15 Denison Avenue, Toronto, Ontario

Risk Assessment

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ACRONYMS/DEFINITIONS

All abbreviated terms in the RA are defined below.

ADI	Allowable Daily Intake
AGAT	AGAT Laboratories
ANSI	Area of Natural or Scientific Interest
AOC	Area of Contamination
APEC	Area of Potential Environmental Concern
ASTM	American Society for Testing Materials
BCF	Bioconcentration Factor
B-HWS	Hot Water Soluble Boron
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
BV Labs	Bureau Veritas Laboratories
CALA	Canadian Association for Laboratories Accreditation
CCME	Canadian Council of Ministers of the Environment
CN^-	Cyanide
COA	Certificate of Analysis
COC	Contaminant of Concern
CPU	Certificate of Property Use
CR	Concentration Ratio
Cr (VI)	Chromium VI
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
EASR	Environmental Activity and Sector Registry
EC	Electrical Conductivity
ECA	Environmental Compliance Approval
ECSM	Ecological Conceptual Site Model
ECxx	Effect Concentration Endpoints
EPC	Exposure Point Concentration
ER	Exposure Ratio
ERA	Ecological Risk Assessment
EPDM	Ethylene Propylene Diene Monomer
ESA	Environmental Site Assessment
EXP	EXP Services Inc.
FA	Exposure Event
GMP	Groundwater Management Plan
HASP	Health and Safety Plan
HBIAC	Health-Based Indoor Air Criteria
HDPE	High Density Polyethylene
Hg	Mercury

HHCSM	Human Health Conceptual Site Model
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
IAQ	Indoor Air Quality
ILCR	Incremental Lifetime Cancer Risk
J&E	Johnson and Ettinger
LADD	Lifetime Average Daily Dose
LED/LEC	Lethal Effective Dose/Concentration
LDPE	Low Density Polyethylene Tubing
LNAPL	Light Non-Aqueous Phase Liquid
LOAEL	Lowest Observed Adverse Effect Level
NHIC	Natural Heritage Information Centre
NOAEL	No Observed Adverse Effect Level
masl	Metres Above Sea Level
mbgs	Metres Below Ground Surface
MECP	Ministry of Environment, Conservation and Parks
MGRA	Modified Generic Risk Assessment
MNRF	Ontario Ministry of Natural Resources and Forestry
MOL	Ministry of Labour
O. Reg. 153/04	Environmental Protection Act, Ontario Regulation 153/04, Records of Site Condition Part XV.I of the Act
ORP	Other Regulated Parameters
OSHA	Occupational Safety and Health Association
OSWER	Office of Solid Waste and Emergency Response
OTR	Ontario Typical Range
Pa	Pascal
PAH	Polycyclic Aromatic Hydrocarbon
PCA	Potentially Contaminating Activity
pCOC	Potential Contaminant of Concern
PHC	Petroleum Hydrocarbon
POD	Point of Departure
PPE	Personal Protective Equipment
PSF	Pre-Submission Form
PSS	Property-Specific Standard (same as Risk Assessment Standard in Regulation)
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QP_{ESA}	Qualified Person for Environmental Site Assessment
QP_{RA}	Qualified Person for Risk Assessment
RA	Risk Assessment
RBC	Risk-Based Concentration
RBCA	Risk-Based Corrective Action

RDL	Reporting Detection Limit
REM	Reasonable Estimate of the Maximum Concentration (maximum concentration + 20%)
RfC	Reference Concentration
RfD	Reference Dose
RMM	Risk Management Measure
RMP	Risk Management Plan
RPD	Relative Percent Difference
RPI	Residential/Parkland/Institutional
RSC	Record of Site Condition
SAR	Sodium Adsorption Ratio
SARO	Species at Risk in Ontario
SCS	Site Condition Standard (Referring to Tables 1 through 9 in O. Reg. 153/04)
SDR	Standard Dimensionless Ratio
SGMP	Soil and Groundwater Management Plan
SMP	Soil Management Plan
SOP	Standard Operating Proceedure
SSD	SubSlab Depressurization
SSV	Sub-Slab Vapour
SVIMS	Soil Vapour Intrusion Mitigation System
Terrapex	Terrapex Environmental Ltd
TRV	Toxicity Reference Value
UCLM	Upper Confidence Limit on the Mean
UF	Uncertainty Factor
US EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
VEC	Valued Ecological Component
WAA	Wider Area of Abatement

1. Summary of Recommendations/Findings

1.1 Risk Assessment Objectives and Approach

EXP Services Inc. (EXP) was retained by CreateTO (the "Client") to conduct a Tier 3 Risk Assessment (RA) for the property municipally located at 15 Denison Avenue in Toronto, Ontario (hereinafter referred to collectively as the "Site" or "RA property"). The Site is located north of Queen Street West, between Augusta and Denison Avenue, and south of Wolsely Street in Toronto Ontario, as shown on Figure 1 (in Appendix B).

The RA was conducted in accordance with Ontario Regulation (O. Reg.) 153/04 and in accordance with generally accepted professional practices. Subject to this standard of care, EXP makes no express or implied warranties regarding its services and no third party beneficiaries are intended. Our terms and conditions, the limitation of liability, scope of report, and third party reliance are outlined in Appendix A.

This RA is considered as an "other" RA (i.e., other than those identified in O. Reg. 153/04 Schedule C Part II) based on the following:

- The RA is not conducted as a "limited scope" RA.
- Due to the Site conditions, the RA cannot be conducted as a Modified Generic Risk Assessment (MGRA; Tier 2).
- The RA is not based on a community assessment report.
- The RA is not conducted as "an estimation of natural local background concentrations".
- The RA is not a "new science" RA. No contaminants of concern (COCs) are identified at the RA property for which there are no applicable SCS. In addition, no new computer models are used that are not available to the public or the Ontario Ministry of the Environment, Conservation and Parks (MECP), and no probabilistic models are applied.
- At this time, it is not expected that the RA will be classified as a "Wider Area of Abatement (WAA)" RA, unless otherwise requested by the District Office.

The RA property comprises an area of approximately 0.24 hectares (0.59 acres). Surrounding properties have been developed for community use to the north (Wolseley Street) followed by primarily residential and institutional & open space to the northwest, community use (a laneway) followed by commercial to the south, community use (Denison Avenue) followed by mixed residential to the west, and community use (Augusta Avenue) followed by mixed residential and commercial to the east. The Site location is shown on Figure 1 (Appendix B). A Site plan is provided on Figure 3 (Appendix B).

Based on the reviewed historical records, the Site was first developed for residential use prior to 1875. A bakery was opened at 13 Denison Avenue (central-western portion of the Site) prior to 1929. Circa 1970, the structures on-Site were demolished, and the Site was redeveloped into the current public parking lot owned and operated by the City of Toronto.

Although the development plan for the Site has yet to be finalized, it is understood that the Site is intended to be redeveloped as a mixed use, affordable housing development, complete with a multi-storey residential tower, cultural space and parkland, occupying the entirety of the Site footprint. The future Site building will be constructed as a slab-on-grade structure, and no basement or other subgrade structures are planned to be constructed at the Site. The Site is intended to be redeveloped for indigenous housing and is a priority redevelopment project for the City of Toronto. Given the intended change to a more sensitive (i.e., most sensitive being residential / institutional / parkland) land use, a Record of Site Condition (RSC) is required. The RA will support the filing of the RSC and will be completed in accordance with O. Reg. 153/04.

There are no surface water bodies located on or within 30 m of the Site. The nearest downgradient surface water body to the Site is Lake Ontario, located approximately 1.3 km south of the Site. Based on ground water elevation data, the primary localized ground water flow across the Site was determined to be southwest of the Site, towards Lake Ontario. Based on local topography, the predominant groundwater flow direction for the Study Area is determined to be south towards Lake Ontario.

The RA property is not considered an Environmentally Sensitive Area under Section 41 of O. Reg. 153/04 as discussed further in Section 3.3 and the Phase Two Conceptual Site Model (CSM; Appendix B), and the applicable generic Site Condition Standards (SCS) are those provided in Table 3 Full Depth Generic SCS in a Non-Potable Groundwater Condition for Residential/Parkland/Institutional land use with medium-fine textured soil (2011a) (herein referred to as Table 3 SCS).

The RA was completed in full compliance with the mandatory requirements contained in Table 1: Mandatory Requirements for Risk Assessment Reports contained in O. Reg. 153/04. This RA was required to assess the potential risks associated with exposure to COCs in the soil and groundwater of the RA property. The Property-Specific Standards (PSS) developed via the RA will be utilized in the preparation of a forthcoming RSC for the Site.

COCs were identified as any substances which met any of the following criteria:

- have reported measured concentrations exceeding the applicable MECP (2011a) Table 3 SCS;
- were detected and have no MECP (2011a) Table 3 SCS value and were identified as potential contaminants of concern (pCOCs) in the Phase One Environmental Site Assessments (ESAs); or,
- were detected on the RA property at concentrations within the applicable MECP (2011a) SCS, but had laboratory reporting detection limits (RDLs) in excess of the applicable SCS and were identified as pCOCs in the Phase One ESAs.

The CSMs developed for this RA consider soil and groundwater COCs and include:

- A Human Health Conceptual Site Model (HHCSM); and
- An Ecological Conceptual Site Model (ECSM).

The CSMs depict the exposure routes, pathways and potential receptors, both on and off the RA property and are provided as Figures 21A and 22A for human health and ecological health, respectively. As risk management measures (RMMs) are required for the protection of human health and ecological health, an HHCSM and ECSM with RMM are also provided (Figures 21B and 22B, respectively).

A human health and ecological RA was carried out to support PSS developed for the RA property. The RA was conducted using both qualitative and quantitative approaches. A quantitative approach was taken to assess the risks associated with exposure of the most sensitive and significant receptors to the final list of COCs.

The objectives of the human health risk assessment (HHRA) are to:

- Assess the potential risks, if any, related to COCs identified in soil and groundwater as well as from light non-aqueous phase liquid (LNAPL), to potential human receptors associated with the residential land use. This includes on-Site residents, visitors/trespassers, long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers to the RA property, with and without RMMs in place;
- Identify PSS that are protective of the most sensitive of all potential human receptors that may be present on or off the RA property; and,
- Identify any RMM necessary to mitigate exposures by on- and off-Site human receptors based on the results of the HHRA, if required.

The objectives of the ecological risk assessment (ERA) are to:

- Assess the potential risk of exposure to COCs in soil and groundwater as well as from LNAPL, to plant, soil invertebrate, avian and mammalian receptors, both on and off the RA property, as well as aquatic receptors in off-Site surface waters, without RMMs in place for the current and future property uses;
- Identify PSS that provide protection to the most sensitive of all ecological receptors; and,

- Identify any RMM necessary to mitigate exposures by on- and off-Site ecological receptors based on the results of the ERA, if required.

1.2 Deviations from Pre-Submission Form

A copy of the Pre-Submission Form (PSF) is provided on the supporting documentation zip file (Appendix Q). A copy of the MECP comments on the PSF are included in Appendix D. EXP's responses to the MECP comments have been added next to the comment. An updated zip file containing all available environmental reports, laboratory certificates of analysis for submissions by EXP and EXP borehole logs is also provided in Appendix Q of the RA report.

Deviations from the information provided in the PSF are summarized in Table 1 below.

Table 1: Deviations from the Pre-Submission Form

Deviation	Reference
Additional ESA work has been completed at the Site in support of the Risk Assessment submission to address MECP review comments received on the PSF. In December 2024, MW4 was re-sampled for volatile organic compounds (VOCs) to address a previous RDL exceedance of ethylene dibromide, and several monitoring wells were sampled for cyanide (CN-) to address pCOCs associated with off-Site areas of potential environmental concern (APECs). In January 2025, EXP advanced three (3) additional boreholes across the Site. One (1) surface and one (1) subsurface soil sample were collected from the boreholes or the analysis of grain size. In addition, one (1) soil sample and a duplicate soil sample were collected for the analysis of methyl mercury from the location of the original exceedance.	Risk Assessment – Section 3.0, Appendix B, Appendix C and Appendix Q
As a result of on-going ESA work being completed at the Site, a new minimum depth to groundwater was identified at BH/MW5, located at the southeastern portion of the Site. The new minimum depth to groundwater identified within a monitoring well at the Site is 2.84 m bgs.	Risk Assessment – Section 3.0, Appendix B, Appendix Q
At the time of the Risk Assessment, the free-product removal program was on-going. Supporting figures have been included within the Phae Two CSM to show the lateral and vertical delineation of LNAPL free product in groundwater at the Site.	Appendix B
Based on MECP review comments received at the time of the PSF, revisions have been made to the lawyers letter to clarify the boundaries of the RA property.	Appendix I
Additional discussion on the current status of the free product remedial program has been included within the Phase Two CSM. A final report documenting the efforts undertaken and the result of the program is expected to be prepared following completion of one (1) year of removals and three (3) months of regular monitoring.	Appendix B

1.3 Risk Assessment Standards

O. Reg. 153/04 requires that a PSS be developed for each COC, which is identified as a contaminant found on, in or under a property with a concentration that exceeds the applicable SCS for the property, or for which no applicable SCS are prescribed. The process of screening for and selection of COCs for this RA is described in Section 3.3.

The PSS for soil and groundwater developed during the RA process are provided in Appendix E (see Tables E6-1 and E6-2). The development of the PSS, and selection of final values using data from the HHRA and ERA, is described in Section 6.1.

1.4 Risk Assessment Assumptions

The RA was conducted, and PSS developed, using the following assumptions:

- For human and ecological receptors, the Table 3 SCS, considered to be protective of a non-potable groundwater condition are suitable for use in the screening of pCOCs in soil and groundwater;

- Human and ecological receptors present on the RA property are reflective of either the currently existing land use (commercial) or the proposed residential land use outlined in Section 1.1 (residential/parkland/institutional);
- Substances that were never detected during Phase Two ESAs, and were not identified as pCOCs in the Phase One ESAs, are assumed not to be present on the property;
- Substances that were detected but for which there are no applicable Table 3 SCS and were considered pCOCs in the Phase One ESAs, are assessed in the RA as COCs; and,
- Maximum COC concentrations found on the RA property are deemed acceptable if no unacceptable risks are identified in the quantitative or qualitative RA, or if RMM are used to block exposure routes and alleviate those risks.

1.5 Risk Management Requirements

As unacceptable risks were predicted for exposure of some human and ecological receptors to impacted soil and groundwater (Sections 4 and 5), RMM have been recommended for the RA property (Section 7) as follows:

- Potential risks from indoor air vapour inhalation for future buildings will be mitigated by the implementation of engineering measures to mitigate vapour intrusion.
- Potential risks from direct contact of impacted soil for the maintenance worker, Site resident and Site visitors (recreational and trespasser) and ecological receptors will be mitigated by a soil barrier (hard cap and/or soft cap cover systems).
- Potential risks from direct contact of impacted groundwater and/or LNAPL, as well as inhalation of trench air sourced from groundwater and/or LNAPL will be mitigated by implementation of a pathway-specific health and safety plan (HASP) for construction/subsurface utility workers.
- A soil and groundwater management plan (SGMP) is required to properly manage contaminated soils on-Site.
- Potential risks from ingestion of garden produce will be mitigated by an administrative a restriction on planting of fruit and vegetables for consumption unless planted in above ground containers such that they are isolated from the subsurface conditions.
- An administrative control will govern the final building design, requiring the future development to be constructed as a slab-on-grade structure.

An indoor air monitoring program is required for the vapour intrusion RMM. In addition, several maintenance and monitoring requirements are associated with the construction and on-going operation of the vapour intrusion RMM.

Monitoring of the soil barrier will be required to ensure the integrity of all barriers, as applicable. Maintenance will involve the continued repair of any damage, deterioration or compromises noted during inspection of the barriers.

No maintenance is necessary for RMM pertaining to the HASP or SGMP. Monitoring for the HASP and SGMP will be required for the duration of time that the HASP and SGMP are implemented. Monitoring requirements should be outlined in the HASP and SGMP.

No maintenance or monitoring is required pertaining to the garden produce restriction and the slab-on-grade administrative restriction.

2. Risk Assessment Team Membership

This RA was completed by EXP and the team members, along with their respective areas of expertise, are listed in Table 2.

Table 2: Risk Assessment Team

Discipline	Name
Human Health Risk Assessment	Mr. Shane Ward, B.Sc., QP-RA Mr. Samuel Patterson, M.E.S.
Ecological Risk Assessment	Mr. Shane Ward, B.Sc., QP-RA Mr. Samuel Patterson, M.E.S.
Environmental Chemistry, Geoscience	Mr. Robert Helik, P.Eng., QPESA, QP-RA
Hydrogeology	Mr. Robert Helik, P.Eng., QPESA, QP-RA
Environmental Engineering	Mr. Robert Helik, P.Eng., QPESA, QP-RA

All team members have the necessary experience and expertise to conduct an RA in a manner acceptable to the MECP as summarized below. Additional information (including curriculum vitae), related to the qualifications of the EXP team members, is provided in Appendix F. Mandatory certifications signed by the Qualified Person for Risk Assessment (QP_{RA}) are provided in Appendix H.

Shane Ward, is the QP_{RA} for the PSF and RA.

Mr. Ward has over thirteen (13) years of experience in the areas of human health and ecological risk assessment, fate and transport modelling, risk assessment modeling, project management, due diligence and risk management. He is currently a Senior Risk Assessment Specialist at EXP and provides senior oversight and technical review on risk assessment projects. Mr. Ward has conducted numerous human health and ecological risk assessments for contaminated Sites in Ontario (under O. Reg 153/04, as amended) and across Canada (under Federal Contaminated Sites Action Plan protocols). To date, he has been involved in over twenty (20) RAs that have been successfully accepted by the MECP. He has also conducted over one-hundred (100) Screening Level Risk Assessments (SLRAs) in Ontario and across Canada to support due diligence and financing purposes. Moreover, he has conducted third-party peer review of O. Reg. 153/04 and due diligence RAs on behalf of local municipalities or clients.

Samuel Patterson, M.E.S., is responsible for the preparation of the HHRA and ERA for the PSF and the RA.

Mr. Patterson is a Risk Assessment Specialist and Project Manager at EXP's Stony Creek Office with over five (5) years of combined experience in the Risk Assessment field and technical training as an environmental toxicologist. Samuel obtained his Honours, Bachelor of Science degree in Environmental Science with a specialization in Eco-Toxicology in 2017 and his Master of Environmental Studies degree (M.E.S.) at Queen's University (Kingston, Ontario) in 2019. Samuel has valued project experience in conducting Phase One and Phase Two ESAs, MGRAs, SLRAs, and Tier III Risk Assessments in Ontario under O. Reg. 153/04, as amended. Samuel is responsible for providing technical support at all stages of human health and ecological Risk Assessment including, but not limited to, problem formulation, exposure assessment, hazard assessment and risk management.

Robert Helik, P.Eng., oversaw the preparation of the risk management plan and environmental assessment work.

Robert has 22 years of experience as an environmental specialist, having worked on a variety of environmental assessment, remediation, and risk assessment projects in the past, as well as on numerous hazardous materials and mould assessment and abatement projects.

His current responsibilities include the management and coordination of the environmental groups, including the Site assessment and risk assessment teams; overseeing and reviewing detailed human health risk assessments, oversight and creation of risk management measures, data management, quality assurance/quality control (QA/QC), and client liaisons. As part of his responsibilities, Rob's role is to ensure the consistency and quality of the risk assessment report prior to its submission to the regulatory bodies.

Rob is a registered Qualified Person (QP) with the MECP who manages and coordinates Phase One and Two ESAs for residential, commercial and industrial properties in support of risk assessment projects. Rob is also a registered Qualified Person for the purpose of overseeing Risk Assessment projects in Ontario (QP_{RA}). Rob also has extensive experience working within the various provincial environmental frameworks across Canada, and in accordance with the Federal guidelines for all types of environmental projects.

Mr. Helik is a QP registered with the MECP for the purpose of Phase One and Two ESAs (QP_{ESA}), and for conducting Risk Assessments (QP_{RA}). His role in the current RA is as the QP_{ESA} and engineer.

Additional information (including curriculum vitae), related to the qualifications of the EXP team members, is provided in Appendix F. Mandatory certifications signed by the QP_{RA} are provided in Appendix H.

3. Property Information, Site Plan and Geological Interpretation

3.1 Property Information

The RA property is municipally located at 15 Denison Avenue in Toronto, Ontario and comprises an area of approximately 0.24 hectares (0.59 acres). Surrounding properties have been developed for community use to the north (Wolseley Street) followed by primarily residential and institutional & open space to the northwest, community use (a laneway) followed by commercial to the south, community use (Denison Avenue) followed by mixed residential to the west, and community use (Augusta Avenue) followed by mixed residential and commercial to the east. The Site location is shown on Figure 1 (Appendix B). A Site plan is provided on Figure 3 (Appendix B).

The Site is owned by the City of Toronto. The legal description, PIN, and assessment roll number of the RA property is provided in Table 3, below.

Table 3: RA Property Description Summary

Municipal Address	Legal Description	PIN(s)	Assessment Roll Number
15 Denison Avenue, Toronto, ON	Part of Pin 21238-0045 (LT) LANE PL 65 TORONTO; 10 FT LANE, 8 FT 9 INCH LANE PL D127 TORONTO; PT LT 1 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT LT 9 PL D127 TORONTO AS IN WA99649; TORONTO , CITY OF TORONTO PIN 21238-0046 (LT) LT 1-5 PL D127 TORONTO EXCEPT A95815, WA99649; TORONTO , CITY OF TORONTO PIN 21238-0047 (LT) LT 6-8 PL D127 TORONTO; PT LT 9 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT UNLETTERED LT TO REAR OF LT 3 N/S QUEEN ST PL 65 TORONTO PT 5, EXPROP PL WA91330; PT 1 & 2, EXPROP PL WA88833 & AS IN WA90829 WA88489, WA88331, WA88288, WA88252 EXCEPT WA99649, WA95819; S/T WA90829; S/T INTEREST IN WA90829; S/T DEBTS IN WA97766; TORONTO , CITY OF TORONTO	21238-0045 (LT) 21238-0046 (LT) 21238-0047 (LT)	190406528000400

A Survey Plan prepared by Holding Jones Vanderveen Inc (Ontario Land Surveyors) is attached as Appendix I. A lawyer's letter stating the name of the property owner and the legal description of the RA property (including PIN and assessment roll number) is also included in Appendix I.

The Site is vacant of structures and developed as an asphalt-paved public parking lot. Based on a review of fire insurance plans (FIPs), municipal records, historical aerial photographs, chain of title information, and other records, the Site was first developed

for residential use as early as 1858, and a bakery was opened at 13 Denison Avenue (central-western portion of the Site) in the 1920s. Prior to 1858 the Site was agricultural. Circa 1970, the structures on-Site were demolished and the Site was redeveloped into the current parking lot.

The intended redevelopment of the Site includes a multi-storey residential tower, cultural space and parkland (mixed Residential, Community, Parkland use). The future Site building will be constructed as a slab-on-grade structure, and no basement or other subgrade structures are planned to be constructed at the Site. The Site is intended to be redeveloped for indigenous housing and is a priority redevelopment project for the City of Toronto.

Given the intended change to a more sensitive (i.e., most sensitive being residential / institutional / parkland) land use, an RSC is required. The RA will support the filing of the RSC and will be completed in accordance with O. Reg. 153/04.

Surrounding properties have been developed for community use to the north (Wolseley Street) followed by primarily residential and institutional & open space to the northwest, community use (a laneway) followed by commercial to the south, community use (Denison Avenue) followed by mixed residential to the west, and community use (Augusta Avenue) followed by mixed residential and commercial land use to the east. Therefore, relevant off-Site human receptors include residents (toddlers and adults), property visitors (recreational and trespasser), outdoor maintenance workers and indoor workers. Construction/utility workers are also considered present due to potential redevelopment activities as well as potential for utility maintenance in the area of the Site. The nearest off-Site terrestrial ecological receptors are terrestrial plants, invertebrates, mammals and birds which may frequent the surrounding properties as well as aquatic receptors within Lake Ontario, located 1.3 km downgradient of regional groundwater flow.

The history and characterization of the property is summarized in the Phase One Summary provided in Appendix J. Electronic copies of the Phase One ESA reports or similar reports relied upon within the RA are provided within the zip file presented as Appendix Q.

During EXP's assessment of the historic and current activities at the RA property, several potentially contaminating activities (PCAs) were identified pertaining to current and historical operations on and around the RA property. Several sources of PCAs, considered as possible contributors to areas of potential environmental concern (APECs) on the RA property, were identified within the Phase One Study Area (Appendix J). There are thirteen (13) PCAs identified within the Phase One Study Area (i.e., 250 metres from the Site boundaries) that were considered to result in APECs; two (2) of which are located on-Site. The number presented in brackets beside each PCA is associated with the PCA number in Table 2, Schedule D of O. Reg. 153/04. Where the activity is not listed, it is identified as "other".

The two (2) PCAs identified on-Site are:

- PCA 1 – (30) – Importation of Fill Material of Unknown Quality
- PCA 2 – (Other) – De-icing salts

The eleven (11) PCAs identified off-Site are:

- PCA 3 – (37) – Operation of Dry Cleaning Equipment (where chemicals are used)
- PCA 4 – (Other) - historical manufacturing
- PCA 5 – (37) – Operation of Dry Cleaning Equipment (where chemicals are used)
- PCA 6 – (33) – Metal Treatment, Coating, Plating and Finishing
- PCA 7 – (Other) – Coal Storage
- PCA 8 – (28) Gasoline and Associated Products in Fixed Tanks
- PCA 9 – (8) – Chemical Manufacturing, Processing and Bulk Storage

- PCA 10 – (37) – Operation of Dry Cleaning Equipment (where chemicals are used)
- PCA 11 – (17) – Dye Manufacturing, Processing and Bulk Storage
- PCA 12 – (28) Gasoline and Associated Products in Fixed Tanks
- PCA 13 – (52) – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems

All other PCAs identified within the Phase One Study Area are considered *de minimis*, and therefore do not contribute to an APEC on-Site due to their inferred cross- or downgradient location relative to the Site.

The locations of the PCAs are shown on Figure 2. The locations of the APECs are shown on Figure 4. Off-Site PCAs that are considered to be *de minimis* are shown in green on Figure 2.

Based on the identification of APECs in the Phase One ESA, several Phase Two ESAs were conducted. These assessments are summarized in the Phase Two Summary provided in Appendix J. The purpose of these reports was to assess the potential for soil and groundwater impacts associated with each APEC and the extent of these impacts. Copies of the reports, where available, are provided on the zip file provided In Appendix Q.

3.2 Site Plan and Hydrogeological Interpretation of RA Property

The following Phase Two ESAs, or similar investigations, contributing to the hydrogeological interpretation of the RA property have been completed at the RA property as documented in the following reports:

1. Terrapex Environmental Ltd. (2020) *Summary of Environmental Investigation, 15 Denison Avenue, Toronto, Ontario,* dated April 30, 2020.
2. EXP (2022a) *Phase One Environmental Site Assessment, 15 Denison Avenue, Toronto, Ontario,* dated April 27, 2022.
3. EXP (2022b) *15 Denison Avenue, Toronto, Ontario, M5T 2M4, Hydrogeological Investigation,* dated June 28, 2022.
4. EXP (2022c) *Phase Two Environmental Site Assessment, 15 Denison Avenue, Toronto, Ontario,* dated August 31, 2022.
5. EXP (2025a) *Phase Two Environmental Site Assessment Update, 15 Denison Avenue, Toronto, Ontario*, In-Progress.
6. EXP (2025b) *Free Product Removal Program, 15 Denison Avenue, Toronto, Ontario*, In-Progress.

All the above-mentioned environmental reports were available for review by EXP and are included on the zip file provided as Appendix Q, with the exception of the EXP (2025a) Phase Two ESA and the EXP (2025b) Free Product Removal Program reports, which are currently in progress. EXP's borehole logs and Certificates of Analysis are also provided in Appendix Q. The locations of all boreholes and groundwater monitoring wells are shown on the Borehole/Monitoring Well Location Plan presented in Figure 5A (Appendix B).

3.2.1 Geology

Regional Geology

The Site is located in the physiographic region designated as the Iroquois Plain (Chapman and Putnam, 1984). The overburden at the Site is anticipated to consist of fine-textured glaciolacustrine deposits consisting of fine-textured glaciolacustrine deposits consisting of silt and clay, minor sand and gravel (Sharpe, 1980).

According to the Ontario Geological Survey map of the area, the underlying geology is comprised of Georgian Bay Formation, Blue Mountain Formation, Billings Formation, Collingwood Member and Eastview Member, consisting of shale, limestone, dolostone and siltstone (Ontario Geological Survey, 1991).

Local Geology

Based on previous subsurface investigations completed at the Site, the general stratigraphy at the Site, as observed in the boreholes, comprised of pavement structure (150 to 170 mm asphaltic concrete and granular material), followed by fill materials extending between depths of 0.76 to 2.29 m bgs, overlying native deposits of clayey silt, silt and sandy silt till with traces of sand and gravel at all borehole locations. The silty sand to silty clay was encountered at depths of approximately 0.76 to 16.76 m bgs and was generally brown in colour becoming grey with depth. Bedrock was encountered in BH3, BH4, BH24-1, BH24-2, and BH24-3. The depth of bedrock ranged between 14.93 m to 21.34 m bgs. BH3, BH4, BH24-1, BH24-2, and BH24-3 were all terminated at the bedrock interface or within bedrock. Bedrock at the Site consisted of a grey shale material, becoming more competent with depth.

A cross-section plan is provided as Figure 5A (Appendix B). Cross sections illustrating the geology at the Site are shown on Figures 17A through 20B (Appendix B).

3.2.2 Hydrology

No surface water bodies are present on-Site and storm water is managed by stormwater catch basins. However, a review of the topographic map for the Site and the study region indicated that the Site slopes gently towards the south. Lake Ontario is located approximately 1.3 km south of the Site. Groundwater flow within the Phase One Study Area is anticipated to be towards the south and Lake Ontario. Local groundwater flow direction at the Site has shown variation between monitoring dates and may be influenced by the presence of utilities and other subsurface features at the Site and on adjacent properties. Please refer to Section 3.2 of the Phase Two CSM (Appendix B) for further discussion on the variations observed within on-Site.

3.2.3 Hydrogeology

Based on the groundwater contour map delineated for the Site and topography of the Site and study region, the local groundwater was determined to be in a south-southwesterly direction. Based on review of a topographic map of the Site, surface grade elevations showed a decrease across the Site towards the south. EXP completed a Hydrogeological Investigation at the Site (EXP, 2022b) which determined that the groundwater across the Site is likely flowing in a southwesterly direction based on groundwater elevation measurements made in January – February 2022 (as presented on Figure 6A). A second groundwater contour map was prepared based on groundwater elevations collected on April 25, 2024 (following installation of extraction wells along the northern and northeastern portions of the Site). Groundwater flow directions showed some variability on April 25, 2024, with radial flow out from the center of the Site towards the southeast and the northwest. A groundwater contour generated from groundwater elevation measurements on June 6th, 2024, showed a similar radial pattern from the center of the Site at BH/MW3 towards the northwest and the southeast. Finally, a groundwater contour generated from data on December 18, 2024, showed a groundwater flow towards the center and northeastern portions of the Site. Local groundwater flow direction has shown variation between monitoring dates and may be influenced by the presence of utilities and other subsurface features at the Site and on adjacent properties in addition to the on-going free-product removals. As part of the free-product removal program, a vacuum truck collects large volumes of groundwater from extraction wells installed along the northern and northeastern Site boundaries, which is suspected to be influencing local groundwater elevations across the RA property. The direction of regional and local groundwater flow at the Site is assumed to be towards the south/southwest and Lake Ontario. Finally, it is noted that due to the on-going pumping of groundwater, screen lengths (i.e., from surface to termination depth) and diameter of the extraction wells (i.e., 4”), groundwater elevations from these locations were not relied upon in the identification of a minimum depth to groundwater or to generate groundwater contours.

Monitoring wells BH/MW1, BH/MW2, BH/MW3, BH/MW4, BH/MW5, BH/MW107 and BH/MW109 are installed with screen depths between approximately 6.0 – 9.0 m bgs and are representative of shallow overburden groundwater at the RA property. Several deeper monitoring wells were installed at the bedrock / over burden interface, including BH/MW24-1, BH/MW24-3 and BH/MW108 screened at depths between approximately 12.3 – 15.3 m bgs. Monitoring well BH/MW24-2 was installed in bedrock at the Site with a screen depth of 17.0 – 20.0 m bgs. The minimum depth to groundwater identified within the shallow overburden groundwater was 2.84 m bgs at BH/MW5 in December 2024 and the minimum depth to the deep groundwater unit was determined to be 7.74 m bgs at BH/MW23-3 in December 2024.

Based on the positive vertical hydraulic gradient calculated between BH/MW109 and BH/MW24-2, it is assumed that the deeper groundwater unit is migrating upwards at the Site. The deeper groundwater unit may be under confining pressure applied by the overlying clayey silt till and sandy silt till. Given that no exceedances of the Table 3 SCS have been identified within the deeper groundwater unit at the Site, it has been inferred that the groundwater units are not hydraulically interconnected.

3.2.4 Subsurface Structures and Utilities

The Site utilities and services were identified at the Site based on relevant utility infrastructure observed during the Site reconnaissance, and the information obtained from the public and private locates that were completed for the Site. The Site utilities are summarized as follows and noted on Figure 3 (Appendix B), where available. The Site is serviced by the following:

Table 4: Locations of Utilities On-Site

Utility	Source	Location	Site Entry
Natural Gas	Enbridge Gas	Not Applicable	Not Applicable.
Sanitary Sewer	City of Toronto	Not Applicable	Not Applicable.
Storm Sewer	City of Toronto	Underground	Various storm sewers were observed in the asphalt portion of the Site, the storm sewer enters the Site from the north, adjacent to Wolseley Street.
Water	City of Toronto	Not Applicable.	Not Applicable.
Electricity	Toronto Hydro	Underground	Entering from the western portion of the Site along Denison Avenue. A hydro main is present adjacent to the Site along Denison running north-south.
Telecommunications	Bell Canada / Telus / Rogers	Not Applicable.	Not Applicable.

Locations of these utilities are provided in Figure 3 (Appendix B). However, based on the minimum depth to groundwater of 2.84 m bgs and the fact that the only subsurface utility currently installed within the boundaries of the Site is a catch basin for storm water, it does not appear that contaminant transport is significantly altered by the presence of utilities.

3.3 Contaminants of Concern

O. Reg. 153/04 outlines the specific criteria that determine the selection of appropriate SCS for screening COCs. Results of prior ESAs have indicated the presence of pCOCs in the soil and groundwater of the RA property. The screening process for the selection of COCs in the RA was based on three (3) criteria: (1) the maximum on-Site concentration exceeds the applicable SCS; (2) no SCS exists and the parameter cannot be screened for exclusion based on Ontario Typical Range (OTR) or other background values; or (3) the parameter was not detected at concentrations in excess of analytical RDLs, however, the RDLs exceed the applicable SCS. The evaluation of the third criterion, also took into consideration the potential for the chemical constituent to have been used at the Site and the factors affecting the RDLs.

3.3.1 Selection of Appropriate Site Condition Standards

Using the following evaluation criteria, EXP determined the appropriate SCS for the property per O. Reg. 153/04:

Is the Site within 30 metres of a water body?

The nearest downgradient surface water body to the Site is Lake Ontario, located approximately 1.3 km south of the Site. Based on the local topography and groundwater contour maps delineated for the Site, the shallow groundwater at the Site and in the

Phase One ESA study region is anticipated to flow in a southerly direction. The shallow contour maps are presented in Figures 6A and 6D within Appendix B.

Is this a shallow soil Site?

The Site is not within a shallow soil condition. Bedrock was encountered in BH3, BH4, BH24-1, BH24-2, and BH24-3. The depth of bedrock ranged between 14.93 m bgs to 21.34 m bgs. BH3, BH4, BH24-1, BH24-2, and BH24-3 were all terminated at the bedrock interface or within bedrock. Bedrock at the Site consisted of a grey shale material, becoming more competent with depth. Therefore, it is concluded that greater than two-thirds of the Site has overburden greater than 2 metres in thickness, and the Site is not considered to be within a shallow soil condition, as per O. Reg. 153/04, Section 43.1.

What is the soil pH?

Based on the previous Phase Two ESAs completed by Terrapex (2020) and EXP (2022c and 2025a), thirty-one (31) soil samples and three (3) field duplicate samples were collected across both surficial and subsurface soil at the Site. Several pH exceedances were identified within soil samples collected from the Site, including BH2-SS1 with a soil pH value of 12.1 at a depth of 0.15 – 0.76 m bgs, BH2-SS2 with a soil pH value of 11.3 at a depth of 0.76 – 1.37 m bgs, BH5 SS1 with a soil pH value of 10.0 at a depth of 0.15 – 0.76 m bgs and BH106-2A with a soil pH value of 9.11 at a depth of 0.80 – 1.1 m bgs. In March 2024, EXP completed a soil pH averaging program at each of the above locations. Further details on the results of which are provided within Section 4.0 of the Phase Two CSM (Appendix B).

Following the MECP (2016a) guidance and as per Section 48.(2) of O.Reg. 153/04, the three (3) pH results for each sampling location were logarithmically averaged and yielded a value of 8.90 at BH2-SS1, 8.19 at BH2-SS2, 8.33 at BH5 SS1, and 8.43 at BH106-2A which are within the acceptable range for the application of Table 3 SCS. As such, soil at the Site is within the range of 5.0 to 9.0 for surficial soil and 5.0 to 11.0 for subsurface soil for non-sensitive Sites as defined by O. Reg 153/04. Therefore, the Site is not considered to be a “Sensitive Site” as per O. Reg. 153/04, Section 41.

Is the property located within or adjacent to an area of natural significance?

Information available on the Ministry of Natural Resources and Forestry (MNRF) website and the City of Toronto Official Plan (2024) indicated that the Site is not located on or within 30 metres of any areas of natural significance as defined by O. Reg. 153/04 as follows:

1. An area reserved or set apart as a provincial park or conservation reserve under the Provincial Parks and Conservation Reserves Act, 2006.
2. An area of natural and scientific interest (ANSI; life science or earth science) identified by the Ministry of Natural Resources as having provincial significance.
3. A wetland identified by the Ministry of Natural Resources as having provincial significance.
4. An area designated by a municipality in its official plan as environmentally significant.
5. An area designated as an escarpment natural area or an escarpment protection area by the Niagara Escarpment Plan under the Niagara Escarpment Planning and Development Act.
6. Property within an area designated as a natural core area or natural linkage area within the area to which the Oak Ridges Moraine Conservation Plan under the Oak Ridges Moraine Conservation Act, 2001 applies.
7. An area set apart as a wilderness area under the Wilderness Areas Act.

To determine whether threatened or endangered species may frequent the Site, MNRF “Make a Map: Natural Heritage Areas” listings were searched for threatened or engendered species as part of the PSF submission (July 2024) and these listings were searched again in January 2025. The map is divided into 1 square kilometres quadrants in which species at risk can be searched. Given the map format, it is not possible to search a specific radius from the Site. As such, quadrants that included the Site and within 250 metres of the Site boundaries were searched (i.e., 17PJ2834, 17PJ2934, 17PJ2833, 17PJ2933). Using the Species at Risk in Ontario (SARO) status as a criteria, species that were found to be threatened or endangered within these quadrants are tabulated below.

Table 5: Threatened and Endangered Species On and Around the Site

Common Name	Scientific Name	SARO Status	Grid Identifier	Habitat[1]
Queensnake	*Regina septemvittata*	END	17PJ2933 17PJ2833 17PJ2934 17PJ2834	Queensnakes are most commonly found in stream or river habitats, with rock or gravel in the channel and along the banks to provide cover; however, they can less commonly be found in marshes, ponds, lake shores, and quarries. They require permanent still or flowing bodies of water with temperatures at or above 18˚C for most of the active season and a large population of crawfish. They are usually confined to within 3 metres of a shoreline.
Piping Plover	*Charadrius melodus*	END	17PJ2933 17PJ2833 17PJ2934 17PJ2834	Piping Plovers nest exclusively on dry sandy or gravelly beaches just above the reach of high water and waves. When not migrating, this bird spends virtually all of its time between the water's edge and the back of the beach.
Eastern Meadowlark	*Sturnella magna*	THR	17PJ2933 17PJ2833 17PJ2934	The Eastern Meadowlark prefers grassland habitats, including native prairies and savannahs as well as non-native pastures, hayfields, weedy meadows, herbaceous fencerows and airfields. Nests are built in depressions in the ground, in well-concealed areas of grasslands.
Chimney Swift	*Chaetura pelagica*	THR	17PJ2833 17PJ2834	Chimney Swift mainly used large hollow trees for nesting and roosting, before urbanization and have since adopted chimneys and other man-made structures for both nesting and roosting. These birds typically concentrate near water where insects (main food source) are abundant.

[1] Habitat requirements obtained from MECP Ontario Species at Risk website (2024d).

Although the endangered/threatened species above were found to be within or adjacent to the 1 km quadrant comprising the Site, none were retained as viable species currently inhabiting the Site, or properties within 250 metres of the Site. A rationale is provided for each of the species in Table 6, below.

Table 6: Rationale for Exclusion of Sensitive Species Habitat

Common Name	Habitat Present On-Site	Habitat Present Off-Site[1]	Rationale
Queensnake	No	No	Given there are no water bodies on or in the vicinity of the Site, this species was not retained as viable species inhabiting the Site or within 30 metres of the Site. Given the current commercial use of the Site within a highly developed area, suitable habitat is not present on, or around the Site and it is not anticipated that this species be present on-Site or within the surrounding properties. Therefore, the presence of these species is considered low and is not considered a valued ecological component (VEC) in the ERA.
Piping Plover	No	No	Given that the Site is in a highly urban area and the closest surface water body is located approximately 1.3 south of the Site, there are no suitable food resources available at the Site or within 30 metres of the Site. Given

Common Name	Habitat Present On-Site	Habitat Present Off-Site[1]	Rationale
			there are no water bodies on or in the vicinity of the Site, the presence of these species is considered low and is not considered a VEC in the ERA.
Eastern Meadowlark	No	No	As the Site has been used for commercial uses since the early 1900s and is located within a highly urban area, no habitat is considered to be present for the Easter Meadowlark on-Site or within 30 metres of the Site. Therefore, the Eastern Meadowlark is not considered a VEC in the ERA.
Chimney Swift	No	No	Given that the Chimney Swift nests and roosts in chimneys and other man-made structures, it is considered possible that this species may be present within 30 metres of the Site. However, given that the Site is in a highly urban area and the closest surface water body is located 1.3 km south of the Site, there are no suitable food resources available at the Site or within 30 metres of the Site. Therefore, the presence of these species is considered low and are not considered a VEC in the ERA.

[1] Habitat requirements obtained from MECP Ontario Species at Risk website (2024d).

Is groundwater used for potable purposes?

The Site and all properties within 250 m of the Site are connected to the municipal water supply, which is taken from Lake Ontario. The City of Toronto was notified in a letter dated April 18, 2024, of EXP's intention to apply non-potable groundwater SCS. A response from the City, dated April 23, 2024, indicated no objection to the use of non-potable SCS to the Site. Prior to RSC filing, an updated notification letter will be sent to the City, if required. The letter to the City and the City's response are provided in Appendix O.

What is the soil texture?

As part of the Phase Two ESA (EXP, 2022c) two (2) soil samples were collected from the surficial and subsurface soils at the Site and were analyzed for grain size. As part of the Phase Two ESA (EXP, 2022c) a surficial soil sample was collected from BH3 at a depth of 0.8 – 1.4 m bgs from the sandy silt and a second subsurface soil sample was also collected from BH3 at a depth of 4.6 – 5.2 m bgs. Both samples collected by EXP (2022c) were determined to be medium-fine textured.

In January 2025, EXP returned to the Site to advance two (2) shallow boreholes to collect surficial and subsurface soil samples from the northeastern and southwestern portions of the Site to provide additional evidence to support the classification of the Site as a medium-fine textured Site. A surficial soil sample was collected from BH201 at a depth of 0.8 – 1.4 m bgs from the silty clay fill and a subsurface soil sample was collected from BH202 at a depth of 2.4 – 3.1 m bgs from the silty clay till. Both soil samples collected by EXP (2025a) were determined to be medium-fine textured. As such, the application of medium-fine textured soil is considered to be appropriate for Site characterization.

What is the intended land use of the RA property?

Although the development plan for the Site has yet to be finalized, it is understood that the Site is intended to be redeveloped as a mixed use, affordable housing development, complete with a multi-storey residential tower, cultural space and parkland, occupying the entirety of the Site footprint. The future Site building will be constructed as a slab-on-grade structure, and no basement or other subgrade structures are planned to be constructed at the Site. The Site is intended to be redeveloped for indigenous housing and is a priority redevelopment project for the City of Toronto.

Which depth of soil restoration will be used?

The RA considers a full depth soil condition for evaluation of the risks associated with COCs.

Conclusion

Based on the above information, the appropriate generic remediation Standards for the Site were determined to be the Table 3 Full Depth Generic SCS in a Non-Potable Groundwater Condition for Residential/Parkland/Institutional land use with medium-fine textured soil, as listed in the MECP technical document *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* referenced by O. Reg. 153/04.

As discussed in Section 3.2.3, the shallowest depth to groundwater (from grade) at the Site is 2.84 m bgs identified at BH/MW5 in December 2024. The second highest water table measurement was identified to be 3.6 m bgs, also identified at BH/MW5 in April 2024. It is noted that no exceedances of the Table 3 SCS have been identified for any groundwater samples collected from BH/MW5. In addition, as discussed in Section 3.3.1 above, the Site is intended to be redeveloped with a slab-on-grade mixed use building. As such, the highest groundwater table measurement is not within 1 m of the future foundational slab indicating that groundwater is unlikely to be present within the gravel crush layer upon redevelopment of the Site and thus groundwater at the Site is not considered to be a shallow condition. In the derivation of the generic SCS, the MECP assumed a depth to groundwater of 3 mbgs and depth below a residential basement slab at 1.58 mbgs, resulting in a separation distance of 1.42 m between the bottom of the slab and the groundwater table. Therefore, under the assumed slab-on-grade scenario, the separation distance is greater than that assumed by the MECP, and therefore the Table 3 SCS are considered appropriate. Sufficient separation distance from the foundational slab to the water table will be maintained upon redevelopment and therefore, volatile groundwater parameters were not screened to the Table 7 SCS.

If the maximum detected concentrations of the identified chemical constituents, found in environmental media from the RA property, were below the Table 3 SCS, these substances were not identified as COCs and are considered to not pose unacceptable risks to human and/or ecological receptors. However, if the maximum analytical results for soil or groundwater exceed the Table 3 SCS, these substances are considered COCs and PSS will be set based on other jurisdictions, a qualitative RA, or a quantitative RA approach. Substances with reported measured concentrations within the applicable Table 3, but for which the laboratory RDL was greater than the Table 3 SCS, were also considered COCs, and a PSS was derived.

3.3.2 Selection of Contaminants of Concern in Soil

COCs in soil were screened by comparing maximum concentrations reported from the Phase Two ESAs to the Table 3 SCS. The screening of COCs in soil was based on the analytical results presented in the investigative reports listed in Section 3.2. The screening of petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and xylenes (BTEX), VOCs, polycyclic aromatic hydrocarbons (PAHs), metals (including hydride-forming metals), other regulated parameters (ORPs; including hot water soluble boron [B-HWS], hexavalent chromium [Cr (VI)], mercury [Hg], CN^-, electrical conductivity [EC], and sodium adsorption ratio [SAR]) in soil is summarized in Table C-1 in Appendix C. The raw data for all parameters measured in soil are provided in Tables C-3 to C-7 of Appendix C. These tables were revised to reflect deviations from the PSF as noted in Section 1.2.

Based on soil samples collected from the RA property, the following COCs were identified in soil:

PHCs

- PHC fraction F1

PAHs

- Acenaphthylene
- Anthracene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene

- Dibenz(a,h)anthracene
- Fluoranthene
- Indeno(1,2,3-cd)pyrene
- Phenanthrene

Metals (including hydride-forming metals) and ORPs

- Barium
- Copper
- Lead
- Mercury
- Zinc

Analytical results for soil are presented on Figures 7 through 12 within Appendix B. A summary of each area of contamination is outlined under Section 4.6 of the Phase Two CSM (Appendix B).

It is the $QP_{ESA's}$ opinion that the elevated EC/SAR concentrations in soil are associated with de-icing activities in the winter months and as such are not considered to be in excess of the SCS for the purposes of filing an RSC, based on the exemption outlined in Section 49.1 (1) of O. Reg. 153/04, as amended. Therefore, EC and SAR are not considered to be soil COCs.

3.3.3 Selection of Contaminants of Concern in Groundwater

COCs in groundwater were screened by comparing maximum measured concentrations or maximum RDLs to the Table 3 SCS. The PSF Tables were revised and reproduced for screening of pCOCs in groundwater to reflect deviations from the PSF as noted in Section 1.2. The screening of PHCs, BTEX, VOCs, PAHs, metals (including hydride-forming metals), and ORPs in groundwater is summarized in Table C-2 in Appendix C. The raw data for all parameters measured in groundwater are provided in Tables C-9 to C-13 of Appendix C.

Based on groundwater samples collected from the RA property, the following COCs were identified based on exceedances of the Table 3 SCS:

PHCs

- PHC fraction F1
- PHC fraction F2
- PHC fraction F3

VOCs

- Xylenes

Analytical results for groundwater are presented on Figures 13 through 16 of Appendix B.

Isolated PAH Exceedance (Benzo(g,h,i)perylene):

An isolated exceedance of benzo(g,h,i)perylene was identified at BH/MW1 on January 24, 2022. Based on review of field notes (which identified a potential sediment interference) and the completion of two (2) confirmatory sampling event on July 12, 2022, and April 22, 2024, with results below both the Table 3 SCS and the laboratory RDL, EXP does not believe the isolated exceedance of benzo(g,h,i)perylene in groundwater is representative of current Site conditions and is likely attributed to sediment interference. As such, given the completion of two (2) rounds of groundwater sampling, with results below the Table 3 SCS and

the presence of sediment identified in the original sample, benzo(g,h,i)perylene is not retained as a COC for groundwater at the Site.

Elevated RDL Exceedance (Ethylene Dibromide):

An isolated RDL exceedance of ethylene dibromide was identified at BH/MW4 on December 24, 2021. Based on review of the laboratory CoA it was identified that the RDL of ethylene dibromide was increased due to sample dilution at the time of analysis due to high PHC and BTEX concentrations in the sample. The sample was diluted to keep the target compounds in the calibration range of the instrument and to avoid contaminating the Purge and trap system. Ethylene dibromide has not been detected above the RDL in any soil or groundwater sample collected from Site. In total, sixteen (16) soil samples and one (1) field duplicate sample were analyzed for VOCs and six (6) groundwater samples, and two (2) field duplicate sample were analyzed for VOCs, with all results below the laboratory RDL.

Finally, on December 8, 2024, EXP collected one (1) original and one (1) duplicate groundwater sample from MW4 using low-flow sampling methodologies. Based on review of the laboratory analytical results ethylene dibromide was below the laboratory RDL of <0.40 in both the original sample and the duplicate sample. As such, ethylene dibromide is identified to be below the applicable Table 3 SCS at MW4, and the prior RDL exceedance is deemed to be attributable solely to sample dilution at the time of laboratory analysis. Ethylene dibromide will not be retained as a COC.

3.3.4 Sampling Programs

Intrusive sampling programs were conducted at the RA property to evaluate soil and groundwater quality for potential impacts based on the APECs identified during the Phase One ESAs and similar documents, provided in Appendix J. Electronic copies of the Phase One ESA reports are provided on the zip file in Appendix Q. The locations of the PCAs are identified in Figure 2 (Appendix B). The APECs resulting from on- and off-Site PCAs are presented in Figure 4 (Appendix B).

The Phase Two ESAs completed by EXP and others between 2020 to present, relied on in preparation of this RA, involved the advancement of boreholes within each APEC. Select borehole locations were completed as groundwater monitoring wells. Soil and groundwater samples were collected for pCOCs to characterize and delineate soil and groundwater impacts at the Site.

This RA was based on the cumulative results of the chemical analyses reported for the soil and groundwater samples collected across the RA property by Terrapex (2020) and EXP. A discussion of all previous sampling programs relied upon in the RA is presented in Appendix J. The raw data tables presenting the soil and groundwater analytical results for all parameters measured on-Site are provided in Appendix C. The locations of boreholes and monitoring wells are presented in Figure 5A (Appendix B). Assessment of APECs are summarized in the Phase Two CSM (Appendix B). A summary of the total number of samples collected per parameter group for soil and groundwater are presented in Tables J-3 and J-4 of the Phase Two ESA Summary (Appendix J), respectively.

Complete electronic copies of the available Phase Two ESAs and other investigative reports are provided on the zip file included in Appendix Q.

3.3.5 Quality Assurance and Quality Control

QA/QC measures were implemented during all supplemental sampling and analysis programs, to ensure the collection of high quality data that met the objectives of the RA.

3.3.5.1 Project Quality Management

The EXP sampling programs were performed in accordance with the MECP document *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, December 1996 (MOEE, 1996) and O. Reg. 153/04.

As part of the EXP sampling programs, analyses were performed using generally accepted principles and with appropriate sampling equipment. Written field and laboratory sampling procedures for groundwater developed by EXP were used to ensure consistency in sample collection and preparation of samples for submission to the laboratory.

The staff involved in the field sampling have participated in regular, on-going, EXP training programs and were qualified and experienced in collecting, describing, and preparing environmental samples for laboratory analysis.

Laboratory analyses were performed using generally accepted principles in accordance with the MECP document Protocol for Analytical methods used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (Protocol) (MECP, 2011b).

Data quality objectives for the parameters of concern were set to meet acceptable RDLs to achieve the goal of defining areas where such parameters are present at levels in excess of applicable generic Standards, as defined in the Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MECP, 2011a). This included providing written instruction to the participating analytical laboratory describing the required analyses on a Chain of Custody prepared and delivered with the samples.

3.3.5.2 Field Quality Assurance/Quality Control

The EXP soil and groundwater sampling plans were prepared and executed based on previous environmental investigations conducted at the RA property.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by EXP. EXP field sampling QA/QC protocols are tailored to the investigations and include, where appropriate:

- The collection of at least one (1) field duplicate sample for soil and groundwater;
- Instrument calibration checked on a daily basis, and re-calibrated prior to use, if required per EXP Standard Operating Procedures (SOPs);
- Use of dedicated sampling equipment – bailer, low-density polyethylene (LDPE) tubing for low flow sampling, latex gloves, nylon string;
- Thorough cleaning of groundwater level measuring meter using soap and water, followed by a distilled water rinse and a methanol rinse. Equipment is allowed to air dry between sampling locations; and,
- Inclusion of one (1) trip blank for volatiles in groundwater analyses.

A trip blank was submitted for each groundwater sampling event, and all samples were below the laboratory RDL for all VOCs analyzed as discussed in Appendix J.

3.3.5.3 Laboratory Quality Assurance/Quality Control

EXP contracted AGAT and Bureau Veritas Laboratories (BV Labs), both accredited (CALA certified) laboratories, for analytical testing of soil and groundwater at the Site. It is noted that Terrapex contracted BV Labs (CALA certified) for analytical testing of soil and groundwater at the Site. The laboratories performed the work following formal written methods and procedures. These methods include all the minimum requirements as specified in the Protocol (MECP, 2011b).

EXP has accepted the data provided by AGAT and BV Labs based on their assurance that, at minimum, the following requirements have been met and documentation to demonstrate compliance can be produced upon request:

- The method performance criteria in the Protocol were met;
- Sampling storage requirements, pre-analysis processing techniques, and holding times for all sample types as identified in the Protocol were met following receipt and sign-off of the samples from EXP staff;
- The results of all laboratory QC samples were within statistically determined control limits; and,
- A Certificate of Analysis with all the QA/QC sample data, has been received from the laboratory (AGAT or BV Labs) and is included within the appropriate reports on the zip file in Appendix Q.

A summary of the soil and groundwater samples collected during the Phase Two ESAs is provided in the Phase Two Summary in Appendix J. Appendix J also includes a summary of the RPDs of the soil and groundwater field duplicate samples collected during the Phase Two ESAs.

QA/QC programs were also carried out by AGAT to evaluate the accuracy of the data. As part of the laboratory's analytical program, standard laboratory QA/QC protocols were accepted which included the analysis of method blanks, matrix spikes and 10% replicates for every sampling batch.

The following QA/QC analyses were conducted for soil and groundwater analyses, were applicable:

- Laboratory Duplicates / Laboratory Control Sample Duplicates;
- Surrogate Standard Recovery;
- Matrix Spikes;
- Method Blanks; and,
- Method Blank Spikes.

3.3.6 Adequacy of Data

The Phase Two ESAs and other subsurface investigations completed by EXP and others were conducted at the RA property to assess the quality of soil and groundwater within each APEC. The analytical data from the Phase Two ESAs were assessed by EXP with respect to the evaluation of the APECs and potential data gaps. The data reviewed in the RA comprised data reported by EXP and Terrapex between 2020 and present day. Based on this review, it is the opinion of the QP_{ESA} and QP_{RA} that the sampling program is adequate for the RA objectives.

Based on the APECs identified in the Phase One ESA (EXP, 2022a), boreholes were advanced and soil samples were collected to assess for pCOCs that may have been associated with these activities. Groundwater monitoring wells were installed in select boreholes and screened at specific intervals for the collection of groundwater samples to assess for pCOCs. The rationale for the selection of the investigative locations and the laboratory chemical analyses was presented in the overview of the investigative reports provided in Appendix J. The selected analytical test groups were considered appropriate to assess Site conditions based on past activities and the chemicals potentially used or handled at the Site, or that may potentially have been transported to the Site via groundwater migration.

The raw data tables presenting the soil and groundwater analytical results for all parameters measured on-Site are provided on in Appendix C). A summary of the sampling frequency is provided in Tables J-3 and J-4 for soil and groundwater, respectively, in the Phase Two Summary (Appendix J).

The soil and groundwater sampling programs conducted at the RA property facilitated the evaluation of the potential presence of COCs associated with the APECs. The coverage of the Site soil and groundwater sampling program was sufficient to define the extent and magnitude of the COCs that were identified at the Site. Overall, it is the opinion of the QP_{ESA} that the extent of the sampling and the quality of the soil and groundwater data obtained was sufficient to meet the objectives of the RA.

4. Human Health Risk Assessment (HHRA)

The HHRA follows the standard RA process: Problem Formulation, Exposure Assessment, Hazard Assessment, and Risk Characterization.

Problem Formulation

The first stage of the HHRA is problem formulation. It involves the collection of data and definition of the areas of concern to be evaluated in the HHRA. The main components of problem formulation include:

1. Site characterization, as described in Sections 3.1 and 3.2. This involves the collection and review of data that can influence the transport and availability of COCs to potential receptors, such as geological and hydrogeological information of the RA property.
2. Chemical characterization, as described in Section 3.3. This involves the identification of COCs based on the chemical analytical data collected from the RA property.
3. Receptor characterization, which will be discussed in Sections 4.1 and 4.2. This involves the identification of receptors of concern – receptors with the greatest probability of exposure to the COCs and/or are more sensitive to the COCs.
4. Exposure pathway characterization, which will be discussed in Section 4.2. This involves the identification of the relevant pathways of exposure, based on the COCs chemical properties, such as volatility and solubility in water, and the characteristics of the receptors of concern, such as their physiology and behaviour.

Exposure Assessment

The second stage of the HHRA is the exposure assessment, in which the exposures of receptors of concern to COCs are evaluated. An exposure assessment may be carried out by measuring the concentrations of a COC in the tissues and cells of the receptor of concern, or the dose at which the receptors were actually exposed. More realistically, exposure can be estimated based on the concentration of the COC in the source media. The degree of exposure depends on a number of factors pertaining to the fate and transport of the COC in the environment, the source media and the characteristics of the receptors of concern. These factors include:

- The concentration of the COC in the environmental medium at the source(s), as well as background or ambient concentrations;
- The physical and chemical properties of the COC that influence environmental fate and transport, such as volatility, solubility and hydrophobicity;
- Site characteristics, such as the geology and hydrogeology, which also influence the fate and transport of the COC in the environment;
- The physiological and behavioural characteristics of the receptor, such as respiration rate, ingestion rate and amount of time spent in each area of concern; and,
- Other physical, chemical and biological factors that can influence the bioavailability of COCs.

Hazard Assessment

The toxic potency of a COC is a function of its inherent toxicity, or its ability to activate the biological mechanism of toxicity within the receptor. This is dependent upon its ability to reach the Site of activation, as well as receptor-specific factors, such as the age, sex, and species of the receptor and its ability to resist, repair, or adapt to the toxic impact.

Hazard assessment is based on the dose-response concept that is fundamental to the responses of biological systems to chemicals (Filov et al., 1979; Amdur et al., 1991). The dose-response of an organism to a chemical is derived via observations of the toxicological effects on organisms when exposed to chemicals in the environment from various point and non-point sources,

or in the laboratory under controlled conditions (Doull et al., 1980; FDA, 1982). The dose response data are used to derive an exposure limit, the concentration or dose, where no adverse effects are anticipated.

When setting an exposure limit for a chemical, considerations must be given to factors that can affect the degree of impact on a receptor. These may include:

- The exposure scenario, such as the duration or levels of exposure. Different exposure scenarios may result in impacts on different target organs. Therefore, the exposure scenario should be representative of the "real-world" conditions for the receptor of concern.
- The route of exposure. Exposure via different routes, such as inhalation, ingestion, or dermal contact, may impact tissues. It is recommended that different exposure limits be set for exposures via different routes.
- Receptor characteristics. The toxic potency of a chemical can be dependent on the characteristics of the receptors, such as the age, sex, and species. For instance, children are generally more sensitive to the toxicity of a chemical than adults and would warrant a greater level of protection. It is sometimes prudent to set different exposure limits for different life stages.

Risk Characterization

The assessment of the potential for adverse effects, as defined by the Environmental Protection Act is fundamental to risk characterization.

For COCs with a threshold-type dose-response, risk characterization involves a comparison of the total estimated exposure with the exposure limit. For COCs with a non-threshold-type dose-response, i.e., carcinogens, risk characterization involves the calculation of the predicted risk of an individual in a population of a given size developing cancer over a lifetime. Further details are provided in Section 4.4.

4.1 Problem Formulation

The problem formulation process for the HHRA includes identifying COCs, exposure pathways and receptors to be addressed in the Exposure Assessment. In order to do so, an HHCSM is prepared (Section 4.1.1) and the RA objectives are defined (Section 4.1.2).

4.1.1 Human Health Conceptual Site Model

The HHCSM combines the information gathered during the problem formulation phase and provides a summary of the exposure scenarios to be evaluated in the HHRA. These conceptual exposure scenarios represent the interactions of the COCs with receptors via the various exposure pathways.

An HHCSM was developed based on information obtained during the investigations of the RA property describing the Site geologic and hydrogeologic conditions, the COCs, and their distribution in soil and groundwater (see Section 3). Based on the Site information, review of the chemical and physical properties of the COCs and the current commercial use and anticipated future mixed residential, commercial and parkland land use, potentially complete exposure pathways were identified for quantitative or qualitative evaluation in the HHRA.

A graphical representation of the HHCSM based on the existing and intended Site conditions is presented in Figure 21A. However, as RMM (Section 7) are required for protection of human receptors on the RA property, an additional HHCSM is provided to show exposure scenarios in the presence of RMM (Figure 21B). Details of the receptors and exposure scenarios are described below and in the Exposure Assessment in Section 4.2.

Contaminants of Concern

The soil COCs are listed in Section 3.3.2 and include PHC fraction F1, several PAHs (including acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene and phenanthrene), several metals (barium, copper, lead, zinc) and mercury.

The groundwater COCs are listed in Section 3.3.3 and include PHC F1-F3 and xylene.

As per MECP guidance, as multiple carcinogenic PAHs were retained as COCs in soil, all other carcinogenic PAHs will be retained for further assessment, and the sum of the total carcinogenic effects will be evaluated for the applicable exposure pathways. A list of the carcinogenic PAHs as defined by the MECP (2018) is provided below:

- Acenaphthene;
- Acenaphthylene;
- Anthracene;
- Benzo(a)anthracene;
- Benzo(a)pyrene;
- Benzo(b)fluoranthene;
- Benzo(g,h,i)perylene;
- Benzo(k)fluoranthene;
- Chrysene;
- Dibenz(a,h)anthracene;
- Fluoranthene;
- Indeno(1,2,3-cd)pyrene; and,
- Pyrene.

It is recognized that some, but not all, PAHs are considered volatile. The Henry's Law Constant (in units of atm-m^3/mol) or vapour pressure (torr) may be used to determine if a contaminant is sufficiently volatile to warrant an assessment via vapour inhalation exposure pathways. As such, any PAH with a Henry's Law Constant (at the average soil or groundwater temperature of 15 °C, as per MECP guidance) greater than $1x10^{-5}$ atm-m^3/mol or vapour pressure greater than 1 Torr is considered volatile for the purposes of the RA. An evaluation of volatility for PAHs is presented in Table 7, below.

Table 7: Evaluation of Volatility for PAHs

Contaminant	Henry's Law Constant (atm-m^3/mol) [(1)]	Vapour Pressure (torr)[(2)]	Volatile (Yes / No)
Acenaphthene	**$7.11x10^{-5}$**	$2.50x10^{-3}$	**Yes**
Acenaphthylene	**$1.25x10^{-4}$**	$9.12x10^{-4}$	**Yes**

Contaminant	Henry's Law Constant (atm-m^3/mol) (1)	Vapour Pressure (torr)(2)	Volatile (Yes / No)
Anthracene	**1.90x10^{-5}**	2.67x10^{-6}	**Yes**
Benzo(a)anthracene	3.15x10 $^{-6}$	1.90x10^{-6}	No
Benzo(a)pyrene	8.62x10^{-8}	5.49x10^{-9}	No
Benzo(b)fluoranthene	1.48x10^{-7}	5.00x10^{-7}	No
Benzo(g,h,i)perylene	3.30x10^{-7}	1.00x10^{-10}	No
Benzo(k)fluoranthene	1.19x10^{-7}	9.65x10^{-10}	No
Chrysene	1.26x10^{-6}	6.23x10^{-9}	No
Dibenz(a,h)anthracene	8.31x10^{-9}	1.39x10^{-11}	No
Fluoranthene	2.74x10^{-6}	9.22x10^{-6}	No
Indeno(1,2,3-cd)pyrene	6.16x10^{-8}	1.25x10^{-10}	No
Phenanthrene	**4.23x10^{-5}**	1.12x10^{-4}	**Yes**
Pyrene	3.56x10^{-6}	4.50x10^{-6}	No

(1) Henry's Law Constant at average soil and groundwater temperature (15°C), obtained from MECP (2011b).
(2) Vapour Pressure obtained from MECP (2011b) and converted to torr.

Bold = Henry's Law Constant exceeds 1 x 10^{-5} atm-m^3/mol or Vapour Pressure exceeds 1 torr, and thus contaminant is considered volatile.

Based on the above comparison, the following PAHs are considered sufficiently volatile and will be evaluated for inhalation based exposure pathways as applicable:

- Acenaphthene;
- Acenaphthylene;
- Anthracene; and,
- Phenanthrene.

In the case of volatile carcinogenic PAHs, only volatile PAHs will be assessed for the sum of total carcinogenic exposure via inhalation-based exposure pathways. As such, for inhalation based exposure pathways the assessment of total carcinogenic PAHs will only include acenaphthylene, acenaphthene, and anthracene.

Based on the assessment of physical properties and the distribution of the COCs in soil and groundwater, relevant receptors at the RA property can come into potential contact with the COCs by both direct and indirect exposure routes. Potential exposure to all soil COCs, which may be bound to soil mineral particles and soil organic matter or dissolved in pore water, may occur by direct dermal contact, incidental ingestion or soil particulate inhalation. The degree of solid phase and dissolved phase partitioning of the volatile parameters from soil or groundwater to soil vapour and thus indoor air, outdoor air, or trench/excavation air, is determined to a large extent by their polar/non-polar characteristics.

Exposure Pathways and Receptors

The current land use is commercial, and the future land use of the RA property is proposed to be mixed residential, parkland, and community use. Although the development plan for the Site has yet to be finalized, it is understood that the Site is intended to be redeveloped as a mixed use, affordable housing development, complete with a multi-storey residential tower, cultural space and parkland, occupying the entirety of the Site footprint. The future Site building will be constructed as a slab-on-grade structure, and no basement or other subgrade structures are planned to be constructed at the Site. The Site is intended to be redeveloped for indigenous housing and is a priority redevelopment project for the City of Toronto. Under these land use

scenarios, five (5) human receptor groups were identified for evaluating potential human health risks associated with exposure to COCs in on-Site soil and groundwater including:

- Site residents (toddler and composite);
- Site visitors (parkland/recreational or trespassers; toddler, and composite);
- Adult indoor workers (adult);
- Outdoor maintenance workers (adult and pregnant adult); and,
- Construction/subsurface utility subsurface workers (adult and pregnant adult).

The potential pathways by which the Site receptors may be exposed to the COCs include:

- Direct exposure to soil through dermal contact, incidental ingestion, and particulate inhalation (Site residents, Site visitors, outdoor maintenance workers and construction/utility workers);
- Direct exposure to groundwater or LNAPL through dermal contact and incidental ingestion (construction/subsurface utility workers);
- Indirect exposure to volatile COCs released from soil and groundwater, as well as LNAPL to indoor air through inhalation and vapour contact (Site residents, Site visitors and indoor workers);
- Indirect exposure to volatile COCs released from soil and groundwater, as well as LNAPL to outdoor air (including trench air for construction/subsurface utility workers) through inhalation and vapour contact (Site residents, Site visitors, outdoor maintenance workers and construction/utility workers); and,
- Indirect exposure to soil COCs via ingestion of homegrown garden produce (Site residents and Site visitors).

Off-Site Receptors

Off-Site receptors on neighbouring properties may potentially come into contact with the COCs present in soil and groundwater of the RA property. The surrounding properties include commercial land use to the south, Augusta Avenue followed by residential land use to the east, Denison Avenue followed by residential and institutional land use to the west and Wolseley Street followed by residential to the north. Potential off-Site receptors include property residents, visitors (recreational and trespassers), long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers. The potential exposure pathways by which these receptors can be exposed to the Site COCs include:

- Inhalation of soil/dust particles blown off Site during high intensity soil works/development;
- Inhalation and vapour dermal contact exposure to volatile COCs released to outdoor air (including trench air) from soil and groundwater;
- Inhalation and vapour dermal contact exposure to volatile COCs released to indoor air from soil and groundwater; and,
- Direct exposure to groundwater through dermal contact and incidental ingestion (construction/subsurface utility workers).

Further details pertaining to receptors and exposure pathways are provided in Sections 4.2.1 and 4.2.2, respectively.

4.1.2 Risk Assessment Objectives

The objectives of the HHRA are to:

- Qualitatively or quantitatively evaluate the potential on-Site human health risks arising from exposure to identified COCs in soil and groundwater, as well as LNAPL for the future mixed residential, community and parkland land use;
- Develop PSS that are protective of human health under the land uses noted above; and,

- Identify any RMM necessary to mitigate exposures by on-Site human receptors based on the results of the HHRA, if required.

The environmental conditions of the RA property were investigated through various ESAs conducted by EXP and others between 2020 to present. The data collected were used to characterize conditions for the current RA. The work completed by EXP included the collection of soil and groundwater samples for chemical analysis from different locations to assess conditions at the APECs. Sampling programs were conducted following acceptable field protocols and QA/QC measures in order to provide representative data of acceptable accuracy and precision. The programs were evaluated as to their representativeness, completeness, accuracy and precision to minimize uncertainty and meet the RA data quality objectives. Analytical programs were undertaken by qualified laboratories employing applicable QA/QC protocols to minimize uncertainty and provide accurate and representative data.

As discussed in Section 3.3.6, the extent and magnitude of the soil and groundwater impacts have been sufficiently defined and, in the opinion of the QP_{ESA} and QP_{RA}, meet the data quality objectives of the current HHRA. Furthermore, assessment of laboratory QA/QC data (Section 3.3.5), showed that analytical data of acceptable quality meeting the objectives of the RA were provided.

The HHRA objectives were set by identifying the receptors and exposure pathways relevant to the RA property as summarized in Table 8 in Section 4.2.2. The HHRA assumes a hypothetical human receptor, who may be an infant, toddler, child, teenager, or adult. The receptor works in, lives in, or is a visitor to, the area being assessed and could potentially be exposed directly or indirectly to the COCs. The HHRA assumes general physical and behavioural characteristics specific to the receptor type, such as body weight, inhalation rate and length of exposure, to quantify the chemical exposure of the receptor.

The HHRA is designed to provide a comprehensive assessment of the risks to human health. As it is not possible to consider all individual human receptors that may potentially be exposed to the COCs on the RA property, receptors that are at greatest risk are chosen for the assessment, such as people with the greatest probability of being exposed to the COCs, and those that are likely to be the most sensitive to COCs. The receptors relevant to the intended mixed residential, parkland, and community use of the RA property include a Site resident (toddler and composite), Site visitor (parkland/recreational or trespasser; toddler and composite), an indoor worker (adult), an outdoor maintenance worker (adult and pregnant adult), and a construction/subsurface utility worker (during redevelopment; adult and pregnant adult). Based on the surrounding land uses, the relevant off-Site receptors include property residents, property visitors (recreational and trespassers), long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers.

Both qualitative and quantitative approaches were used to assess potential risks to the relevant receptors and exposure pathways identified in the HHCSM. The undertaking of a quantitative assessment for each COC was determined from a secondary screening against pathway specific health-based component values presented in MECP (2016b) applicable to the Site receptors and exposure pathways. A COC was carried forward for quantitative risk analysis if the screening concentration exceeded the applicable MECP pathway specific component value and for exposure pathways where no component value is available (i.e., inhalation of vapours in a trench), where sufficient information is available to allow for quantitative evaluation. For details of the screening process see Sections 4.4.3.1 and 4.4.3.2. It is noted that potential risks from exposure to LNAPL cannot be quantitatively assessed; therefore, risks from exposure to LNAPL are qualitatively assessed in Section 4.4.3.6.

In undertaking any RA, there are various sources of uncertainty, which must be taken into account when setting the RA objectives. These uncertainties are associated with the field sampling and analytical programs, the characterization of the Site geologic and hydrogeologic conditions, the evaluation of contaminant fate and transport mechanisms, the evaluation of receptor characteristics and behaviour patterns and the assessment of chemical toxicological effects.

Conservative models and parameter values are applied in the assessment of contaminant fate and transport through different environmental media, resulting in overestimates at points of exposure. Conservative assumptions are also applied in the evaluation of receptor characteristics and behaviour patterns that are representative of the current and future land uses at the RA property. Toxicity reference values (TRVs) used to characterize hazards and risks from exposure tend to be very conservative as orders of magnitude of uncertainty factors are applied. The overall tendency, therefore, is to apply conservative assumptions

in all areas of the risk analysis to compensate for data and information limitations and uncertainty. As a result, it is more likely that overestimates of exposures, hazards and risks are reported in the RA than underestimates. The uncertainties associated with the exposure assessment, hazard assessment and risk characterization are discussed further in the individual sections below.

4.2 Exposure Assessment

The primary objective of the exposure assessment is to predict the rate of exposure (expressed in mg/kg body weight/day for oral and dermal pathways) and/or concentration in a medium to which receptors are exposed (as in the case of air concentrations of vapours, which are expressed as mg/m^3) of representative human receptors to COCs. These predictions are made using the exposure scenarios and pathways identified in the problem formulation phase. In the process, a number of conservative assumptions, pertaining to the characteristics of the receptors, Site conditions and other factors, are applied.

An exposure assessment may be carried out by measuring the concentrations of COC in the tissues and cells of the receptor of concern, or, if applicable, recording the dose of a COC to which a receptor was directly exposed (i.e., via gavage or injection). In an environmental RA, however, neither of these approaches is typically feasible, since they require direct communication, historical records of potential exposure pathways (i.e., consumption/inhalation) and/or biological samples from any and all humans visiting the Site. As a consequence, most exposure assessments consist of estimations of exposure based on the concentrations of COC in the source media (e.g. soil, sediment, and groundwater). The degree of exposure depends on a number of factors pertaining to the fate and transport of the COC in the environment, the source media, and the characteristics of the receptors of concern. These factors include:

- The concentration of the COC in the environmental media at the source(s), as well as background or ambient concentrations;
- The physical and chemical properties of the COC that influence their environmental fate and transport, such as volatility, solubility, and hydrophobicity;
- Site characteristics, such as the geology and hydrogeology, which also influence the fate and transport of the COC in the environment;
- The physiological and behavioural characteristics of the receptor, such as respiration rate, ingestion rate and amount of time spent on the areas of concern; and,
- Other physical, chemical, and biological factors that can influence the bioavailability of the COC.

4.2.1 Receptor Characteristics

A series of standard human receptor characteristics and activity patterns (e.g., body weight, surface areas, and time on-Site) were used in the exposure assessment. The *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario* (MECP, 2011c) was the key source of human exposure parameters used in the current assessment. For the assessment of lead, the *Technical Update: Dealing with Lead in Soil in Human Health Risk Assessments under O. Reg. 153/*04 MECP (2024c) was also considered. For receptor characteristics and activity patterns which lacked an applicable MECP (2011c) value, conservative default values were applied based on other jurisdictions or professional judgement. Table E4-5 in Appendix E provides a summary of the characteristics of all the human receptors evaluated quantitatively in the HHRA.

Exposure Scenarios

Toddler Resident

Under the future toddler resident scenario, it was assumed that a toddler could potentially be directly exposed to COCs in soil via dermal contact, dust inhalation and incidental ingestion. The toddler resident could be exposed to COCs in soil or groundwater, as well as LNAPL, via the inhalation of indoor air through the migration of vapours from underlying impacted soil or groundwater. The toddler could also be exposed via inhalation of volatile COCs that have migrated from soil or groundwater, as well as LNAPL, to outdoor air and to soil COCs indirectly via garden produce ingestion. It was assumed that the toddler resident spends 24 hours/day, 7 days/week and 50 weeks/year indoor on the RA property for a duration of 4.5 years (MECP, 2011c).

MECP (2011c) does not specify the duration of time that on-Site residents spend outdoors at a Site. The United States Environmental Protection Agency (US EPA) reports an average daily outdoor exposure duration of 258 minutes (4.3 h) for children under the age of 11 years old using the data provided by Wiley et al. (1991) (Table 16-14 of Exposure Factor Handbook, US EPA, 2011). In addition, the total time spent indoors and outdoors was estimated by US EPA (2011) using the data provided by Timmer et al. (1985). The maximum time spent outdoors is associated with the age group of 3 to 5 years old who spend 2.5 hours outdoors on weekdays and 3.1 hours outdoors during the weekends (i.e., on average 2.7 hours/day). Based on the data presented in US EPA (1996), the average time spent outdoors at a residence by adults of 18 years and older was 141 minutes/day (2.35 hours/day). To be conservative, the maximum daily outdoor exposure duration in the present RA, was assumed to be the longest estimate, of 4.3 hours, for all age groups including toddlers. It was also assumed that the toddler spends 7 days/week and 39 weeks/year outdoors at the RA property. This receptor and its relevant pathways were assessed quantitatively in the RA.

Composite Resident

Under the future composite resident scenario, it was assumed that this receptor lives on the RA property from birth, through life stages of infant, toddler, child, teen and adult. Composite residents could potentially be indirectly exposed to COCs in soil while spending time on-Site, via dermal contact, dust inhalation, and incidental ingestion. The composite resident could also be indirectly exposed to COCs in soil and groundwater, as well as LNAPL, via the inhalation of vapours released to outdoor and indoor air and indirectly to soil COCs via garden produce ingestion in the proposed residential building scenario. It was assumed that the composite resident spends 21.83 to 24 hours/day depending on the stage of lifetime and 7 days/week and 50 weeks/year indoors for all life stages on the RA property throughout a cumulative lifetime of 76 years (MECP, 2011c). As discussed above, it was assumed that the composite resident spends 4.3 hours/day outdoors during all life stages. It was also assumed that the composite resident spends this time each day, 7 days/week and 39 weeks/year outdoors at the RA property. This receptor and its relevant pathways were assessed quantitatively in the RA.

Toddler Site Visitor (Parkland/Recreational and Trespasser)

Under the toddler visitor for the future land use scenario, it was assumed that a toddler could potentially be directly exposed to COCs in soil via dermal contact, dust inhalation, and incidental ingestion. The toddler visitor could be exposed to COCs in soil and groundwater, as well as LNAPL, via the inhalation of indoor air that has been impacted through the migration of vapours from underlying impacted soil or groundwater. The toddler visitor could also be exposed via inhalation of volatile COCs that have migrated from soil or groundwater, as well as LNAPL, to outdoor air and indirectly to soil and groundwater COCs via garden product ingestion in the proposed residential building scenario. It was assumed that the toddler visitor spends 1.5 hours/day, 7 days/week and 39 weeks/year on the RA property for a duration of 4.5 years. Due to having a much greater exposure rate, the toddler resident was evaluated as a surrogate for the toddler Site visitor.

Composite Visitor (and Trespasser)

Under the composite visitor and future land use scenarios, it was assumed that this receptor is a visitor to the RA property from birth, through life stages of infant, toddler, child, teen, and adult. A composite visitor could potentially be exposed to COCs in soil and groundwater, as well as LNAPL, via the inhalation of indoor air and outdoor air that has been impacted through the infiltration of vapours from underlying impacted soil and groundwater, as well as LNAPL. This receptor may also be exposed to soil COCs via direct contact, dust inhalation and incidental ingestion and indirectly to soil COCs via garden produce ingestion under the proposed residential development scenario. It was assumed that the composite visitor spends 1.5 hours/day, 7 days/week and 39 weeks/year on the RA property for all life stages throughout a lifetime of 76 years. Due to having a much greater exposure rate, the composite resident was evaluated as a surrogate for the composite Site visitor.

Indoor Worker

An indoor worker is considered to be present under future land uses and may be exposed to on-Site COCs via vapour inhalation of volatile COCs released from soil or groundwater, as well as LNAPL, that have migrated to an enclosed indoor air space. This receptor is conservatively assumed to spend their entire working career at the Site where they may potentially be exposed to volatile COCs. The indoor worker is assumed to spend 9.8 hours/day, 5 days/week and 50 weeks/year indoors on the RA property,

for a duration of 56 years (MECP, 2011b). Due to having a much greater exposure rate, the Site resident was considered a surrogate for the future indoor worker in the HHRA, where applicable.

Outdoor Maintenance Worker

Under the outdoor maintenance worker scenario, it was assumed that an adult maintenance worker, responsible for work such as lawn care and some light gardening, could potentially be exposed to volatile COCs via the inhalation of ambient outdoor air impacted through the migration of vapours from soil and groundwater, as well as LNAPL. It was also assumed that an outdoor maintenance worker could also potentially be exposed to COCs in soil via direct dermal contact, dust inhalation, and incidental ingestion. Consistent with MECP (2011c), the maintenance worker was assumed to be exposed outdoors for 39 weeks/year given that exposure to soil COCs is limited for 3 winter months of the year. In summary, the maintenance worker was assumed to be exposed while working outdoors for 9.8 hours/day, 5 day/week, 39 weeks/year for the entire 56-year adult life stage (MECP, 2011c).

Given the minimum depth to groundwater at the Site of 2.84 m bgs, it is not anticipated that outdoor maintenance workers will come into direct contact with groundwater impacts or LNAPL on a chronic basis during routine landscaping/maintenance activities. Therefore, direct contact with groundwater or LNAPL was considered to be an incomplete exposure pathway for the outdoor maintenance worker.

To evaluate direct contact exposure with lead impacts in soil, a pregnant maintenance worker was also considered. As recommended by MECP (2024c), the pregnant outdoor maintenance worker was assumed to spend 9.8 hours per day, 5 days a week, 52 weeks per year for 56 years on the RA property.

Construction/Subsurface Utility Worker

Under the construction/subsurface utility worker scenario, exposures of an adult worker involved in construction and utility maintenance, or any other high intensity, short-term, sub-grade activity, were evaluated. The worker was assumed to be exposed to COCs while working on the RA property 9.8 hours/day, 5 days/week, 39 weeks/year for 1.5 years at ground level (MECP, 2011c). While at work, it was conservatively assumed that workers could be exposed to volatile soil and groundwater COCs, as well as LNAPL, via inhalation of vapours in ambient air at ground surface. A construction/subsurface utility worker could also be directly exposed to COCs in soil by dermal contact, incidental ingestion, and soil particulate inhalation.

During time spent in an on-Site trench or narrow excavation, workers would be exposed to COCs or LNAPL via inhalation of vapours in trench air. During trench/excavation dewatering, construction/subsurface utility workers may also be exposed to groundwater COCs through direct contact and this was considered a complete pathway in the HHRA. MECP (2011c) has not recommended specific exposure parameters for a construction/subsurface utility worker working within an on-Site trench or narrow excavation. As such, this RA has been conducted based on the assumption that the construction/subsurface utility worker would spend 100% of their time on-Site (i.e., 9.8 hours/day, 5 days/week) for a total of 4 weeks per year working within a trench or narrow excavation conducting subsurface activities. EXP has derived this exposure scenario based on professional experience from oversight and management of various construction projects across Ontario that have required monitoring of workers within trenches and narrow excavations. In the opinion of the QP, this assumed exposure scenario of spending 20 working days per year within a trench or narrow excavation is considered to be sufficiently conservative in evaluating the trench-related exposure pathways for the construction/subsurface utility worker at the Site.

Due to the strenuous nature of the activities involved in construction/utility work, an elevated breathing rate was assumed for the construction/subsurface utility worker while at work. As recommended by the US EPA (1997) and applied by MECP (2011c), the breathing rate while working was assumed to be 1.5 m^3/hr.

To evaluate direct contact exposure with lead impacts in soil, a pregnant construction/subsurface utility worker was also considered in the HHRA. In this scenario, the pregnant construction/subsurface utility worker was assumed to be on the property 9.8 hours per day, 5 days a week, 52 weeks per year for a working life of 56 years.

The surrounding properties include commercial land use to the south, Augusta Avenue followed by residential land use to the east, Denison Avenue followed by residential and institutional land use to the west and Wolseley Street followed by residential to the north

Off-Site Human Receptors

As described in Section 4.1.1, the surrounding properties include commercial land use to the south, Augusta Avenue followed by residential land use to the east, Denison Avenue followed by residential and institutional land use to the west and Wolseley Street followed by residential land use to the north. Therefore, the relevant off-Site receptors include property residents, property visitors (recreational and trespassers), long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers.

Similar exposure pathways to groundwater COCs described for on-Site human receptors may be applied for off-Site human receptors. Additionally, off-Site human receptors may be exposed to soil COCs via inhalation of dust/particles originating from the RA property as well as potential contact with soil COCs via soil erosion/run off to sediment and leaching to surface water and subsequent dermal contact and incidental ingestion to surface water. Due to the low mobility of soil and non-potable groundwater condition, all other soil exposure pathways are considered incomplete for off-Site receptors. The on-Site human receptors could serve as surrogates indicative of worst-case potential risks to the nearest off-Site human receptors, arising from migration of COCs off-Site with the exception of the surface water pathways as this pathway is considered incomplete for on-Site receptors.

4.2.2 Pathway Analysis

An exposure pathway is the path that a contaminant follows from the environmental medium that the receptor may be exposed to, such as air, soil, and water, to reach the receptor. From the medium, the COC enters the receptor via exposure routes, which may include inhalation, ingestion, or dermal absorption.

The COCs identified in soil include volatile chemical constituents that will partition into soil gas and migrate through the soil unsaturated zone to outdoor air or the indoor air of an overlying building. Receptors at the RA property were also evaluated for potential exposure to COCs in soil via direct dermal contact, incidental ingestion, soil particulate inhalation in addition to inhalation of indoor air and outdoor air (ground level and within a trench).

As volatile COCs were found in groundwater at the RA property, receptors were evaluated for potential exposure to COCs in groundwater via indoor air and outdoor air inhalation (ground level and within a trench). As a future construction/subsurface utility worker could undertake excavation work at depths below the groundwater table during redevelopment, these receptors were also evaluated for dermal contact and incidental ingestion exposure to COCs in groundwater.

In addition, given the presence of residual LNAPL in groundwater at the Site, it was assumed that all Site receptors could be exposed to volatiles sourced from the product in outdoor air, and indoor workers, residents and property visitors could be exposed to via indoor air inhalation. In addition, given the potential future presence of construction/utility workers at the Site it was conservatively assumed that these receptors could be exposed to residual LNAPL indirectly through combined trench air and outdoor air inhalation and through direct contact when working within a trench or excavation.

The exposure pathways and routes evaluated in the current assessment are summarized in the HHCSM provided as Figure 21A. The exposure pathways and routes considered complete in this RA for on-Site receptors are summarized in Table 8 below, and were evaluated qualitatively or quantitatively in the RA.

Table 8: Summary of Human Health Exposure Pathways (On-Site)

COC	Media	Exposure Pathway	Receptor
PHC F1 Acenaphthylene, anthracene, phenanthrene Mercury	Soil	Indoor air inhalation	Site resident, Site visitor/trespasser, long-term indoor worker
		Outdoor ambient air inhalation	Site resident, Site visitor/trespasser, long-term outdoor maintenance worker, construction/subsurface utility worker
		Inhalation of trench/excavation air	Construction/subsurface utility worker
		Vapour skin contact (indoor and outdoor)	Site resident, Site visitor/trespasser, long-term indoor worker, long-term outdoor maintenance worker, construction/subsurface utility worker
PHC F1 Acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene Barium, copper, lead, zinc Mercury	Soil	Direct contact (dermal contact, incidental ingestion)	Site resident, Site visitor/trespasser, long-term outdoor maintenance worker, Construction/subsurface utility worker
		Ingestion of homegrown garden produce	Site resident, Site visitor/trespasser
Xylene PHC F1, PHC F2	Groundwater	Indoor air inhalation	Site resident, Site visitor/trespasser, long-term indoor worker
		Outdoor ambient air inhalation	Site resident, Site visitor/trespasser, long-term outdoor maintenance worker, construction/subsurface utility worker
		Inhalation of trench/excavation air	Construction/subsurface utility worker
		Vapour skin contact	Site resident, Site visitor/trespasser, long-term indoor worker, long-term outdoor maintenance worker, Construction/subsurface utility worker
Xylene PHC F1, PHC F2, PHC F3	Groundwater	Direct contact (dermal contact, incidental ingestion)	Construction/subsurface utility worker

COC	Media	Exposure Pathway	Receptor
LNAPL Free Product	Groundwater (LNAPL Free Product)	Direct contact (dermal contact, incidental ingestion)	Construction/subsurface utility worker
		Indoor air inhalation	Site resident, Site visitor/trespasser, long-term indoor worker
		Outdoor ambient air inhalation	Site resident, Site visitor/trespasser, long-term outdoor maintenance worker, construction/subsurface utility worker
		Inhalation of trench/excavation air	Construction/subsurface utility worker
		Vapour skin contact	Site resident, Site visitor/trespasser, long-term indoor worker, long-term outdoor maintenance worker, Construction/subsurface utility worker

Off-Site receptors on neighbouring properties may potentially come into contact with the COCs present in the soil and groundwater of the RA property. As outlined in Section 4.2.1, off-Site receptors include property residents, property visitors (recreational and trespassers), long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers. The potential exposure pathways by which these receptors can be exposed to the Site COCs include:

- Inhalation of soil/dust particles blown off-Site during high intensity soil works/development for residents, visitors (recreational and trespassers), outdoor maintenance workers, and construction/subsurface utility workers;
- Inhalation and vapour dermal contact exposure to volatile COCs released to indoor air from groundwater and residual LNAPL for residents, visitors (recreational and trespasser), and indoor workers;
- Inhalation and vapour dermal contact exposure to volatile COCs released to outdoor air from groundwater and residual LNAPL for property residents, visitors (recreational and trespassers), outdoor maintenance workers, and construction/subsurface utility workers;
- Inhalation of trench air impacted with volatile COCs from groundwater and residual LNAPL for the construction/subsurface workers; and,
- Direct exposure to groundwater COCs and residual LNAPL through dermal contact and incidental ingestion by construction/subsurface utility workers.

