0.075	<100	<100	<0.2
BH160-01	2018-08-13	0.4-0.7	<200	350	<200	340	-	-	-	-	-	-	-	-
BH160-04	2018-08-13	2.5-3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH161-01	2018-08-13	0.4-0.7	<200	<200	<200	<200	-	-	-	-	-	-	-	-
Z201 (Duplicate of BH161-01)	2018-08-13	0.4-0.7	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH161-04	2018-08-13	2.5-3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH162-01	2018-08-13	0.4-0.7	350	**2400**	350	**2390**	-	-	-	-	-	-	-	-
BH162-03	2018-08-13	2.5-3	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH163-01	2018-08-13	0.4-0.7	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH164-01	2018-08-13	0.4-0.7	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH165-01	2018-08-13	0.4-0.7	<200	<200	<200	<200	-	-	-	-	-	-	-	-
BH166-01	2018-08-13	0.4-0.7	600	**3810**	600	**3810**	0.0058	0.026	<0.05	<0.05	<0.075	<100	<100	<0.2
BH166-02	2018-08-13	1.1-1.4	710	**3160**	710	**3160**	<0.005	0.022	<0.05	<0.05	<0.075	130	130	<0.2
BH166-03	2018-08-13	1.5-1.8	<200	280	-	-	-	-	-	-	-	-	-	-
BH180-01	2018-09-05	0.4-0.7	<200	<200	-	-	-	-	-	-	-	-	-	-