The following pathways were considered incomplete in the HHRA and were therefore not assessed:

- All indoor exposure pathways (i.e., inhalation of indoor air, vapour skin contact with indoor air) were considered incomplete in the RA for on and off-Site outdoor maintenance workers and construction/subsurface utility workers given that these receptors are assumed to stay outdoors at all times;
- Due to the depth to groundwater at the Site, the groundwater to garden produce ingestion pathway was considered to be incomplete at the Site;
- All outdoor exposure pathways (i.e., inhalation of outdoor air, vapour skin contact with outdoor air, direct contact with soil) is considered incomplete for the indoor long-term worker as they are assumed to spend negligible time outdoors;

- As soil has limited mobility, dermal contact and incidental ingestion, indoor and/or outdoor air inhalation and vapour skin contact exposure pathways for soil were considered negligible for off-Site receptors and therefore were considered incomplete; and,
- Direct contact (ingestion and dermal contact) with groundwater to all human receptors (with exception of the construction worker) was considered incomplete given the depth to groundwater and non-potable condition of the Site.

4.2.3 Exposure Estimates

The soil parameters and exposure pathways that were carried forward for quantitative assessment in the HHRA, based on the screening of COCs to their component values (Section 4.4.3.1 and Table E4-1 of Appendix E) are summarized in Table 9.

The MECP has not derived component values protective of the trench air inhalation pathway for construction/subsurface utility workers. As a conservative measure, all volatile COCs in soil were conservatively retained for quantitative assessment of this exposure pathway. It should be noted that a parameter is considered volatile if the Henry's Law constant is greater than 1.05E-05 atm-m^3/mol at the average groundwater temperature of 15°C or the parameter has a vapour pressure greater than 1 Torr (MECP, 2019). Furthermore, although the REM soil concentrations of select COCs were below their respective S-OA component value protective of the outdoor air inhalation pathway, all volatile COCs in soil were retained for quantitative assessment of the outdoor air inhalation pathway for the construction/subsurface utility worker in order to calculate exposure and risk estimates associated with the total outdoor air (i.e., ground level and trench air) exposure.

Table 9: Soil COCs and Exposure Pathways to be Quantitatively Assessed in the HHRA

Direct Contact (S1; Resident)	Direct Contact (S2; Outdoor Maintenance Worker)	Direct Contact (S3; Construction/ Subsurface Utility Worker)	Indoor Air (S-IA; Resident and Future Indoor Worker)	Outdoor Air (S-OA; Resident and Outdoor Maintenance Worker)	Outdoor and Trench Air (Construction/ Subsurface Utility Worker)
Acenaphthene* Acenaphthylene* Anthracene* Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g.h.i)perylene* Benzo(k)fluoranthene Chrysene* Dibenz(a,h)anthracene Fluoranthene* Indeno(1,2,3-cd)pyrene Phenanthrene Pyrene* Copper Lead	Acenaphthene* Acenaphthylene* Anthracene* Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene* Benzo(k)fluoranthene Chrysene* Dibenz(a,h)anthracene Fluoranthene* Indeno(1,2,3-cd)pyrene* Phenanthrene Pyrene* Lead	Phenanthrene Lead	PHC F1 Phenanthrene Mercury	Phenanthrene	PHC F1 Acenaphthene* Acenaphthylene Anthracene Phenanthrene Mercury

* REM did not exceed the component value however the parameter was retained for evaluation of total carcinogenic PAHs.

The groundwater parameters and exposure pathways that were carried forward for quantitative assessment in the HHRA, based on the screening against component values (Section 4.4.3.2 and Table E4-2 of Appendix E) are summarized in Table 10.

As required by O. Reg. 213/91, section 230, "every excavation that a worker may be required to enter shall be kept reasonably free of water"; however, there is the potential that construction/subsurface utility workers may come into direct contact (i.e., incidental ingestion and dermal exposure) with pooled groundwater in an excavation. MECP does not provide groundwater component criteria protective of the incidental groundwater direct contact pathways (i.e., incidental ingestion and dermal contact) during an excavation. It is assumed that the GW1 component value provided in the development of Table 2 SCS (applicable for a potable water scenario) will be suitable to identify groundwater COCs for quantitative analysis of the incidental groundwater direct contact pathways for the construction/subsurface utility worker. This assumption is based on the following considerations: (1) The GW1 component value is based on a life-stage dependent drinking water intake rates (e.g., 0.64 to 2.3 L/day) and body weights (e.g., 8.2 to 70.7 kg); however, as outlined in Table E4-5 in Appendix E, the construction/subsurface utility worker is assumed to have a much lower incidental ingestion rate of 0.005 L/day and higher body weight of 70.7 kg; and (2) the GW1 component value was derived based on an exposure duration of 76 years; however, the construction/subsurface utility worker is assumed to only be on-Site for 1.5 years. While the GW1 component value does not consider dermal contact with groundwater, this exposure pathway is anticipated to be minimal compared to the groundwater ingestion pathway. Based on these considerations, it is anticipated that incidental ingestion and dermal contact exposure to groundwater by construction/subsurface utility workers would be significantly less than potable groundwater ingestion by residents. Therefore, the use of the GW1 component value to identify COCs for quantitative analysis of direct contact with groundwater by construction/subsurface utility workers was considered to be a conservative but suitable approach.

MECP has not derived component values protective of the groundwater to outdoor air and trench air inhalation pathways for construction/subsurface utility workers during an excavation. Additionally, MECP has not derived component values protective of the groundwater to outdoor air inhalation pathways for property residents, visitors (recreational and trespassers), and outdoor maintenance workers. Although it is likely that the GW2 component values are protective of these outdoor receptors, the current HHRA acknowledges that a direct correlation between an indoor air component values and an outdoor receptor may be inappropriate. As a result, all volatile COCs in groundwater were retained for quantitative assessment of the outdoor air and trench air inhalation pathways. It should be noted that a parameter is considered volatile if the Henry's Law constant is greater than 1.05E-05 atm-m^3/mol at the average groundwater temperature of 15°C or the parameter has a vapour pressure greater than 1 Torr (MECP, 2019).

Table 10: Groundwater COCs and Exposure Pathways to be Quantitatively Assessed in HHRA

Dermal Contact and Incidental Ingestion (GW1; Construction/ Subsurface Utility Worker)	Indoor Air Inhalation (GW2-Residential; Resident and Future Indoor Worker)	Outdoor Air (Residents and Outdoor Maintenance Workers)	Outdoor Air and Trench Air (Construction/ Subsurface Utility Workers)
PHC F1 PHC F2	PHC F1 PHC F2	PHC F1 PHC F2 Xylenes	PHC F1 PHC F2 Xylenes

A "point estimate" or "deterministic" approach was used to estimate exposure rates for each of the human receptors, using the previously discussed receptor and exposure parameters. This approach entails predicting the reasonable estimate of the maximum (REM) of each receptor using an exposure point concentration (EPC) of each COC in either soil or groundwater. The chosen EPC is intended to represent the COC concentration to which each receptor can realistically be anticipated to be exposed over time. While the US EPA Risk Assessment Guidance for Superfund (US EPA, 1989) recommends estimating the REM using the upper 95% confidence limit on the arithmetic mean of the data set (i.e., the 95% UCLM), the recommendations of the MECP, which are to use the maximum measured concentration of each COC, were followed. This ensures a conservative assessment based on what is assumed to be a "worst-case" exposure scenario.

The calculated exposure is expressed as the amount of contaminant entering the body per unit of body weight per unit of time (mg chemical/kg body weight/day). For COCs in air, prorated concentrations of COCs in air (mg/m^3), adjusted for receptor specific exposure conditions, were used to assess exposure and risk.

The REM COC concentrations measured in in soil and groundwater, as summarized in Tables E4-1 and 4-2 of Appendix E, were applied as EPCs in the quantitative HHRA, as shown in Tables E4-3 and E4-4. The REM is calculated as the maximum measured concentration + 20% to account for sampling and analytical variability.

Due to uncertainty regarding the composition, concentrations of constituents and non-depleting source of the LNAPL free product identified at the Site, only a qualitative assessment of the potential risks of free product will be provided within the Risk Assessment. Pre-remedial, 'worst-case' groundwater concentrations are relied upon for the assessment of groundwater-based exposure pathways to ensure a conservative approach is undertaken when evaluating potential risks from groundwater COCs and to capture the potential effects of LNAPL present in the subsurface at the Site.

4.2.3.1 Exposure to COCs via Inhalation of Vapours in Indoor Air

Migration of volatile chemicals from soil and groundwater to indoor air can create a potential exposure pathway to receptors of concern. The fundamental underlying principle for vapour transport is based on observations that small but persistent pressure differences established between the exterior and interior of buildings may cause infiltration of soil gas through the substructure of buildings. Based on measurements of the advective flow of radon from soil air into buildings, various methodologies have been developed to estimate the entry of vaporized chemicals. The majority of these methodologies are theoretical in nature and have not been extensively validated with empirical data. However, the methodologies can be used to provide a conservative estimate of exposures to vapours from subsurface sources.

The evaluation of the indoor air pathway is based on the vapour intrusion model developed by Johnson and Ettinger (J&E,1991).

Johnson and Ettinger (1991) and Little et al. (1992) reported that the flux of volatile chemicals through the substructure of buildings is based on the concentration and pressure gradients affecting the transport of vapours in the soil adjacent to the substructure. It is assumed a zone (hereafter referred to as the zone of influence) surrounds the substructure of the building, within which vapours will be transported by convection and/or diffusion through the substructure of the building (shown in the schematic diagram below). Hence, the concentration of vapours within the zone of influence arising from a soil or groundwater source can be used to estimate the concentration of vapours inside the building.

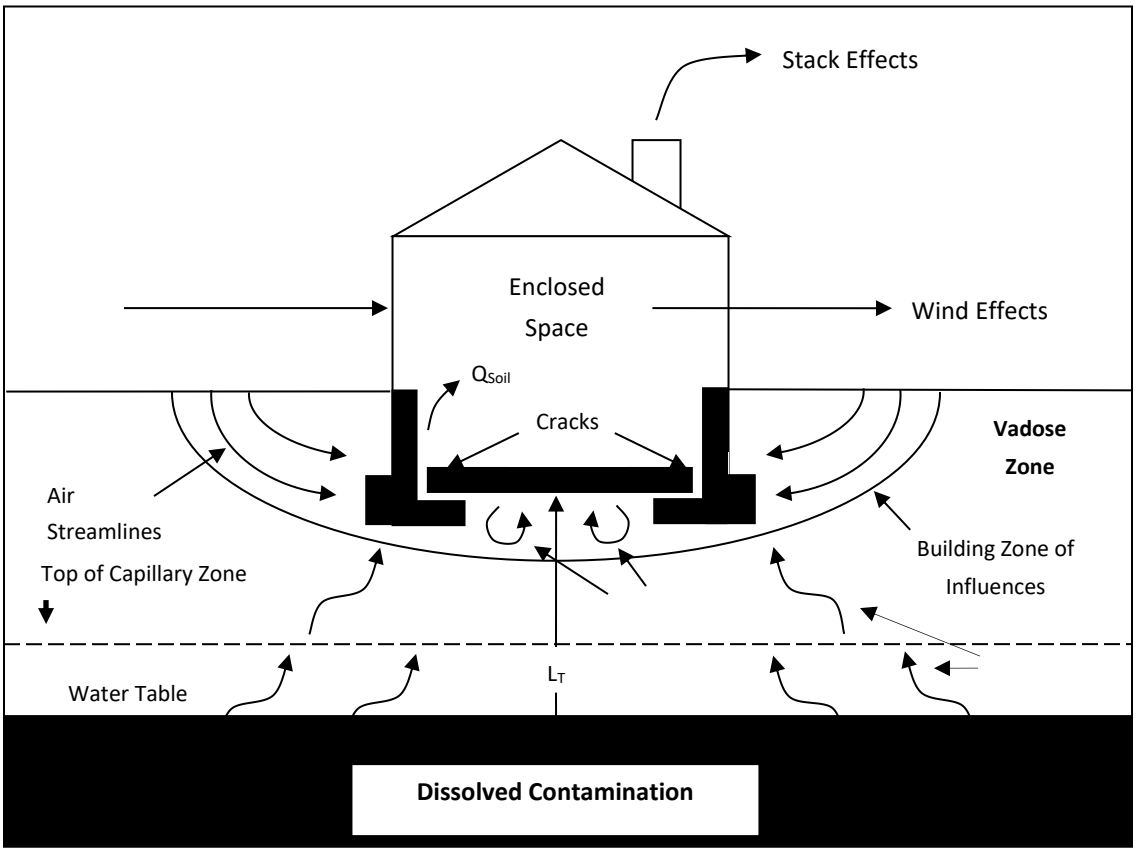

Figure 4-1 The Vapour Infiltration Pathway (US EPA, 2004a)

Johnson and Ettinger (1991) developed a heuristic model describing single component chemical transport through one or more soil layers of the unsaturated zone to the indoor air space of an overlying building. The J&E model is a multi-compartment model combining an analytical solution of the one dimensional advective-dispersion equation, describing vapour transport from the unsaturated zone into an overlying building, with a solution of the diffusion equation, describing vapour and liquid diffusive transport through the unsaturated zone from an underlying source, and a steady-state building ventilation mass balance equation. The model calculates the soil gas attenuation factor relating the chemical concentration in soil gas to the concentration in indoor air. The J&E modelling approach has been adapted to describe volatile chemical transport from soil and groundwater sources assuming linear equilibrium phase partitioning with soil gas. Based on the soil and groundwater screening presented in Sections 4.4.3.1 and 4.4.3.2, respectively, quantitative evaluation of the vapour intrusion pathway was performed under the future residential land use scenario for both soil and groundwater.

As cited in MECP Rationale Document (2011c), there are a number of precluding subsurface conditions, which affect the validity of applying the J&E model for different Sites. The precluding factors outlined in Section 7.3.3.1 of the Rationale document were reviewed. Based on the Site-specific properties of the RA property, the application of the J&E model was reviewed in detail with respect to the bedrock characteristics found on the RA property, and depth to groundwater. These conditions were evaluated based on the future redevelopment scenario of a slab-on-grade residential building. The input parameters for the future slab-on-grade residential building scenario are displayed on Table E4-9 of Appendix E. The parameters are consistent with the parameters for a residential with a basement evaluated by MECP (2011c), with the exception of the depth below grade to the bottom of the enclosed floor space which was set as the thickness of the foundational slab for a residential building. The building characteristics applied in the J&E modeling are presented in Table E4-9.

The J&E model is not applicable for buildings constructed on media with high gas permeability such as vertically or near-vertically fractured bedrock, karst or cobbles. As discussed in Section 3.2.1, bedrock is found at a minimum depth of approximately 14.9 m bgs. Based on review of the borehole logs, the bedrock at the Site consists of thinly bedded or laminated grey shale with limestone interbeds and is completely weathered to highly weathered in the upper 3 m, becoming moderately to slightly weathered with depth. No evidence of vertically fractured bedrock was identified during past drilling programs. Therefore, any potential future residential building on-Site is anticipated to have more than 1 m thickness of soil beneath its slab in all areas before bedrock begins and this precluding factor recommended by MECP for the use of J&E model does not apply on the RA property.

Further, as outlined in MECP (2011c), the vapour intrusion model cannot be used to generate an attenuation factor under circumstances where shallow groundwater exists, and the shallowest water table is expected to be within the gravel crush layer beneath the floor slab. This limitation is set to fulfill the J&E model assumption which requires that "the top of the capillary fringe must be below the bottom of the building floor in contact with the soil" (US EPA, 2004a). The minimum depth to groundwater encountered in on the RA property is 2.84 m bgs. As such, the groundwater table is not expected to be present within the gravel crush layer for a future slab-on-grade building. For conservative purposes, for assessment of vapour intrusion sourced from groundwater, the empirical attenuation factor recommended by MECP (2011c) for a residential building (α=0.02) was conservatively used to predict indoor air concentrations of groundwater COCs for future buildings.

Based on the above evaluation, the J&E model is applicable to estimate the vapour infiltration of soil COCs for a future slab-on-grade residential building. For soil and groundwater parameters that exceeded the residential S-IA component value and the GW2 component value, respectively, the REM soil and groundwater concentrations of each COC were used to predict indoor air concentrations for a future slab-on-grade residential building.

For soil COCs, the depth to contamination was assumed to be directly below the gravel crush layer, in keeping with MECP (2016b) as presented in Table E4-8. The Site-specific vapour intrusion modeling for soil COCs in excess of applicable residential indoor air component values were conducted under the slab-on-grade residential building scenario.

Indoor air concentrations sourced from soil were estimated using the J&E model as applied in the US EPA (2004a) Excel spreadsheet program "SL-ADV" version 3.1. It is acknowledged that the US EPA no longer supports the use of the J&E model for predicting indoor air concentrations based on measured soil concentrations to be consistent with the Office of Solid Waste and Emergency Response (US EPA OSWER, 2015). US EPA OSWER (2015) does not recommend the use of soil data for estimating the potential for vapour intrusion risks due to the potential for vapour loss due to volatilization during soil sampling, preservation and chemical analysis. Furthermore, US EPA OSWER (2015) indicates that there are uncertainties with soil partitioning calculations. However, in the absence of soil vapour sampling data that can be applied to the future building scenario and reduce the uncertainty in indoor air concentration estimates, the J&E model was applied to predict indoor air concentrations for soil COCs in this RA. Uncertainty associated with the use of this model is discussed in Section 4.2.4.

Three (3) soil layers were assumed in the J&E modeling as presented in Table E4-7. The soil stratigraphy from the ground surface to the bottom of the enclosed space (Soil Stratum A) was set as a silty clay unit based on the fine textured soil at the Site. Soil Stratum B was set to the 30 cm gravel crush base layer beneath the foundational slab, following MECP (2011c and 2016b) and Soil Stratum C was set to 0.1 cm of silty clay, in keeping with the layers assumed by MECP (2016b). Advective transport was evaluated based on the default soil gas flow rates applied by MECP (2011c) for the generic residential building with basement with medium-fine textured soils (1.0 LPM).

Physical and chemical properties of the soil and groundwater COCs are provided in Tables E4-6A and E4-6B, respectively. It is noted that the physical and chemical properties of the COCs were updated in the J&E spreadsheet to be consistent with those provided in MECP (2016b). A summary of the soil properties applied in the indoor air model is provided in Table E4-7.

Predicted soil gas concentrations, attenuation factors and indoor air concentrations calculated for the proposed mixed commercial and residential building, and existing industrial/commercial building scenarios for COCs in soil are presented in Table E4-12.

As discussed above, the empirical attenuation factor recommended by MECP was used to predict indoor air concentrations of groundwater COCs for the future slab-on-grade residential building. The source vapour concentrations resulting from infiltration of vapours from impacted soil were predicted using the following equation (mercury in soil applied as an example):

$$C_v = \frac{H' x\ C_s\ x\ P_b}{\theta_w + (K_{oc} x\ foc) x\ P_b + H' x\ \theta_a} \text{ x CF}$$

where:

C_v	=	Soil vapour concentration (µg/m^3)
C_s	=	Soil REM concentration (µg/kg; 2.28 µg/g for mercury)
H'	=	Dimensionless Henry's Law constant at average groundwater temperature (15°C; 1.99E-01 for mercury)
Pb	=	Soil dry bulk density (1.38 g/cm^3; MECP [2011c])
Θw	=	Soil water-filled porosity (0.216 cm^3/cm^3; MECP [2011c])
Θa	=	Soil air-filled porosity (0.265 cm^3/cm^3; MECP [2011c])
K_{oc}	=	Soil organic carbon partition coefficient (6.60E+05 cm^3/g; MECP [2011c])
F_{oc}	=	Soil organic carbon (0.005; MECP default)
CF	=	Conversion factor (1E+06 cm^3/m^3)

The predicted source vapour concentration for mercury in the future residential use building scenario was calculated to be 3.43E-01 µg/m^3 as presented in Table E4-12 in Appendix E.

The source vapour concentrations resulting from infiltration of vapours from impacted groundwater were predicted for the future residential building scenario using the following equation (PHC F1 Aliphatic C6-C8 in groundwater applied as an example):

$C_v = C_g$ x H' x CF

where:

C_v	=	Source vapour concentration (µg/m^3)
C_g	=	Groundwater REM concentration (µg/L; 154,638 µg/L for PHC F1 Aliphatic C6-C8)
H'	=	Dimensionless Henry's Law constant at average groundwater temperature (15°C; 5.17E+01 for PHC F1 Aliphatic C6-C8)
CF	=	Conversion factor (1,000 L/m^3)

The predicted source vapour concentration for PHC F1 Aliphatic C6-C8 in the future residential building scenario was calculated to be 8.00E+09 µg/m^3 as presented in Table E4-13 in Appendix E.

Indoor air COC concentrations resulting from infiltration of vapours from impacted groundwater under a building were predicted using the source vapour concentration multiplied by the empirical attenuation factor of 0.02, recommended by MECP (2011c) for a residential scenario. For impacted soil, an attenuation factor of based on the respective J&E model of each COC in soil was used, provided in Appendix E. The indoor air concentration for PHC F1 Aliphatic C6-C8 in groundwater for the future residential building was calculated to be 1.60E+08 µg/m^3.

Predicted soil gas concentrations, attenuation factors and indoor air concentrations calculated for the proposed residential building for soil and groundwater COCs are summarized in Tables E4-12 and E4-13, respectively.

Exposure for the indoor air vapour intrusion pathway is calculated as the adjusted or prorated indoor air exposure concentration as follows (example for the toddler resident exposed to PHC F1 Aliphatic C6-C8 in indoor air sourced from groundwater for the proposed residential building is shown):

$$EXP_{IA,} = \frac{C_{IA} \times EF}{HPY}$$

where:

EXP_{IA}	=	Prorated indoor air exposure concentration of COCs sourced from soil or groundwater (mg/m^3)
C_{IA}	=	Indoor air concentration (1.60E+05 mg/m^3 for PHC F1 Aliphatic C6-C8 in groundwater)
EF	=	Exposure frequency (hr/yr, = 24 hr/d x 7 d/wk x 50 wk/yr)
HPY	=	Hours per year (365 d/yr x 24 hr/d)

Therefore, the prorated indoor air exposure concentration of PHC F1 Aliphatic C6-C8 sourced from groundwater to the toddler resident is 1.53E+05 mg/m^3. The prorated indoor air exposure concentrations for the Site resident exposed to soil and groundwater COCs via indoor air inhalation under the future residential building scenario are provided in Tables E4-22A/B and E4-23A/B, respectively.

4.2.3.2 Exposure to COCs via Direct Contact with Soil/Dust

Through typical outdoor activities, human receptors are brought into direct dermal contact with soil and dust, may accidentally ingest soil or dust particles, or may be exposed to soil COCs through inhalation of airborne dust. The Site resident, outdoor maintenance worker and construction worker are each assumed to touch, ingest and inhale soil/dust while spending time on-Site.

Exposures via incidental ingestion of soil and dust, dermal contact and soil particulate inhalation for the Site visitor, maintenance worker and construction worker are estimated as follows (an example is provided for the construction/subsurface utility worker exposure to phenanthrene):

Exposure via Incidental Ingestion of Soil and Dust

$$\boldsymbol{EXP_{ING} = \frac{AO \times CF \times C_{soil} \times RAF \times EF}{BW \times DPY}}$$

where:

EXP_{ING}	=	Exposure from incidental ingestion of soil (mg/kg/day)
AO	=	Amount of soil/dust ingested (100 mg/day for the construction/subsurface utility worker)
C_{soil}	=	Concentration of contaminant in soil (27.6 mg/kg for phenanthrene)
RAF	=	Ingestion relative absorption factor (1.0, unitless)
EF	=	Number of days spent on-Site per year (5 days/wk x 39 wk/yr for the construction worker at ground level)
BW	=	Body weight (70.7 kg for the construction worker)
DPY	=	Days per year (365 days/yr)

CF = Conversion factor (1.0E-06 kg/mg)

Therefore, the predicted incidental ingestion exposure for the construction/subsurface utility worker exposed to phenanthrene in soil is 2.09E-05 mg/kg/day.

Exposure via Dermal Contact with Soil and Dust

$$\boldsymbol{EXP_{DER} = \frac{(AES \times DAF_B) \times C_{soil} \times EFxRAF}{BW \times DPY}}$$

where:

EXP_{DER} = Dermal exposure from contact with outdoor soil/dust (mg/kg/day)
AES = Skin surface area exposed (3,400 cm^2 for the construction/subsurface utility worker)
DAF_B = Soil adherence factor whole body (2.00E-07 kg/cm^2/day)
C_{soil} = Concentration of contaminant in soil (27.6 mg/kg for phenanthrene)
EF = Number of days spent on-Site per year 5 days/wk x 39 wk/yr for the construction/subsurface utility worker at ground level)
RAF = Dermal relative absorption factor (0.13 for phenanthrene, unitless)
BW = Body weight (70.7 kg for the construction worker)
DPY = Days per year (365 days/yr)

Therefore, the predicted dermal contact exposure for the construction worker exposed to phenanthrene in soil is 1.84E-05 mg/kg/day.

Exposure via Inhalation of Re-suspended Dusts

$$EXP_{INH} = \frac{C_{soil} \times PM_{10} \times CF \times FPM_{10} \times IR \times EF \times FR_{soil}}{AI \times DPY}$$

where:

EXP_{INH} = Inhalation exposure to substance from outside airborne dust (mg/m^3);
AI = Inhalation rate (20 m^3/d; MECP, 2011c)
C_{soil} = Concentration of contaminant in soil (27.6 mg/kg for phenanthrene)
PM_{10} = Concentration of PM_{10} in the air (100 µg/m^3)
CF = Conversion factor (1.00E-09 kg/µg)
FPM_{10} = Fraction of PM10 which is depoSited (0.6, unitless)
IR = Inhalation rate (1.5 m^3/hr for the construction worker; MECP, 2011c)
EF = Number of hours spent outside per year (9.8 hrs/day x 5 days/wk x 39 wks/yr)
FR_{soil} = Fraction of airborne dust originating from on-Site soil (1, unitless)
DPY = Days per year (365 days)

Therefore, the average prorated soil particulate air concentration of phenanthrene for the construction/subsurface utility worker was estimated to be 6.50E-07 mg/m^3.

Tables E4-14A/B through E4-16 provide the predicted exposures of Site residents, outdoor maintenance workers and construction/subsurface utility workers to those soil COCs for which a quantitative assessment for the direct contact pathway was performed, respectively.

4.2.3.3 Exposure to COCs via Inhalation of Vapours from Soil to Ground-Level Ambient Outdoor Air

A construction/subsurface utility worker, outdoor maintenance worker, and toddler/composite on-Site resident were all assumed to be exposed to COCs via inhalation of vapours migrating from soil to ambient outdoor air. This exposure was predicted by estimating the volatilization rates from the exposed soil and the effect that they would have on the air concentrations within a theoretical box. An example calculation for phenanthrene is provided below.

A surface soil volatilization factor (VF_{ss}) was outlined in the American Standard for Testing and Materials (ASTM) Standard E1739–95 (1995, Reapproved 2010 and 2015). This factor is the steady-state ratio of the concentration of an organic substance within a defined zone of ambient air to the source concentration in surface soil (RBCA, 1995). This value is calculated based on the flux of vapours from the surface soil and the mixing of the vapours within the air above the ground's surface. Calculation of this value assumes there is an infinite source of the substance assessed within the surface soils. As the vapours migrate from the soil surface, they are mixed and diluted with the surrounding ambient air. This dilution is calculated using a simple box model approach for surface soil and ambient air vapours (Table x2.5 in ASTM, 1995, Reapproved 2010 and 2015). The air mixing zone characteristics at ground level are provided in Table E4-10.

The VF_{ss} was calculated for each volatile COC. The VF_{ss} was calculated as follows (phenanthrene is used as an example):

$$VF_{SS} = \frac{2 \times C \times W \times B \times \left[\sqrt{\frac{D_{eff} \times H}{\pi \times (\theta_{ws} + k_{oc} \times f_{oc} \times B + \theta_{as} \times H) \times t}}\right]}{\mu_{air} \times \delta_{air}}$$

where:

VF_{ss}	=	Surface soil volatilization factor from trench soils (mg/m^3-air/mg/kg-soil)
W	=	Width of source area parallel to wind (1300 cm)
C	=	Conversion factor (1,000 cm^3-kg/m^3-g)
B	=	Soil bulk density (1.38 g/cm^3 for silty clay)
D_{eff}	=	Effective molecular diffusion through soil (5.24E-03 cm^2/s for phenanthrene)
H	=	Henry's law constant (unitless, 1.79E-03 for phenanthrene)
π	=	Pi (3.14)
θ_{ws}	=	Volumetric water content in vadose zone soil (0.216 cm^3-water/cm^3-soil)
K_{oc}	=	Organic carbon-water partition coefficient (4.16E+04 for phenanthrene)
f_{oc}	=	Fraction organic carbon (0.005, MECP default value)
θ_{as}	=	Volumetric air content in vadose zone soils (0.265 cm^3-air/cm^3-soil)
t	=	Averaging time for flux (1.0E+07 s for the construction worker)
μ_{air}	=	Wind speed above ground surface (410 cm/s; MECP, 2011c)
d_{air}	=	Ambient air mixing zone height (200 cm)

From the above equation, the effective molecular diffusion through soil (D_{eff}) was calculated as follows:

$$D_{eff} = D^{air} \times \frac{\theta_{as}^{3.33}}{\theta_T^{2}} + \left[\frac{D^{wat}}{H} \times \frac{\theta_{ws}^{3.33}}{\theta_T^{2}} \right]$$

where:

D_{eff}	=	Effective molecular diffusion through soil (cm^2/s)
D^{air}	=	Diffusion coefficient in air (3.24E-02 cm^2/s for phenanthrene)
θ_{as}	=	Volumetric air content in vadose zone soils (0.265 cm^3-air/cm^3-soil)
θ_T	=	Total soil porosity (0.481 cm^3/cm^3)
D^{wat}	=	Diffusion coefficient in water (6.69E-06 cm^2/s for phenanthrene)
H	=	Henry's law constant (unitless, 1.79E-03 for phenanthrene)
θ_{ws}	=	Volumetric water content in vadose zone soil (0.216 cm^3-water/cm^3-soil)

Therefore, the calculated D_{eff} and VF_{ss} for phenanthrene were calculated to be 1.78E-03 cm^2/s and 8.10E-07 mg/m^3-air/mg/kg-soil, respectively, as presented in Table E4-17A.

The concentration in ambient outdoor air was then calculated as follows:

$$C_{air} = C_{soil} \times VF_{ss}$$

where:

C_{air}	=	Concentration of contaminant in air (mg/m^3)
C_{soil}	=	Concentration of contaminant in soil (27.6 mg/kg for phenanthrene)
VF_{ss}	=	Surface soil volatilization factor from surface soils (8.10E-07 mg/m^3 air/mg/kg-soil)

The predicted concentration of phenanthrene volatilizing to the ambient outdoor air from impacted soil is 2.23E-05 mg/m^3. Predicated outdoor air concentrations for all volatile soil COC are presented in Table E4-17A.

The construction/subsurface utility worker exposure to ground level outdoor air is evaluated as the adjusted or prorated outdoor air exposure concentration as follows:

$$EXP_{OA} = \frac{C_{OA} \times EF \times INH_{CW}}{INH_{TRV} \times HPY}$$

where:

EXP_{OA}	=	Prorated ground level outdoor air concentration (mg/m^3)
C_{OA}	=	Concentration in ground level outdoor air from impacted soil (2.23E-05 mg/m^3 for phenanthrene)
IN_{HCW}	=	Construction/subsurface utility worker inhalation rate (1.5 m^3/hr)
EF	=	Exposure frequency (hr/yr = 9.8 hr/d x 5 d/wk x 35 wk/yr)
INH_{TRV}	=	Assumed inhalation rate for derivation of TRVs (0.83 m^3/hr)
HPY	=	Hours per year (365 d/yr x 24 hr/d)

Therefore, the prorated exposure concentration of phenanthrene in ground level outdoor air from impacted soil is 7.87E-06 mg/m^3.

The predicted prorated exposure concentrations of soil COCs volatilizing to the ambient outdoor air from impacted soil are presented in Tables E4-27 to E4-29.

4.2.3.4 Exposure to COCs via Inhalation of Vapours from Soil to Ambient Air within a Trench

While spending time working within an on-Site trench, it was assumed that a construction/subsurface utility worker would be exposed to COCs via inhalation of vapours migrating from impacted soil. This exposure was predicted using the REM concentrations of COCs in soil and by estimating the volatilization rates and the effects that they would have on the air concentrations within the trench. The air mixing characteristics for the trench scenario is presented in Table E4-11.

The construction/subsurface utility worker was assumed to be exposed to these vapours for 9.8 hours per day, 5 days per week for 4 weeks per year. To account for reduced air flow and mixing within a trench, the wind speed within the trench was reduced to one-tenth of the ground surface wind speed (0.41 m/s) which is generally equivalent to the windspeed applied in trench models by US EPA Region 8 (US EPA, 1999a) of 0.45 m/s, as reported by Meridian (2011).

To estimate the concentration of contaminants in trench air, the VF_{TS} were calculated based on the methodologies outlined in ASTM Standard E1739–95 (1995, Reapproved 2010 and 2015). The VF_{TS} was calculated based on volatilization factor for surface soil and ambient air vapours (Table x2.5 in ASTM, 1995, Reapproved 2010 and 2015) and modified to account for the trench scenario (i.e., accounting for influence from trench walls).

The trench was assumed to be 2 m deep x 1 m wide x 13 m long. The wind direction was assumed to be parallel to the length of the trench. The VFTS was calculated for each volatile soil COC as follows, with an example for phenanthrene provided:

$$VF_{TS} = \frac{(W_c \times L_c + 2 \times L_c \times D_c + 2 \times W_c \times D_c) \times C \times 2 \times B \times \left[\sqrt{\frac{D_{eff} \times H}{\pi \times (\theta_{ws} + k_{oc} \times f_{oc} \times B + \theta_{as} \times H) \times t}}\right]}{V_t \times A}$$

where:

VF_{TS}	=	Surface soil volatilization factor from trench soils (mg/m^3-air/mg/kg- soil)
W_c	=	Width of trench and contaminant source (100 cm)
L_c	=	Length of trench and contaminant source (1,300 cm)
D_c	=	Depth of trench and contaminant source (200 cm)
C	=	Conversion factor (1,000 cm^3-kg/m^3-g)
B	=	Soil bulk density (1.38 g/cm^3 for silty clay)
D_{eff}	=	Effective molecular diffusion through soil (1.78E-03 cm^2/s for phenanthrene)
H	=	Henry's law constant (1.79E-03 for phenanthrene)
π	=	Pi (3.14)
θ_{ws}	=	Volumetric water content in vadose zone soil (0.216 cm^3-water/cm^3 soil)
K_{oc}	=	Organic carbon-water partition coefficient (4.16E+04 cm^3/g for phenanthrene)
F_{oc}	=	Fraction organic carbon (0.005; MECP (2011c) default value)
θ_{as}	=	Volumetric air content in vadose zone soils (0.265 cm^3-air/cm^3-soil)
t	=	Averaging time for flux (1.03E+07 s for the construction/subsurface utility worker)
V_t	=	Volume of trench (2.60E+07 cm^3)
A	=	Air exchange rate (3.15E-02 s^{-1})

Note that the value of effective molecular diffusion through soil was calculated using the equation provided in Section 4.2.3.3

From the above equation, the air exchange rate (A) is calculated as follows:

$$A = \frac{U_{air}}{Lc}$$

where:

A	=	Air exchange rate (s^{-1})
U_{air}	=	Wind speed through trench (cm/s)
Lc	=	Length of trench and contaminant source (cm)

The trench air exchange rate was set to 3.15E-02 s^{-1} for a trench based on an assumed reduced wind speed one-tenth of that of ground level air. The concentration of contaminant in the air within the trench was then calculated as follows:

$$C_{air} = C_{soil} \times VF_{Ts}$$

where:

C_{air}	=	Concentration of contaminant in air in trench (mg/m^3)
C_{soil}	=	Concentration of contaminant in soil (27.6 mg/kg for phenanthrene)
VF_{TS}	=	Surface soil volatilization factor from trench soils (4.30E-05 mg/m^3-air/mg/kg- soil for phenanthrene)

The concentration of phenanthrene in trench air from impacted soil is 1.19E-03 mg/m^3. The concentration of COCs in the trench air from impacted soil are presented in Table E4-17B.

The construction/subsurface utility worker exposure to trench level outdoor air is evaluated as the adjusted or prorated outdoor air exposure concentration, calculated using the same equation provided in Section 4.2.3.3.

The predicted prorated exposure concentrations of soil COCs volatilizing to trench air from impacted soil are presented in Table E4-29.

4.2.3.5 Direct Contact with Groundwater within an On-Site Trench

A construction/subsurface utility worker was assumed to be exposed to COCs in groundwater that has pooled within the bottom of an open trench via direct dermal contact and incidental ingestion prior to and during dewatering activities. The exposed skin surface area recommended by MECP (2011c) was used. The construction/subsurface utility worker was assumed to be subject to dermal absorption through direct contact with impacted groundwater as a result of continuous submersion of the skin surface exposed, in groundwater, for two 15 minute events per day, 195 days per year, for 1.5 years.

Exposure via Dermal Contact

The method used to predict dermal absorption was taken from the US EPA Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Portion E: Supplemental Guidance for Dermal Risk Assessment) (US EPA, 2004b). In this method, the absorption of contaminants from water is a function of the thickness of the stratum corneum and the duration of the exposure event. This model assumes that absorption continues after the exposure event has ended. The final absorbed dose (DA_{event}) considers the net fraction available for absorption on the stratum corneum after the exposure event (FA). For the current assessment, the FA for all COC in groundwater was assumed to be 1.0. Since the length of the daily exposure events are relatively short (two 15 minute events), it was assumed that a steady-state would not be reached and that neither the viable epidermis nor the cutaneous blood flow would limit the dermal absorption of the COC (US EPA, 2004b).

The permeability coefficient (Kp) of an organic chemical is a function of the path length of chemical diffusion (i.e., the thickness of the stratum corneum), the chemical-specific membrane/vehicle partition coefficient (i.e., the octanol/water partition coefficient), and the effective diffusion coefficient of the chemical in the stratum corneum (US EPA, 2004b).

For organics (PHC F1 Aliphatic C6-C8 provided as an example):

$$DA_{event} = 2 * FA * K_p * C_{GW} * \sqrt{\frac{6 * \tau_{event} * t_{event}}{\pi}} * CF$$

where:

DA_{event}	=	Absorbed dose per event (mg/cm^2-event)
FA	=	Fraction absorbed water (1.0 unitless)
K_p	=	Dermal permeability coefficient of chemical in water (1.04E-01 cm/hr for PHC F1 Aliphatic C6-C8)
C_{GW}	=	Concentration of chemical in groundwater (154,638 µg/L for PHC F1 Aliphatic C6-C8)
T_{event}	=	Lag time per event (3.66E-01 hr/event for PHC F1 Aliphatic C6-C8)
t_{event}	=	Event duration (0.25 hr/event)
π	=	Pi (3.14)
CF	=	Conversion factor (1.00E+06 (mg/cm^3) /(µg/L))

K_p and T_{event} values were derived based on the following equations provided by the US EPA (2004b):

$$\log Kp = -2.80 + 0.66 \log K_{ow} - 0.0056\ MW$$

where:

K_p	=	Dermal permeability coefficient of chemical in water (cm/hr)
$\log_{Kow}$	=	Log Octanol-water partition coefficient (3.60E+00 for PHC F1 Aliphatic C6-C8)
MW	=	Molecular weight (1.00E+02 g/mol for PHC F1 Aliphatic C6-C8)

And

$$\tau_{event} = \frac{l_{sc}^2}{6\ D_{sc}} = 0.105\ x\ 10^{(0.0056\ MW)}$$

where:

τ_{event}	=	Lag time per event (hr/event)
l_{sc}	=	Apparent thickness of stratum corneum (0.001 cm)
D_{sc}	=	Effective diffusion coefficient for chemical transfer through the stratum corneum (cm^2/hr)
MW	=	Molecular weight (1.00E+02 g/mol for PHC F1 Aliphatic C6-C8)

The total daily exposure to groundwater COC via absorption from dermal contact with groundwater during construction activities within the trench were predicted as follows:

$$EXP_{DermTrench} = \frac{DA_{event} * SA * EV * EF * ED}{BW * DPY * AP}$$

where:

$EXP_{Derm\ Trench}$	=	Daily dermal exposure via direct contact with groundwater within the trench (mg/kg/day)
DA_{event}	=	Absorbed dose per event (1.37E-02 mg/cm^2-event for PHC F1 Aliphatic C6-C8)
SA	=	Exposed surface area (3,400 cm^2 for the construction/subsurface utility worker)
EV	=	Event frequency (2 event/day)
EF	=	Exposure frequency (195 working days/year for the construction/subsurface utility worker)
ED	=	Exposure duration (1.5 years for construction/subsurface utility worker)
BW	=	Body weight (70.7 kg for the construction/subsurface utility worker)
DPY	=	Days per year (365 days/year)
AP	=	Averaging period (1.5 years for non-cancer and 56 years for cancer for the construction/subsurface utility worker)

Therefore, the predicted dermal contact exposure for the construction/subsurface utility worker exposed to PHC F1 Aliphatic C6-C8 in groundwater is 7.04E-01 mg/kg/day.

Exposure via Incidental Ingestion

The construction/subsurface utility worker was also assumed to have direct exposure to groundwater while working in a trench or excavation via incidental ingestion. The exposure via incidental ingestion of groundwater was envisioned to occur as the result of splashing of pooled water in a trench prior to or during dewatering. The US EPA Region IV (2014) estimates an incidental ingestion rate of 10 mL/hr for adults while wading. This value is considered to be overly conservative for the application to a construction/subsurface utility worker working in a trench while the pooled groundwater is not as deep as a wading scenario. It is anticipated that as part of construction activity, the trench is dewatered prior to entering and the potential incidental ingestion of groundwater will be limited to the trench dewatering activities. Therefore, the exposure duration of 2 hours (i.e., the time that construction/subsurface worker spends in a trench) was not used to estimate the incidental ingestion rate of groundwater. Instead, an ingestion rate of 0.005 L/d was applied assuming exposure duration of 0.5 hour and the conservative incidental ingestion rate of 10 mL/hr while wading.

The estimates of exposure via ingestion of groundwater are calculated as follows (using PHC F1 Aliphatic C6-C8 as an example):

$$DWEF = \frac{IIIR \times EF_a \times EF_b \times ED}{BW \times AP \times C}$$

where:

DWEF	=	Exposure factor for groundwater incidental ingestion (L/kg-bw/d)
IIIR	=	Incidental ingestion intake rate (0.005 L/d)
EF_a	=	Exposure frequency (5 d/w)
EF_b	=	Exposure frequency (39 w/y)
ED	=	Exposure duration (1.5 y)
BW	=	Body weight (70.7 kg)
AP	=	Averaging period (1.5 years for non-carcinogens)
C	=	Unit conversion factor (365)

$$EXP_{Incidental\ Ingestion} = \frac{DWEF \times C_{GW} \times RAF_{oral}}{1000}$$

where:

$EXP_{Incidental\ Ingestion}$	=	Exposure via incidental ingestion of groundwater (mg/kg/d)
DWEF	=	Drinking water exposure factor (3.78E-05 L/kg-bw/d)
C_{GW}	=	Concentration of COC in groundwater (1.55E+02 mg/L for PHC F1 Aliphatic C6-C8)
RAF_{oral}	=	Relative absorption factor, oral from water (1.00, unitless)

Therefore, the exposure estimate for incidental ingestion of PHC F1 Aliphatic C6-C8 in groundwater for construction/subsurface utility workers on the RA property is 5.84E-03 mg/kg-bw/d. Table E4-18 presents all the assumptions and intermediate parameters used in the calculation of dermal contact with groundwater and also exposure estimates for direct contact and incidental ingestion of groundwater COCs for construction/subsurface utility workers at the RA property.

4.2.3.6 Exposure to COCs via Inhalation of Vapours from Groundwater to Ground-Level Ambient Outdoor Air

A Site resident, construction/subsurface utility worker, and outdoor maintenance worker on the RA property were assumed to be exposed to COCs via inhalation of vapours migrating from groundwater to ambient outdoor air. Exposures were predicted using the REM concentrations of COCs in groundwater and by estimating the volatilization rates from the groundwater and the effect that they would have on air concentrations in ground-level ambient air. An example calculation is provided below for xylenes.

To estimate this exposure pathway, a groundwater volatilization factor (VF_{wamb}) was calculated as outlined in ASTM Standard E1739–95 (1995, Reapproved 2010 and 2015). The groundwater volatilization factor is the steady-state ratio of the concentration of a substance in ambient air to the concentration in underlying impacted groundwater. The VF_{wamb} factor accounts for the steady state partitioning of dissolved substances in groundwater to the soil vapour phase, the flux rate of soil vapour to ground surface, and the mixing of soil vapours in the breathing zone of a receptor (RBCA, 1995).

The VF_{wamb} was calculated as follows:

$$VF_{wamb} = \frac{H \times C}{1 + \left(\frac{(U_{air} \times \delta_{air} \times L_{GW})}{D_{eff\,GW} \times W} \right)}$$

where:

VF_{wamb}	=	Groundwater volatilization factor (mg/m^3-air/mg/L-water)
H	=	Henry's law constant (7.62E+01 for xylene, unitless)
C	=	Conversion factor (1,000 cm^3-kg/m^3-g)
U_{air}	=	Wind speed above ground surface (410 cm/s)
δ_{air}	=	Mixing zone height (200 cm)
L_{GW}	=	Depth to groundwater (71 cm; based on minimum depth to groundwater measurement from grade)
$D_{eff\,GW}$	=	Effective molecular diffusion above groundwater table (1.03E-02 cm^2/s for xylenes)
W	=	Width of source area parallel to wind (1,300 cm, MECP (2011c) default value)

The value of effective molecular diffusion through soil above the groundwater table was determined from the US EPA Vapour Infiltration Model which uses the following equation:

$$D_{eff\ GW} = \left(h_{cap} + h_v\right) x \left(\frac{h_{cap}}{D_{eff\ cap}} + \frac{h_v}{D_{eff}}\right)^{-1}$$

where:

$D_{eff\ GW}$	=	Effective molecular diffusion above groundwater table (cm^2/s)
h_{cap}	=	Thickness of capillary fringe (17.05 cm)
h_v	=	Thickness of vadose zone (53.95 cm)
$D_{eff\ cap}$	=	Effective diffusivity in the capillary zone (1.03E-02 cm^2/s for xylenes)
D_{eff}	=	Effective diffusivity in the vadose zone soil (1.03E-02 cm^2/s for xylenes)

The concentration of contaminant in ambient outdoor air as a result of volatilization from groundwater was then calculated as follows:

where:

$$C_{air} = C_{GW} \times VF_{wamb}$$

C_{air}	=	Concentration of contaminant in ambient outdoor air (mg/m^3)
C_{GW}	=	Concentration of contaminant in groundwater (5.57E+00 mg/L for xylenes)
VF_{wamb}	=	Groundwater volatilization factor for ambient air (4.39E-02 mg/m^3-air/mg/L-water for xylenes)

Therefore, the concentration of xylenes in ambient outdoor air, sourced from groundwater, is 2.45E-01 mg/m^3. Table E4-19 presents chemical specific parameters, intermediate parameters used in the calculations, and predicted concentrations of groundwater COCs in outdoor air, relevant to the maintenance and construction/sub-surface receptors.

4.2.3.7 Exposure to COCs via Inhalation of Vapours from Groundwater to Ambient Air within a Trench

While spending time working within an on-Site trench, it was conservatively assumed that a construction/subsurface utility worker would be exposed to volatile COCs via inhalation of vapour migrating from impacted subsurface groundwater. This exposure rate was predicted by estimating the volatilization rate from groundwater and the ambient air concentration resulting from mixing with air within the trench. The same volatilization factor applied for inhalation of vapours from ground level ambient air was applied as summarized in 4.2.3.6 with modifications to account for the trench characteristics.

The construction/subsurface utility worker was assumed to be exposed to vapours within a trench for 9.8 hours per day, 5 days per week for 4 weeks per year. To account for reduced air flow and mixing within a trench, the wind speed within the trench was reduced to one-tenth of the ground surface wind speed (0.41 m/s) which is generally equivalent to the windspeed applied in trench models by US EPA Region 8 (US EPA, 1999a) of 0.45 m/s, as reported by Meridian (2011).

The trench air volatilization factor (VFT_{GW}) was calculated as follows (xylenes provided as an example):

$$VF_{TGW} = \frac{H \times C}{1 + \left(\frac{\left(U_{air} \times \delta_{air} \times L_{GW}\right)}{D_{eff\,GW} \times W}\right)}$$

VF_{TGW}	=	Groundwater volatilization factor for trench air (mg/m^3-air/mg/L-water)

H = Henry's law constant (7.62E+01 for xylenes, unitless)

C = Conversion factor (1,000 cm^3-kg/m^3-g)

U_{air} = Wind speed within the trench (41 cm/s)

δ_{air} = Mixing zone height (200 cm)

L_{GW} = Depth to groundwater (10 cm; assumed due to dewatering activities)

$D_{eff\ GW}$ = Effective molecular diffusion above groundwater table (1.03E-02 cm^2/s for xylenes)

W = Width of source area parallel to wind (1,300 cm, MECP as cited by Meridian Inc. (2011))

The overall effective molecular diffusion coefficient for chemical transport through soil above the groundwater table is calculated as the distance weighted average of the effective diffusion coefficients for the capillary fringe and unsaturated zone soils using the same equation provided in Section 4.2.3.6.

Therefore, the contaminant trench air concentration is calculated as follows:

$$Cair_{trench} = VF_{TGW} \times C_{GW}$$

$Cair_{trench}$ = Contaminant trench air concentration (mg/m^3)

C_{GW} = Contaminant groundwater concentration (5.57E+00 mg/L for xylenes)

VF_{TGW} = Trench air volatilization factor (1.25E+01 mg/m^3 air/mg/L water for xylenes)

Therefore, the concentration of xylenes in trench air, sourced from groundwater, is 6.95E+01 mg/m^3. Table E4-20 presents the intermediate parameters used in the calculations, and predicted concentrations of groundwater COCs in trench air.

The construction/subsurface utility worker exposure to trench air is evaluated as the adjusted or prorated outdoor air exposure concentration, calculated using the same equation provided in Section 4.2.3.3.

The predicted prorated exposure concentrations of groundwater COCs volatilizing to trench air from impacted groundwater for the construction/subsurface utility worker are presented in Table E4-33.

4.2.4 Uncertainties in the Exposure Assessment

In the HHRA, every effort is made to ensure data and assumptions adequately represent conditions for the Site. However, where property-specific data are not available, assumptions are made, which can result in uncertainty in the assessment. It is necessary to ensure the RA is adequately protective of all receptors. Therefore, the choice is generally made to choose the more conservative of assumptions, which is likely to result in over-estimates of exposure and, likewise, risk. The following are examples of assumptions made during exposure estimates and how they may have affected the conclusions of this RA:

- Exposure estimates were calculated assuming that the receptor is exposed to the maximum soil and groundwater concentrations throughout the exposure duration. This is likely an overestimation of the actual exposure given that humans are mobile and are unlikely to spend all of their time within the area of the maximum soil or groundwater concentrations. In addition, it is highly conservative to assume that soil or groundwater COCs are ubiquitous throughout the entire Site at the maximum concentration. A more likely scenario is one of heterogeneity and that humans are generally exposed (on average) to much lower concentrations of each COC. Therefore, this assumption is expected to result in a significantly higher exposure estimate than is likely to occur in reality.

- Similarly, exposure estimates for indoor air via volatilization were calculated assuming that the maximum soil and groundwater concentrations are encountered across the entire footprint of the building. As it is more probable that a range of concentrations exists below the building floor slab, the calculated indoor air concentration is likely overestimated.
- Outdoor maintenance workers were assumed to work for 56 years at the same location. However, statistics presented in MECP (2011c) suggest that this is a significant overestimation of the actual amount of time that an outdoor maintenance worker would spend on a given Site being exposed to the maximum concentration of COCs in soil and groundwater.
- The use of vapour infiltration models to predict indoor air concentrations presents uncertainties in the HHRA. Typically, such models are based on studies involving measurements of advective flow of radon from soil air into buildings. The models can be used to estimate the COC concentrations in indoor air from subsurface sources. However, it should be noted that the models are theoretical when used to describe the transport of chemical contaminants, and are often not validated with empirical or field data. The following assumptions and limitations of the models should be considered:
    - Contaminant vapours are assumed to enter structures through cracks and openings in the walls and foundation;
    - Convective transport or pressure driven flow occurs primarily within the building zone of influence;
    - The conservative assumption is made that the floors and walls are imperfect as vapour barriers and that 100% of vapours originating from below the building will enter the building;
    - All soil properties in any one horizontal layer are homogenous;
    - Contaminants are ubiquitous and concentrations are homogenous, within the zone of contamination;
    - The area of the zone of contamination is greater than the building footprint;
    - The model does not account for transformation processes (e.g., biodegradation, etc.); and,
    - Conditions within the building, such as ventilation rate and pressure differentials between the interior and the sub-slab space are considered constant.

The above assumptions and limitations are discussed in detail within the US EPA (2004b) document. The application of these assumptions results, in general, in an overly conservative estimate of vapour intrusion of COC. However, it is noted that the use of J&E to predict indoor air concentrations using soil concentrations may provide an underestimate of risk due to the potential for vapour loss due to volatilization during soil sampling, preservation and chemical analysis (US EPA OSWER, 2015). Measures taken to reduce potential for vapour loss was applied during field programs by collecting samples using generally accepted principles, using appropriate sampling equipment and in accordance with the MOEE (1996) and O. Reg. 153/04. Laboratory analyses were completed in accordance with MECP (2011b) protocols. It is further noted that there is uncertainty associated with soil partitioning calculations (US EPA OSWER, 2015) that may under or overpredict indoor air concentrations.

As described before, several assumptions made in estimating the flux rate of contaminants from groundwater into the trench air as follows:

- Wind velocity within the trench was assumed to be reduced relative to that at the ground surface; and,
- Mixing at the ground surface is conservatively assumed to be in one dimension under steady-state conditions with no consideration given to dispersion. Multi-dimensional mixing with a significant dispersion component can be expected at ground surface.
- Isothermal conditions are assumed, however, volatilization rates, through the strong functional dependence of Henry's Law constants, can be greatly affected by temperature.
- Well mixed conditions in the bulk liquid are assumed, however, less than uniform mixing can be expected resulting in concentration gradients that can limit volatilization rates.

For inhalation exposure to volatile contaminants within outdoor air at ground surface and for the general trench scenario sourced from soil and groundwater these additional assumptions were made:

- Chemical transport through the unsaturated zone soils and capillary fringe was conservatively assumed to occur by one dimensional binary molecular diffusion obeying Fick's Law under steady-state conditions and within homogenous porous media with uniform properties. Multi-dimensional chemical transport, multiple chemical fluxes and heterogenous porous media would be encountered under field conditions and, therefore, result in lower rates of chemical transport through unsaturated zone soils. Soil heterogeneity even at relatively short scales of less than 1 m can result in a variations of transport properties approaching an order of magnitude or more;
- Non-depleting soil and groundwater sources are assumed, whereas due to continuous partition and biodegradation of contaminants, continuous source reduction can be expected;
- Equilibrium phase partitioning was assumed at the soil and groundwater contaminant sources. Non-equilibrium rate-limited processes can be expected to prevail as soil and groundwater sources become depleted; and
- Contaminant fluxes can be affected by the bulk movement of soil gas arising from pressure gradients created by barometric pressure and water table fluctuations.

It is acknowledged that the above noted vapour models (i.e., J&E and ASTM models) assume that there is no free product in the subsurface. LNAPL can act as a non-depleting source of contamination and release a continuous source of contamination to soil and/or groundwater, resulting in non-equilibrium conditions, which differ from the assumption relied upon to within these models. Pre-remedial groundwater concentrations were relied upon for the assessment of potential risks to ensure a conservative approach was undertaken to assess potential risks. In addition, a qualitative assessment of potential risks to LNAPL free product was completed for the HHRA due to uncertainty regarding a quantitative assessment of potential LNAPL risks.

In general, the assumptions applied in the exposure and risk calculations are selected so as to err on the conservative side. Each of the individual conservative assumptions contributes to the overall estimation of actual risks. Compounding effects of multiple conservative assumptions, that were applied throughout the exposure and risk characterization phases, are, therefore, likely to result in a cumulative overestimation of risks.

4.3 Toxicity Assessment

4.3.1 Nature of Toxicity (Hazard Assessment)

The toxicity of a chemical or agent is the ability of that substance to temporarily or permanently damage cells, tissues etc. of the body resulting in a loss of structure or function. Information pertaining to the toxicity of chemicals is typically obtained from laboratory studies using animals and controlled conditions (FDA, 1982), or epidemiological and occupational studies of human exposure.

For the purpose of an RA, the chronic toxicity of a substance is typically of more interest than acute toxicity. That is, effects of lower concentrations over a prolonged period of time are generally of more concern for environmental contaminants. It is also necessary to discern between substances for which the chronic effects have a threshold, below which no adverse effect is anticipated, or no threshold (i.e., the potential for an effect is anticipated at any concentration), as is the case for mutagenic/ carcinogenic substances.

The assessment of the COCs carried forward for quantitative evaluation in the HHRA showed that potential exposure to these chemical constituents can result in either, and in some cases both, threshold (non-carcinogenic) and non-threshold (carcinogenic) health effects. The potential adverse health effects are manifested through the oral and dermal exposure routes and, for the majority of the volatile COCs, through the inhalation exposure route. Descriptions of the potential adverse health effects often associated with exposure to each of the COCs in the HHRA, are provided in Tables E4-21A and E4-21B for soil and groundwater COCs, respectively. The mode of action, whether via threshold, non-threshold (e.g. mutagenic, DNA adduct formation) or carcinogenic effects, is also indicated in the table for each COC.

4.3.2 Dose Response Assessment

Toxicity is a function of the "dose", or amount of chemical taken into the body, and the duration of exposure. For every substance, there is a specific dose and duration of exposure necessary to produce a toxic effect in an individual. The relationship between dose and toxic effect is known as the dose-response relationship. The dose-response concept is fundamental to the responses of biological systems to chemicals (Filov et al., 1979; Amdur et al., 1991; Doull et al., 1980) and is the principle upon which the hazard assessment is based. The maximum dose to which humans can be exposed, and still have a low probability of experiencing adverse health effects, is known as the exposure limit, or TRV. This term applies to both threshold and non-threshold substances, in that the TRV for a carcinogen is the concentration at which the probability of an adverse effect is considered to be within acceptable limits.

The point of departure (POD) is the preferred method used for the estimation of toxicological criteria for threshold effects, where enough data are available. The mathematical model unit risk estimation method is used for non-threshold substances. The threshold approach results in a TRV which is often referred to as a reference dose (RfD), or allowable daily intake (ADI). Estimates of this type of TRV are based on a modeled dose (based on a dose-response curve) corresponding to an incremental effect (e.g. lower confidence limit of a dose or concentration corresponding to a 10% increase in response [LED10 or LEC10]). However, as the majority of toxicological data is derived from animal studies, the POD must be adjusted for use in the evaluation of risks to humans. This is done using "uncertainty factors" (UFs) (FDA, 1982; US EPA, 1989; Health Canada, 1993), the magnitude of which depend on several factors. The level of confidence in available data is a key factor in the uncertainty which, in turn, depends on differences in species and duration of exposure, safety of sensitive species and individuals, and the quality of available data (i.e., the weight of evidence of the supporting data). Some conservative assumptions may be made concerning the relative effects of substances in different species. Where available, route-specific exposure limits (e.g., inhalation reference concentrations (RfCs) and oral RfDs) are used to characterize the hazard of chemicals. If a route-specific TRV is not available, additional conservative assumptions and UFs may be used for route-to-route extrapolation. In cases where insufficient data are available to derive a POD value, no observed adverse effect levels (NOAELs) or lowest observed adverse effect levels (LOAELs) may be used, with UFs applied, to derive a TRV.

The TRVs used for each COC in this RA are provided in Tables E4-21A and E4-21B for soil and groundwater COCs, respectively. In all cases, the TRVs were those recommended by the MECP (2011c), MECP (2016), MECP (2024a) or MECP (2024b). In these cases, no rationale was provided for the selection of the TRV. However, in some cases, multiple TRVs were provided by MECP, an alternative TRV was used, or one was not provided by the MECP. In these cases, published limits from credible agencies were considered, in addition to any available new literature that might contribute to the derivation of an exposure limit. When setting an exposure limit for a substance, considerations must be given to factors that can affect the degree of impact on a receptor. These may include:

- Exposure scenario, such as the duration or levels of exposure. Different exposure scenarios may result in impacts on different target organs. Therefore, the exposure scenario should be representative of the "real-world" conditions for the receptor of concern.
- Route of exposure. A toxic endpoint is generally dependent on the route of exposure; exposure via different routes, such as inhalation, ingestion, or dermal contact, may impact tissues only at the Site of entry. It is recommended that different exposure limits be set for exposures via different routes.
- Receptor characteristics. The toxic potency of a chemical is dependent on the characteristics of the receptors, such as the age, sex, and species. For instance, children are generally more sensitive to the toxicity of a chemical than adults and would warrant a greater level of protection. It is therefore sometimes recommended that different exposure limits be set for different life stages.

All TRVs selected for use in the RA were obtained from MECP, with the exception of phenanthrene. Appendix K discusses the selection of TRVs for phenanthrene for TRVs that have not been recommended by the MECP.

Where available, route-specific exposure limits (e.g., inhalation RfCs and oral RfDs) were used to characterize the hazard of contaminants. In cases where more than one toxicological endpoint has been reported for a chemical (i.e., threshold and non-threshold), both endpoints have been reported in Tables E4-21A and E4-21B for soil and groundwater, respectively.

4.3.3 Uncertainties in the Toxicity Assessment

The use of UFs and conservative assumptions for the selection of TRVs in the toxicity assessment may contribute to an overestimation of actual health risks to human receptors on the RA property. Assumptions made during the toxicity assessment include the following:

- For genotoxic substances (mutagens and carcinogens), it was assumed that genetic lesions do not undergo repair within the affected tissues. However, organisms produce certain enzymes for the purpose of repairing routine damage to DNA. Thus, the potential adverse effects arising from exposure to a substance causing damage to DNA would only be observed if the ability of these repair enzymes to "fix" the damage was exceeded. Moreover, the majority of the human genome contains non-coding DNA, damage to which would have no effect on cellular activity. In addition, due to the robustness of the human genome, functional analogs and the duplication of genes, genetic damage at one position in a chromosome does not necessarily manifest as an adverse phenotypical effect.
- Large UFs (i.e., typically 1000-fold) were applied in the estimation of RfDs and RfCs for the threshold acting contaminants. These UFs were applied to exposure levels from studies where no adverse effects are observed (i.e., to the NOAEL). Thus, exceeding the toxicological criterion means that there is less compensation for uncertainty, however this does not imply that adverse effects would necessarily occur.
- When recommending TRVs based on animal data, all jurisdictions make the assumption that humans are the most sensitive species with respect to the toxic effects of the COCs. Also, toxicological data (incorporating UFs) from the most sensitive laboratory species are used in the estimation of toxicological criteria for humans. Unless it can be demonstrated conclusively that the animal used in the study is significantly more sensitive due to a specific difference in physiology, TRVs for humans will be derived that are orders of magnitude lower than those for the most sensitive animal species. As a result there is a likelihood that some TRVs are highly conservative.
- The application of conservative relative absorption factors accounting for difference between experimental and environment conditions would tend to overestimate potential risks.
- When deriving TRVs, it is assumed that the MECP took into account study and experimental uncertainty, and the most sensitive toxicological endpoints for each substance were selected from the available scientific literature to represent the exposure limit. This approach was not necessarily applied in the derivation of TRVs where MECP did not provide one, or where new scientific literature/interpretation was available, as it may often be found that the most sensitive endpoints are not the result of a high quality study or do not conform with the consensus of the literature.
- In some cases TRVs are not available and toxicity data from surrogate chemicals are used. While the selection of the surrogate was based on choosing a chemical of similar, or representative, structure and properties, there is uncertainty in the assessment of toxicity for these parameters and groups for which insufficient toxicological data are available.

The toxicity of all parameters was assumed to be independent. In the event that two or more parameters exhibit similar toxicological effects and modes of action (i.e., synergistic or additive effects), this assumption may have resulted in an underestimate of the overall toxicological effects arising from exposure to environmental media at the Site.

4.4 Risk Characterization

4.4.1 Interpretation of Health Risks

For COCs with a threshold-type (non-carcinogenic) dose-response, risk characterization involves a comparison of the total estimated exposure with the exposure limit. This comparison is known as the exposure ratio (ER) for oral and dermal routes of exposures and the concentration ratio (CR) for inhalation exposures. The ER is calculated as the quotient of the predicted daily exposure (average daily dose) and the oral RfD. For the inhalation route, the CR is calculated as the quotient of the predicted indoor or outdoor air concentration and the RfC.

Calculations for ER and CR are as follows:

$$Concentration\ Ratio = \frac{Air\ Concentration\ (\frac{\mu g}{m^3})}{Exposure\ Limit\ (\frac{\mu g}{m^3})}$$

or

$$Exposure\ Ratio = \frac{Estimated\ Exposure\ \left(\frac{\mu g}{kg}/day\right)}{Exposure\ Limit\ \left(\frac{\mu g}{kg}/day\right)}$$

To be consistent with the terminology used in the MECP Rationale Document (MECP, 2011c), both CR and ER are referred to as hazard quotients (HQs) in this RA.

For COCs with a non-threshold-type dose-response, i.e., carcinogens, risk characterization involves the calculation of the predicted risk of an individual in a population of a given size developing cancer over a lifetime, also known as the incremental lifetime cancer risk (ILCR). For estimating non-threshold risks, the mathematical model unit risk estimation approach assumes that there would be no risk of experiencing an adverse effect if the rate of exposure or dose was zero. However, it does assume a risk at any given concentration of a substance, and the absence of a threshold. This approach, generally applied to mutagenic/carcinogenic substances, yields an estimate of a cancer slope factor (CSF) or unit risk cancer potency estimate (q1*). The q1* may be used directly in risk characterization to yield predicted risks of cancer incidence in a population.

The ILCR is calculated based on the average lifetime daily exposure. The ILCR is expressed as a fraction representing the prediction that 1 person per *n* people would develop cancer, where the magnitude of *n* reflects the risk to that population. The risk of developing cancer is higher for a chemical with a higher ILCR value; for example, if the ILCR is 0.1 (representing 1 person per 10), the predicted risk of any individual developing cancer would be higher than if the ILCR is 0.001 (1 per 1,000). In this RA, under the guidance of the MECP, ILCR levels that are less than one-in-one million are considered acceptable (MECP, 2011c).

The lifetime average daily dose (LADD), as a measure of exposure, is the product of the daily exposure and the ratio of the exposure duration and the carcinogenic averaging time. In the case of the composite lifetime resident, the lifetime daily exposure is the time weighted average of the individual life stage daily exposures. For the oral and dermal pathways, the ILCR is the product of the lifetime daily exposure and the CSF. For the inhalation routes, the ILCR is the product of the lifetime daily exposure (prorated concentration) and the q1*.

The ILCR for oral and dermal routes of exposures is calculated as follows:

$$ILCR = Estimated\ Exposure\ \left(\frac{\mu g}{kg}/day\right)\ x\ q_*^1\left(\frac{\mu g}{kg}/day\right)^{-1}$$

where q1* represents the CSF.

The ILCR for the inhalation route of exposure is calculated as follows:

$$ILCR = Air\ Concentration\ \left(\frac{\mu g}{m^3}\right)\ x\ Unit\ Risk\ (\frac{\mu g}{m^3})^{-1}$$

HQ and ILCR are effective tools for expressing potential adverse health effects from exposures to COC in that:

- They allow comparisons of potential adverse effects on health between substances and different exposure scenarios (e.g., typical Ontario versus Site-specific conditions);
- Potential adverse effects can be estimated from exposures to mixtures of substances that act on similar biological systems (e.g., all substances that cause liver toxicity, or kidney toxicity, or respiratory tract cancers); and,
- They help simplify the presentation of the RA results so that the reader may have a clear understanding of the significance of these results, and an appreciation of their significance.

For human exposures to non-carcinogens, no adverse health effects would be expected if the total exposure from all sources and all media, including background sources, resulted in a HQ of less than or equal to 1.0. It is, however, more common for an RA to assess the risk associated with a single medium via an exposure scenario, in order to derive a Site-specific component value for the exposure scenario. The selection of a HQ of 1.0 would then be inappropriate. The MECP attempts to address this by applying an HQ of 0.2 (0.5 for PHCs; 0.8 for adult exposure to lead) for each exposure scenario (MECP, 2011c).

For human exposures to carcinogens, the risk level is evaluated by comparing the ILCR value for the exposure to a benchmark level that is considered to have negligible cancer risk, generally in the range of 1.0E-04 to 1.0E-06. According to Appendix C – Essentially Negligible Cancer Risk for Contaminated Site Risk Assessment from Health Canada PQRA Part 1, although 1 in 1 million (10^{-6}) cancer risk is the most frequently used risk level for the management of risks posed by environmental contamination, many agencies and provinces (including US EPA), identify a range of increased cancer incidence risk; generally from 1.0E-04 to 1.0E-06 is considered an acceptable risk range, depending on the situation and circumstances of exposure (Health Canada, 2012). The MECP considers 1.0E-06 to be an acceptable cancer risk level. Health Canada considers 1.0E-05 to be a generally acceptable cancer risk level for many potential carcinogens (Health Canada, 2012). Although the MECP conservatively considers an increased chance of cancer developing of one in a million (1.0E-06) to be the acceptable rate of risk for environmental pollutants, such an increase rate of risk is generally not considered measurable with statistical uncertainty, among risk assessors of other jurisdictions. Nonetheless, for the purpose of this RA, a 1.0E-06 risk level was adopted for preliminary quantifications and assessment of cancer risks.

When the HQ or ILCR values are below the threshold levels, it can be concluded that the exposure to the COC is not expected to result in any observable adverse health effects. On the other hand, a predicted HQ value that is greater than the acceptable level does not necessarily indicate potential risks associated with a given exposure scenario. RAs commonly apply overly conservative estimates, such as overestimating the exposure duration, to ensure that the process does not underestimate the potential impacts on human health. HQ values above 0.2 (0.5 for PHCs; 0.8 for adult exposure to lead) may reflect the conservatism and may require a re-evaluation of the model parameters, such as the chemical concentration at the point of exposure and toxicological criteria.

The following subsections describe the results of the risk characterization phase. For COC and pathways that were evaluated quantitatively, ILCR and HQ were approximated for threshold and non-threshold COC, respectively. Predicted risks and calculated risk-based concentrations (RBCs) are provided in Section 4.4.2.

For COC and pathways that were evaluated qualitatively, that qualitative assessment is provided in Section 4.4.3.

Proposed RBCs protective of all human receptors for COCs in groundwater are provided in Section 4.4.4.

4.4.2 Quantitative Interpretation of Health Risks

A quantitative comparison of the estimated exposures and the selected exposure limits for receptors under each of the scenarios assessed is provided below in Table 11.

As discussed in Section 4.4.1, for non-carcinogenic effects, where background exposures to COCs are not taken into consideration, the MECP has apportioned 20% (50% for PHCs) of the total exposure to any of environmental medium (e.g., soil or groundwater)

under consideration. HQ values for non-carcinogens that are less than 0.20 (0.5 for PHCs; 0.8 for adult exposure to lead) are considered to represent a situation in which medium-related exposures account for less than 20% (50% for PHCs; 80% for adult exposure to lead) of the toxicological criterion, and no adverse effects are expected to be associated with the estimated level of exposure. For carcinogenic compounds, the MECP has adopted an acceptable ILCR of 1-in-1,000,000 (1.0E-06).

Table 11: Summary of Quantitative Interpretation of Human Health Risks

Receptor	Pathway	Media	COC with Risk Predicted	Table Reference (Appendix E)
Site Resident	Indoor Air Inhalation	Soil	**HQ:** PHC F1 **ILCR:** NA (no risk predicted)	E4-22A E4-22B
		Groundwater	**HQ:** PHC F1, PHC F2 **ILCR:** NA (no risk predicted)	E4-23A E4-23B
	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	**HQ:** Benzo(a)pyrene, copper, lead **ILCR:** Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, total carcinogenic PAHs	E4-24
	Outdoor Air Inhalation	Soil	NA (no risk predicted)	E4-27
		Groundwater	NA (no risk predicted)	E4-31
Outdoor Maintenance Worker	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	**HQ:** NA (no risk predicted) **ILCR:** Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, total carcinogenic PAHs	E4-25
	Outdoor Air Inhalation	Soil	NA (no risk predicted)	E4-28
		Groundwater	NA (no risk predicted)	E4-32

Receptor	Pathway	Media	COC with Risk Predicted	Table Reference (Appendix E)
Construction/Subsurface Utility Worker	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	NA (no risk predicted)	E4-26
	Direct Contact (dermal contact and incidental ingestion)	Groundwater	**HQ:** PHC F1, PHC F2 **ILCR:** NA (no risk predicted)	E4-30
	Outdoor Air Inhalation (ground level)	Soil	NA (no risk predicted)	E4-29
		Groundwater	**HQ:** PHC F1 **ILCR:** NA (no risk predicted)	E4-33
	Trench Air Inhalation	Soil	NA (no risk predicted)	E4-29
		Groundwater	**HQ:** Xylenes, PHC F1 **ILCR:** NA (no risk predicted)	E4-33

NA - not applicable.
* No unacceptable risks were predicted for soil particulate inhalation.

RMM are required for pathways for which unacceptable risks were predicted as discussed in Section 7 and Appendix M.

The RBCs for each pathway are provided in the individual tables noted in Table 11, above.

4.4.3 Qualitative Interpretation of Health Risks

4.4.3.1 Screening of COCs in Soil

As discussed in Section 3, PHC fraction F1, several PAHs (including acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b/j)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene and phenanthrene), several metals (barium, copper, lead, zinc) and mercury were retained as COCs in soil based on exceedances of the Table 3 SCS. The screening of soil COCs against pathway-specific component values is considered a qualitative assessment as no calculations for uptake/dose have been performed and no additional considerations have been given to Site-specific parameters that may affect exposure. This screening is summarized in Table E4-1.

The relevant component pathways evaluated in the pathway-specific screening were as follows:

- S1 – soil direct contact including dermal contact and incidental ingestion for a high frequency and low intensity exposure in a residential/parkland/institutional setting;
- S2 – soil dermal contact and incidental ingestion at a lower frequency and intensity in a commercial/industrial/community setting or a residential setting at depth;
- S3 – soil dermal contact, incidental ingestion and soil particulate inhalation protective of workers undertaking excavation works;
- S-IA (Residential) – soil to indoor air (for the proposed residential land use scenario);
- Indoor Air Odour (proposed residential land use scenario); and,
- S-OA – soil to outdoor air.

The S1 and S2 component values are protective of Site residents (also used as a surrogate for Site visitors in the current RA) and outdoor maintenance worker direct contact soil exposure, respectively, with the exception of dust inhalation, and the S3 values are protective of construction/subsurface utility worker direct contact soil exposure.

The S1 and S2 component values are lower frequency and lower intensity human health exposure scenarios. The dust inhalation exposure pathway was not incorporated in calculating the S1 and S2 component values by the MECP. Given that these component values are calculated using only a soil ingestion and dermal exposure model, without the incorporation of the dust inhalation pathway, we assume that the impact of inhalation of dust particles is deemed minimal by MECP (in comparison to the oral and dermal exposure routes) when considering risks to residents and outdoor maintenance workers. Therefore, the dust inhalation pathway was only assessed for soil COCs that exceeded their respective S1 and S2 component values and not required based on the screening against S1 and S2 for this RA.

Parameters for which the REM concentrations met the applicable component value, no unacceptable risk is anticipated, and the component value was considered as a candidate RBC. For parameters for which the REM concentrations exceeded the component value or no component value was provided, either a qualitative or quantitative evaluation was performed.

It is noted that component values used for screening were updated based on updated TRVs provided by MECP (2024a), where applicable are the updated component values provided by the MECP (2024c) for lead.

The parameters in soil for which the REM exceeded a component value, or a component value was not available and was quantitatively assessed is summarized in Table 9 of Section 4.2.3.

As there are no MECP (2011c) component values for the soil to trench air pathway, all volatile COCs were assessed for this exposure pathway as shown in Table 8 of Section 4.2.3.

According to MECP (2011c), the indoor air inhalation component value (S-IA) is protective of indoor air odour. Therefore, this pathway is assessed via the indoor air inhalation component value.

There are no soil component values available that represent exposure to human receptors via ingestion of homegrown produce that may be affected by impacted soil. Exposure to COCs via this pathway is evaluated qualitatively in Section 4.4.3.3.

4.4.3.2 Screening of COCs in Groundwater

As discussed in Section 3, PHC F1-F3 and xylenes were retained as COCs in groundwater based on exceedances of the Table 3 SCS.

Given the shallow groundwater condition at the Site, the REM concentrations of the groundwater COCs were compared to respective Table 3 GW2 (indoor air inhalation) and GW2 Odour component values for the future proposed residential land use scenario. The GW1 component value was adopted from the potable groundwater scenario (Table 2 SCS) and was used as a surrogate to assess the incidental ingestion and dermal contact pathways under the construction/subsurface utility worker exposure scenario.

For parameters for which the REM concentrations met the applicable component value, no unacceptable risk is anticipated, and the component value was considered as a candidate RBC. For parameters for which the REM concentrations exceeded the component value or no component value was provided, either a qualitative or quantitative evaluation was performed.

Component values used for screening were updated based on updated TRVs provided by MECP (2024a), where applicable.

The parameters in groundwater for which the REM exceeded a component value, and therefore will be quantitatively assessed is summarized in Table 10 of Section 4.2.3.

As there are no MECP (2011c) component values for the groundwater to outdoor air pathway, all COCs which are considered to be sufficiently volatile, were carried forward for further quantitative assessment of this exposure pathway. For construction/subsurface utility workers, the outdoor air pathway also considers the more intense trench exposure scenario as outlined in Section 4.2.3.7.

4.4.3.3 Ingestion of Homegrown Garden Produce

Given the depths to groundwater measured at the Site, and the minimum measured depth of 2.84 m bgs, it is assumed that groundwater will not be in direct contact with the roots of seasonal crop vegetables grown on-Site for consumption purposes. It is unlikely that any seasonal produce grown at the Site will not have roots that extend below 1.5 m bgs.

Based on the Government of Canada's Canadian Environmental Protection Act, 1999, Persistence and Bioaccumulation Regulation (SOR/2000-107), a chemical is bioaccumulative if the logarithm of its octanol-water partition coefficient (log K_{ow}) is equal to or greater than 5. As such, several PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b/j)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene and indeno(1,2,3-cd)pyrene) in soil exceed this criterion. The log K_{ow} values for PHC F1 aliphatic C6-C8, PHC F1 aliphatic C>8-C10, PHC F1 aromatic C>8-C10, several PAHs (acenaphthylene, anthracene and phenanthrene) and mercury in soil were below this criterion. No log K_{ow} values were available for barium, copper, lead and zinc. The log K_{ow} of soil COCs on-Site are provided in Table E4-6A.

As such, resident and visitor/trespasser exposure to PAHs (including benzo(a)anthracene, benzo(a)pyrene, benzo(b/j)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene and indeno(1,2,3-cd)pyrene) in soil via ingestion of homegrown garden produce was considered a complete pathway in the HHRA based on the exceedance of the log K_{ow} criterion. Additionally, as log K_{ow} were not available for barium, copper, lead and zinc in soil, exposure to these COCs was conservatively considered as complete via ingestion of homegrown garden produce in the HHRA. However, it is not anticipated that a significant portion of a resident and/or visitor/trespassers diet would be comprised of homegrown produce and therefore this pathway is considered negligible compared to other applicable pathways (e.g. direct contact, vapour inhalation). However, it was conservatively assumed that unacceptable risks may occur as a result of exposure to select PAHs and metals in soil and therefore RMM are proposed for this pathway as outlined in Section 7 and Appendix M. Any produce garden to be grown at the Site, should be confined to raised planter boxes, separated from direct contact with the known soil impacts.

4.4.3.4 Vapour Skin Contact

The vapour skin contact pathway must be evaluated qualitatively, as the methodology to evaluate dermal transport of vapours across the skin has not developed to a level where exposure can be reliably quantified. This is partly because the vapour permeability coefficient for air used in the transport equation is not well characterized for many substances. In addition, toxicity information for dermal exposure is commonly obtained from studies involving oral exposures, which would add an additional degree of uncertainty to a quantitative assessment. It is assumed that the magnitude of exposure via the vapour skin contact pathway would be minimal because there is no potable use of groundwater on the RA property. Thus, there is little opportunity for vapour exposure at concentrations that could reasonably be anticipated to penetrate the outer skin layer. It is also expected that relatively low levels of COCs will off-gas from soil or groundwater to ambient air. Thus, risks due to the vapour skin contact pathway are assumed to be negligible and were not considered further in the RA.

4.4.3.5 Risks to Site Visitors and Indoor Workers under Future Property Use

Although Site visitors (recreational users and trespassers) and long-term indoor workers are possible receptors on the RA property following Site redevelopment to residential use, it is not anticipated that their exposure rates would be greater than the rates for Site residents. Therefore, risks to Site visitors and long-term indoor workers were not calculated and the Site resident is considered a surrogate for these receptors. Any RMM proposed for the protection of the Site resident will also be protective of future Site visitors (and trespassers) and long-term indoor workers.

4.4.3.6 Residual LNAPL Free Product

As discussed within Section 4.2.2, given the presence of residual LNAPL at the Site, it was assumed that all Site receptors could be exposed to volatiles sourced from the product in outdoor air, and indoor workers, residents and property visitors could be exposed to via indoor air inhalation. In addition, given the potential future presence of construction/utility workers at the Site it was conservatively assumed that these receptors could be exposed to residual LNAPL indirectly through combined trench air and outdoor air inhalation and through direct contact when working within a trench or excavation.

Given the minimum depth to groundwater at the RA property and the proposed future building design (i.e., slab-on-grade) property residents, visitors, long-term indoor workers and outdoor workers are not anticipated to directly contact residual LNAPL product in the Site. Given that the future building design will not extend to within the water table, there is no potential for seepage of product through subgrade walls or to be collected within sump pits at the Site. Only the construction worker receptor may come into direct contact with residual LNAPL at the Site when performing work within a trench or excavation that extends to within the water table. As required in Ontario, trenches or excavations are required to be dewatered prior to entry by workers, meaning it is unlikely that residual LNAPL will enter trenches or excavations to an appreciable degree. In addition, given the minimum depth to the water table and future slab-on-grade building design it is unlikely that trenches or excavations will be required to extend within the water table for future building construction. However, as a conservative measure direct contact exposure to construction workers via contact with LNAPL in groundwater is considered to be a complete exposure pathway. Given that the exact composition and concentration of constituents of the residual LNAPL at the Site is unknown, a quantitative assessment of direct contact risk could not be performed. Instead, a qualitative assessment of potential risk is provided herein. As a conservative measure, direct contact risks for the construction worker to residual LNAPL are identified and RMM in the form of a HASP and SGMP are proposed in Section 7.0. The HASP and SGMP will be required to be prepared to outline specific measures and personal protective equipment (PPE) to be undertaken during earthworks to mitigate the potential for direct contact with residual LNAPL in the subsurface.

Similarly, the combined trench air and outdoor air inhalation exposure pathway for Site construction workers was also identified to be complete for Site construction workers. Based upon the analytical results collected from monitoring wells at the Site, the LNAPL appears to be primarily composed of volatile, low molecular weight hydrocarbons, including high concentrations of PHC F1 and PHC F2. In addition, the presence of residual LNAPL at the Site may act as a non-depleting source of volatile contaminants including PHC F1 and F2. Due to the uncertainty regarding the residual LNAPL composition and concentration of constituents and the impacts of the non-depleting source on trench air concentrations a quantitative assessment of potential risks was not completed. As a conservative measure, it is assumed that risks for construction workers are present for inhalation-based exposure pathways when a receptor is present within a trench or excavation. The HASP will be required to include Site-specific guidance to recommend PPE, engineering measures (i.e., trench air flow augmentation), trigger values and monitoring requirements to mitigate any risk posed to construction workers via the inhalation of impacted trench air while completing earthworks.

No risks are anticipated to Site residents, visitors/trespassers, and long-term outdoor workers via exposure to volatile COCs sourced from LNAPL in outdoor air at the Site. A quantitative evaluation of outdoor air inhalation exposure risks was completed for these receptors via exposure to volatile groundwater COCs and no risks were identified, as presented within Tables E4-31, E4-32 and E4-33. In addition, the residual free product is localized to the northwestern corner of the Site and it is unlikely that receptors will spend all time outdoors on-Site within the same region of the Site where residual LNAPL may be present upon redevelopment. The added dilution of wind mixing and urban wind tunnelling would reduce the likelihood of any potential adverse risks to human receptors. In addition, given that the future Site will be developed to be slab-on-grade no subsurface structures are planned to be completed which could act as preferential pathways allowing contaminant vapour to migrate the ground surface. Finally, given the depth to the water table, medium-fine soil texture and lower air-filled porosity of the silty clay present at the Site, contaminant vapours migrating from residual LNAPL are not anticipated to pose risks to future Site residents, visitors or long-term outdoor workers.

Finally, as noted above, property residents, visitors and long-term indoor workers may be exposed to contaminant vapours sourced from residual LNAPL via vapour intrusion and indoor air inhalation within the future building. Based on the quantitative

evaluation of potential risk for soil and groundwater COCs via indoor air inhalation, unacceptable risks were identified for PHC F1 in soil and PHC F1 and PHC F2 in groundwater, as presented in Tables E4-22A and E4-23A of Appendix E, respectively. As mentioned above the exact composition and concentration of constituents of the residual LNAPL is unknown. Given that the presence of residual LNAPL at the Site would result in a non-depleting source for volatiles contaminants, risks to Site residents, Site visitors and long-term indoor workers are conservatively identified via indoor air inhalation exposure. As such, as recommended in Section 7.0, the vapour mitigation system to be designed for the future Site building will need to take into account the potential presence of residual LNAPL below the building footprint and ensure that materials used are chemically compatible and resistant to the volatile COCs sourced from this medium. Considerations in the design of the future vapour mitigation system will need to also account for the presence of non-depleting sources which may continue to act as a release point for volatile vapours, so long as residual LNAPL remains present.

4.4.4 Human Health Property-Specific Standards

RBCs were derived for soil and groundwater COCs that would be protective of human health under each exposure scenario evaluated quantitatively. For carcinogens, the RBCs were derived to ensure that receptors do not experience an increased cancer risk level of greater than 1.0E-06 from exposure to each environmental medium exposure pathway. For non-carcinogens, RBCs were derived to ensure that receptors do not receive an estimated dose exceeding 20% (50% for PHC or 80% for adult exposure to lead) of the RfD for each environmental medium exposure pathway. The derivation of the RBC is shown below:

$$RBC_{S/GW,carcinogenic\ effects} = \frac{1 \times 10^{-6} \times C_{S/GW}}{ILCR}$$

$$RBC_{S/GW,\ non-carcinogenic\ effects} = \frac{0.2\ (0.5\ for\ TCE) \times C_{S/GW}}{HQ}$$

where:

$RBC_{S/GW, Carcinogenic\ effects}$	=	Property Specific Soil/Sediment/Groundwater Standard protective of carcinogenic effects
$RBC_{S/GW, non-carcinogenic\ effects}$	=	Property Specific Soil/Sediment/Groundwater Standard protective of non-carcinogenic effects
$C_{S/GW}$	=	Concentration of soil, groundwater, or sediment COC (mg/kg or µg/L)
1x10-6	=	Acceptable ILCR per each environmental medium exposure pathway
0.2	=	Acceptable HQ per each environmental medium exposure pathway (0.5 for PHCs or 0.8 for adult exposure to lead)
ILCR	=	Predicted ILCR
HQ	=	Predicted HQ

Proposed risk-based soil RBCs for individual receptors and pathways are provided in Appendix E, Tables E4-34A/B to E4-36 for toddler residents, composite residents, outdoor maintenance workers and construction/subsurface utility workers, respectively. Proposed risk-based groundwater RBCs for individual receptors and pathways are provided in Appendix E, Tables E4-38 to E4-40 for Site residents, outdoor maintenance workers and construction/subsurface utility workers, respectively. For COCs where there was more than one pathway for the route of exposure (i.e., inhalation of ambient and trench air), the risks were summed for each medium. For each COC, the minimum of the risk-based back calculated values and/or component values protective of carcinogenic and non-carcinogenic effects and each exposure pathway was selected as the risk-based RBC for each receptor as presented in predicted risk tables for each pathway (Tables E4-22A/B through E4-33).

Final human health candidate RBC values for soil and groundwater COCs were set at the lowest of the pathway-specific/ receptor-specific values, where the calculated risks for all pathways were within acceptable levels. Proposed RBCs, for COCs for which

unacceptable levels of risk were predicted (for any one pathway), were set as the REM concentration (i.e. maximum concentration plus 20% to account for sampling and analytical variability) in the presence of RMM. These are presented in Tables E4-37 and E4-41 for soil and groundwater, respectively.

RBCs were quantitatively and/or qualitatively derived for all applicable pathways for a COC found in soil and groundwater on the RA property. For exposure scenarios in which the REM concentration was not in excess of the component value, the component value was selected as the RBC for that particular exposure pathway.

Soil COCs

A summary of the final human health RBCs derived for each receptor is provided in Appendix E, Table E4-37. It is noted that carcinogenic PAHs that did not pose a risk individually, but were considered for total PAHs were set at their minimum RBC although RMM is required.

The final candidate human health PSS were carried forward for consideration in the selection of the final soil PSS in Section 6.

Risks at the proposed PSS values were not calculated as the REM concentrations were used to assess risk in this RA and the final PSS, as selected in Section 6, do not exceed the REM concentrations.

Groundwater COCs

A summary of the final candidate human health PSS derived for each receptor is provided in Appendix E, Table E4-41.

The proposed final human health RBCs were carried forward for consideration in the selection of the final groundwater PSS in Section 6.

Risks at the proposed PSS values were not calculated as the REM concentrations were used to assess risk in this RA and the final PSS, as selected in Section 6, do not exceed the REM concentrations.

4.4.5 Special Considerations

Section 41 of O. Reg. 153/04 dictates certain restrictions in application of SCS for environmentally sensitive areas. The Site was not identified as an environmentally sensitive area as discussed in Section 3.3.1.

Section 43.1 of O. Reg. 153/04 defines the restrictions in application of SCS for shallow soil property or water body. As discussed in Section 3.2.1, bedrock was not encountered at depths of 2 mbgs or less. Thus, the Site is not considered to be a shallow soil property. Furthermore, the RA property is not located adjacent to, nor within 30 m of, a surface water body.

It is noted that based on the intended development of the property, the building will be constructed to be slab-on-grade and the Table 3 SCS and GW2 component values were used to evaluate the groundwater to indoor air pathway in the RA. Consideration to the Table 7 SCS for volatile groundwater parameters was not required due to the separation distance between the minimum water depth measurement and the future evaluation of the gravel sub-base.

Based on the above information, and as discussed in Section 3.3.1, the COCs for the Site were determined based on a comparison to the Table 3 (Standards for volatile groundwater parameters). Therefore, no further considerations are required to justify the PSS that were proposed in the HHRA.

4.4.6 Interpretation of Off-Site Health Risks

The proposed human health PSS were evaluated as to whether they would result in a concentration greater than the applicable full depth SCS for the nearest off-Site receptor.

On any Site with groundwater contamination, the potential for migration of impacted groundwater to off-Site locations presents a possible risk of exposure and adverse effects on the health of off-Site human receptors. As discussed in Section 3.2.3, the

regional groundwater flow direction is inferred to be southwest, towards Lake Ontario, located approximately 1.3 km south of the Site. Based on the groundwater contour maps delineated for the Site and the topography of the Site and study area, the regional and Site-specific groundwater is anticipated to be flowing in a southwesterly direction.

Surrounding properties include commercial land use to the south and southwest along Queen Street West, Augusta Avenue followed by residential land use to the east, Denison Avenue followed by residential and institutional land use to the west and Wolseley Street followed by residential land use to the north. The nearest off-Site receptors downgradient of the Site are indoor workers, property visitors and outdoor maintenance workers of the neighbouring commercial properties to the south and southwest of the Site. Construction/subsurface utility workers may also be present at these surrounding properties.

Based on the current surrounding land uses, the Table 3 SCS for industrial/commercial/community property use was identified as the applicable full depth Standard for the nearest off-Site human receptors.

Movement of soil off-Site is assumed to be minimal under normal Site conditions but might result in concentrations exceeding the Table 3 SCS at the nearest off-Site receptors during development or other soil works where excessive dust is generated. It is noted that based on the on-Site assessment, no risks are anticipated to human receptors as a result of dust inhalation (see Sections 4.4.2 for the quantitative evaluation). Soil capping is required as an RMM to protect on-Site receptors and a SGMP is also recommended during any future Site works. These RMM will provide protection to off-Site receptors in addition to those on-Site.

There is potential for lateral migration of vapours from on-Site soil and groundwater to off-Site buildings. Soil and groundwater exceedances greater than their residential S-IA and GW2 component values were considered further for this pathway, and include PHC F1 and mercury in soil and PHC F1 and F2 in groundwater. According to the MECP (2021) *Draft Technical Guidance for Soil Vapour Intrusion Assessment*, they use a distance greater than 10 metres for chemicals that are readily biodegradable, like petroleum-related compounds, or 30 metres for chemicals that do not readily biodegrade under aerobic conditions, would indicate a sufficient natural attenuation to be a negligible concern, and has been suggested by a number of jurisdictions. Further discussion on these parameters and potential for lateral migration and vapour intrusion into off-Site buildings is presented below.

An isolated exceedance of the residential S-IA for PHC F1 was identified at BH5 (4.57 – 5.18 m bgs) in the southeastern portion of the Site. The nearest off-Site properties are commercial use buildings located south of the Site across the southern laneway abutting the Sites southern boundary. It is noted that the maximum concentration of PHC F1 is well below the Table 3 S-IA component value for medium-fine textured soil and commercial land use of 420 µg/g. In addition, the delineated PHC exceedance in soil is located more then 10 m away from the nearest off-Site residential use property and it is not anticipated that soil vapour impacts would migrate off-Site to the east at concentrations that could pose risk to off-Site residential receptors. As such, the potential for soil vapours containing PHC F1 to laterally migrate onto commercial and residential properties to the south and east of the Site is not anticipated.

Similarly, mercury was also only identified to exceed the applicable SCS at one (1) location on-Site, BH106 (2020) at a depth of 0.8 – 1.1 m bgs in the southwestern corner of the Site. The nearest off-Site building is located south of the Site along Queen Street and is commercial in use. It is noted that mercury is below the applicable commercial S-IA component value of 22 µg/g. The property to the west of the mercury exceedance is occupied by a religious organization and is classified as institutional land use. The building is approximately 20 m west of the soil exceedance for mercury. Given that no on-Site indoor air inhalation risks were identified for mercury in soil it is not anticipated that mercury vapours will migrate laterally off-Site at concentrations that would pose risk to off-Site receptors via vapour intrusion.

Finally, phenanthrene was only identified to exceed in soil at one (1) location, BH108 (2020) at a depth of 0.3 – 0.6 m bgs in the southeastern portion of the Site. The nearest off-Site properties are commercial use buildings located south of the Site across the southern laneway abutting the Sites southern boundary and residential use properties located east of Augusta Avenue. Although there is no commercial S-IA component value for the assessment of phenanthrene in soil, this COC is not anticipated to pose risk to off-Site commercial use buildings given that phenanthrene was not determined to pose indoor air

inhalation risk for occupants of the future slab-on-grade residential use building. The residential use building to the east of the Site is located approximately 20 m away from the phenanthrene exceedance and it is unlikely that phenanthrene would migrate in soil vapour to the east at concentrations that would result in indoor air inhalation risks within the structure.

As discussed above, the groundwater flow direction for the Site and the study region is determined to be towards the southwest. As such, the nearest downgradient properties would be the commercial use properties along Queen Street and at the corner of Queen Street and Denison Avenue. As shown on Figure 13, groundwater impacts are localized to four (4) monitoring wells located at the northeastern corner of the Site. As shown on Figure 13, MW107, MW108 and MW109 and MW4 are impacted with concentrations of PHC F1, F2, F3 and/or xylenes in excess of the applicable Table 3 SCS. Groundwater exceedances are both vertically and horizontally delineated at the Site. PHC and xylene exceedances in groundwater appear to be migrating on-Site from a source northeast of the Site and do not appear to be migrating across the Site at concentrations that would exceed the applicable SCS at the nearest downgradient off-Site property. Further to this, the nearest off-Ste properties from the PHC and xylene exceedances are residential properties located to the north and east of the Site; however, all off-Site properties to the north and east are greater than 10 m and thus it is unlikely that PHC and BTEX contaminant vapours from groundwater impacts would migrate off-Site at concentrations that would pose risk to occupants of these structures.

Finally, as discussed within Appendix B, free product has been identified at the Site, which appears to be migrating onto the Site from an off-Site source, and remediation efforts have been undertaken to reduce the measurable levels of free product present in the subsurface at the Site. Although residual levels of free product are still present in the northeastern corner of the Site, free product measurements have shown steady reductions in measurable thickness since initiation of the remediation program in April 2024. As shown on plan view Figure 13A residual free product has been delineated to monitoring and extraction wells EW5, EW6, EW7, EW8, EW9, EW10, BH/MW4, and BH/MW109. Lateral delineation of the LNAPL free product in groundwater is provided by EW4, BH/MW3 and BH/MW107 which have shown no indication of measurable LNAPL free product in groundwater during any of the monitoring or extraction events completed at the Site. Vertical delineation of residual LNAPL in groundwater is provided by monitoring wells BH/MW108 (screened 13.78 – 15.81 m bgs and by BH/MW24-3 (screened 12.3 – 15.3 m bgs). Cross sections showing the lateral and vertical extent of residual LNAPL in groundwater at the Site are provided as Figures 19B and 20B of Appendix B.

Based on the inferred regional and Site-specific groundwater flow direction the residual free-product does not appear to be migrating across the Site at levels that would indicate that free-product could flow through the Site and migrate onto adjacent downgradient properties. As noted in the associated Hydrogeological Investigation for the Site (EXP, 2022b), the average hydraulic conductivity of the water bearing unit was determined to be 1.4E-07 m/s, indicating very slow movement of groundwater across within this water bearing unit. Based on review of the associated hydrogeological investigation and the subsurface conditions identified within the borehole logs, it is assumed that the fine soil texture of the silt and clay till at the Site is mitigating the migration of free product across the Site.

Given the above, EXP is of the opinion that there are no off-Site risks associated with the on-Site soil exceedances. Any potential for off-Site soil migration will be mitigated by the implantation of a soil barrier system and SGMP upon redevelopment. Under current Site conditions, there is limited potential for off-Site soil migration given that the Site is currently paved. The off-Site migration of volatile soil contaminants was also not identified to pose potential risk to off-Site receptors. Similarly, on-Site residual LNAPL and groundwater exceedances were vertically and laterally delineated to the northeastern corner of the Site and do not appear to be migrating across the Site with the regional groundwater flow direction. It is anticipated that the fine soil texture is mitigating flow through of residual LNAPL and groundwater COCs to the southwest. Given that off-Site residential properties were greater than 10 m away from the boundary of the Site, vapours sourced from groundwater are not anticipated to result in off-Site risk via vapour intrusion. As such, no RMM are currently recommended for the protection of off-Site human receptors.

Table 12: Summary of Potential Off-Site Exceedances (Human Receptors)

COC	Media	Applicable SCS at Location of the Nearest Off-Site Receptor	Location of Nearest Off-Site Receptor	Description of Receptor
PHC F1	Groundwater	Table 3 SCS (750 µg/L)	Commercial Properties – South of Site	Indoor Workers, Property Visitors / Trespassers
PHC F2	Groundwater	Table 3 SCS (150 µg/L)		
PHC F3	Groundwater	Table 3 SCS (500 µg/L)		
Xylenes	Groundwater	Table 3 SCS (4,200 µg/L)		

4.4.7 Discussion of Uncertainty

Given the many assumptions used in the HHRA, there are uncertainties in the risk characterization, as discussed below. However, as the HHRA adopts a high degree of conservatism, the uncertainties are not likely to result in underestimation of potential health risks.

- The assessment assumes that all human receptors are exposed to the REM soil and groundwater concentrations for the full exposure duration used in risk calculation. In reality, the REM soil and groundwater concentrations are not found throughout the entire RA property, and human receptors are not expected to stay only within the area of maximum concentrations throughout the entire duration of exposure. These assumptions will result in over estimation of risks.
- It is assumed that outdoor maintenance workers spend 56 years on-Site, which is highly conservative. Canadian statistics show that it is highly unlikely that a person would spend a lifetime at one job. It is even more unlikely that the person would spend all of his or her on-Site time in the vicinity of the maximum soil and/or groundwater concentrations throughout the 56 years. Thus, the risks to outdoor maintenance worker are likely overestimated.
- The breathing rate of the construction/subsurface utility worker was assumed to be elevated compared to the average person, for the duration of this receptor's time spent on the RA property. In reality, the breathing rate of this receptor is likely to be elevated for only a portion of the day.
- The prediction of indoor air concentration of COCs is likely to be highly conservative. The modeling has been conducted assuming that the entire building footprint is underlain by soil and/or groundwater COCs at maximum concentrations as well as using conservative attenuation factors provided by MECP (2011c).
- The assessment assumes that maximum soil and/or groundwater concentrations exist throughout the entire RA property, and the concentrations remain constant over time. In reality, the concentrations and bioavailability of most COCs will decrease over time due to natural processes such as dilution from surface infiltration, dispersion, chemical and/or biological degradation, precipitation, and sorption.
- The characterization of risks to non-carcinogenic COCs assumed that the acceptable HQ was 0.2 (0.5 for PHCs or 0.8 for adult exposure to lead) per exposure pathway (e.g. inhalation of indoor air, dermal contact). This assumption conservatively reserves 80% (50% for PHCs and 20% for adult exposure to lead) of the RfD to other exposure pathways and sources of exposure (e.g., food items, consumer products, etc.). For instance, a toddler resident who spends 24 hours indoors, under the assumptions of the GW2 exposure pathway, would have minimal exposure to contaminants via ingestion of soil outdoors. For many contaminants, sources of exposure other than contaminated environmental media may be negligible.
- It is acknowledged that human health component values were not developed with the consideration of LNAPL free product being present at a Site. The presence of free product in the subsurface can impact the assumptions used to derive the human health component values. For example, LNAPL can act as a non-depleting source of contamination and release a continuous source of contamination to soil and groundwater, resulting in non-equilibrium conditions, which differ from the assumption

relied upon to derive the GW2 or S-IA component values or the vapour models utilized in the HHRA (i.e., J&E and ATSM). Although, the presence of LNAPL free-product in the subsurface at the Site may not have been accounted for in the derivation of component values used in the HHRA, component values and vapour models were only relied upon for the assessment of soil and groundwater COC concentrations. Pre-remedial groundwater concentrations were relied upon for the assessment of potential risks to ensure a conservative approach was undertaken to assessing potential risks. In addition, a qualitative assessment of potential risks to LNAPL free product was completed for the HHRA due to uncertainty regarding a quantitative assessment of potential LNAPL risks, and RMM have been proposed.

Each of the individual assumptions made in the exposure and toxicity assessments are most often conservative in nature, so as to err on the side of caution when addressing uncertainties. The compounding effect of multiple conservative assumptions is that the overall estimate of risks is also likely to be very conservative. As a result, the RA conclusions are assumed to be based on overestimations of the actual risks to human receptors on a given property.

5. Ecological Risk Assessment (ERA)

5.1 Problem Formulation

As required by O. Reg. 153/04, an ERA was conducted as part of the current RA. The purpose was to evaluate the potential impacts of contaminants in soil and groundwater to ecological receptors.

The Problem Formulation for the ERA includes preparation of an ECSM and defining the RA objectives.

5.1.1 Ecological Conceptual Site Model

The conceptual model combines the information gathered during the problem formulation phase and provides a summary of the exposure scenarios to be evaluated in the ERA. These conceptual exposure scenarios represent the interactions of the COCs with receptors via the various exposure pathways.

An ECSM was developed based on information obtained during the investigations of the RA property describing the Site geologic and hydrogeologic conditions, the COCs, and their distribution in soil and groundwater (see Section 3). Based on the Site information, review of the chemical and physical properties of the COCs and the anticipated future residential land use, potentially complete exposure pathways were identified for quantitative or qualitative evaluation in the ERA.

Regardless of current configuration of the Site or future development plans for the property, the current RA is required to assess risks to ecological receptors, assuming the potential for direct contact with all on-Site soils without any barriers or restrictions, and must consider the potential for contact with groundwater beneath the property and/or soil and groundwater COCs in any nearby surface water bodies.

The ECSM provides an outline of the general exposure scenarios to be evaluated by bringing together the COCs, receptors and exposure pathways into one overall conceptual framework (Figure 22A). As RMM (Section 7) are required for protection of ecological receptors on the RA property, an additional ECSM is provided to show exposure scenarios in the presence of RMM (Figure 22B).

Contaminants of Concern

The soil COCs are listed in Section 3.3.2 and include PHC fraction F1, several PAHs (including acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene and phenanthrene), several metals (barium, copper, lead, zinc) and mercury.

The groundwater COCs are listed in Section 3.3.3 and include PHC F1-F3 and xylene.

Exposure Pathways and Receptors

It is not possible to evaluate risks to all species within a complex ecosystem. Therefore, for the purpose of the ERA, VECs are selected to represent groups of organisms with a variety of feeding and behavioural characteristics. Terrestrial VECs are generally selected based on recommended representative species from the MECP Rationale Document (2011c) and are considered by MECP to be “typical of agricultural or natural ecosystems in Southern Ontario”. Terrestrial VECs include plants, soil invertebrates and terrestrial wildlife. VECs have also been identified for the off-Site aquatic environment, for the purpose of assessing the soil leaching and the groundwater migration to surface water pathway in this RA. These receptors are discussed in Section 5.2.

Based on the COCs identified, the potential pathways by which the on-Site receptors can be exposed to the COCs include:

- Direct exposure to soil COCs through dermal contact, incidental ingestion and/or particulate inhalation (soil invertebrates and terrestrial mammals and birds);
- Direct exposure to soil COCs through root uptake (terrestrial plants);

- Indirect exposure to soil and groundwater COCs through ingestion of impacted food/prey (soil invertebrates and terrestrial mammals and birds);
- Indirect exposure to volatile COCs released from soil and groundwater, as well as LNAPL, to outdoor air through atmospheric deposition (terrestrial plants); and,
- Indirect exposure to volatile COCs released from soil and groundwater, as well as LNAPL, to outdoor air through inhalation and dermal contact (soil invertebrates and terrestrial mammals and birds).

The potential pathways are further discussed in Section 5.3.1.

Groundwater and LNAPL on-Site is found below the depth at which plant root uptake is considered to be likely (i.e., greater than 1.5 mbgs) and therefore, these pathways are considered incomplete for on and off-Site terrestrial plants in the ECSM (Figure 22A). Similarly, direct contact by soil invertebrates, mammals and birds with groundwater is considered unlikely since these organisms generally avoid saturated zones and therefore these pathways were considered incomplete for these receptors.

Off-Site terrestrial receptors may come into contact with soil/dust containing COCs as well as soil COCs through volatilization and subsequent stem and foliar uptake (terrestrial plants) and inhalation (soil invertebrates, terrestrial mammals and birds). Therefore, these pathways are marked complete on the ECSM (Figure 22A). Due to the low mobility of soil, all other exposure pathways are considered incomplete for off-Site terrestrial receptors. Furthermore, given that on-Site ecological receptors are assumed to spend 100% of their time on-Site (see Section 5.3), off-Site receptors are not assumed to be exposed to soil COCs via ingestion of plant and animal tissue.

Off-Site aquatic and semi-aquatic receptors, in addition to terrestrial mammals and birds may be exposed to soil COCs indirectly via soil leaching to groundwater and the subsequent migration to surface water and to groundwater COCs via direct migration and discharge to surface water. Based on the separation distance between the Site and nearest downgradient surface water body, Lake Ontario located approximately 1.3 km south of the Site, the soil erosion exposure pathway was considered to be incomplete.

5.1.2 Risk Assessment Objectives

The objectives of the current ERA are to:

- Quantitatively or qualitatively evaluate ecological risks associated with exposure to impacted soil and groundwater, as well as LNAPL;
- Develop PSS that are protective of ecological receptors under the future residential use of the Site; and,
- Identify any RMM necessary to mitigate on-Site ecological receptors' exposures based on the results of the ERA, if required.

The current assessment assumed that ecological receptors would be exposed to soil and groundwater COCs at levels currently found on-Site. In this ERA, the reasonable estimate of the maximum (i.e., REM) was used for exposure estimates and is calculated as the maximum concentration + 20%. The potential risks to aquatic receptors in the off-Site water body were assessed for soil COCs via soil leaching to groundwater and subsequently migrating to the nearest surface water body and for groundwater COCs migrating to the nearest surface water body. To assess the potential risks to ecological receptors, both quantitative and qualitative assessment approaches are used in the present ERA. It is noted that potential risks from exposure to LNAPL cannot be quantitatively assessed; therefore, risks from exposure to LNAPL are qualitatively assessed in Section 5.5.3.6.

The environmental conditions of the RA property were investigated through various ESAs conducted by EXP and others between 2020 to present. The data collected were used to characterize conditions for the current RA. The work completed by EXP included the collection of soil and groundwater samples for chemical analysis from different locations to assess conditions at the APECs. Sampling programs were conducted following acceptable field protocols and QA/QC measures in order to provide representative

data of acceptable accuracy and precision. The programs were evaluated as to their representativeness, completeness, accuracy, and precision to minimize uncertainty and meet the RA data quality objectives. Analytical programs were undertaken by qualified laboratories employing applicable QA/QC protocols to minimize uncertainty and provide accurate and representative data.

As discussed in Section 3.3.6, the extent and magnitude of the soil and groundwater impacts have been sufficiently defined and, in the opinion of the QP_{ESA}, meet the data quality objectives of the current ERA. Furthermore, assessment of laboratory QA/QC data (Section 3.3.5), showed that analytical data of acceptable quality meeting the objectives of the RA were provided.

The ERA objectives were set by identifying the receptors and exposure pathways relevant to the RA property. The ERA assumes a hypothetical ecological receptor that could potentially be exposed directly or indirectly to the COCs.

The ERA is designed to provide a comprehensive assessment of the risks to ecological health. In this ERA, VECs are receptors selected to be representative of groups of species that are common components of natural ecosystems found in southern Ontario and are the same as those recommended by MECP (2011c) as further discussed in Section 5.2. The receptors selected to be VECs are intended to represent the variety of organisms found on-Site and address their different characteristics such as feeding habits and behavioural traits. The VECs include on- and off-Site terrestrial receptors and off-Site semi-aquatic and aquatic VECs. The protection of VECs is intended to be on a community/population level. Based on the COCs identified, the relevant pathways evaluated in the ERA were identified as outlined in Section 5.3.1. To assess the potential risks to ecological receptors, both quantitative and qualitative assessment approaches are used in the present ERA as presented in Sections 5.5.2 and 5.5.3. The REM COC concentrations in soil and groundwater were compared to the applicable MECP 2011 Table 3 ecological component values, where available.

In undertaking any RA, there are various sources of uncertainty, which must be taken into account when setting the RA objectives. These uncertainties are associated with the field sampling and analytical programs, the characterization of the Site geologic and hydrogeologic conditions, the evaluation of contaminant fate and transport mechanisms, the evaluation of receptor characteristics and behaviour patterns and the assessment of chemical toxicological effects. Conservative assumptions are also applied in the evaluation of receptor characteristics and behaviour patterns that are representative of the current and future land uses at the RA property. The overall tendency is to apply conservative assumptions in all areas of the risk analysis to compensate for data and information limitations and uncertainty. As a result, it is more likely that overestimated exposures, hazards and risks are reported in the RA than underestimates. The uncertainties associated with the exposure assessment, hazard assessment and risk characterization are discussed further in the individual Sections, below.

5.2 Receptor Characterization

In this RA, VECs are receptors selected to be representative of groups of species that are common components of natural ecosystems found in Southern Ontario. The selection of VECs is generally based on natural feature studies conducted on the area of interest or on areas that have a similar land use and ecological state. The receptors selected to be VECs are intended to represent the variety of organisms found on-Site and address their different characteristics such as feeding habits and behavioural traits. However, because the RA property is located in an urban area and protection is intended to be on a community/population level, and not for individual organisms, surrogate representative species were used. For the purpose of this RA, all terrestrial VECs were chosen from those recommended by MECP (2011c). These terrestrial receptors “represent groups of species that are typical of agricultural and natural ecosystems in Southern Ontario and include most of Ontario in their breeding range” (MECP, 2011c). VECs have been identified for the on- and off-Site terrestrial and aquatic environments.

As it is not possible to evaluate all ecological species at a Site, representative VECs are selected based on several criteria (Suter, 1989; CCME, 1997), including:

- Threatened or endangered species;
- Sensitivity to the COCs on the property;
- Biological and ecological relevance;

- Ability to measure or predict effects; and,
- Social relevance (species of recreational, commercial, or social importance).

To determine whether threatened or endangered species may frequent the Site, MNRF "Make a Map: Natural Heritage Areas" listings were searched for threatened or endangered species. As discussed in Section 3.3.1, no threatened or endangered species were retained as VECs for the Site.

The individual VECs considered for the RA are discussed in the following sub-sections.

5.2.1 VECs in the Aquatic Environment

As discussed in Section 3.2.2, the nearest downgradient surface water body Lake Ontario, located within 1.3 km south of the Site. Therefore, within this assessment, potential risks to various species of fish, invertebrates, amphibians and aquatic plant species were evaluated to ensure that populations of these groups are able to successfully survive, grow, and reproduce in off-Site bodies of surface water that may be influenced by the migration of COCs from on-Site soil and groundwater. Semi-aquatic birds such as the Mallard Duck and Canada Goose and semi-aquatic mammals such as the American mink were also identified as potential VECs at the off-Site water body. All of the above-noted VECs were assessed as a group using MECP (2011c) screening component values (see Section 5.5.3). Per the MECP (2011c), the S-GW3 component value assesses the movement of a substance from soil to groundwater then to aquatic receptors in a surface water body, and the GW3 component value addresses the potential for environmental impacts to aquatic biota when contaminated groundwater discharges into surface water bodies. Therefore, the S-GW3 and GW3 component values present protection to a population level of all aquatic receptors identified in the ERA. It is noted that current knowledge and information on the toxicology and exposure characterization for amphibians and reptiles are limited. Given the current toxicity data for amphibians and reptiles is not adequate to perform a quantitative assessment in the ERA, these VECs were not evaluated separately from the MECP (2011c) component values. The uncertainty associated with applying the MECP (2011c) component values for amphibians is discussed in Section 5.5.7.

5.2.2 VECs in the Terrestrial Environment

Given the location of the Site in an urban environment and the proposed residential land use of the RA property, terrestrial vegetation, soil invertebrates, mammals and birds were considered possible groups of VECs for the current assessment, which are exposed to COCs in on-Site soil and groundwater. These were assessed as a group using MECP (2011c) screening component values. As discussed above and in Section 5.1.2, protection is intended to be on a community/population level, and not for individual organisms, however for the purpose of the RA, surrogate species were used to represent each trophic group.

The RA property may be frequented by some common bird species that would consume earthworms and other invertebrates, as well as seeds or fruit. The American Woodcock, Red-Winged Blackbird and Red-Tailed Hawk were selected to represent birds that consume significant amounts of soil invertebrates only (American Woodcock), vegetation only (Red-Winged Black Bird) and also prey on small mammals and are readily subjected to increased exposure of chemicals that may bioaccumulate (Red-Tailed Hawk).

A few common mammals may also frequent the RA property, such as the Meadow Vole and Short-Tailed Shrew. Meadow Voles and Shrews are likely to receive relatively large chemical doses because they consume a large amount of food relative to their body weight. They will also commonly ingest soil during feeding. The Meadow Vole and Short-Tailed Shrew were selected to represent small mammals. The Meadow Vole is estimated to have a diet composed of 100% vegetation while the Short-Tailed Shrew is assumed to consume 100% soil invertebrates. The Red Fox was considered a VEC to represent large mammals. It is noted that given the current and intended configuration of the Site, it is not anticipated that suitable breeding habitat will be present for mammals and birds on or off the RA property.

Thus, the following terrestrial VECs were considered:

- Earthworms (soil invertebrates)
- Plants (trees, grasses, etc.) representative of landscaping on a residential/commercial/parkland property

- Meadow Vole – represents a herbivorous small mammal
- Short-Tailed Shrew – represents a vermivorous small mammal (consumes mostly terrestrial invertebrates)
- Red Fox – represents a carnivorous large mammal
- Red-Winged Blackbird – represents a herbivorous bird
- American Woodcock – represents a vermivorous bird (consumes mostly soil invertebrates)
- Red-Tailed Hawk - represent carnivore birds that prey on small mammals and are readily subject to increased exposure of chemicals that may bioaccumulate

Although large mammals are not likely to inhabit the property given the location of the property in a commercial/residential area of a highly developed urban centre, the Red Fox was conservatively considered a VEC in the RA.

In connection with the selection of VECs, assessment endpoints are identified for the ERA. Assessment endpoints are the explicit expressions of the actual environmental value that is to be protected (Suter, 1989). The assessment endpoints selected for evaluation in this ERA are survival, growth, and reproduction. Thus, risks to all terrestrial VECs were evaluated based on these assessment endpoints and no others i.e., metabolic or biochemical endpoints or biomarkers. The assessment endpoints selected for evaluation in this ERA are outlined in MECP (2011c), which describes how the MECP component values were derived.

Given the current toxicity data for reptiles and amphibians is not adequate to perform a quantitative assessment in the ERA, these VECs were not evaluated separately from the MECP (2011c) component values. The uncertainty associated with applying the MECP (2011c) component values for reptiles and amphibians is discussed in Section 5.5.7.

5.3 Exposure Assessment

The exposure assessment includes an analysis of the pathways through which VECs may be exposed to COCs and an estimate of the levels to which they are exposed.

The REM COC concentrations measured in soil and groundwater, as summarized in Tables E5-1 and E5-2 of Appendix E, were applied as EPCs in the ERA. The REM is calculated as the maximum measured concentration + 20% to account for sampling and analytical variability.

5.3.1 Pathway Analysis

Ecological receptors may be exposed to chemicals present in soil and groundwater via several potential exposure pathways which are listed below:

- Direct exposure to soil COCs through dermal contact, incidental ingestion and/or particulate inhalation (soil invertebrates and terrestrial mammals and birds);
- Indirect exposure to soil and groundwater COCs through ingestion of impacted food/prey (soil invertebrates and terrestrial mammals and birds);
- Indirect exposure to volatile COCs released from soil and groundwater, as well as LNAPL, to outdoor air through atmospheric deposition (terrestrial plants); and,
- Indirect exposure to volatile COCs released from soil and groundwater, as well as LNAPL, to outdoor air through inhalation and dermal contact (soil invertebrates and terrestrial mammals and birds).

Off-Site receptors on neighbouring properties, as well as the nearest surface water body may potentially come into contact with the COCs present in the soil and groundwater of the RA property. The potential exposure pathways by which these receptors can be exposed to the Site COCs include:

- Direct exposure to soil COCs through particulate inhalation (soil invertebrates, terrestrial birds and mammals);
- Indirect exposure to volatile COCs released from soil and groundwater, as well as LNAPL, to outdoor air through atmospheric deposition (terrestrial plants);
- Indirect exposure to volatile COCs released from soil and groundwater, as well as LNAPL, to outdoor air through inhalation and dermal contact (soil invertebrates and terrestrial mammals and birds);
- Direct exposure to surface water through root uptake (aquatic plants);
- Direct exposure to surface water through dermal contact and ingestion (terrestrial birds and mammals, aquatic invertebrates, aquatic birds and mammals, amphibians and fish);
- Indirect exposure to COCs through ingestion of impacted plant and animal tissue (terrestrial birds and mammals, aquatic invertebrates, aquatic birds and mammals, amphibians and fish); and,
- Direct exposure to surface water through gill intake (aquatic invertebrates, amphibians and fish).

The following pathways were considered incomplete in the ERA and were therefore not assessed in the ERA:

- Direct contact with impacted groundwater or LNAPL is not anticipated for on- or off-Site terrestrial plants, soil invertebrates, mammals and birds given the depth to groundwater is below typical rooting depths for urban vegetation and that these receptors typically avoid saturated soils (see additional details below);
- Since there are no surface water bodies on-Site, surface water exposure pathways for on-Site ecological receptors are incomplete;
- Based on the separation distance to the nearest downgradient surface water body, the soil erosion to sediment exposure pathway was considered to be incomplete;
- As soil has limited mobility, dermal contact and incidental ingestion pathways were considered negligible for off-Site receptors and therefore were considered incomplete; and,
- Given that on-Site ecological receptors are assumed to spend 100% of their time on-Site, off-Site terrestrial ecological receptors are not assumed to be exposed to soil COCs via ingestion of plant and animal tissue.

The exposure pathways that were included in the ERA are described in further detail below for each VEC and are depicted in the ECSM (Figure 22A).

Terrestrial Plants

The ERA assumed terrestrial plants would be exposed primarily to COCs in soil via root uptake. Roots generally remain within the top 1 m of soil, which provides the most favourable conditions for root growth (Craul, 1992). Studies have shown that 80% of the roots of most trees lie within the top 30 cm of soil (Himelick, 1986), while 94% of Kentucky bluegrass roots are found within this zone (Stewart et al., 2004). Under nursery conditions, it was demonstrated that the natural root distributions of seven species of trees (Norway, Red and Sugar Maple, Green Ash, Redbud, Ginkgo, Pin Oak) were most developed at 13-38 cm (Watson and Himelick, 1982). As the minimum depth to groundwater at the Site was measured to be 2.84 m bgs, root uptake of groundwater COCs or LNAPL is considered an incomplete exposure pathway for both on-Site and off-Site plants.

Plants could also potentially be exposed to soil COCs via the atmospheric deposition of on-Site COCs being transferred to the atmosphere via volatilization. However, exposure via volatilization was considered to be insignificant compared to the direct contact exposure pathway due to dilution of vapours in outdoor air. Therefore, this exposure pathway was not assessed separately. While this represents an uncertainty in the evaluation, it should be noted that dose-response data on the direct contact pathway for volatile substances is often based on analytical findings carried out under controlled head-space analytical procedures with concentrations expressed as the sum of soil vapour, soil water and soil particle concentrations. As such, assessment of the direct contact pathway for these receptors via the use of total soil analytical data is assumed to be protective of the exposure to volatiles via this pathway. Therefore, exposure and risks to terrestrial plants are predicted by comparing COC

concentrations in soil to concentrations that have been determined to be acceptable for growing plants. The direct contact component values protective of terrestrial plants and soil invertebrates (MECP, 2011c) were used as the screening benchmark, where available. This screening is considered a qualitative assessment and is provided in Section 5.5.3.

Soil Invertebrates

The feeding and burrowing habits of soil invertebrates determine the exposure of these organisms to COCs in soil. Invertebrates that may be exposed to COCs in soil include mites, woodlice, snails and slugs, nematodes, insects, spiders, centipedes, carabid beetles, and many others. Some invertebrates, such as many earthworm species, are exposed to COCs in soil because they ingest large amounts of soil during feeding. Soil invertebrates could also be exposed to soil COCs via direct dermal contact and inhalation of vapours of soil COCs in ambient air. The exposure to soil COC via inhalation of vapours in ambient air was considered to be insignificant compared to the direct contact and ingestion exposure pathways. However, there is insufficient information to evaluate this pathway for individual organisms. Therefore, this pathway was not assessed separately. While this represents an uncertainty in the evaluation, it should be noted that dose-response data on the direct contact pathway for volatile substances is usually based on analytical findings carried out under controlled head-space analytical procedures with concentrations expressed as the sum of soil vapour, soil water and soil particle concentrations. As such, assessment of the direct contact pathway for these receptors via the use of total soil analytical data is assumed to be protective of the exposure to volatiles via this pathway. To assess exposure and risk to soil invertebrates, COC concentrations in soil are compared to concentrations that have been deemed acceptable for soil invertebrate populations. The direct contact component values protective of terrestrial plants and soil invertebrates (MECP, 2011c) were used as the screening benchmark, where available. This screening is considered a qualitative assessment and is provided in Section 5.5.3.

Terrestrial invertebrates are likely to avoid water-saturated soils at and within a groundwater table, as this zone would not have suitable organic substrates or oxygen required for survival. They are generally found within the first 30 cm of soil, where the bulk of plant roots and biological activity takes place. Thus, terrestrial invertebrates are not anticipated to come into contact with groundwater or LNAPL on the RA property and this exposure pathway was considered to be incomplete in the ERA.

Terrestrial Wildlife

Wildlife may be exposed to COCs in the environment via three distinct pathways: ingestion, inhalation, and dermal contact. Ingestion of COCs can occur via consumption of food containing the COC and by incidental ingestion of impacted soil. Inhalation is a potential exposure pathway for chemicals that are volatile, or if they are attached to fine particulate matter suspended in ambient air. Inhalation toxicity data for mammalian wildlife are limited for endpoints of interest in the ERA (e.g., reproduction) and little data exists for avian species.

Dermal exposure occurs when COCs contact and/or are absorbed through the skin, as a result of direct contact with impacted soil. Dermal exposure is generally assumed to be negligible for birds and mammals because feathers on birds and fur on mammals reduce dermal exposure by limiting the contact of skin with chemicals in soil (Sample et al., 1997). It should be noted that, as per MECP (2011c), there is currently insufficient information to add incorporate modeling for inhalation and dermal exposure of terrestrial wildlife to this process, and it is commonly thought that inhalation and dermal exposure are not significant pathways of exposure. As such, these pathways were not analyzed quantitatively for the purposes of this ERA. and were assessed qualitatively in Section 5.5.3. However, incidental ingestion of soil may occur during feeding and grooming, and exposure to soil COCs that have accumulated in food items is also considered a possible exposure route. Hence, exposure via ingestion of food and soil is the only exposure pathway considered quantitatively in this ERA for both mammalian and avian receptor groups. This pathway is generally the most significant exposure route of terrestrial species to environmental contaminants. The direct contact component values protective of terrestrial wildlife (MECP, 2011c) were used as the screening benchmark, where available. This screening is considered a qualitative assessment and is provided in Section 5.5.3.

Only terrestrial mammals that burrow have the potential to come into direct contact with groundwater or LNAPL. Potential for direct contact to groundwater by the Short-Tailed Shrew and Meadow Vole is considered to be minimal as these small mammals have shallow burrows and are likely to avoid water-saturated soils. Short-Tailed Shrews tend to burrow in leaf litter and fallen grasses within 0.1 metre of the surface (Ballenger, 2000), while Meadow Voles create shallow surface tunnels or runways and

use existing burrows only occasionally. As a result, it is unlikely for terrestrial mammals on the RA property to come into direct contact with groundwater or LNAPL and, therefore, direct contact to this medium was considered an incomplete exposure pathway.

Off-Site Receptors

Off-Site terrestrial receptors may be exposed to COCs in soil via direct contact with soil/dust. Although movement of dust off-Site is possible, particularly that generated during redevelopment activities, inhalation of dust is not considered to be a significant exposure pathway for ecological receptors.

Off-Site aquatic receptors may be exposed to COCs in soil indirectly via soil leaching to groundwater and the subsequent migration to surface water and to groundwater COCs via migration to surface water. Therefore, these pathways were considered complete in the ERA. Various aquatic species including fish, invertebrates, reptiles, amphibians and aquatic plant species were considered as aquatic VECs present in an off-Site water body that may be influenced by the migration of COCs from on-Site soil and groundwater. Generally, aquatic animals including fish, invertebrates and amphibians can be exposed to the COCs in a water body via skin/scale absorption, water ingestion and food ingestion. Based on the physical chemical properties of a compound, any of the above exposure pathways might be considered either significant or negligible. For example, hydrophobic compounds, if they are released to a water body, will generally partition to organic particulate matter and ultimately precipitate into the sediment. As long as these compounds partition to the particulate matter they are less bioavailable for direct uptake by fish. The main exposure pathway for fish to the hydrophobic compounds will be via ingestion of food items which have been exposed to COCs in the sediment.

Aquatic vegetation will be exposed to COCs in a water body via root uptake of surface water, stem uptake through direct contact with surface water, and root uptake from sediment.

The S-GW3 and GW3 component values protective of soil leaching to groundwater and subsequent migration to surface water and the groundwater migration to surface water pathways (MECP, 2011c), respectively, were used as the screening benchmarks for evaluation of risks to aquatic receptors, where available. This screening is considered a qualitative assessment and is provided in Section 5.5.3.

5.3.2 Exposure Estimates

The majority of toxicological literature for these receptor groups is based on studies where exposures are reported in terms of media concentrations, as opposed to uptake or dose metrics. Therefore, no calculations for uptake/dose have been performed for these pathways/receptors. As the aerial extent of the maximum COC concentration (and, thus, the REM) was assumed to be the entire Site footprint, exposure was assumed to take place at all times, while the receptor is present on-Site for these pathways and receptor groups. Although birds and mammals are mobile receptors that will forage from a large home range (see Table E5-4), risks to these receptors were also based on the REM of the COCs in soil. To be conservative it is assumed that the applicable ecological receptors are present on-Site and would be exposed to COCs in soil 100% of the time. Therefore, the REM of soil and groundwater COC concentrations were used to predict risks to all ecological receptors in the ERA.

The REM concentrations in soil and groundwater are presented in Tables E5-1 and E5-2 of Appendix E, respectively.

Exposure modeling for uptake via soil ingestion and dietary food items by terrestrial mammals and birds is presented in Section 5.3.2.1, below. Note that exposure modeling was only performed for parameters carried forward for assessment of this pathway where the benchmark was based on a dose (i.e., mg/kg-bw/day) rather than a soil concentration (see Table E5-7).

5.3.2.1 Exposure Modeling for Terrestrial Wildlife

Exposure of wildlife (mammals and birds) to soil COCs may occur by consumption of COCs in soil directly or through consumption of food sources that have been exposed to COCs, as represented by the following equation:

$$E_{ingestion} = E_{food} + E_{soil}$$

where:

$E_{ingestion}$	=	Total ingestion exposure (mg/kg/day)
E_{food}	=	Exposure from food consumption (mg/kg/day)
E_{soil}	=	Exposure from soil consumption (mg/kg/day)

Exposure from food ingestion is estimated by the following equation:

$$E_{food} = (C_{food} \times IR_{food})/ BW$$

where:

E_{food}	=	Exposure from food consumption (mg/kg/day)
C_{food}	=	Concentration of chemical in food (mg/kg)
IR_{food}	=	Ingestion rate (kg/d)
BW	=	Body weight (kg)

Similarly, exposure from soil ingestion is estimated by the following equation:

$$E_{soil} = (C_{soil} \times IR_{soil})/ BW$$

where:

E_{soil}	=	Exposure from soil consumption (mg/kg/day)
C_{soil}	=	Concentration of chemical in soil (mg/kg)
IR_{soil}	=	Soil ingestion rate (kg/d)
BW	=	Body weight (kg)

To ensure a conservative RA approach, it was assumed that 100% percent of the terrestrial receptor diet originated from on-Site resources. The moisture content of dietary items was assumed to be 84% for earthworms and 70% for terrestrial vegetation (Sample and Suter, 1994). The wet weight consumption rates for the American Woodcock and Red-Winged Blackbird in Table E5-4 were converted into dry weight consumption rates using the moisture content of dietary items. As such, dry weight consumption rates are calculated as follows:

Consumption of invertebrates for American Woodcock

0.15 kg wet weight/ day x (1-0.84) = 0.024 kg dry weight/ day

Consumption of plants for Red-Winged Blackbird

0.091 kg wet weight/ day x (1-0.7) = 0.0273 kg dry weight/ day

The dry weight consumption rates of the other bird, Short-Tailed Shrew, Meadow Vole, Red Fox and Red-Tailed Hawk were calculated using the same rationale.

In the current ERA, the contaminant concentrations in food items (*e.g.*, plants and soil invertebrates) consumed by mammals and birds were calculated using the following methods:

Tissue Concentrations in Plants - Organic Chemicals

To estimate plant tissue concentrations of organic chemicals, the maximum COC concentration in soil was multiplied by the chemical-specific soil-to-plant bioconcentration factor (BCF). An example is provided below for benzo(a)anthracene.

$$C_{plants} = C_{soil} \times BCF$$

where:

C_{plants}	=	Concentration of chemical in plants on a dry weight basis (mg/kg)
C_s	=	REM soil concentration (mg/kg; 21.6 mg/kg for benzo(a)anthracene)
BCF	=	Bioconcentration factor (1.81E-02 for benzo(a)anthracene)

To estimate the soil-to-plant BCF, the following equation, expressed in Travis and Arms (1988), was used:

$$Log(BCF) = 1.588 - 0.578 \times Log(K_{ow})$$

where:

$LogK_{ow}$	=	Log Octanol-water partitioning coefficient (unitless; 5.76E+00 for benzo(a)anthracene)

Log K_{OW} values used in this RA are provided in Table E5-5. The plant tissue concentrations of soil COCs are presented in Table E5-6.

Tissue Concentrations in Soil Invertebrates – Organic Chemicals

To calculate the uptake of non-ionic organic contaminants from soil into the soil invertebrates, the model described in *Attachment 4-1* of *the US EPA Guidance for Developing Ecological Soil Screening Levels* (2007) was used. In this model, concentrations of non-ionic organic contaminants moving from soil into soil invertebrates are calculated as a function of the degree of partitioning between soil pore water and invertebrates. The following equations explain this phenomenon (benzo(a)anthracene provided as an example):

$$C_{worm} = K_{ww} \times C_w$$

where:

C_{worm}	=	Concentration in worm (mg/kg dry weight)
K_{ww}	=	Biota to soil water partitioning coefficient (L soil pore water/kg wet weight tissue; 6.41E+03 L soil pore water/kg wet weight tissue for benzo(a)anthracene, accounting for 16% solids, see below)
C_w	=	Concentration in the soil pore water (mg/L soil pore water; 6.40E-03 mg/L soil pore water for benzo(a)anthracene)

In the case of lipophilic chemicals, K_{ww} is a function of the octanol-water partition coefficient (K_{ow}) and the fraction lipid content of the organism. The following regression equation for K_{ww} in earthworms was developed:

$$Log(K_{ww}) = 0.87 \times Log(K_{ow}) - 2$$

Note that K_{ww} was converted from wet to dry tissue weight basis by assuming a 16% solid content for tissue and thus dividing K_{ww} (wet weight basis) by 0.16.

The concentration of a chemical in soil pore water (C_w) is related to the concentration in soil using the following equation:

$$C_w = C_s/K_d$$

where:

C_s = Concentration in soil (mg/kg soil)
K_d = Soil to water partitioning coefficient (L soil pore water / kg dw soil)

For non-ionic organic compounds, Kd is calculated as:

$$K_d = f_{oc} \times K_{oc}$$

where:

f_{oc} = Fraction of organic carbon in soil (kg organic carbon/kg soil)
K_{oc} = Soil organic carbon to water partitioning coefficient (L soil pore water/kg organic carbon)

In the absence of any measurement for f_{OC} on the RA property, the f_{OC} was set to 0.005 which is the MECP default value for f_{OC} in a medium to fine textured soil.

Therefore,

$$C_{worm} = 10^{0.87 \times Log(Kow) - 2} / 0.16 \times C_s/(f_{oc} \times K_{oc})$$

The predicted concentration of benzo(a)anthracene in the tissue of invertebrates is predicted to be 1.20E+02 mg/kg dw. The concentrations of soil COCs in the tissue of invertebrates are presented in Table E5-6.

Tissue Concentrations in Small Mammals and Birds – Organic Chemicals

To estimate the secondary or tertiary exposure levels of mammals and birds such as the Red Fox and Red-Tailed Hawk, through their diet, it was necessary to calculate the concentration of COCs in their food items, i.e., small mammals and birds.

The Travis and Arms biotransfer factor model presented in MECP (2011c) was used in the present RA in order to estimate the concentration of contaminants in the tissues of small mammals and birds. This model is also used by US EPA in order to calculate food item- and media-to-animal BCFs (US EPA, 1999b). Travis and Arms (1988) developed a regression model for deriving biotransfer factors of organic compounds to beef. A biotransfer factor was defined as the ratio of the chemical concentration in animal tissue to daily intake of chemical by the animal through ingestion of food and soil. The regression model related the biotransfer factor of a chemical to its octanol water partitioning coefficient, and is presented as follows:

$$LogB_{b/mammals} = -7.6 + LogK_{OW}$$

where:

$B_{b/mammals}$ = biotransfer factor (day/kg fresh weight tissue)

The biotransfer factor was used to estimate the tissue concentration based on the calculated daily intake of COCs.

$$C_{mammals/bird} = B_{b/\ mammals\ or\ birds} \times \text{Daily Intake of Chemical}_{b/\ mammals/birds}$$

where:

$C_{mammals/bird}$ = Concentration of soil COCs in tissue of mammals/bird (mg/kg fresh weight)

$B_{b/mammals\ or\ birds}$ = Biotransfer factor (day/kg fresh weight tissue)

Daily Intake of Chemical $_{b/\ mammals/birds}$ = Daily Intake of Chemicals by mammals and birds (mg/d)

Tissue Concentrations in Plants – Inorganics

To calculate the plant tissue concentrations of barium found on the property, the following regression equation was used from *Attachment 4-1* of the *US EPA Guidance for Developing Ecological Soil Screening Levels* (2007):

$C_p = 0156 \times C_s$

where:

C_p = Concentration in plant tissue (mg/kg dry weight)

C_s = Concentration in soil (mg/kg)

Tissue Concentrations in Soil Invertebrates – Inorganics

To calculate the soil to earthworm uptake of barium found on the property, the following regression equation was used from *Attachment 4-1* of the *US EPA Guidance for Developing Ecological Soil Screening Levels* (2007):

$C_e = 0.091 \times C_s$

where:

C_e = Concentration in earthworm (mg/kg dry weight)

C_s = Concentration in soil (mg/kg)

Tissue Concentrations in Small Mammals and Birds – Inorganics

To calculate the soil to small mammals and birds uptake of barium found on the property, the following regression equation was used from *Attachment 4-1* of the *US EPA Guidance for Developing Ecological Soil Screening Levels* (2007):

$C_e = 0.00015 \times 50 \times C_s$

where:

C_e = Concentration in earthworm (mg/kg dry weight)

C_s = Concentration in soil (mg/kg)

The biotransfer factor for birds was derived by multiplying the mammal biotransfer factor by 0.8 to account for the difference in the fat content of birds versus mammals as per US EPA (1999b).

The predicted concentration of COCs in wildlife food items is presented in Table E5-6. The wildlife exposure estimates are presented as doses in Table E5-7.

5.3.3 Discussion of Uncertainty in the Exposure Assessment

The ERA was conducted using a "deterministic" approach, which is preferred by the MECP. "A deterministic" approach assumes that the maximum measured concentrations of COCs in soil and groundwater are, in fact found across the entire RA property. Therefore, it is expected that the exposure estimates for terrestrial mammals and birds are significantly over-estimated. The approach also over-predicts the risks to plant and soil invertebrate communities. Within a community, some organisms may be exposed to the maximum soil concentrations, but for the community as a whole, which exists over a wider area and depth, the assumption that each individual organism is exposed to the maximum COC concentrations will likely over-predict the exposure, and hence the risk to the community.

The ERA also over-predicts risks to VECs by assuming that they consume plants and soil invertebrates exposed to the maximum soil concentrations and would ingest only soil containing COCs at maximum concentrations. It is highly unlikely that a mobile receptor, such as a rodent or bird would consume plants or soil invertebrates or ingest soil only within the area of maximum COC concentrations in soil.

The use of regression models to estimate the Bb values, and their use in estimations of compound concentrations in small mammals and birds, may introduce uncertainty. Bioavailability, metabolic rate, type of digestive system, and feeding behaviour are the key factors that affect the uptake of a compound by wildlife species. By using the regression models to estimate the biotransfer factors, some assumptions are made regarding the above outlined key parameters which introduce uncertainties to estimated tissue concentrations in mammals and birds in higher trophic levels. In addition, biotransfer values have been developed using data from a limited number of empirical studies. The studied compounds, species and exposure pathways may differ from those at the Site. Also, the regression model developed by Travis and Arms (1988) applies to beef. Therefore, data used in developing the regression model are specific to tissue/organ analysis versus whole body. As a result, the exposure levels may be under- or over-estimated to an unknown degree which causes uncertainties in estimating exposure (US EPA, 1999b). In summary, as cited in the US EPA (1999b), major uncertainties associated with this approach are the 1) amount of bioconcentration of various organic compounds in fatty tissues, and 2) variation in lipid content, metabolism, and feeding characteristics between species.

The soil ingestion rates, dietary compositions, and dietary consumption rates used in the exposure assessment were taken from reputable sources but may have been based on animals in captivity. These values may not be completely representative of parameters for individuals in the wild. This may result in over- or underestimations of exposure.

5.4 Hazard Assessment

5.4.1 Benchmark and Exposure Limits

Benchmarks and exposure limits are concentrations or doses derived using scientific data from toxicological studies that are considered as acceptable limits which provide protection to VECs. These benchmarks and exposure limits were utilized by the MECP (2011c) to derive the component values protective of ecological receptors. The component values derived by the MECP (2011c) were used to assess risks in the ERA. Where an MECP (2011c) benchmark was unavailable, a rationale for the selection of the benchmark and/or exposure limits used in the ERA is provided in Appendix L. Soil benchmark values are provided in Tables E5-8A and E5-8B for soil invertebrates and terrestrial plants, and mammals and birds, respectively.

5.4.2 Discussion of Uncertainty in the Hazard Assessment

Uncertainties associated with the hazard assessment include the following:

- With respect to most TRVs/benchmarks for common rodent test species (*i.e.*, mouse) were selected as surrogates for the Meadow Vole and Short-Tailed Shrew. This is based on the assumption that these species will have a similar toxicological response as the test species. If the target species are more or less sensitive than the test species, risks may be over or under-predicted, respectively.
- The chemical form of the COC used to derive the TRV/benchmark may differ from the form found in on-Site soils or in food items which may over or under-predict risks.
- Soil benchmarks are meant to be conservative values designed to rule out risks; it can be safely assumed that concentrations below the benchmarks are not expected to pose any adverse effects. However, when NOAELs are used, the values are not an exact threshold of toxicity and tend to be overly-conservative. Concentrations that exceed the NOAELs do not necessarily result in adverse effects. It is therefore preferred to assess the risk based on LOAELs or effect concentration endpoints (ECxx).
- As individual benchmark concentrations were not derived by the MECP for each of the plant and soil invertebrate groups, the selected values are assumed to be protective of both types of receptors. However, there are differences in the sensitivities of each receptor type and use of these values to predict risks may over- predict risks to the less sensitive of the two groups.
- For the assessment of risks to plants and soil invertebrates, the bioavailability of COCs in soil was assumed to be equivalent to the bioavailability in the soils of the studies used to derive the benchmark concentrations. If the bioavailability of COCs in on-Site soil is greater or less than in the study soils, the predicted risks may be under- or over-estimated, respectively.
- Toxicological effects data are more readily available for domestic and laboratory mammals, such as rats and mice than for other mammals. The use of this data may result in over- or under-estimations of risk, if applied to exposure estimates for wildlife species that are less or more sensitive, respectively, than the test species.
- In this RA, the GW3 value is also assumed to be protective of terrestrial animal indirect exposure to ground water COCs via surface water. However, if these assumptions are untrue, the predicted risks may be under-estimated for these pathways.

5.5 Risk Characterization

5.5.1 Interpretation of Ecological Risks

There are several ways that ecological risks may be characterized. For the current ERA, the method used was the calculation of a HQ, which is a unitless value defined as:

Hazard Quotient = Level of Exposure / TRV (or Benchmark)

Hazard quotients are calculated for each VEC/COC combination. The selection of HQ = 1 as an indicator of risk levels for ecological assessment, is an arbitrary one. A value of <1 indicates that there is an unlikely potential for an adverse effect at either the species or population level. A value of >1 indicates that there may be the potential for an adverse effect at the species level. However, this does not indicate that there is a risk at the population level.

An HQ range of greater than 1, although representative of a possible elevated ecological risk, may be appropriate in some cases, particularly where it would be inappropriate (more environmentally damaging) to remediate the associated natural environment as opposed to accepting an elevated HQ threshold. It might also be appropriate to allow the HQ to exceed 1 in cases where it can be demonstrated that the percentage of soil on the RA property with COC concentrations exceeding the TRV is such that an acceptable fraction of individual VECs might be at risk, but the population on a whole is protected. This approach is also considered appropriate when the following information for the Site is considered:

- The property is not considered environmentally sensitive as it is not located within 30 m of an area of natural significance or part of such an area and the assessment of risks does not include threatened or endangered species; and,

- An HQ greater than 1 is not conclusively indicative of unacceptable risk at the individual species level and is even less indicative of the potential to negatively impact ecological receptors at the population level since there is enough inherent conservatism in our approach to compensate for benchmark exceedances.

Conservative steps in our approach include:

- REM concentrations used in exposure assessment;
- No compensation for heterogeneity of the contaminant distribution within the ecosystem; the REM concentrations were used to represent the entire Site; and,
- The most sensitive test species were used to represent potential toxicity to all other species.

Furthermore, the US EPA describes the HQ as a screening tool for determining if an adverse effect is likely, but not indicative of the magnitude of risk. Thus, in cases where HQ > 1, further evaluation (e.g., statistical (probabilistic) analysis) may be warranted to determine if ecological risks are significant and whether RMM or remediation are justified.

Estimated risks are reported for ecological receptors based on the quantitative and qualitative assessment in Sections 5.5.2 and 5.5.3, respectively. RBCs protective of all VECs and candidate ecological PSS are provided in Section 5.5.4.

5.5.2 Quantitative Interpretation of Ecological Risks

A summary of the quantitative evaluation of risks to VECs is provided in Table 13, below.

Table 13: Summary of Quantitative Interpretation of Ecological Risks

Receptor	Pathway	Media	COC with Risk Predicted	Table Reference (Appendix E)
Terrestrial Plants	Direct Contact	Soil	Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, copper, indeno(1,2,3-cd)pyrene, lead, PHC F1, phenanthrene, zinc	E5-9
Soil Invertebrates	Direct Contact	Soil	Anthracene, benzo(a)anthracene, chrysene, copper, indeno(1,2,3-cd)pyrene, lead, PHC F1, phenanthrene, zinc	E5-9
Mammals – Meadow Vole	Direct Contact	Soil	None	E5-10A
Mammals – Short-Tailed Shrew	Direct Contact	Soil	Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, copper, indeno(1,2,3-cd)pyrene	E5-10A
Mammals – Red Fox	Direct Contact	Soil	None	E5-10A
Birds – American Woodcock	Direct Contact	Soil	Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, copper, indeno(1,2,3-cd)pyrene, lead	E5-10A

Receptor	Pathway	Media	COC with Risk Predicted	Table Reference (Appendix E)
Birds – Red-Winged Black Bird	Direct Contact	Soil	Barium, lead	E5-10A
Birds – Red-Tailed Hawk	Direct Contact	Soil	None	E5-10A

RMM are required for pathways for which unacceptable risks were predicted as discussed in Section 7 and Appendix M.

The RBCs for each pathway are provided in Tables E5-9 and E5-10B for plants and invertebrates exposure to soil COC and mammals and bird exposure to soil COCs, respectively.

5.5.3 Qualitative Interpretation of Ecological Risks

5.5.3.1 Screening of COCs Against Ecological Component Values

Soil COCs

The REM concentrations of soil COCs were compared to the applicable ecological component values provided by MECP (2011c) as shown in Table E5-1. The ecological component values for plants, soil invertebrates, mammals, birds, and for aquatic receptors, are point of contact values, since the majority of toxicological literature for these receptor groups is based on studies where exposures are reported in terms of media concentrations, as opposed to uptake or dose metrics. This constitutes as a qualitative assessment, since no calculations for uptake/dose have been performed and no additional considerations have been given to Site-specific parameters that may affect exposure. For parameters for which the REM concentrations meet the applicable component value, no unacceptable risk is anticipated. Therefore, no further assessment of risks is required. For parameters for which an REM concentration exceeded a component value, or for which no component value was available from MECP (2011c), a quantitative and/or qualitative evaluation was performed as discussed in Sections 5.2.2 or further within Section 5.5.3.

The following REM concentrations met the component values protective of plants and invertebrates, as shown in Table E5-1:

- Barium;
- Benzo(a)pyrene;
- Benzo(k)fluoranthene; and,
- Mercury.

Therefore, no risk is anticipated as a result of exposure to these parameters. The REM concentrations of all other parameters for which a component value protective of plants and invertebrates was available, were in excess of their respective component values protective of plants and soil invertebrates. Therefore, these parameters were assessed quantitatively in Section 5.5.2. No component values were available for acenaphthylene, benzo(j)fluoranthene, and, dibenz(a,h)anthracene. Therefore, these parameters were also evaluated quantitatively in Section 5.5.2.

The following REM concentrations met the component values protective of mammals and birds, as shown in Table E5-1:

- Anthracene;
- Benzo(a)pyrene;
- Mercury;
- PHC F1; and,
- Phenanthrene.

Therefore, no risk is anticipated as a result of exposure to these parameters. The REM concentrations of all other parameters for which a component value protective of mammals and birds was available, were in excess of their respective component values

protective of mammals and birds. Therefore, these parameters were assessed quantitatively in Section 5.5.2. No component values were available for acenaphthylene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene, and PHC fractions F1. With the exception of PHC F1, these parameters were evaluated quantitively in Section 5.5.2. PHC F1 was evaluated by *Alberta Tier 1 Soil and Groundwater Remediation Guideline,* January 2019 (AEP, 2024), refer to Appendix L. The REM concentrations of PHC F1 (306 mg/kg) were below their applicable AEP Surface Soil Remediation Guideline Value for Natural Area Land Use for wildlife soil and food ingestion (11,000 mg/kg). Therefore, risks to mammals and birds from exposure to PHC F1 in soil are not anticipated. Therefore, with the exception of PHC F1, these parameters were evaluated quantitively in Section 5.5.2.

The REM concentrations of soil COCs were compared to the ecological component values protective of soil leaching to groundwater (S-GW3) as shown in Table E5-1. All parameters for which component values are provided by the MECP were within the generic S-GW3 component value, with the exception of acenaphthylene, anthracene and PHC F1. No S-GW3 value was available for barium, copper, lead, and zinc. Qualitative evaluation of parameters exceeding the generic S-GW3 value and parameters without an S-GW3 value is discussed in Section 5.5.3.4.

Groundwater COCs

The REM of the groundwater COCs were compared to the ecological component values protective of groundwater migrating to surface water (GW3), as shown in Table E5-2. The REM concentrations for PHC F1, PHC F2 and xylene are above the generic their respective GW3 component values, and no GW3 component value is available for PHC F3. Qualitative evaluation of parameters exceeding the generic GW3 value and parameters without an GW3 value is discussed in Section 5.5.3.5.

5.5.3.2 Terrestrial Wildlife

As discussed in Section 5.3.1, wildlife may be exposed to COCs in the environment via three distinct pathways: ingestion, inhalation, and dermal contact. However, this RA follows the guidance of the US EPA (1999b) and Environment Canada (1994) who consider ingestion to be the major pathway of concern for wildlife and consider the inhalation and dermal contact exposure pathways to be negligible in relative terms. Therefore, in terms of a qualitative evaluation, the latter pathways were not considered significant in this RA and risks to wildlife via these exposure pathways are not anticipated to exceed acceptable limits.

5.5.3.3 Terrestrial Plants and Soil Invertebrates

As outlined in Section 5.3.1, plants could be exposed to volatile COCs via stem and foliar uptake of vapours. Furthermore, soil invertebrates could also potentially be exposed to volatile COCs via inhalation of vapours. However, exposure to these receptors via volatilization was considered to be insignificant compared to the direct contact exposure pathway as most chemicals are rapidly diluted and dispersed. Therefore, these pathways were not assessed separately for these receptors. While this represents an uncertainty in the evaluation, it should be noted that dose-response data on the direct contact pathway for volatile substances is often based on analytical findings carried out under controlled head-space analytical procedures with concentrations expressed as the sum of soil vapour, soil water and soil particle concentrations. As such, assessment of the direct contact pathway for these receptors via the use of total soil analytical data is assumed to be protective of the exposure to volatiles via this pathway and these pathways are not anticipated to are not anticipated to exceed acceptable limits.

5.5.3.4 Soil Leaching

The REM concentrations of soil COCs were compared to the ecological component values protective of soil leaching to groundwater (S-GW3) as shown in Table E5-1. All parameters for which a component value was provided were within the generic S-GW3 component value, with the exception of acenaphthylene, anthracene and PHC F1. As shown in Table E5-1, the S-GW3 component value was modified within the MGRA Model (MECP, 2016) by applying the Site-specific distance to the receiving surface water body, Lake Ontario located 1.3 km south of the Site. The REM concentrations of acenaphthylene, anthracene and PHC F1 met their respective Site-specific GW3 component values. Component values were not available for barium, copper, lead, and zinc. The maximum groundwater concentration of these parameters was compared against the groundwater Table 3 SCS (see Table E5-3). As all groundwater samples were within the Table 3 SCS for barium, copper, lead, and zinc, significant leaching of these parameters is not anticipated. Therefore, significant leaching of these chemicals in soil to groundwater and subsequent

migration to Lake Ontario is not anticipated. As such, no unacceptable risk is anticipated for off-Site aquatic receptors via this pathway.

5.5.3.5 Groundwater Migration and Discharge to Surface Water

As shown on Table E5-2, PHC F1, PHC F2, and xylenes are present in groundwater at concentrations above their respective generic GW3 component values. Given that PHC F3 is largely insoluble in groundwater, no GW3 component value is provided for the assessment of this parameter and no potential risks to off-Site aquatic receptors are anticipated. As shown in Table E5-2, the GW3 component value was modified within the MGRA Model (MECP, 2016) by applying the Site-specific distance to the receiving surface water body, Lake Ontario located 1.3 km south of the Site. The REM concentration of xylene met the Site-specific GW3 component value, while PHC F1 and PHC F2 still exceeded the modified GW3 component value indicating the potential for off-Site migration and discharge to a receiving surface water body.

Although, the Site specific GW3 component values were exceeded for PHC F1 and F2, EXP is of the opinion that off-Site risks to aquatic receptors are not anticipated as a result. Based on the delineation of groundwater exceedances to the northeastern portion of the Site, groundwater exceedances do not appear to be migrating across the RA property with the groundwater flow path. In addition, the Site is located approximately 1.3 km north of Lake Ontario and is located the highly urbanized downtown City core. Groundwater would likely be intercepted by the foundational collection systems of deeper structures (i.e., parking garages, transport tunnels, municipal infrastructure) prior to discharge to Lake Ontario. As such, although the Site-specific GW3 component values are exceeded by PHC F1 and F2 REM concentrations, no risks are identified to off-Site aquatic ecological receptors present within Lake Ontario.

5.5.3.6 Residual LNAPL Free Product

As noted above in the RA, residual free product is present at the northeastern corner of the Site and has been vertically and laterally delineated as presented on Figure 13A. The residual LNAPL is present floating atop the groundwater table below the Site. There are no complete direct contact exposure pathways for terrestrial ecological receptors to contact the residual free product at the Site. Due to the depth to the water table, direct contact with free product for terrestrial plants, invertebrates, mammals and birds is considered to be an incomplete exposure pathway. While the inhalation and atmospheric deposition of contaminant vapours sourced from residual LNAPL is identified to be a complete exposure pathway, the total exposure for terrestrial ecological receptors is assumed to be negligible. Terrestrial mammals and birds are mobile receptors and would not be expected to remain on-Site at ground level in the northeastern corner of the Site were worst case outdoor air concentrations may be expected. Similarly, while terrestrial plants and soil invertebrates may be sessile or have limited mobility, atmospheric exposure to contaminant vapours sourced from residual LNAPl is expected to be a minor overall contribution to total exposure in comparison with exposure routes such as direct soil contact and root uptake. Based on the above, risks to ecological receptors as a result of the on-Site residual LNAPL are not anticipated at this time. Further discussion on the potential for off-Site risks to ecological receptors is provided within Section 5.5.6.

5.5.4 Ecological Property-Specific Standards

For parameters having an REM concentration within all applicable MECP (2011c) ecotoxicity component values, and there are no applicable exposure pathways with no available MECP (2011c) component value, the lowest component value was selected as the candidate PSS. For parameters wherein the REM concentration exceeded an ecotoxicity component value or an MECP (2011c) component value was unavailable for an ecological pathway, the lowest of the component value or risk-based back-calculated value protective of all ecological receptors was determined (“minimum RBC”). This minimum RBC was selected as the final candidate ecological PSS except where the candidate RBC value was lower than the on-Site REM concentration. Where the minimum RBC is less than then on-Site REM concentration, RMM are necessary and the final candidate ecological PSS was set as the REM concentration (i.e., maximum concentration + 20% to account for sampling and analytical variability).

Ecological Property-Specific Soil Standards

The final soil ecological PSS are presented in Table E5-11. In instances where the minimum RBC is lower than the REM, the REM was selected as the final candidate PSS in the presence of RMM. Note that based on the qualitative assessment (see Sections 5.5.3 and 5.5.6) for some parameters/pathways, the selection of the REM as the candidate PSS does not necessarily signify that

RMM is required for the parameter. Parameters requiring RMM are noted in Table E5-12. The remaining final soil ecological PSS were set to the minimum RBC.

The final ecological PSS (Table E5-11) were carried into Section 6 of the RA for selection of the final PSS for the Site.

As the final PSS, as selected in Section 6, are equal to the REM soil concentrations, a separate evaluation of risk at PSS is not required for parameters/pathways evaluated quantitatively in the ERA.

Ecological Property-Specific Groundwater Standards

The groundwater ecological RBCs are presented in Table E5-12. Candidate ecological PSS was set to REM to ensure the PSS is within a reasonable estimate of the maximum and not excessively greater than the measured concentrations as with the RBC (GW3 component values).

The final candidate ecological PSS for groundwater (Tables E5-12) were carried into Section 6 of the RA for selection of the final PSS for the Site.

Risks at the proposed PSS values were not calculated as the REM concentrations were used to assess risk in this RA and the final PSS, as selected in Section 6, do not exceed the REM concentrations.

5.5.5 Special Considerations

Section 41 of O. Reg. 153/04 dictates certain restrictions in application of SCS for environmentally sensitive areas. The Site was not identified as an environmentally sensitive area as discussed in Section 3.3.1.

Section 43.1 of O. Reg. 153/04 defines the restrictions in application of SCS for shallow soil property or water body. As discussed in Section 3.2.1, bedrock was not encountered at depths of 2 mbgs or less. Thus, greater than two-thirds of the Site has overburden greater than 2 metres in thickness, and the Site is not considered to be within a shallow soil condition, as per O. Reg. 153/04, Section 43.1.

5.5.6 Interpretations of Off-Site Ecological Risks

The proposed ecological PSS were evaluated as to whether they would result in a concentration greater than the applicable full depth SCS for the nearest off-Site receptor.

The Site is located in an area of primarily mixed commercial, institutional and residential use. Additionally, Lake Ontario is located approximately 1.3 km south of the Site. Surrounding properties include commercial land use to the south and southwest along Queen Street West, Augusta Avenue followed by residential land use to the east, Denison Avenue followed by residential and institutional land use to the west and Wolseley Street followed by residential land use to the north. Based on the current surrounding land uses and non-potable groundwater conditions, the Table 3 SCS for all types of property use were identified as the applicable full depth standards for the nearest off-Site ecological receptors which includes terrestrial plants, invertebrates, mammals, and birds which may frequent the surrounding properties as well as aquatic species inhabiting Lake Ontario.

The nearest off-Site terrestrial ecological receptors for soil COCs are terrestrial plants, invertebrates, mammals and birds which may frequent the surrounding properties. The COCs found in soil are not expected to be transported across the RA property and be present at concentrations in excess of the Table 3 SCS at the nearest off-Site terrestrial receptors due to the limited mobility of soil. Although there is potential for off-Site receptors to be exposed to soil and dust from the RA property through soil/dust inhalation pathways, the off-Site migration of soil/dust is not likely to result in off-Site soil concentrations in excess of the Table 3 SCS. There is also potential for exposure to volatile COCs released from soil, groundwater or residual LNAPL via stem and foliar uptake (terrestrial plants) and vapour inhalation by soil invertebrates, mammals and birds. However, these pathways are considered negligible as discussed in Section 5.5.3 and are not considered likely to result in concentrations greater than the Table 3 SCS off-Site.

The nearest off-Site ecological receptors for groundwater COCs and leaching of soil COCs are aquatic receptors within the nearest downgradient water body, Lake Ontario, located within approximately 1.3 km south of the Site. Therefore, off-Site aquatic receptors (various species of fish, invertebrates, amphibians and aquatic plant species), semi-aquatic and terrestrial mammals and birds may be exposed to soil COCs via leaching to groundwater and the subsequent discharge, as well as to impacted groundwater migrating off-Site and discharging to Lake Ontario. Off-Site terrestrial plants, soil invertebrates, mammals and birds are not anticipated to directly contact groundwater or residual LNAPL due to the depth to groundwater measured at the Site.

As discussed in Sections 5.5.3.1 and 5.5.3.4, leaching of soil COCs to groundwater is anticipated to be negligible. While no S-GW3 component values were available for select metals in soil (i.e., barium, copper lead and zinc) maximum groundwater concentrations of these COCs were compared against the applicable SCS. Given that no exceedances of barium, copper, lead and zinc were identified in groundwater at the Site, no risks were identified for soil leaching to groundwater and off-Site migration. All other soil parameters were within their applicable S-GW3 component values, as shown on Table E5-1 of Appendix E. As such, there is no risk for off-Site receptors via the soil leaching to groundwater and off-Site migration exposure pathway.

As discussed in Section 5.5.3.5, although exceedances of the Site-specific GW3 component value were identified for PHC F1 and PHC F2 in groundwater the groundwater migration to surface water exposure pathway was further qualitatively assessed. Although, the Site specific GW3 component values were exceeded for PHC F1 and F2, EXP is of the opinion that off-Site risks to aquatic receptors are not anticipated as a result. Based on the delineation of groundwater exceedances to the northeastern portion of the Site, groundwater COCs do not appear to be migrating across the RA property with the groundwater flow path. In addition, the Site is located approximately 1.3 km north of Lake Ontario and is located the highly urbanized downtown City core. Groundwater would likely be intercepted by the foundational collection systems of deeper structures (i.e., parking garages, transport tunnels, municipal infrastructure) prior to discharge to Lake Ontario. As such, although the Site-specific GW3 component values are exceeded by PHC F1 and F2 REM concentrations, no risks are identified to off-Site aquatic ecological receptors present within Lake Ontario.

As discussed within Section 5.5.3.6, residual LNAPL product is present in the subsurface at the northeastern portion of the Site. The residual LNAPL product is laterally and vertically delineated and does not appear to be migrating across the Site with the groundwater flow direction. As discussed in Section 5.5.3.6, all exposure pathways for on-Site terrestrial ecological receptors to the residual LNAPL are considered to be negligible or incomplete. As such, it is assumed that the same would be true for off-Site terrestrial ecological receptors. As discussed above, residual LNAPL does not appear to be flowing across the Site with the groundwater flow direction. Given the separation distance from the nearest downgradient surface water body of 1.3 km, no risks are anticipated for off-Site aquatic ecological receptors as a result of the residual LNAPL at the Site.

A summary of potential off-Site exceedances is presented in Table 14, below.

Table 14: Summary of Potential Off-Site Exceedances (Ecological Receptors)

COC	Media	Applicable SCS at Location of the Nearest Off-Site Receptor	Location of Nearest Off-Site Receptor	Description of Receptor
PHC F1	Groundwater	750	Lake Ontario	Aquatic Ecological Receptors
PHC F2		150		
PHC F3		500		
Xylenes		4,200		

5.5.7 Discussion of Uncertainty

The RA relies on Site-specific data, as well as data from the scientific literature and where data is limited, or impractical to collect, assumptions are often made. Uncertainties could arise during the process of data collection and/or from the assumptions made.

It is important to understand the sources of uncertainty that could be introduced at any stages of the RA, when interpreting the RA conclusions. The RA adopts a conservative approach where uncertainty exists, recognizing that any uncertainty could potentially alter the conclusions of the RA. This ensures that the potential impacts would more likely be overestimated in the RA.

Some of the key sources of uncertainty associated with the current ERA include the following:

- Screening benchmarks for soil invertebrates and plants, published in the literature and by regulatory agencies, are meant to be conservative. The benchmarks facilitate the ruling out of risks, rather than prediction. It can be safely assumed that concentrations that are below these benchmark levels would not result in unacceptable impacts. However, the reverse may not be true; concentrations that exceed these levels do not necessarily result in adverse effects. The use of benchmark concentrations to predict risks is likely to result in the derivation of PSS values that are very conservative.
- It was assumed that the Meadow Vole, Short-Tailed Shrew, Red Fox, American Woodcock, Red-Winged Blackbird and Red-Tailed Hawk would only consume food items living and growing within on-Site soils that contain COCs at the maximum concentration. It is more realistic to assume that wildlife would forage throughout a larger area that contained soils with COC concentrations significantly lower than the maximum on-Site concentrations.
- It was assumed that all COCs in soil were 100% bioavailable for wildlife receptors. However, that is not always the case, considering that COCs may be found at depths to which VECs are not exposed. In addition, it is assumed that conditions in the wild, to which VECs are exposed, are similar to those in the laboratory studies from which TRVs are derived. This may not always be the case, as some studies may be based on direct dose or dermal applications of contaminants, while others may be based on uptake from soil with different properties than the RA property soil, which may, in turn, affect sorption and bioavailability.
- TRVs for birds are based on limited available data and by species-to-species extrapolation. Thus, an inherent uncertainty exists in the applicability of these TRVs due to species differences in sensitivity which may result in over- or under-estimations of risk.
- It is assumed that the screening benchmarks for aquatic life are protective of amphibians given the lack of toxicity data for amphibians, these screening benchmarks may over or under-estimate risk to these receptors. However, given the inherent conservative nature of these benchmarks, the likelihood of these screening benchmarks to underestimate risks to these receptors is considered low.
- It is assumed that the screening benchmarks for aquatic life are protective of terrestrial animal life and terrestrial plant root exposure to shallow groundwater.
- The use of a Site maximum concentration is not representative of the Site as a whole. Although within the area of the Site maximum, certain adverse effects may be observed for some ecological receptors, the goal of an ERA is not to protect specific ecological receptors, but the populations and communities of wildlife, plants and invertebrates as a whole. As such, although specific portions of a Site might be heavily impacted by contaminants, this does not mean that a healthy community of ecological species cannot thrive.
- Risks predicted using the HQ approach applies to individual organisms, whereas the assessment endpoint for the ERA is focused on the protection of populations and communities of wildlife, plants and invertebrates. Thus, derived PSS for ecological receptors are likely to be more conservative than is necessary.
- The use of an HQ of 1 is arbitrary. Risks predicted using HQ = 1 as a limit may apply to individual organisms, depending on the TRV that is used, whereas the assessment endpoint for the ERA is focused on the protection of populations and communities of wildlife, plants and invertebrates. Thus, derived RBC for ecological receptors are likely to be more conservative than is necessary.
- It is acknowledged that ecological component values were not developed with the consideration of LNAPL free product being present at a Site. The presence of free product in the subsurface can impact the assumptions used to derive the ecological component values. For example, LNAPL can act as a non-depleting source of contamination and release a continuous source of contamination to soil and groundwater, resulting in non-equilibrium conditions, which differ from the

assumption relied upon to derive the GW3 or S-GW3 component values. Although, the presence of LNAPL free-product in the subsurface at the Site may not have been accounted for in the derivation of component values used in the HHRA, component values were only relied upon for the assessment of soil and groundwater COC concentrations. Pre-remedial groundwater concentrations were relied upon for the assessment of potential risks to ensure a conservative approach was undertaken to assessing potential risks. In addition, a qualitative assessment of potential risks to LNAPL free product was completed for the HHRA due to uncertainty regarding a quantitative assessment of potential LNAPL risks.

6. Conclusions and Recommendations

The main findings from the RA pertaining to unacceptable risks to receptors are summarized in Table 15:

Table 15: Summary of Unacceptable Risks to Human and Ecological Health

Receptor	Pathway with Risk	Media	Contaminant of Concern
Site Resident (also surrogate for Site visitor and indoor worker)	Indoor Air Inhalation	Soil	PHC F1
		Groundwater	PHC F1, PHC F2
	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, copper, lead
	Ingestion of garden produce	Soil	Benzo(a)anthracene, benzo(a)pyrene, benzo(b/j)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, barium, copper, lead, zinc
Outdoor Maintenance Worker	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene
Construction Worker	Direct Contact (dermal contact and incidental ingestion)	Groundwater	PHC F1, PHC F2
	Outdoor and Trench Air Inhalation		Xylenes, PHC F1
Plants and Soil Invertebrates	Direct Contact	Soil	Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, copper, indeo(1,2,3-cd)pyrene, lead, PHC F1, phenanthrene and zinc
Mammals and Birds	Direct Contact	Soil	Barium, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, copper, indeno(1,2,3-cd)pyrene, lead

* No unacceptable risks were predicted for soil particulate inhalation.

As discussed within Section 4.4.3.6 of the HHRA and 5.5.3.6 of the ERA, a qualitative assessment of the LNAPL risks to human and ecological receptors at the Site was performed. As shown in Table 15, risks to the Site resident, Site visitor and long-term indoor worker were identified via vapour intrusion of volatile components of the LNAPL. In addition, risks for the construction worker were identified for direct contact with LNAPL while working within a trench or excavation and for the outdoor/trench air inhalation exposure pathway. Given the above, EXP has proposed RMM in Section 7.0 to address the potential risks posed by the presence of residual LNAPL at the Site.

RMM are proposed for protection of the receptors via the exposure pathways noted in Table 15, above, as described in Section 7 and Appendix M.

6.1 Recommended Standards

The final property-specific soil and groundwater Standards, derived to be protective of human health and ecological receptors, are provided in Tables E6-1 and E6-2, respectively. The lowest of the human health and ecological RBC values for each COC were evaluated for consideration of the candidate final PSS values. However, as discussed in Sections 4.4.4 and 5.5.4, it is recognized that the MECP Guidelines for risk assessment indicate PSS largely in excess of Site concentrations are not desirable. Since the MECP Approved MGRA Model limits PSS values to the maximum Site concentration + 20% (MECP, 2016), this approach has been applied in the RA. Therefore, if the minimum human health or ecological RBC exceeded the Site maximum by more than 20%, the REM concentration (i.e., Site maximum + 20% to account for sampling and analytical variability) was chosen as the final candidate PSS for consideration as the Final PSS. In addition, where a risk-based human health or ecological RBC value is lower than the on-Site COC maximum concentration, RMM are necessary and the final candidate RBC carried forward into Section 6 was set at the maximum concentration + 20% with RMM.

The final PSS for all soil and groundwater COCs on the RA property were set at the REM concentration (Tables E6-1 and E6-2, respectively).

RMM are proposed in Section 7.0 for the protection of the applicable human and ecological receptors. A detailed Risk Management Plan (RMP) is provided in Appendix M.

As discussed under the uncertainty analyses in Sections 4 and 5 of the RA report, the conservative assumptions made in the RA process are generally thought to contribute to a potential overestimation of the actual risks rather than underestimation of risks. Therefore, it is expected that the proposed Standards are adequately protective of on-Site human health and ecological receptors.

6.2 Special Considerations for Groundwater Standards

The proposed groundwater PSS were compared to the 50% solubility limits of groundwater COCs. As identified in Table E4-2 of Appendix E, the REM concentrations of PHC F1, PHC F2 and PHC F3 exceed their respective 50% solubility limits. As noted in the RA, LNAPL free product has been identified at the RA property and EXP is currently overseeing remedial efforts to extract the remaining LNAPL to an extent reasonably practicable. The 50% solubility limits for all groundwater COCs evaluated within the RA are presented in Tables E4-2 in Appendix E.

In 2021 and 2022, evidence (i.e., strong odour, sheen or visible product) of the presence of LNAPL free product was identified at several on-Site monitoring well locations at the RA property. In the summer of 2022, LNAPL free product, or signifiers of the potential for free product, was identified at BH/MW2, BH/MW3, BH/MW109, and BH/MW4. During a free-product assessment completed in July 2022 to assess all existing monitoring wells for the presence of free-product, the 'worst-case' conditions were observed at monitoring well location MW4, in the northeastern portion of the Site. Approximately 1 m of LNAPL free product was identified at MW4 in July 2022. It is noted that minimal product (i.e., <1 cm) was only observed in a bailer used to monitor

free product at MW2 during one (1) monitoring event in July 2022. In addition, only a strong petroleum odour was observed at MW3 in July 2022. Both MW2 and MW3 have been sampled for PHCs and BTEX in groundwater twice, in December-January 2021-2022 and on April 22, 2024. Analytical results for PHCs and BTEX from both monitoring wells have been below the laboratory RDL across all sampling events indicating LNAPL free product or dissolved phase COCs from LNAPL are not present at monitoring wells MW2 and MW3.

In March 2024, EXP returned to the Site and installed ten (10), 4-inch diameter, extraction wells at the Site in order to facilitate a remedial program to remove the LNAPL free product from groundwater at the Site to an extent reasonably practicable. All extraction wells were installed by a licensed drilling contractor and were completed to a depth of approximately 9.2 m bgs and were outfitted with a screen extending from 9.2 m bgs to just below surface grade at each extraction well. Extraction wells were installed across the northern and northeastern property boundary in the vicinity of the identified LNAPL and worst case PHC and BTEX exceedances. EXP is currently undertaking regular groundwater pumping events and free product gauging in order to remove the LNAPL free product from the subsurface at the Site. During each extraction event EXP Technicians use an IP probe to monitor the depth to free product, thickness of free product and static water level.

EXP and the remedial subcontractor are currently completing six (6) months of bi-weekly groundwater removals from the Site, which will be followed by six (6) months of monthly extraction events. During each extraction event EXP Technicians use an IP probe to monitor the depth to free product, thickness of free product and static water level. Following the completion of one (1) year of extraction events, EXP will complete a monthly free product monitoring program to evaluate if residual free product levels rebound following completion of the extraction activities. EXP has completed a total of six (6) months of bi-weekly free-product extractions at the Site between April 25, 2024, and September 26, 2024. EXP is currently in the process of completing six (6) months of regular monthly free product extractions at the Site. As of January 15th, 2025, EXP had completed a total of sixteen (16) free product removal events at the Site and the monthly free product extraction events are currently planned to cease in March 2025. Between initiation of the monitoring program and December 18, 2024, approximately 8,100 L of impacted groundwater and residual free product has been removed from the Site and transported to an accredited waste disposal facility. Following completion of the scheduled extraction events, EXP will return to the Site on a monthly basis to monitor the extraction wells and monitoring wells at the Site to determine if free product levels at the Site are remaining stable or rebounding. Following completion of the three (3) month observation period, EXP will make a recommendation to the Client pursue additional extraction efforts or other methods to address any residual LNAPL at the Site following completion of one (1) year of regular groundwater extractions. Following completion of the remedial extraction program, a summary report will be prepared to document the efforts undertaken at the Site to address the presence of LNAPL in groundwater.

Figure 13A presents a plan view summary of the results of the LNAPL extraction program completed at the Site between April 2024 and January 2025. Figure 13A also presents summary tables for each monitoring or extraction well where LNAPL has been identified during the program, presenting the measured thickness of LNAPL at each location by observation date. LNAPL free product has not been identified at BH/MW1, BH/MW2, BH/MW3, BH/MW107, BH/MW108, BH/MW24-1, BH/MW24-2, BH/MW24-3, EW1, EW2, EW3, and EW4. Residual (i.e., low levels) of LNAPL product have been identified at EW5, EW6 and EW7. Measurable LNAPL free product levels have been detected at EW8, EW9, EW10, BH/MW4, and BH/MW109. Worst-case LNAPL conditions appear to be localized to the northeastern corner of the RA property and do not appear to me migrating across the Site with the inferred direction of groundwater flow. It is assumed that the low permeability of the water bearing soils at the Site is acting to mitigate downgradient migration of the LNAPL across the RA property, cross sections showing the lateral and vertical delineation of LNAPL at the Site are provided as Figures 19B and 20B.

7. Risk Management Plan

7.1 Risk Management Plan

An RMP is required to address risks to human receptors on-Site. The objective of the RMP is to establish RMM to minimize the risk of exposure to the COCs to acceptable levels, by reducing the exposure to the COCs, or by completely eliminating the exposure risk, by blocking the exposure pathway of concern between the COCs and the potential receptors. It is understood that the RMM will be presented on a Certificate of Property Use (CPU) for the RA property.

7.1.1 Risk Management Performance Objectives

Risk reduction can be achieved by addressing any component of the exposure pathway by a) removing or treating the source, b) interrupting contaminant transport mechanisms, or c) controlling activities at the point of exposure. The RMP outlines the RMMs that may be implemented, where applicable and once the intended land use, on-Site activities and/or construction plans for the property are finalized, to achieve risk reduction.

The COCs and pathways which require RMM are summarized in Table 15 in Section 6. Table 16 presents an overview of the RMM and their performance objectives. The required reduction in exposure concentration to achieve acceptable target levels (HQ less than or equal to 0.2 (0.5 for PHCs or 0.8 for adult exposure to lead) for human health, and/or a cancer risk level to less than or equal to 1E-06 for human health) is provided in Tables 17A and 17B for soil and groundwater, respectively. Details of the RMM are discussed in Appendix M.

Table 16: Summary of RMM Performance Objectives

Proposed RMM	Pathway Mitigated	Affected Receptors	Performance Objectives
Vapour Mitigation System (Vapour Collection System and Membrane)	Indoor air inhalation (sourced from soil, groundwater and residual LNAPL)	Residents, Indoor Workers, Site Visitors	Reduction of COC concentrations in indoor air to within target levels.
Soil Barrier	Direct contact with soil	Residents, Outdoor Maintenance Workers, Site Visitors, terrestrial plants and soil invertebrates, mammals and birds	100% blockage of direct contact pathways through implementation of a physical barrier.
Health and Safety Plan	Direct contact with groundwater (and residual LNAPL) and inhalation of trench air (sourced from groundwater and residual LNAPL)	Construction/Subsurface Utility Workers	100% blockage of direct and indirect contact pathways by use of PPE.

Proposed RMM	Pathway Mitigated	Affected Receptors	Performance Objectives
Soil and Groundwater Management Plan	Direct contact with groundwater and residual LNAPL	Construction/Subsurface Utility Workers, Off-Site receptors	100% blockage of direct contact pathways by soil and groundwater management and administrative restrictions minimizing potential exposure during earthworks.
Prohibition of planting of fruit and vegetables for consumption	Ingestion of garden produce	Residents and Site visitors	100% blockage of exposure to soil COCs via ingestion of homegrown garden produce through an administrative control prohibiting gardening for consumption in on-Site soils unless they are isolated from subsurface conditions.
Administrative control for slab-on-grade building design	Indoor air inhalation (sourced from groundwater and residual LNAPL)	Residents, Indoor Workers, Site Visitors	Maintain sufficient separation distance from the foundational slab and the groundwater table, such that the assumptions relied upon in the RA remain valid upon redevelopment.

Table 17A: Summary of Required Exposure Concentration Reduction Levels for Soil COCs

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Minimum RBC[1]	Target Concentration[2]	Percent Concentration Reduction[3]
Indoor Air Inhalation (Resident, Indoor Worker, Site Visitor)	PHC F1	306	65	2.13	65	79%
Direct Contact (Resident, Site Visitor)	Benzo(a)anthracene	21.6	0.63	5.7	5.7	74%
	Benzo(a)pyrene	16.8	0.3	0.57	0.6	97%
	Benzo(b)fluoranthene	20.4	0.78	5.7	5.7	72%
	Benzo(k)fluoranthene	7.68	0.78	5.7	5.7	26%
	Dibenz(a,h)anthracene	2.52	0.1	0.57	0.6	77%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	5.70	5.7	44%
	Copper	1560	180	198	198	87%
	Lead	612	120	18.2	120	80%
Ingestion of Garden Produce (Resident, Site Visitor)	Benzo(a)anthracene	21.6	0.63	0.63	0.63	97%
	Benzo(a)pyrene	16.8	0.3	0.3	0.3	98%
	Benzo(b)fluoranthene	20.4	0.78	0.78	0.78	96%
	Benzo(k)fluoranthene	7.68	0.78	0.78	0.78	90%
	Chrysene	16.8	7.8	7.8	7.8	54%
	Dibenz(a,h)anthracene	2.52	0.1	0.1	0.1	96%
	Fluoranthene	48	0.69	0.69	0.69	99%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	0.48	0.48	95%
	Barium	623	390	390	390	37%
	Copper	1560	180	180	180	88%
	Lead	612	120	120	120	80%
	Zinc	660	340	340	340	48%
Direct Contact (Outdoor Maintenance Worker)	Benzo(a)anthracene	21.6	0.63	7	7	68%
	Benzo(a)pyrene	16.8	0.3	0.7	0.7	96%
	Benzo(b)fluoranthene	20.4	0.78	7	7	66%
	Benzo(k)fluoranthene	7.68	0.78	7	7	9%
	Dibenz(a,h)anthracene	2.52	0.1	0.7	0.7	72%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	7	7	32%
Direct Contact (Plants and Soil Invertebrates)	Anthracene	6.72	0.74	3.1	3.1	54%
	Benzo(a)anthracene	21.6	0.63	0.63	0.63	97%
	Benzo(b)fluoranthene	20.4	0.78	1.2	1.2	94%

	Chrysene	16.8	7.8	8.8	8.8	48%
	Copper	1560	180	180	180	88%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	0.48	0.48	95%
	Lead	612	120	310	310	49%
	PHC F1	306	65	210	210	31%
	Phenanthrene	27.6	7.8	7.8	7.8	72%
	Zinc	660	340	500	500	24%
Direct Contact (Mammals and Birds)	Barium	623	390	503	503	19%
	Benzo(a)anthracene	21.6	0.63	1.13	1	95%
	Benzo(b)fluoranthene	20.4	0.78	3.57	4	82%
	Benzo(k)fluoranthene	7.68	0.78	1.88	2	76%
	Chrysene	16.8	7.8	2.7	8	54%
	Copper	1560	180	242	242	84%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	1.96	2	81%
	Lead	612	120	80.7	120	80%

All values in µg/g.
[1] Minimum RBC for given exposure pathway for all relevant receptors from Human and Ecological Candidate PSS Tables (Tables E4-34A/B to E4-36 and E5-11, respectively, Appendix E).
[2] Where the minimum RBC was lower than the Table 3 SCS, the target concentration was set as the SCS.
[3] % concentration reduction = (PSS – Target Concentration)/PSS x 100%.
NA – not applicable. No reduction required.

Table 17B: Summary of Required Exposure Concentration Reduction Levels for Groundwater COCs

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Minimum RBC[1]	Target Concentration[2]	Percent Concentration Reduction[3]
Indoor Air Inhalation (Resident, Indoor Worker, Site Visitor)	PHC F1	255,600	750	0.45	750	100%
	PHC F2	192,000	150	5.67	150	100%
Direct Contact (Construction Worker)	PHC F1	255,600	750	17,702	17,702	93%
	PHC F2	192,000	150	5,264	5,264	97%
Outdoor and Trench Air Inhalation (Construction Worker)	Xylenes	5,568	4,200	270	4,200	25%
	PHC F1	255,600	750	5,055	5,055	98%

All values in µg/L.
[1] Minimum RBC for given exposure pathway for all relevant from Human Candidate PSS Tables (Tables E4-38 to E4-40, Appendix E).
[2] Where the minimum RBC was lower than the Table 3 SCS, the target concentration was set as the SCS.
[3] % concentration reduction = (PSS – Target Concentration)/PSS x 100%.

It is noted that the required reduction in exposure concentration cannot be calculated for pathways where exposure to LNAPL may present an unacceptable risk. Therefore, the required exposure reduction is assumed to be 100% for exposure to LNAPL.

7.1.2 Risk Management Measures

7.1.2.1 Administrative Control – Slab-On-Grade Building Desing

To ensure that the assumptions relied upon within the RA's evaluation of potential risks to human health via vapour intrusion remain valid upon redevelopment of the Site, the CPU will be required to include an administrative control governing the final form of the future building to be developed at the RA property. The administrative control will dictate that the future building to be developed at the RA property will need to be a slab-on-grade structure. The slab-on-grade building design will ensure that impacted groundwater will not be present within the gravel crush of the foundational slab upon redevelopment, thus ensuring the assumptions relied upon within the evaluation of potential human health risks remain valid.

7.1.2.2 Engineered Measures for Vapour Intrusion

RMMs are required to mitigate indoor air vapour intrusion for any new building constructed on-Site. The proposed re-development plan for the Site is yet to be finalized; however, it is EXP's understanding that the current redevelopment plan includes a multi-storey residential tower, cultural space and parkland (mixed Residential, Community, Parkland use). The future Site building will be constructed as a slab-on-grade structure, and no basement or other subgrade structures are planned to be constructed at the Site. The Site is intended to be redeveloped for indigenous housing and is a priority redevelopment project for the City of Toronto.

The proposed vapour mitigation system is a sub-slab vapour membrane barrier with a passive sub-slab venting system (with the option to convert to an active system as a contingency measure).

Specific requirements of the vapour intrusion RMM is provided in Appendix M. It is acknowledged that the vapour intrusion RMM will be a requirement of the CPU for the Site.

7.1.2.3 Hard and/or Fill Cap

The results of the risk assessment indicated that there are potential risks posed to the on-Site human and terrestrial ecological receptors via the direct contact exposure pathways with COCs in soil. As such, in order to protect the on--Site receptors, the implementation of a hard cap (i.e., asphalt, concrete, or building slab) and/or fill cap (unimpacted soil) is proposed as an RMM.

The barrier RMM consists of capping the RA Property ground surface wherever there is less than 1.0 metre of unimpacted soil between the soil surface and impacted soil, so as to prevent exposure to the COCs.

It is noted that "unimpacted soil" is described as soil in which contaminants are present at concentrations less than the MECP Table 3 SCS; "impacted soil" is described as soil in which one (1) or more contaminants are present at a concentration greater than the risk-based concentration without incorporation of RMM.

The barrier may consist entirely of a fill cap; entirely of a hard cap; or, of a hard cap in some areas of the RA Property and a fill cap in other areas of the RA Property. The barrier RMM is required across the full aerial extent of the Site.

Details and specifications on the proposed engineering RMM, related to the hard cap and fill cap, are present in the Engineering Risk Management Measures provided in Appendix M. It is acknowledged that the barrier RMM will be a requirement of the CPU for the Site.

7.1.2.4 Health and Safety Plan

Under the Ontario Occupational Health and Safety Act, every employer is required to provide a health and safety policy and program. The Act also provides the framework and the tools to provide a safe and healthy workplace. It sets out the rights and duties of all parties in the workplace and establishes procedures for dealing with workplace hazards. Where compliance has not been achieved voluntarily, the Act provides for enforcement of the law. The implementation of a HASP is, therefore, the duty of every employer and the scope of the RMP is limited to HASP which is specific to unacceptable risks identified for the construction worker. At the time of work, the HASP should be prepared by a qualified person with respect to health and safety practices in

the workplace and pertaining to the COCs noted in Table 15 (Section 6), specifically direct contact with groundwater impacts and residual LNAPL. In addition, the HASP will be required to provide specific guidance related to mitigating the potential for risks to construction workers via outdoor and trench air inhalation. The HASP is to be specific to the exposure pathways that may pose potential risks above acceptable levels (i.e., direct contact) and is to be developed in accordance with all MOL and other occupational health and safety requirements.

Details of the minimum requirements of the HASP are described in Appendix M.

7.1.2.5 Soil and Groundwater Management Plan

In the event of any earthworks at the RA property involving potential contact with or the re-distribution of impacted soil and groundwater, a SGMP is recommended for the protection of human and ecological receptors. The SGMP will also be required to provide guidance for the potential presence of residual free-product within groundwater present in any excavations or trenches at the Site.

Details of the minimum requirements of a SGMP are described in Appendix M.

7.1.2.6 Prohibition of Planting of Fruit and Vegetables for Consumption

Given that there may be potential risks if a community or individual garden is planted in native soils as a result of soil COCs, prohibition of planting fruit or vegetable for consumption unless planted in above ground containers, isolated from the subsurface is included as an RMM.

7.1.2.7 Implications for Off-Site Receptors

The RMM pertaining to vapour intrusion and the HASP for on-Site workers will have no impact on off-Site human or ecological receptors.

The RMM pertaining to the soil barrier and SGMP may provide some level of protection to off-Site human and ecological receptors by minimizing off-Site migration of groundwater and soil/dust and preventing exposure to soil COCs through direct contact, ingestion and dust inhalation pathways. However, as migration of soil/dust is generally considered insignificant in terms of being an off-Site exposure pathway, it is assumed the implications for off-Site receptors are minimal.

7.1.3 Duration of Risk Management Measures

Indoor Air Vapour Intrusion

The proposed engineering controls protective of the indoor air vapour intrusion pathway are permanent RMM. These RMM must be maintained as long the concentrations of the applicable volatile COCs in soil and groundwater posing potential risks above acceptable levels are in excess of the MECP Table 3 SCS for soil and groundwater COCs, and while residual LNAPL is present.

Soil Barrier

The installation and maintenance of the soil barrier is required for as long as the applicable soil COC concentrations exceed the Table 3 SCS.

Health and Safety Plan

The implementation of HASP, where applicable, is required for as long as groundwater COCs exceed the Table 3 SCS, and while residual LNAPL is present.

Soil and Groundwater Management Plan

The SGWMP is required for as long as soil and groundwater COC concentrations exceed the Table 3 SCS, and while residual LNAPL is present.

Prohibition of Planting of Fruit and Vegetables for Consumption

The prohibition on the planting of fruit and vegetables for consumption is required as long as soil COC concentrations exceed the Table 3 SCS.

Slab-On-Grade Building Construction

The slab-on-grade administrative RMM is required on-Site for as long as groundwater COCs exceed the Table 3 SCS.

7.1.4 Requirements for Monitoring and Maintenance

Monitoring and maintenance during construction of a passive SVIMS is required. Furthermore, a pressure differential monitoring program and an indoor air quality program is required for this RMM.

Monitoring of the soil barrier measures will be required to ensure the integrity of all barriers, as applicable. Maintenance will involve the continued repair of any damage, deterioration or compromises noted during inspection of the barriers.

The maintenance and monitoring of all barriers will be the responsibility of the RA property owner, who must keep a written record of all inspections including visual observations and, where applicable, analytical test results. The property owner will ensure that a full program of monitoring is conducted and documented for as long as COCs exceed the applicable MECP SCS, or until a new RA is performed resulting in a new RSC.

No maintenance is necessary for RMM pertaining to the HASP or SGMP. When work is to be undertaken which requires implementation of a HASP or SGMP, these plans must be specific to the work to be undertaken, including outlining the necessary monitoring requirements, and must be prepared prior to initiating the work. Monitoring of the proper implementation of the HASP and SGMP will be required for the duration of time that the HASP and SGMP are implemented.

No maintenance or monitoring is required pertaining to the garden produce restriction or administrative slab-on-grade RMM is required.

Further details pertaining to monitoring and maintenance are provided in Appendix M.

8. Public Communication Plan

8.1 Optional Communication Plans

No optional public communication plan was prepared as part of the RA.

8.2 Required Communication Plans for RA Properties in Wider Area of Abatement

As the RA property was not located within a WAA, the preparation of a public communications plan was not a requirement of the RA.

Appendix A: Limitations and Use of Report

LIMITATIONS AND USE OF REPORT

BASIS OF REPORT

The Report is based on site conditions known or inferred by the investigation undertaken as of the date of the Report. Should changes occur which potentially impact the condition of the site the recommendations of EXP may require re-evaluation. Where special concerns exist, or the Client has special considerations or requirements, these should be disclosed to EXP to allow for additional or special investigations to be undertaken not otherwise within the scope of investigation conducted for the purpose of the Report.

Where applicable, recommended field services are the minimum necessary to ascertain that construction is being carried out in general conformity with building code guidelines, generally accepted practices and EXP's recommendations. Any reduction in the level of services recommended will result in EXP providing qualified opinions regarding the adequacy of the work. EXP can assist design professionals or contractors retained by the Client to review applicable plans, drawings, and specifications as they relate to the Report or to conduct field reviews during construction.

RELIANCE ON INFORMATION PROVIDED

The evaluation and conclusions contained in the Report are based on conditions in evidence at the time of site inspections and information provided to EXP by the Client and others. The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose as communicated by the Client. EXP has relied in good faith upon such representations, information and instructions and accepts no responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of any misstatements, omissions, misrepresentation or fraudulent acts of persons providing information. Unless specifically stated otherwise, the applicability and reliability of the findings, recommendations, suggestions or opinions expressed in the Report are only valid to the extent that there has been no material alteration to or variation from any of the information provided to EXP.

STANDARD OF CARE

This report ("Report") has been prepared in a manner consistent with the degree of care and skill exercised by engineering consultants currently practicing under similar circumstances and locale. No other warranty, expressed or implied, is made. Unless specifically stated otherwise, the Report does not contain environmental consulting advice.

COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment form part of the Report. This material includes, but is not limited to, the terms of reference given to EXP by the Client, communications between EXP and the Client, other reports, proposals or documents prepared by EXP for the Client in connection with the site described in the Report. In order to properly understand the suggestions, recommendations and opinions expressed in the Report, reference must be made to the Report in its entirety. EXP is not responsible for use by any party of portions of the Report.

USE OF REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. No other party may use or rely upon the Report in whole or in part without the written consent of EXP. Any use of the Report, or any portion of the Report, by a third party are the sole responsibility of such third party. EXP is not responsible for damages suffered by any third party resulting from unauthorised use of the Report.

REPORT FORMAT

Where EXP has submitted both electronic file and a hard copy of the Report, or any document forming part of the Report, only the signed and sealed hard copy shall be the original documents for record and working purposes. In the event of a dispute or discrepancy, the hard copy shall govern. Electronic files transmitted by EXP utilize specific software and hardware systems. EXP makes no representation about the compatibility of these files with the Client's current or future software and hardware systems. Regardless of format, the documents described herein are EXP's instruments of professional service and shall not be altered without the written consent of EXP.

Appendix B: Phase Two Conceptual Site Model

Phase Two Conceptual Site Model – 15 Denison Avenue, Toronto, ON

This section presents a P2CSM providing a narrative, graphical and tabulated description integrating information related to the Site geologic and hydrogeologic conditions, areas of potential environmental concern/potential contaminating activities, the presence and distribution of potential contaminants of concern, contaminant fate and transport, and potential exposure pathways. These components are discussed in the following sections. The Phase Two CSM was completed in accordance with O. Reg.153/04 as defined by the MECP. The list of figures referenced throughout this report is provided below.

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1. Introduction

The Site is located on the east side of Denison Avenue, west of Augusta Avenue and south of Wolseley Street, approximately 45 metres north of Queen Street West (Figure 1). Details of the Site are as follows:

Table 1: Site Identification Information

Municipal Address	15 Denison Avenue
Current Land Use	Commercial
Proposed Land Use	Residential, Community, Parkland
Legal Description	Part of PIN 21238-0045 (LT) LANE PL 65 TORONTO; 10 FT LANE, 8 FT 9 INCH LANE PL D127 TORONTO; PT LT 1 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT LT 9 PL D127 TORONTO AS IN WA99649; TORONTO , CITY OF TORONTO PIN 21238-0046 (LT) LT 1-5 PL D127 TORONTO EXCEPT WA95815, WA99649; TORONTO , CITY OF TORONTO PIN 21238-0047 (LT) LT 6-8 PL D127 TORONTO; PT LT 9 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT UNLETTERED LT TO REAR OF LT 3 N/S QUEEN ST PL 65 TORONTO PT 5, EXPROP PL WA91330; PT 1 & 2, EXPROP PL WA88833 & AS IN WA90829 WA88489, WA88331, WA88288, WA88252 EXCEPT WA99649, WA95819; S/T WA90829; S/T INTEREST IN WA90829; S/T DEBTS IN WA97766; TORONTO , CITY OF TORONTO
Property Identification Number (PIN)	Part of 21238-0045 (LT) All of 21238-0046 (LT) All of 21238-0047 (LT)
Approximate Universal Transverse Mercator (UTM) coordinates	NAD83 17T 629009 m E 4834085 m N
Accuracy Estimate of UTM	10-15 m
Measurement Method	GPS
Site Area	0.24 hectares (0.59 acres)
Property Owners, Owner Contact and Address	The Corporation of the City of Toronto 61 Front Street West, Union Station, East Wing, 3rd Floor Toronto, Ontario M5J 1E5 Attn. Mr. Jason Slidders ~~attn. Ms. Tracey Smith~~

2. Potentially Contaminating Activities and Areas of Potential Environmental Concern

2.1 Potentially Contaminating Activities

A Phase One ESA, in accordance with O.Reg.153/04, has been conducted by EXP in 2021 for the Phase One Property. Several PCAs were identified on-Site and within 250 m from the Phase One Property site boundaries. All PCAs that were identified within 250 m property are shown on Figure 2. Each PCA was further evaluated to determine if the activity may be contributing to an APEC at the Phase One Property.

The QP determined that select PCAs may contribute to an APEC for the property, while several PCAs were determined to not contribute to an APEC at the Phase One Property/Site due to various factors including, but not limited to, relative distance to the Phase One Property/Site, orientation to the Phase One Property/Site; degree and nature of PCA operations, potentially impacted media, etc. Refer to Table 2 for the evaluation of the PCAs in the Phase One Study Area.

Table 2: Potentially Contaminating Activities in the Phase One Study Area

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
Site					
1	Entire Site	On-site	PCA#30 – Importation of Fill Material of Unknown Quality	Fill material was potentially used as a base for the parking lot, and in the former building cavities when the Site was redeveloped for use as a parking lot. Based on the borehole logs from past ESA work at the Site, fill of unknown quality is present across the Site.	Yes, as the PCA is located on-Site.
2	Entire Site	On-site	PCA#Other – de-icing salts	De-icing salts were potentially used in the parking lot and on adjacent municipal streets.	Yes, as the PCA is located on-Site.
Surrounding Properties					
3	5 Denison Avenue	5 m south	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records Denison Laundry was located at the property from 1936 to 1940.	Yes, based on the close proximity to the Site.
4	1-5 Denison Avenue	5 m south	PCA#Other - historical manufacturing	Based on the 1948 and 1961 FIPs, various light factories were located at the property.	Yes, based on the close proximity to the Site.
5	3 Denison Avenue	15 m south	PCA#37 – Operation of Dry Cleaning Equipment	Based on the municipal records Denison Cleaners was located at the property from 1955 to 1960.	Yes, based on the close proximity to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
			(where chemicals are used)		
6	472-474 Queen Street West	5 m south	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the 1948 and 1961 FIPs, a metal works company was located at the rear of the property.	Yes, based on the close proximity to the Site.
7	468 Queen Street West	5 m south	PCA#Other – Coal Storage	Based on the municipal records, Rogers Elias Coal Co Ltd was located at the property from 1907 to 1940.	Yes, based on the close proximity to the Site.
8	478 Queen Street West	5 m south	PCA#28 Gasoline and Associated Products in Fixed Tanks	Based on the ERIS report, J. Brelin had a fuel tank installed in 1919.	Yes, based on the close proximity to the Site.
9	11 Augusta Avenue	15 m southeast	PCA#8 – Chemical Manufacturing, Processing and Bulk Storage	Based on the municipal records, Allen William H Co, manufacturing chemists were located at the property in 1885.	Yes, based on the close proximity to the Site.
10	21-23 Augusta Avenue	15 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, Maple Leaf Cleaners Ltd. was located at the property from 1960 to 1965.	Yes, based on the close proximity to the Site.
11	458 Queen Street West	15 m east	PCA#17 – Dye Manufacturing, Processing and Bulk Storage	Based on the municipal records, British American Dyeing Co was located at the property in 1900.	Yes, based on the close proximity to the Site.
12	12 Denison Avenue	20 m west of the site	PCA#28 Gasoline and Associated Products in Fixed Tanks	Based on the ERIS report, a fuel oil tank was installed in 1932.	Yes, based on the close proximity to the Site.
13	41 Augusta Avenue	65 m north	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the 1935 FIP, a repair garage was located at the property.	Yes, based on the close proximity to the Site.
14	1 Denison Avenue	25 m south	PCA#Other - historical manufacturing	Based on the municipal records, Denton Manufacturing was located at the property in 1955.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
15	2 Denison Avenue	35 m southwest	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a cleaning and pressing business was located at the property in 1945.	No, based on the inferred hydraulically downgradient location relative to the Site.
16	40 Denison Avenue	80 m northwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1865.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
17	64 Denison Avenue	175 m northwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1870.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
18	68 Denison Avenue	185 m northwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property from 1875 to 1880.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
19	476 Adelaide Street West	210 m south	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1880.	No, based on the inferred hydraulically downgradient location relative to the Site.
20	480 Adelaide Street West	235 m south	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, State of the Arts Ltd. (a printing company) was registered as a waste generator at the property between 1995 and 2001.	No, based on the inferred hydraulically downgradient location relative to the Site.
21	490 Adelaide Street West	235 m south	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records, Webster Printing Co was located at the property from 1950 to 1960.	No, based on the inferred hydraulically downgradient location relative to the Site.
22A	502 Adelaide Street West	235 m south	PCA#39 – Paints Manufacturing, Processing and Bulk Storage	Based on the municipal records, various paint companies were located at the property between 1945 and 1995.	No, based on the inferred hydraulically downgradient location relative to the Site.
22B	502 Adelaide Street West	235 m south	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, Nu Way Mfg Co was located at the property between 1955 and 1979.	No, based on the inferred hydraulically downgradient location relative to the Site.
22C	502 Adelaide Street West	235 m south	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a cleaner & presser was located at the property in 1925.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
23A	530 Adelaide Street	240 m southwest	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report various clothing and textile manufacturing businesses were located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
23B	530 Adelaide Street	240 m southwest	PCA#49 – Salvage Yard, including automobile wrecking	Based on the 1948 FIP, a junk yard was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
24	2 Augusta Avenue	90 m south	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a sheet metal company was located at the property in 1919.	No, based on the inferred hydraulically downgradient location relative to the Site.
25	2-4 Augusta Avenue	90 m south	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a tin business was located at the property in 1914.	No, based on the inferred hydraulically downgradient location relative to the Site.
26	70 Augusta Avenue	155 m north	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a laundry business was located at the property in 1940.	No, based on the separation distance from the Site.
27	98 Augusta Avenue	215 m north	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, Grange Co Laundry was located at the property from 1945 to 1965.	No, based on the separation distance from the Site.
28	104 Augusta Avenue	220 m north	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a laundry business was located at the property in 1929.	No, based on the separation distance from the Site.
29	60 Brant Street	145 m south	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, City of Toronto had a gas & oil tank and pump in 1932.	No, based on the inferred hydraulically downgradient location relative to the Site.
30A	32 Camden Street	225 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1870.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
30B	32 Camden Street	225 m southeast	PCA#Other – Skate Manufacturing	Based on the municipal records and ERIS report, a custom skate manufacturing business was located at the property between 1978 and 1995.	No, based on the inferred hydraulically downgradient location relative to the Site.
31	32-36 Camden Street	225 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records, Modern Blouse Mfg Co. was located at the property in 1965.	No, based on the inferred hydraulically downgradient location relative to the Site.
32	34 Camden Street	225 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1880.	No, based on the inferred hydraulically downgradient location relative to the Site.
33	38-40 Camden Street	215 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records and ERIS report, Bernard Cowan Company limited, a clothing manufacturing company was located at the property from 1955 to 2000.	No, based on the inferred hydraulically downgradient location relative to the Site.
34	38 Camden Street	215 m southeast	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, various printing and publishing companies were located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
35	42 Camden Street	205 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records and ERIS report, Superb Fashions Ltd., a clothing manufacturing company was located at the property from 1985 to 2000.	No, based on the inferred hydraulically downgradient location relative to the Site.
36	44 Camden Street	200 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records, a fur clothing manufacturing company was located at the since in 1950.	No, based on the inferred hydraulically downgradient location relative to the Site.
37A	45 Camden Street	245 m southeast	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records and ERIS report, multiple printing companies were located at the property between 1955 and 1965.	No, based on the inferred hydraulically downgradient location relative to the Site.
37B	45 Camden Street	245 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, multiple clothing manufacturing companies were located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
38A	47 Camden Street	240 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records and FIPs, Canadian Sewing Machine & Steam Iron Co was located at the property from 1972 to 2000.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
38B	47 Camden Street	240 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records, Cobra Slack Mfg Co was located at the property in 1978/79.	No, based on the inferred hydraulically downgradient location relative to the Site.
38C	47 Camden Street	240 m southeast	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products	Based on the municipal records, Sklar Furniture Mfg Co was located at the property from 1950 to 1955.	No, based on the inferred hydraulically downgradient location relative to the Site.
39	49 Camden Street	235 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records, Elite Blouse & Skirt Mfg Co was located at the property in 1955.	No, based on the inferred hydraulically downgradient location relative to the Site.
40	51 Camden Street	225 m southeast	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report and municipal records, Lunar Caustic Press was located at the property from 1995 to 2000.	No, based on the inferred hydraulically downgradient location relative to the Site.
41	18 Cameron Street	165 m east	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records, a printer was located at the property in 1940.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
42	21 Carr Street	125 m northwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1880.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
43	34 Carr Street	165 m northwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1880.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
44A	20 Maud Street	200 m south	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, various printing companies were located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
44B	20 Maud Street	200 m south	PCA#54 – Textile Manufacturing and Processing	Based o the ERIS report, various clothing manufacturing companies were located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
44C	20 Maud Street	200 m south	PCA#Other - photoprocessing	Based on the ERIS report, 1076473 Ontario Limited was registered as a waste generator of photoprocessing wastes from 2002 to 2006.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
45	22 Maud Street	220 m south	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products	Based on the 1964 FIP, Master Pad Co. Ltd. (mill construction) was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
46	30 Maud Street	180 m south	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, Maud Street Printing Service was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
47	127 Portland Street	215 m south	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, a dress manufacturing company was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
48	127-129 Portland Street	215 m south	PCA#45 – Pulp, Paper, and Paperboard Manufacturing and Processing	Based on the 1964 FIP, a box factory (Collet Sproule Paper Box Factory) was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
49	149 Portland Street	165 m south	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the 1964 FIP, a Chinese laundry business was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
50	164 Portland Street	130 m southwest	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the 1964 FIP, a Chinese laundry business was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
51	390 Queen Street West	240 m east	PCA#28 Gasoline and Associated Products in Fixed Tanks	Based on the ERIS report, Graham Allan had a fuel tank installed in 1919.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
52A	400 Queen Street West	220 m east	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records, various printing and publishing companies were located at the property between 1950 and 1972.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
52B	400 Queen Street West	220 m east	PCA#37 – Operation of Dry Cleaning Equipment	Based on the municipal records, a laundry business was located at the property in 1895.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
			(where chemicals are used)		
53	416 Queen Street West	160 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the ERIS report and municipal records, General Industrial Sewing Machine Co was located at the property from 1978 to 2000.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
54	420 Queen Street West	150 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a Chinese laundry business was located at the property from 1907 to 1914.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
55	424 Queen Street West	135 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, various blacksmiths, tinsmiths and coppersmiths were located at the property from 1865 to 1914.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
56	428 Queen Street West	125 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, Carl's Cleaners was located at the property in 1950.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
57	430 Queen Street West	120 m east	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, M Weinberg had a permit for a fuel tank in 1919.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
58	432 Queen Street West	100 m east	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, L Tulchinskey had a fuel tank installed in 1919.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
59	434 Queen Street West	90 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a cleaner & presser was located at the property in 1940.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
60	444 Queen Street West	60 m east	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records, a fur clothing manufacturing company was located at the property from 1945 to 1950.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
61	492 Queen Street West	30 m west	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records a tinsmith was located at the property in 1880.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
62	502 Queen Street West	60 m west	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, Singer Sewing Machine Co. was located at the property in 1965.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
63A	516 Queen Street West	90 m west	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records a publishing company was located at the property in 1919.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
63B	516 Queen Street West	90 m west	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a tinsmith was located at the property in 1875.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
64	530R Queen Street West	160 m west	PCA#Other - historical manufacturing	Based on the 1964 FIP, various light manufacturing companies were located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
65	534 Queen Street West	155 m west	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, Mole's Hardware was granted a permit to install a gasoline pump and 500 gallon tank in 1922.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
66	536 Queen Street West	165 m west	PCA#Other – Coal Storage	Based on the municipal records, a coal company was located at the property in 1885.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
67	542 Queen Street West	180 m west	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, A fuel oil tank was installed in 1936.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
68	544 Queen Street West	185 m west	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records and ERIS report, Victory Cleaners was located at the property from 1955 to 2020.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
69	546 Queen Street West	195 m west	PCA#28 Gasoline and Associated Products in Fixed Tanks	Based on the municipal records Canadian Oil Co. was located at the property in 1895.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
70	550 Queen Street West	200 m west	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, a printing company was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
71	552 Queen Street West	205 m west	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, Victory Cleaners was located at the property from 1945 to 1950.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
72	558 Queen Street West	220 m west	PCA#47 – Rubber Manufacturing and Processing	Based on the municipal records and ERIS report, Rite Rubber Co was located at the property from 1985 to 2000.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
73	564 Queen Street West	235 m west	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1865.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
74A	568 Queen Street West	245 m west	PCA#Other – Coal Storage	Based on the municipal records, Conger Coal Co Ltd. was located at the property from 1900 to 1914.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
74B	568 Queen Street West	245 m west	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a tinsmith was located at the property in 1870.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
75	461 Queen Street West	55 m south	PCA#28 Gasoline and Associated Products in Fixed Tanks	Based on the ERIS report, 1260482 Ontario Limited (general rental centre) was registered as a was generator of light fuels in 2005.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
76	451 Queen Street West	235 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a laundry business was located at the property in 1890.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
77	455 Queen Street West	220 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1880.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
78	463 Queen Street West	205 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a laundry business was located at the property from 1950 to 1972.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
79A	471 Queen Street West	190 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a laundry business was located at the property from 1960 to 1972.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
79B	471 Queen Street West	190 m east	PCA#17 – Dye Manufacturing, Processing and Bulk Storage	Based on the municipal records, a dye company was located at the property from 1900 to 1914.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
80	473 Queen Street West	180 m east	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, Levine Leather Co had a fuel tank installed in 1919.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
81A	475 Queen Street West	175 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, American Sewing Machine Co was located at the property in 1965.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
81B	475 Queen Street West	175 m east	PCA#47 – Rubber Manufacturing and Processing	Based on the municipal records, a rubber company was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
81C	475 Queen Street West	175 m east	PCA#17 – Dye Manufacturing, Processing and Bulk Storage	Based on the municipal records, a dye company was located at the property in 1936.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
81D	475 Queen Street West	175 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records a blacksmith was located at the property from 1890 to 1895.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
82A	477 Queen Street West	170 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records a laundry business was located at the property in 1890.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
82B	477 Queen Street West	170 m east	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, Priestly Demolition Inc. was registered as a waste generator of light fuels in 2006.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
83A	479 Queen Street West	165 m east	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records, various printing and publishing companies were located at the property from 1950 to 1990.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
83B	479 Queen Street West	165 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property from 1875 to 1885.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
84	483 Queen Street West	155 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a laundry business was located at the property in 1940.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
85	485 Queen Street West	150 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1870.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
86	489 Queen Street West	140 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a manufacturing company was located at the property in 1895.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
87	491 Queen Street West	135 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records and ERIS report, Central Industrial Sewing Machine Co Ltd. was located at the property from 1985 to 2001.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
88	493 Queen Street West	130 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, Central Industrial Sewing Machine Co Ltd. was located at the property in 1978/79.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
89A	497 Queen Street West	120 m east	PCA#39 – Paints Manufacturing, Processing and Bulk Storage	Based on the municipal records, a paint company was located at the property in 1914.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
89B	497 Queen Street West	120 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a manufacturing company was located at the property in 1895.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
90	501-503 Queen Street West	105 m east	PCA#34 – Metal Fabrication	Based on the municipal records, a foundry was located at the property from 1907 to 1925.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
91A	503 Queen Street West	105 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records a tin worker was located at the property in 1907.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
91B	503 Queen Street West	105 m east	PCA#34 – Metal Fabrication	Based on the municipal records, a foundry was located at the property in 1907.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
91C	503 Queen Street West	105 m east	PCA#39 – Paints Manufacturing, Processing and Bulk Storage	Based on the municipal records, a paint company was located at the property in 1914.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
92	505 Queen Street West	105 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, various laundry businesses were located at the property from 1895 to 1907.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
93	505-507 Queen Street West	100 m southeast	PCA#49 – Salvage Yard, including automobile wrecking	Based on the municipal records, the Salvation Army Industrial (believed to be a salvage operation) was located at the property in 1919 and 1925.	No, based on the inferred hydraulically downgradient location relative to the Site.
94	507 Queen Street West	100 m southeast	PCA#49 – Salvage Yard, including automobile wrecking	Based on the municipal records, the Salvation Army Salvage Department was located at the property in 1914.	No, based on the inferred hydraulically downgradient location relative to the Site.
95A	509 Queen Street West	95 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records a tin worker was located at the property in 1907.	No, based on the inferred hydraulically downgradient location relative to the Site.
95B	509 Queen Street West	95 m southeast	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a laundry business was located at the property in 1890.	No, based on the inferred hydraulically downgradient location relative to the Site.
96	511 Queen Street West	90 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, various sewing machine companies were located at the property from 1985 to 2000.	No, based on the inferred hydraulically downgradient location relative to the Site.
97	514 Queen Street West	80 m west	PCA#Other – photoprocessing	Based on the municipal records and ERIS report, West Camera Ltd. was registered as a waste generator of photoprocessing wastes from 1992 to 2001.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
98	519 Queen Street West	80 m southeast	PCA#59 – Wood Treating and Preservative Facility and Bulk	Based on the ERIS report and municipal records, a furniture manufacturing company was	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
			Storage of Treated and Preserved Wood Products	located at the property from 1955 to 1965.	
99	525 Queen Street West	75 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1880.	No, based on the inferred hydraulically downgradient location relative to the Site.
100	535 Queen Street West	60 m south	PCA#28 Gasoline and Associated Products in Fixed Tanks	Based on the ERIS report, Dominion Bank has a gasoline pump in 1931.	No, based on the inferred hydraulically downgradient location relative to the Site.
101	537 Queen Street West	55 m south	PCA#28 Gasoline and Associated Products in Fixed Tanks	Based on the ERIS report, in 1924, a retail gasoline pump was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
102	547 Queen Street West	55 m south	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a laundry business was located at the property from 1907 to 1936.	No, based on the inferred hydraulically downgradient location relative to the Site.
103A	553 Queen Street West	55 m south	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report and municipal records, various printing companies were located at the property from 1940 to 1989.	No, based on the inferred hydraulically downgradient location relative to the Site.
103B	553 Queen Street West	55 m south	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a fur cleaning company was located at the property in 1940.	No, based on the inferred hydraulically downgradient location relative to the Site.
103C	553 Queen Street West	55 m south	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1880.	No, based on the inferred hydraulically downgradient location relative to the Site.
103D	553 Queen Street West	55 m south	PCA#54 – Textile Manufacturing and Processing	Based on the 1964 FIP, a clothing factory was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
104	567 Queen Street West	60 m south	PCA#17 – Dye Manufacturing, Processing and Bulk Storage	Based on the municipal records, a dyer was located at the property in 1885.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
105	575 Queen Street West	75 m southwest	PCA#8 – Chemical Manufacturing, Processing and Bulk Storage	Based on the municipal records, Frontier Chemical Co was located at the property in 1960.	No, based on the inferred hydraulically downgradient location relative to the Site.
106	581 Queen Street West	85 m south	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, H Franklin had a fuel oil tank installed in 1925.	No, based on the inferred hydraulically downgradient location relative to the Site.
107	587 Queen Street West	115 m southwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1865.	No, based on the inferred hydraulically downgradient location relative to the Site.
108	591 Queen Street West	125 m southwest	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a cleaning & pressing business was located at the property in 1940.	No, based on the inferred hydraulically downgradient location relative to the Site.
109	495 Queen Street	125 m southeast	PCA#Other – vaping business	Based on the ERIS report, JUUL Labs, Inc. was registered as a waste generator of miscellaneous waste organic chemicals as of October 2019.	No, based on the inferred hydraulically downgradient location relative to the Site.
110	597 Queen Street West	145 m southwest	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, various dry cleaning businesses were located at the property from 1945 to 1979.	No, based on the inferred hydraulically downgradient location relative to the Site.
111	601 Queen Street West	150 m southwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, Durand Plating Co was located at the property in 1907.	No, based on the inferred hydraulically downgradient location relative to the Site.
112	603 Queen Street West	155 m southwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, Durand Electro Plating Co was located at the property from 1914 to 1940.	No, based on the inferred hydraulically downgradient location relative to the Site.
113	605 Queen Street West	160 m southwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, various tinsmiths and blacksmiths were located at the property from 1890 to 1945.	No, based on the inferred hydraulically downgradient location relative to the Site.
114A	607 Queen Street West	165 m southwest	PCA#37 – Operation of Dry Cleaning	Based on the municipal records, various laundry businesses were	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
			Equipment (where chemicals are used)	located at the property from 1895 to 1960.	
114B	607 Queen Street West	165 m southwest	PCA#49 – Salvage Yard, including automobile wrecking	Based on the municipal records, Standard Car Wreckers were located at the property in 1940.	No, based on the inferred hydraulically downgradient location relative to the Site.
115	609 Queen Street West	170 m southwest	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records and ERIS report, a knitting mill was located at the property from 1995 to 2000.	No, based on the inferred hydraulically downgradient location relative to the Site.
116A	619 Queen Street West	195 m southwest	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records, a printing company was located at the property from 1895 to 1900.	No, based on the inferred hydraulically downgradient location relative to the Site.
116B	619 Queen Street West	195 m southwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1870.	No, based on the inferred hydraulically downgradient location relative to the Site.
117	621 Queen Street West	200 m southwest	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a cleaner & presser was located at the property from 1940 to 1945.	No, based on the inferred hydraulically downgradient location relative to the Site.
118	623 Queen Street West	210 m southwest	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records, various printing companies were located at the property from 1936 to 1945.	No, based on the inferred hydraulically downgradient location relative to the Site.
119A	629 Queen Street West	230 m southwest	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a laundry business was located at the property from 1929 to 1940.	No, based on the inferred hydraulically downgradient location relative to the Site.
119B	629 Queen Street West	230 m southwest	PCA#17 – Dye Manufacturing, Processing and Bulk Storage	Based on the municipal records, a dye business was located at the property from 1914 to 1919.	No, based on the inferred hydraulically downgradient location relative to the Site.
120A	440 Richmond Street West	230 m southeast	PCA#10 – Commercial Autobody Shops	Based on the municipal records, an autobody shop was located at the property in 1965.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
120B	440 Richmond Street West	230 m southeast	PCA#28 - Gasoline and Associated Products Storage in Fixed Tanks	Based on the municipal records a service station was located at the property from 1955 to 1960.	No, based on the inferred hydraulically downgradient location relative to the Site.
121	452 Richmond Street West	195 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a watch manufacturing company was located at the property in 1990.	No, based on the inferred hydraulically downgradient location relative to the Site.
122	456-458 Richmond Street West	190 m southeast	PCA#32 – Iron and Steel Manufacturing and Processing	Based on the municipal records, a brass manufacturing company was located at the property from 1936 to 1940.	No, based on the inferred hydraulically downgradient location relative to the Site.
123A	458 Richmond Street West	190 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records a dress manufacturing company was located at the property in 2000.	No, based on the inferred hydraulically downgradient location relative to the Site.
123B	458 Richmond Street West	190 m southeast	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a dry cleaner was located at the property in 2000.	No, based on the inferred hydraulically downgradient location relative to the Site.
124A	460-470 Richmond Street West	165 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records and ERIS report, various clothing manufacturing companies were located at the property from 1929 to 1960.	No, based on the inferred hydraulically downgradient location relative to the Site.
124B	460-470 Richmond Street West	165 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, Dominion Machine & Tool Co. Ltd. was located at the property from 1929 to 1940.	No, based on the inferred hydraulically downgradient location relative to the Site.
124C	460-470 Richmond Street West	165 m southeast	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records and ERIS report, various printing companies were located at the property in 1940.	No, based on the inferred hydraulically downgradient location relative to the Site.
125	480-494 Richmond Street West	110 m southeast	PCA#34 – Metal Fabrication	Based on the municipal records, a foundry was located at the property from 1936 to 1955.	No, based on the inferred hydraulically downgradient location relative to the Site.
126	484-492 Richmond Street West	115 m southeast	PCA#34 – Metal Fabrication	Based on the municipal records, a foundry was located at the property from 1914 to 1929.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
127	588 and 590 Richmond Street West	185 m southwest	PCA#Other – medical equipment manufacturing	Based on the ERIS report and municipal records, Accurate Surgical Instruments was located at the property from 1978 to 1990.	No, based on the inferred hydraulically downgradient location relative to the Site.
128	492 Richmond Street West	115 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a tinsmith was located at the property in 1914.	No, based on the inferred hydraulically downgradient location relative to the Site.
129	496-508 Richmond Street West	95 m southeast	PCA#49 – Salvage Yard, including automobile wrecking	Based on the municipal records, the Salvage Army salvage operation was located at the property from 1919 to 1955.	No, based on the inferred hydraulically downgradient location relative to the Site.
130	502 Richmond Street West	95 m south	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the ERIS report, Salvation Army Garage was registered as a waste generator of waste oils & lubricants from 1992 to 1998.	No, based on the inferred hydraulically downgradient location relative to the Site.
131	506 Richmond Street West	95 m south	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, A gasoline pump was installed on the curb of a Salvation Army storage building in 1924.	No, based on the inferred hydraulically downgradient location relative to the Site.
132A	508 Richmond Street West	95 m southeast	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the municipal records, various automotive repair garages were located at the property between 1925 and 1945.	No, based on the inferred hydraulically downgradient location relative to the Site.
132B	508 Richmond Street West	95 m southeast	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, a gasoline service station with one tank was located at the property in 1922 and 1924.	No, based on the inferred hydraulically downgradient location relative to the Site.
132C	508 Richmond Street West	95 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the ERIS report, a blacksmith was located at the property from 1914 to 1925.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
133	510 Richmond Street West	90 m south	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the municipal records, a garage was located at the property from 1972 to 1990.	No, based on the inferred hydraulically downgradient location relative to the Site.
134	518 Richmond Street West	90 m south	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a tinsmith was located at the property from 1919 to 1925.	No, based on the inferred hydraulically downgradient location relative to the Site.
135	520 Richmond Street	90 m south	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the ERIS report, Stephenson's Rental Services Inc. was registered as a waste generator of waste oils & lubricants, emulsified oils, oil skimmings & sludges, petroleum distillates and light fuels from 2005 to as of December 2018.	No, based on the inferred hydraulically downgradient location relative to the Site.
136	546 Richmond Street West	90 m south	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products	Based on the municipal records, a furniture manufacturing company was located at the site in 1990.	No, based on the inferred hydraulically downgradient location relative to the Site.
137	552 Richmond Street West	95 m south	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products	Based on the municipal records and FIPs, a lumber yard was located at the property in 1955 and 1964.	No, based on the inferred hydraulically downgradient location relative to the Site.
138A	445 Richmond Street West	230 m southeast	PCA#17 – Dye Manufacturing, Processing and Bulk Storage	Based on the municipal records a dye company was located at the property in 200.	No, based on the inferred hydraulically downgradient location relative to the Site.
138B	445 Richmond Street West	230 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, textile mill was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
138C	445 Richmond Street West	230 m southeast	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal record, a printing company was located at the property from 1965 to 1979.	No, based on the inferred hydraulically downgradient location relative to the Site.
139A	457 Richmond Street West	210 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records and ERIS report, various clothing manufacturing companies were located at the property from 1955 to 1965.	No, based on the inferred hydraulically downgradient location relative to the Site.
139B	457 Richmond Street West	210 m southeast	PCA#Other - photoprocessing	Based on the ERIS report, a photoprocessing was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
140A	471 Richmond Street West	185 m southeast	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report and municipal records, various printing companies were located at the property from 1955 to 1979.	No, based on the inferred hydraulically downgradient location relative to the Site.
140B	471 Richmond Street West	185 m southeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a welding company was located at the property in 1945.	No, based on the inferred hydraulically downgradient location relative to the Site.
141A	477 Richmond Street West	170 m southeast	PCA#10 – Commercial Autobody Shops	Based on the municipal records and FIPs, various auto body shops were located at the property from 1945 to 1990.	No, based on the inferred hydraulically downgradient location relative to the Site.
141B	477 Richmond Street West	170 m southeast	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, Clarity Colour Inc. was registered as a waste generator of photoprocessing wastes from 1995 to 2004.	No, based on the inferred hydraulically downgradient location relative to the Site.
141C	477 Richmond Street West	170 m southeast	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, a clothing manufacturing company was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
142	483 Richmond Street West	160 m southeast	PCA#10 – Commercial Autobody Shops	Based on the municipal records, an autobody shop was located at the property from 1978 to 1990.	No, based on the inferred hydraulically downgradient location relative to the Site.
143	496 Richmond Street West	100 m southeast	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain	Based on the municipal records and FIPs, the Toronto department of public works was located at the property in 1978/79.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
			transportation systems		
144	497 Richmond Street West	145 m south	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the municipal records and FIPs, the Toronto department of public works was located at the property from 1985 to 1990.	No, based on the inferred hydraulically downgradient location relative to the Site.
145	501-509 Richmond Street West	145 m south	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the municipal records, the Toronto department of water works was located at the property from 1919 to 1929.	No, based on the inferred hydraulically downgradient location relative to the Site.
146	505 Richmond Street West	145 m south	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, PUC (Works Yard Storage Tank) uncovered a leaking abandoned oil tank in 1995, causing soil contamination.	No, based on the inferred hydraulically downgradient location relative to the Site.
147	505-511 Richmond Street West	145 m south	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the municipal records, the Toronto department of water works was located at the property from 1960 to 1990.	No, based on the inferred hydraulically downgradient location relative to the Site.
148	513 – 523 Richmond Street West	140 m south	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the municipal records, the Toronto department of water works was located at the property from 1919 to 1929.	No, based on the inferred hydraulically downgradient location relative to the Site.
149A	525 Richmond	140 m south	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records, a hosiery manufacturing company	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
	Street West			was located at the property from 1972 to 1979.	
149B	525 Richmond Street West	140 m south	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records a foundry was located at the property in 1960.	No, based on the inferred hydraulically downgradient location relative to the Site.
150	533 Richmond Street West	150 m south	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products	Based on the municipal records, a lumber company was located at the property from 1965 to 1979.	No, based on the inferred hydraulically downgradient location relative to the Site.
151A	543 Richmond Street West	195 m southwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a manufacturing company was located the property in 2000.	No, based on the inferred hydraulically downgradient location relative to the Site.
151B	543 Richmond Street West	195 m southwest	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, various printing companies were located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
152	545 Richmond Street West	190 m southwest	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, a printing company was located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
153A	555 Richmond Street West	225 m southwest	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records, various printing companies were located at the property from 1972 to 1979.	No, based on the inferred hydraulically downgradient location relative to the Site.
153B	555 Richmond Street West	225 m southwest	PCA#Other – photoprocessing	Based on the ERIS report, Lason Canada Company (motion picture laboratory) was registered as a waste generator of transfer station oils wastes and photoprocessing wastes from 1999 to 2006.	No, based on the inferred hydraulically downgradient location relative to the Site.
153C	555 Richmond Street West	225 m southwest	PCA#Other – medical device manufacturing	Based on the ERIS report, various medical device manufacturing companies were located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
153D	555 Richmond Street West	225 m southwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the ERIS report, various metal companies were located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
153E	555 Richmond Street West	225 m southwest	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, textile manufacturing companies were located at the property.	No, based on the inferred hydraulically downgradient location relative to the Site.
154A	16 Ryerson Avenue	140 m west	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a sheet metal company was located at the property from 1960 to 1965.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
154B	16 Ryerson Avenue	140 m west	PCA#45 – Pulp, Paper, and Paperboard Manufacturing and Processing	Based on the municipal records, an envelope manufacturing company was located at the property in 1950.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
154C	16 Ryerson Avenue	140 m west	PCA#8 – Chemical Manufacturing, Processing and Bulk Storage	Based on the municipal records, multiple chemical companies were located at the property in 1950.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
154D	16 Ryerson Avenue	140 m west	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the municipal records, a printing company was located at the property in 2000.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
155	16 & 24 Ryerson Avenue	140 m west	PCA#45 – Pulp, Paper, and Paperboard Manufacturing and Processing	Based on the municipal records, multiple envelope/paper manufacturing companies were located at the property from 1945 to 1965.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
156A	24 Ryerson Avenue	150 m northwest	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, various printing companies were located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
156B	24 Ryerson Avenue	140 m west	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, a knitting mill was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
157	33 Ryerson Avenue	115 m northwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a tool and die manufacturing company was located at the property from 1914 to 1919.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
158	47 Ryerson Avenue	125 m northwest	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1875.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
159	57 Ryerson Avenue	150 m northwest	PCA#37 – Operation of Dry Cleaning	Based on the municipal records, a laundry business was located at the property from 1914 to 1925.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
			Equipment (where chemicals are used)		
160	81-83 Ryerson Avenue	215 m northwest	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a dry cleaner was located at the property from 1940 to 1965.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
161A	83 Ryerson Avenue	215 m northwest	PCA#34 – Metal Fabrication	Based on the municipal records, a brass manufacturing company was located at the property from 1925 to 1936.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
161B	83 Ryerson Avenue	215 m northwest	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the ERIS report, Sanitary Carpet Cleaning Co was issued a permit in 1921 to install carpet cleaning machinery in the rear building.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
162A	174 Spadina Avenue	200 m east	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, various printing companies were located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
162B	174 Spadina Avenue	200 m east	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, various clothing manufacturing companies were located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
163	180 Spadina Avenue	200 m east	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products	Based on the FIP, a furniture manufacturing company was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
164	186 Spadina Avenue	205 m northeast	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, a newspaper publisher was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
165	188A Spadina Avenue	210 m northeast	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, a fur clothing manufacturing company was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
166A	192 Spadina Avenue	210 m northeast	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the FIP and ERIS report, various printing companies were located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
166B	192 Spadina Avenue	210 m northeast	PCA#28 Gasoline and Associated Products in Fixed Tanks	Based on the ERIS report, Murray Printing Co had a fuel oil tank installed in 1920.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
166C	192 Spadina Avenue	210 m northeast	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, various clothing manufacturing companies were located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
167	196 Spadina Avenue	215 m northeast	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, various clothing manufacturing companies were located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
168	198 Spadina Avenue	245 m northeast	PCA#54 – Textile Manufacturing and Processing	Based on the ERIS report, a fur clothing manufacturing company was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
169	208-210 Spadina Avenue	245 m northeast	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the FIP, General Motors Garage was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
170	1 Vanauley Street	120 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a dry cleaner was located at the property in 1972.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
171A	7 Vanauley Street	120 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a buckle and clasp manufacturing company was located at the property from 1978 to 1986.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
171B	7 Vanauley Street	120 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a dry cleaner was located at the property in 1965.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
172A	8 Vanauley Street	85 m east	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, Associated Cleaners & Dyers, a dry cleaning business had a gasoline tank installed in 1933.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
172B	8-14 Vanauley Street	85 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a dry cleaner was located at the property from 1929 to 1979.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
173	14 Vanauley Street	85 m east	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS report, Fountain "My Valet", a cleaning and pressing business, had a gasoline tank installed in 1920.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
174	20-28 Vanauley Street	85 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a dry cleaner was located at the property in 1965.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
175A	28 Vanauley Street	85 m east	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used)	Based on the municipal records, a dry cleaner was located at the property from 1945 to 1960.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
175B	28 Vanauley Street	85 m east	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products	Based on the municipal records, a furniture manufacturing company was located at the property in 1936.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
176	28-30 Vanauley Street	85 m east	PCA#52 – Storage, maintenance, fueling, and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the municipal records, Mack Trucks of Canada Ltd. was located at the property in 1925.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
177A	39 Vanauley Street	120 m east	PCA#8 – Chemical Manufacturing, Processing and Bulk Storage	Based on the municipal records, a chemist was located at the property in 1875.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
177B	39 Vanauley Street	120 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1865.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
178	40 Vanauley Street	85 m northeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a tin can manufacturing company was located at the property in 1955.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
179A	40-42 Vanauley Street	85 m northeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a metal and textile salvage was located at the property in 1955.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
179B	40-42 Vanauley Street	85 m northeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records, a metal and textile salvage was located at the property in 1955.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
180	50 Vanauley Street	90 m northeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1880.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
181	55 Vanauley Street	120 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a tinmith was located at the property in 1880.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
182A	94 Vanauley Stret	120 m northeast	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a metal and textile salvage was located at the property from 1919 to 1929.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
182**B**	94 Vanauley Stret	120 m northeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records, a metal and textile salvage was located at the property from 1919 to 1929.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
183	96 Vanauley Street	120 m northeast	PCA#49 – Salvage Yard, including automobile wrecking	Based on the municipal records, a salvage yard was located at the property from 1945 to 1950	No, based on the inferred hydraulically cross-gradient location relative to the Site.
184	22 Wolseley Street	65 m west	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the municipal records, a blacksmith was located at the property in 1880.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
185	35 Wolseley Street	85 m west	PCA#58 - Waste Disposal and Waste Management, including thermal	Based on the ERIS report, in 1946, a well at the rear of the property was filled using 100 loads of ashes.	No, based on the inferred hydraulically cross-gradient location relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
			treatment, landfilling and transfer of waste other than use of biosoils as soil conditioners		
186	51 Wolsley Street	135 m west	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, a printing company was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
187	54 Wolseley Street	160 m west	PCA#31 – Ink Manufacturing, Processing and Bulk Storage	Based on the ERIS report, a printing company was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
188	55 Wolseley Street	145 m west	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the ERIS report, a tinsmith was located at the property in 1919.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
189	63 Wolseley Street	170 m west	PCA#33 – Metal Treatment, Coating, Plating and Finishing	Based on the FIP, and iron and aluminum business was located at the property.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
190	Vanauley Street and Queen Street West	115 m east	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Based on the ERIS report, Metrolinx was registered as a waste generator of other specified inorganic sludges, slurries or solids, waste oils/sludges (petroleum based) and light fuels from 2020 to as of April 2021.	No, based on the inferred hydraulically cross-gradient location relative to the Site.
191	St. Andrews Square (south of Richmond Street West and east of Maud Street,	135 m south	PCA#58 - Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste other than use of biosoils as soil conditioners	Based on the ERIS report, in the 1880s ashes, mud and scrapings were deposit in St. Andrew's Square. The property was later filled and graded and occupied by a market, hall, city yard and playground.	No, based on the inferred hydraulically downgradient location relative to the Site.

(1) Distances are approximate. Precise distances are not possible due to the age of some listings and the aggregation and/or loss of addresses.

(2) Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D (O.Reg 153/04, as amended) that is occurring or has occurred in a phase one Study area.

2.2 Areas of Potential Environmental Concern

Based on the evaluation of the PCAs located within the Phase One Study Area APECs were identified, as presented in Figure 4, and summarized in Table 3 below.

Table 3: Areas of Potential Environmental Concern (APECs)

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)1	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
APEC 1: Potential presence of fill material brought to site for construction of parking lot and infilling of former building cavities (PCA identifier 1)	Entire Site	PCA#30 - Importation of Fill Material of Unknown Quality	On-Site	PHCs, PAHs, metals, As, Sb, Se, HWS-B, CN-, Hg, Cr(VI), Soil pH	Soil
APEC 2: Potential use of de-icing salts in the parking lot (PCA identifier 2)	Entire Site	PCA#Other – de-icing salts	On-Site	EC, SAR, Na+, Cl- ~~EC and SAR~~	Soil and Groundwater
APEC 3: Off-site PCAs to the south – historical dry cleaning, light manufacturing, metals work, coal storage and fuel tank (PCA identifiers 3, 4, 5, 6, 7, 8)	Southern portion of Site	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used) PCA#Other - historical manufacturing PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used) PCA#33 – Metal Treatment, Coating, Plating and Finishing PCA#Other – Coal Storage	Off-Site	PAHs, metals, As, Sb, Se, ~~HWS-B,~~ CN-, Hg, Cr(VI), PHCs, BTEX, VOCs	Groundwater

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)1	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
		PCA#28 Gasoline and Associated Products in Fixed Tanks			
APEC 4: Off-site PCAs to the southeast – historic chemists, dry cleaning and dye works (PCA identifiers, 9, 10, 11)	Southeastern portion of site	PCA#8 – Chemical Manufacturing, Processing and Bulk Storage PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used) PCA#17 – Dye Manufacturing, Processing and Bulk Storage	Off-site	PHCs, BTEX, VOCs, PAHs	Groundwater
APEC 5: Historic fuel oil tank to the west (PCA identifier 12)	Northwestern portion of site	PCA#28 Gasoline and Associated Products in Fixed Tanks	Off-site	PHCs, BTEX, PAHs, Metals, As, Sb, Se, ~~HWS-B,~~ CN-, Hg, Cr(VI)	Groundwater
APEC 6: Historic repair garage to the north (PCA identifier 13)	Northeastern portion of site	PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems	Off-site	PHCs, BTEX, VOCs, PAHs, Metals, As, Sb, Se, ~~HWS-B,~~ CN-, Hg, Cr(VI)	Groundwater

(1) Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D (O.Reg.153/04, as amended) that is occurring or has occurred in a phase one Study area.

Based on the findings of the Phase One ESA and conclusions, a Phase Two ESA was required to assess the soil and groundwater conditions at the Site.

Refer to Figures 4 and 5B for the location of APECs on the Site. Boreholes/monitoring wells advanced on the Site to investigate the identified APECs, and subsequently to delineate COCs detected in soil and/or groundwater, are shown on Figures 5A and 5B. Extraction wells installed as part of the on-going free product removal program are also shown on Figure 5A and 5B. Given that the extraction wells are installed as a 0.10 diameter wells with a full length screen depth, no groundwater samples, water level measurements or other data relied upon for purposes of the Phase Two ESA or Risk Assessment were collected from these locations. Extraction wells were only used for the removal of free product at the RA property.

2.3 Underground Utilities

The Site utilities and services were identified at the Site based on information provided in environmental records and relevant utility infrastructure observed during the Site reconnaissance. The Site utilities are summarized in the table below and noted on Figure 3, where available. It is noted that the precise underground location and depths of the utilities cannot be determined without professional locate services.

Table 4: Site Utilities

Utility	Source	Location	Site Entry
Natural Gas	Enbridge Gas	Not Applicable	Not Applicable.
Sanitary Sewer	City of Toronto	Not Applicable	Not Applicable.
Storm Sewer	City of Toronto	Underground	Various storm sewers were observed in the asphalt portion of the Site, the storm sewer enters the Site from the north, adjacent to Wolseley Street.
Water	City of Toronto	Not Applicable.	Not Applicable.
Electricity	Toronto Hydro	Underground	Entering from the western portion of the Site along Denison Avenue. A hydro main is present adjacent to the Site along Denison running north-south.
Telecommunications	Bell Canada / Telus / Rogers	Not Applicable.	Not Applicable.

Locations of these utilities are provided in Figure 3. However, based on the minimum depth to groundwater of 2.84 m bgs and the fact that the only subsurface utility currently installed within the boundaries of the Site is a catch basin for storm water, it does not appear that contaminant transport is significantly altered by the presence of utilities. ~~At the time of the Phase Two ESA, there were no buildings present on Site. Preferential pathways for COCs in groundwater include underground utilities, however; the minimum depth to groundwater at the Site is 3.60 m. As such, it is unlikely for utilities to influence the migration of groundwater COCs.~~

3. Physical Site Description

3.1 Geological and Hydrogeological Conditions

The Site and surrounding areas are located within the Iroquois Plain which is expected to consist of undifferentiated older tills and may include stratified deposits. The bedrock in the general area of the Site is part of a group belonging to the Georgian Bay Formation, Blue Mountain Formation, Billings Formation, Collingwood Member and Eastview Member, consisting of shale, limestone, dolostone and siltstone.

According to the topographic map from Natural Resources of Canada (Toporama), the elevation of the Site is approximately 94 m above sea level (m asl). A review of the topographic map indicated that the nearest water body is Lake Ontario, located approximately 1.3 km south of the site. Based on the local topography, the anticipated groundwater flow direction is south.

Based on the review of available resources from the Ministry of Natural Resources and Forestry website and the City of Toronto Official Plan on April 24, 2024, no areas of natural significance were identified at the Site or within 30 m of the Site.

3.1.1 Surface Material

Pavement structure, comprising 150 to 170 mm asphaltic concrete, was encountered in all borehole locations at ground surface.

3.1.2 Fill Material

Fill, comprising granular material with trace gravel, sand and/or clay, was encountered below the surface at all borehole locations to depths ranging from approximately 0.76 to 2.29 m below existing ground surface (bgs).

3.1.3. Native Material

The fill was underlaid by clayey silt, silt and sandy silt till with traces of sand and gravel at all borehole locations. The silty sand to silty clay was encountered at depths of approximately 0.76 to 16.76 m below existing ground surface and was generally brown in colour becoming grey with depth. Previously installed boreholes BH1 and BH106 were terminated in the silty sand to sandy silt till deposit at depths ranging from 3.05 to 14.48 m bgs, and BH101 to BH105, BH 107 to BH109, BH2 and BH 5 were terminated in the clayey silt till deposit at depths ranging from 3.05 to 16.0 m bgs.

3.1.4 Bedrock

Bedrock was encountered in BH24-1, BH24-2, and BH24-3 as well as previously advanced boreholes BH3, and BH4. The depth of bedrock ranged between 14.93 m to 21.34 m bgs. BH24-1, BH24-2, and BH24-3 were all terminated at or within bedrock.

3.2 Hydrogeology

Based on the groundwater contour map delineated for the Site and topography of the Site and study region, the local groundwater was determined to be in a south-southwesterly direction. Based on review of a topographic map of the Site, surface grade elevations showed a decrease across the Site towards the south. EXP completed a Hydrogeological Investigation at the Site (EXP, 2022b) which determined that the groundwater across the Site is likely flowing in a southwesterly direction based on groundwater elevation measurements made in January – February 2022 (as presented on Figure 6A). A second groundwater contour map was prepared based on groundwater elevations collected on April 25, 2024 (following installation of extraction wells along the northern and northeastern portions of the Site). Groundwater flow directions showed some variability on April 25, 2024, with radial flow out from the center of the Site towards the southeast and the northwest. A groundwater contour generated from groundwater elevation measurements on June 6th, 2024, showed a similar radial pattern from the center of the Site at BH/MW3 towards the northwest and the southeast. Finally, a groundwater contour generated from data on December 18, 2024, showed a groundwater flow towards the center and northeastern portions of the Site. Local groundwater flow direction has shown variation between monitoring dates and may be influenced by the presence of utilities and other subsurface features at the Site and on adjacent properties in addition to the on-going free-product removals. As part of the free-product removal program, a vacuum truck collects large volumes of groundwater from extraction wells installed along the northern and northeastern Site boundaries, which is suspected to be influencing local groundwater elevations across the RA property. The direction of regional and local groundwater flow at the Site is assumed to be towards the south/southwest and Lake Ontario. Finally, it is noted that due to the on-going pumping of groundwater, screen lengths (i.e., from surface to termination depth) and diameter of the extraction wells (i.e., 4”), groundwater elevations from these locations were not relied upon in the identification of a minimum depth to groundwater or to generate groundwater contours.

Monitoring wells BH/MW1, BH/MW2, BH/MW3, BH/MW4, BH/MW5, BH/MW107 and BH/MW109 are installed with screen depths between approximately 6.0 – 9.0 m bgs and are representative of shallow overburden groundwater at the RA property. Several deeper monitoring wells were installed at the bedrock / over burden interface, including BH/MW24-1, BH/MW24-3 and BH/MW108 screened at depths between approximately 12.3 – 15.3 m bgs. Monitoring well BH/MW24-2 was installed in bedrock at the Site with a screen depth of 17.0 – 20.0 m bgs. BH/MW24-1 through BH/MW24-3 were installed between March 28, 2024, and April 11, 2024. Following installation of these monitoring wells, groundwater levels were initially collected on April 15, 2024, and were reported at 3.77 m bgs at BH/MW24-1, 6.95 m bgs at BH/MW24-2 and 4.30 at BH/MW24-3. Following April 15, 2024, subsequent groundwater level measurements showed much greater depths to groundwater, indicating the measurements on April 15th, 2024, were not collected from stabilized groundwater conditions. Depths to groundwater for the deeper groundwater until presented within Table 5 do not include groundwater measurements from April 15th, 2024, due to the anomalous measurements. Based on the positive vertical hydraulic gradient calculated between BH/MW109 and BH/MW24-2, presented in

Table 5, it is assumed that the deeper groundwater unit at the Site is migrating upwards at the Site. The deeper groundwater unit may be under confining pressure applied by the overlying clayey silt till and sandy silt till. Given that no exceedances of the Table 3 SCS have been identified within the deeper groundwater unit at the Site, it has been inferred that the groundwater units are not hydraulically interconnected.

~~shown to flow in a southwesterly direction based on groundwater elevations collected between January and February 2022 and local groundwater was shown to flow in a northwestern direction at the western portion of the Site, and a southeastern direction in the southeast corner of the Site based on groundwater elevations collected on April 25, 2024. Local groundwater flow direction has shown variation between monitoring dates and may be influenced by the presence of utilities and other subsurface features at the Site and on adjacent properties. The direction of regional groundwater flow at the Site is assumed to be towards the south and Lake Ontario.~~

Refer to Table 5 for the Site hydrogeology characteristics based on groundwater monitoring observations.

Table 5: Site Hydrogeology Characteristics

Location	Observation
Minimum Depth to Overburden Groundwater	2.84 m bgs at BH/MW5 (18-Dec-2024) ~~3.60 to 14.50 m bgs~~
Minimum~~Groundwater~~ Elevation of Overburden Groundwater Unit	92.31 m ASL at BH/MW5 (18-Dec-2024) ~~81.10 to 92.05 m asl~~
Minimum Depth to Deep Groundwater	7.74 m bgs at BH/MW23-3 (18-Dec-2024)
Minimum Elevation of Deep Groundwater Unit	87.64 m ASL (18-Dec-2024)
Direction of Groundwater Flow	Southwesterly ~~(January - February 2022)~~ ~~Northwesterly to Southeasterly (April 2024)~~
Horizontal Hydraulic Gradient	0.005 m/m (between MW1 and MW4) and 0.001 m/m (between MW2 and MW5)
Vertical Hydraulic Gradient	0.63 m/m (between BH/MW109 and MW24-2)

m bgs = metres below ground surface
m asl = meters above sea level

The groundwater contour plans for the Phase Two Property as based on measurements from January 2022, April 2024, June 2024 and December 2024 are illustrated on Figures 6A through 6D ~~and 6B.~~

3.3 Site Sensitivity

The Site Sensitivity classification with respect to the conditions set out under Sections 35, 41 and 43.1 of O.Reg. 153/04 were evaluated to determine if the Site is sensitive, as presented in Table 6.

Table 6: Site Sensitivity

Sensitivity	Classification	Does Sensitivity Apply to Site?
Section 35 applies if	(i) The full depth generic site condition standards in a non-potable groundwater condition	Yes
	(ii) The stratified site condition standards in a non-potable groundwater condition	No

Sensitivity	Classification	Does Sensitivity Apply to Site?
	(iii) The property, and all other properties located, in whole or in part, within 250 metres of the boundaries of the property, are supplied by a municipal drinking water system	Yes
	(iv) The record of site condition does not specify agricultural or other use as the type of property use	Yes
	(v) The property is located in an area designated in the municipal official plan as a well-head protection area or other designation identified by the municipality for the protection of groundwater	No
	(vi) The property or one of the properties in the phase one study area has a well used or intended for use as a source of water for human consumption or agriculture.	No
	(vii) A person authorized by the owner of a property has given the clerk of the municipality a written notice of intention to apply the standards in preparing a record of site condition for the property; A. the single tier municipality has given written notice that it does not object to the application of the standards	Yes
Section 41 applies if	(i) property is within an area of natural significance	No
	(ii) property includes or is adjacent to an area of natural significance or part of such an area (City of Toronto's Environmental Significant Area)	No
	(iii) property includes land that is within 30 m of an area of natural significance or part of such an area (City of Toronto's Environmental Significant Area)	No
	(iv) soil at property has a pH value for surface soil less than 5 or greater than 9	No*
	(v) soil at property has a pH value for sub-surface soil less than 5 or greater than 11	No
	(vi) a qualified person is of the opinion that, given the characteristics of the property and the certifications the qualified person would be required to make in a record of site condition in relation to the property as specified in Schedule A, it is appropriate to apply this section to the property	No
Section 43.1 applies if	(i) property is a shallow soil property	No
	(ii) property includes all or part of a water body or is adjacent to a water body or includes land that is within 30 m of a water body	No

*pH levels outside of the MECP acceptable range were identified at select locations in 2020 and 2021; however, additional investigations completed at the Site in March 2024 indicated that the average pH at these locations were within the acceptable range. See Section 4 for additional details.

3.3.1 Areas on, in or under the phase two property where excess soil is finally placed~~Soil Importation~~

Fill material is typically brought to a property as a base for buildings and pavement areas. Fill can also be used to re-grade a property, and to backfill excavations.

Based on the reviewed information, it appears that fill material is present across the entire Site, and the fill material is assessed in this Phase Two ESA as APEC 1. No fill material has been brought to the Site during the Phase Two ESA.

3.4 Land Use

At the time of the Phase Two ESA, the Site was a parking lot. The Owner is planning to re-develop the Site as a mixed use, affordable housing development, complete with a multi-storey residential tower, cultural space and parkland, occupying the entirety of the Site footprint. The future Site building is planned to be constructed as a slab-on-grade development. No subgrade structures are currently planned to be developed at the RA property.

4. Contaminants of Concern

For assessment purposes, EXP selected the MECP (2011) Table 3: Full depth Background Site condition Standards in a Non-Potable Ground Water Condition for Residential/Parkland/Institutional Property Use and medium/fine textured soil was considered applicable for determining contaminants of concern (COCs), based on the rationale presented in Table 7 below.

Table 7: Site Condition Standards

Description	Site Specific Condition
Section 35 Site Sensitivity	Applicable • The full depth generic site condition standards in a non-potable groundwater condition. • The property, and all other properties located, in whole or in part, within 250 metres of the boundaries of the property, are supplied by a municipal drinking water system. • The Site is not proposed for agricultural or other property use for filing RSC. • The Site was not located within a wellhead protection area. • No well within the Phase One Study Area is used as a source of water for human consumption or agriculture. A person authorized by the owner of a property has given the clerk of the municipality a written notice of intention to apply the non-portable ground water standards. The single tier municipality (City of Toronto) has given written notice that it does not object to the application of the standards
Section 41 Site Sensitivity	Not applicable • The soil at the Site has pH values between 5 and 9 for surficial soil; and, between 5 and 11 for subsurface soil*. • The Site is not located within, and/or located adjacent to an area of natural significance/an environmentally sensitive area.
Section 43.1 Site Sensitivity	Not applicable • The Site is not considered a shallow soil property, based on the recovered soil cores, which indicated that more than two-thirds of the Site has an overburden thickness in excess of 2 m. • The Site is not located within 30 m of a surface water body
Land Use	Residential/Parkland/Institutional • The proposed future use of the Site is for mixed use, including residential.

Description	Site Specific Condition
Soil Texture	Medium and Fine textured • The predominant texture of soils at the Site is considered to be medium and fine, based on soil characteristics identified in the borehole logs and during the 75 micron sieve grain size analysis.

* As a part of the soil investigation conducted by Terrapex in 2020, a pH value for surface soil was reported as 9.11 at BH106-2A, collected at a depth of 0.8-1.1 m bgs, which is outside the range for the application of the Table 3 SCS. In addition, as a part of the Phase Two ESA conducted by EXP (2022), pH values for surface soil were reported at 12.1 and 11.3 at BH2-SS1 and BH2-SS2 respectively, at depths ranging from 0.76 to 1.37 m bgs, and 10.0 at BH5 SS1 at a depth of 0.17-0.75 m bgs, which are also outside the range for the application of the Table 3 SCS.

From March 25th to March 27th, 2024, EXP returned to the Site and advanced nine (9) additional shallow boreholes in proximity to BH106, BH2, and BH5 (i.e., within <2 m radius). Three (3) soil samples were collected from the surrounding shallow boreholes for each sample location, at the same depths where out-of-range pH values were found and collected samples were submitted for pH analysis. It is noted that the initial analytical results for soil pH collected from a depth of 3.05 – 3.66 m bgs at BH2 SS5 during the Phase Two ESA by EXP in 2022 were within acceptable range for subsurface soils, and pH averaging was not conducted; however, additional samples were collected at this depth for delineation purposes.

Following the MECP (2016) guidance and as per Section 48.(2) of O.Reg. 153/04, the three (3) pH results for each sampling location were logarithmically averaged and yielded a value of 8.90 at BH2-SS1, 8.19 at BH2-SS2, 8.33 at BH5 SS1, and 8.43 at BH106-2A which are within the acceptable range for the application of Table 3 SCS. As such, Section 41 was not applied to the Site, and the Site was not classified as environmentally sensitive. Refer to Figure 11. It is suspected that the soil pH exceedances may be associated with fill material of unknown quality identified at the Site. Based on review of the borehole logs, various debris including concrete fragments, brick fragments and asphalt fragments have been identified in the fill materials. Alkaline compounds such as the constituents of concrete may have been included in the original soil samples at the time of collection and resulted in elevated soil pH measurements at select locations within the fill materials.

Based on the reported analytical results, various parameters were detected at concentrations above the applicable MECP Table 3 SCS in soil and groundwater

Table 8: Table 3 SCS Exceedances in Soil

Parameter Analyzed in Soil	Maximum Concentration	Site Condition Standard (1)	Maximum Concentration Above Applicable SCS?
Metals, Inorganics and Other Regulated Parameters			
Barium	519	390	Yes
Copper	1,300	180	Yes
Lead	510	120	Yes
Mercury	1.9	1.8	Yes
Zinc	550	340	Yes
Electrical Conductivity	4.94	0.7	No(2)
Sodium Adsorption Ratio	105	5	No(2)
Polycyclic Aromatic Hydrocarbons (PAHs)			
Acenaphthylene	1.9	0.17	Yes
Anthracene	5.6	0.74	Yes
Benz(a)anthracene	18	0.63	Yes
Benzo(a)pyrene	14	0.3	Yes

Parameter Analyzed in Soil	Maximum Concentration	Site Condition Standard (1)	Maximum Concentration Above Applicable SCS?
Benzo(b)fluoranthene	17	0.78	Yes
Benzo(k)fluoranthene	6.4	0.78	Yes
Chrysene	14	7.8	Yes
Dibenz(a,h)anthracene	2.1	0.1	Yes
Fluoranthene	40	0.69	Yes
Indeno(1,2,3-cd)pyrene	8.5	0.48	Yes
Phenanthrene	23	7.8	Yes
Petroleum Hydrocarbon (PHCs)			
PHC F1 (C6-C10)-BTEX	255	65	Yes

(1) Table 3 Site Condition Standards for a Residential/Parkland/Institutional Property use and medium/fine textured soil.

(2) Parameter deemed not to exceed SCS based on amendments to O.Reg. 153/04.

Table 9: Table 3 SCS Exceedances in Groundwater

Parameter Analyzed in Groundwater	Maximum Concentration	Site Condition Standard (1)	Maximum Concentration Above Applicable SCS?
Petroleum Hydrocarbon (PHCs) with BTEX			
PHC F1 (C6 to C10) - BTEX	213,000	750	Yes
PHC F2 (C10 to C16)	160,000	150	Yes
PHC F3 (C16-C34)	1,500	500	Yes
Xylene	4,640	4,200	Yes

(1) Table 3 Site Condition Standards for All Types of Property use and medium/fine textured soil.

Electrical Conductivity, Sodium Adsorption Ratio and De-icing Salt Exemption:

The identified exceedances of EC and SAR in soil and sodium are likely to be attributable to the application of de-icing salts on-Site and/or salting of the surrounding roadways (i.e. Denison Avenue, Wolsely Street and/or Augusta Avenue) during winter months. It should be noted that salt-related parameters will not be retained as COCs due to the recent amendments to O.Reg. 153/04 regarding the application of deicing salts to paved surfaces for the purposes of vehicular and pedestrian traffic safety. As presented in the paragraph 1 of Section 49.1 in O.Reg. 407/19:

Section 49.1 - If an applicable Site condition standard is exceeded at a property solely because of one of the following reasons, the applicable Site condition standard is deemed not to be exceeded for the purpose of Part XV.1 of the Act:

1. The qualified person has determined, based on a phase one environmental Site assessment or a phase two environmental Site assessment, that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both.

As such, seventeen (17) parameters in soil are retained as COCs for the present investigation:

- Barium;
- Copper;
- Lead;
- Mercury;
- Zinc;

- Acenaphthylene;
- Anthracene;
- Benz(a)anthracene;
- Benzo(b)fluoranthene;
- Benzo(k)fluoranthene;
- Benzo(a)pyrene;
- Chrysene;
- Dibenz(a,h)anthracene;
- Fluoranthene;
- Indeno(1,2,3-cd)pyrene;
- Phenanthrene; and,
- F1 (C6-C10)-BTEX.

Four (4) parameters in Site groundwaters were retained as COCs for the present investigation:

- PHC F1 (C6 to C10) - BTEX;
- PHC F2 (C10 to C16);
- PHC F3 (C16-C34);
- Xylenes in groundwater.

Additionally, LNAPL Free Product was also observed in the monitoring wells on-Site, as discussed further in Section 4.2.

Elevated Reported Laboratory Detection Limits:

It is noted that ethylene dibromide in groundwater sample MW4 (laboratory ID No. 3397294) had a laboratory RDL that was raised due to elevated concentrations of target analytes (i.e., PHCs and BTEX), resulting in the dilution of the sample at the laboratory. As a result, the RDL of ethylene dibromide was elevated above the Table 3 SCS. However, based on a review of the PCAs, APECs and pCOCs identified at Site, laboratory CoAs, ~~and~~ commercial applications of ethylene dibromide and the results of a subsequent sampling event completed at MW4, this parameter will not be retained as a COC for the Site for the following ~~three (3)~~ four (4) reasons:

1. This RDL exceedance of ethylene dibromide was isolated to one (1) sample, MW4, collected at a screen depth of 6.09 – 9.14 m bgs from the overburden groundwater. Upon review of the laboratory CoA (No. 21T849562), it was identified that the RDL of ethylene ~~the select VOC was~~dibromide was increased due to sample dilution at the time of analysis. The sample was diluted to keep the target compounds in the calibration range of the instrument and avoid contaminating the Purge and Trap system, attributed to the high concentration of xylene. The reporting detection limit has been corrected for the dilution factor used.

2. It is noted that ethylene dibromide has not been detected above the RDL in any soil or groundwater sample collected from Site. In total, ~~fourteen (14)~~sixteen (16) soil samples and one (1) field duplicate sample were analyzed for VOCs, and six~~five~~ (~~5~~6) groundwater samples and ~~one~~two (2~~1~~) field duplicate sample were analyzed for VOCs.

3. Ethylene dibromide is most commonly used currently as a pest treatment for forestry and agriculture and as an intermediate for dyes, resins, waxes and gums. Prior to 1990 ethylene dibromide was used as an additive in some gasoline mixtures to scavenge lead and to stop engine knocking. However, after the 1970s the use of ethylene dibromide as a fuel additive in Canada was primary limited to aviation fuel or high-performance racing fuels. As such, given the identified APECs and associated COPCs at the Site, ethylene dibromide is unlikely to be associated with any APECs at the Site.

~~3.~~4. On December 8, 2024, EXP collected one (1) original and one (1) duplicate groundwater sample from MW4 using low-flow sampling methodologies. Based on review of the laboratory analytical results ethylene dibromide was below the laboratory RDL of <0.40 in both the original sample and the duplicate sample. At the time of sample collection on December 18, 2024, a Trip Blank samples was also submitted to the contractual laboratory to evaluate field handling and transport. As such, ethylene dibromide is identified to be below the applicable Table 3 SCS at MW4, and the prior RDL exceedance is deemed to be attributable solely to sample dilution at the time of laboratory analysis.

As such, ethylene dibromide will not be retained as a COC.

Isolated PAH Exceedance (Benzo(g,h,i)perylene):

It should be noted that an isolated exceedance of benzo(g,h,i)perylene was identified at BH/MW1 on January 24, 2022. Based on review of field notes (which identified a potential sediment interference) and the completion of two (2) confirmatory sampling event on July 12, 2022, and April 22, 2024, with results below both the Table 3 SCS and the laboratory RDL, EXP does not believe the isolated exceedance of benzo(g,h,i)perylene in groundwater is representative of current Site conditions and is likely attributed to sediment interference. As such, given the completion of two (2) rounds of groundwater sampling, with results below the Table 3 SCS and the presence of sediment identified in the original sample, benzo(g,h,i)perylene is not retained as a COC for groundwater at the Site.

Mercury Exceedance in Soil and Methyl Mercury Sampling:

As a result of the mercury exceedance identified at BH106-2A at a depth of 0.8 – 1.1 m bgs, EXP advanced BH203 within 2m of this location in January 2025. An original soil sample and a duplicate soil sample were collected from BH203 at approximately the same sampling interval and were submitted to the contractual laboratory for the analysis of methyl mercury. Analytical results for methyl mercury in both the original and duplicate soil sample were well below the Table 3 SCS and thus methyl mercury formation is not identified to be occurring at the Site within proximity to the identified soil exceedance for total mercury. Please refer to figure 9 for a plan view Figure showing the location of the mercury exceedance and the location of BH203.

4.1 Soil Impacts

Soil samples were submitted for the analysis of PHCs, BTEX, VOCs, PAHs, metals, hydride forming metals and ORPs (including Hg, MeHg, CN-, Cr VI, B-HWS, EC, SAR). Details of the delineation, source and distribution of the impacts are summarized in Table 10, based on the current Site conditions.

Table 10: Source and Distribution of Soil Impacts

Parameter Group and Media	Horizontal Delineation	Associated Drawings	Vertical Delineation	Associated Drawings
PHCs / Soil	Southeastern portion of the Site	7	An Isolated exceedance was identified between 4.57 - 5.18 m bgs at BH5. The exceedance at BH5 was vertically	17B and 19C

Parameter Group and Media	Horizontal Delineation	Associated Drawings	Vertical Delineation	Associated Drawings
			delineated by a clean sample collected from BH106 at 8.38 – 8.99 m bgs.	
PAHs / Soil	Northern, western and southeastern portions of the Site	12	It is inferred that PAH exceedances are primarily isolated to the fill materials (found from approximately 0.0 to 2.9 m bgs) and/ or upper native materials. BH101 (2020) exceedances (0.3 – 0.6 m bgs) were vertically delineated at BH101 (2020) with a clean sample collected from 3.8 – 4.4 m bgs. BH101, BH102 and BH104 (2020) exceedances were found at 0.15 – 0.76 m bgs, 0.15 – 0.76 m bgs and 0.3 – 0.6 m bgs, respectively, and were vertically delineated by a clean sample collected at BH104 (2020) from a depth of 3.8 – 4.4 m bgs. BH1 exceedances (0.15 – 0.76 m bgs) were vertically delineated at BH1 with a clean sample collected from BH1 at 3.05 – 3.66 m bgs. Exceedances were identified at BH102 (2020) and BH108 (2020) at a depth of 0.3 – 0.6 m bgs and were both vertically delineated by clean samples collected from 3.1 – 3.6 m bgs at each location. Finally, an exceedance was identified at BH4 at 0.17 – 0.76 m bgs that was vertically delineated by a clean sample at BH4 from 4.57 – 5.18 m bgs.	17G and 18G
Metals and Mercury / Soil	Northern, east-central and southern portions of the Site	9	It is inferred that metal and mercury exceedances are primarily isolated to the fill materials (found from approximately 0.0 to 2.9 m bgs) and/or upper native materials. BH101 (2020) exceedances (0.3 – 0.6 m bgs) were vertically delineated at BH101 (2020) with a clean sample collected from 3.8 – 4.4 m bgs. BH1 exceedances (0.15 – 0.76 m bgs) were vertically delineated at BH1 with a clean sample collected from 3.05 – 3.66 m bgs. BH106 (2020) exceedances were delineated by a clean sample collected at 3.8 – 4.4 m bgs. BH102 (2020) and BH107 (2020) exceedances (0.3 – 0.6 m bgs) were both vertically delineated by clean samples from 3.1 – 3.6 m bgs at each location. Exceedances at BH105 (2020) (0.3 – 0.6 m bgs) and BH110 (0.15 – 0.76 m bgs) were vertically delineated by a clean	17D and 18D

Parameter Group and Media	Horizontal Delineation	Associated Drawings	Vertical Delineation	Associated Drawings
			sample collected from BH105 (2020) at a depth of 3.8 – 4.4 m bgs. An exceedance at BH108 (2020) was vertically delineated by a clean sample collected at BH108 (2020) from 3.1 – 3.6 m bgs. Finally, an exceedance was identified at BH4 at 0.17 – 0.76 m bgs that was vertically delineated by a clean sample at BH4 from 4.57 – 5.18 m bgs.	

4.2 Groundwater Impacts

Groundwater samples were submitted for the analysis of PHCs, BTEX, VOCS, PAHs, metals, hydride forming metals and ORPs (including Hg, Cr Vi, Na+, Cl-, CN-). Details of the delineation, source and distribution of the impacts are summarized in Table 11, based on the current Site conditions.

Table 11: Source and Distribution of Groundwater Impacts

Parameter Group and Media	Horizontal Delineation	Associated Drawings	Vertical Delineation	Associated Drawings
PHCs and BTEX / Groundwater	Northern, central and east portions of the Site	13	Groundwater exceedances were identified at a screen depth of 6.09 - 9.14 m bgs at monitoring well MW4, at a screen depth of 7.61 – 9.14 m bgs at MW107 and MW109 and at a screen depth of 13.78 – 15.31 m bgs at MW108. PHCs F1-F3 and xylene exceedances in groundwater were vertically delineated to a depth of 16.8 m bgs at MW24-2 (MW24-2 screened between 16.8 – 19.8 m bgs).	17H and 18H

Evidence of LNAPL Free-Product in Groundwater:

In 2021 and 2022, evidence (i.e., strong odour, sheen or visible product) of the presence of LNAPL free product was identified at several on-Site monitoring well locations at the RA property. In the summer of 2022, LNAPL free product, or signifiers of the potential for free product, was identified at BH/MW2, BH/MW3, BH/MW109, and BH/MW4. During a free-product assessment completed in July 2022 to assess all existing monitoring wells for the presence of free-product, the 'worst-case' conditions were observed at monitoring well location MW4, in the northeastern portion of the Site. Approximately 1 m of LNAPL free product was identified at MW4 in July 2022. It is noted that minimal product (i.e., <1 cm) was only observed in a bailer used to monitor free product at MW2 during one (1) monitoring event in July 2022. In addition, only a strong petroleum odour was observed at MW3 in July 2022. Both MW2 and MW3 have been sampled for PHCs and BTEX in groundwater twice, in December-January 2021-2022 and on April 22, 2024. Analytical results for PHCs and BTEX from both monitoring wells have been below the laboratory RDL across all sampling events indicating LNAPL free product is not present at monitoring wells MW2 and MW3.

~~In 2021 and 2022, evidence of LNAPL free product was identified at several monitoring well locations within the central, northeastern and northwestern portion of the Site. In the summer of 2022, LNAPL free product was identified at BH/MW2, BH/MW3, BH/MW109, and BH/MW4. During a free-product assessment completed in July 2022 to assess all existing monitoring wells for the presence of free-product, the 'worst-case' conditions were observed at monitoring well location MW4, in the northeastern portion of the Site. Approximately 1 m of LNAPL free product was identified at MW4 in July 2022. It is noted that minimal product was observed in a bailer used to monitor free product at MW2 during one (1) monitoring event in July 2022. LNAPL was not detected in MW2 during six (6) consecutive monitoring events over the course of 2024, and groundwater samples submitted for analysis of PHCs/BTEX and VOCs from this monitoring well for two (2) consecutive sampling events were below the applicable Table 3 Site Condition Standards. As such, MW2 is not considered to contain free product.~~

In March 2024, EXP returned to the Site and installed ten (10), 4-inch diameter, extraction wells at the Site in order to facilitate a remedial program to remove the LNAPL free product from groundwater at the Site to an extent reasonably practicable. All extraction wells were installed by a licensed drilling contractor and were completed to a depth of approximately 9.2 m bgs and were outfitted with a screen extending from 9.2 m bgs to just below surface grade at each extraction well. Extraction wells were installed across the northern and northeastern property boundary in the vicinity of the identified LNAPL and worst case PHC and BTEX exceedances. EXP is currently undertaking regular groundwater pumping events and free product gauging in order to remove the LNAPL free product from the subsurface at the Site. During each extraction event EXP Technicians use an interface (IP) probe to monitor the depth to free product, thickness of free product and static water level.

EXP and the remedial subcontractor are currently completing six (6) months of bi-weekly groundwater removals from the Site, which will be followed by six (6) months of monthly extraction events. During each extraction event EXP Technicians use an IP probe to monitor the depth to free product, thickness of free product and static water level. Following the completion of one (1) year of extraction events, EXP will complete a monthly free product monitoring program to evaluate if residual free product levels rebound following completion of the extraction activities. EXP has completed a total of six (6) months of bi-weekly free-product extractions at the Site between April 25, 2024, and September 26, 2024. EXP is currently in the process of completing six (6) months of regular monthly free product extractions at the Site. As of January 15th, 2025, EXP had completed a total of sixteen (16) free product removal events at the Site and the monthly free product extraction events are currently planned to cease in March 2025. Between initiation of the monitoring program and December 18, 2024, approximately 8,100 L of impacted groundwater and residual free product has been removed from the Site and transported to an accredited waste disposal facility. Following completion of the scheduled extraction events, EXP will return to the Site on a monthly basis to monitor the extraction wells and monitoring wells at the Site to determine if free product levels at the Site are remaining stable or rebounding. Following completion of the three (3) month observation period, EXP will make a recommendation to the Client pursue additional extraction efforts or other methods to address any residual LNAPL at the Site following completion of one (1) year of regular groundwater extractions. Following completion of the remedial extraction program, a summary report will be prepared to document the efforts undertaken at the Site to address the presence of LNAPL in groundwater.

Figure 13A presents a plan view summary of the results of the LNAPL extraction program completed at the Site between April 2024 and January 2025. Figure 13A also presents summary tables for each monitoring or extraction well where LNAPL has been identified during the program, presenting the measured thickness of LNAPL at each location by observation date. LNAPL free product has not been identified at BH/MW1, BH/MW2, BH/MW3, BH/MW107, BH/MW108, BH/MW24-1, BH/MW24-2, BH/MW24-3, EW1, EW2, EW3, and EW4. Residual (i.e., low levels) of LNAPL product have been identified at EW5, EW6 and EW7. Measurable LNAPL free product levels have been detected at EW8, EW9, EW10, BH/MW4, and BH/MW109. Worst-case LNAPL conditions appear to be localized to the northeastern corner of the RA property and do not appear to ~~m~~be migrating across the Site with the inferred direction of groundwater flow. It is assumed that the low permeability of the water bearing soils at the Site is acting to mitigate downgradient migration of the LNAPL across the RA property, cross sections showing the lateral and vertical delineation of LNAPL at the Site are provided as Figures 19B and 20B.

~~Based on completion of several extraction events during April and May 2024, free product ranging in thickness between 2.26 and 0.01 m has been identified at several monitoring well and extraction well locations, with the thickest LNAPL present at MW109 on April 24, 2024. LNAPL free product has been detected at BH/MW109, BH/MW4, EW5, EW7, EW9 and EW10 on one~~

~~(1) or more occasions since initiation of the free product removal program. EXP will provide a final remediation report, detailing the methodologies and results of the free product extraction program at the time of the initial RA submission.~~

It is acknowledged that an RSC cannot be filed for the property until such a time as the LNAPL free-product present in the subsurface of the Site has been remediated to an extent reasonably feasible.

~~The following table summarized free product detected during monitoring events at the Site.~~

~~**Table 12:** Summary of Free Product detected in Monitoring Wells On-Site~~

~~Well ID~~	~~Free Product Thickness (m)~~ ~~12-Jul-22~~	~~Free Product Thickness (m)~~ ~~22 and 23-Apr-24~~	~~Free Product Thickness (m)~~ ~~25-Apr-24~~	~~Free Product Thickness (m)~~ ~~9-May-24~~	~~Free Product Thickness (m)~~ ~~23-May-24~~	~~Free Product Thickness (m)~~ ~~6-Jun-24~~	~~Free Product Thickness (m)~~ ~~20-Jun-24~~
~~MW2~~	~~~0.01~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~
~~MW109~~	~~~1~~	~~2.26~~	~~1.49~~	~~1.08~~	~~*Observed~~	~~0.56~~	~~0.89~~
~~MW4~~	~~~1~~	~~0.44~~	~~*Observed~~	~~0.53~~	~~*Observed~~	~~0.11~~	~~0.44~~
~~EW5~~	~~NI~~	~~-~~	~~0.06~~	~~-~~	~~-~~	~~-~~	~~0.13~~
~~EW7~~	~~NI~~	~~-~~	~~0.01~~	~~-~~	~~-~~	~~-~~	~~0.07~~
~~EW8~~	~~NI~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0.03~~
~~EW9~~	~~NI~~	~~-~~	~~0.34~~	~~*Observed~~	~~*Observed~~	~~-~~	~~0.29~~
~~EW10~~	~~NI~~	~~-~~	~~1.1~~	~~0.63~~	~~*Observed~~	~~-~~	~~0.5~~

~~Notes:~~
~~" " indicates free product was not detected at the time of monitoring.~~
~~"NI" indicates the monitoring/extraction well was not yet installed at the time of the monitoring event.~~
~~"*Observed" indicates free product was observed in a bailer, however, an in-well measurement was not obtained.~~

4.3 Sediments Impacts

No sediment or surface water bodies are present at the site.

4.4 Contaminant Fate and Transport

4.4.1 Soil Media

Several parameters were noted to exceed the applicable Table 3 SCS, barium, copper, lead, mercury, zinc, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3,-cd)pyrene, Phenanthrene and F1 - BTEX. Metals and PAHs are likely associated with the importation of fill and as such are generally located in the surface soils of the Site and are unlikely to migrate/degrade. In addition, it is assumed that the soil pH range exceedances identified in select soil samples collected across the Site are attributable to debris (i.e., concrete fragments) within the fill materials at the time of sample collection. As there are no sources for PHCs on-Site, the PHC impacts in the soil are likely the result of an off-Site source that has migrated via the groundwater table onto the Site likely associated with the historical auto repair garage identified to the north of the Site. It is unlikely that an on-Site fuel source is present at the time of the Phase Two ESA, and, as such, the source may be the result of an off-Site UST/AST that is no longer in use. The PHCs impacts are lighter fractions and as such are more likely to volatilize/degrade over time.

4.4.2 Groundwater Media

Several parameters were noted to exceed the applicable Table 3 SCS; fraction of PHCs F1 to F3 (including free product) and xylenes in groundwater. Thus, four (4) parameters are retained as COCs in groundwater. As mentioned above, the PHCs and associated products (xylenes) are likely associated with the historical auto repair garage identified to the north of the Site or the result of unidentified off-Site UST/AST(s) that have leaked and have impacted the Site based on the worst case LNAPL locations observed in the northeastern portion of the Site, adjacent to August Avenue.

The free product detected in groundwater at the Site must be removed to the extent reasonably practical prior to the filling of an RSC.

4.4.3 Preferential Pathways

Given that soil is immobile and the majority of the impacts are located in the fill material above the groundwater table, no significant migration of the soil contamination is anticipated. Migration of contaminants in soil via leaching of contamination to groundwater is a possible migration pathway; however, this migration pathway is not anticipated to be significant. EXP notes that there are storm sewers on-Site and these sewers may have allowed for hydrocarbon impacts in soil vapour to have migrated across ~~onto~~ the Site with greater ease. However, based on the depth to groundwater at the northeastern portion of the Site, it is not anticipated that the on-Site storm sewers would act as a preferential pathway for LNAPL migration across the RA property.

4.4.4 Climatic Conditions

It is noted that climatic or meteorological conditions may influence the distribution and migration of COCs and the identified LNAPL product at the Site. Seasonal fluctuations in groundwater due to cyclical increases and decreases in precipitation can affect groundwater recharge. Groundwater levels may be elevated in the spring and fall due to snow melt and/or increases in precipitation; and, groundwater levels may be lowered in the winter and summer due to snow storage and/or increased evaporation. Such fluctuations can increase the vertical distribution of COCs in the capillary zone, as well as alter the direction of groundwater flow paths based on changes in infiltration rates. Changes in depths to groundwater at the Site within the vicinity of the identified LNAPL may result in smearing of LNAPL in the soil column as groundwater levels rise and fall. Seasonal differences in precipitation could also impact the degree to which LNAPL in groundwater is transported in the subsurface, where seasons with higher precipitation volumes may result in faster movement in the subsurface. However, given the low hydraulic conductivity at the Site, surface infiltration and groundwater flow paths would be limited in extent; therefore, climatic and meteorological conditions at the site are not expected to have a significant influence on the contaminants or contaminant migration.

4.5~~6~~ Areas where Contaminants are Present

The following table summarizes each area of contamination (AOC) identified at the Site.

Table 13: Summary of Areas of Contamination

Area of Contamination and Location	COCs in Excess of Table 3 SCS	Medium	Distribution of Contaminants	Discharge of Contaminants into the Natural Environment	Migration of Contaminants	Influence of Climatic or Meteorological Conditions	Vapour Intrusion Pathway Considerations
AOC A – Southeastern portion of the Site	PHC F1 - BTEX	Soil	A soil exceedance of PHC F1 - BTEX was localized to one (1) borehole location (BH5). The lateral extent of impacts is shown on Figure 7. Vertical delineation was achieved at a depth of 8.38 in BH106 SS9. The vertical extent of impacts is shown on Figure 17B and 19C.	The source of contamination may be associated with the historical auto repair garage situated to the north of the Site (PCA 13).	Given that soil is immobile, no significant migration of the soil contamination is anticipated. Migration of contaminants in soil via leaching of contamination to groundwater is a possible migration pathway. However, as no groundwater exceedances were identified in samples collected from the adjacent	Given the fine soil type, current use of the Site as a parking lot and low hydraulic conductivity at the Site, surface infiltration would be limited in extent. Therefore, climatic and meteorological conditions at the Site are not expected to have a significant influence on the contaminants or contaminant migration.	There are currently no enclosed structures on the Site. PHC F1 - BTEX may be present under buildings constructed on-Site in the future and may present a risk to receptors via vapour intrusion.

Area of Contamination and Location	COCs in Excess of Table 3 SCS	Medium	Distribution of Contaminants	Discharge of Contaminants into the Natural Environment	Migration of Contaminants	Influence of Climatic or Meteorological Conditions	Vapour Intrusion Pathway Considerations
					monitoring wells at the southeastern corner of the Site, this migration pathway is not anticipated to be significant.		
AOC B – Northern, western and southeastern portions of the Site.	Acenaphthylene, Anthracene, Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene Fluoranthene, Indeno(1,2,3-cd) pyrene, Chrysene and Phenanthrene.	Soil	Soil exceedances of PAHs were localized to eight (8) borehole locations: BH1, BH101, BH104 (2020), BH102, BH101 (2020), BH102 (2020), BH108 (2020) and BH4. The lateral extent of impacts is shown on Figure 12. It is inferred that PAH exceedances are primarily isolated to the fill materials (found from approximately 0.0 to 2.9 m bgs) and/ or upper native materials. BH101 (2020) exceedances (0.3 – 0.6 m bgs) were vertically delineated at BH101 (2020) with a clean	The source of contamination is likely associated with the importation of fill materials of unknown quality (PCA 1).	Given that soil is immobile, no significant migration of the soil contamination is anticipated. Migration of contaminants in soil via leaching of contamination to groundwater is a possible migration pathway. However, as no groundwater PAH exceedances	Given the fine soil type, current use of the Site as a parking lot and low hydraulic conductivity at the Site, surface infiltration would be limited in extent. Therefore, climatic and meteorological conditions at the Site are not expected to have a significant influence on the contaminants or contaminant migration.	There are currently no enclosed structures on the Site. Select volatile PAHs (i.e., acenaphthylene, anthracene and phenanthrene) may be present under buildings constructed on-Site in the future and may present a risk to receptors via vapour intrusion. The remaining PAHs are not considered sufficiently volatile for vapour

Area of Contamination and Location	COCs in Excess of Table 3 SCS	Medium	Distribution of Contaminants	Discharge of Contaminants into the Natural Environment	Migration of Contaminants	Influence of Climatic or Meteorological Conditions	Vapour Intrusion Pathway Considerations
			sample collected from 3.8 – 4.4 m bgs. BH101, BH102 and BH104 (2020) exceedances were found at 0.15 – 0.76 m bgs, 0.15 – 0.76 m bgs and 0.3 – 0.6 m bgs, respectively, and were vertically delineated by a clean sample collected at BH104 (2020) from a depth of 3.8 – 4.4 m bgs. BH1 exceedances (0.15 – 0.76 m bgs) were vertically delineated at BH1 with a clean sample collected from 3.05 – 3.66 m bgs. Exceedances were identified at BH102 (2020) and BH108 (2020) at a depth of 0.3 – 0.6 m bgs and were both vertically delineated by clean samples collected from 3.1 – 3.6 m bgs at each location. Finally, an exceedance was identified at BH4 at 0.17 – 0.76 m bgs that was		Table 3 SCS were found at the Site, this migration pathway is not anticipated to be significant.		intrusion pathways to be complete.

Area of Contamination and Location	COCs in Excess of Table 3 SCS	Medium	Distribution of Contaminants	Discharge of Contaminants into the Natural Environment	Migration of Contaminants	Influence of Climatic or Meteorological Conditions	Vapour Intrusion Pathway Considerations
			vertically delineated by a clean sample at BH4 from 4.57 – 5.18 m bgs. The vertical extent of impacts are shown on Figures 17G and 18G.				
AOC C – Northern, east central and southern portions of the Site	Barium, Copper, Lead, Mercury and Zinc.	Soil	Soil exceedances of metals and/or mercury were localized to nine (9) borehole locations: BH1, BH106 (2020), BH101 (2020), BH102 (2020), BH4, BH110, BH105 (2020), BH108(2020), BH107 (2020). The lateral extent of impacts is shown on Figure 9. It is inferred that metal and mercury exceedances are primarily isolated to the fill materials (found from approximately 0.0 to 2.9 m bgs) and/or upper native materials. BH101 (2020) exceedances (0.3 – 0.6 m bgs) were vertically delineated at BH101 (2020) with a clean	The source of contamination is likely associated with the importation of fill materials of unknown quality (PCA 1).	Given that soil is immobile, no significant migration of the soil contamination is anticipated. Migration of contaminants in soil via leaching of contamination to groundwater is a possible migration pathway however as no groundwater metals or ORPs were identified in exceedances of Table 3 SCS from the	Given the fine soil type, current use of the Site as a parking lot and low hydraulic conductivity at the Site, surface infiltration would be limited in extent. Therefore, climatic and meteorological conditions at the Site are not expected to have a significant influence on the contaminants or contaminant migration.	There are currently no enclosed structures on the Site. Mercury may be present under buildings constructed on-Site in the future and may present a risk to receptors via vapour intrusion. Barium, Copper, Lead, and Zinc are not considered sufficiently volatile for vapour intrusion pathways to be complete.

Area of Contamination and Location	COCs in Excess of Table 3 SCS	Medium	Distribution of Contaminants	Discharge of Contaminants into the Natural Environment	Migration of Contaminants	Influence of Climatic or Meteorological Conditions	Vapour Intrusion Pathway Considerations
			sample collected from 3.8 – 4.4 m bgs. BH1 exceedances (0.15 – 0.76 m bgs) were vertically delineated at BH1 with a clean sample collected from 3.05 – 3.66 m bgs. BH106 (2020) exceedances were delineated by a clean sample collcted at 3.8 – 4.4 m bgs. BH102 (2020) and BH107 (2020) exceedances (0.3 – 0.6 m bgs) were both vertically delineated by clean samples from 3.1 – 3.6 m bgs at each location. Exceedances at BH105 (2020) (0.3 – 0.6 m bgs) and BH110 (0.15 – 0.76 m bgs) were vertically delineated by a clean sample collected from BH105 (2020) at a depth of 3.8 – 4.4 m bgs. An exceedance at BH108 (2020) was vertically delineated by a clean		adjacent monitoring wells, this migration pathway is not anticipated to be significant.		

Area of Contamination and Location	COCs in Excess of Table 3 SCS	Medium	Distribution of Contaminants	Discharge of Contaminants into the Natural Environment	Migration of Contaminants	Influence of Climatic or Meteorological Conditions	Vapour Intrusion Pathway Considerations
			sample collected from 3.1 – 3.6 m bgs. Finally, an exceedance was identified at BH4 at 0.17 – 0.76 m bgs that was vertically delineated by a clean sample at BH4 from 4.57 – 5.18 m bgs. The vertical extent of impacts are shown on Figures 17D and 18D.				
AOC D – Northern, central and east portions of the Site	PHCs F1 to F3 and Xylene	Groundwater	Exceedances of PHCs F1 to F3 and/or xylenes were identified in four (4) monitoring well locations, MW107, MW4, MW108 and MW109. The horizontal extent of the impact is shown in Figure 13 and vertical delineation of groundwater impacts are shown on Figure 17H and 18H. Groundwater impacts for PHCs and xylenes been vertically delineated to 16.8 mbgs at MW24-2 in the northern portion of the Site.	The source of contamination may be associated with the historical auto repair garage situated to the north of the Site (PCA 13) or other unidentified fuel storage tanks located within proximity to the northeastern	Groundwater impacts are expected to be migrating with groundwater flow (predominantly northwest). Given the depth of the groundwater impact, existing and potential future underground utility conduits may act as a	The climatic and meteorological conditions at the Site are not believed to have a significant influence on the contaminants or contaminant migration at the Site. However, given that PHC F1, F2, and F3 are LNAPL potential exists for the migration of these contaminants at the surface of the groundwater table,	There are currently no enclosed structures on the Site. PHCs F1 to F2 and xylene may be present under buildings constructed on-Site in the future and may present a risk to receptors via vapour intrusion. PHC F3 is not considered sufficiently volatile for vapour

Area of Contamination and Location	COCs in Excess of Table 3 SCS	Medium	Distribution of Contaminants	Discharge of Contaminants into the Natural Environment	Migration of Contaminants	Influence of Climatic or Meteorological Conditions	Vapour Intrusion Pathway Considerations
				portion of the Site where worst case LNAPL conditions were identified.	preferential pathway for the migration of the groundwater impacts.	increases in precipitation and temperatures may result in the amplified volatilization and migration of these COCs in the subsurface.	intrusion pathways to be complete.

5. Exposure Pathways

5.1 Human Health Receptors and Exposure Pathways

The selection of human receptors is based on the proposed future mixed-residential use of the Site. The proposed redevelopment includes a multi-storey residential tower, cultural space and parkland. Therefore, the receptors chosen for analysis are those standard receptors found at residential and community properties and include: property residents (all ages), property visitors (all ages), property trespassers (child and adult). Subsurface workers (e.g., construction/utility workers), long-term outdoor workers (e.g., grounds keepers) and indoor workers (e.g., security guards or staff) may also be present during redevelopment and future operation of the Site and as such, are also considered as potentially present at the Site.

Based on the COCs identified in soil and groundwater at the Site, possible routes of exposure for on-Site human receptors include the following:

- Incidental soil ingestion, dermal contact and inhalation of soil particulates for the property resident, visitor, trespasser, long-term outdoor worker, and subsurface worker;
- Ingestion of homegrown produce impacted with soil for the property residents, ~~and~~ property visitors and trespassers;
- Inhalation of indoor air impacted with volatile soil and groundwater COCs and LNAPL for the long-term property resident, property visitor, ~~and~~ trespassers and indoor workers;
- Inhalation of outdoor air impacted with volatile soil and groundwater COCs and LNAPL for the property resident, property visitor, property trespasser, long-term outdoor worker and subsurface worker;
- Trench air inhalation impacted with volatile COCs sourced from soil or groundwater and LNAPL for the subsurface worker;
- Vapour skin contact for the property resident, property visitor, property trespasser, long-term indoor worker, long-term outdoor worker, and subsurface worker; and,
- Groundwater and LNAPL dermal contact and incidental ingestion for the subsurface worker completing excavation or utility trench work.

~~It should be noted that the trench air exposure pathway is only applicable for the sub-surface worker receptor, as only this receptor is considered to be exposed to trench air impacted with contaminants sourced from the Site. Based on the measured depth to groundwater at the Site, 3.60 to 14.50 m bgs, and non-potable groundwater condition, all direct contact groundwater-based exposure pathways are deemed incomplete, with the exception of those identified for subsurface workers who may contact pooled groundwater in excavations and/or trenches while completing subsurface work.~~

The following pathways were considered incomplete and were therefore not assessed:

- All indoor exposure pathways (i.e., inhalation of indoor air, vapour skin contact with indoor air) were considered incomplete in the RA for on and off-site outdoor maintenance workers and construction/subsurface utility workers given that these receptors are assumed to stay outdoors at all times;
- Due to the depth to groundwater at the Site, the groundwater to garden produce ingestion pathway was considered to be incomplete at the Site;
- All outdoor exposure pathways (i.e., inhalation of outdoor air, vapour skin contact with outdoor air, direct contact with soil) is considered incomplete for the indoor long-term worker as they are assumed to spend negligible time outdoors;

- As soil has limited mobility, dermal contact and incidental ingestion, indoor and/or outdoor air inhalation and vapour skin contact exposure pathways for soil were considered negligible for off-site receptors and therefore were considered incomplete; and,
- Direct contact (ingestion and dermal contact) with groundwater to all human receptors (with exception of the construction worker) was considered incomplete given the depth to groundwater and non-potable condition of the site.

Off-site human receptors consist of the same receptors found on-site. The potential exposure routes for human receptors are summarized in Figure 2119A. As risk management measures (RMM) are intended for the Site, a human health conceptual site model (HHCSM) in the presence of RMM is provided as Figure 2119B.

5.2 Ecological Receptors and Exposure Pathways

The selection of ecological receptors takes into consideration the location of the Site in an urban area and the presence of Lake Ontario, located approximately 1.3 km south of the Site. Relevant on-Site receptors consist of terrestrial VECs such as plants, soil invertebrates, mammals and birds. Given the depth to groundwater measured at the Site (i.e., 2.843.6 m bgs), all direct contact groundwater exposure pathways are deemed incomplete for terrestrial ecological receptors present on-Site.

On-Site ecological exposure routes include the following:

- Root uptake and direct contact by terrestrial plants;
- Stem and foliar uptake and contact by terrestrial plants;
- Soil particulate inhalation, dermal contact and incidental ingestion by terrestrial mammals and birds;
- Dermal contact and incidental ingestion by soil invertebrates;
- Ingestion of impacted plant and animal tissue by soil invertebrates, mammals and birds; and,
- Vapour inhalation by soil invertebrates, mammals and birds.

The following pathways were considered incomplete and were therefore not assessed:

- Direct contact with impacted groundwater is not anticipated for on- or off-site terrestrial plants, soil invertebrates, mammals and birds given the depth to groundwater is below typical rooting depths for urban vegetation and that these receptors typically avoid saturated soils (see additional details below);
- Since there are no surface water bodies on-site, surface water exposure pathways for on-site ecological receptors are incomplete;
- Based on the separation distance to the nearest downgradient surface water body, the soil erosion to sediment exposure pathway was considered to be incomplete;
- As soil has limited mobility, dermal contact and incidental ingestion pathways were considered negligible for off-site receptors and therefore were considered incomplete; and,
- Given that on-site ecological receptors are assumed to spend 100% of their time on-site, off-site terrestrial ecological receptors are not assumed to be exposed to soil COCs via ingestion of plant and animal tissue.

Off-Site ecological receptors consist of the same terrestrial receptors found on-site, in addition to aquatic species. Aquatic species include aquatic vegetation, aquatic invertebrates, amphibians and reptiles, semi-aquatic mammals and birds, and fish.

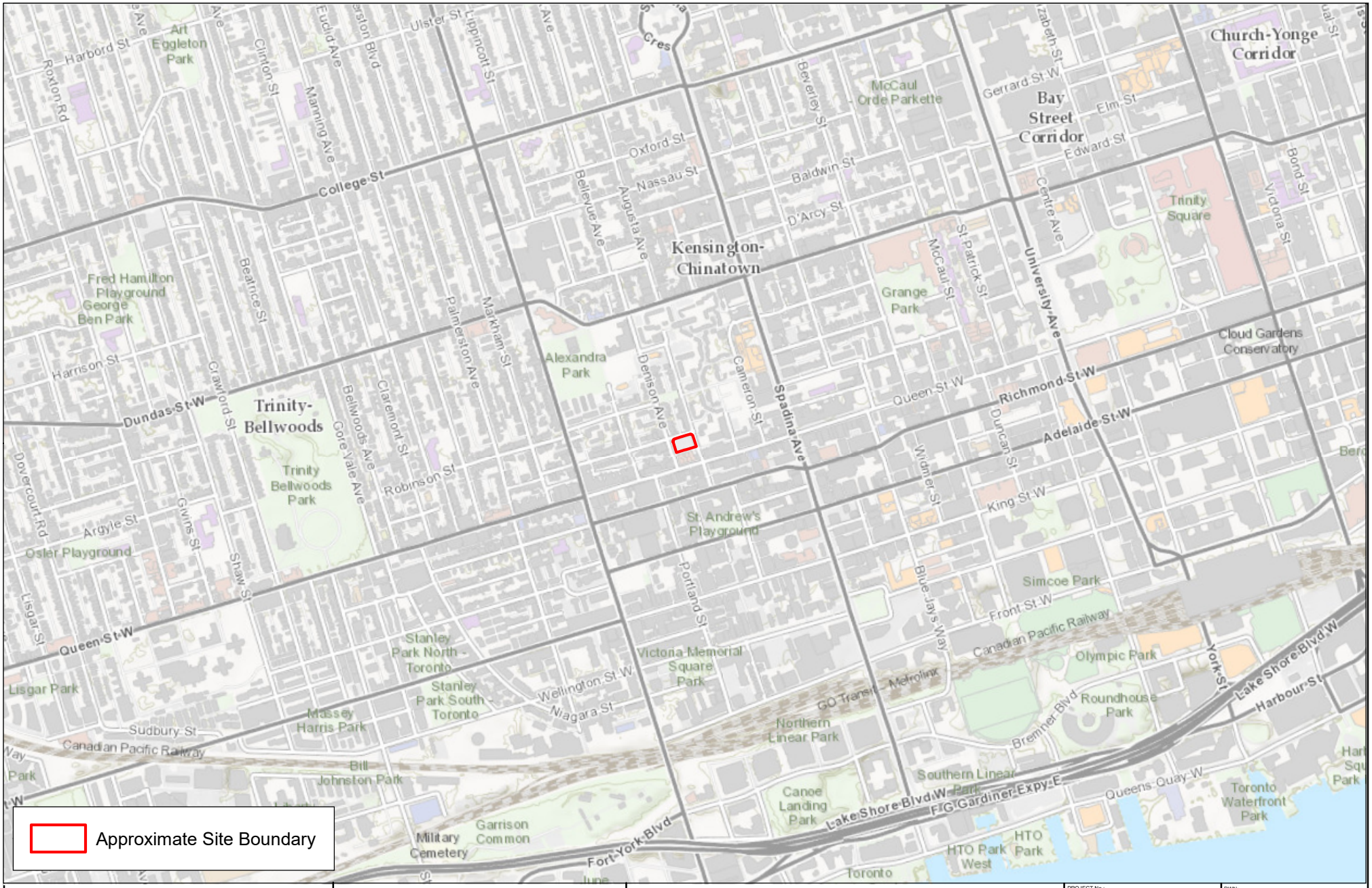
Off-Site exposure routes for terrestrial receptors include the following:

- Soil particulate inhalation by terrestrial mammals and birds;
- Stem and foliar uptake by terrestrial plants;
- Ingestion of impacted plant and animal tissues by soil invertebrates, terrestrial mammals and birds;
- Vapour inhalation by soil invertebrates and mammals and birds; and,
- Surface water dermal contact, ingestion and ingestion of plant or animal tissue impact with COCs migrating to surface water by terrestrial mammals and birds.

Relevant exposure pathways for off-Site aquatic receptors such as aquatic plants, aquatic invertebrates, aquatic birds and mammals, amphibians, reptiles and fish include the following:

- Root, stem and foliar uptake of surface water for aquatic plants;
- Ingestion and dermal contact of surface water for aquatic invertebrates, semi-aquatic mammals and birds, amphibians and reptiles, and fish;
- Ingestion of impacted plant and animal tissue for aquatic invertebrates, semi-aquatic mammals and birds, amphibians and reptiles, and fish; and,
- Gill uptake of surface water for aquatic invertebrates and fish.

The potential exposure routes for ecological receptors are summarized in Figure 2~~0~~A. As RMM are intended for the Site, the ecological conceptual site model (ECSM) in the presence of RMM is provided as Figure 2~~0~~B.



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TITLE AND LOCATION:

SITE LOCATION PLAN
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JUNE 2024	FIG. No.: 1

PCA Identifier(s)	Potentially Contaminating Activity (PCA)
9, 105, 154C, 177A	PCA#8 – Chemical Manufacturing, Processing and Bulk Storage
120A, 141A, 142	PCA#10 – Commercial Autobody Shops
11, 79B, 81C, 104, 119B, 138A	PCA#17 – Dye Manufacturing, Processing and Bulk Storage
8, 12, 29, 51, 57, 58, 65, 67, 69, 75, 80, 82B, 100, 101, 106, 120B, 131, 132B, 146, 166B, 172A, 173	PCA#28 Gasoline and Associated Products in Fixed Tanks
1	PCA#30 – Importation of Fill Material of Unknown Quality
20, 21, 35, 37B, 41, 42, 44A, 46, 52A, 63A, 70, 83A, 103A, 116A, 118, 124C, 138C, 140A, 141B, 151B, 152, 153A, 154D, 156A, 162A, 164, 166A, 186, 187	PCA#31 – Ink Manufacturing, Processing and Bulk Storage
122	PCA#32 – Iron and Steel Manufacturing and Processing
6, 16, 17, 18, 19, 22B, 24, 25, 30A, 32, 38B, 43, 53, 55, 61, 62, 63B, 73, 74B, 77, 81A, 81D, 83B, 85, 86, 87, 88, 89B, 91A, 95A, 96, 99, 103C, 107, 111, 112, 113, 116B, 121, 124B, 128, 132C, 134, 140B, 149B, 151A, 153D, 154A, 157, 158, 171A, 177B, 178, 179A, 180, 181, 182A, 184, 188, 189	PCA#33 – Metal Treatment, Coating, Plating and Finishing
90, 91B, 125, 126, 161A	PCA#34 – Metal Fabrication
3, 5, 10, 15, 22C, 26, 27, 28, 49, 50, 52B, 54, 56, 59, 68, 71, 76, 78, 79A, 82A, 84, 92, 95B, 102, 103B, 108, 110, 114A, 117, 119A, 123B, 159, 160, 161B, 170, 171B, 172B, 174, 175A	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used)
22A, 89A, 91C	PCA#39 – Paints Manufacturing, Processing and Bulk Storage
48, 154B, 155	PCA#45 – Pulp, Paper, and Paperboard Manufacturing and Processing
72, 81B	PCA#47 – Rubber Manufacturing and Processing
23B, 93, 94, 114B, 129, 183	PCA#49 – Salvage Yard, including automobile wrecking
13, 130, 132A, 133, 135, 143, 144, 145, 147, 148, 169, 176, 190	PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems
23A, 31, 33, 34, 36, 37A, 38A, 38C, 40, 44B, 47, 60, 103D, 115, 123A, 124A, 138B, 139A, 141C, 149A, 153E, 156B, 162B, 165, 166C, 167, 168, 179B, 182B	PCA#54 – Textile Manufacturing and Processing
185, 191	PCA#58 - Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste other than use of biosoils as soil conditioners
39, 45, 98, 136, 137, 150, 163, 175B	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products
2	PCA#Other – de-icing salts
4, 14, 64	PCA#Other – historical manufacturing
7, 66, 74A	PCA#Other – Coal Storage
30B	PCA#Other – Skate Manufacturing
44C, 139B, 97, 153B	PCA#Other - photoprocessing
109	PCA#Other – vaping business
127, 153C	PCA#Other – medical equipment manufacturing

Approximate Site Boundary
Phase One Study Area
PCA of De minimis Concern
PCA Contributing to APEC
Fuel Storage Tank

Land Use

Commercial
Commercial Residential Employment
Institutional
Mixed Residential Commercial
Open Space
Residential

City of Toronto

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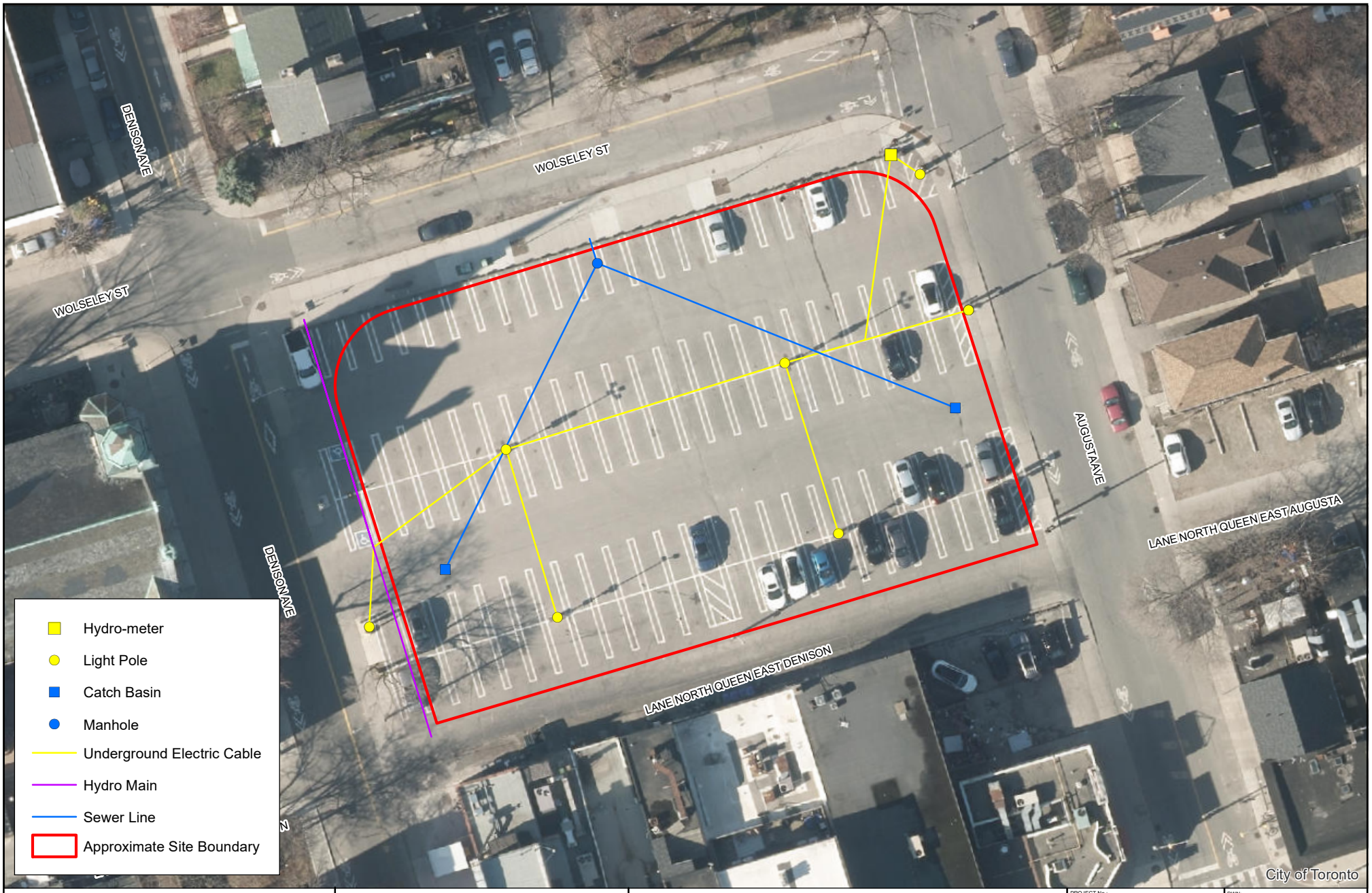
N

0 40 80 120 160 200 m

TITLE AND LOCATION:

PHASE ONE STUDY AREA, SURROUNDING LAND USE AND POTENTIALLY CONTAMINATING ACTIVITIES
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21018382-B0	AC
SCALE: AS NOTED	CHKD: SP
DATE: JUNE 2024	FIG. No.: 2



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N

0 5 10 15 20 25 m

TITLE AND LOCATION:

SITE PLAN AND UTILITIES
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JUNE 2024	FIG. No.: 3

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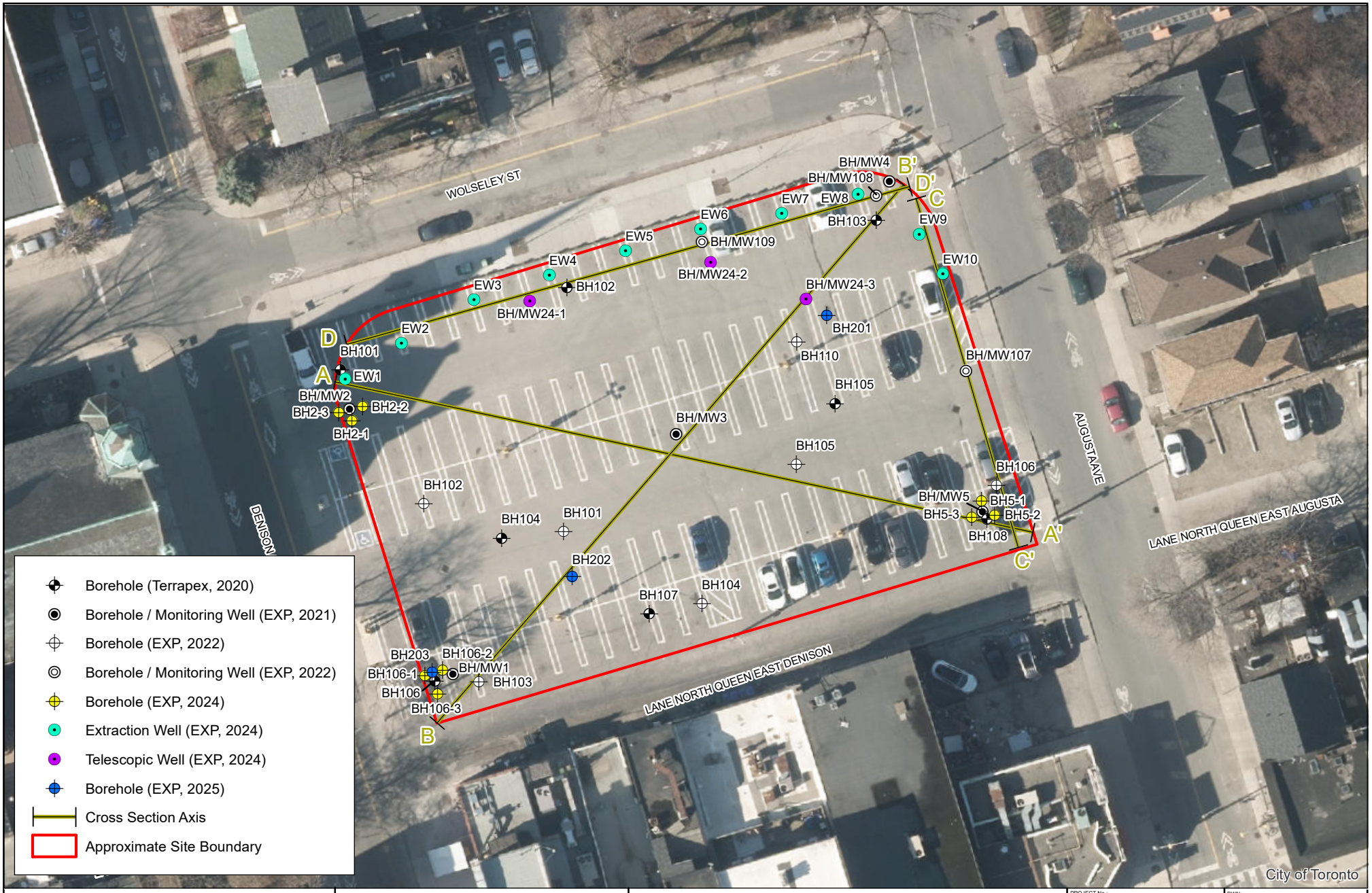
0 5 10 15 20 25 m

TITLE AND LOCATION:

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN (APECs)
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JUNE 2024	FIG. No.: 4



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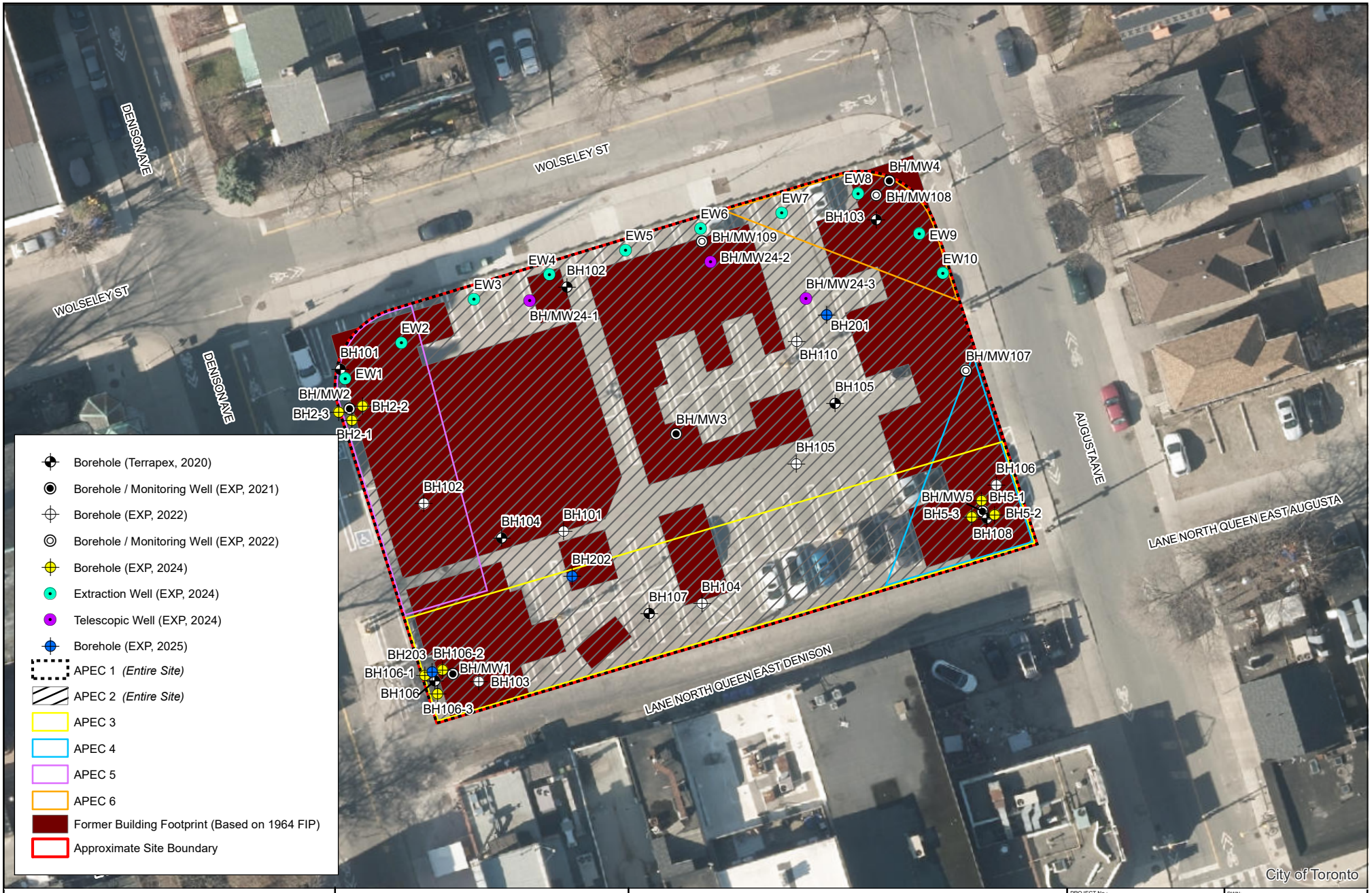
0 5 10 15 20 25 m

TITLE AND LOCATION:

BOREHOLE / MONITORING WELL
LOCATION PLAN
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JANUARY 2025	FIG. No.: 5A



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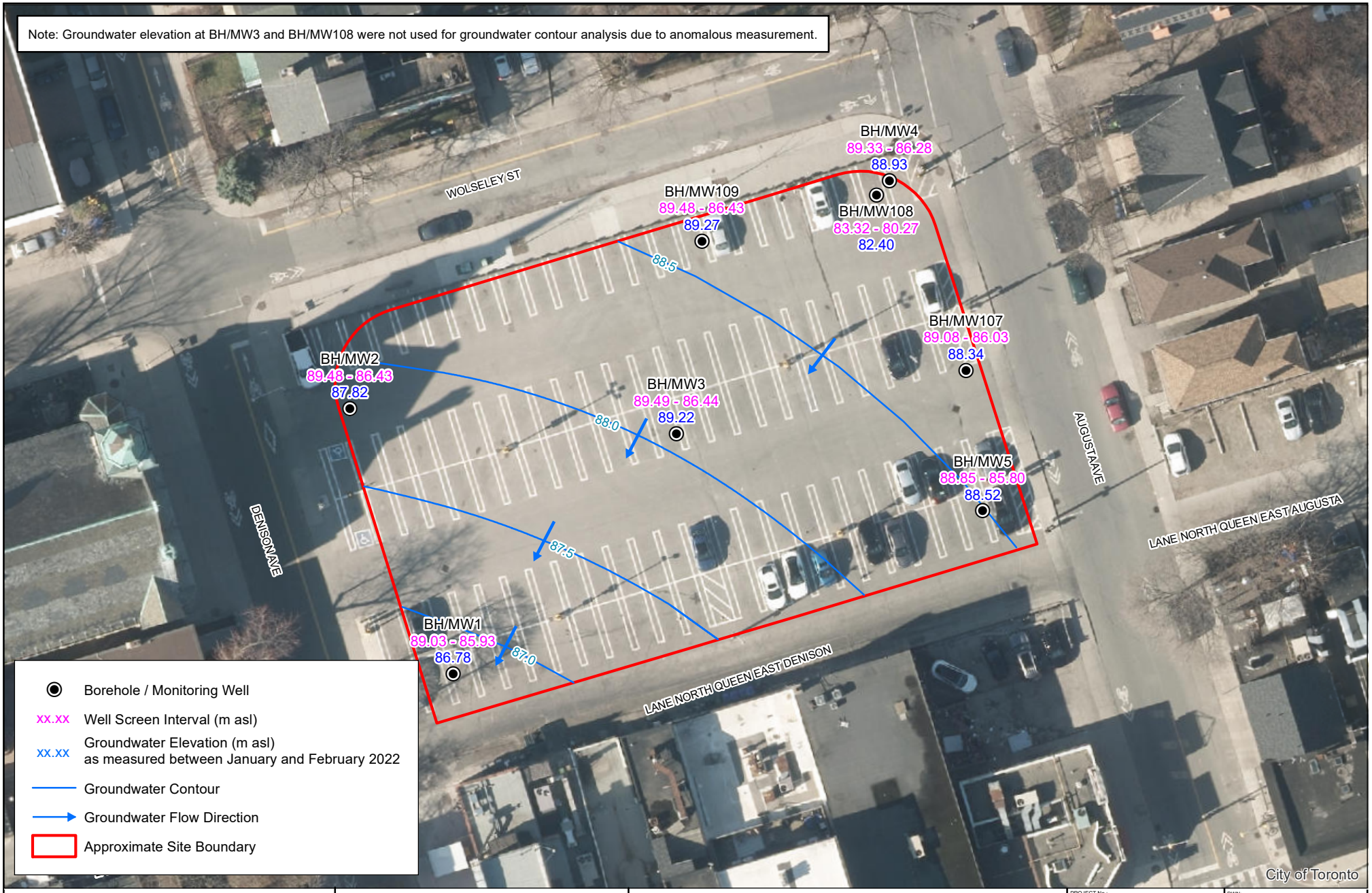
N

0 5 10 15 20 25 m

TITLE AND LOCATION:

BOREHOLE / MONITORING WELL
LOCATION PLAN AND APECs
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JANUARY 2025	FIG. No.: 5B



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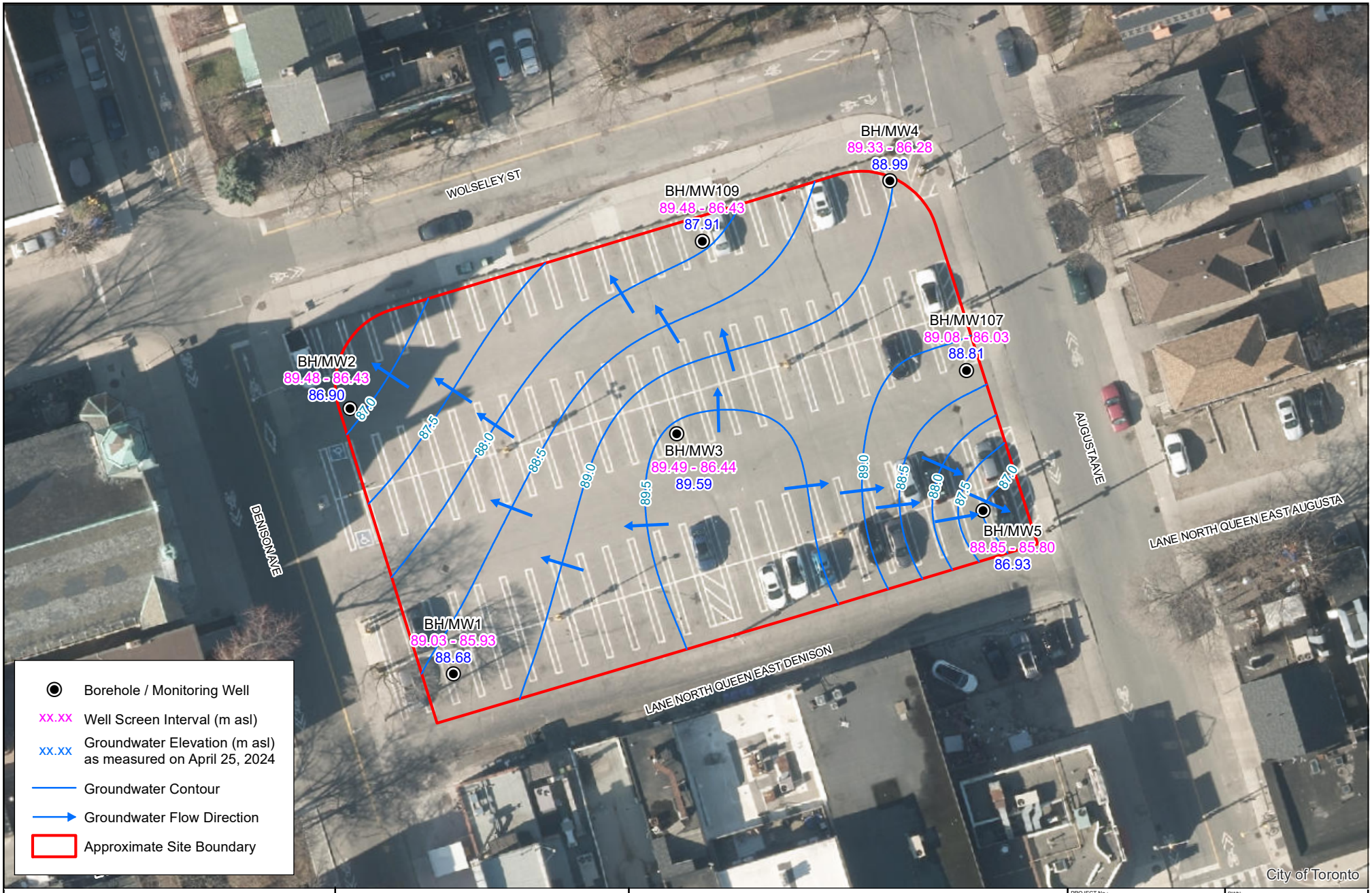
0 5 10 15 20 25 m

TITLE AND LOCATION:

SHALLOW GROUNDWATER CONTOUR PLAN
- JANUARY AND FEBRUARY 2022
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JUNE 2024	FIG. No.: 6A



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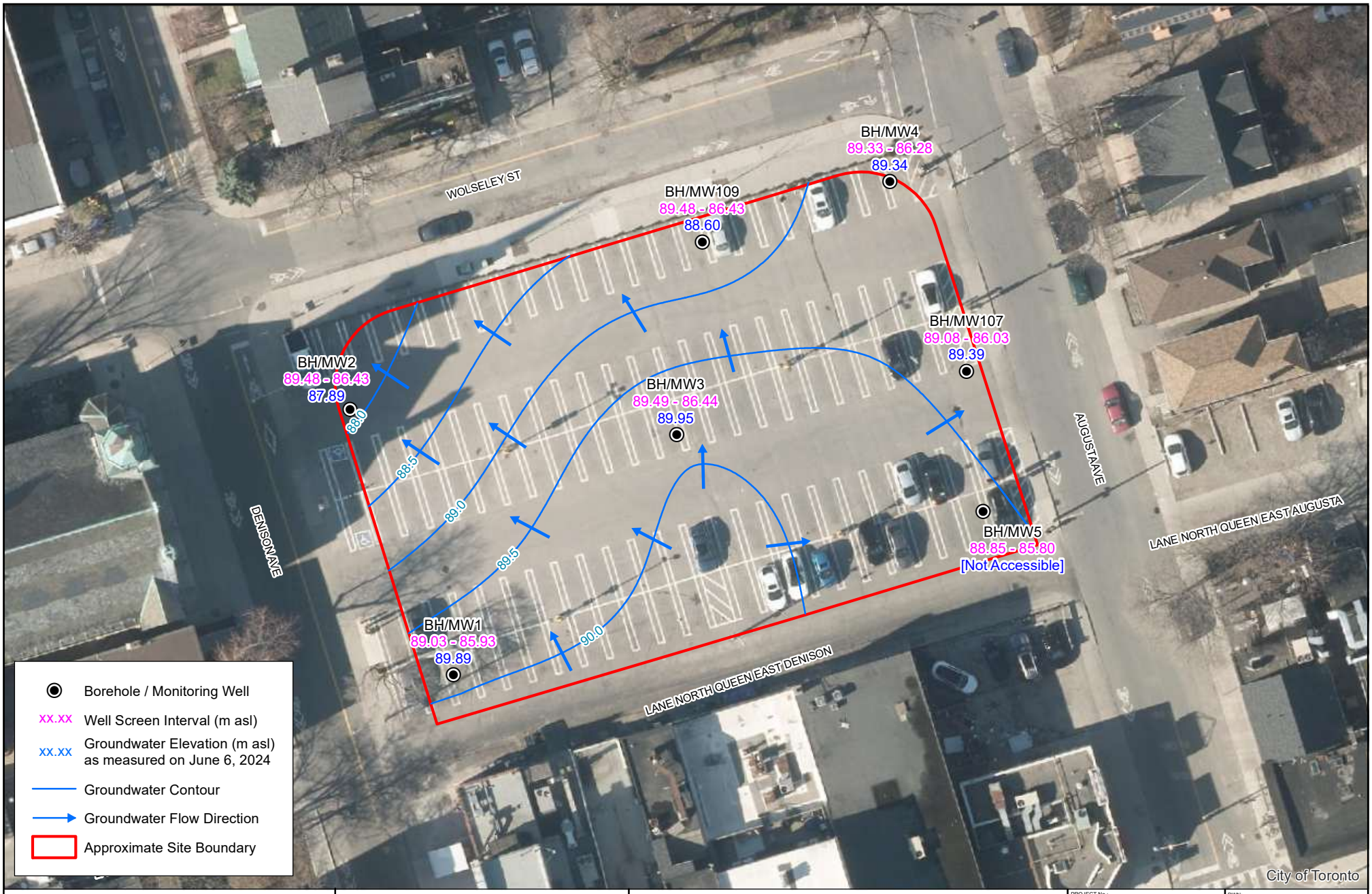
0 5 10 15 20 25 m

TITLE AND LOCATION:

SHALLOW GROUNDWATER CONTOUR PLAN
- APRIL 25, 2024
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21018382-B0	AC
SCALE:	CHKD:
AS NOTED	SP
DATE:	FIG. No.:
JUNE 2024	6B



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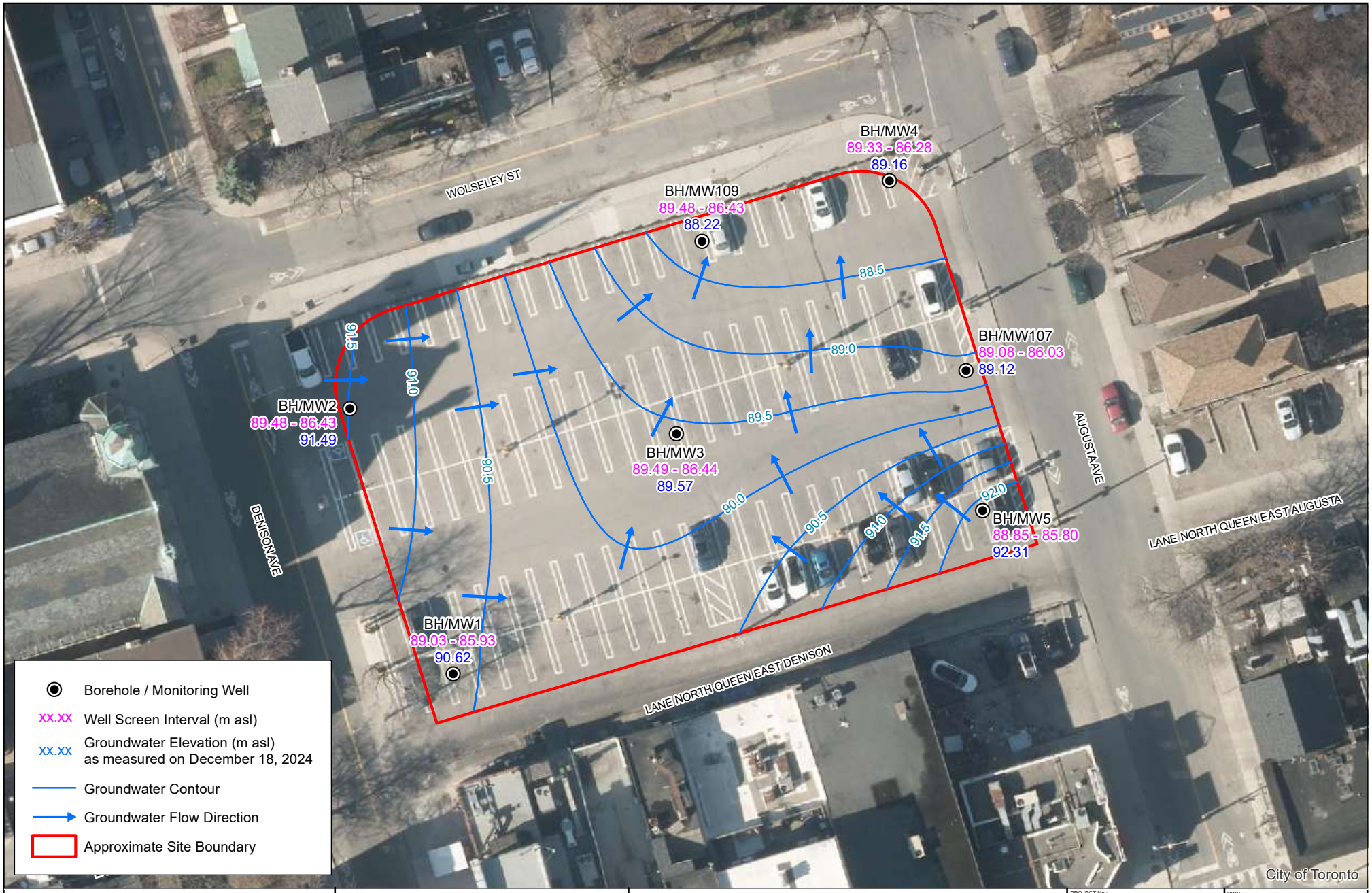
0 5 10 15 20 25 m

TITLE AND LOCATION:

SHALLOW GROUNDWATER CONTOUR PLAN
- JUNE 6, 2024
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JANUARY 2025	FIG. No.: 6C



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TITLE AND LOCATION:

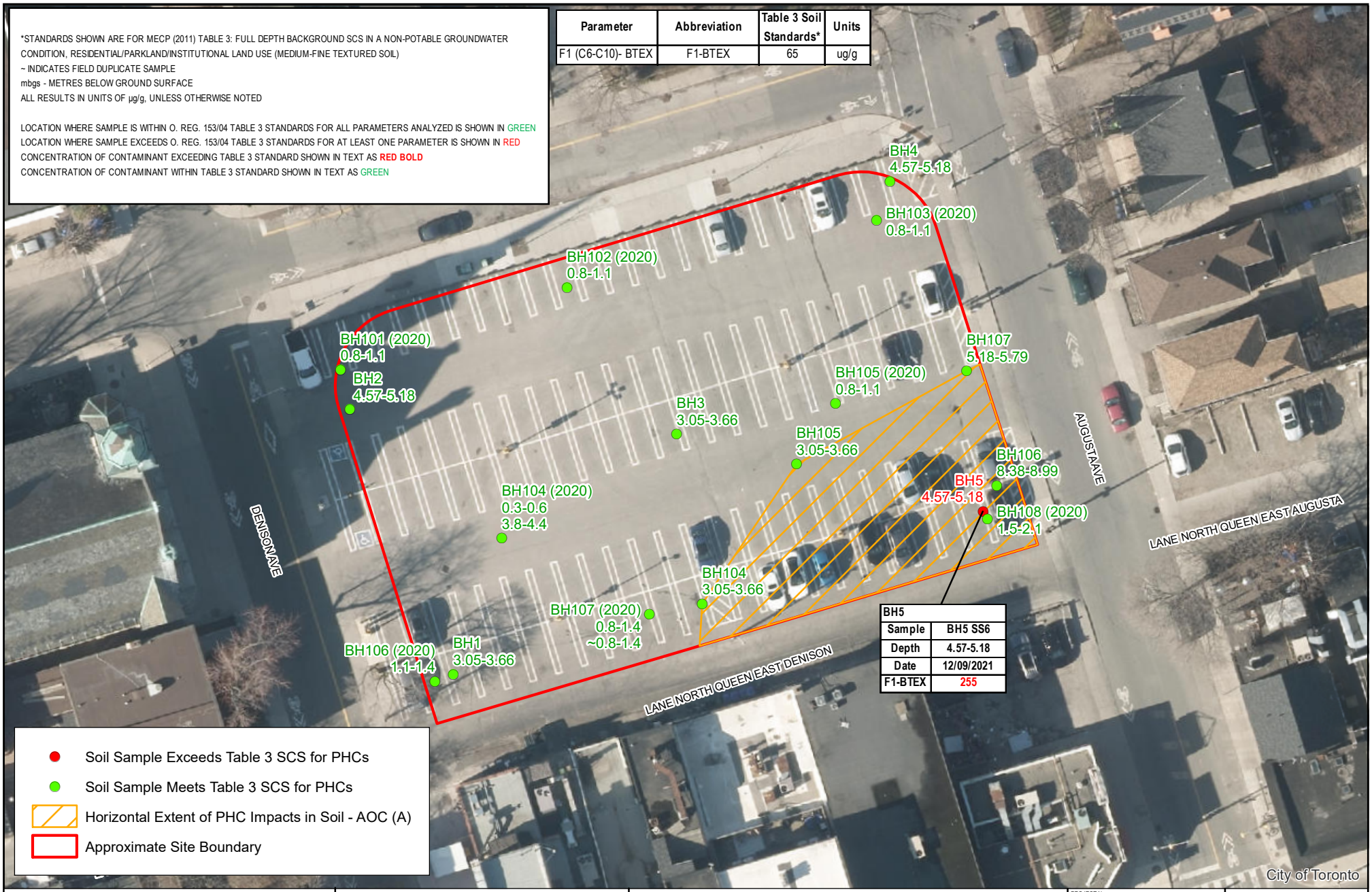
SHALLOW GROUNDWATER CONTOUR PLAN
- DECEMBER 18, 2024
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JANUARY 2025	FIG. No.: 6D

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Abbreviation	Table 3 Soil Standards*	Units
F1 (C6-C10)- BTEX	F1-BTEX	65	ug/g



BH5	
Sample	BH5 SS6
Depth	4.57-5.18
Date	12/09/2021
F1-BTEX	255

- Soil Sample Exceeds Table 3 SCS for PHCs
- Soil Sample Meets Table 3 SCS for PHCs
- Horizontal Extent of PHC Impacts in Soil - AOC (A)
- Approximate Site Boundary

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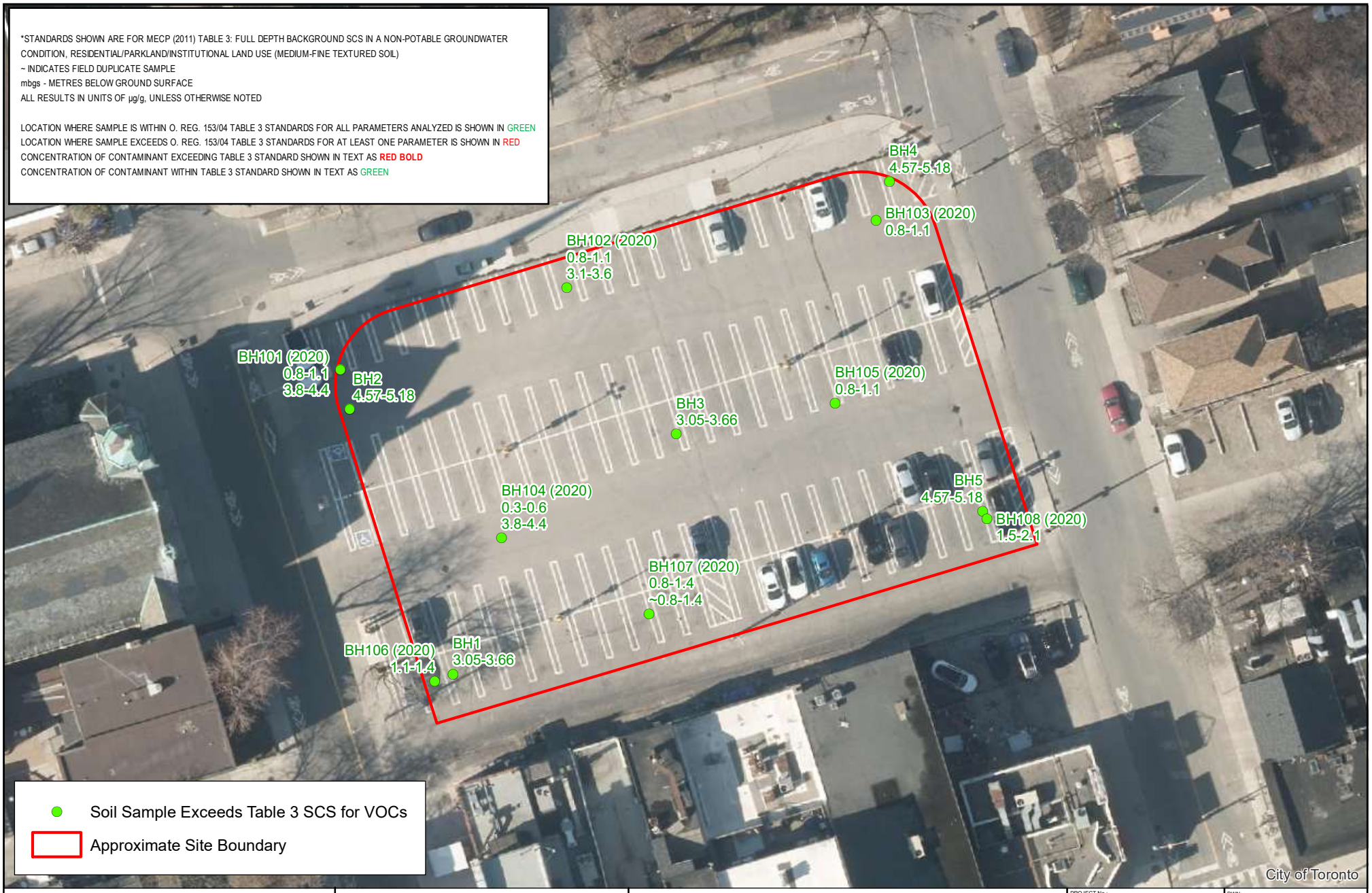
TITLE AND LOCATION:
SOIL ANALYTICAL RESULTS -
PETROLEUM HYDROCARBONS (PHCs)
INCLUDING BTEX
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JUNE 2024	FIG. No.: 7

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN



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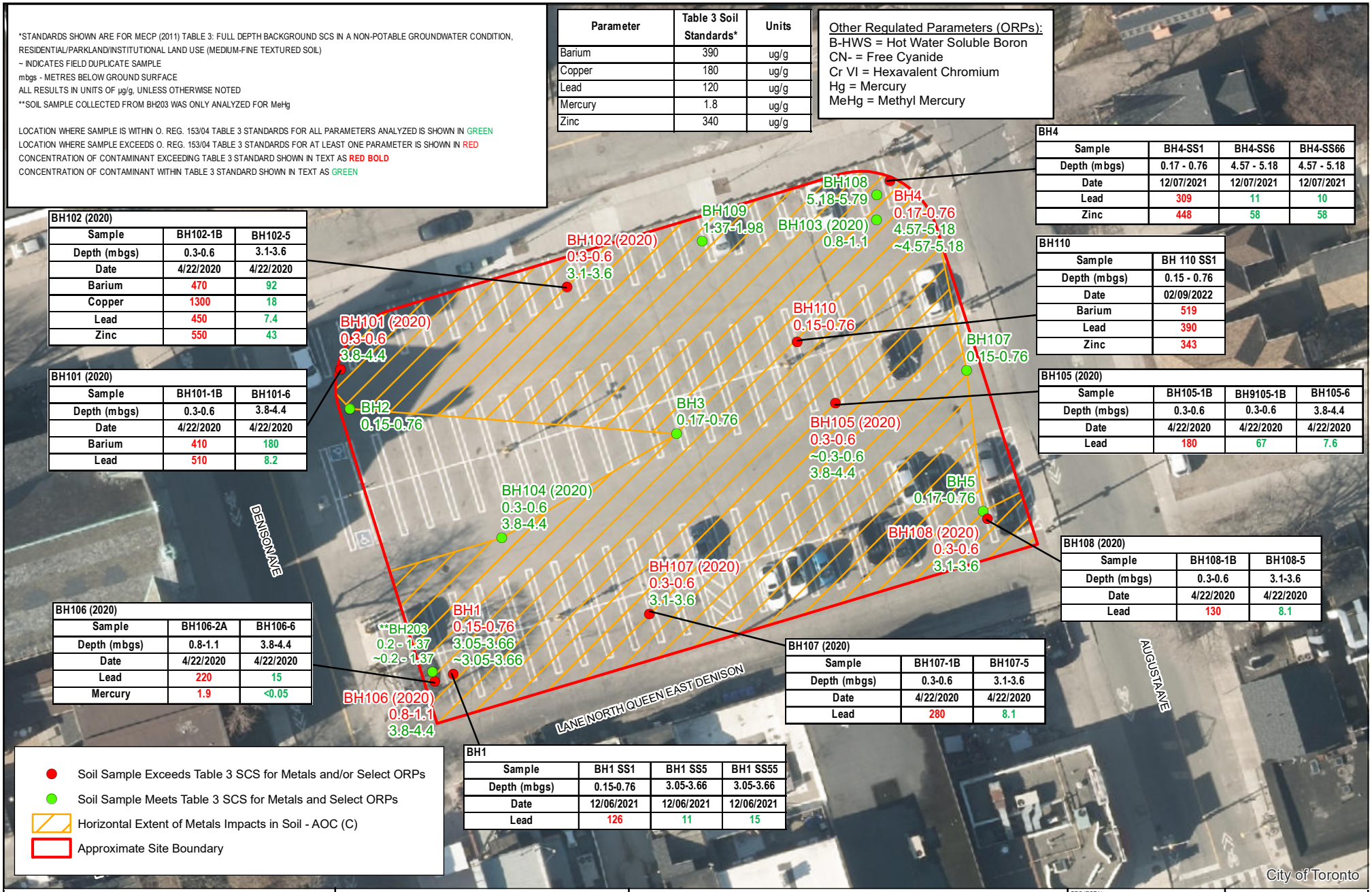
TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS -
VOLATILE ORGANIC COMPOUNDS (VOCs)
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JUNE 2024	FIG. No.: 8



*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED
**SOIL SAMPLE COLLECTED FROM BH203 WAS ONLY ANALYZED FOR MeHg

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Table 3 Soil Standards*	Units
Barium	390	ug/g
Copper	180	ug/g
Lead	120	ug/g
Mercury	1.8	ug/g
Zinc	340	ug/g

Other Regulated Parameters (ORPs):
B-HWS = Hot Water Soluble Boron
CN- = Free Cyanide
Cr VI = Hexavalent Chromium
Hg = Mercury
MeHg = Methyl Mercury

BH4

Sample	BH4-SS1	BH4-SS6	BH4-SS66
Depth (mbgs)	0.17 - 0.76	4.57 - 5.18	4.57 - 5.18
Date	12/07/2021	12/07/2021	12/07/2021
Lead	309	11	10
Zinc	448	58	58

BH102 (2020)

Sample	BH102-1B	BH102-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/22/2020
Barium	470	92
Copper	1300	18
Lead	450	7.4
Zinc	550	43

BH110

Sample	BH 110 SS1
Depth (mbgs)	0.15 - 0.76
Date	02/09/2022
Barium	519
Lead	390
Zinc	343

BH101 (2020)

Sample	BH101-1B	BH101-6
Depth (mbgs)	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020
Barium	410	180
Lead	510	8.2

BH105 (2020)

Sample	BH105-1B	BH9105-1B	BH105-6
Depth (mbgs)	0.3-0.6	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020	4/22/2020
Lead	180	67	7.6

BH108 (2020)

Sample	BH108-1B	BH108-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/22/2020
Lead	130	8.1

BH106 (2020)

Sample	BH106-2A	BH106-6
Depth (mbgs)	0.8-1.1	3.8-4.4
Date	4/22/2020	4/22/2020
Lead	220	15
Mercury	1.9	<0.05

BH107 (2020)

Sample	BH107-1B	BH107-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/22/2020
Lead	280	8.1

BH1

Sample	BH1 SS1	BH1 SS5	BH1 SS55
Depth (mbgs)	0.15-0.76	3.05-3.66	3.05-3.66
Date	12/06/2021	12/06/2021	12/06/2021
Lead	126	11	15

- Soil Sample Exceeds Table 3 SCS for Metals and/or Select ORPs
- Soil Sample Meets Table 3 SCS for Metals and Select ORPs
- Horizontal Extent of Metals Impacts in Soil - AOC (C)
- Approximate Site Boundary

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N

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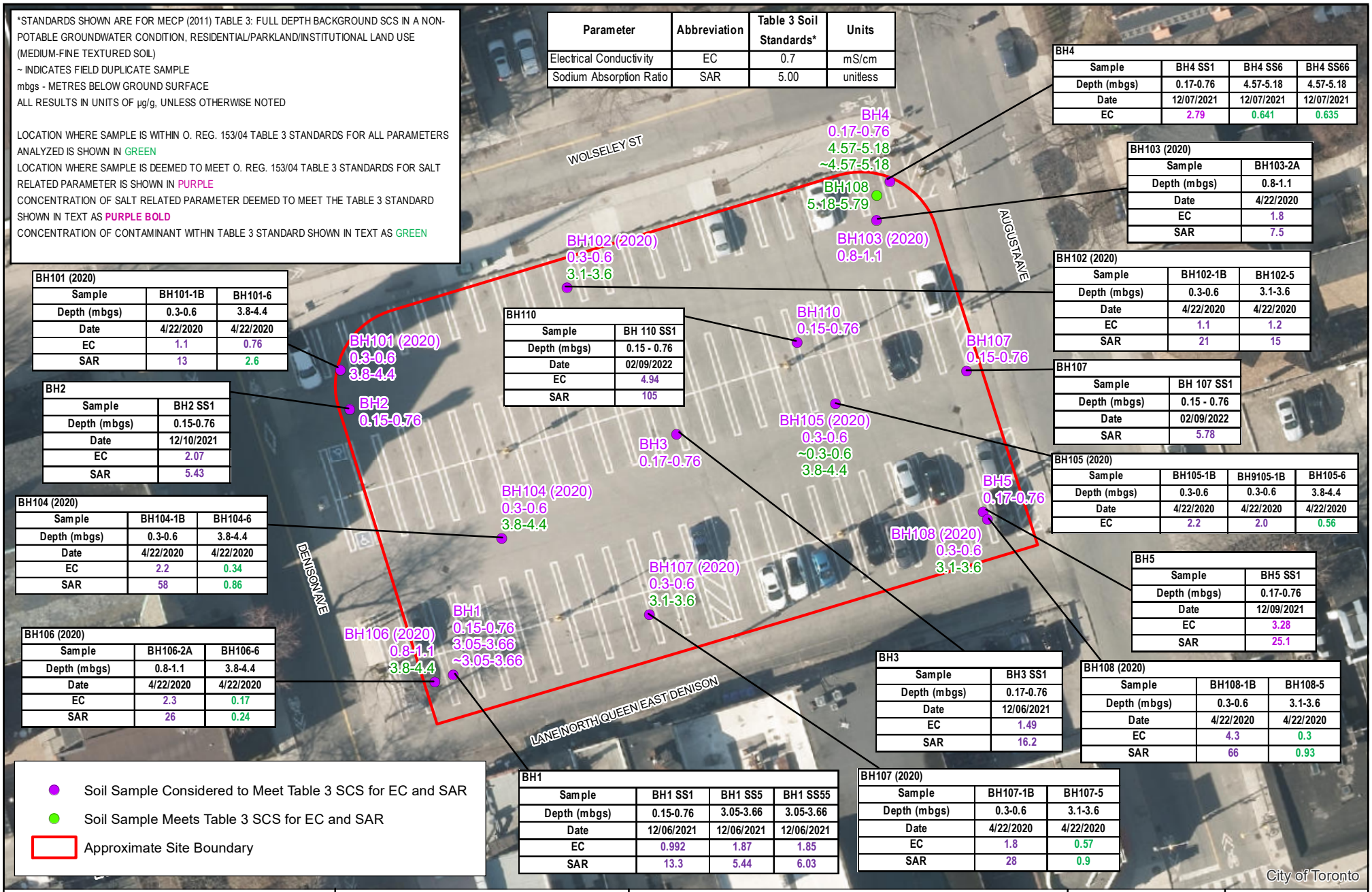
TITLE AND LOCATION:
SOIL ANALYTICAL RESULTS -
METALS INCLUDING HYDRIDE FORMING METALS AND SELECT ORPs
(B-HWS,CN-, Cr VI, Hg, MeHg)
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JANUARY 2025	FIG. No.: 9



*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE IS DEEMED TO MEET O. REG. 153/04 TABLE 3 STANDARDS FOR SALT RELATED PARAMETER IS SHOWN IN PURPLE
CONCENTRATION OF SALT RELATED PARAMETER DEEMED TO MEET THE TABLE 3 STANDARD SHOWN IN TEXT AS **PURPLE BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Abbreviation	Table 3 Soil Standards*	Units
Electrical Conductivity	EC	0.7	mS/cm
Sodium Absorption Ratio	SAR	5.00	unitless

BH4

Sample	BH4 SS1	BH4 SS6	BH4 SS66
Depth (mbgs)	0.17-0.76	4.57-5.18	4.57-5.18
Date	12/07/2021	12/07/2021	12/07/2021
EC	2.79	0.641	0.635

BH103 (2020)

Sample	BH103-2A
Depth (mbgs)	0.8-1.1
Date	4/22/2020
EC	1.8
SAR	7.5

BH102 (2020)

Sample	BH102-1B	BH102-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/22/2020
EC	1.1	1.2
SAR	21	15

BH101 (2020)

Sample	BH101-1B	BH101-6
Depth (mbgs)	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020
EC	1.1	0.76
SAR	13	2.6

BH110

Sample	BH 110 SS1
Depth (mbgs)	0.15 - 0.76
Date	02/09/2022
EC	4.94
SAR	105

BH107

Sample	BH 107 SS1
Depth (mbgs)	0.15 - 0.76
Date	02/09/2022
SAR	5.78

BH2

Sample	BH2 SS1
Depth (mbgs)	0.15-0.76
Date	12/10/2021
EC	2.07
SAR	5.43

BH105 (2020)

Sample	BH105-1B	BH9105-1B	BH105-6
Depth (mbgs)	0.3-0.6	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020	4/22/2020
EC	2.2	2.0	0.56

BH104 (2020)

Sample	BH104-1B	BH104-6
Depth (mbgs)	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020
EC	2.2	0.34
SAR	58	0.86

BH5

Sample	BH5 SS1
Depth (mbgs)	0.17-0.76
Date	12/09/2021
EC	3.28
SAR	25.1

BH106 (2020)

Sample	BH106-2A	BH106-6
Depth (mbgs)	0.8-1.1	3.8-4.4
Date	4/22/2020	4/22/2020
EC	2.3	0.17
SAR	26	0.24

BH3

Sample	BH3 SS1
Depth (mbgs)	0.17-0.76
Date	12/06/2021
EC	1.49
SAR	16.2

BH108 (2020)

Sample	BH108-1B	BH108-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/22/2020
EC	4.3	0.3
SAR	66	0.93

BH1

Sample	BH1 SS1	BH1 SS5	BH1 SS55
Depth (mbgs)	0.15-0.76	3.05-3.66	3.05-3.66
Date	12/06/2021	12/06/2021	12/06/2021
EC	0.992	1.87	1.85
SAR	13.3	5.44	6.03

BH107 (2020)

Sample	BH107-1B	BH107-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/22/2020
EC	1.8	0.57
SAR	28	0.9

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N

0 5 10 15 20 25 m

TITLE AND LOCATION:

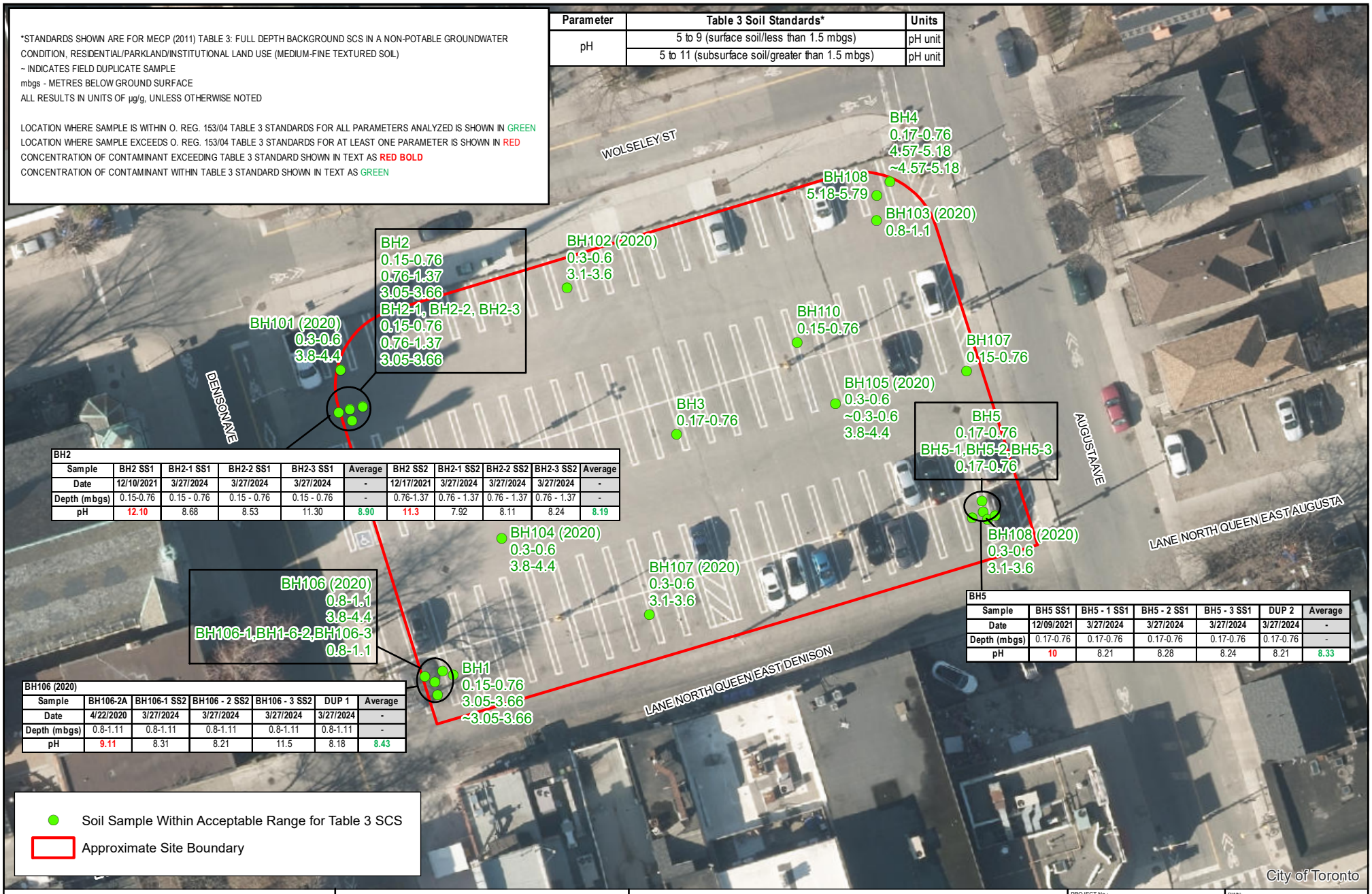
SOIL ANALYTICAL RESULTS -
ELECTRICAL CONDUCTIVITY (EC) AND
SODIUM ADSORPTION RATIO (SAR)
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21018382-B0	AC
SCALE:	CHKD:
AS NOTED	SP
DATE:	FIG. No.:
JUNE 2024	10

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Table 3 Soil Standards*	Units
pH	5 to 9 (surface soil/less than 1.5 mbgs)	pH unit
	5 to 11 (subsurface soil/greater than 1.5 mbgs)	pH unit



BH2

Sample	BH2 SS1	BH2-1 SS1	BH2-2 SS1	BH2-3 SS1	Average	BH2 SS2	BH2-1 SS2	BH2-2 SS2	BH2-3 SS2	Average
Date	12/10/2021	3/27/2024	3/27/2024	3/27/2024	-	12/17/2021	3/27/2024	3/27/2024	3/27/2024	-
Depth (mbgs)	0.15-0.76	0.15 - 0.76	0.15 - 0.76	0.15 - 0.76	-	0.76-1.37	0.76 - 1.37	0.76 - 1.37	0.76 - 1.37	-
pH	**12.10**	8.68	8.53	11.30	8.90	**11.3**	7.92	8.11	8.24	8.19

BH106 (2020)

Sample	BH106-2A	BH106-1 SS2	BH106 - 2 SS2	BH106 - 3 SS2	DUP 1	Average
Date	4/22/2020	3/27/2024	3/27/2024	3/27/2024	3/27/2024	-
Depth (mbgs)	0.8-1.11	0.8-1.11	0.8-1.11	0.8-1.11	0.8-1.11	-
pH	**9.11**	8.31	8.21	11.5	8.18	8.43

BH5

Sample	BH5 SS1	BH5 - 1 SS1	BH5 - 2 SS1	BH5 - 3 SS1	DUP 2	Average
Date	12/09/2021	3/27/2024	3/27/2024	3/27/2024	3/27/2024	-
Depth (mbgs)	0.17-0.76	0.17-0.76	0.17-0.76	0.17-0.76	0.17-0.76	-
pH	**10**	8.21	8.28	8.24	8.21	8.33

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TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS - pH
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21018382-B0	AC
SCALE: AS NOTED	CHKD: SP
DATE: JUNE 2024	FIG. No.: 11

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Table 3 Soil Standards*	Units
Acenaphthylene	0.17	ug/g
Anthracene	0.74	ug/g
Fluoranthene	0.69	ug/g
Benz(a)anthracene	0.63	ug/g
Benzo(b)fluoranthene	0.78	ug/g
Benzo(k)fluoranthene	0.78	ug/g
Benzo(a)pyrene	0.3	ug/g
Indeno(1,2,3-cd)pyrene	0.48	ug/g
Dibenz(a,h)anthracene	0.1	ug/g
Chrysene	7.8	ug/g
Phenanthrene	7.8	ug/g

BH102 (2020)		
Sample	BH102-1B	BH102-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/22/2020
Benzo(a)pyrene	0.32	<0.0050

BH4			
Sample	BH4 SS1	BH4-SS6	BH4-SS66
Depth (mbgs)	0.17-0.76	4.57-5.18	4.57-5.18
Date	12/7/2021	12/7/2021	12/7/2021
Acenaphthylene	0.31	<0.05	<0.05
Anthracene	2.46	<0.05	<0.05
Fluoranthene	12.3	<0.05	<0.05
Benz(a)anthracene	8.41	<0.05	<0.05
Benzo(b)fluoranthene	6.62	<0.05	<0.05
Benzo(k)fluoranthene	1.79	<0.05	<0.05
Benzo(a)pyrene	4.74	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	1.95	<0.05	<0.05
Dibenz(a,h)anthracene	0.70	<0.05	<0.05

BH101 (2020)		
Sample	BH101-1B	BH101-6
Depth (mbgs)	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020
Fluoranthene	1	<0.0050
Benzo(a)pyrene	0.52	<0.0050

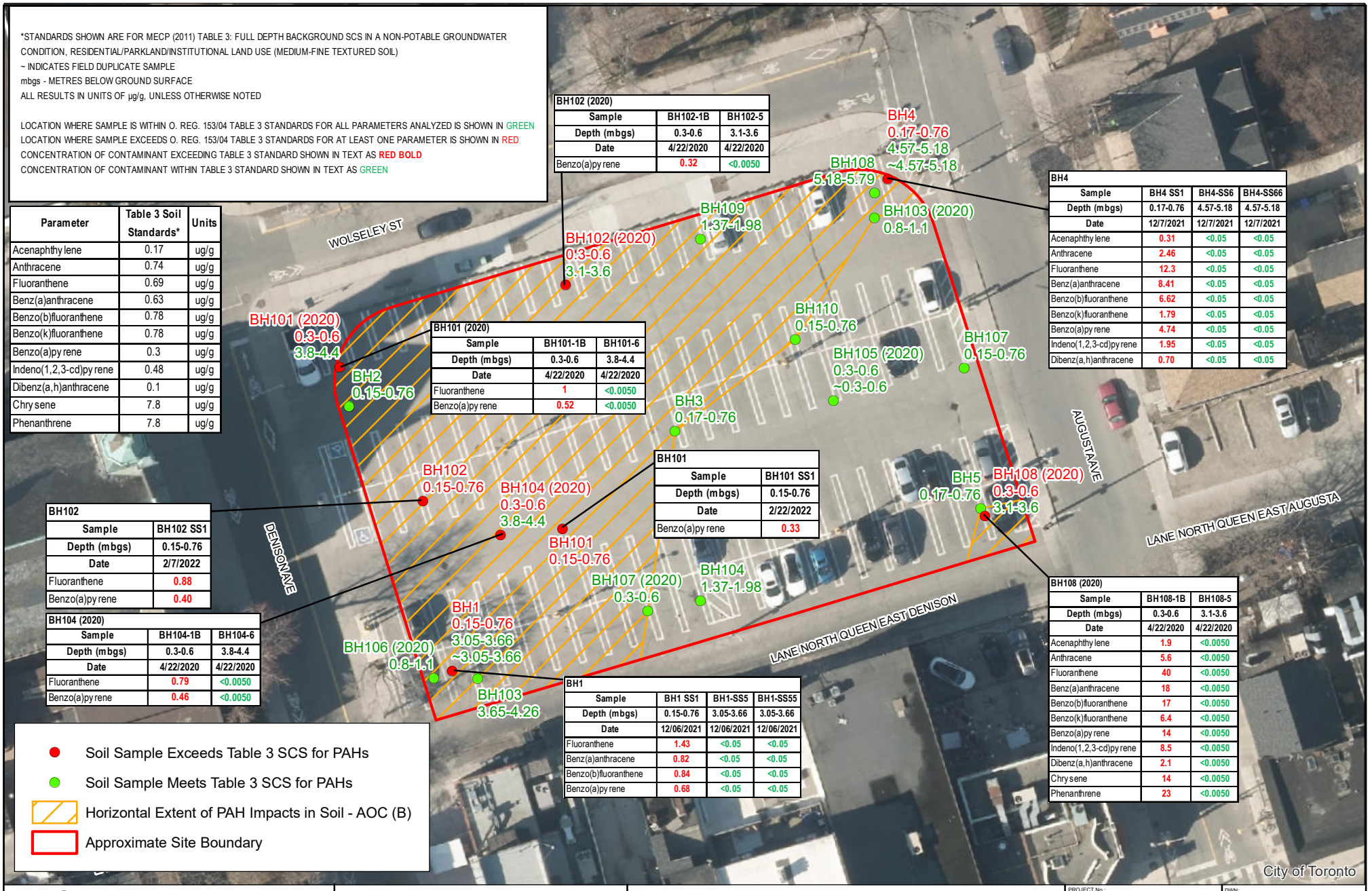
BH101	
Sample	BH101 SS1
Depth (mbgs)	0.15-0.76
Date	2/22/2022
Benzo(a)pyrene	0.33

BH102	
Sample	BH102 SS1
Depth (mbgs)	0.15-0.76
Date	2/7/2022
Fluoranthene	0.88
Benzo(a)pyrene	0.40

BH104 (2020)		
Sample	BH104-1B	BH104-6
Depth (mbgs)	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020
Fluoranthene	0.79	<0.0050
Benzo(a)pyrene	0.46	<0.0050

BH1			
Sample	BH1 SS1	BH1-SS5	BH1-SS55
Depth (mbgs)	0.15-0.76	3.05-3.66	3.05-3.66
Date	12/06/2021	12/06/2021	12/06/2021
Fluoranthene	1.43	<0.05	<0.05
Benz(a)anthracene	0.82	<0.05	<0.05
Benzo(b)fluoranthene	0.84	<0.05	<0.05
Benzo(a)pyrene	0.68	<0.05	<0.05

BH108 (2020)		
Sample	BH108-1B	BH108-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/22/2020
Acenaphthylene	1.9	<0.0050
Anthracene	5.6	<0.0050
Fluoranthene	40	<0.0050
Benz(a)anthracene	18	<0.0050
Benzo(b)fluoranthene	17	<0.0050
Benzo(k)fluoranthene	6.4	<0.0050
Benzo(a)pyrene	14	<0.0050
Indeno(1,2,3-cd)pyrene	8.5	<0.0050
Dibenz(a,h)anthracene	2.1	<0.0050
Chrysene	14	<0.0050
Phenanthrene	23	<0.0050



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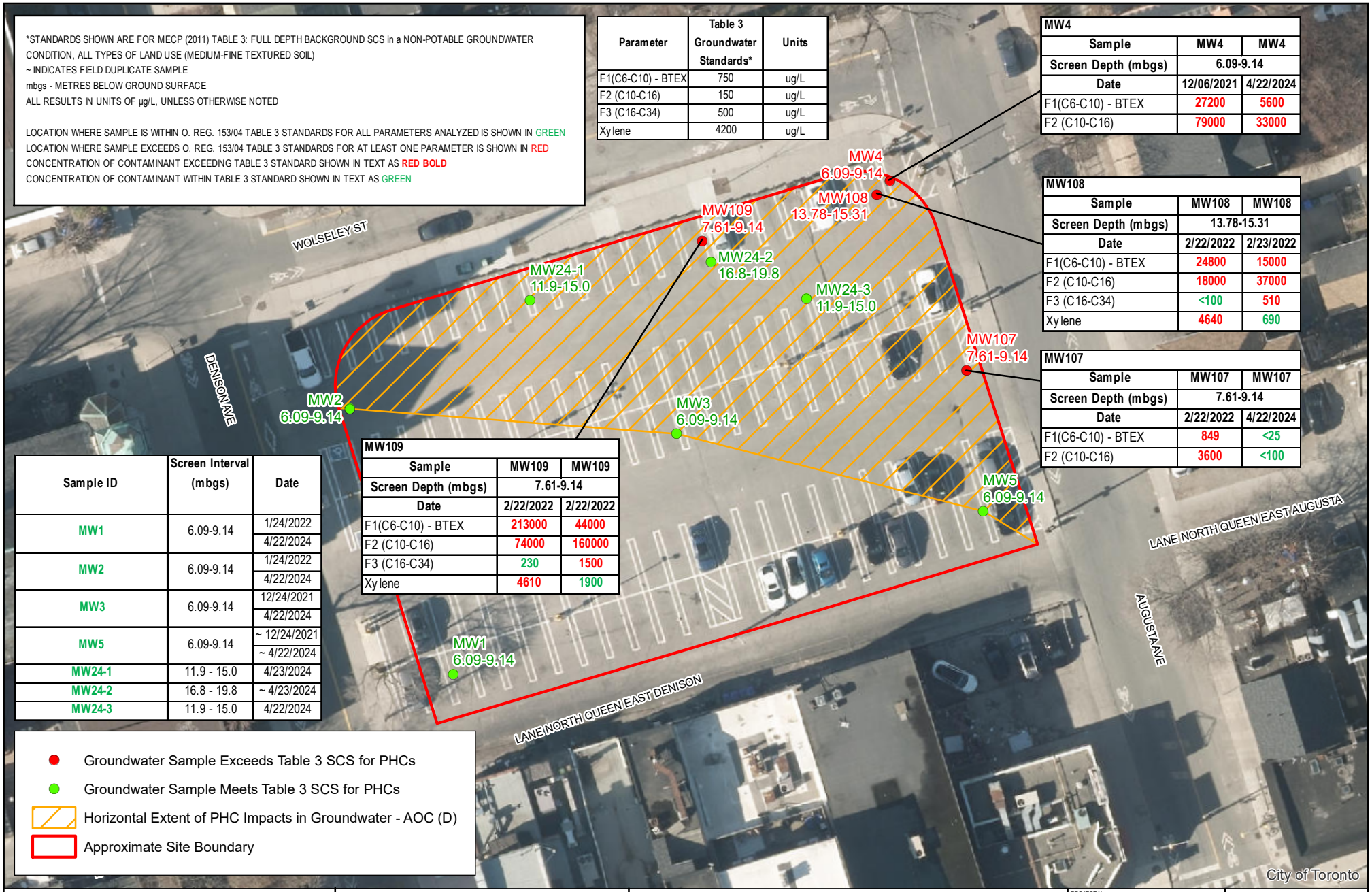
TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS -
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21018382-B0	AC
SCALE:	CHKD:
AS NOTED	SP
DATE:	FIG. No.:
JUNE 2024	12



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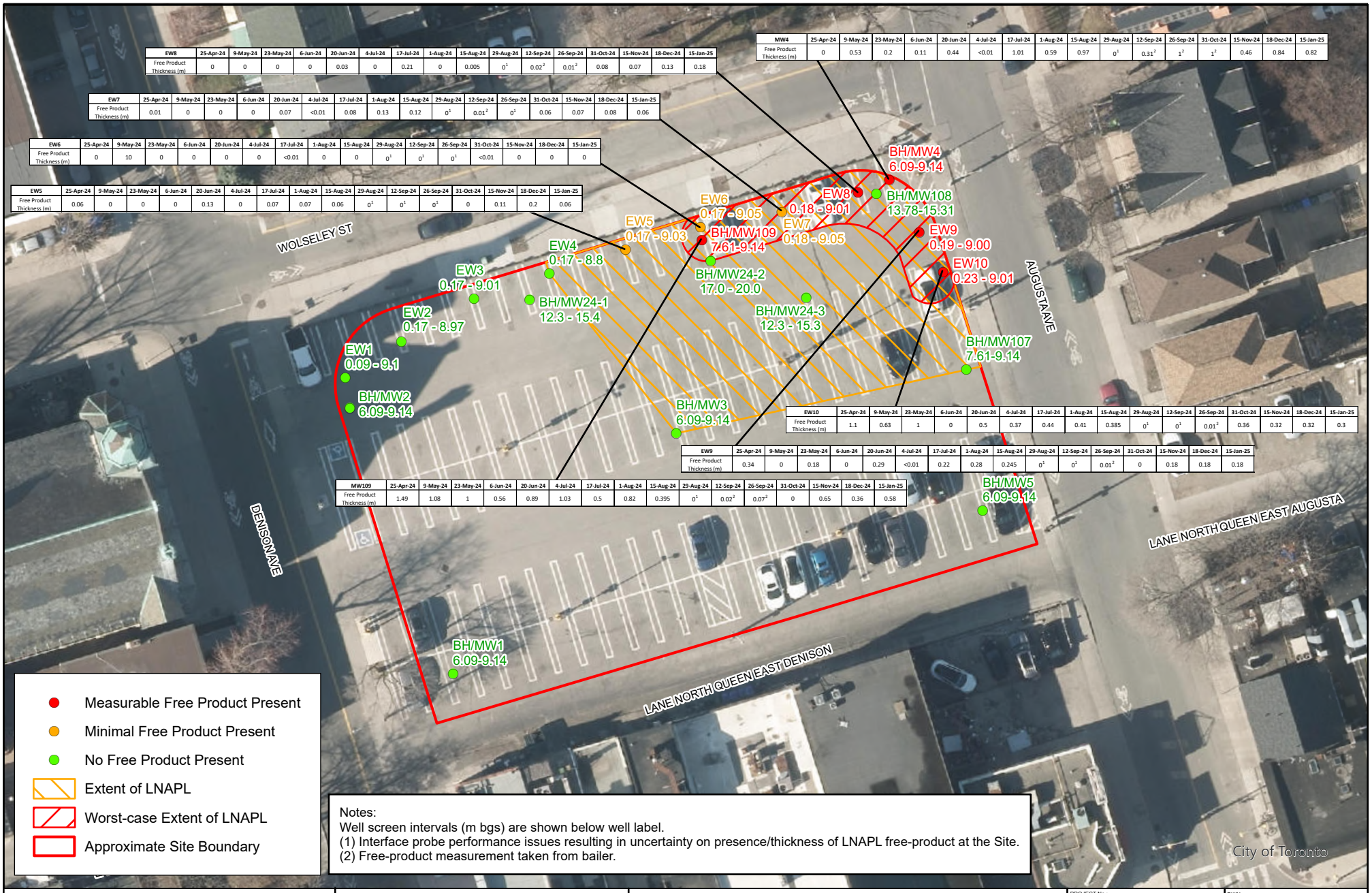
TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS (PHCs) INCLUDING BTEX
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JUNE 2024	FIG. No.: 13



EW8	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0	0	0	0	0.03	0	0.21	0	0.005	0[1]	0.02[2]	0.01[2]	0.08	0.07	0.13	0.18

EW7	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0.01	0	0	0	0.07	<0.01	0.08	0.13	0.12	0[1]	0.01[2]	0[1]	0.06	0.07	0.08	0.06

EW6	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0	10	0	0	0	0	<0.01	0	0	0[1]	0[1]	0[1]	<0.01	0	0	0

EW5	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0.06	0	0	0	0.13	0	0.07	0.07	0.06	0[1]	0[1]	0[1]	0	0.11	0.2	0.06

MW4	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0	0.53	0.2	0.11	0.44	<0.01	1.01	0.59	0.97	0[1]	0.31[2]	1[2]	1[2]	0.46	0.84	0.82

EW10	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	1.1	0.63	1	0	0.5	0.37	0.44	0.41	0.385	0[1]	0[1]	0.01[2]	0.36	0.32	0.32	0.3

EW9	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0.34	0	0.18	0	0.29	<0.01	0.22	0.28	0.245	0[1]	0[1]	0.01[2]	0	0.18	0.18	0.18

MW109	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	1.49	1.08	1	0.56	0.89	1.03	0.5	0.82	0.395	0[1]	0.02[2]	0.07[2]	0	0.65	0.36	0.58

- Measurable Free Product Present
- Minimal Free Product Present
- No Free Product Present
- Extent of LNAPL
- Worst-case Extent of LNAPL
- Approximate Site Boundary

Notes:
Well screen intervals (m bgs) are shown below well label.
(1) Interface probe performance issues resulting in uncertainty on presence/thickness of LNAPL free-product at the Site.
(2) Free-product measurement taken from bailer.

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TITLE AND LOCATION:

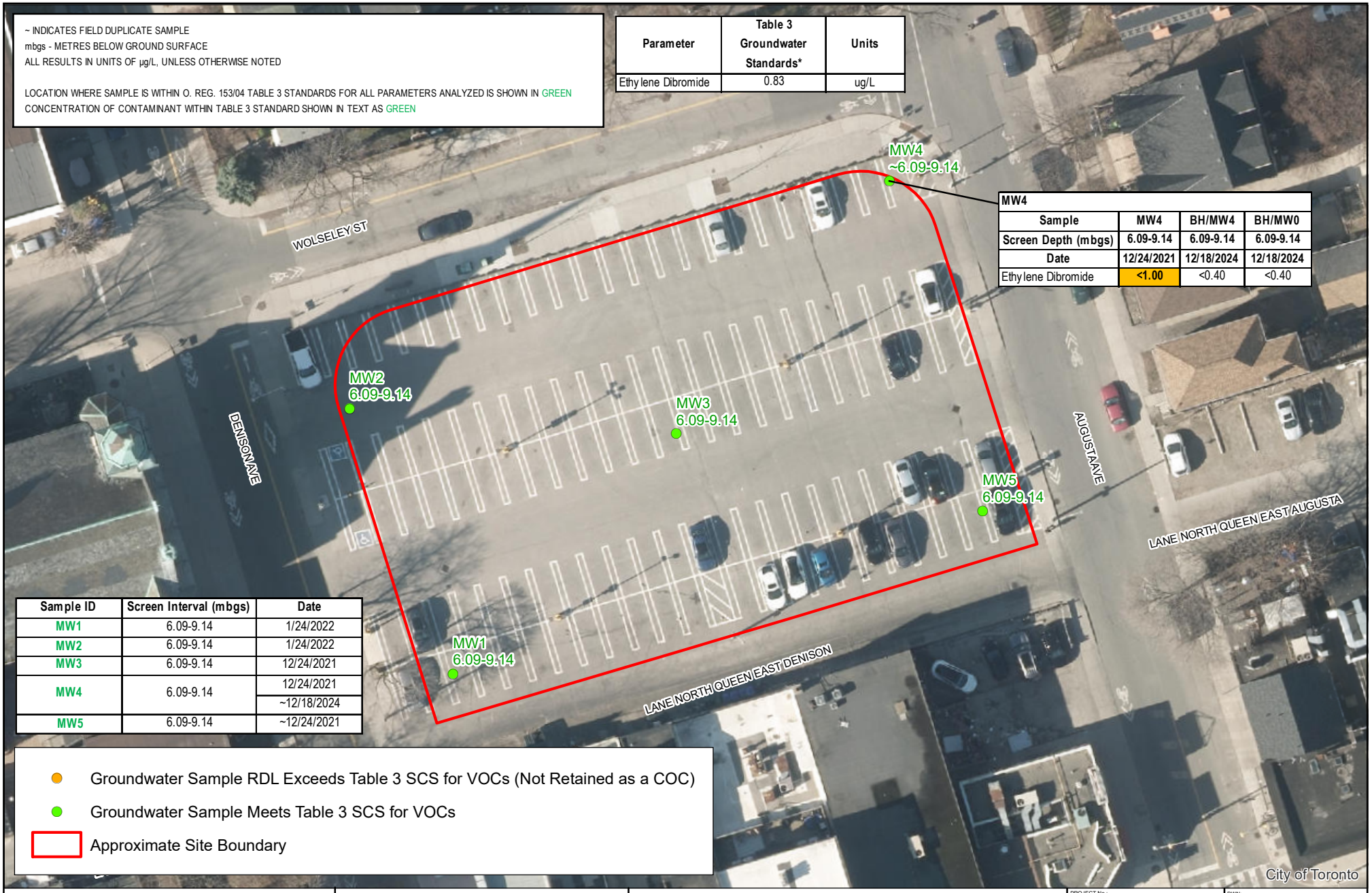
FREE PRODUCT LOCATION PLAN
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21018382-B0	AC
SCALE:	CHKD:
AS NOTED	SP
DATE:	FIG. No.:
JANUARY 2025	13A

~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/L, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Table 3 Groundwater Standards*	Units
Ethylene Dibromide	0.83	ug/L



MW4			
Sample	MW4	BH/MW4	BH/MW0
Screen Depth (mbgs)	6.09-9.14	6.09-9.14	6.09-9.14
Date	12/24/2021	12/18/2024	12/18/2024
Ethylene Dibromide	<1.00	<0.40	<0.40

Sample ID	Screen Interval (mbgs)	Date
MW1	6.09-9.14	1/24/2022
MW2	6.09-9.14	1/24/2022
MW3	6.09-9.14	12/24/2021
MW4	6.09-9.14	12/24/2021
		~12/18/2024
MW5	6.09-9.14	~12/24/2021

- Groundwater Sample RDL Exceeds Table 3 SCS for VOCs (Not Retained as a COC)
- Groundwater Sample Meets Table 3 SCS for VOCs
- Approximate Site Boundary

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TITLE AND LOCATION:

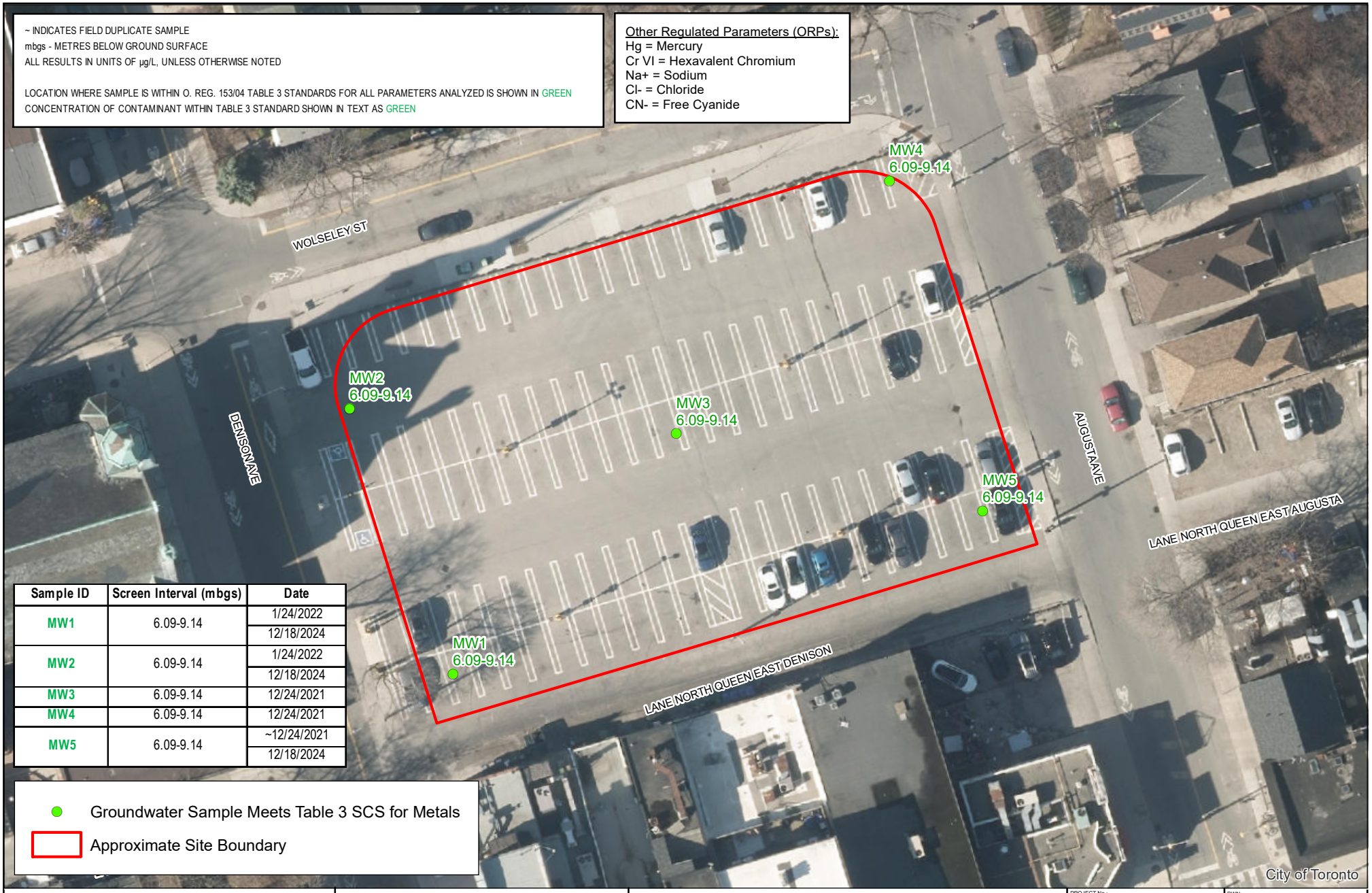
GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21018382-B0	AC
SCALE:	CHKD:
AS NOTED	SP
DATE:	FIG. No.:
JANUARY 2025	14

~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/L, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Other Regulated Parameters (ORPs):
Hg = Mercury
Cr VI = Hexavalent Chromium
Na+ = Sodium
Cl- = Chloride
CN- = Free Cyanide



Sample ID	Screen Interval (mbgs)	Date
MW1	6.09-9.14	1/24/2022
		12/18/2024
MW2	6.09-9.14	1/24/2022
		12/18/2024
MW3	6.09-9.14	12/24/2021
MW4	6.09-9.14	12/24/2021
MW5	6.09-9.14	~12/24/2021
		12/18/2024

Groundwater Sample Meets Table 3 SCS for Metals

Approximate Site Boundary

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TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS -
METALS INCLUDING HYDRIDE-FORMING METALS,
AND SELECT ORPs (Hg, Cr VI, Na+, Cl-, CN-)
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

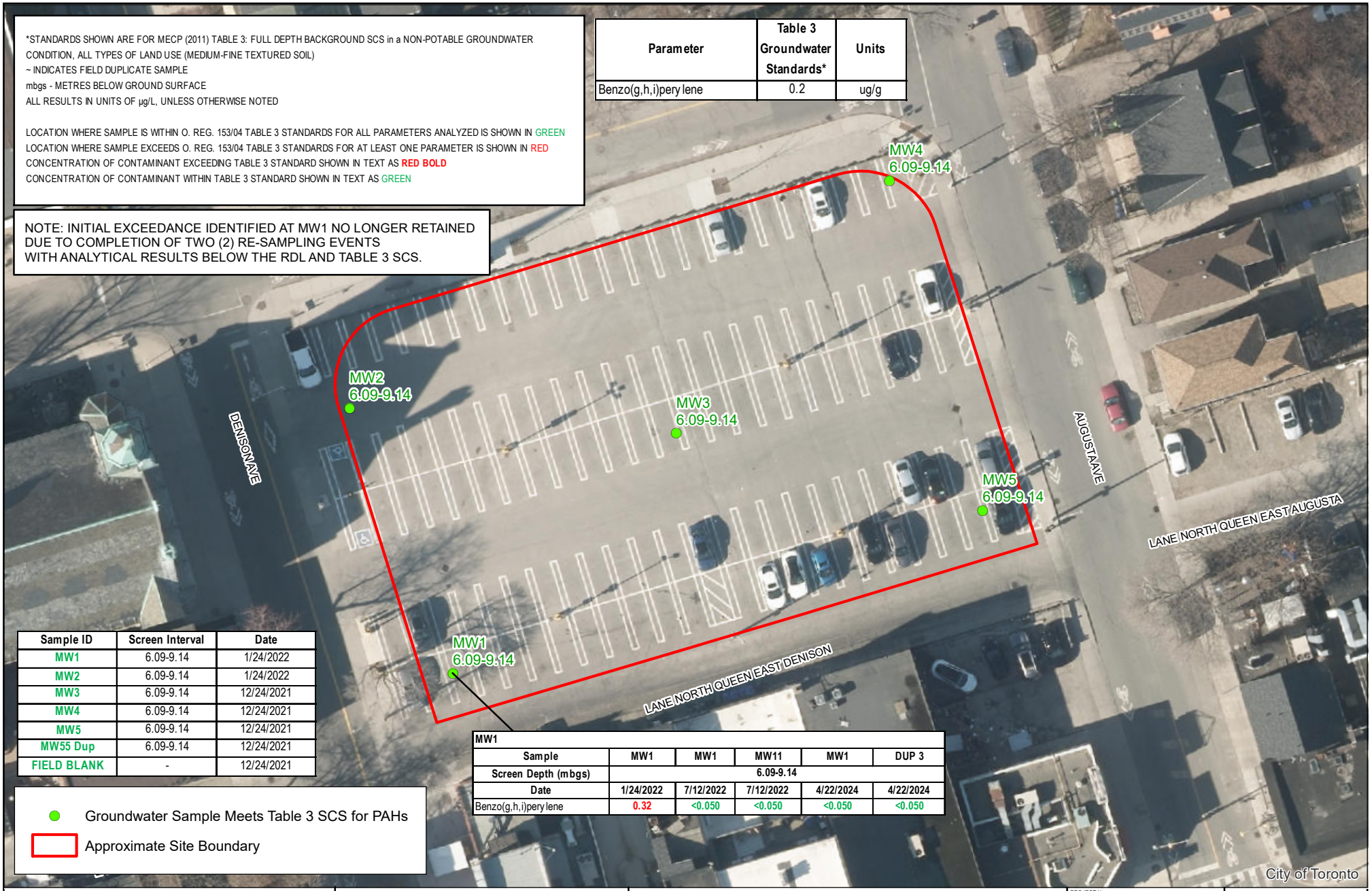
PROJECT No.:	DWN:
GTR-21018382-B0	AC
SCALE:	CHKD:
AS NOTED	SP
DATE:	FIG. No.:
JANUARY 2025	15

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS in a NON-POTABLE GROUNDWATER CONDITION, ALL TYPES OF LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/L, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Table 3 Groundwater Standards*	Units
Benzo(g,h,i)perylene	0.2	ug/g

NOTE: INITIAL EXCEEDANCE IDENTIFIED AT MW1 NO LONGER RETAINED DUE TO COMPLETION OF TWO (2) RE-SAMPLING EVENTS WITH ANALYTICAL RESULTS BELOW THE RDL AND TABLE 3 SCS.



Sample ID	Screen Interval	Date
MW1	6.09-9.14	1/24/2022
MW2	6.09-9.14	1/24/2022
MW3	6.09-9.14	12/24/2021
MW4	6.09-9.14	12/24/2021
MW5	6.09-9.14	12/24/2021
MW55 Dup	6.09-9.14	12/24/2021
FIELD BLANK	-	12/24/2021

MW1					
Sample	MW1	MW1	MW11	MW1	DUP 3
Screen Depth (mbgs)	6.09-9.14				
Date	1/24/2022	7/12/2022	7/12/2022	4/22/2024	4/22/2024
Benzo(g,h,i)perylene	0.32	<0.050	<0.050	<0.050	<0.050

Groundwater Sample Meets Table 3 SCS for PAHs

Approximate Site Boundary

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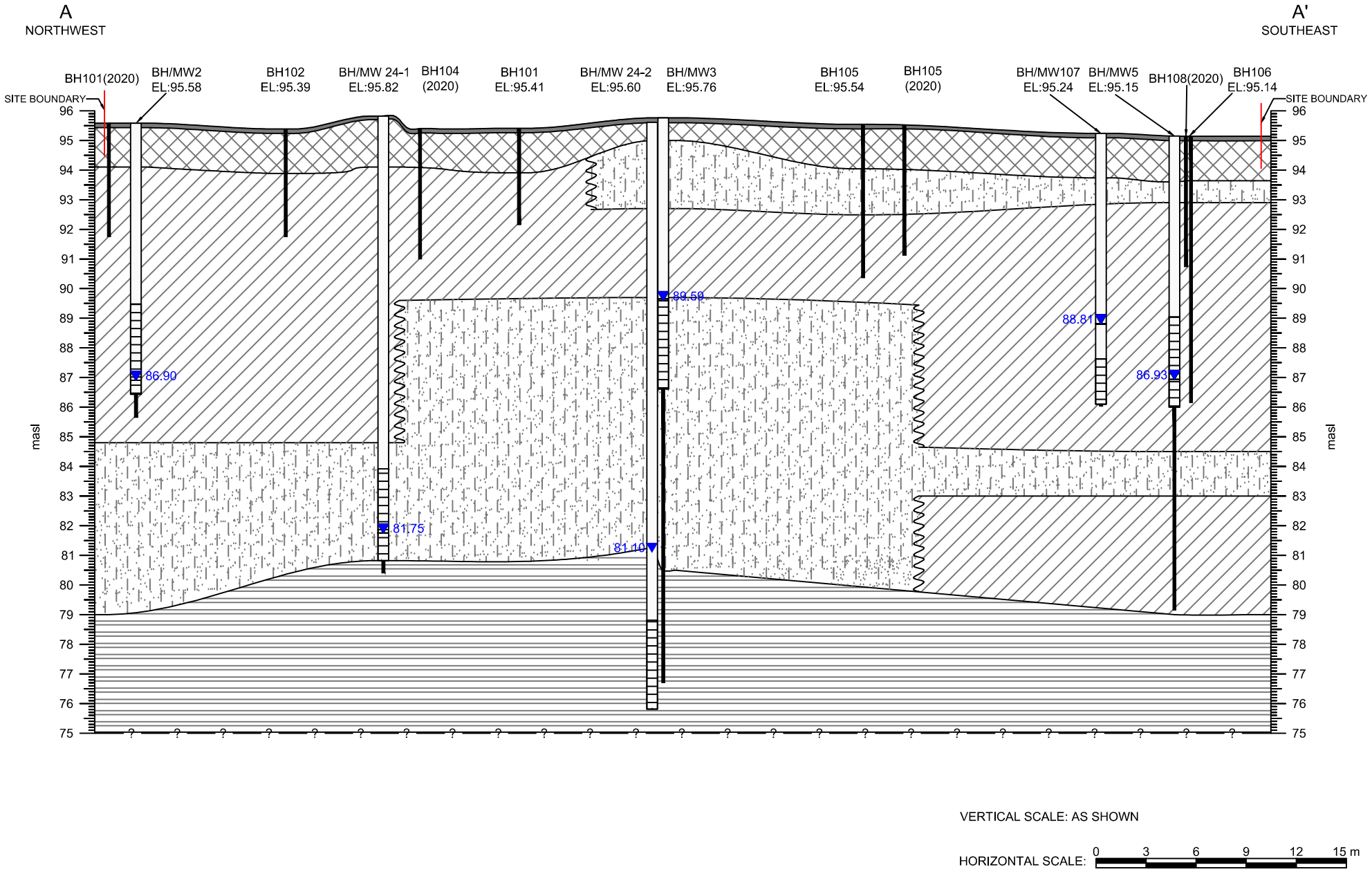
TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS -
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21018382-B0	AC
SCALE:	CHKD:
AS NOTED	SP
DATE:	FIG. No.:
JUNE 2024	16



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LEGEND:

- ASPHALT
- FILL
- CLAYEY SILT TILL
- CLAYEY SILT
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION A-A'

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	17A

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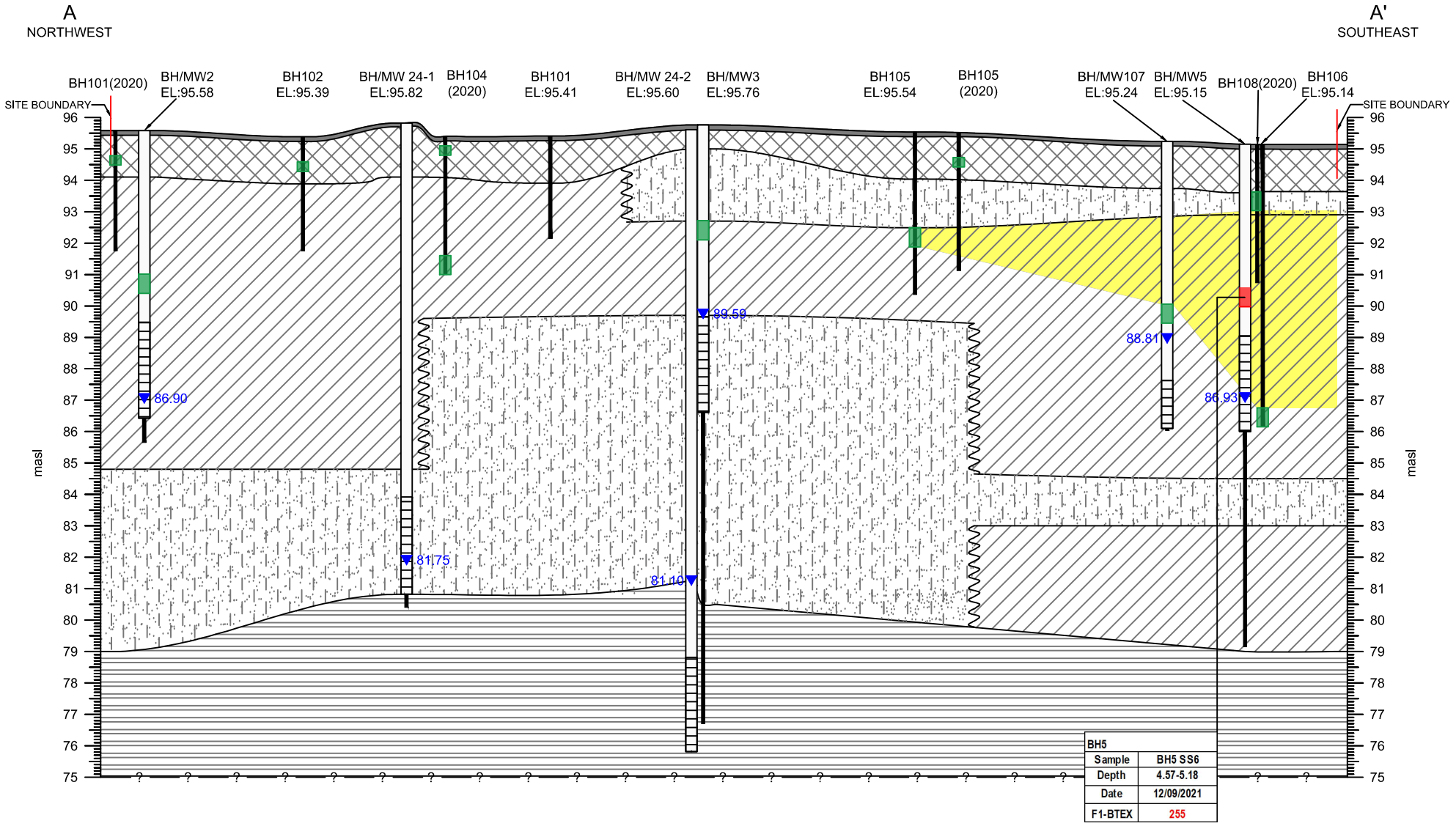

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Abbreviation	Table 3 Soil Standards*	Units
F1 (C6-C10)- BTEX	F1-BTEX	65	ug/g

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:
- ASPHALT
- FILL
- CLAYEY SILT TILL
- CLAYEY SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- EXTENT OF IMPACT

TITLE AND LOCATION:

CROSS SECTION A-A' WITH PHC (INCLUDING BTEX) CONCENTRATIONS IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 17B

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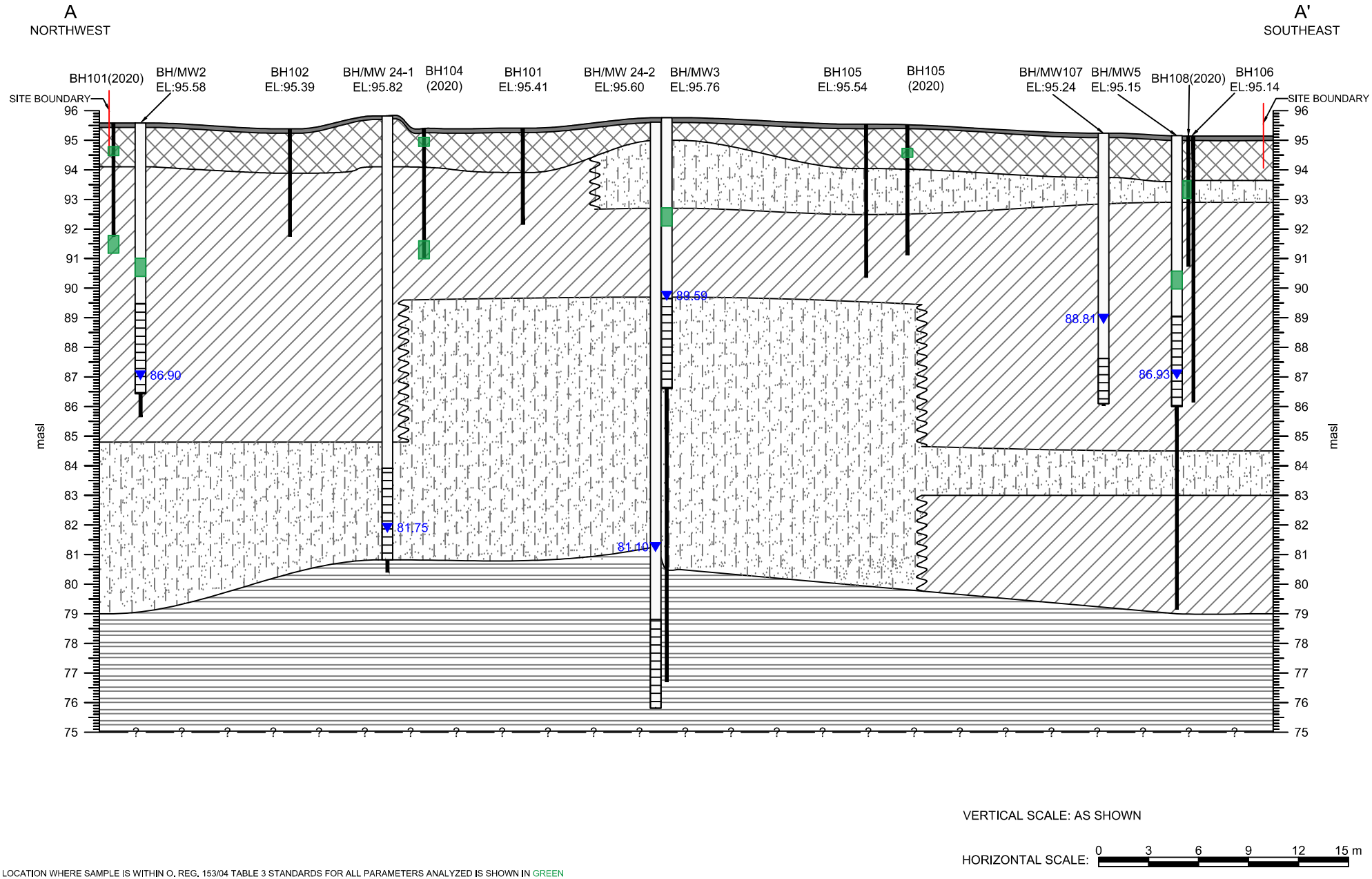

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN

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LEGEND:

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- CLAYEY SILT
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION A-A' WITH VOC CONCENTRATIONS IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
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AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	17C

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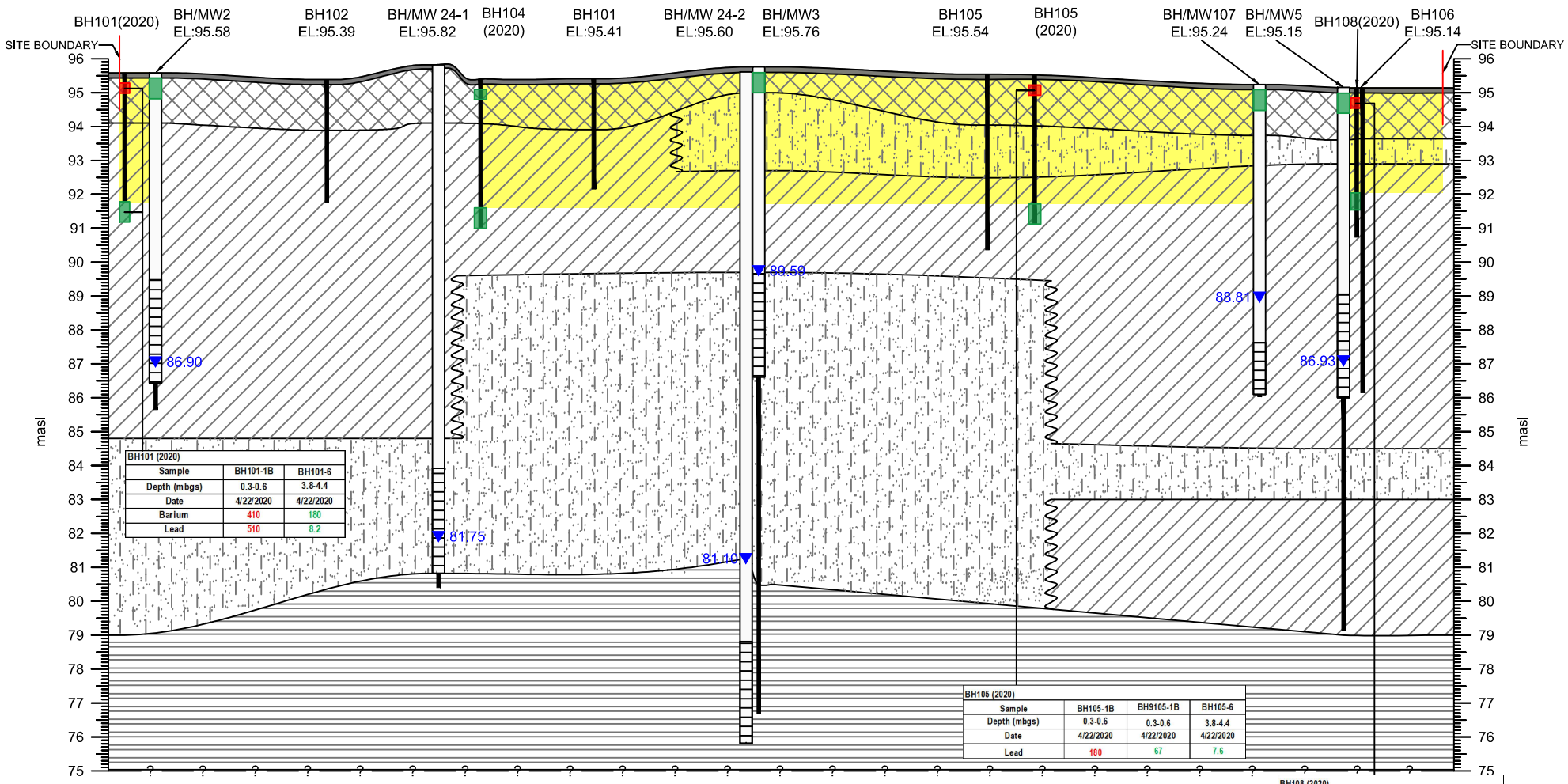
A
NORTHWEST

A'
SOUTHEAST



BH101 (2020)		
Sample	BH101-1B	BH101-6
Depth (mbgs)	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020
Barium	410	180
Lead	510	8.2

BH105 (2020)			
Sample	BH105-1B	BH9105-1B	BH105-6
Depth (mbgs)	0.3-0.6	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020	4/22/2020
Lead	180	67	7.6

BH108 (2020)		
Sample	BH108-1B	BH108-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/23/2020
Lead	130	8.1

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Abbreviation	Table 3 Soil Standards*	Units
Barium	Barium	390	ug/g
Copper	Copper	180	ug/g
Lead	Lead	120	ug/g
Mercury	Mercury	1.8	ug/g
Zinc	Zinc	340	ug/g

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:
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- FILL
- CLAYEY SILT TILL
- CLAYEY SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- EXTENT OF IMPACT

TITLE AND LOCATION:
CROSS SECTION A-A' WITH METALS, HYDRIDE-FORMING METALS AND SELECT ORPs (B-HWS,CN-, Cr VI, Hg) CONCENTRATIONS IN SOIL
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
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DATE:	FIG. NO.:
JANUARY 2025	17D

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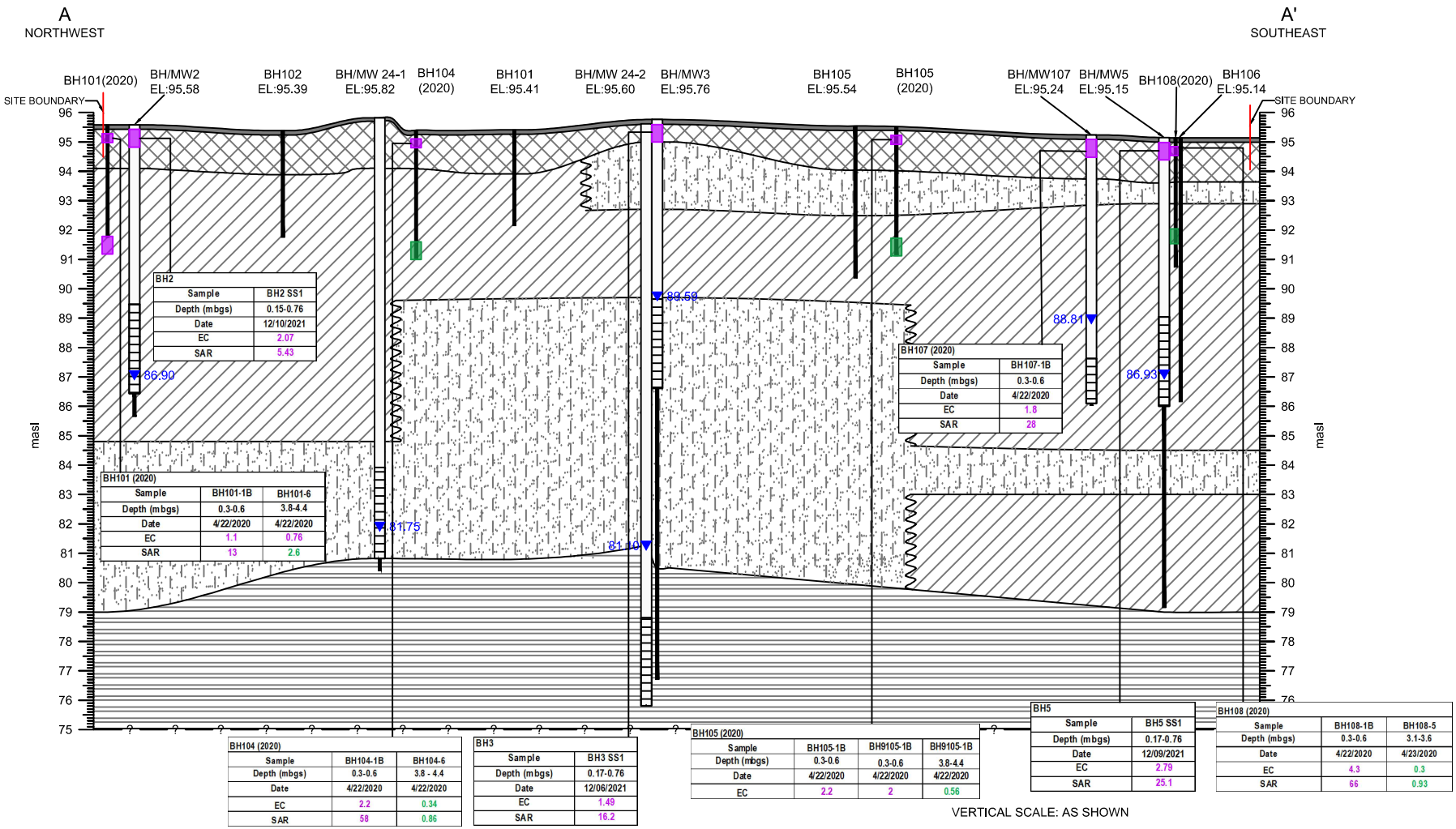

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
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LOCATION WHERE SAMPLE IS DEEMED TO MEET O. REG, 153/04 TABLE 3 STANDARDS FOR SALT RELATED PARAMETER IS SHOWN IN PURPLE
CONCENTRATION OF SALT RELATED PARAMETER DEEMED TO MEET THE TABLE 3 STANDARD SHOWN IN TEXT AS **PURPLE BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

NOTE: THE ELEVATED EC AND SAR IN SOIL IS LIKELY ASSOCIATED WITH ROAD SALT APPLICATION ON THE PAVED PARKING LOT FOR ROAD SAFETY OF VEHICULAR OR PEDESTRIAN TRAFFIC UNDER CONDITION OF SNOW OR ICE OR BOTH. AS SUCH, THE ELEVATED EC AND SAR IN SOIL IS DEEMED NOT TO BE EXCEEDED THE TABLE 3 SCS BASED ON THE SECTION 49.1 OF O.REG 153/04

Parameter	Abbreviation	Table 3 Soil Standards*	Units
Electrical Conductivity	EC	0.7	mS/cm
Sodium Absorption Ratio	SAR	5.00	unitless

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LEGEND:
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- CLAYEY SILT TILL
- CLAYEY SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION A-A' WITH EC AND SAR IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE:	CK:
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JANUARY 2025	17E

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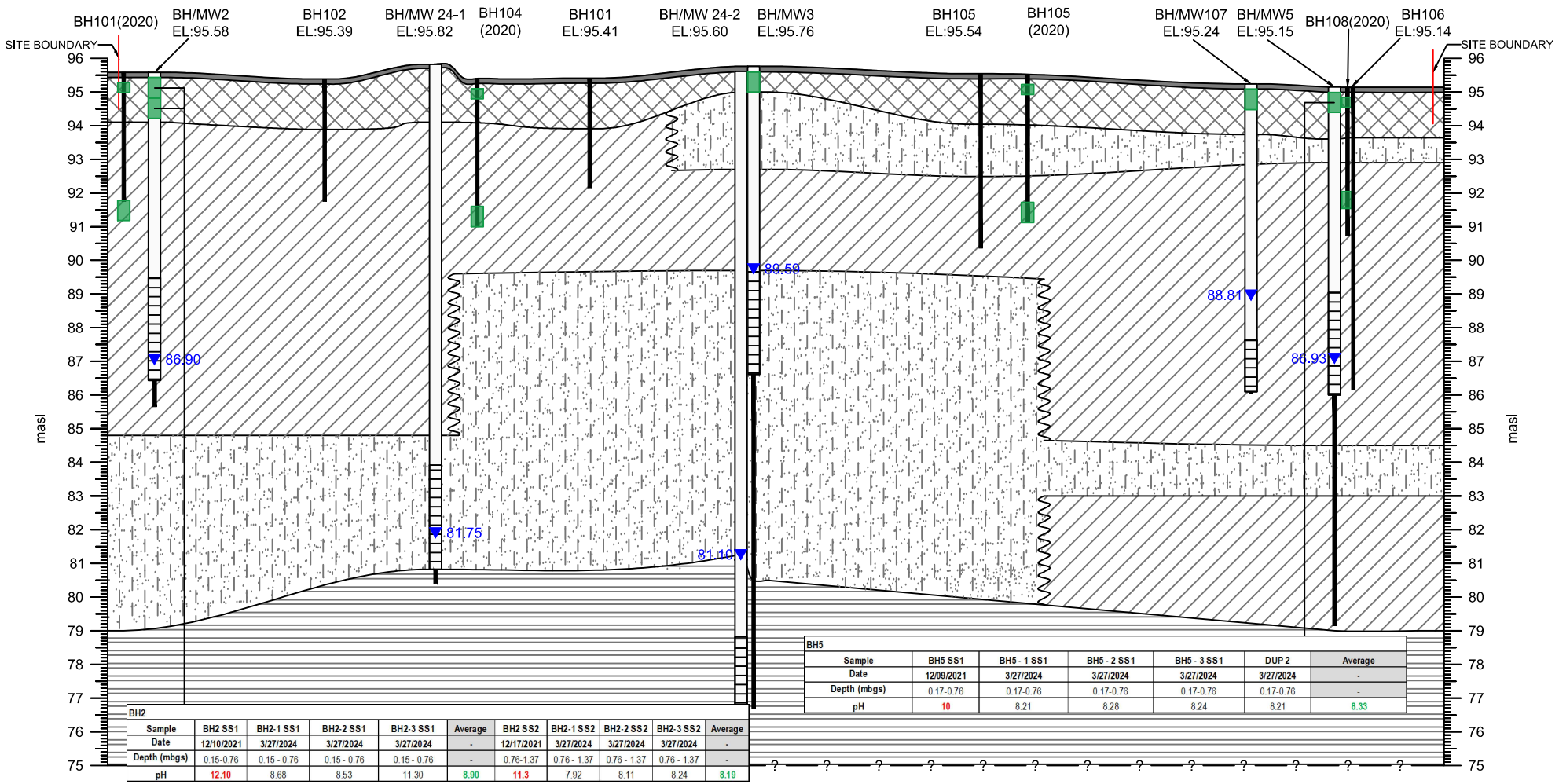
A
NORTHWEST

A'
SOUTHEAST



BH2

Sample	BH2 SS1	BH2-1 SS1	BH2-2 SS1	BH2-3 SS1	Average	BH2 SS2	BH2-1 SS2	BH2-2 SS2	BH2-3 SS2	Average
Date	12/10/2021	3/27/2024	3/27/2024	3/27/2024	-	12/17/2021	3/27/2024	3/27/2024	3/27/2024	-
Depth (mbgs)	0.15-0.76	0.15 - 0.76	0.15 - 0.76	0.15 - 0.76	-	0.76-1.37	0.76 - 1.37	0.76 - 1.37	0.76 - 1.37	-
pH	12.10	8.68	8.53	11.30	8.90	11.3	7.92	8.11	8.24	8.19

BH5

Sample	BH5 SS1	BH5 - 1 SS1	BH5 - 2 SS1	BH5 - 3 SS1	DUP 2	Average
Date	12/09/2021	3/27/2024	3/27/2024	3/27/2024	3/27/2024	-
Depth (mbgs)	0.17-0.76	0.17-0.76	0.17-0.76	0.17-0.76	0.17-0.76	-
pH	10	8.21	8.28	8.24	8.21	8.33

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
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CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

NOTE: INITIAL pH EXCEEDANCE RESOLVED VIA CONFIRMATORY SOIL SAMPLING PROGRAM COMPLETED IN MARCH 2024

Parameter	Table 3 Soil Standards*	Units
pH	5 to 9 (surface soil/less than 1.5 mbgs)	pH unit
	5 to 11 (subsurface soil/greater than 1.5 mbgs)	pH unit

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:
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- FILL
- CLAYEY SILT TILL
- CLAYEY SILT
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION A-A' WITH pH IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
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PROJECT NO.:	DWN.:
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DATE:	FIG. NO.:
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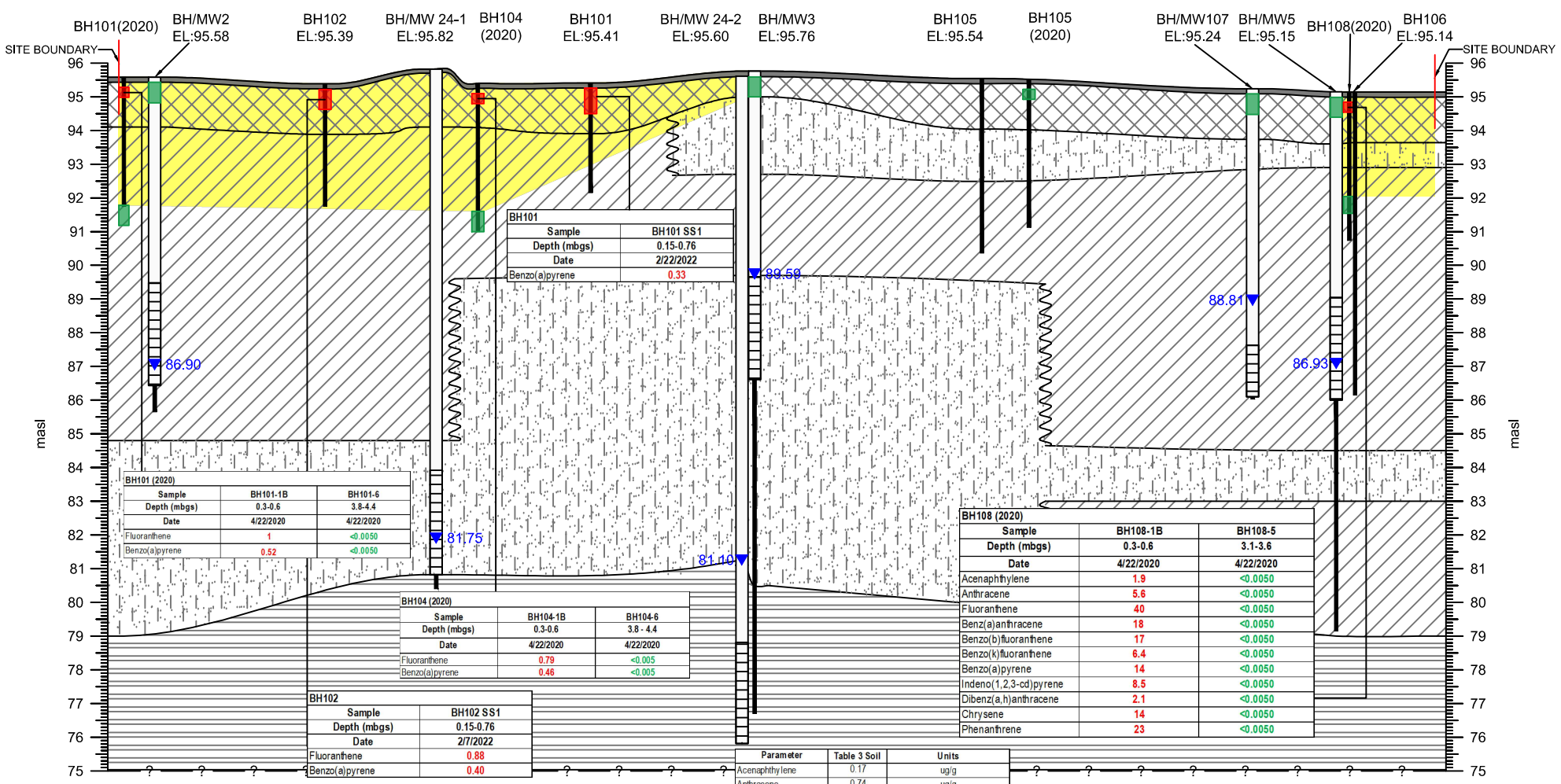

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
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VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:
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- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- EXTENT OF IMPACT

TITLE AND LOCATION:

CROSS SECTION A-A' WITH PAH CONCENTRATIONS IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.: GTR-21018382-B0	DWN.: MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 17G

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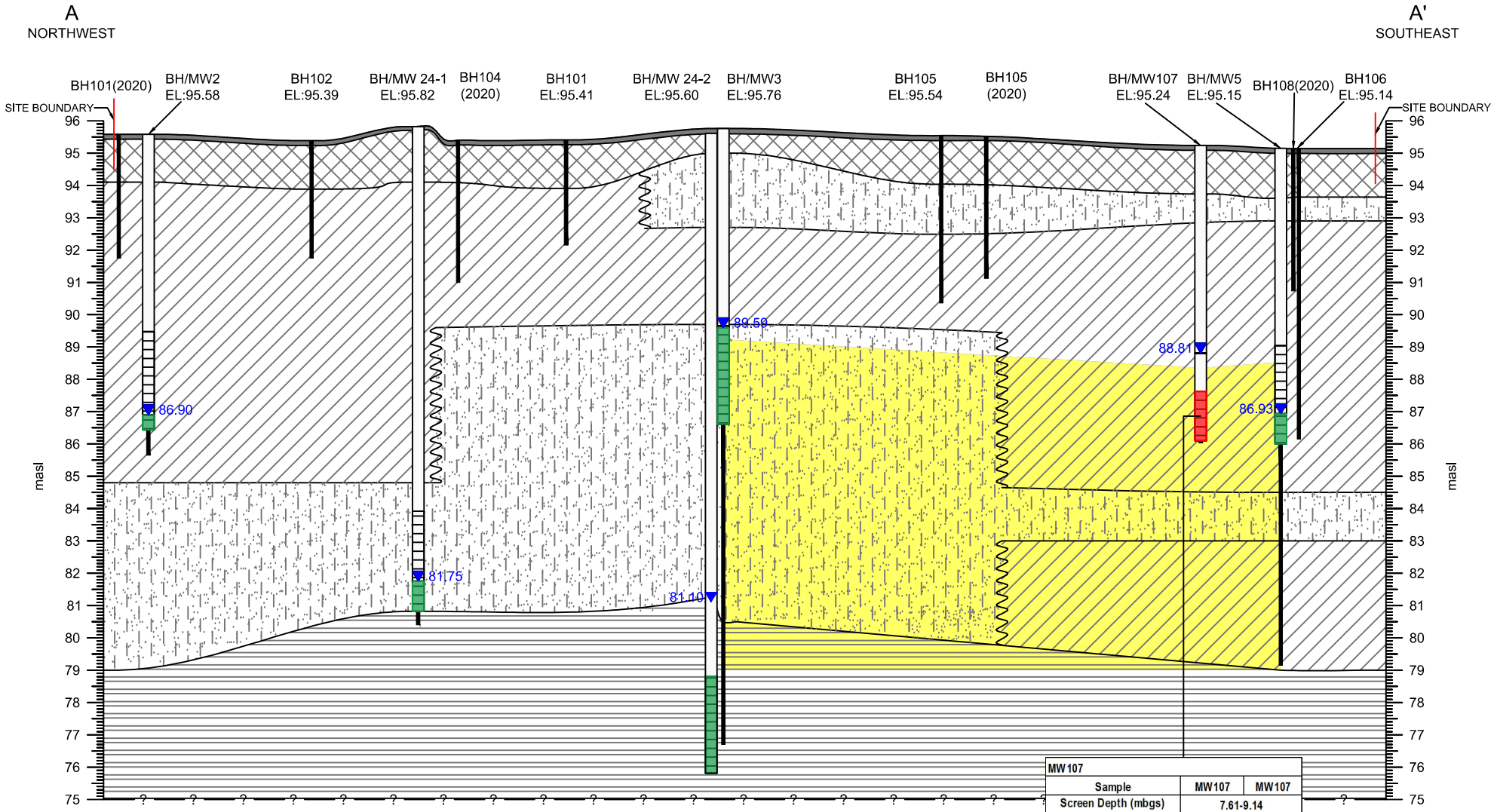

MW107		
Sample	MW107	MW107
Screen Depth (mbgs)	7.61-9.14	
Date	2/22/2022	4/22/2024
F1(C6-C10) - BTEX	849	<25
F2 (C10-C16)	3600	<100

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
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CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Table 3 Groundwater Standards*	Units
F1(C6-C10) - BTEX	750	ug/L
F2 (C10-C16)	150	ug/L
Xylene	4200	ug/L

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LEGEND:
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- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- EXTENT OF IMPACT

TITLE AND LOCATION:

CROSS SECTION A-A' WITH PHC AND BTEX CONCENTRATIONS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
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PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
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DATE:	FIG. NO.:
JANUARY 2025	17H

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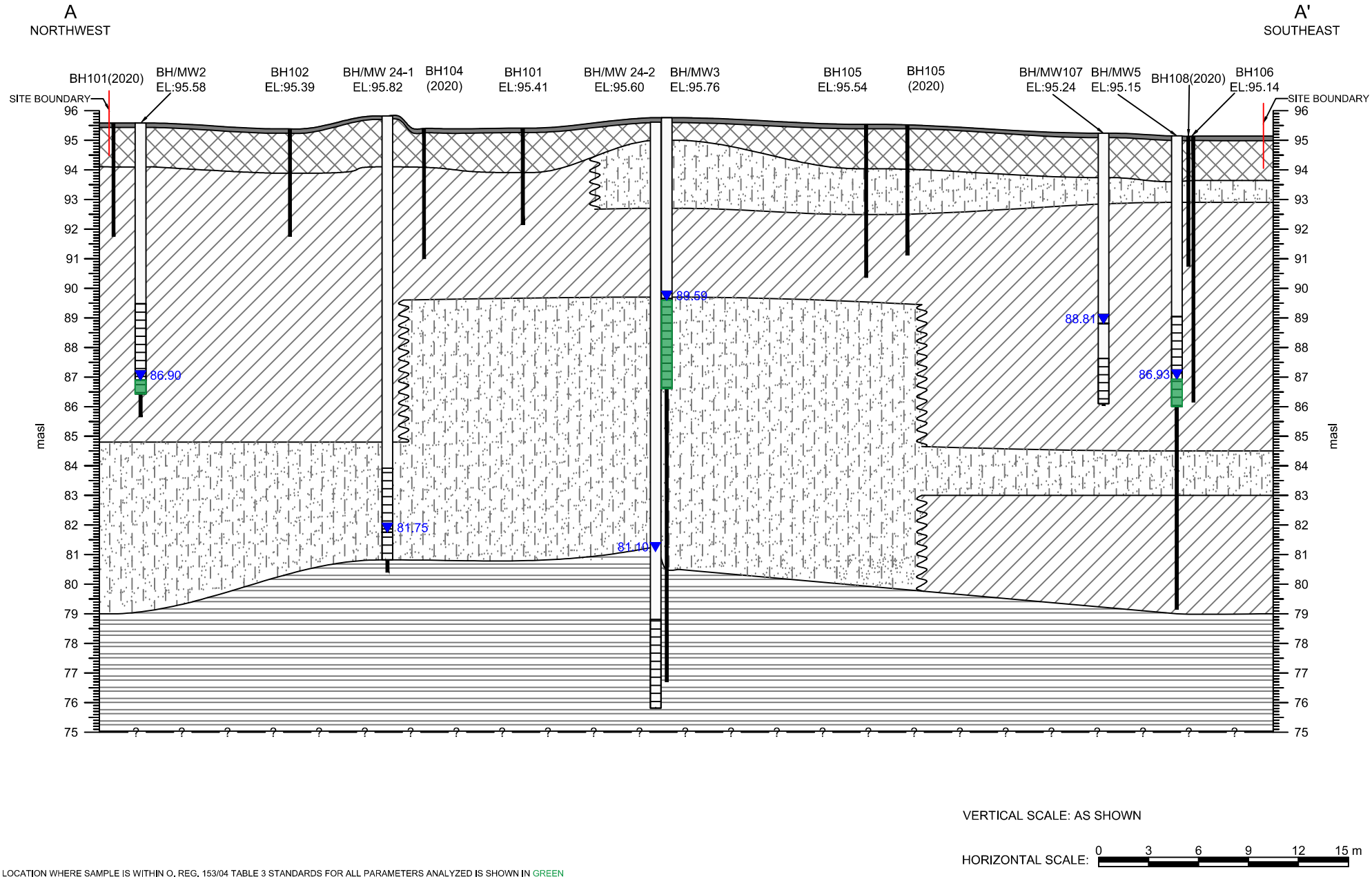

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN

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▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION A-A' WITH VOC CONCENTRATIONS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
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PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	17I

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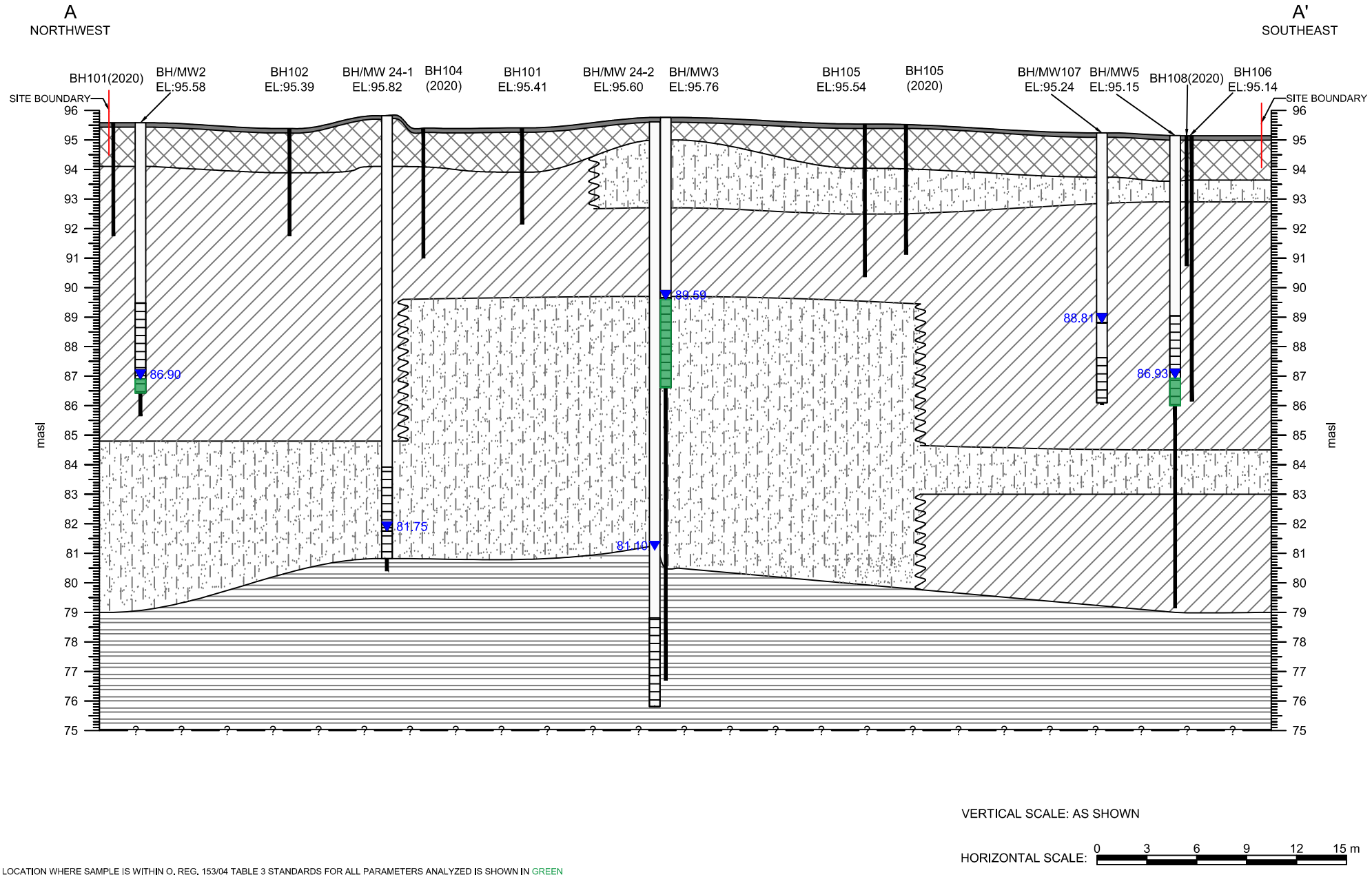

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- SANDY SILT TILL
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▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION A-A' WITH METALS, HYDRIDE-FORMING METALS AND ORPs (Hg, Cr VI, Na+, Cl-, CN-) CONCENTRATIONS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
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PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 17J

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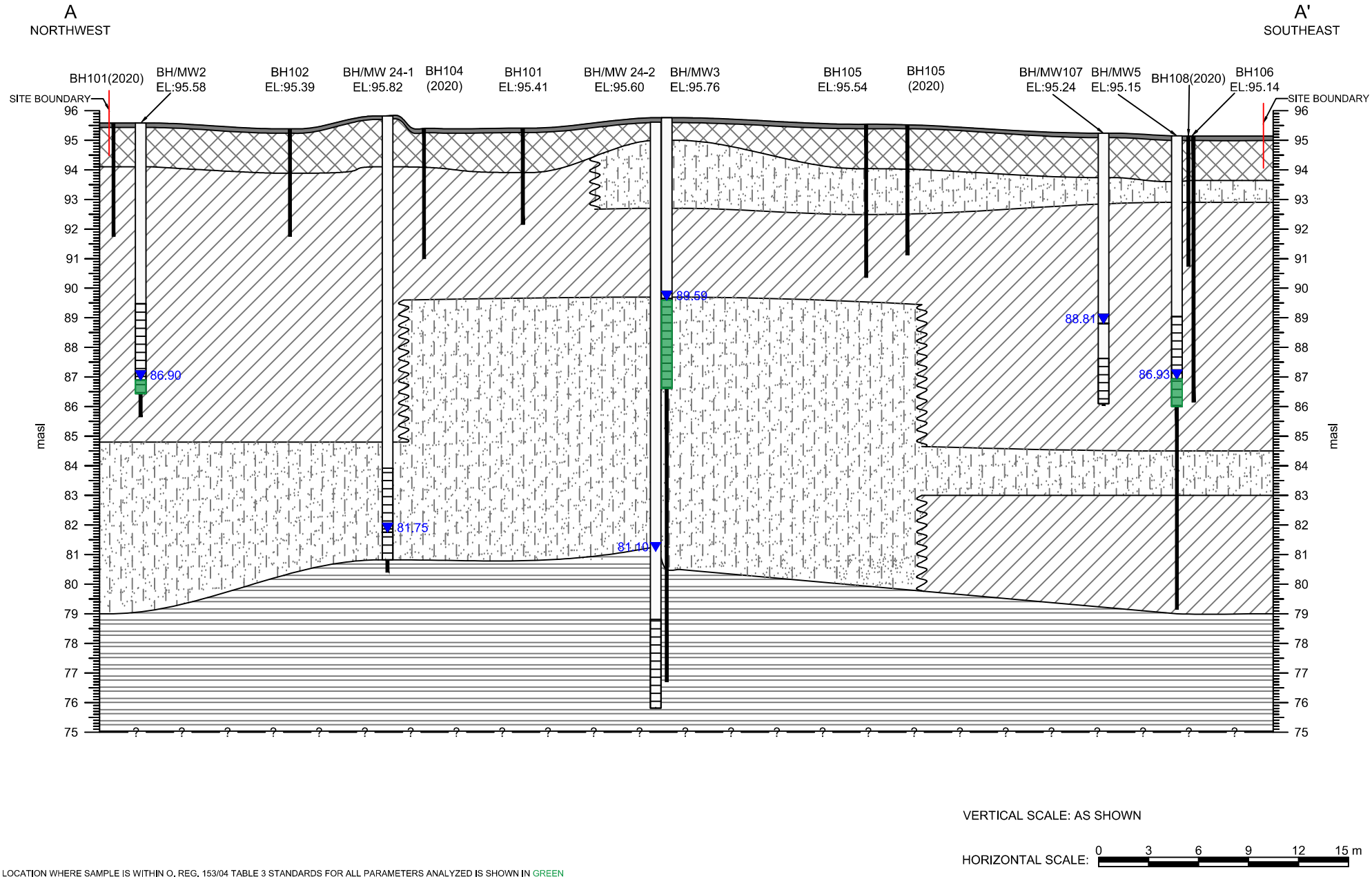

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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- FILL
- CLAYEY SILT TILL
- CLAYEY SILT
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION A-A' WITH PAH CONCENTRATIONS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	17K

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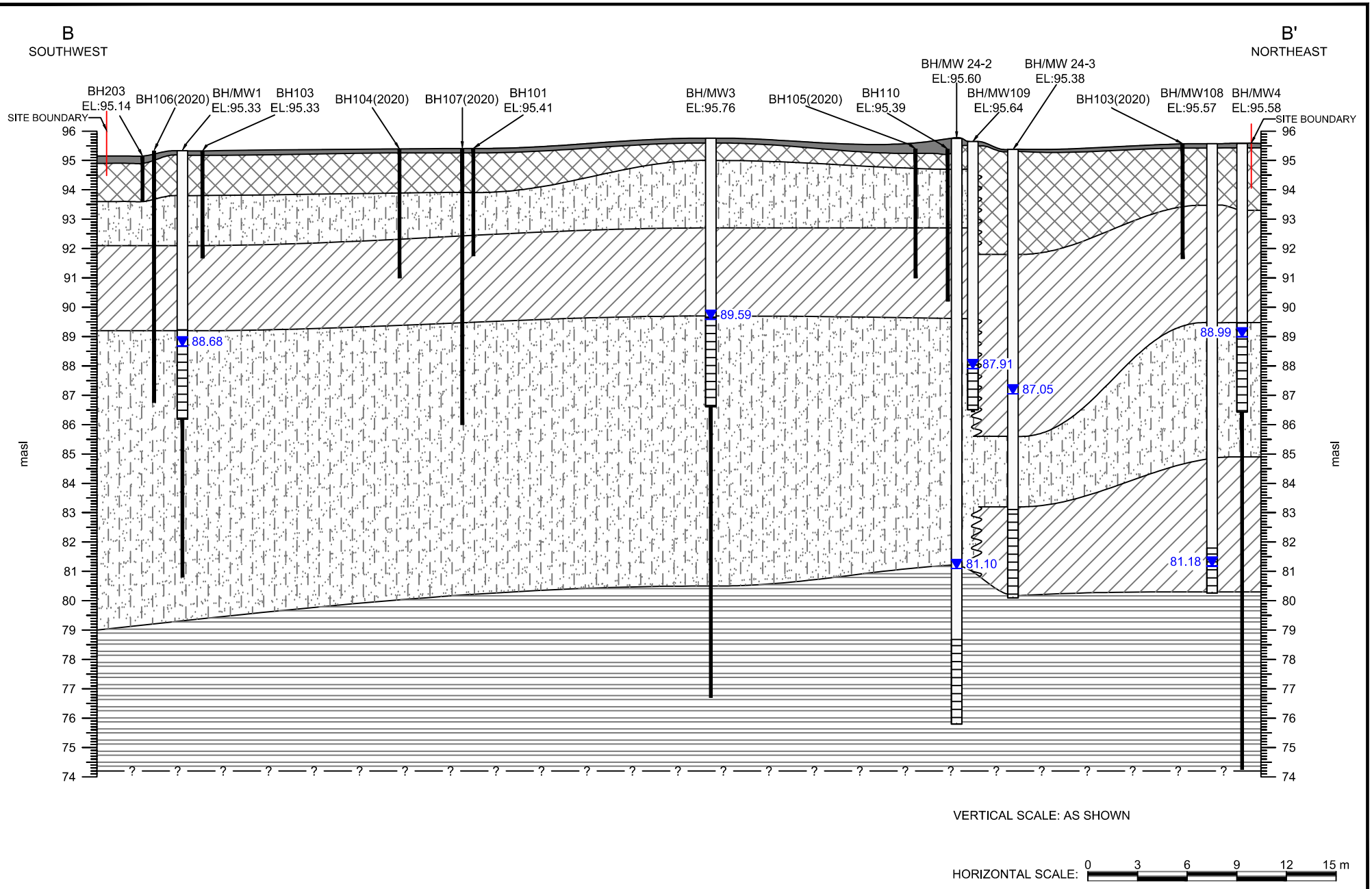

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LEGEND:

- ASPHALT
- FILL
- CLAYEY SILT TILL
- SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION B-B'

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 18A

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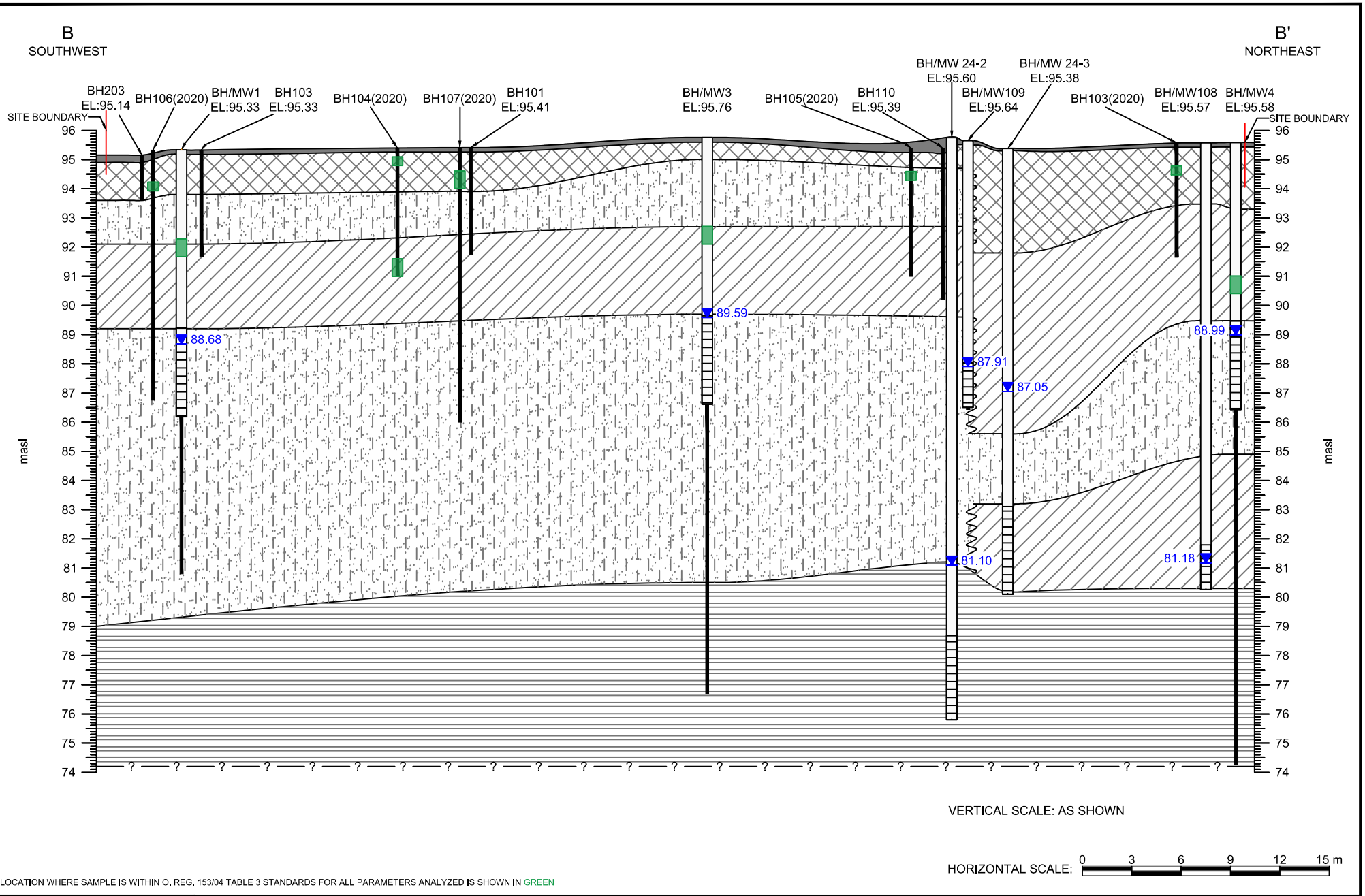

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN

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LEGEND:

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- FILL
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- SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION B-B' WITH PHC (INCLUDING BTEX) CONCENTRATIONS IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
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PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 18B

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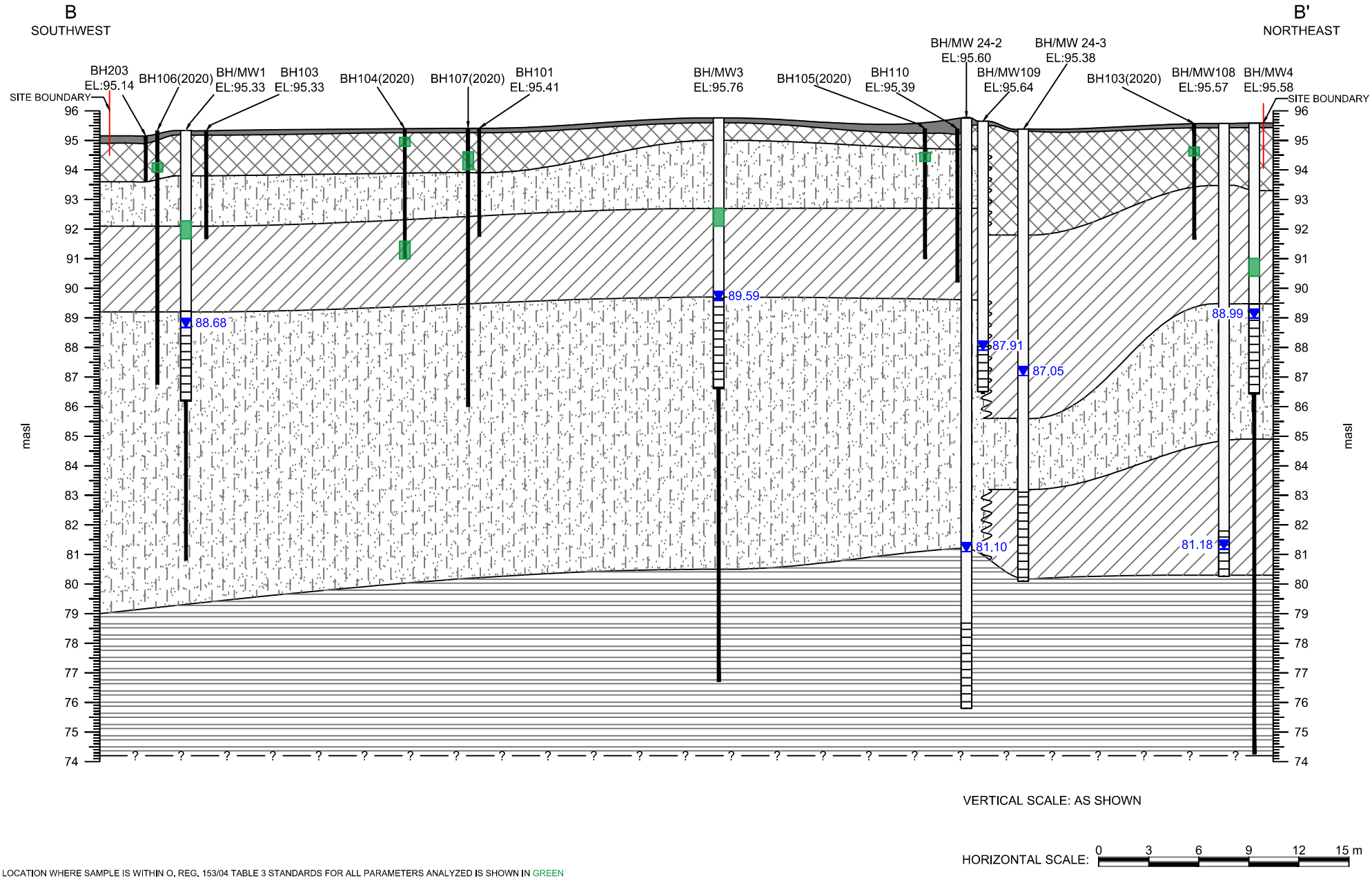

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LEGEND:

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- SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION B-B' WITH VOC CONCENTRATIONS IN SOIL
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	18C

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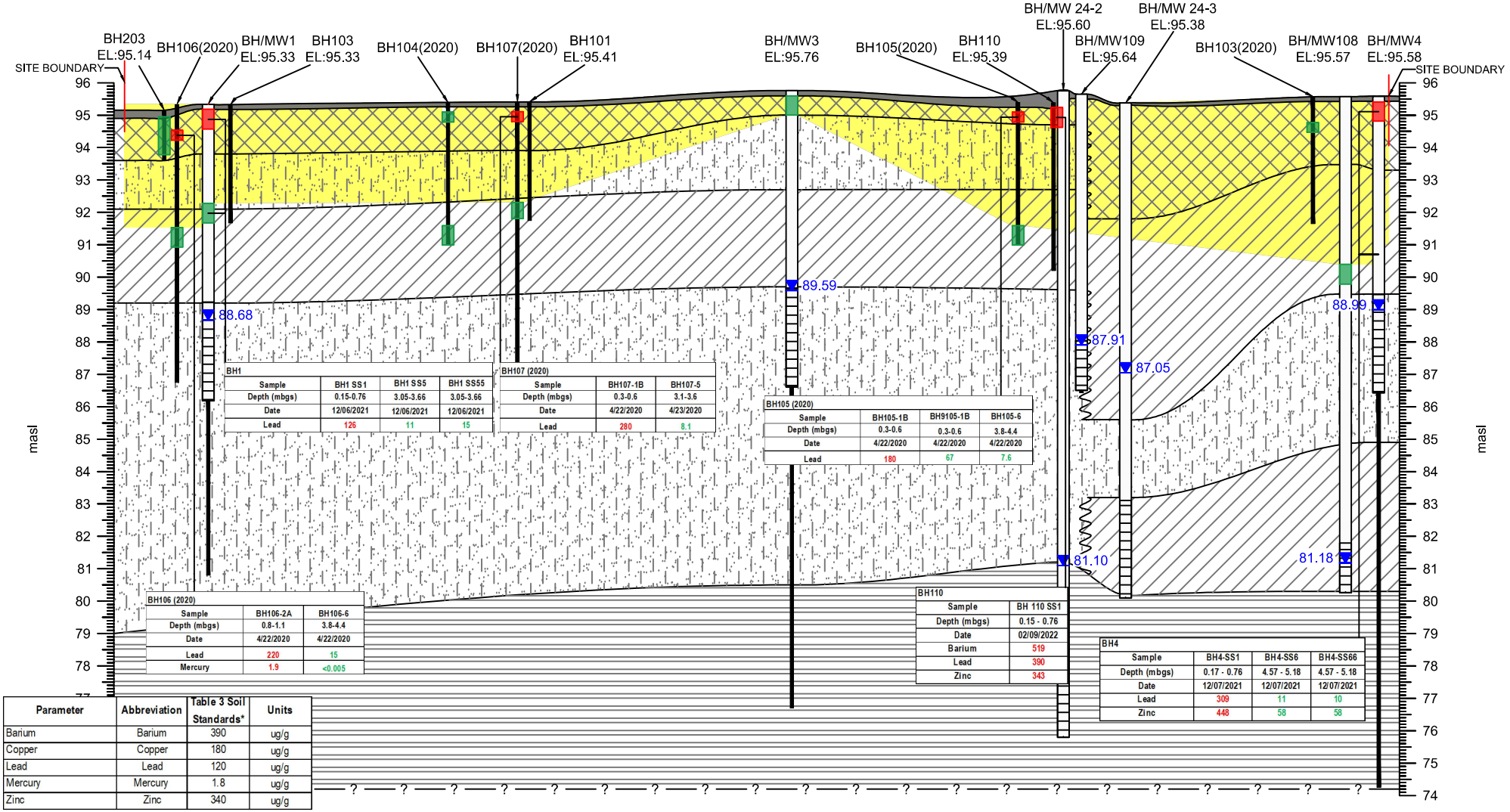
B
SOUTHWEST

B'
NORTHEAST



BH1			
Sample	BH1 SS1	BH1 SS5	BH1 SS55
Depth (mbgs)	0.15-0.76	3.05-3.66	3.05-3.66
Date	12/06/2021	12/06/2021	12/06/2021
Lead	126	11	15

BH107 (2020)		
Sample	BH107-1B	BH107-5
Depth (mbgs)	0.3-0.6	3.1-3.6
Date	4/22/2020	4/23/2020
Lead	280	8.1

BH105 (2020)			
Sample	BH105-1B	BH9105-1B	BH105-6
Depth (mbgs)	0.3-0.6	0.3-0.6	3.8-4.4
Date	4/22/2020	4/22/2020	4/22/2020
Lead	180	67	7.6

BH106 (2020)		
Sample	BH106-2A	BH106-6
Depth (mbgs)	0.8-1.1	3.8-4.4
Date	4/22/2020	4/22/2020
Lead	220	15
Mercury	1.9	<0.005

BH110	
Sample	BH 110 SS1
Depth (mbgs)	0.15 - 0.76
Date	02/09/2022
Barium	519
Lead	390
Zinc	343

BH4			
Sample	BH4-SS1	BH4-SS6	BH4-SS66
Depth (mbgs)	0.17 - 0.76	4.57 - 5.18	4.57 - 5.18
Date	12/07/2021	12/07/2021	12/07/2021
Lead	309	11	10
Zinc	448	58	58

Parameter	Abbreviation	Table 3 Soil Standards*	Units
Barium	Barium	390	ug/g
Copper	Copper	180	ug/g
Lead	Lead	120	ug/g
Mercury	Mercury	1.8	ug/g
Zinc	Zinc	340	ug/g

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
* SOIL SAMPLE COLLECTED FOR THE ANALYSIS OF MeHg ONLY
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:
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- FILL
- CLAYEY SILT TILL
- SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- EXTENT OF IMPACT

TITLE AND LOCATION:
CROSS SECTION B-B' WITH METALS, HYDRIDE-FORMING METALS AND SELECT ORPs(B-HWS, CN-, Cr VI, Hg, MeHg) CONCENTRATIONS IN SOIL
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE:	CK:
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DATE:	FIG. NO.:
JANUARY 2025	18D

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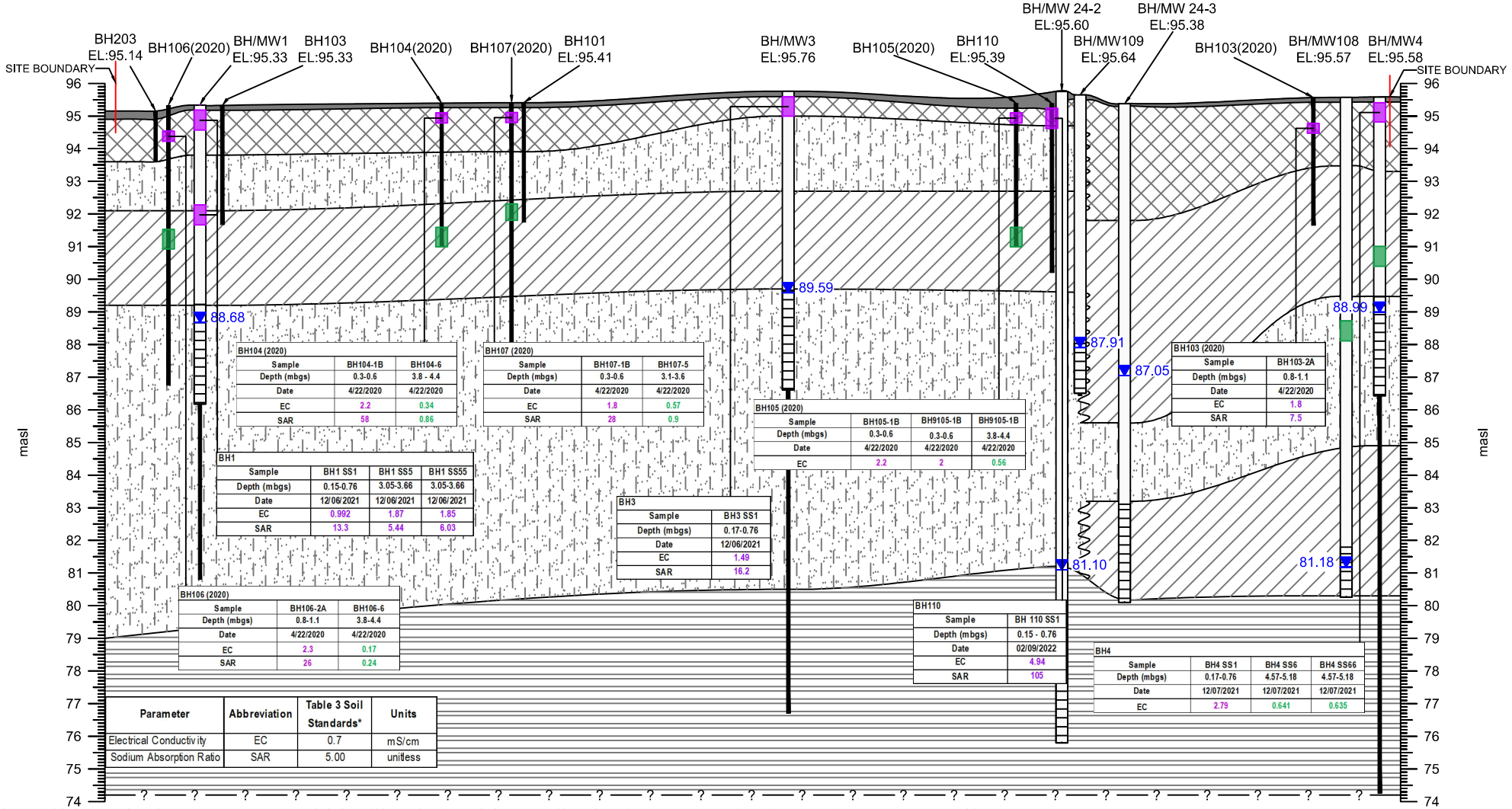

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ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE IS DEEMED TO MEET O. REG. 153/04 TABLE 3 STANDARDS FOR SALT RELATED PARAMETER IS SHOWN IN PURPLE
CONCENTRATION OF SALT RELATED PARAMETER DEEMED TO MEET THE TABLE 3 STANDARD SHOWN IN TEXT AS **PURPLE BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

NOTE: THE ELEVATED EC AND SAR IN SOIL IS LIKELY ASSOCIATED WITH ROAD SALT APPLICATION ON THE PAVED PARKING LOT FOR ROAD SAFETY OF VEHICULAR OR PEDESTRIAN TRAFFIC UNDER CONDITION OF SNOW OR ICE OR BOTH, AS SUCH, THE ELEVATED EC AND SAR IN SOIL IS DEEMED NOT TO BE EXCEEDED THE TABLE 3 SCS BASED ON THE SECTION 49.1 OF O.REG 153/04

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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- SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION B-B' WITH EC AND SAR IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.: GTR-21018382-B0	DWN.: MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 18E

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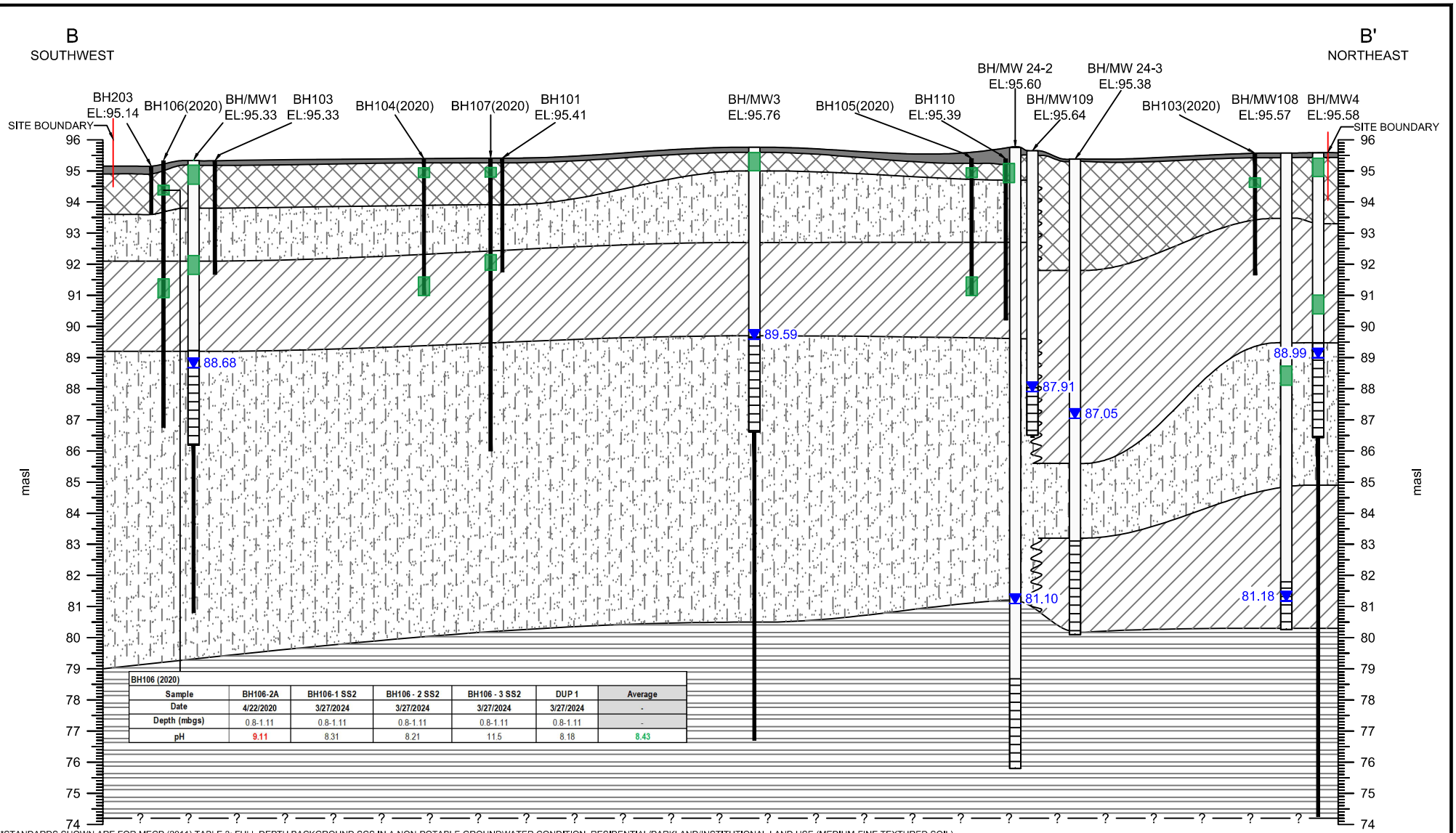

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
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ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

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CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

NOTE: INITIAL pH EXCEEDANCE RESOLVED VIA CONFIRMATORY SOIL SAMPLING PROGRAM COMPLETED IN MARCH 2024

Parameter	Table 3 Soil Standards*	Units
pH	5 to 9 (surface soil/less than 1.5 mbgs)	pH unit
	5 to 11 (subsurface soil/greater than 1.5 mbgs)	pH unit

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:
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- SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION B-B' WITH pH IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
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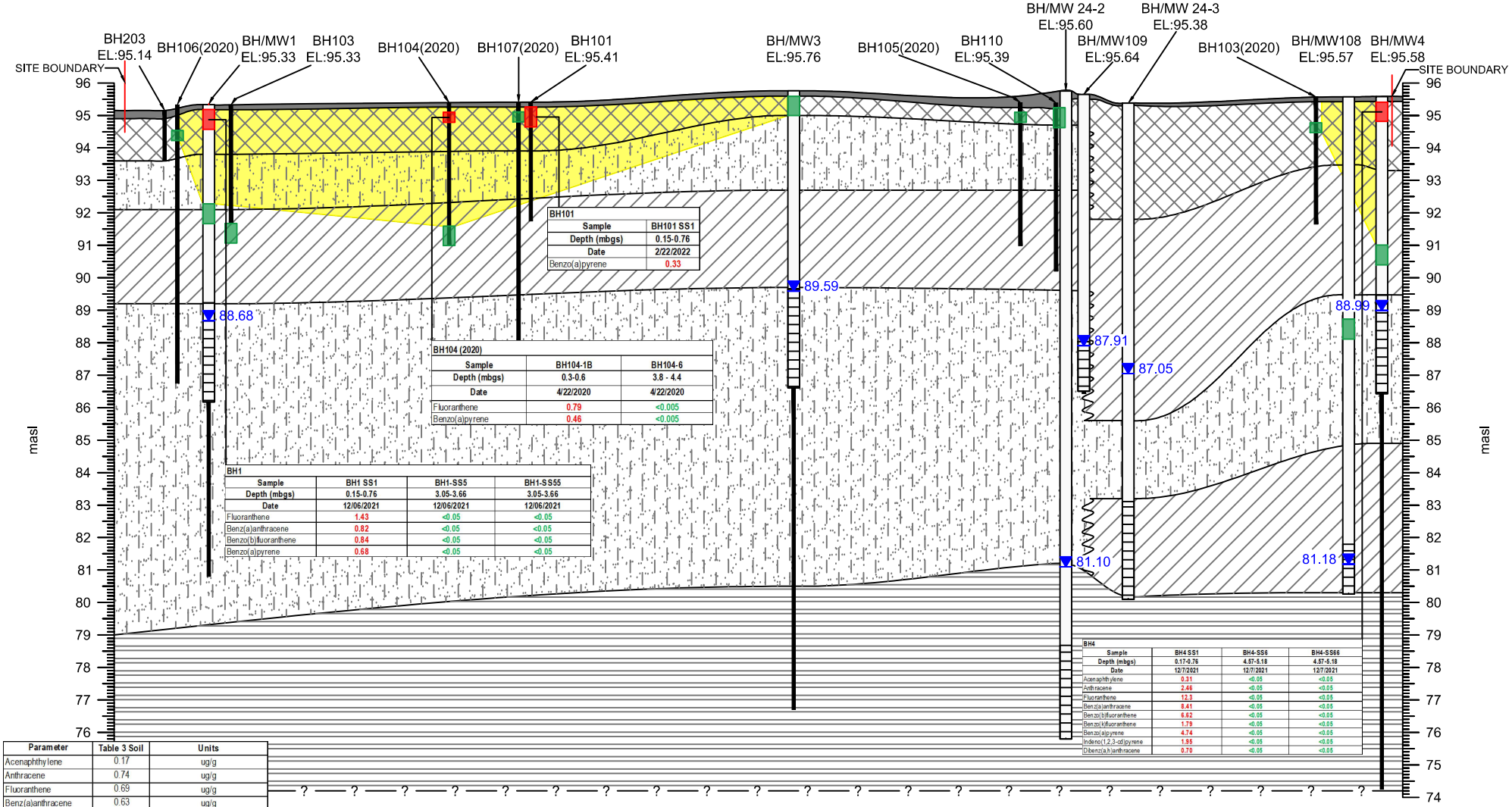
B
SOUTHWEST

B'
NORTHEAST



Parameter	Table 3 Soil	Units
Acenaphthylene	0.17	ug/g
Anthracene	0.74	ug/g
Fluoranthene	0.69	ug/g
Benz(a)anthracene	0.63	ug/g
Benzo(b)fluoranthene	0.78	ug/g
Benzo(k)fluoranthene	0.78	ug/g
Benzo(a)pyrene	0.3	ug/g
Benzo(g,h,i)perylene	7.8	ug/g
Indeno(1,2,3-cd)pyrene	0.48	ug/g
Dibenz(a,h)anthracene	0.1	ug/g
Chrysene	7.8	ug/g
Phenanthrene	7.8	ug/g

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
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VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:
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- SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- EXTENT OF IMPACT

TITLE AND LOCATION:

CROSS SECTION B-B' WITH PAH CONCENTRATIONS IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 18G

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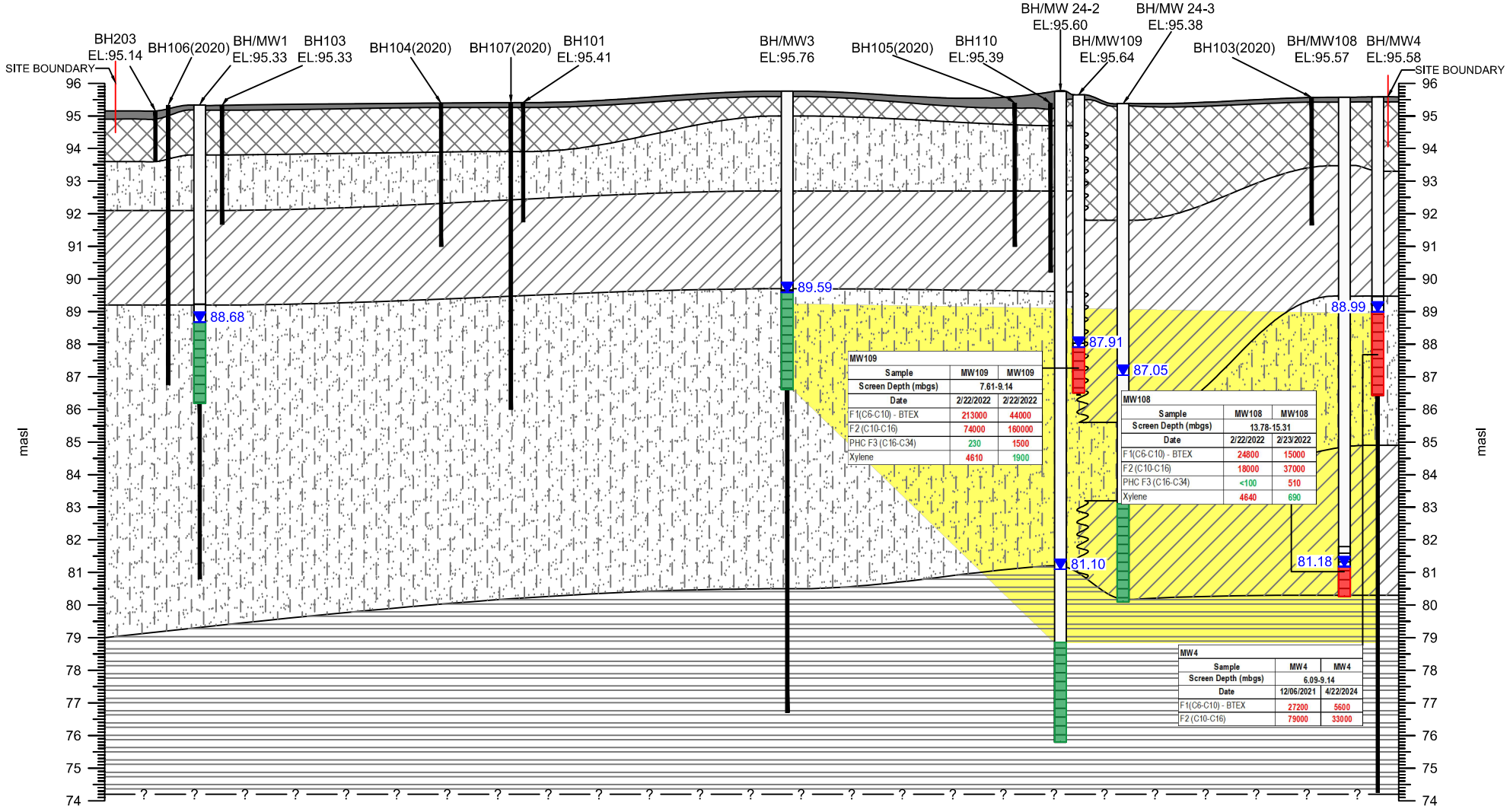

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CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Table 3 Groundwater Standards*	Units
F1(C6-C10) - BTEX	750	ug/L
F2 (C10-C16)	150	ug/L
Xylene	4200	ug/L

VERTICAL SCALE: AS SHOWN

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- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- EXTENT OF IMPACT

TITLE AND LOCATION:

CROSS SECTION B-B' WITH PHC AND BTEX CONCENTRATIONS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
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SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 18H

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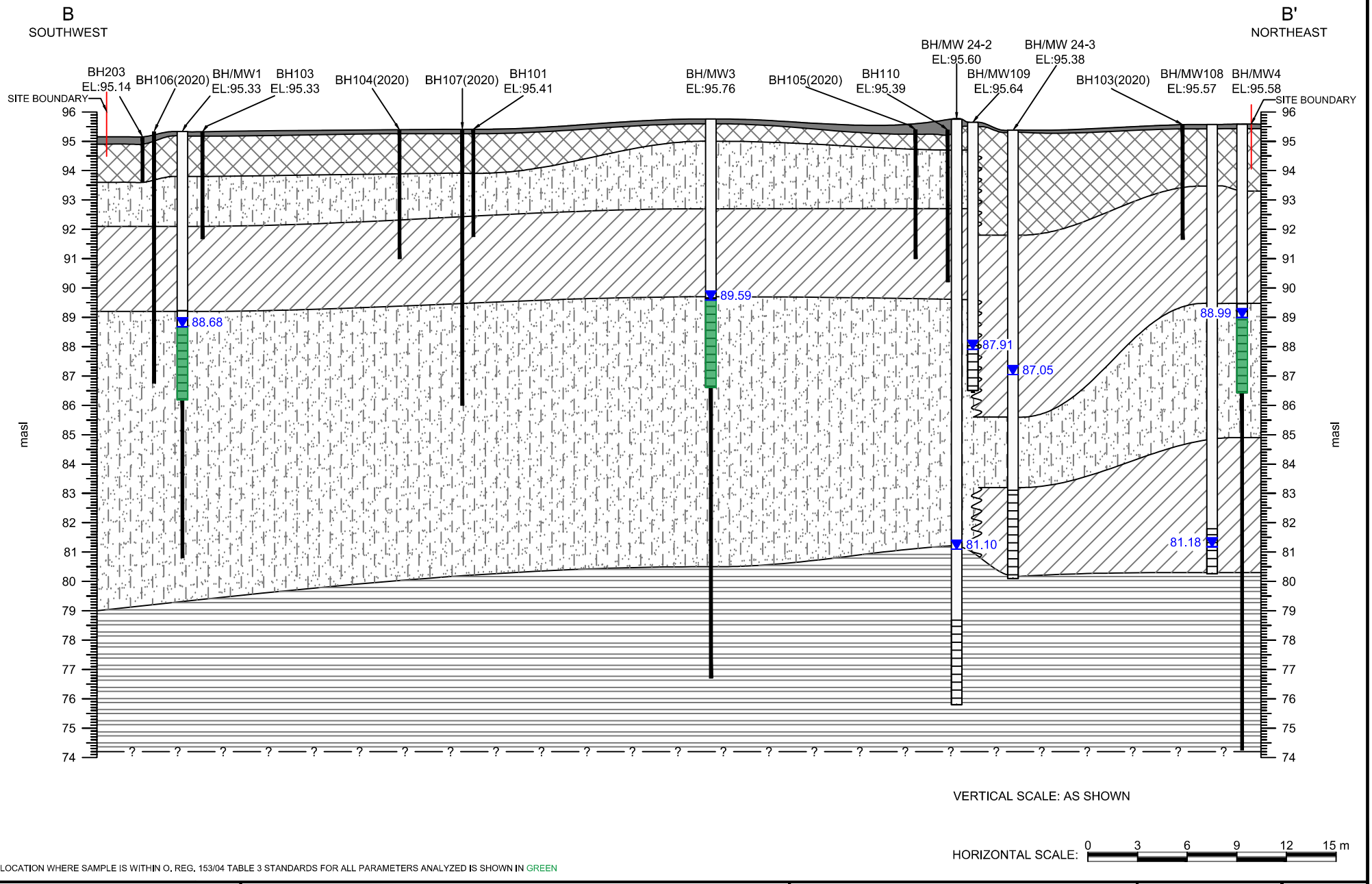

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN

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▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION B-B' WITH VOC CONCENTRATIONS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
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TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	18I

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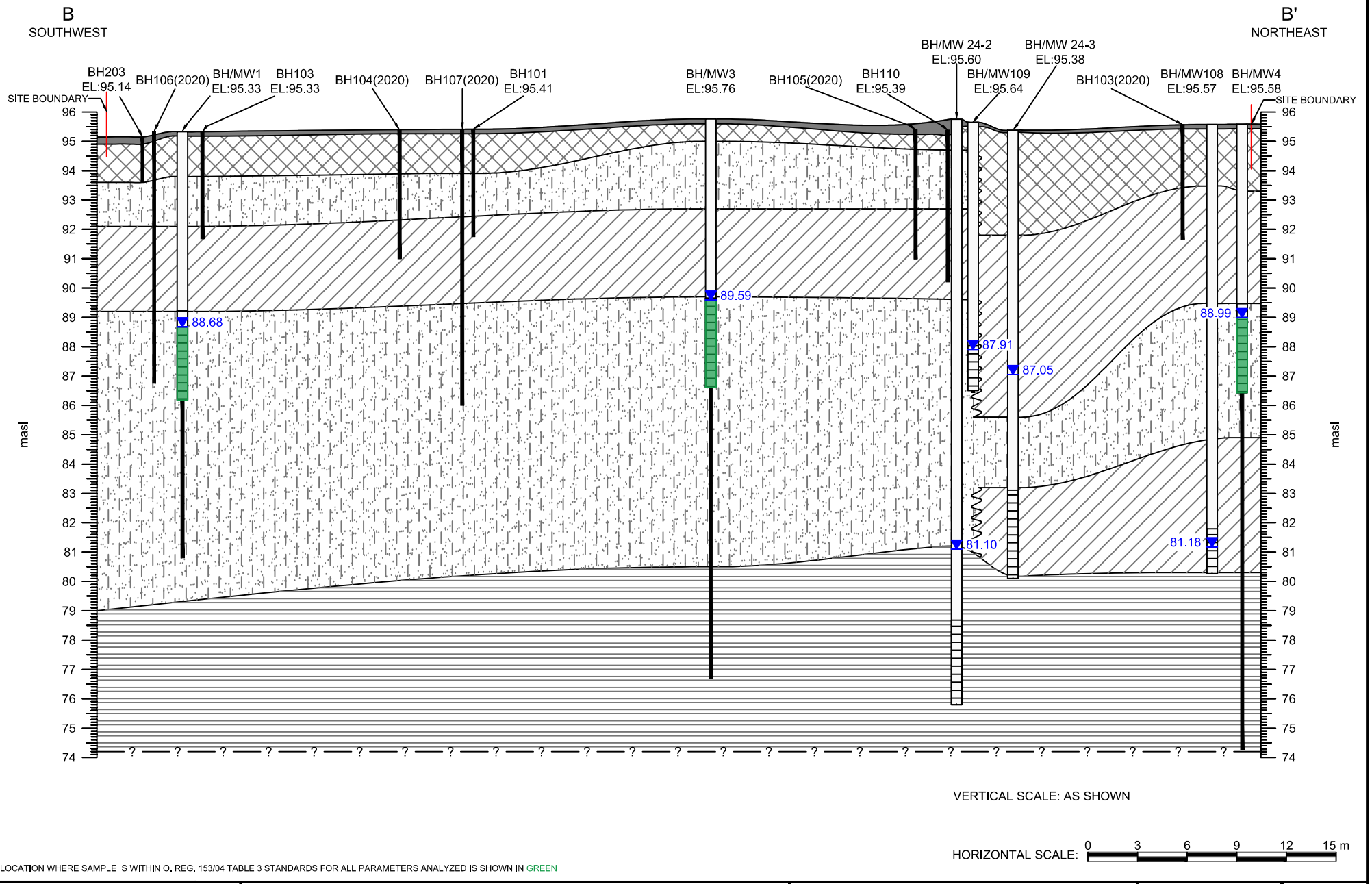

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN

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- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION B-B' WITH METALS, HYDRIDE-FORMING METALS AND ORPs (Hg, Cr VI, Na+, Cl-, CN-) CONCENTRATIONS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.: GTR-21018382-B0	DWN.: MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 18J

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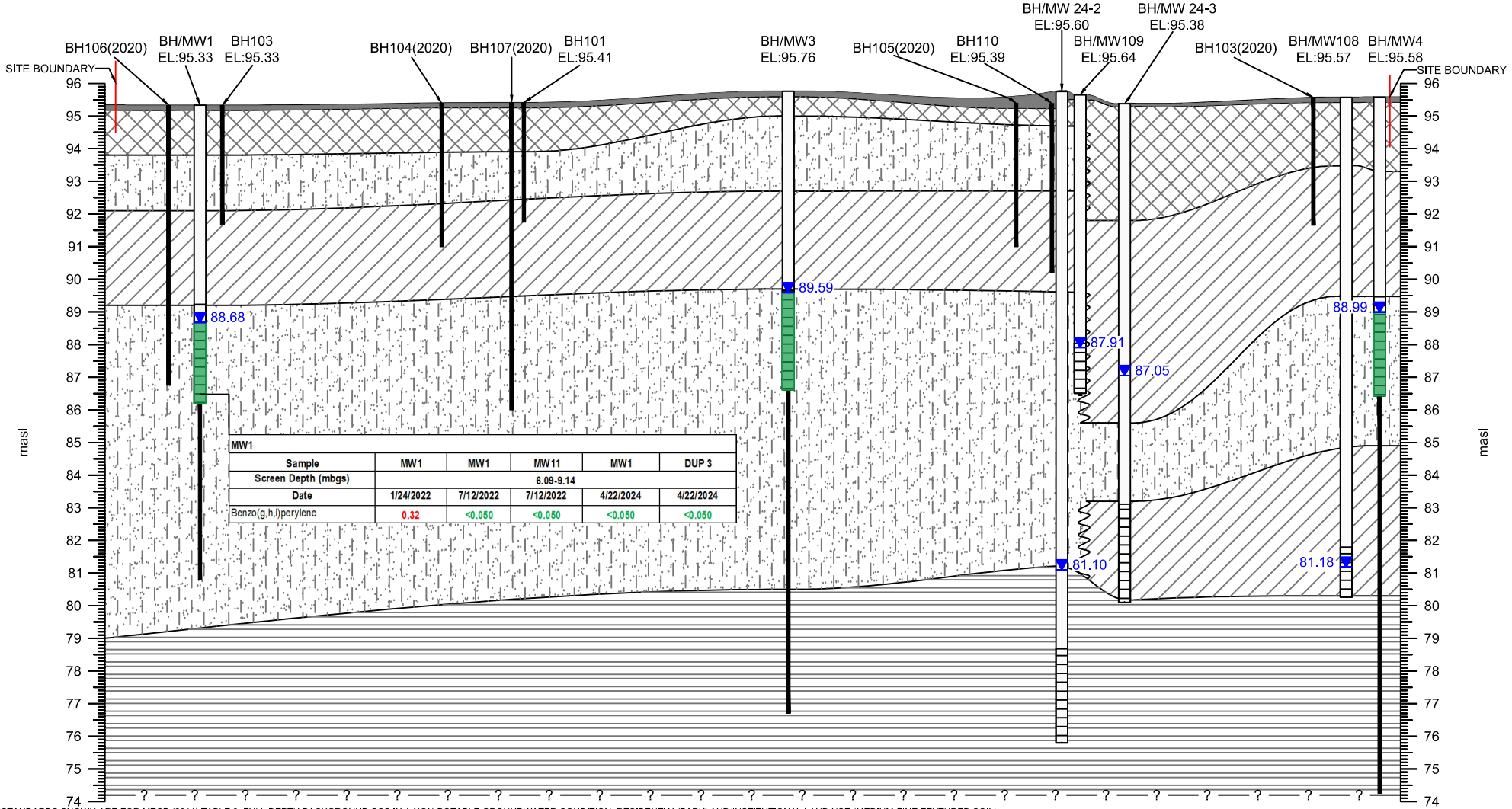

MW1					
Sample	MW1	MW1	MW11	MW1	DUP 3
Screen Depth (mbgs)	6.09-9.14				
Date	1/24/2022	7/12/2022	7/12/2022	4/22/2024	4/22/2024
Benzo(g,h,i)perylene	0.32	<0.050	<0.050	<0.050	<0.050

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

NOTE: INITIAL EXCEEDANCE IDENTIFIED AT MW1 NO LONGER RETAINED DUE TO COMPLETION OF TWO (2) RE-SAMPLING EVENTS WITH ANALYTICAL RESULTS BELOW THE RDL AND TABLE 3 SCS

Parameter	Table 3	Units
Benzo(g,h,i)perylene	0.2	ug/g

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:
- ASPHALT
- FILL
- CLAYEY SILT TILL
- SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

TITLE AND LOCATION:

CROSS SECTION B-B' WITH PAH CONCENTRATIONS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 18K

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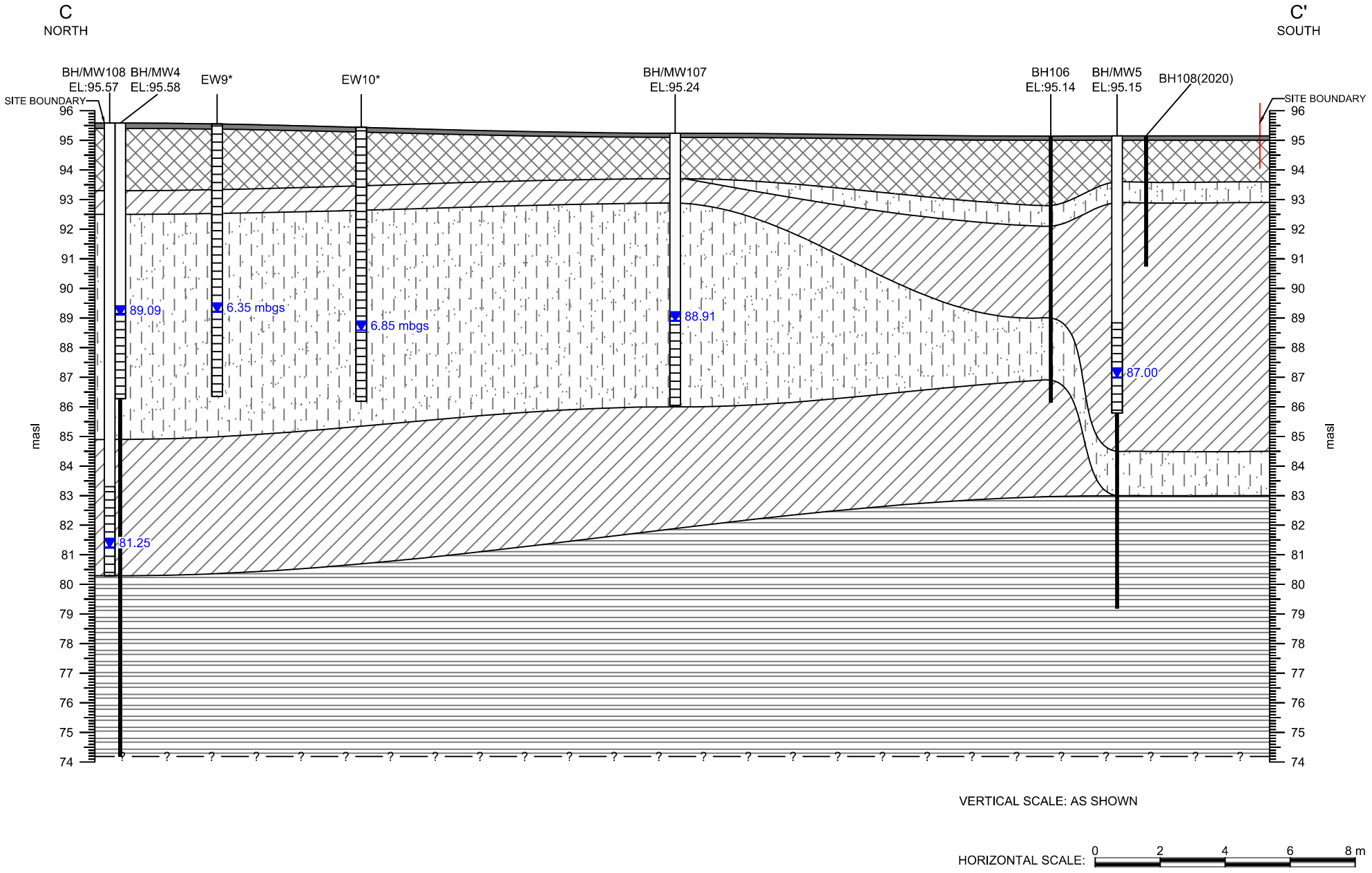

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LEGEND:

- ASPHALT
- FILL
- CLAYEY SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

NOTE: *EXTRACTION WELL (EW) GROUND SURFACE ELEVATIONS WERE NOT MEASURED

TITLE AND LOCATION:

CROSS SECTION C-C'

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	19A

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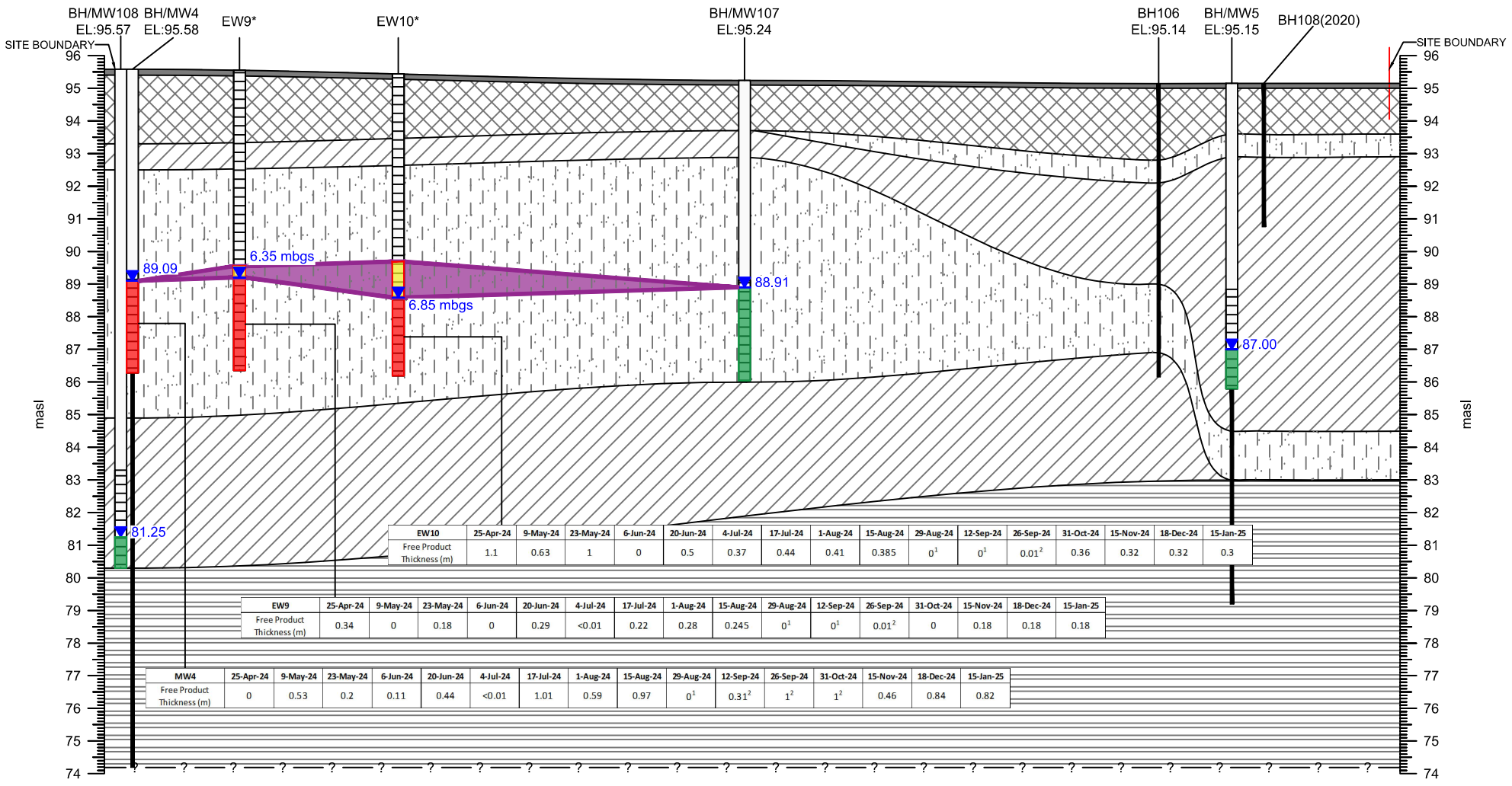
C
NORTH

C'
SOUTH



EW10	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	1.1	0.63	1	0	0.5	0.37	0.44	0.41	0.385	0[1]	0[1]	0.01[2]	0.36	0.32	0.32	0.3

EW9	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0.34	0	0.18	0	0.29	<0.01	0.22	0.28	0.245	0[1]	0[1]	0.01[2]	0	0.18	0.18	0.18

MW4	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0	0.53	0.2	0.11	0.44	<0.01	1.01	0.59	0.97	0[1]	0.31[2]	1[2]	1[2]	0.46	0.84	0.82

NOTE: *EXTRACTION WELL (EW) GROUND SURFACE ELEVATIONS WERE NOT MEASURED

FREE PRODUCT MEASUREMENTS FROM APRIL 25, 2024 - 1st FREE PRODUCT EXTRACTION EVENT AND ASSUMED TO BE REPRESENTATIVE OF WORST-CASE CONDITIONS

WELL SCREEN INTERVALS (m bgs) ARE SHOWN BELOW WELL LABEL
(1) INTERFACE PROBE PERFORMANCE ISSUES RESULTING IN UNCERTAINTY ON PRESENCE/THICKNESS OF LNAPL FREE-PRODUCT AT THE SITE.
(2) FREE-PRODUCT MEASUREMENT TAKEN FROM BAILER

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 2 4 6 8 m

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LEGEND:
- ASPHALT
- FILL
- CLAYEY SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- MEASURABLE FREE PRODUCT PRESENT
- NO FREE PRODUCT PRESENT
- EXTENT OF LNAPL IMPACTED GROUNDWATER
- MEASUREABLE LNAPL

TITLE AND LOCATION:

CROSS SECTION C-C' AND FREE-PRODUCT MEASUREMENTS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 19B

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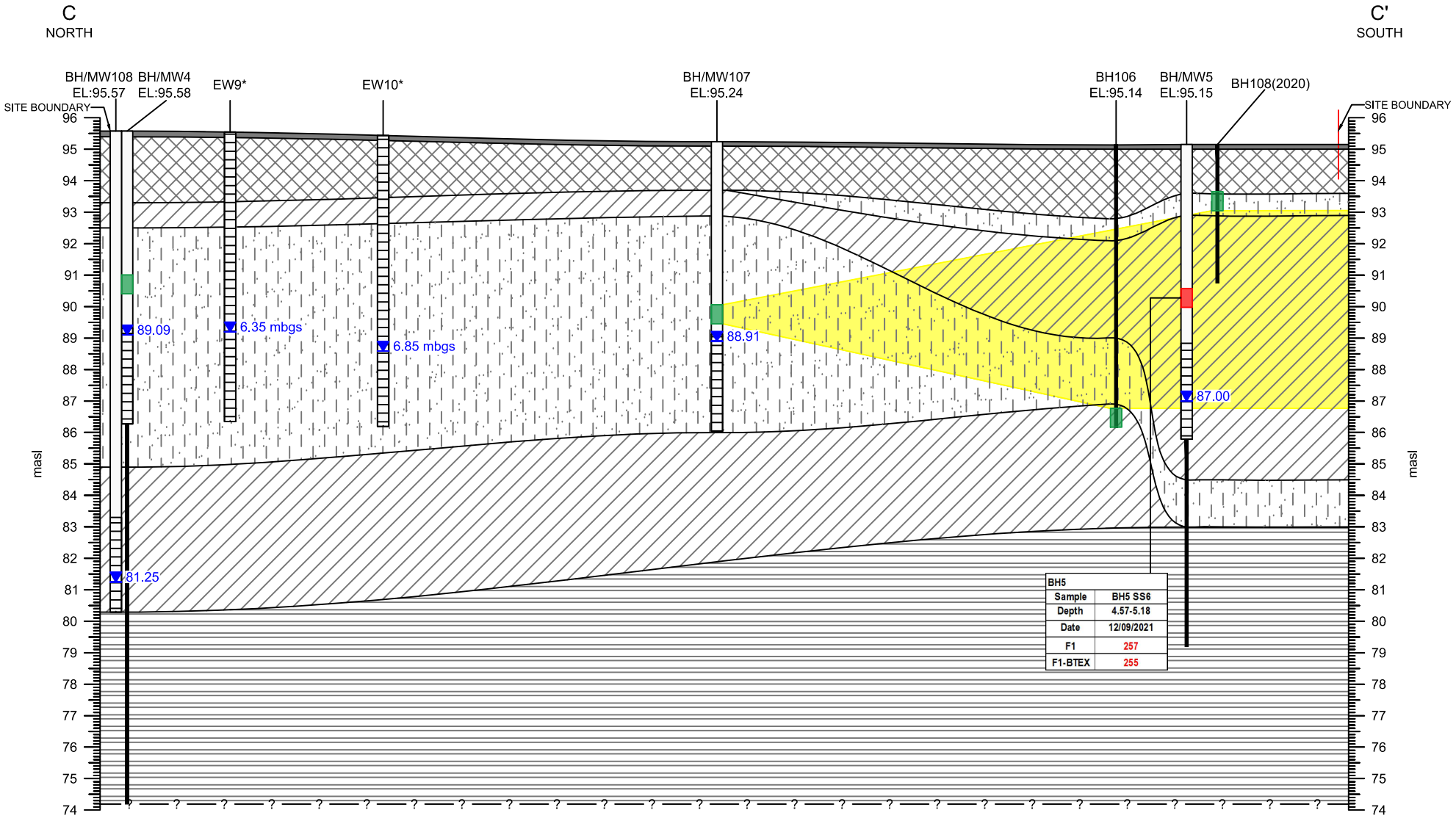

*STANDARDS SHOWN ARE FOR MECP (2011) TABLE 3: FULL DEPTH BACKGROUND SCS IN A NON-POTABLE GROUNDWATER CONDITION, RESIDENTIAL/PARKLAND/INSTITUTIONAL LAND USE (MEDIUM-FINE TEXTURED SOIL)
~ INDICATES FIELD DUPLICATE SAMPLE
mbgs - METRES BELOW GROUND SURFACE
ALL RESULTS IN UNITS OF µg/g, UNLESS OTHERWISE NOTED

LOCATION WHERE SAMPLE IS WITHIN O. REG. 153/04 TABLE 3 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
LOCATION WHERE SAMPLE EXCEEDS O. REG. 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 3 STANDARD SHOWN IN TEXT AS **RED BOLD**
CONCENTRATION OF CONTAMINANT WITHIN TABLE 3 STANDARD SHOWN IN TEXT AS GREEN

Parameter	Abbreviation	Table 3 Soil Standards*	Units
F1 (C6-C10)	F1	65	ug/g
F1 (C6-C10)- BTEX	F1-BTEX	65	ug/g

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 2 4 6 8 m

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LEGEND:
- ASPHALT
- FILL
- CLAYEY SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- EXTENT OF IMPACT

NOTE: *EXTRACTION WELL (EW) GROUND SURFACE ELEVATIONS WERE NOT MEASURED

TITLE AND LOCATION:

CROSS SECTION C-C' WITH PHC (INCLUDING BTEX) CONCENTRATIONS IN SOIL

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.: GTR-21018382-B0	DWN.: MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 19C

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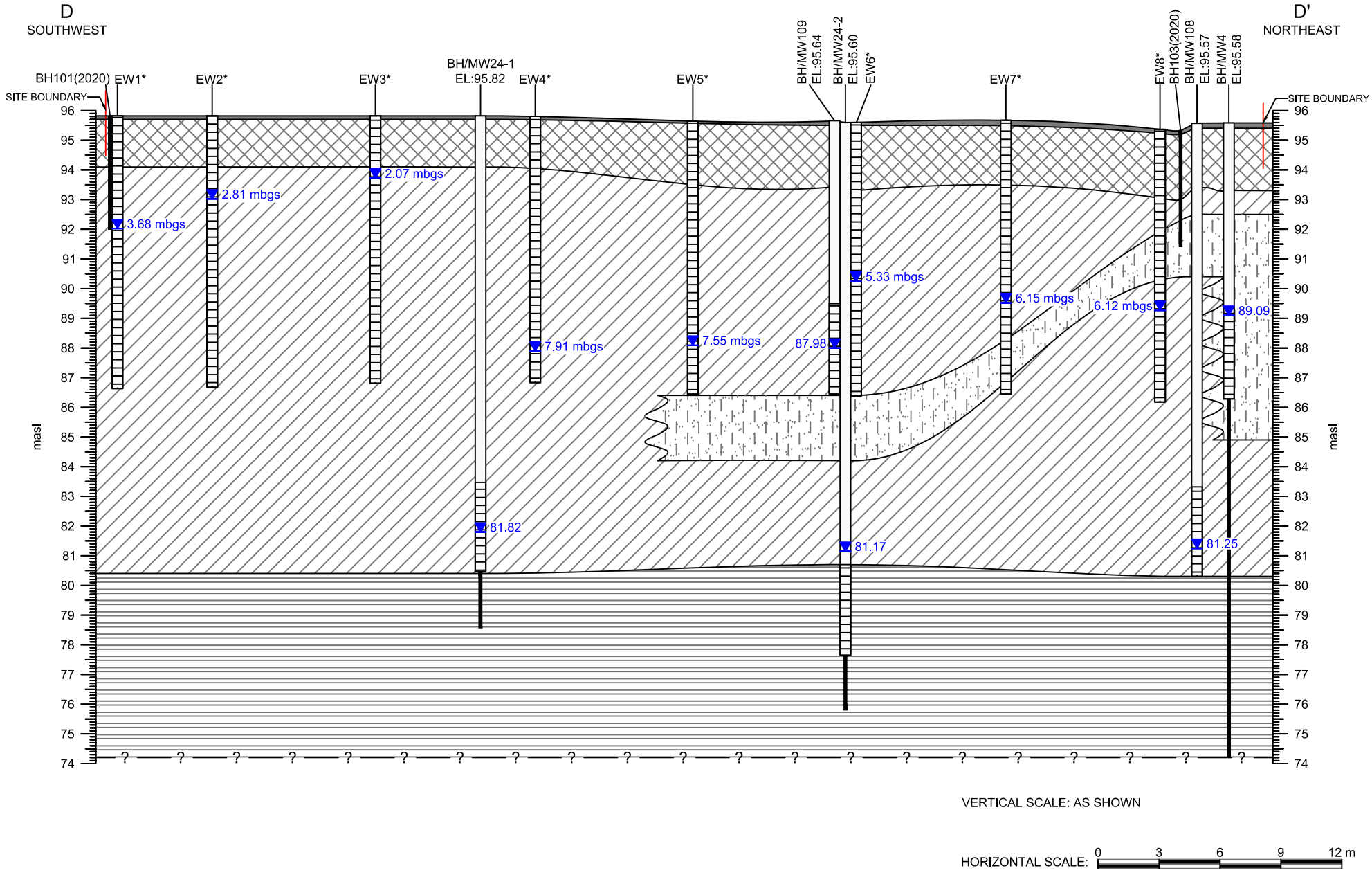

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LEGEND:

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- CLAYEY SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024

NOTE: *EXTRACTION WELL (EW) GROUND SURFACE ELEVATIONS WERE NOT MEASURED

TITLE AND LOCATION:

CROSS SECTION D-D'

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 20A

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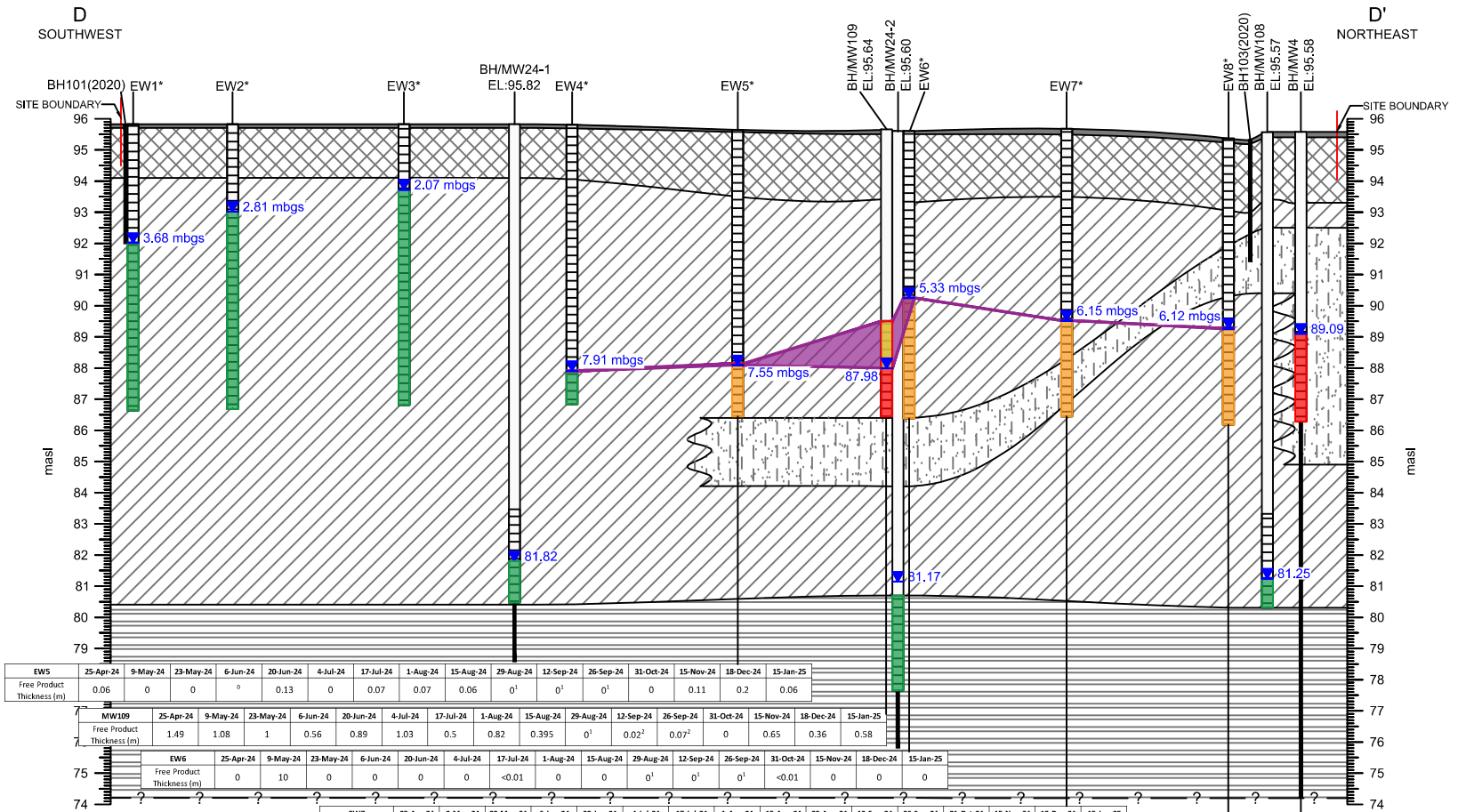

EW5	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0.06	0	0	0	0.13	0	0.07	0.07	0.06	0[1]	0[1]	0[1]	0	0.11	0.2	0.06

MW109	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	1.49	1.08	1	0.56	0.89	1.03	0.5	0.82	0.395	0[1]	0.02[2]	0.07[2]	0	0.65	0.36	0.58

EW6	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0	10	0	0	0	0	<0.01	0	0	0[1]	0[1]	0[1]	<0.01	0	0	0

EW7	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0.01	0	0	0	0.07	<0.01	0.08	0.13	0.12	0[1]	0.01[2]	0[1]	0.06	0.07	0.08	0.06

EW8	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0	0	0	0	0.03	0	0.21	0	0.005	0[1]	0.02[2]	0.01[2]	0.08	0.07	0.13	0.18

MW4	25-Apr-24	9-May-24	23-May-24	6-Jun-24	20-Jun-24	4-Jul-24	17-Jul-24	1-Aug-24	15-Aug-24	29-Aug-24	12-Sep-24	26-Sep-24	31-Oct-24	15-Nov-24	18-Dec-24	15-Jan-25
Free Product Thickness (m)	0	0.53	0.2	0.11	0.44	<0.01	1.01	0.59	0.97	0[1]	0.31[2]	1[2]	1[2]	0.46	0.84	0.82

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 m

NOTE: *EXTRACTION WELL (EW) GROUND SURFACE ELEVATIONS WERE NOT MEASURED

FREE PRODUCT MEASUREMENTS FROM APRIL 25, 2024 - 1st FREE PRODUCT EXTRACTION EVENT AND ASSUMED TO BE REPRESENTATIVE OF WORST-CASE CONDITIONS

WELL SCREEN INTERVALS (m bgs) ARE SHOWN BELOW WELL LABEL
(1) INTERFACE PROBE PERFORMANCE ISSUES RESULTING IN UNCERTAINTY ON PRESENCE/THICKNESS OF LNAPL FREE-PRODUCT AT THE SITE.
(2) FREE-PRODUCT MEASUREMENT TAKEN FROM BAILER

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LEGEND:
- ASPHALT
- FILL
- CLAYEY SILT TILL
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 25, 2024
- MEASURABLE FREE PRODUCT PRESENT
- NO FREE PRODUCT PRESENT
- MINIMAL FREE PRODUCT PRESENT
- EXTENT OF LNAPL IMPACTED GROUNDWATER
- MEASUREABLE LNAPL

TITLE AND LOCATION:

CROSS SECTION D-D' AND FREE-PRODUCT MEASUREMENTS IN GROUNDWATER

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	MS
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: 20B

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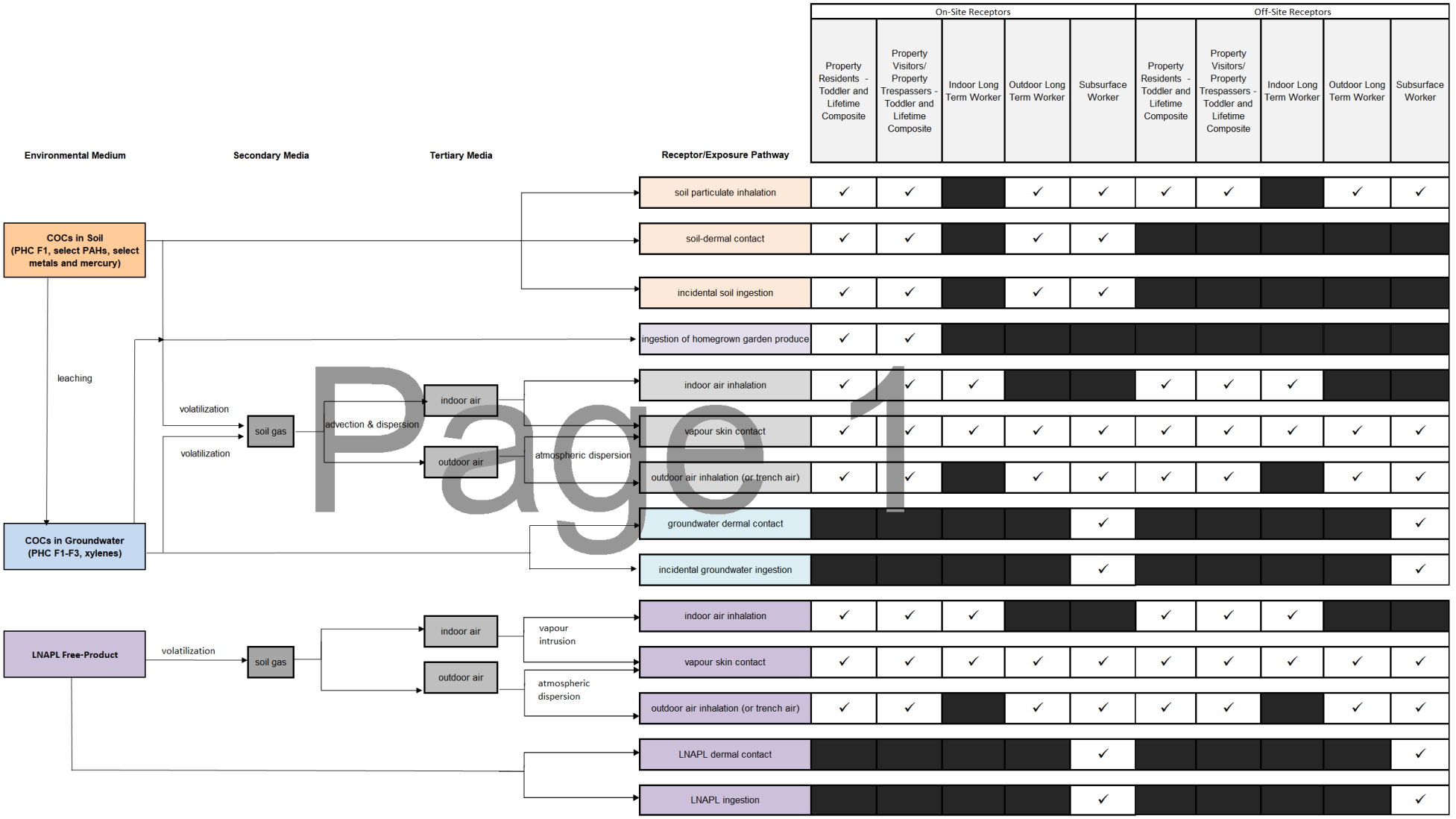

Page 1

Legend:

	Pathway is incomplete
✓	Pathway is complete

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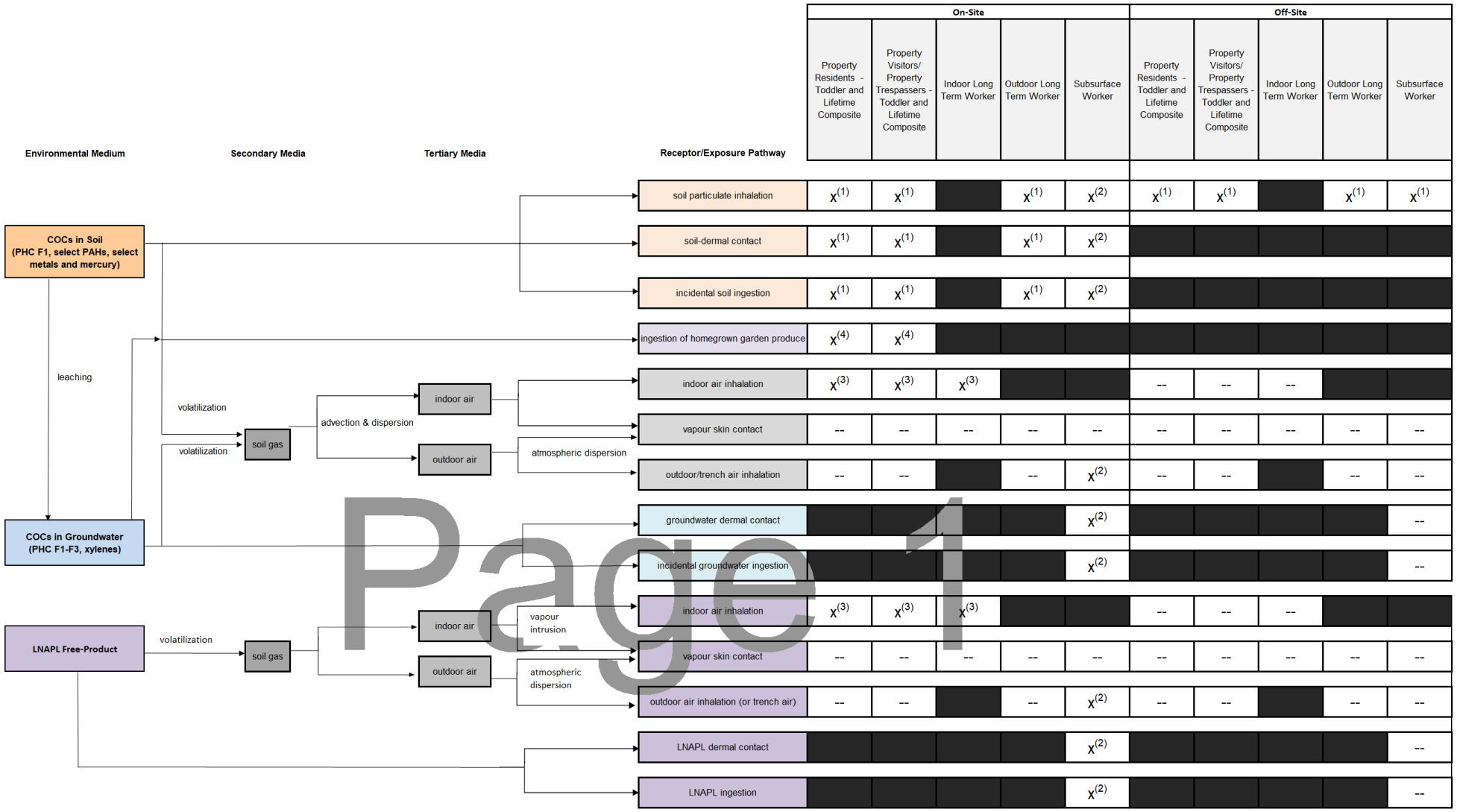
TITLE AND LOCATION:

Human Health Conceptual Exposure Model Without Risk Management Measures

Phase Two Environmental Site Assessment Update
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: SP
SCALE: AS NOTED	CHKD: SP
DATE: JAN 2024	FIG. No.: 21A



Page 1

Legend:

	Pathway is incomplete
X	Pathway is blocked by RMM
--	Pathway is complete but unacceptable risks are not anticipated

RMM required on-Site (subject to MECP approval):
(1) Hard cap/fill cap
(2) Health and safety plan
(3) Engineered measures for vapour intrusion mitigation
(4) Garden produce restriction

A soil and groundwater management plan is also required for the Site.

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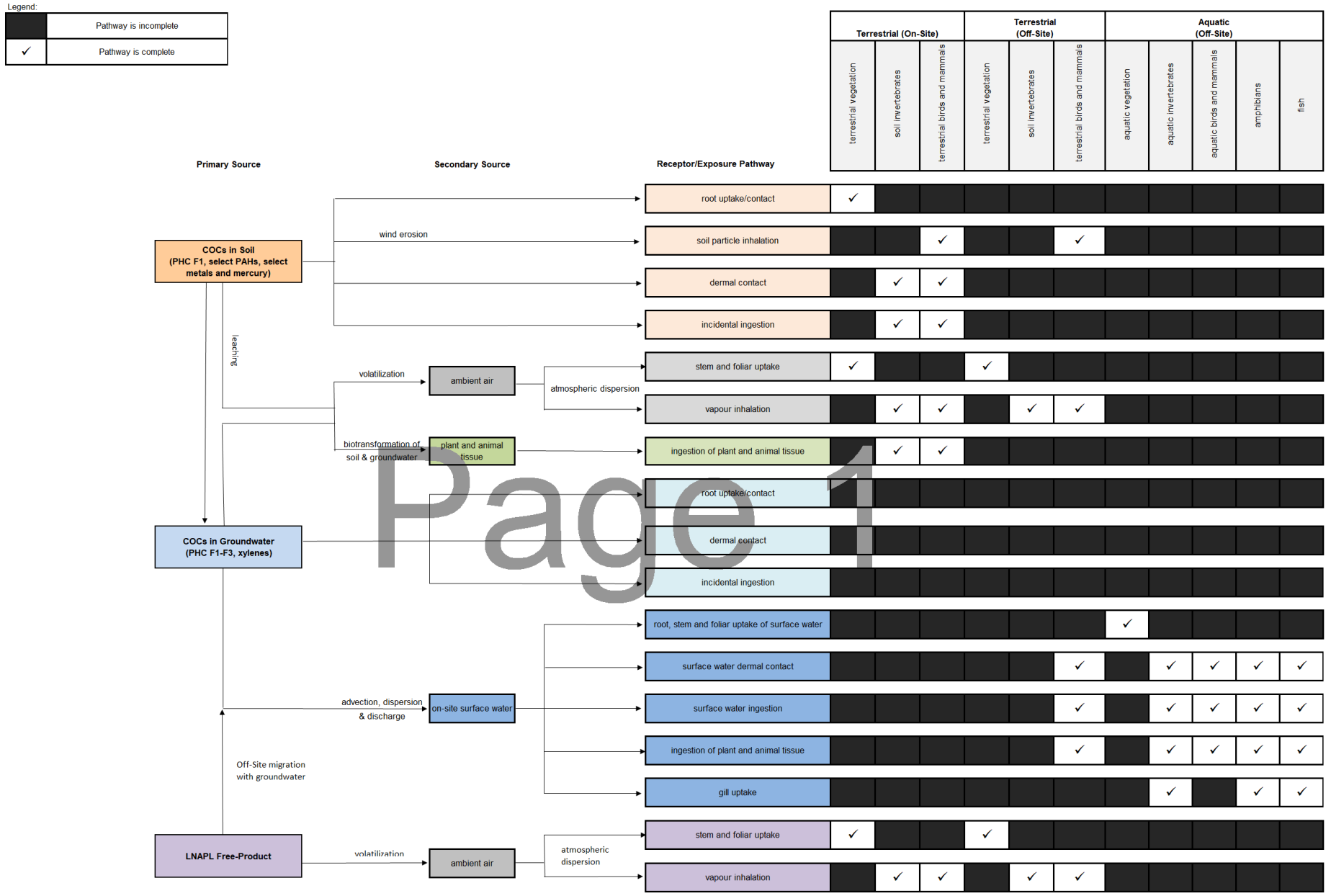
TITLE AND LOCATION:

Human Health Conceptual Exposure Model With Risk Management Measures

Phase Two Environmental Site Assessment Update
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: SP
SCALE: AS NOTED	CHKD: SP
DATE: JAN 2024	FIG. No.: 21B



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TITLE AND LOCATION:

Ecological Health Conceptual Exposure Model Without Risk Management Measures

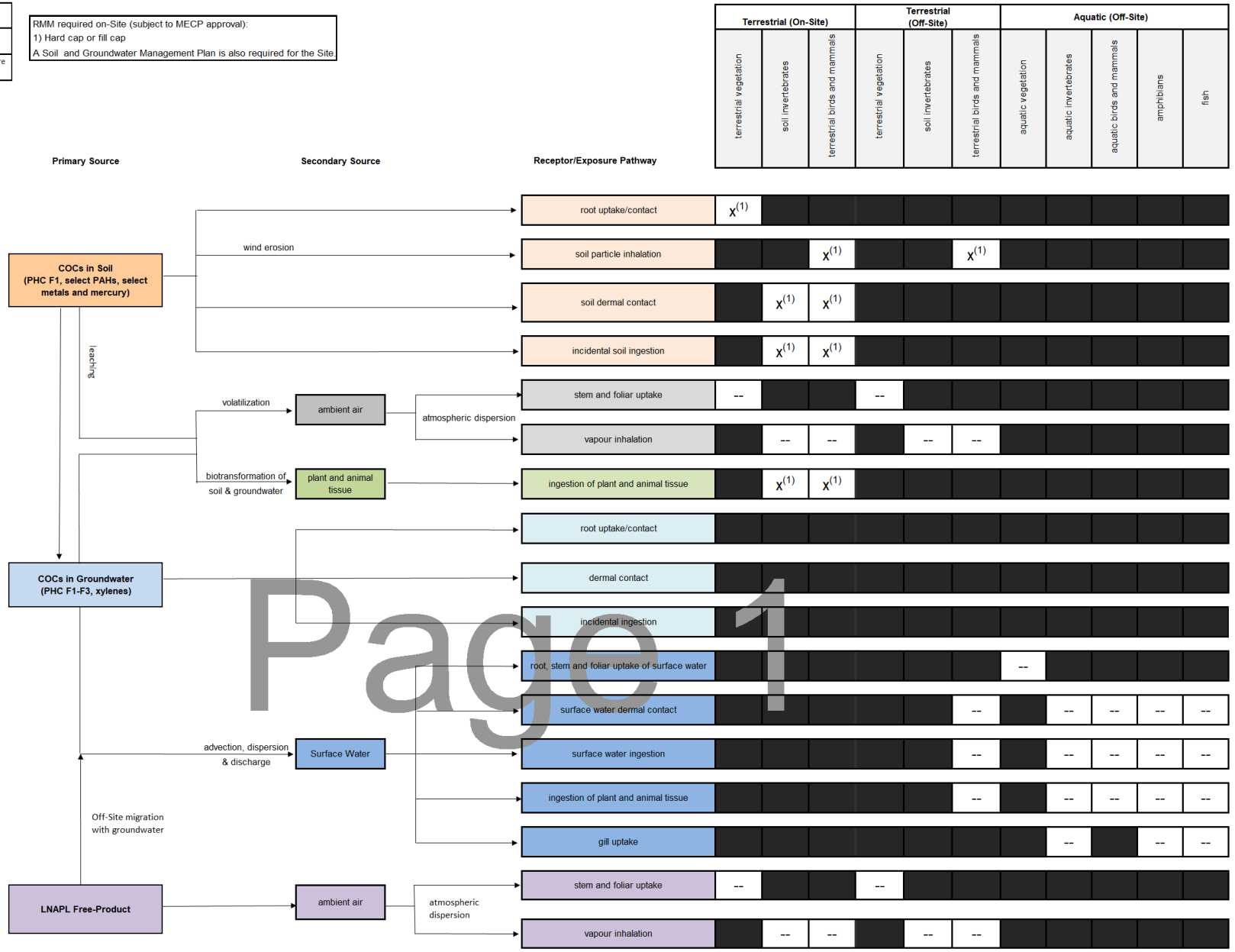
Phase Two Environmental Site Assessment Update
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: SP
SCALE: AS NOTED	CHKD: SP
DATE: JAN 2024	FIG. No.: 22A

Legend:

	Pathway is incomplete
x	Pathway is blocked by RMM
--	Pathway is complete but unacceptable risks are not anticipated

RMM required on-Site (subject to MECP approval):
1) Hard cap or fill cap
A Soil and Groundwater Management Plan is also required for the Site.



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TITLE AND LOCATION:

Ecological Health Conceptual Exposure Model With Risk Management Measures

Phase Two Environmental Site Assessment Update
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: SP
SCALE: AS NOTED	CHKD: SP
DATE: JAN 2024	FIG. No.: 22B

Appendix C: Contaminant Inventory and Data Tables

TABLE C.1: CONTAMINANT INVENTORY FOR FULL DEPTH SOIL
15 Denison Ave, Toronto, Avenue
GTR-21018382-B0

Contaminant Identifier	Contaminant	Maximum Measured Concentration	Units	Minimum Reporting Detection Limit (MDL)	MECP Table 3 SCS Residential Property Use and Medium/Fine Textured Soil	Potential for Exceedence of Applicable SCSs at nearest off-Site receptors?		Retained as a contaminant for RA?	
						Yes	No	Yes	No
PHCF1	PHC F1 (C6-C10) - BTEX	255	µg/g	5	65		X	X	
PHCF2	PHC F2 (C10-C16)	<10	µg/g	10	150		X		X
PHCF3	PHC F3 (C16-C34)	<50	µg/g	50	1,300		X		X
PHCF4	PHC F4 (C34-C50)	<50	µg/g	50	5,600		X		X
67641	Acetone	<0.50	µg/g	0.49	28		X		X
71432	Benzene	<0.05	µg/g	0.0060	0.17		X		X
75274	Bromodichloromethane	<0.05	µg/g	0.04	13		X		X
75252	Bromoform	<0.05	µg/g	0.04	0.26		X		X
74839	Bromomethane	<0.05	µg/g	0.04	0.05		X		X
56235	Carbon Tetrachloride	<0.05	µg/g	0.04	0.12		X		X
108907	Chlorobenzene	<0.05	µg/g	0.04	2.7		X		X
67663	Chloroform	0.059	µg/g	0.04	0.18		X		X
124481	Dibromochloromethane	<0.05	µg/g	0.04	9.4		X		X
95501	1,2-Dichlorobenzene	<0.05	µg/g	0.04	4.3		X		X
541731	1,3-Dichlorobenzene	<0.05	µg/g	0.04	6		X		X
106467	1,4-Dichlorobenzene	<0.05	µg/g	0.04	0.097		X		X
75718	Dichlorodifluoromethane	<0.05	µg/g	0.04	25		X		X
75343	1,1-Dichloroethane	<0.05	µg/g	0.02	11		X		X
107062	1,2-Dichloroethane	<0.05	µg/g	0.03	0.05		X		X
75354	1,1-Dichloroethylene	<0.05	µg/g	0.04	0.05		X		X
156592	Cis-1,2-Dichloroethylene	<0.05	µg/g	0.02	30		X		X
156605	Trans-1,2-Dichloroethylene	<0.05	µg/g	0.04	0.75		X		X
78875	1,2-Dichloropropane	<0.05	µg/g	0.03	0.085		X		X
542756	1,3-Dichloropropene (cis + trans)	<0.05	µg/g	0.04	0.083		X		X
100414	Ethylbenzene	0.86	µg/g	0.01	15		X		X
106934	Ethylene Dibromide (1,2-Dibromoethane)	<0.05	µg/g	0.04	0.05		X		X
11053	Hexane (n)	<0.05	µg/g	0.04	34		X		X
75092	Methylene chloride (Dichloromethane)	<0.05	µg/g	0.049	0.96		X		X
78933	Methyl ethyl ketone (2-Butanone)	<0.50	µg/g	0.4	44		X		X
108101	Methyl Isobutyl Ketone	<0.50	µg/g	0.40	4.3		X		X
1634044	Methyl t-butyl ether (MTBE)	<0.05	µg/g	0.04	1.4		X		X
100425	Styrene	<0.05	µg/g	0.04	2.2		X		X
630206	1,1,1,2-Tetrachloroethane	<0.05	µg/g	0.04	0.05		X		X
79345	1,1,2,2-Tetrachloroethane	<0.05	µg/g	0.04	0.05		X		X
127184	Tetrachloroethylene	0.27	µg/g	0.04	2.3		X		X
108883	Toluene	<0.05	µg/g	0.020	6		X		X
71556	1,1,1-Trichloroethane	<0.05	µg/g	0.04	3.4		X		X
79005	1,1,2-Trichloroethane	<0.05	µg/g	0.04	0.05		X		X
79016	Trichloroethylene	<0.05	µg/g	0.01	0.52		X		X
75694	Trichlorofluoromethane	<0.05	µg/g	0.04	5.8		X		X
75014	Vinyl Chloride	<0.02	µg/g	0.019	0.022		X		X
1330207	Xylenes (total)	1.4	µg/g	0.02	25		X		X
83329	Acenaphthene	0.88	µg/g	0.0050	58		X		X
208968	Acenaphthylene	1.9	µg/g	0.0050	0.17		X	X	
120127	Anthracene	5.6	µg/g	0.0050	0.74		X	X	
56553	Benzo(a)anthracene	18	µg/g	0.0050	0.63		X	X	
50328	Benzo(a)pyrene	14	µg/g	0.0050	0.3		X	X	
205992	Benzo(b)fluoranthene	17	µg/g	0.0050	0.78		X	X	
191242	Benzo(ghi)perylene	7.8	µg/g	0.0050	7.8		X		X
207089	Benzo(k)fluoranthene	6.4	µg/g	0.0050	0.78		X	X	
218019	Chrysene	14	µg/g	0.0050	7.8		X	X	
53703	Dibenz(a,h)anthracene	2.1	µg/g	0.0050	0.1		X	X	
206440	Fluoranthene	40	µg/g	0.0050	0.69		X	X	
86737	Fluorene	1.22	µg/g	0.0050	69		X		X
193395	Indeno(1,2,3-cd)pyrene	8.5	µg/g	0.0050	0.48		X	X	
91576	1&2-Methylnaphthalene	0.47	µg/g	0.0071	3.4		X		X
91203	Naphthalene	0.142	µg/g	0.0050	0.75		X		X
85018	Phenanthrene	23	µg/g	0.0050	7.8		X	X	
129000	Pyrene	37	µg/g	0.0050	78		X		X
7440360	Antimony	4.3	µg/g	0.20	7.5		X		X
7440382	Arsenic	14	µg/g	1.0	18		X		X
7440393	Barium	519	µg/g	0.50	390		X	X	
7440417	Beryllium	1	µg/g	0.20	5		X		X
7440428	Boron (Total)	28	µg/g	5.0	120		X		X
7440428HWS	Boron (Hot water soluble)	1.4	µg/g	0.050	1.5		X		X
7440439	Cadmium	1	µg/g	0.10	1.2		X		X
16065831	Chromium (total)	43	µg/g	1.0	160		X		X
18540299	Chromium VI	4.4	µg/g	0.18	10		X		X
7440484	Cobalt	14.5	µg/g	0.10	22		X		X
7440508	Copper	1300	µg/g	0.50	180		X	X	
7439921	Lead	510	µg/g	1.0	120		X	X	
7439976	Mercury	1.9	µg/g	0.050	1.8		X	X	
22967926	Methyl Mercury	0.00012	µg/g	0.000057	0.0094		X		X
7439987	Molybdenum	2.8	µg/g	0.50	6.9		X		X
7440020	Nickel	29	µg/g	0.50	130		X		X
7782492	Selenium	1.2	µg/g	0.50	2.4		X		X
7440224	Silver	0.6	µg/g	0.20	25		X		X
7440280	Thallium	<0.5	µg/g	0.050	1		X		X
7440611	Uranium	1.11	µg/g	0.050	23		X		X
7440622	Vanadium	53.8	µg/g	5.0	86		X		X
7440666	Zinc	550	µg/g	5.0	340		X	X	
EC	Electrical Conductivity (mS/cm)	4.94	mS/cm	0.002	0.7		X		X
SAR	Sodium Adsorption Ratio (unitless)	105	unitless	N/A	5		X		X
57125	Free Cyanide	<0.04	µg/g	0.010	0.051		X		X
NV	pH (pH units)	7.17 - 8.90	pH units	NA	5-9 (surface soil); 5-11 (subsurface soil)		X		X

Concentration within the Table 3 SCS.
Concentration exceeds the Table 3 SCS and will be retained as COC in the RA.
Concentration exceeds applicable MECP Standards; however, salt-related parameters are not considered as COCs due to amendments to the Regulation (O.Reg. 407/19 - December 4, 2019) .

TABLE C.2: CONTAMINANT INVENTORY FOR FULL GROUNDWATER
15 Denison Ave, Toronto, Avenue
GTR-21018382-A0

Contaminant Identifier	Contaminant	Maximum Measured Concentration	Units	Minimum Reported Detection Limit	MECP Table 3 SCS Residential Property Use and Medium/Fine Textured Soil	Potential for Exceedence of Applicable SCSs at nearest off-Site receptors?		Retained as a contaminant for RA?	
						Yes	No	Yes	No
PHCF1	PHC F1 (C6-C10) - BTEX	213,000	µg/L	25	750	X[1]		X	
PHCF2	PHC F2 (C10-C16)	160,000	µg/L	100	150	X[1]		X	
PHCF3	PHC F3 (C16-C34)	1,500	µg/L	100	500	X[1]		X	
PHCF4	PHC F4 (C34-C50)	280	µg/L	100	500		X		X
67641	Acetone	<10	µg/L	1.0	130,000		X		X
71432	Benzene	4.96	µg/L	0.20	430		X		X
75274	Bromodichloromethane	<2.00	µg/L	0.20	85,000		X		X
75252	Bromoform	<1.00	µg/L	0.10	770		X		X
74839	Bromomethane	<2.00	µg/L	0.20	56		X		X
56235	Carbon Tetrachloride	<2.00	µg/L	0.20	8.4		X		X
108907	Chlorobenzene	<1.00	µg/L	0.10	630		X		X
67663	Chloroform	3.59	µg/L	0.20	22		X		X
124481	Dibromochloromethane	<1.00	µg/L	0.10	82,000		X		X
95501	1,2-Dichlorobenzene	<1.00	µg/L	0.10	9,600		X		X
541731	1,3-Dichlorobenzene	<1.00	µg/L	0.10	9,600		X		X
106467	1,4-Dichlorobenzene	<1.00	µg/L	0.10	67		X		X
75718	Dichlorodifluoromethane	<2.00	µg/L	0.20	4,400		X		X
75343	1,1-Dichloroethane	<3.00	µg/L	0.30	3,100		X		X
107062	1,2-Dichloroethane	<2.00	µg/L	0.20	12		X		X
75354	1,1-Dichloroethylene	<3.00	µg/L	0.30	17		X		X
156592	cis-1,2-Dichloroethylene	<2.00	µg/L	0.20	17		X		X
156605	trans-1,2-Dichloroethylene	<2.00	µg/L	0.20	17		X		X
78875	1,2-Dichloropropane	<2.00	µg/L	0.20	140		X		X
542756	1,3-Dichloropropene	<0.50	µg/L	0.30	45		X		X
100414	Ethylbenzene	516	µg/L	0.10	2,300		X		X
106934	Ethylene Dibromide (1,2-Dibromoethane)	<1.00	µg/L	0.10	0.83		X		X
11053	Hexane (n)	<2.00	µg/L	0.20	520		X		X
75092	Methylene chloride (Dichloromethane)	<3.00	µg/L	0.30	5,500		X		X
78933	Methyl ethyl ketone (2-Butanone)	<10.0	µg/L	1.0	1,500,000		X		X
108101	Methyl Isobutyl Ketone	<10.0	µg/L	1.0	580,000		X		X
1634044	Methyl t-butyl ether (MTBE)	<2.00	µg/L	0.20	1,400		X		X
100425	Styrene	<18	µg/L	0.10	9,100		X		X
630206	1,1,1,2-Tetrachloroethane	<1.00	µg/L	0.10	28		X		X
79345	1,1,2,2-Tetrachloroethane	<1.00	µg/L	0.10	15		X		X
127184	Tetrachloroethylene	<2.00	µg/L	0.20	17		X		X
108883	Toluene	65	µg/L	0.20	18,000		X		X
71556	1,1,1-Trichloroethane	<3.00	µg/L	0.30	6,700		X		X
79005	1,1,2-Trichloroethane	<2.00	µg/L	0.20	30		X		X
79016	Trichloroethylene	<2.00	µg/L	0.20	17		X		X
75694	Trichlorofluoromethane	<4.00	µg/L	0.40	2,500		X		X
75014	Vinyl Chloride	<1.70	µg/L	0.17	1.7		X		X
1330207	Xylenes (total)	4,640	µg/L	0.20	4,200	X[1]		X	
83329	Acenaphthene	0.29	µg/L	0.05	1700		X		X
208968	Acenaphthylene	<0.20	µg/L	0.05	1.8		X		X
120127	Anthracene	<0.10	µg/L	0.05	2.4		X		X
56553	Benzo(a)anthracene	<0.20	µg/L	0.05	4.7		X		X
50328	Benzo(a)pyrene	<0.01	µg/L	0.009	0.81		X		X
205992	Benzo(b)fluoranthene	<0.10	µg/L	0.05	0.75		X		X
191242	Benzo(ghi)perylene	<0.20	µg/L	0.05	0.2		X		X
207089	Benzo(k)fluoranthene	<0.10	µg/L	0.05	0.4		X		X
218019	Chrysene	<0.10	µg/L	0.05	1		X		X
53703	Dibenz(a,h)anthracene	<0.20	µg/L	0.05	0.52		X		X
206440	Fluoranthene	0.78	µg/L	0.05	130		X		X
86737	Fluorene	0.27	µg/L	0.05	400		X		X
193395	Indeno(1,2,3-cd)pyrene	<0.20	µg/L	0.05	0.2		X		X
91576	1&2-Methylnaphthalene	41	µg/L	0.071	1800		X		X
91203	Naphthalene	48.8	µg/L	0.05	6,400		X		X
85018	Phenanthrene	0.31	µg/L	0.03	580		X		X
129000	Pyrene	0.62	µg/L	0.05	68		X		X
7440360	Antimony	1.2	µg/L	1.0	20,000		X		X
7440382	Arsenic	3.8	µg/L	1.0	1,900		X		X
7440393	Barium	712	µg/L	2.0	29,000		X		X
7440417	Beryllium	<0.5	µg/L	0.5	67		X		X
7440428	Boron (Total)	711	µg/L	10	45,000		X		X
7440439	Cadmium	<0.20	µg/L	0.20	2.7		X		X
16065831	Chromium (total)	<2.0	µg/L	2.0	810		X		X
18540299	Chromium VI	3.41	µg/L	2.00	140		X		X
7440484	Cobalt	1.76	µg/L	0.50	66		X		X
7440508	Copper	5.10	µg/L	1.0	87		X		X
7439921	Lead	0.5	µg/L	0.50	25		X		X
7439976	Mercury	<0.02	µg/L	0.02	2.8		X		X
7439987	Molybdenum	93.3	µg/L	0.5	9,200		X		X
7440020	Nickel	5	µg/L	1.0	490		X		X
7782492	Selenium	5	µg/L	1.0	63		X		X
7440224	Silver	<0.20	µg/L	0.20	1.5		X		X
7440280	Thallium	<0.30	µg/L	0.30	510		X		X
7440611	Uranium	4.63	µg/L	0.50	420		X		X
7440622	Vanadium	1.28	µg/L	0.40	250		X		X
7440666	Zinc	297	µg/L	5.0	1,100		X		X
7440235	Sodium	126,000	µg/L	250	2,300,000		X		X
16887006	Chloride	227,000	µg/L	100	2,300,000		X		X
57125	Free Cyanide	<0.001	ug/L	0.001	66		X		X

Parameter within current applicable MECP Standards.
Parameter exceeds the Table 3 SCS and will be retained as a COC in the RA.
Non-detect but detection limit exceeds the applicable MECP (2011) SCS. However, this parameter is not considered a COC at the Site. Refer to Phase Two CSM in Appendix A for further details.
Parameter exceeds Table 3 and/or 7 SCS but will not be retained as COC in the RA. See Phase Two CSM for a rationale.

1 There is potential for exceedence of applicable SCSs at nearest off-Site receptors upgradient of the Site. However, the PHC and xylene exceedances in groundwater appear to be migrating on-Site from a source northeast of the Site and do not appear to be migrating across the Site at concentrations that would exceed the applicable SCS at the nearest downgradient off-Site property.

SOIL ANALYTICAL RESULTS:

Table C.3 - SOIL ANALYTICAL RESULTS- Petroleum Hydrocarbons (PHCs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH101-2A (2020)	BH102-2A (2020)	BH103-2A (2020)	BH104-1B (2020)	BH104-6 (2020)	BH105-2 (2020)	BH106-2B (2020)
Lab ID			MMM510	MMM513	MMM515	MMW528	MMW529	MMM519	MMM522
Sampling Date			22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20
Soil Sample Depth (m)			0.8-1.1	0.8-1.1	0.8-1.1	0.3 - 0.6	3.8 - 4.4	0.8-1.1	1.1-1.4
Consultant			Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex
Laboratory			BV	BV	BV	BV	BV	BV	BV
Certificate of Analysis Number			C099980	C099980	C099980	C0A1969	C0A1969	C099980	C099980
PHC F1 (C6-C10)	65	5	<10	<10	<10	<10	<10	<10	<10
PHC F1 (C6-C10) - BTEX	65	5	<10	<10	<10	<10	<10	<10	<10
PHC F2 (C10-C16)	150	10	<10	<10	<10	<10	<10	<10	<10
PHC F3 (C16-C34)	1300	50	<50	<50	<50	<50	<50	<50	<50
PHC F4 (C34-C50)	5600	50	<50	<50	<50	<50	<50	<50	<50
Reached baseline at C50?	NV	NV	YES	YES	YES	YES	YES	YES	YES
PHC F4 (C34-C50)-gravimetric	5600	-	-	-	-	-	-	-	-

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011

2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only

3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceriticate of Analysis which contains all QA/QC information

SOIL ANALYTICAL RESULTS:

Table C.3 - SOIL ANALYTICAL RESULTS- Petroleum Hydrocarbons (PHCs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH107-2 (2020)	BH9107-2 (2020) (DUP of BH107-2)	BH108-3 (2020)	BH1 SS5	BH2 SS6	BH3 SS5	BH4 SS6
Lab ID			MMM525	MMM526	MMM529	3331908	3331916	3331910	3331912
Sampling Date			22-Apr-20	22-Apr-20	22-Apr-20	6-Dec-21	10-Dec-21	6-Dec-21	7-Dec-21
Soil Sample Depth (m)			0.8-1.4	0.8-1.4	1.5-2.1	3.05-3.66	4.57-5.18	3.05-3.66	4.57-5.18
Consultant			Terrapex	Terrapex	Terrapex	EXP	EXP	EXP	EXP
Laboratory			BV	BV	BV	AGAT	AGAT	AGAT	AGAT
Certificate of Analysis Number			C099980	C099980	C099980	21T843367	21T843367	21T843367	21T843367
PHC F1 (C6-C10)	65	5	<10	<10	<10	<5	<5	<5	<5
PHC F1 (C6-C10) - BTEX	65	5	<10	<10	<10	<5	<5	<5	<5
PHC F2 (C10-C16)	150	10	<10	<10	<10	<10	<10	<10	<10
PHC F3 (C16-C34)	1300	50	<50	<50	<50	<50	<50	<50	<50
PHC F4 (C34-C50)	5600	50	<50	<50	<50	<50	<50	<50	<50
Reached baseline at C50?	NV	NV	YES	YES	YES	YES	YES	YES	YES
PHC F4 (C34-C50)-gravimetric	5600	-	-	-	-	-	-	-	-

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011

2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only

3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceriticate of Analysis which contains all QA/QC information

SOIL ANALYTICAL RESULTS:

Table C.3 - SOIL ANALYTICAL RESULTS- Petroleum Hydrocarbons (PHCs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH5 SS6	BH104 SS5	BH105 SS5	BH106 SS9	MW 107 SS7
Lab ID			3331914	3492141	3492120	3497899	3501471
Sampling Date			9-Dec-21	7-Feb-22	7-Feb-22	8-Feb-22	9-Feb-22
Soil Sample Depth (m)			4.57-5.18	3.05-3.66	3.05-3.66	8.38-8.99	5.18-5.79
Consultant			EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	AGAT	AGAT	AGAT	AGAT
Certificate of Analysis Number			21T843367	22T861405	22T861405	22T861802	22T862183
PHC F1 (C6-C10)	65	5	**257**	<5	<5	<5	<5
PHC F1 (C6-C10) - BTEX	65	5	**255**	<5	<5	<5	<5
PHC F2 (C10-C16)	150	10	<10	<10	<10	<10	<10
PHC F3 (C16-C34)	1300	50	<50	<50	<50	<50	<50
PHC F4 (C34-C50)	5600	50	<50	<50	<50	<50	<50
Reached baseline at C50?	NV	NV	YES	YES	YES	YES	YES
PHC F4 (C34-C50)-gravimetric	5600	-	-	-	-	-	-

All soil concentrations reported in μg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011

2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only

3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceriticate of Analysis which contains all QA/QC information

SOIL ANALYTICAL RESULTS:

Table C.4 - SOIL ANALYTICAL RESULTS- Benzene, Toulene, Ethylbenzene, and Xylene (BTEX)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH1 SS5	BH2 SS6	BH3 SS5	BH4 SS6
Lab ID			3331908	3331916	3331910	3331912
Sampling Date			6-Dec-21	10-Dec-21	6-Dec-21	7-Dec-21
Soil Sample Depth (m)			3.05-3.66	4.57-5.18	3.05-3.66	4.57-5.18
Consultant			EXP	EXP	EXP	EXP
Laboratory			AGAT	AGAT	AGAT	AGAT
Certificate of Analysis Number			21T843367	21T843367	21T843367	21T843367
Benzene	0.17	0.02	<0.02	<0.02	<0.02	<0.02
Toluene	6	0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	15	0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (total)	25	0.05	<0.05	<0.05	<0.05	<0.05

All soil concentrations reported in μg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011

2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only

3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceriticate of Analysis which contains all QA/QC information

SOIL ANALYTICAL RESULTS:

Table C.4 - SOIL ANALYTICAL RESULTS- Benzene, Toulene, Ethylbenzene, and Xylene

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH5 SS6	BH104 SS5	BH105 SS5	BH106 SS9	MW 107 SS7
Lab ID			3331914	3492141	3492120	3497899	3501471
Sampling Date			9-Dec-21	7-Feb-22	7-Feb-22	8-Feb-22	9-Feb-22
Soil Sample Depth (m)			4.57-5.18	3.05-3.66	3.05-3.66	8.38-8.99	5.18-5.79
Consultant			EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	AGAT	AGAT	AGAT	AGAT
Certificate of Analysis Number			21T843367	22T861405	22T861802	22T861405	22T862183
Benzene	0.17	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	15	0.05	0.86	<0.05	<0.05	<0.05	<0.05
Xylenes (total)	25	0.05	1.4	<0.05	<0.05	<0.05	<0.05

All soil concentrations reported in μg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011

2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only

3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceriticate of Analysis which contains all QA/QC information

SOIL ANALYTICAL RESULTS:

Table C.5 - SOIL ANALYTICAL RESULTS- Volatile Organic Compounds (VOCs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH101-2A (2020)	BH101-6 (2020)	BH102-2A (2020)	BH102-5 (2020)	BH103-2A (2020)	BH104-1B (2020)	BH104-6 (2020)	BH105-2 (2020)	BH106-2B (2020)
Lab ID			MMM510	MMM511	MMM513	MMM514	MMM515	MMW528	MMW529	MMM519	MMM522
Sampling Date			22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20
Soil Sample Depth (m)			0.8-1.1	3.8-4.4	0.8-1.1	3.1-3.6	0.8-1.1	0.3 - 0.6	3.8 - 4.4	0.8-1.1	1.1-1.4
Consultant			Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex
Laboratory			BV	BV	BV	BV	BV	BV	BV	BV	BV
Certificate of Analysis Number			C099980	C099980	C099980	C099980	C099980	C0A1969	C0A1969	C099980	C099980
cis- & trans-1,3-Dichloropropene	0.083	0.04	<0.050	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acetone	28	0.49	<0.50	<0.49	<0.50	<0.49	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	0.17	0.006	<0.050	<0.0060	<0.020	<0.0060	<0.050	<0.020	<0.020	<0.050	<0.050
Bromodichloromethane	13	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	0.26	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane	0.05	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	0.12	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	2.7	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroform	0.18	0.04	<0.050	<0.040	0.059	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	9.4	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	4.3	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	6	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	0.097	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane	25	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	11	0.02	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	0.05	0.03	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	0.05	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	30	0.02	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	0.75	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	0.085	0.03	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	15	0.01	<0.020	<0.010	<0.020	<0.010	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylene Dibromide (1,2-Dibromoethane)	0.05	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Hexane (n)	34	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Methylene chloride (Dichloromethane)	0.96	0.049	<0.050	<0.049	<0.050	<0.40	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl ethyl ketone (2-Butanone)	44	0.4	<0.50	<0.40	<0.50	<0.40	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	4.3	0.4	<0.50	<0.40	<0.50	<0.040	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl t-butyl ether (MTBE)	1.4	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Styrene	2.2	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	0.05	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	0.05	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	2.3	0.04	0.27	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	6	0.02	0.027	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
1,1,1-Trichloroethane	3.4	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	0.05	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	0.52	0.01	<0.050	<0.010	<0.050	<0.010	<0.050	<0.050	<0.050	<0.050	<0.050
Trichlorofluoromethane	5.8	0.04	<0.050	<0.040	<0.050	<0.040	<0.050	<0.050	<0.050	<0.050	<0.050
Vinyl Chloride	0.022	0.019	<0.020	<0.019	<0.020	<0.019	<0.020	<0.020	<0.020	<0.020	<0.020
m-Xylene + p-Xylene	NV	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene	NV	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes (Total)	25	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011

2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only

3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceritificate of Analysis which contains all QA/QC information

SOIL ANALYTICAL RESULTS:
Table C.5 - SOIL ANALYTICAL RESULTS- Volatile Organic Compounds (VOCs)
GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH107-2 (2020)	BH9107-2 (2020) (DUP of BH107-2)	BH108-3 (2020)	BH1 SS5	BH2 SS6	BH3 SS5	BH4 SS6	BH5 SS6	Methanol Blank
Lab ID			MMM525	MMM526	MMM529	3331908	3331916	3331910	3331912	3331914	MMM531
Sampling Date			22-Apr-20	22-Apr-20	22-Apr-20	6-Dec-21	10-Dec-21	6-Dec-21	7-Dec-21	9-Dec-21	22-Apr-20
Soil Sample Depth (m)			0.8-1.4	0.8-1.4	1.5-2.1	3.05-3.66	4.57-5.18	3.05-3.66	4.57-5.18	4.57-5.18	-
Consultant			Terrapex	Terrapex	Terrapex	EXP	EXP	EXP	EXP	EXP	Terrapex
Laboratory			BV	BV	BV	AGAT	AGAT	AGAT	AGAT	AGAT	BV
Certificate of Analysis Number			C099980	C099980	C099980	21T843367	21T843367	21T843367	21T843367	21T843367	C099980
cis- & trans-1,3-Dichloropropene	0.083	0.04	<0.050	<0.050	<0.050	<0.04	<0.04	<0.04	<0.04	<0.04	<0.05
Acetone	28	0.49	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49
Benzene	0.17	0.006	<0.050	<0.050	<0.050	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0060
Bromodichloromethane	13	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Bromoform	0.26	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Bromomethane	0.05	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Carbon Tetrachloride	0.12	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Chlorobenzene	2.7	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Chloroform	0.18	0.04	<0.050	<0.050	<0.050	<0.04	<0.04	<0.04	<0.04	<0.04	<0.040
Dibromochloromethane	9.4	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
1,2-Dichlorobenzene	4.3	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
1,3-Dichlorobenzene	6	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
1,4-Dichlorobenzene	0.097	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Dichlorodifluoromethane	25	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
1,1-Dichloroethane	11	0.02	<0.050	<0.050	<0.050	<0.02	<0.02	<0.02	<0.02	<0.02	<0.040
1,2-Dichloroethane	0.05	0.03	<0.050	<0.050	<0.050	<0.03	<0.03	<0.03	<0.03	<0.03	<0.040
1,1-Dichloroethylene	0.05	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
cis-1,2-Dichloroethylene	30	0.02	<0.050	<0.050	<0.050	<0.02	<0.02	<0.02	<0.02	<0.02	<0.040
trans-1,2-Dichloroethylene	0.75	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
1,2-Dichloropropane	0.085	0.03	<0.050	<0.050	<0.050	<0.03	<0.03	<0.03	<0.03	<0.03	<0.040
Ethylbenzene	15	0.01	<0.020	<0.020	<0.020	<0.05	<0.05	<0.05	<0.05	0.86	<0.010
Ethylene Dibromide (1,2-Dibromoethane)	0.05	0.04	<0.050	<0.050	<0.050	<0.04	<0.04	<0.04	<0.04	<0.04	<0.040
Hexane (n)	34	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Methylene chloride (Dichloromethane)	0.96	0.049	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.049
Methyl ethyl ketone (2-Butanone)	44	0.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.40
Methyl Isobutyl Ketone	4.3	0.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.40
Methyl t-butyl ether (MTBE)	1.4	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Styrene	2.2	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
1,1,1,2-Tetrachloroethane	0.05	0.04	<0.050	<0.050	<0.050	<0.04	<0.04	<0.04	<0.04	<0.04	<0.040
1,1,2,2-Tetrachloroethane	0.05	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Tetrachloroethylene	2.3	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Toluene	6	0.02	<0.020	<0.020	<0.020	<0.05	<0.05	<0.05	<0.05	<0.05	<0.020
1,1,1-Trichloroethane	3.4	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
1,1,2-Trichloroethane	0.05	0.04	<0.050	<0.050	<0.050	<0.04	<0.04	<0.04	<0.04	<0.04	<0.040
Trichloroethylene	0.52	0.01	<0.050	<0.050	<0.050	<0.03	<0.03	<0.03	<0.03	<0.03	<0.010
Trichlorofluoromethane	5.8	0.04	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.040
Vinyl Chloride	0.022	0.019	<0.020	<0.020	<0.020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.019
m-Xylene + p-Xylene	NV	0.02	<0.020	<0.020	<0.020	<0.05	<0.05	<0.05	<0.05	0.92	<0.020
o-Xylene	NV	0.02	<0.020	<0.020	<0.020	<0.05	<0.05	<0.05	<0.05	0.48	<0.020
Xylenes (Total)	25	0.02	<0.020	<0.020	<0.020	<0.05	<0.05	<0.05	<0.05	1.4	<0.020

All soil concentrations reported in µg/g.
'<' = Parameter below detection limit, as indicated
'NV'= No value
Bold Concentration exceeds MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011

2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only

3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceritificate of Analysis which contains all QA/QC information

SOIL ANALYTICAL RESULTS:

Table C.6 - SOIL ANALYTICAL RESULTS- Polycyclic Aromatic Hydrocarbons (PAHs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH101-1B (2020)	BH101-6 (2020)	BH102-1B (2020)	BH102-5 (2020)	BH103-2A (2020)	BH104-1B (2020)	BH104-6 (2020)	BH105-1B (2020)	BH9105-1B (2020) (DUP of BH105-1B)	BH106-2A (2020)	BH107-1B (2020)	BH108-1B (2020)	BH108-5 (2020)	BH1 SS1
Lab ID			MMM509	MMM511	MMM512	MMM514	MMM515	MMW528	MMW529	MMM515	MMM518	MMM521	MMM524	MMM528	MMM530	3331907
Sampling Date			22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	6-Dec-21
Soil Sample Depth (m)			0.3-0.6	3.8-4.4	0.3-0.6	3.1-3.6	0.8-1.1	0.3 - 0.6	3.8 - 4.4	0.3-0.6	0.3-0.6	0.8-1.1	0.3-0.6	0.3-0.6	3.1-3.6	0.15-0.76
Consultant			Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	EXP
Laboratory			BV	BV	BV	BV	BV	BV	BV	BV	BV	BV	BV	BV	BV	AGAT
Certificate of Analysis Number			C099980	C099980	C099980	C099980	C099980	C0A1969	C0A1969	C099980	C099980	C099980	C099980	C099980	C099980	22T862183
Naphthalene	0.75	0.005	0.011	<0.0050	0.01	<0.0050	<0.0050	0.0081	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	0.11	<0.0050	<0.05
Acenaphthylene	0.17	0.005	0.11	<0.0050	0.074	<0.0050	<0.0050	0.054	<0.005	0.019	<0.0050	0.01	0.0096	**1.90**	<0.0050	<0.05
Acenaphthene	58	0.005	0.022	<0.0050	0.015	<0.0050	<0.0050	0.023	<0.005	0.007	<0.0050	0.012	<0.0050	0.61	<0.0050	<0.05
Fluorene	69	0.005	0.024	<0.0050	0.015	<0.0050	<0.0050	0.021	<0.005	0.007	<0.0050	0.012	<0.0050	0.87	<0.0050	<0.05
Phenanthrene	7.8	0.005	0.45	<0.0050	0.25	<0.0050	<0.0050	0.27	<0.005	0.14	<0.0050	0.19	0.043	**23**	<0.0050	0.64
Anthracene	0.74	0.005	0.12	<0.0050	0.015	<0.0050	<0.0050	0.085	<0.005	0.037	<0.0050	0.053	0.013	**5.6**	<0.0050	0.16
Fluoranthene	0.69	0.005	**1**	<0.0050	0.63	<0.0050	<0.0050	**0.79**	<0.005	0.32	0.0053	0.53	0.12	**40**	<0.0050	**1.43**
Pyrene	78	0.005	1.1	<0.0050	0.64	<0.0050	<0.0050	0.78	<0.005	0.33	0.0057	0.45	0.12	37	<0.0050	1.2
Benzo(a)anthracene	0.63	0.005	0.45	<0.0050	0.31	<0.0050	<0.0050	0.46	<0.005	0.15	<0.0050	0.25	0.068	**18**	<0.0050	**0.82**
Chrysene	7.8	0.005	0.43	<0.0050	0.28	<0.0050	<0.0050	0.38	<0.005	0.14	<0.0050	0.2	0.064	**14**	<0.0050	0.67
Benzo(b/j)fluoranthene	0.78	0.005	0.62	<0.0050	0.42	<0.0050	<0.0050	0.54	<0.005	0.2	<0.0050	0.25	0.11	**17**	<0.0050	**0.84**
Benzo(k)fluoranthene	0.78	0.005	0.21	<0.0050	0.14	<0.0050	<0.0050	0.19	<0.005	0.068	<0.0050	0.095	0.035	**6.4**	<0.0050	0.44
Benzo(a)pyrene	0.3	0.005	**0.52**	<0.0050	**0.32**	<0.0050	<0.0050	**0.48**	<0.005	0.16	<0.0050	0.18	0.075	**14**	<0.0050	**0.68**
Indeno(1,2,3-cd)pyrene	0.48	0.005	0.37	<0.0050	0.22	<0.0050	<0.0050	0.29	<0.005	0.11	<0.0050	0.12	0.065	**8.5**	<0.0050	0.28
Dibenz(a,h)anthracene	0.1	0.005	0.0076	<0.0050	0.051	<0.0050	<0.0050	0.057	<0.005	0.024	<0.0050	0.03	0.013	**2.10**	<0.0050	0.09
Benzo(ghi)perylene	7.8	0.007	0.39	<0.0050	0.23	<0.0050	<0.0050	0.26	<0.005	0.11	<0.0050	0.1	0.067	7.8	<0.0050	0.34
1&2-Methylnaphthalene	3.4	0.005	0.026	<0.0071	0.03	<0.0071	<0.0071	0.014	<0.0071	<0.0071	<0.0071	<0.0071	<0.0071	0.2	<0.0071	<0.05

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011

2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only

3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceriticate of Analysis which contains all QA/QC information

SOIL ANALYTICAL RESULTS:

Table C.6 - SOIL ANALYTICAL RESULTS- Polycyclic Aromatic Hydrocarbons

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH1-SS5	BH1-SS55 (DUP of BH1 SS5)	BH2 SS1	BH3 SS1	BH4 SS1	BH4-SS6	BH4-SS66 (DUP of BH4 SS6)	BH5 SS1	BH101 SS1	BH102 SS1	BH103 SS5	BH104 SS2	BH108 SS7	MW 107 SS1	BH109 SS2	BH 110 SS1
Lab ID			3439065	3439066	3331915	3331909	3331911	3439063	3439064	3331913	3492116	3492126	3492133	3492136	3497898	3501475	3492124	3501477
Sampling Date			6-Dec-21	6-Dec-21	10-Dec-21	6-Dec-21	7-Dec-21	7-Dec-21	7-Dec-21	9-Dec-21	7-Feb-22	7-Feb-22	7-Feb-22	7-Feb-22	8-Feb-22	9-Feb-22	7-Feb-22	9-Feb-22
Soil Sample Depth (m)			3.05-3.66	3.05-3.66	0.15-0.76	0.17-0.76	0.17-0.76	4.57-5.18	4.57-5.18	0.17-0.76	0.15-0.76	0.15-0.76	3.65-4.26	1.37-1.98	5.18-5.79	0.15-0.76	1.37-1.98	0.15-0.76
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT
Certificate of Analysis Number			22T855232	22T855232	21T843367	21T843367	21T8343367	22T855232	22T855232	21T843367	22T861405	22T861405	22T861405	22T861405	22T861802	22T862183	22T861405	22T862183
Naphthalene	0.75	0.005	<0.05	<0.05	<0.05	<0.05	0.142	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.17	0.005	<0.05	<0.05	<0.05	<0.05	**0.31**	<0.05	<0.05	<0.05	0.06	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	58	0.005	<0.05	<0.05	<0.05	<0.05	0.88	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	69	0.005	<0.05	<0.05	<0.05	<0.05	1.22	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	7.8	0.005	<0.05	<0.05	<0.05	<0.05	7.16	<0.05	<0.05	0.38	0.24	0.49	<0.05	<0.05	<0.05	0.05	<0.05	0.21
Anthracene	0.74	0.005	<0.05	<0.05	<0.05	<0.05	**2.46**	<0.05	<0.05	0.11	0.09	0.15	<0.05	<0.05	<0.05	<0.05	<0.05	0.06
Fluoranthene	0.69	0.005	<0.05	<0.05	<0.05	<0.05	**12.3**	<0.05	<0.05	0.46	0.64	**0.88**	<0.05	<0.05	<0.05	0.11	<0.05	0.39
Pyrene	78	0.005	<0.05	<0.05	<0.05	<0.05	11.5	<0.05	<0.05	0.45	0.65	0.81	<0.05	<0.05	<0.05	0.1	<0.05	0.35
Benzo(a)anthracene	0.63	0.005	<0.05	<0.05	<0.05	<0.05	**8.41**	<0.05	<0.05	0.38	0.45	0.56	<0.05	<0.05	<0.05	0.05	<0.05	0.2
Chrysene	7.8	0.005	<0.05	<0.05	<0.05	<0.05	5.58	<0.05	<0.05	0.14	0.29	0.43	<0.05	<0.05	<0.05	<0.05	<0.05	0.21
Benzo(b/j)fluoranthene	0.78	0.005	<0.05	<0.05	<0.05	<0.05	**6.62**	<0.05	<0.05	0.32	0.46	0.59	<0.05	<0.05	<0.05	0.06	<0.05	0.23
Benzo(k)fluoranthene	0.78	0.005	<0.05	<0.05	<0.05	<0.05	**1.79**	<0.05	<0.05	0.11	0.21	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	0.09
Benzo(a)pyrene	0.3	0.005	<0.05	<0.05	<0.05	<0.05	**4.74**	<0.05	<0.05	0.22	**0.33**	**0.4**	<0.05	<0.05	<0.05	0.05	<0.05	0.17
Indeno(1,2,3-cd)pyrene	0.48	0.005	<0.05	<0.05	<0.05	<0.05	**1.95**	<0.05	<0.05	<0.05	0.2	0.27	<0.05	<0.05	<0.05	<0.05	<0.05	0.09
Dibenz(a,h)anthracene	0.1	0.005	<0.05	<0.05	<0.05	<0.05	**0.7**	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	7.8	0.007	<0.05	<0.05	<0.05	<0.05	2.26	<0.05	<0.05	0.14	0.22	0.27	<0.05	<0.05	<0.05	<0.05	<0.05	0.09
1&2-Methylnaphthalene	3.4	0.005	<0.05	<0.05	<0.05	<0.05	0.47	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011

2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only

3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceriticate of Analysis which contains all QA/QC information

SOIL ANALYTICAL RESULTS:
Table C.7 - SOIL ANALYTICAL RESULTS- Metals, Hydride-Forming Metals, and Other Regulated Parameters
GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH101-1B (2020)	BH101-6 (2020)	BH102-1B (2020)	BH102-5 (2020)	BH103-2A (2020)	BH104-1B (2020)	BH104-6 (2020)	BH105-1B (2020)	BH9105-1B (2020) (DUP of BH105-1B)	BH105-6 (2020)
Lab ID			MMM509	MMM511	MMM512	MMM514	MMM515	MMW528	MMW529	MMM517	MMM518	MMM520
Sampling Date			22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20
Soil Sample Depth (m)			0.3-0.6	3.8-4.4	0.3-0.6	3.1-3.6	0.8 - 1.1	0.3 - 0.6	3.8 - 4.4	0.3-0.6	0.3-0.6	3.8-4.4
Consultant			Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex
Laboratory			BV	BV	BV	BV	BV	BV	BV	BV	BV	BV
Certificate of Analysis Number			C099980	C099980	C099980	C099980	C099980	C0A1969	C0A1969	C099980	C099980	C099980
Antimony	7.5	0.2	2.9	<0.20	4.3	<0.20	<0.20	<0.2	<0.20	0.57	0.39	<0.20
Arsenic	18	1	10	2.5	12	2	2.4	3.1	2	5.8	4.9	2.4
Barium	390	0.5	**410**	180	**470**	92	140	86	97	170	160	87
Beryllium	5	0.2	0.58	0.62	0.66	0.63	0.76	0.83	0.66	0.81	1	0.64
Boron (total)	120	5	28	6.3	8.6	6.9	6.7	5.9	7.7	9.8	11	7.7
Boron (Hot Water Soluble)	1.5	0.05	1.4	0.16	0.59	0.2	0.23	0.46	0.34	1.4	1.3	0.32
Cadmium	1.2	0.1	0.63	<0.10	0.87	<0.10	<0.10	0.1	<0.10	0.23	0.16	<0.10
Chromium (total)	160	1	22	31	23	32	33	31	33	31	35	31
Cobalt	22	0.1	6.6	9.2	8.2	9.5	9.1	10	10	11	13	10
Copper	180	0.5	95	20	**1300**	18	19	21	20	30	30	24
Lead	120	1	**510**	8.2	**450**	7.4	8.7	31	7.4	**180**	67	7.6
Molybdenum	6.9	0.5	1.4	<0.50	2.6	<0.50	<0.50	0.51	<0.50	1.3	0.99	<0.50
Nickel	130	0.5	16	21	19	22	23	22	24	22	29	24
Selenium	2.4	0.5	0.6	<0.50	1.2	<0.50	<0.50	0.5	<0.50	1.2	<0.50	<0.50
Silver	25	0.2	0.58	<0.20	0.53	<0.20	<0.20	0.2	<0.20	0.25	<0.20	<0.20
Thallium	1	0.05	0.18	0.12	0.18	0.12	0.17	0.18	0.14	0.17	0.19	0.13
Uranium	23	0.05	0.58	0.46	0.57	0.48	0.56	0.48	0.77	0.51	0.63	0.72
Vanadium	86	5	26	35	27	34	38	39	37	38	42	35
Zinc	340	5	310	47	**550**	43	51	61	49	130	91	48
Chromium VI	10	0.18	<0.18	<0.18	<0.18	<0.18	<0.18	0.35	<0.18	<0.18	0.24	<0.18
Free Cyanide	0.051	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Mercury	1.8	0.05	0.62	<0.050	0.73	<0.050	0.006	0.14	<0.05	0.99	0.39	<0.050
Electrical Conductivity (mS/cm)	0.7	0.002	1.1	0.76	1.1	1.2	1.8	2.2	0.34	2.2	2	0.56
Sodium Adsorption Ratio (unitless)	5	-	13	2.6	21	15	7.5	58	0.86	4.9	4	0.89
pH (pH units)	5-9 (surface soil); 5-11 (subsurface soil)	-	8	7.8	7.7	7.88	7.92	8.49	7.67	7.43	7.55	7.67
Methyl Mercury	0.0094	0.000057	-	-	-	-	-	-	-	-	-	-

Notes:

Other Regulated Parameters (ORPs) - includes HWS-B, CN-, Hg, Cr VI, EC, SAR, MeHg and pH
All soil concentrations reported in µg/g.
'<' = Parameter below detection limit, as indicated
'NV'= No value
~~Conc.~~ pH level outside of acceptable range of 5-9 (surface) and/or 5-11 (subsurface). See Tables C.8A, C.8B and C.8C for pH averaging results. pH exceedances no longer considered.
Bold Concentration exceeds MECP (2011) SCS.
Concentration exceeds applicable MECP Standards; however, this parameter is not considered a COC due to the amendments to the Regulation (O.Reg. 407/19 - December 4, 2019).

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SOIL ANALYTICAL RESULTS:
Table C.7 - SOIL ANALYTICAL RESULTS- Metals, Hydride-Forming Metals, and Other Regulated Parameters
GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH106-2A (2020)	BH106-6 (2020)	BH107-1B (2020)	BH107-5 (2020)	BH108-1B (2020)	BH108-5 (2020)	BH1 SS1	BH1 SS5	BH1 SS55 (DUP of BH1 SS5)	BH2 SS1
Lab ID			MMM521	MMM523	MMM524	MMM527	MMM528	MMM530	3331907	3439065	3439066	3331915
Sampling Date			22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20	6-Dec-21	6-Dec-21	6-Dec-21	10-Dec-21
Soil Sample Depth (m)			0.8-1.1	3.8-4.4	0.3-0.6	3.1-3.6	0.3-0.6	3.1-3.6	0.15-0.76	3.05-3.66	3.05-3.66	0.15-0.76
Consultant			Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	Terrapex	EXP	EXP	EXP	EXP
Laboratory			BV	BV	BV	BV	BV	BV	AGAT	AGAT	AGAT	AGAT
Certificate of Analysis Number			C099980	C099980	C099980	C099980	C099980	C099980	21T843367	22T855232	22T855232	21T843367
Antimony	7.5	0.2	0.46	0.25	1.6	<0.20	1.3	<0.20	<0.8	<0.8	<0.8	<0.8
Arsenic	18	1	3	2	8.4	1.9	3.8	2.4	5	4	4	8
Barium	390	0.5	180	64	250	89	110	87	96.2	128	121	31.4
Beryllium	5	0.2	0.53	0.4	0.69	0.69	0.37	0.67	<0.4	0.5	0.5	<0.4
Boron (total)	120	5	12	6.4	15	8.1	5.8	8.3	7	9	7	13
Boron (Hot Water Soluble)	1.5	0.05	1.3	0.34	1.1	0.16	0.48	0.37	0.42	0.33	0.37	0.39
Cadmium	1.2	0.1	0.21	0.18	0.41	0.13	0.3	<0.10	<0.5	<0.5	<0.5	<0.5
Chromium (total)	160	1	28	19	26	31	18	30	24	40	38	9
Cobalt	22	0.1	6.7	5.6	9.8	9.7	5.2	10	4.5	11.9	12.1	2.7
Copper	180	0.5	22	12	71	21	24	22	14.7	22.1	23	22.7
Lead	120	1	**220**	15	**280**	8.1	**130**	8.1	**126**	11	15	17
Molybdenum	6.9	0.5	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	2.4	0.5	0.5	1.6
Nickel	130	0.5	16	10	23	24	12	25	9	27	27	4
Selenium	2.4	0.5	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.8	<0.8	<0.8	<0.8
Silver	25	0.2	<0.20	<0.20	0.32	<0.20	<0.20	<0.20	<0.5	<0.5	<0.5	<0.5
Thallium	1	0.05	0.13	0.12	0.16	0.12	0.13	0.13	<0.5	<0.5	<0.5	<0.5
Uranium	23	0.05	0.45	0.47	0.45	0.54	0.42	0.72	<0.50	0.87	0.91	1.11
Vanadium	86	5	31	29	31	35	23	34	24.1	44.6	42.2	10.8
Zinc	340	5	110	54	220	50	150	50	116	59	60	89
Chromium VI	10	0.18	0.68	<0.18	<0.18	<0.18	<0.18	<0.18	4.4	<0.2	<0.2	<0.2
Free Cyanide	0.051	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.040	<0.040	<0.040	<0.040
Mercury	1.8	0.05	**1.9**	<0.050	1.3	<0.050	0.28	<0.050	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (mS/cm)	0.7	0.002	2.3	0.17	1.8	0.57	4.3	0.3	0.992	1.87	1.85	2.07
Sodium Adsorption Ratio (unitless)	5	-	26	0.24	28	0.9	66	0.93	13.3	5.44	6.03	5.43
pH (pH units)	5-9 (surface soil); 5-11 (subsurface soil)	-	~~9.11~~	7.81	7.81	8.1	8.1	7.89	8.22	7.22	7.17	~~12.1~~
Methyl Mercury	0.0094	0.000057	-	-	-	-	-	-	-	-	-	-

Notes:

Other Regulated Parameters (ORPs) - includes HWS-B, CN-, Hg, Cr VI, EC, SAR, MeHg and pH
All soil concentrations reported in µg/g.
'<' = Parameter below detection limit, as indicated
'NV'= No value
~~Conc.~~ pH level outside of acceptable range of 5-9 (surface) and/or 5-11 (subsurface). See Tables C.8A, C.8B and C.8C for pH averaging results. pH exceedances no longer considered.
Bold Concentration exceeds MECP (2011) SCS.
Concentration exceeds applicable MECP Standards; however, this parameter is not considered a COC due to the amendments to the Regulation (O.Reg. 407/19 - December 4, 2019).

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SOIL ANALYTICAL RESULTS:
Table C.7 - SOIL ANALYTICAL RESULTS- Metals, Hydride-Forming Metals, and Other Regulated Parameters
GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH2 SS2	BH2 SS5	BH3 SS1	BH4 SS1	BH4 SS6	BH4 SS66 (DUP of BH4 SS6)	BH5 SS1	MW 107 SS1	BH108 SS7
Lab ID			3362030	3362031	3331909	3331911	3439063	3439064	3331913	3501475	3497898
Sampling Date			17-Dec-21	17-Dec-21	6-Dec-21	7-Dec-21	7-Dec-21	7-Dec-21	9-Dec-21	9-Feb-22	8-Feb-22
Soil Sample Depth (m)			0.76-1.37	3.05-3.66	0.17-0.76	0.17-0.76	4.57-5.18	4.57-5.18	0.17-0.76	0.15 - 0.76	5.18 - 5.79
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT
Certificate of Analysis Number			21T846789	21T846789	21T843367	21T843367	22T855232	22T855232	21T843367	22T862183	22T861802
Antimony	7.5	0.2	-	-	<0.8	3.7	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	18	1	-	-	6	14	4	4	5	2	4
Barium	390	0.5	-	-	115	231	88.9	96	59.7	15.9	93.8
Beryllium	5	0.2	-	-	0.7	<0.4	0.6	0.6	<0.4	<0.4	0.7
Boron (total)	120	5	-	-	7	13	10	12	18	<5	9
Boron (Hot Water Soluble)	1.5	0.05	-	-	0.82	1.28	0.36	0.37	0.46	0.15	0.35
Cadmium	1.2	0.1	-	-	<0.5	1.0	<0.5	<0.5	0.5	<0.5	<0.5
Chromium (total)	160	1	-	-	36	19	32	34	15	6	32
Cobalt	22	0.1	-	-	11.3	6.3	12.7	12.9	4.2	2	12.1
Copper	180	0.5	-	-	26	47.1	24.6	24.3	11.9	3.8	24.1
Lead	120	1	-	-	58	**309**	11	10	57	14	13
Molybdenum	6.9	0.5	-	-	1.3	2.8	<0.5	<0.5	1.1	<0.5	<0.5
Nickel	130	0.5	-	-	24	21	29	29	9	4	28
Selenium	2.4	0.5	-	-	<0.8	1.1	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	25	0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	1	0.05	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	23	0.05	-	-	0.58	0.84	0.68	0.73	0.7	<0.50	0.93
Vanadium	86	5	-	-	43.5	15	37.2	41.5	17.2	13.8	36
Zinc	340	5	-	-	75	**448**	58	58	330	21	57
Chromium VI	10	0.18	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Free Cyanide	0.051	0.01	-	-	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	1.8	0.05	-	-	1.63	0.28	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (mS/cm)	0.7	0.002	-	-	1.49	2.79	0.641	0.635	3.28	0.303	0.353
Sodium Adsorption Ratio (unitless)	5	-	-	-	16.2	1.42	1.44	1.34	25.1	5.78	1.19
pH (pH units)	5-9 (surface soil); 5-11 (subsurface soil)	-	~~11.3~~	7.89	7.83	8.18	7.39	7.34	~~10~~	7.62	7.81
Methyl Mercury	0.0094	0.000057	-	-	-	-	-	-	-	-	-

Notes:

Other Regulated Parameters (ORPs) - includes HWS-B, CN-, Hg, Cr VI, EC, SAR, MeHg and pH
All soil concentrations reported in µg/g.
'<' = Parameter below detection limit, as indicated
'NV'= No value
~~Conc.~~ pH level outside of acceptable range of 5-9 (surface) and/or 5-11 (subsurface). See Tables C.8A, C.8B and C.8C for pH averaging results. pH exceedances no longer considered.
Bold Concentration exceeds MECP (2011) SCS.
Concentration exceeds applicable MECP Standards; however, this parameter is not considered a COC due to the amendments to the Regulation (O.Reg. 407/19 - December 4, 2019).

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011
2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only
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SOIL ANALYTICAL RESULTS:
Table C.7 - SOIL ANALYTICAL RESULTS- Metals, Hydride-Forming Metals, and Other Regulated Parameters
GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	BH109 SS2	BH 110 SS1	BH2-1 SS5	BH2-2 SS5	BH2-3 SS5	BH203 SS1A	BH203 SS0 (DUP of BH203 SS1A)
Lab ID			3492124	3501477	YTN874	YTN877	YTN880	AMZU49	AMZU51
Sampling Date			7-Feb-22	9-Feb-22	27-Mar-24	27-Mar-24	27-Mar-24	7-Jan-25	7-Jan-25
Soil Sample Depth (m)			1.37 - 1.98	0.15 - 0.76	3.05-3.66	3.05-3.66	3.05-3.66	0.20 - 1.37	0.20 - 1.37
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	AGAT	BV	BV	BV	BV	BV
Certificate of Analysis Number			22T861405	22T862183	C493962	C493962	C493962	C501321	C501321
Antimony	7.5	0.2	<0.8	2	-	-	-	-	-
Arsenic	18	1	3	10	-	-	-	-	-
Barium	390	0.5	222	**519**	-	-	-	-	-
Beryllium	5	0.2	0.7	0.5	-	-	-	-	-
Boron (total)	120	5	12	9	-	-	-	-	-
Boron (Hot Water Soluble)	1.5	0.05	-	0.44	-	-	-	-	-
Cadmium	1.2	0.1	<0.5	0.6	-	-	-	-	-
Chromium (total)	160	1	43	24	-	-	-	-	-
Cobalt	22	0.1	14.5	7.7	-	-	-	-	-
Copper	180	0.5	27.5	56.7	-	-	-	-	-
Lead	120	1	41	**390**	-	-	-	-	-
Molybdenum	6.9	0.5	<0.5	1	-	-	-	-	-
Nickel	130	0.5	29	19	-	-	-	-	-
Selenium	2.4	0.5	<0.8	<0.8	-	-	-	-	-
Silver	25	0.2	<0.5	0.6	-	-	-	-	-
Thallium	1	0.05	<0.5	<0.5	-	-	-	-	-
Uranium	23	0.05	0.98	0.75	-	-	-	-	-
Vanadium	86	5	53.8	28.3	-	-	-	-	-
Zinc	340	5	110	**343**	-	-	-	-	-
Chromium VI	10	0.18	-	<0.2	-	-	-	-	-
Free Cyanide	0.051	0.01	-	<0.040	-	-	-	-	-
Mercury	1.8	0.05	-	0.35	-	-	-	-	-
Electrical Conductivity (mS/cm)	0.7	0.002	-	4.94	-	-	-	-	-
Sodium Adsorption Ratio (unitless)	5	-	-	105	-	-	-	-	-
pH (pH units)	5-9 (surface soil); 5-11 (subsurface soil)	-	-	7.94	7.88	7.91	7.86	-	-
Methyl Mercury	0.0094	0.000057	-	-	-	-	-	<0.000057	0.00012

Notes:

Other Regulated Parameters (ORPs) - includes HWS-B, CN-, Hg, Cr VI, EC, SAR, MeHg and pH
All soil concentrations reported in µg/g.
'<' = Parameter below detection limit, as indicated
'NV'= No value
~~Conc.~~ pH level outside of acceptable range of 5-9 (surface) and/or 5-11 (subsurface). See Tables C.8A, C.8B and C.8C for pH averaging results. pH exceedances no longer considered.
Bold Concentration exceeds MECP (2011) SCS.
Concentration exceeds applicable MECP Standards; however, this parameter is not considered a COC due to the amendments to the Regulation (O.Reg. 407/19 - December 4, 2019).

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011
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SOIL ANALYTICAL RESULTS:

Table C.8A - SOIL ANALYTICAL RESULTS - Soil pH Averaging (BH2)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Location ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	BH2-SS1				BH2-SS2			
Sample ID		BH2-SS1	BH2-1 SS1	BH2-2 SS1	BH2-3 SS1	BH2-SS2	BH2-1 SS2	BH2-2 SS2	BH2-3 SS2
Lab ID		3331915	YTN872	YTN875	YTN878	3362030	YTN873	YTN876	YTN879
Sampling Date		10-Dec-21	27-Mar-24	27-Mar-24	27-Mar-24	10-Dec-21	27-Mar-24	27-Mar-24	27-Mar-24
Soil Sample Depth (m)		0.15 - 0.76	0.15 - 0.76	0.15 - 0.76	0.15 - 0.76	0.76 - 1.37	0.76 - 1.37	0.76 - 1.37	0.76 - 1.37
Consultant		EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory		AGAT	BV	BV	BV	AGAT	BV	BV	BV
pH (surface soils - 0-1.5 mbgs)	5-9 (surface soil); 5-11 (subsurface soil)	**12.10**	8.68	8.53	11.3	**11.3**	7.92	8.11	8.24
Average pH (Calculated)		**8.90**				**8.19**			

Notes

All soil concentrations reported in pH units

'<' = Parameter below detection limit, as indicated

Bold Concentration exceeds MECP (2011) SCS.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2007. Technical Update Environmentally Sensitive Areas: pH levels. January 2007.

Average for pH calculated per MECP (2007) guidance. Average pH = -log[mean(10^ $^{-sample1}$+10^$^{-sample2}$+10^$^{-sample3}$)]

SOIL ANALYTICAL RESULTS:
Table C.8B - SOIL ANALYTICAL RESULTS - Soil pH Averaging (BH5)
GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Location ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	BH5 SS1				
Sample ID		BH5 SS1	BH5 - 1 SS1	BH5 - 2 SS1	BH5 - 3 SS1	DUP 2 (DUP of BH5 SS1)
Lab ID		3331913	YTN867	YTN868	YTN869	YTN870
Sampling Date		9-Dec-21	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24
Soil Sample Depth (m)		0.15 - 0.76	0.15 - 0.76	0.15 - 0.76	0.15 - 0.76	0.15 - 0.76
Consultant		EXP	EXP	EXP	EXP	EXP
Laboratory		AGAT	BV	BV	BV	BV
pH (surface soils - 0-1.5 mbgs)	5-9 (surface soil); 5-11 (subsurface soil)	**10**	8.21	8.28	8.24	8.21
Average pH (Calculated)		**8.33**				

Notes

All soil concentrations reported in pH units

'<' = Parameter below detection limit, as indicated

Bold Concentration exceeds MECP (2011) SCS.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2007. *Technical Update Environmentally Sensitive Areas: pH levels.* January 2007.

Average for pH calculated per MECP (2007) guidance. Average pH = -log[mean($10^{-sample1}$+$10^{-sample2}$+$10^{-sample3}$)]

SOIL ANALYTICAL RESULTS:

Table C.8C - SOIL ANALYTICAL RESULTS - Soil pH Averaging (BH106)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Location ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium/fine textured soil)	BH106-2A				
Sample ID		BH106-2A	BH106-1 SS2	BH106 - 2 SS2	BH106 - 3 SS2	DUP 1 (DUP of BH106 -2 SS2)
Lab ID		MMM521	YTN863	YTN864	YTN865	YTN866
Sampling Date		22-Apr-20	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24
Soil Sample Depth (m)		0.8 - 1.1	0.8 - 1.1	0.8 - 1.1	0.8 - 1.1	0.8 - 1.1
Consultant		Terrapex	EXP	EXP	EXP	EXP
Laboratory		BV	BV	BV	BV	BV
pH (surface soils - 0-1.5 mbgs)	5-9 (surface soil); 5-11 (subsurface soil)	**9.11**	8.31	8.21	11.5	8.18
Average pH (Calculated)		**8.43**				

Notes

All soil concentrations reported in pH units

'<' = Parameter below detection limit, as indicated

Bold Concentration exceeds MECP (2011) SCS.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2007. *Technical Update Environmentally Sensitive Areas: pH levels.* January 2007.

Average for pH calculated per MECP (2007) guidance. Average pH = $-\log[\text{mean}(10^{-\text{sample1}}+10^{-\text{sample2}}+10^{-\text{sample3}})]$

GROUNDWATER ANALYTICAL RESULTS:

Table C.9 - GROUNDWATER ANALYTICAL RESULTS: Petroleum Hydrocarbons (PHCs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition All Types of Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	MW1	MW1	MW2	MW2	MW3	MW3	MW4	MW4
Lab ID			3451634	YZG823	3451819	YZG824	3397286	YZG822	3397294	YZG826
Sampling Date			24-Jan-22	22-Apr-24	24-Jan-22	22-Apr-24	24-Dec-21	22-Apr-24	24-Dec-21	22-Apr-24
Screen Depth Interval (m)			6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	BV	AGAT	BV	AGAT	BV	AGAT	BV
Certificate of Analysis Number			22T856755	C4C1812	22T856755	C4C1812	21T849562	C4C1812	21T849562	C4C1812
PHC F1 (C6-C10)	750	25	45	<25	<25	<25	<25	<25	**30000**	**7300**
PHC F1 (C6-C10) - BTEX	750	25	44	<25	<25	<25	<25	<25	**27200**	**5600**
PHC F2 (C10-C16)	150	100	<100	<100	<100	<100	<100	<100	**79000**	**33000**
PHC F3 (C16-C34)	500	100	<100	<200	<100	<200	<100	<200	<100	440
PHC F4 (C34-C50)	500	100	<100	<200	<100	<200	<100	<200	<100	<200
Reached baseline at C50?	NV	NV	YES	YES	YES	YES	YES	YES	YES	YES
PHC F4 (C34-C50)-gravimetric	500	-	-	-	-	-	-	-	-	-

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds the MECP (2011) SCS.

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GROUNDWATER ANALYTICAL RESULTS:

Table C.9 - GROUNDWATER ANALYTICAL RESULTS: Petroleum Hydrocarbons (PHCs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition All Types of Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	MW5	MW55 (DUP of MW5)	MW5	DUP 1 (DUP of MW5)	MW107	MW107	MW108	MW108
Lab ID			3397295	3397296	YZG821	YZG831	3541090	YZG835	3541089	YZG830
Sampling Date			24-Dec-21	24-Dec-21	22-Apr-24	22-Apr-24	22-Feb-22	22-Apr-24	22-Feb-22	23-Apr-24
Screen Depth Interval (m)			6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	7.61-9.14	7.61-9.14	13.78-15.31	13.78-15.31
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	AGAT	BV	BV	AGAT	BV	AGAT	BV
Certificate of Analysis Number			21T849562	21T849562	C4C1812	C4C1812	22T866103	C4C1812	22T866103	C4C1812
PHC F1 (C6-C10)	750	25	353	291	<25	<25	**961**	<25	**29800**	**15000**
PHC F1 (C6-C10) - BTEX	750	25	341	278	<25	<25	**849**	<25	**24800**	**15000**
PHC F2 (C10-C16)	150	100	<100	<100	<100	<100	**3600**	<100	**18000**	**37000**
PHC F3 (C16-C34)	500	100	<100	<100	<200	<200	<100	<200	<100	**510**
PHC F4 (C34-C50)	500	100	<100	<100	<200	<200	<100	<200	<100	<200
Reached baseline at C50?	NV	NV	YES	YES	YES	YES	YES	YES	YES	YES
PHC F4 (C34-C50)-gravimetric	500	-	-	-	-	-	-	-	-	-

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds the MECP (2011) SCS.

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GROUNDWATER ANALYTICAL RESULTS:

Table C.9 - GROUNDWATER ANALYTICAL RESULTS: Petroleum Hydrocarbons (PHCs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition All Types of Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	MW109	MW109	MW24-1	MW24-2	DUP 2 (DUP of MW24-2)	MW24-3	FIELD BLANK	TRIP BLANK
Lab ID			3541018	YZG829	YZG828	YZG827	YZG832	YZG825	3397309	YZG834
Sampling Date			22-Feb-22	23-Apr-24	23-Apr-24	23-Apr-24	23-Apr-24	22-Apr-24	24-Dec-21	23-Apr-24
Screen Depth Interval (m)			7.61-9.14	7.61-9.14	11.9 - 15.0	16.8 - 19.8	16.8 - 19.8	11.9 - 15.0	-	-
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	BV	BV	BV	BV	BV	AGAT	BV
Certificate of Analysis Number			22T866103	C4C1812	C4C1812	C4C1812	C4C1812	C4C1812	21T849562	C4C1812
PHC F1 (C6-C10)	750	25	**218000**	**46000**	<25	<25	<25	<25	<25	<25
PHC F1 (C6-C10) - BTEX	750	25	**213000**	**44000**	<25	<25	<25	<25	<25	<25
PHC F2 (C10-C16)	150	100	**74000**	**160000**	<100	<100	<100	<100	<100	<100
PHC F3 (C16-C34)	500	100	230	**1500**	<200	<200	<200	<200	<100	<200
PHC F4 (C34-C50)	500	100	<100	280	<200	<200	<200	<200	<100	<200
Reached baseline at C50?	NV	NV	YES	YES	YES	YES	YES	YES	YES	YES
PHC F4 (C34-C50)-gravimetric	500	-	-	-	-	-	-	-	-	-

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds the MECP (2011) SCS.

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GROUNDWATER ANALYTICAL RESULTS:

Table C.10 - GROUNDWATER ANALYTICAL RESULTS: Benzene, Toulene, Ethylbenzene, and Xylene (BTEX)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition All Types of Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	MW1	MW1	MW2	MW2	MW3	MW3	MW4	MW4
Lab ID			3451634	YZG823	3451819	YZG824	3397286	YZG822	3397294	YZG826
Sampling Date			24-Jan-22	22-Apr-24	24-Jan-22	22-Apr-24	24-Dec-21	22-Apr-24	24-Dec-21	22-Apr-24
Screen Depth Interval (m)			6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	BV	AGAT	BV	AGAT	BV	AGAT	BV
Certificate of Analysis Number			22T856755	C4C1812	22T856755	C4C1812	21T849562	C4C1812	21T849562	C4C1812
Benzene	430	0.2	1.16	<0.20	0.72	<0.20	<0.40	<0.20	4.25	3.1
Toluene	18000	0.2	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	56	65
Ethylbenzene	2300	0.1	<0.10	<0.20	<0.10	<0.20	<0.20	<0.20	217	150
Xylenes (total)	4200	0.2	<0.20	<0.40	<0.20	<0.40	<0.20	<0.40	2540	1400

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds the MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011
2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only
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GROUNDWATER ANALYTICAL RESULTS:
Table C.10 - GROUNDWATER ANALYTICAL RESULTS: Benzene, Toulene, Ethylbenzene, and Xylene (BTEX)
GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition All Types of Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	MW5	MW55 (DUP of MW5)	MW5	DUP 1 (DUP of MW5)	MW107	MW107	MW108	MW108
Lab ID			3397295	3397296	YZG821	YZG831	3541090	YZG835	3541089	YZG830
Sampling Date			24-Dec-21	24-Dec-21	22-Apr-24	22-Apr-24	22-Feb-22	22-Apr-24	22-Feb-22	23-Apr-24
Screen Depth Interval (m)			6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	7.61-9.14	7.61-9.14	13.78-15.31	13.78-15.31
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	AGAT	BV	BV	AGAT	BV	AGAT	BV
Certificate of Analysis Number			21T849562	21T849562	C4C1812	C4C1812	22T866103	C4C1812	22T866103	C4C1812
Benzene	430	0.2	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20	2.84	<4.0
Toluene	18000	0.2	2.18	2.37	<0.20	<0.20	0.42	<0.20	15	<4.0
Ethylbenzene	2300	0.1	0.76	0.88	<0.20	<0.20	12.8	<0.20	384	80
Xylenes (total)	4200	0.2	8.97	10.2	<0.40	<0.40	98.3	<0.40	**4640**	690

All groundwater concentrations reported in µg/L.
'<' = Parameter below detection limit, as indicated
'NV'= No value
Bold Concentration exceeds the MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011
2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only
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GROUNDWATER ANALYTICAL RESULTS:
Table C.10 - GROUNDWATER ANALYTICAL RESULTS: Benzene, Toulene, Ethylbenzene, and Xylene (BTEX)
GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition All Types of Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	MW109	MW109	MW24-1	MW24-2	DUP 2 (DUP of MW24-2)	MW24-3	TRIP BLANK	TRIPBLANK
Lab ID			3541018	YZG829	YZG828	YZG827	YZG832	YZG825	3397319	YZG834
Sampling Date			22-Feb-22	23-Apr-24	23-Apr-24	23-Apr-24	23-Apr-24	22-Apr-24	22-Dec-21	23-Apr-24
Screen Depth Interval (m)			7.61-9.14	7.61-9.14	11.9 - 15.0	16.8 - 19.8	16.8 - 19.8	11.9 - 15.0	-	-
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	BV	BV	BV	BV	BV	AGAT	BV
Certificate of Analysis Number			22T866103	C4C1812	C4C1812	C4C1812	C4C1812	C4C1812	21T849562	C4C1812
Benzene	430	0.2	4.96	<4.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	18000	0.2	15.2	6.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	2300	0.1	516	130	<0.20	<0.20	<0.20	<0.20	<0.10	<0.20
Xylenes (total)	4200	0.2	**4610**	1900	<0.40	<0.40	<0.40	<0.40	<0.20	<0.40

All groundwater concentrations reported in µg/L.
'<' = Parameter below detection limit, as indicated
'NV'= No value
Bold Concentration exceeds the MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011
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GROUNDWATER ANALYTICAL RESULTS:

Table C.11 - GROUNDWATER ANALYTICAL RESULTS: Volatile Organic Compounds (VOCs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition All Types of Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	MW1	MW2	MW3	MW4	BH/MW4	BH/MW0 (DUP of MW4)	MW5	MW55 (DUP of MW5)	TRIP BLANK	TRIP BLANK
Lab ID			3451634	3451819	3397286	3397294	AMCQ39	AMCQ40	3397295	3397296	3397319	AMCQ44
Sampling Date			24-Jan-22	24-Jan-22	24-Dec-21	24-Dec-21	18-Dec-24	18-Dec-24	24-Dec-21	24-Dec-21	22-Dec-21	18-Dec-24
Screen Depth Interval (m)			6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	-	-
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	AGAT	AGAT	AGAT	BV	BV	AGAT	AGAT	AGAT	BV
Certificate of Analysis Number			22T856755	22T856755	21T849562	21T849562	C4BL754	C4BL754	21T849562	21T849562	21T849562	C4BL754
Dichlorodifluoromethane	4400	0.2	<0.20	<0.20	<0.40	<2.00	<1.0	<1.0	<0.40	<0.40	<0.20	<1.0
Vinyl Chloride	1.7	0.17	<0.17	<0.17	<0.34	<1.70	<0.20	<0.20	<0.34	<0.34	<0.17	<0.20
Bromomethane	56	0.2	<0.20	<0.20	<0.40	<2.00	<0.50	<0.50	<0.40	<0.40	<0.20	<0.50
Trichlorofluoromethane	2500	0.4	<0.40	<0.40	<0.80	<4.00	<0.50	<0.50	<0.80	<0.80	<0.40	<0.50
Acetone	130000	1	<1.0	<1.0	<2.0	<10.0	<10	<10	<2.0	<2.0	<1.0	<10
1,1-Dichloroethylene	17	0.3	<0.30	<0.30	<0.60	<3.00	<0.20	<0.20	<0.60	<0.60	<0.30	<0.20
Methylene chloride (Dichloromethane)	5500	0.3	<0.30	<0.30	<0.60	<3.00	<2.0	<2.0	<0.60	<0.60	<0.30	<2.0
trans-1,2-Dichloroethylene	17	0.2	<0.20	<0.20	<0.40	<2.00	<0.50	<0.50	<0.40	<0.40	<0.20	<0.50
Methyl t-butyl ether (MTBE)	1400	0.2	<0.20	<0.20	<0.40	<2.00	<0.50	<0.50	<0.40	<0.40	<0.20	<0.50
1,1-Dichloroethane	3100	0.3	<0.30	<0.30	<0.60	<3.00	<0.20	<0.20	<0.60	<0.60	<0.30	<0.20
Methyl ethyl ketone (2-Butanone)	1500000	1	<1.0	<1.0	<2.0	<10.0	<10	<10	<2.0	<2.0	<1.0	<10
cis-1,2-Dichloroethylene	17	0.2	<0.20	<0.20	<0.40	<2.00	0.97	0.96	<0.40	<0.40	<0.20	<0.5
Chloroform	22	0.2	3.59	3.21	<0.40	<2.00	<0.20	<0.20	0.69	0.55	<0.20	<0.20
1,2-Dichloroethane	12	0.2	<0.20	<0.20	<0.40	<2.00	<0.49	<0.49	<0.40	<0.40	<0.20	<0.49
1,1,1-Trichloroethane	6700	0.3	<0.30	<0.30	<0.60	<3.00	<0.20	<0.20	<0.60	<0.60	<0.30	<0.20
Carbon Tetrachloride	8.4	0.2	<0.20	<0.20	<0.40	<2.00	<0.19	<0.19	<0.40	<0.40	<0.20	<0.19
Benzene	430	0.2	1.16	0.72	<0.40	4.25	2	2	<0.40	<0.40	<0.20	<0.20
1,2-Dichloropropane	140	0.2	<0.20	<0.20	<0.40	<2.00	<0.20	<0.20	<0.40	<0.40	<0.20	<0.20
Trichloroethylene	17	0.2	<0.20	<0.20	<0.40	<2.00	0.92	0.94	<0.40	<0.40	<0.20	<0.20
Bromodichloromethane	85000	0.2	<0.20	<0.20	<0.40	<2.00	<0.50	<0.50	<0.40	<0.40	<0.20	<0.50
Methyl Isobutyl Ketone	580000	1	<1.0	<1.0	<2.0	<10.0	<5.0	<5.0	<2.0	<2.0	<1.0	<5.0
1,1,2-Trichloroethane	30	0.2	<0.20	<0.20	<0.40	<2.00	<0.40	<0.40	<0.40	<0.40	<0.20	<0.40
Toluene	18000	0.2	<0.20	<0.20	<0.40	56	13	14	2.18	2.37	<0.20	<0.20
Dibromochloromethane	82000	0.1	<0.10	<0.10	<0.20	<1.00	<0.50	<0.50	<0.20	<0.20	<0.10	<0.50
Ethylene Dibromide (1,2-Dibromoethane)	0.83	0.1	<0.10	<0.10	<0.20	<1.00	<0.40	<0.40	<0.20	<0.20	<0.10	<0.19
Tetrachloroethylene	17	0.2	<0.20	<0.20	<0.40	<2.00	0.4	0.43	<0.40	<0.40	<0.20	<0.2
1,1,1,2-Tetrachloroethane	28	0.1	<0.10	<0.10	<0.20	<1.00	<0.50	<0.50	<0.20	<0.20	<0.10	<0.50
Chlorobenzene	630	0.1	<0.10	<0.10	<0.20	<1.00	<0.20	<0.20	<0.20	<0.20	<0.10	<0.20
Ethylbenzene	2300	0.1	<0.10	<0.10	<0.20	217	130	130	0.76	0.88	<0.10	<0.20
m-Xylene + p-Xylene	NV	0.2	<0.20	<0.20	<0.40	1820	550	600	5.32	6.05	<0.20	<0.20
Bromoform	770	0.1	<0.10	<0.10	<0.20	<1.00	<1.0	<1.0	<0.20	<0.20	<0.10	<1.0
Styrene	9100	0.1	<0.10	<0.10	<0.20	<1.00	<17	<18	<0.20	<0.20	<0.10	<0.40
1,1,2,2-Tetrachloroethane	15	0.1	<0.10	<0.10	<0.20	<1.00	<0.40	<0.40	<0.20	<0.20	<0.10	<0.40
o-Xylene	NV	0.1	<0.10	<0.10	<0.20	717	610	650	3.65	4.13	<0.10	<0.20
1,3-Dichlorobenzene	9600	0.1	<0.10	<0.10	<0.20	<1.00	<0.40	<0.40	<0.20	<0.20	<0.10	<0.40
1,4-Dichlorobenzene	67	0.1	<0.10	<0.10	<0.20	<1.00	<0.40	<0.40	<0.20	<0.20	<0.10	<0.40
1,2-Dichlorobenzene	9600	0.1	<0.10	<0.10	<0.20	<1.00	<0.40	<0.40	<0.20	<0.20	<0.10	<0.40
1,3-Dichloropropene	45	0.3	<0.30	<0.30	<0.30	<0.30	<0.50	<0.50	<0.30	<0.30	<0.30	<0.50
Xylenes (Total)	4200	0.2	<0.20	<0.20	<0.20	2540	1200	1200	8.97	10.2	<0.20	<0.20
Hexane (n)	520	0.2	<0.20	<0.20	<0.40	<2.00	<1.0	<1.0	<0.40	<0.40	<0.20	<1.0

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

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GROUNDWATER ANALYTICAL RESULTS:

Table C.12 - GROUNDWATER ANALYTICAL RESULTS: Polycyclic Aromatic Hydrocarbons (PAHs)

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition All Types of Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	MW1	MW1	MW11 (DUP of MW1)	MW1	DUP 3 (DUP of MW1)	MW2	MW3	MW4	MW5	MW55 (DUP of MW5)	TRIP BLANK
Lab ID			3451634	TD0305	TD0306	YZG823	YZG833	3451819	3397286	3397294	3397295	3397296	TD0307
Sampling Date			24-Jan-22	12-Jul-22	12-Jul-22	22-Apr-24	22-Apr-24	24-Jan-22	24-Dec-21	24-Dec-21	24-Dec-21	24-Dec-21	12-Jul-22
Screen Depth Interval (m)			6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	-
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	BV	BV	BV	BV	AGAT	AGAT	AGAT	AGAT	AGAT	BV
Certificate of Analysis Number			22T856755	C2J4227	C2J4227	C4C1812	C4C1812	22T856755	21T849562	21T849562	21T849562	21T849562	C2J4227
Naphthalene	6400	0.05	~~<0.20~~	0.53	0.46	0.051	0.08	<0.20	<0.20	48.8	<0.20	<0.20	<0.050
Acenaphthylene	1.8	0.05	~~<0.20~~	<0.050	<0.050	<0.050	<0.050	<0.20	<0.20	<0.20	<0.20	<0.20	<0.050
Acenaphthene	1700	0.05	~~<0.20~~	<0.050	<0.050	0.28	0.24	<0.20	<0.20	0.29	<0.20	<0.20	<0.050
Fluorene	400	0.05	~~<0.20~~	<0.050	<0.050	0.22	0.18	<0.20	<0.20	0.27	<0.20	<0.20	<0.050
Phenanthrene	580	0.03	~~0.48~~	0.06	0.071	0.31	0.22	<0.10	<0.10	<0.10	<0.10	<0.10	<0.030
Anthracene	2.4	0.05	~~0.11~~	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050
Fluoranthene	130	0.05	~~0.34~~	0.055	0.056	0.14	0.099	<0.20	<0.20	0.78	<0.20	<0.20	<0.050
Pyrene	68	0.05	~~1.1~~	0.064	0.074	0.11	0.076	<0.20	<0.20	0.62	<0.20	<0.20	<0.050
Benzo(a)anthracene	4.7	0.05	~~0.35~~	<0.050	<0.050	<0.050	<0.050	<0.20	<0.20	<0.20	<0.20	<0.20	<0.050
Chrysene	1	0.05	~~0.6~~	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050
Benzo(b/j)fluoranthene	0.75	0.05	~~0.24~~	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050
Benzo(k)fluoranthene	0.4	0.05	~~<0.10~~	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050
Benzo(a)pyrene	0.81	0.009	~~0.33~~	<0.0090	<0.0090	<0.0090	<0.0090	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0090
Indeno(1,2,3-cd)pyrene	0.2	0.05	~~<0.20~~	<0.050	<0.050	<0.050	<0.050	<0.20	<0.20	<0.20	<0.20	<0.20	<0.050
Dibenz(a,h)anthracene	0.52	0.05	~~<0.20~~	<0.050	<0.050	<0.050	<0.050	<0.20	<0.20	<0.20	<0.20	<0.20	<0.050
Benzo(ghi)perylene	0.2	0.05	**~~0.32~~**	<0.050	<0.050	<0.050	<0.050	<0.20	<0.20	<0.20	<0.20	<0.20	<0.050
1&2-Methylnaphthalene	1800	0.071	~~<0.20~~	0.22	0.19	<0.071	<0.071	<0.20	<0.20	41	<0.20	<0.20	<0.071

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

~~Bold~~ Exceedance of the MECP Table 3 SCS not retained due to presence of sediment within the orginal sample and two (2) re-sampling events completed at MW1.

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GROUNDWATER ANALYTICAL RESULTS:

Table C.13 - GROUNDWATER ANALYTICAL RESULTS: Metals, Hydride-Forming Metals, and ORPs

GTR-21018382-B0, 15 Denison Avenue, Toronto, ON

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition All Types of Land Use (medium/fine textured soil)	Minimum Reporting Detection Limit (RDL)	MW1	BH/MW1	MW2	BH/MW2	MW3	MW4	BH/MW4	MW5	MW55 (DUP of MW5)	BH/MW5
Lab ID			3451634	AMCQ42	3451819	AMCQ41	3397286	3397294	AMCQ39	3397295	3397296	AMCQ43
Sampling Date			24-Jan-22	18-Dec-24	24-Jan-22	18-Dec-24	24-Dec-21	24-Dec-21	18-Dec-24	24-Dec-21	24-Dec-21	18-Dec-24
Screen Depth Interval (m)			6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14	6.09-9.14
Consultant			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory			AGAT	BV	AGAT	BV	AGAT	AGAT	BV	AGAT	AGAT	BV
Certificate of Analysis Number			22T856755	C4BL754	22T856755	C4BL754	21T849562	21T849562	C4BL754	21T849562	21T849562	C4BL754
Antimony	20000	1	<1.0	-	<1.0	-	<1.0	<1.0	-	1.2	1.2	-
Arsenic	1900	1	3.8	-	1	-	3.1	2.6	-	3.2	2.8	-
Barium	29000	2	204	-	271	-	712	494	-	183	181	-
Beryllium	67	0.5	<0.50	-	<0.50	-	<0.5	<0.5	-	<0.5	<0.5	-
Boron (total)	45000	10	216	-	139	-	711	382	-	215	215	-
Cadmium	2.7	0.2	<0.20	-	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Chromium (total)	810	2	<2.0	-	<2.0	-	<2.0	<2.0	-	<2.0	<2.0	-
Cobalt	66	0.5	<0.50	-	1.56	-	1.76	<0.50	-	1.31	1.41	-
Copper	87	1	<1.0	-	5.1	-	<1.0	<1.0	-	<1.0	<1.0	-
Lead	25	0.5	<0.50	-	0.5	-	<0.50	<0.50	-	<0.50	<0.50	-
Molybdenum	9200	0.5	23.6	-	5.99	-	25	1.21	-	88.9	93.3	-
Nickel	490	1	3	-	4.3	-	5	<1.0	-	4.4	4.7	-
Selenium	63	1	<1.0	-	<1.0	-	3.7	3.3	-	5	4.1	-
Silver	1.5	0.2	<0.20	-	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Thallium	510	0.3	<0.30	-	<0.30	-	<0.30	<0.30	-	<0.30	<0.30	-
Uranium	420	0.5	2.5	-	2.44	-	3.12	<0.50	-	4.63	4.63	-
Vanadium	250	0.4	0.61	-	0.86	-	0.65	0.48	-	1.18	1.28	-
Zinc	1100	5	16.4	-	297	-	5.4	<5.0	-	13.5	19.2	-
Mercury	2.8	0.02	<0.02	-	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
Chromium VI	140	2	<2	-	<2	-	<2.000	<2.000	-	<2.000	3.41	-
Free Cyanide	66	0.001	-	<0.001	-	<0.001	-	-	<0.001	-	-	<0.001
Sodium	2300000	250	99300	-	126000	-	-	-	-	-	-	-
Chloride	2300000	100	119000	-	227000	-	-	-	-	-	-	-

Notes:

Other Regulated Parameters (ORPs) - includes cyanide, mercury, Cr VI and sodium

All groundwater concentrations reported in µg/L

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" April 15, 2011
2. This table represents a summary of the data presented in the Laboratory Certificate of Analysis for convenience purposes only
3. This summary is to be use in conjuction with, not as a replacement of the Laboratory Ceriticate of Analysis which contains all QA/QC information

Appendix D: MECP Comments and EXP Responses

Ministry of the Environment, Conservation and Parks

Technical Assessment and Standards Development Branch
40 St. Clair Avenue West
7th Floor
Toronto ON M4V 1M2
Phone: 416.327.5519
Fax: 416.327.2936

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations techniques et de l'élaboration des normes
40, avenue St. Clair Ouest
7e étage
Toronto, ON M4V 1M2
Tél: 416 .327.5519
Téléc: 416. 327.2936

Ontario

November 18, 2024

City of Toronto
55 John Street, Floor 20
Toronto, Ontario, M5V 3C6

Attention: Alison Folosea – Director, Transaction Services

RE: **Ministry comments for the PSF for 15 Denison Avenue, Toronto, Ontario, report prepared by Exp Services Inc., dated July 25, 2024 [PSF2262-24, IDS No. 0553-D7PKTD].**

This letter will acknowledge receipt of the Pre-Submission Form (PSF) submitted for the following Property under the Records of Site Condition Regulation (O. Reg. 153/04).

- **Pre-Submission Form for 15 Denison Avenue, Toronto, Ontario, report prepared by Exp Services Inc., dated July 25, 2024**

The Ministry has reviewed the PSF submitted for the Property. Our reviewers offer comments, and questions in the attached Schedule A for the proponent's consideration in preparing a risk assessment for submission under the *Environmental Protection Act* (Act), Ontario Regulation 153/04 (Regulation), and associated guidance documents.

The outcome of this preliminary consultation is not binding on the risk assessment property owner or the Ministry, as the understanding of site conditions may develop and/or change during the course of the risk assessment. For this reason, the Ministry has the right to change its position. Ministry comments on the PSF do not in any way indicate acceptance of the final risk assessment approach or other conclusions of the risk assessment report and it does not indicate acceptance of the risk assessment report by the Director pursuant to s.168.5 of the Act.

If, at any time after submitting the PSF, the qualified person responsible for the preparation of the risk assessment changes or the property owner changes, the property owner shall give notice to the Director of the change in circumstance.

Four hard copies of the risk assessment, one marked original (along with a stand-alone electronic copy of the risk assessment [USB format]) are to be submitted to the Director of Client Services and Permissions Branch for review under the Regulation and must include a copy of the PSF as well as a response in the risk assessment report outlining how the Ministry's concerns in Schedule A to this letter were addressed in the risk assessment. However, if the ministry is still working remotely, then please follow the interim submission process for risk assessments. Please ensure the electronic copy submitted during the interim submission process is a stand-alone document and that all sections within the submission are bookmarked.

Please note that a risk assessment under the Regulation does not deal with all potential approvals and issues associated with other Ministry legislation. Other regulatory and compliance tools are required to address other aspects of redevelopment of this property including:

- disposal of excess soil,
- potential for release of contaminants to the environment during remediation and construction activities,
- remedial activities which require Certificates of Approvals, and
- off-site impacts.

Off-site impacts, actual or likely, must be reported to the Ministry District Office forthwith. For your information the Act, Regulation, guidance documents and associated fact sheets have been posted to the following site:

https://www.ontario.ca/page/brownfields-redevelopment

Michelle Zehr
Director, Environmental Protection Act s. 168.5

Attach:

SCHEDULE A

To Director's Notice dated November 18, 2024

Comments by Ministry of Environment, Conservation and Parks On Pre-Submission Form

15 Denison Avenue
Toronto, ON
PSF2262-24

(IDS Ref No. 0553-D7PKTD)

The following are Ministry comments on the following Pre-Submission Form (PSF):

- **Pre-Submission Form for 15 Denison Avenue, Toronto, Ontario, report prepared by Exp Services Inc., dated July 25, 2024**

Ministry reviewers offer comments, observations and questions, as follow, for the proponent's consideration in preparing a risk assessment for submission under the Records of Site Condition Regulation, O. Reg. 153/04 (Regulation).

Comments provided by the Ministry on the content of this Pre-Submission Form are not in any way a Director's response to a risk assessment referred to in subsection 168.5 of the EPA.

It also should be noted that a risk assessment submitted to the Ministry under the Regulation must include all mandatory requirements for risk assessments as listed in Table 1 of Schedule C of the Regulation. These requirements must be met or the risk assessment will be deemed incomplete and may be returned without further review.

It should also be noted that a risk assessment submitted to the Ministry under the Regulation must include a copy of the PSF as well as a response outlining how the comments in this Ministry review have been considered in the risk assessment.

The Regulation, guidance documents and associated fact sheets have been prepared to assist proponents. They can be found posted to the following site:

https://www.ontario.ca/page/brownfields-redevelopment

Timeline for Review of Risk Assessment

The proposed Risk Assessment (RA) will be a RA other than those identified in O. Reg. 153/04, Schedule C, Part II. Therefore, the review timeline for the RA will be set at 16 weeks. Section 46 of the Regulation provides specified maximum timelines for review of a RA by the Ministry. The Ministry's timeline for review of the RA under Section 46 of the Regulation will commence on receipt by the Ministry of a risk assessment in accordance with Section 2 of Schedule C of the Regulation.

COMMENTS ON PRE-SUBMISSION FORM

The following comments pertain to the Pre-Submission Form (PSF) for **15 Denison Avenue, Toronto, Ontario, report prepared by Exp Services Inc., dated July 25, 2024**

General Comments

The Site is about 0.24 hectares (0.59 acres) in size with the municipal address of 15 Denison Toronto, Ontario. The Site is currently used as a City of Toronto Green P parking lot with no permanent structures. Historical land use includes residential and a bakery. Although development plans are not yet finalized, the intended use will likely be mixed use, affordable housing development consisting of a multi-storey residential tower, cultural space and parkland. The future building will be a slab-on-grade building with no basement. The Site is planned to be redeveloped for indigenous housing and is a priority redevelopment project for the City of Toronto.

The nearest surface water body is Lake Ontario, located about 1.3 km south of the Site. The minimum depth to groundwater was reported as 3.6 m bgs.

The QP has indicated that the applicable Site Condition Standards (SCSs) are the MECP Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition for Residential/Parkland/Institutional land use with medium fine textured soil.

The following parameters were reported at concentrations above the Table 3 SCS:

- Soil: PHC F1, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, barium, copper, lead, mercury, zinc, electrical conductivity (EC) and sodium adsorption ratio (SAR).
- Groundwater: PHC F1, F2 and F3, ethylene dibromide, xylene and benzo(g,h,i)perylene

The QP has applied the exemption from Section 49.1(1) of O.Reg.153/04, as such EC and SAR are not considered COCs in the RA. Benzo(g,h,i)perylene in GW had sediment interference and had two rounds of compliant sampling, as such, it was also not considered a COC. The QP also discussed a rationale as to why ethylene dibromide was not retained as a COC despite an elevated detection limit exceeding the applicable SCS.

Light non-aqueous phase liquid (LNAPL) was measured on site with measurable thicknesses. An extraction program is currently being conducted to remove LNAPL from the Site.

Specific Review Comments

1. Introduction and General Approach:
    a. The QP has indicated that the Site was first developed for residential use prior to 1875. A review of City of Toronto property mapping indicates that the site was likely developed with multiple residential units at this time with development occurring as early as 1858. It is recommended that the City of Toronto property maps be referenced so development/type of development on the site can be updated for the RA.
    b. The QP has indicated that the site is not on, adjacent, or within 30 m of an area of natural significance (ANS) per the Ministry of Natural Resources and Forestry services (MNRF) Natural Heritage Areas Website. The QP should confirm that this source includes reference to all 9 ANS as defined by the Regulation.
    c. The QP has removed the elevated reporting detection limit (RDL) for ethylene dibromide in groundwater as a contaminant of concern (COC) from the risk assessment (RA). It is unclear how this parameter can be removed as a COC especially since ethylene dibromide is known to have been historically added to automotive gasoline. Due to the presence of light non aqueous phase liquid (LNAPL) on the site, the QP may wish to resample this well to confirm the presence/absence of this parameter, or alternatively include this parameter as a COC in the RA.
    d. The QP indicated that free product ranging from thickness between 2.26 and 0.01 m has been identified at several monitoring well and extraction well locations. Please clarify that the range is 0.01 to 2.26 m.

2. RA Approach: The QP describes the use of updated toxicity reference values (TRVs) to update the 2016 pathway specific component values. The QP is reminded that the most recent MECP TRVs were released in 2024 rather than 2022. The TRVs were not provided within the PSF and will therefore be reviewed as part of the RA submission.

3. RA Approach: The QP has identified several soil PAHs as COCs, the approach for assessing PAHs will be reviewed within the RA submission.

4. RA Approach: The QP has not identified a Site trespasser in this section, however this receptor was included in the PSF CSMs. Please ensure consistency throughout the PSF submission.

5. PSF Section 2: The QP is reminded of the limitations of certain HHRA models in the presence of LNAPL. Additionally, please note that ASTM E1739-95 has been withdrawn and therefore its use should be re-evaluated.

6. Related to comment above, as a reminder, the ministry's messaging continues to be that free phase product be removed to the extent practicable. The following are provided to the QP for considerations:

- If free product cannot be removed, the RA must provide a rationale for why this is the case.
- If free product is expected to remain on Site, it must be appropriately accounted for in the HH and ERA (including the HH and Eco CSMs).
- Is it expected that the extent of any free product be well delineated and clearly illustrated on figures.
- All exposure pathways related to free product must be considered (e.g., vapour intrusion, groundwater use, direct contact, migration of groundwater to surface water, odour and aesthetic considerations, acute-risk considerations, etc.).
- Please note that the development of the generic SCS did not consider the presence of free product. Therefore, the QPRA must discuss whether the assumptions inherent to the derivation of the human health and ecological component values are still valid (e.g., use of S-IA, GW2, GW3 component values, etc.) when free product is present or suspected to be present.

The reviewer understands that the QP will try to remove LNAPL to the extent feasible, however, all of the details as part of this LNAPL removal program should be included in the RA. Please also see P2CSM comments 6d below.

7. PSF Section 3 – The QP indicated that remediation action has taken place at the Site. Please note that all confirmatory sampling will have to conform to Schedule E requirements.

8. It would appear that pH outside the acceptable range were noted at four surficial soil samples but that confirmatory sampling was completed in March 2024 to address these. It would have been useful if the QP could have included a note in Section 3.6 to direct the reviewer to the section for clarity and transparency. Please also see P2CSM comments 6e below.

9. PSF Section 5 HHCSM with on site RMMs – Receptors on the property: The QP has shown vapour inhalation and skin contact as a complete exposure pathway for the long-term outdoor worker but not the resident, visitor, and trespasser, please clarify as these receptors would also be expected to spend time outdoors at the Site.

10. PSF Section 5, Terrestrial Exposure Pathways and EcoCSM: Inhalation is shown as a complete exposure pathway for offsite soil invertebrates the Eco CSM. This is in contradiction to Section 5 of the PSF where inhalation is shown as being incomplete for offsite receptors. This discrepancy should be resolved.

11. PSF Section 5, Terrestrial Exposure Pathways and EcoCSM: Dermal contact, ingestion of surface water and ingestion of prey are shown as complete pathways for offsite terrestrial birds and mammals in the EcoCSM. However, they are shown as incomplete in the PSF Section 5. Clarification should be provided.

12. PSF Section 8: The QP has not provided a figure showing grain size sampling locations in Appendix G, this should be provided. In addition, it would appear to the reviewer that only two (2) soil samples were collected for grain size analysis and that these were collected from

the same borehole location but at different depths. Additional rationale is required as to why one location for soil grain size sample is sufficient. Alternatively, as a conservative approach, the QP may wish to use coarse textured soil SCS.

13. Appendix A: The following comments pertain to the Phase Two CSM
    a. Section 2, Table 2: Due to the historical development (dating back to the late 1800s) including multiple residential units on the Site, it is unclear why fuel oil tanks and/or coal use/storage for heating purposes were not identified as PCAs/APECs for the site. Clarification is required.
    b. Section 2.2, Table 3:
        i. It is unclear why pH and PHCs were not identified as COPCs for APEC 1. Clarification is required.
        ii. It is unclear why Na and Cl were not identified as COPCs in ground water for APEC 2. Clarification is required.
    c. Section 4, Table 8: Mercury is identified as a COC in soil; however, the reviewer could not locate the results of the required subsequent methylmercury analysis. Please ensure the results for methylmercury are included with the RA submission.
    d. Is it expected that the extent of any free product be well delineated and clearly illustrated on figures. Please ensure this is provided with the RA submission.

14. Appendix B Table B-1: Based on the data presented on the App A CSM figures, particularly at the property boundaries, it is unclear why the QP has stated no for the potential for off-site soil COCs to exceed the applicable SCS at the nearest off-site receptors, please clarify.

15. Additional comments: Secondary screening of COCs to component values was not provided within the PSF report, this will be reviewed as part of the RA submission.

16. Figure 19B presents human health CSM with RMMs. It is indicated that ingestion of homegrown garden produce pathway will be mitigated by RMM (4). Please specify what RMM (4) is. Please also note RMMs may be required to mitigate unacceptable risk identified for off-site receptors, if identified.

Environmental Permissions Branch Comments on Phase Two CSM

These comments are based on the information provided in the phase two conceptual site model (CSM) dated July 2024 in Appendix A of the Pre-Submission Form (PSF) dated July 25, 2024.

General Comments:

1. Section 24, paragraph 1 to 4 of the Regulation – This section specifies the general objectives of a phase one environmental site assessment (ESA), which are to develop a preliminary determination of the likelihood that one or more contaminants have affected any land or water on, in or under the phase one property, to determine the need for a phase two ESA, to provide a basis for carrying out any phase two ESA required and to provide adequate preliminary information about environmental conditions in the land or

water on, in or under the phase one property for the conduct of a risk assessment (RA) following completion of a phase two ESA. The following issue was identified:

a. It is unclear if benzene, toluene, ethylbenzene, xylenes (BTEX) is considered a contaminant of potential concern (COPC) for areas of potential environmental concern (APECs) associated with fuel storage, automotive maintenance and other industrial activities. Note that the qualified person (QP) must identify all COPCs using the Method Groups as identified in the "Protocol for Analytical Methods in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", March 9, 2004, amended as of July 1, 2011 and as of February 19, 2021, which are also listed in footnote number 3 of the approved and updated APEC table form currently available for download during the online RSC submission process. Therefore, if BTEX is considered a COPC, then BTEX should be explicitly identified as such.

2. Subsection 4(1), subparagraph 4.1i of Schedule A – This subparagraph requires that the legal description of the RSC property and a list of its owners and a description of the nature of their interest and any municipal address, assessment roll number (ARN) and property identifier number (PIN) applicable to the property, prepared by a lawyer after reviewing a current plan of survey of the property that has been prepared, signed and sealed by a surveyor and all other necessary documents, be submitted with the RSC. The following issue was identified:

   a. The legal description for Part of PIN 21238-0045 (LT) provided in the letter prepared by the lawyer dated July 23, 2024 (*and in the phase two CSM submitted with the PSF*) does not appear to coincide with the RSC property highlighted on the plan of survey (Plan 66R-31627) submitted with the PSF. For example, the RSC property appears to exclude Part of 8 Ft 9 Inch Lane, Part of Lot 1 and Part of Lot 9, Plan D127 and Part of Lot 3 N/S Queen Street, Plan 65 of PIN 21238-0045 (LT). If this is the case, this should be clarified in the lawyer's letter.

3. Clause 16(2)(b) of Schedule D – The table of current and past uses of the phase one property is required to be completed in a form approved by the Director as part of the phase one ESA. The following issues were identified:

   a. The table of current and past uses of the phase one property provided with the PSF indicates that PIN 21238-0045 (LT) is located in the western portion of the property and that PIN 21238-0046 (LT) is located in the central and southern portions of the property. These descriptions do not appear to be consistent with the plan of survey submitted with the PSF.
   b. There appears to be an overlapping period of ownership for the period between 1903-1911. It is unclear how this can be the case and whether this is a typographical error in the table.

c. The QP indicates in the table of current and past uses submitted with the PSF that the presence of a bakery at the property between the 1920's to 1970's is a commercial use. The QP should clarify the specific nature of the bakery to support the commercial property use designation, rather than industrial use (please refer to Subsection 1(3) of the Regulation (as amended) for property use definitions, and in particular item ii. under the industrial use definition). Where applicable, note that an APEC is expected for any industrial use on the phase one/RSC property and would be subject to enhanced investigation requirements.

4. During the check of the phase two CSM, the Ministry of the Environment, Conservation and Parks (MECP) noticed the following inconsistencies:

    a. The QP identifies hot water soluble boron (B-HWS) as a COPC in ground water in APECs 3, 5 and 6. It is unclear if this is a typographical error as there are no applicable site condition standard SCS for this parameter in ground water.

Specific Comments of the Phase Two CSM:

5. Section 5, paragraph 2 of Schedule E – One of the specific objectives of the site investigation component of a phase two ESA is to confirm whether contaminants are present on, in or under the phase two property, and, if so, what the contaminants are, where they are located on, in or under the phase two property and at what concentrations. The following issues were identified:

    a. Based on the information presented in the phase two CSM submitted with the PSF, it is unclear if the phase two ESA included in the investigation of cyanide (CN^-) in ground water as sampling results for this COPC in ground water for APECs 3, 5 and 6 are missing from figures in the phase two CSM.

    b. Mercury (Hg) is reported to have exceeded the applicable SCS in soil at BH106-2A (0.8-1.1 mbgs); however, it is unclear if sampling and analysis for methyl mercury (Me-Hg) has been conducted at this location and depth where Hg exceeded the applicable SCS. Note that, as per the Soil, Ground Water and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, analysis for Me-Hg applies when Hg (total) standard is exceeded.

6. Section 43 and Table 1, Report Section 6, Sub-Heading (x) of Schedule E – The phase two CSM submitted with the RSC is required to demonstrate the current condition of the phase two property or, where remedial actions have been undertaken, the condition of the phase two property before the remedial actions were undertaken. The following information is missing from the phase two CSM:

    a. A description of, and, as appropriate, figures illustrating the physical setting of the phase two property and any areas under it including:

i. Hydrogeological characteristics, including aquifers, aquitards and, in each hydrostratigraphic unit where one or more contaminants are present at concentrations above the applicable SCSs, lateral and vertical hydraulic gradients. This section of the phase two CSM should identify and include a descriptions of all distinct hydrostratigraphic units (e.g., aquifers, aquitards) investigated under the property. It is unclear if there are distinct hydrostratigraphic units under the property and, if so, the measured ground water levels in each unit should be distinguished. In addition, the phase two CSM should explain the variability in measured ground water elevations in wells installed at/in different depths/stratigraphic units. Lastly, this section of the phase two CSM should specify the direction (e.g., up/down) of the vertical hydraulic gradient.

ii. Approximate depth to water table. This section of the phase two CSM should clarify the depth to the water table. It appears that a very large 3.60 to 14.50 mbgs "water table" range is reported and it is unclear if deeper measured water levels represent the water table surface or potentiometric levels beneath the water table surface.

iii. Areas on, in or under the phase two property where excess soil is finally placed. The heading for Section 3.3.1 of the phase two CSM submitted with the RSC does not appear to be consistent with the current phase two CSM heading in Table 1, Report Section 6, Sub-Heading (x) of Schedule E (i.e., "areas on, in or under the phase two property where excess soil is finally placed"). The QP should ensure the CSM reporting requirements are consistent with the Regulation (as amended).

b. Where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable SCS, identification of:

i. Climatic or meteorological conditions that may have influenced distribution and migration of the contaminants, such as temporal fluctuations in ground water levels. This section of the phase two CSM should include a discussion of how water table fluctuations may have affected light non-aqueous phase liquid (LNAPL) distribution (e.g., smearing, etc.).

c. Where contaminants on, in or under the phase two property are present at concentrations greater than the applicable SCS, two or more cross-sections showing, by parameter group as defined in the Analytical Protocol for which a contaminant has been analysed:

i. The lateral and vertical distribution of each contaminant in each area where the contaminant is present at a concentration greater than the

applicable SCS in soil, ground water and sediment. Only one cross-section was provided for petroleum hydrocarbon (PHC) impacted soil at BH5 in the southeast portion of the property.

ii. Approximate depth to water table in each area referred to in each area where the contaminant is present at a concentration greater than the applicable SCS in soil, ground water and sediment. Measured ground water levels should be shown on all cross-sections showing contaminant distribution in soil.

iii. Any subsurface structures and utilities that may affect contaminant distribution and transport in each area where the contaminant is present at a concentration greater than the applicable SCS in soil, ground water and sediment. The QP indicates in the phase two CSM that on-site storm sewers may have acted as preferential pathways for hydrocarbon migration and, therefore, these features should be located and identified in cross-sections.

d. The phase two CSM reports LNAPL free product in several monitoring and extraction wells on-site. Firstly, the QP will need to show the lateral distribution of LNAPL in a plan view figure using wells with screens that intersect the water table (in accordance with Paragraph 2 of Section 8 of Schedule E). The QP could present this information on Figure 13 or in a separate plan view figure (e.g., Figure 13A). Secondly, the QP will need to show the distribution/delineation and thickness of LNAPL in a minimum of two cross-sections in the area on the property where LNAPL was observed. The QP could present this information on existing cross-sections showing the distribution and delineation of PHCs and BTEX in ground water and an additional cross-section (e.g., C-C') may be necessary along the northern boundary to include extraction wells where LNAPL is reported.

e. Surface soil pH is reported to have been above the specified range for surface soils in four (4) separate samples at three (3) distinct sampling locations at the property. It is acknowledged that the QP is relying upon the averaging provision in the Regulation; however, the QP should still provide an explanation for what may have resulted in elevate surface soil pH in these samples.

f. For clarity, plan view figures showing soil sampling results should specify for each sample whether the sample was collected from fill material or from native material.

g. Figure 1 of the phase two CSM does not appear load properly and is not viewable. The contents of this figures could not be reviewed as a result.

h. Figures in the phase two CSM submitted with the RSC appear to utilize supplementary potentially contaminating activity (PCA) identifiers (e.g., PCA 1,

PCA 2, PCA 3, etc.). At a minimum, the QP must identify PCAs using the numbering and wording in Table 2 of Schedule D. If the QP is of the opinion that use of additional, supplementary identifiers is necessary (above and beyond the aforementioned minimum requirement), then this may be okay; however, at a minimum, the QP must identify PCAs using the numbering and wording in Table 2 of Schedule D, including on figures. This could be addressed by including a small table on the figure that specifies what PCA each supplementary PCA identifier corresponds to.

i. The units of the vertical scale are missing from cross-sections in the phase two CSM submitted with the PSF.

j. Sampling locations that are projected onto cross-sections should have their distance from the cross-section line specified on the cross-section (e.g., off-set distance specified immediately beside the sample location ID/label).

Summary and Conclusions

LNAPL removal is planned for the Site. The QP will need to document the remediation, including the volume of free-flowing product removed from the Site, provide figures showing the extent of impact, provide monitoring data and demonstrate that the LNAPL is stable and not migrating.

The QP has excluded ethylene bromide based on an elevated detection limit. Additional justification for its exclusion must be provided in the RA report. Mercury has been detected in site soils at concentrations above the applicable SCS; as such methyl mercury must be analyzed. The reviewer was unable to locate this data.

Please ensure that all inconsistencies are corrected for the RA report.

Risk Management Measures (RMMs)

- The QP would need to provide details of the RMMs in the RA in accordance to O.Reg. 153/04 (Schedule C, Table 1) and if any RMMs include engineering designs and controls (barriers to site soils, etc.), a Professional Engineer licensed to practice in Ontario should sign and seal a design report that details these designs and specifications along with any design drawing/figures. Please do not copy out the generic MGRA RMMs legal wording as part of the RMP because it is expected that a licensed Professional Engineer with the appropriate RMM experience will be developing and designing site specific RMMs.
- It is also expected that a QP provide details of a soil and groundwater management that includes soil sampling details for any soils excavated on the property and for reuse or for any soils being imported to the RA property and groundwater management plan for any collection and pumping of groundwater related to excavations or foundation drains. A CPU is exempted from parts of O.Reg.406/19 because a CPU is considered a legal

instrument issued by this Ministry.

- If there are potential risks to off-site receptors from the RA property, then the QP would need to "propose risk management measures on the RA property that are designed to prevent, eliminate or ameliorate any adverse effects on or off the RA property" as per O.Reg. 153/04 (Schedule C, Table 1, section 7).
- The Risk Management Plan should follow the requirements and headings outlined in Schedule C, Table 1, section 7 of O.Reg. 153/04.
- The RA should contain a separate appendix that includes all the legal information in one place (i.e. the updated lawyer's letter, a copy of the updated PIN abstracts, copy of the legal transfer and nominee agreements etc.).

Phase Two CSM

The QP indicated that remediation to remove the free product occurred in April and May of 2024. It is expected that the QP provide at least two rounds of groundwater monitoring after all the remediation events have been completed on the property to confirm the final concentrations of PHCs and BTEX in groundwater.

Environmental Bill of Rights Requirements

For any Property Owner or their Agent with an interest in submitting a Risk Assessment to the Ministry for acceptance under the Environmental Protection Act s. 168.5 we want to bring to your attention important amendments under the Environmental Bill of Rights Act.

Ontario Regulation 681/94, Classification of Proposals for Instruments, under the Environmental Bill of Rights (EBR) has been amended to classify certificates of property use (CPUs) as a class II instrument under the EBR if the certificate of property use relates to a risk assessment submitted to the Ministry on or after October 1, 2005. This amendment was made through O. Reg. 505/05. This classification requires a minimum level of public notification (by the Ministry) prior to issuance of the CPU, including a posting on the EBR, of certificate of property use proposals, and provides third party leave to appeal a decision on a certificate of property use.

All decisions regarding a CPU are subject to the Environmental Bill of Rights (EBR). One purpose of the summary of the Risk Management Plan which must be provided in the Risk Assessment Report under the heading "Risk Management Requirements" is to support these requirements. This summary will allow the Ministry to prepare a notice for the EBR in a timely fashion so as not to delay the processing of the submission. The EBR posting allows public input regarding the pending decision of the Director to issue the CPU under Section 168.6 of the EPA.

The summary provided by the Qualified Person under the heading "Risk Management Requirements" will be posted. The Ministry reserves the right to change the wording of the description, as required, to ensure that the public is correctly notified of the subject of the

application. The description should be simple and concise (typically under 100 words) and should include the following information:

- State the risk management measures (indicating the principle equipment and any proposed building or land use restrictions) and on-going monitoring, maintenance and contingency plan requirements.

The Regulation has been filed and can be viewed at e-laws:
https://www.ontario.ca/laws

SUBMISSION OF RISK ASSESSMENT

Submission of Risk Assessment

Four hard copies of the risk assessment (including a stand-alone electronic copy of the risk assessment [USB format]) should be delivered to:

The Director
Client Services and Permissions Branch
135 St. Clair Avenue West, 1st Floor
Toronto, ON, M4V 1P5
Telephone 416-314-8001

Of the four copies, at least one copy must contain the original signature of the QP_{RA} in the section on "mandatory certifications" as required by Section 5 of Schedule C of the Regulation. This original or master copy should be clearly labelled. However, if the ministry is still working remotely, then please follow the interim submission process for risk assessments. Please ensure the electronic copy submitted during the interim submission process is a stand-alone document and that all sections within the submission are bookmarked.

Change of Owner or QP_{RA}

Note that Section 3 (13) of Schedule C of the Regulation requires that the Director be notified in writing of a change of Property Owner, or change of QP_{RA}. It is requested that written notification of such a change be submitted to the Director at the above address and by email to the Risk Assessment Coordinator (address below). It is also requested that the notification include a copy of completed sections A, B, 1 and 10 of the Pre-Submission Form, completed and signed by all parties.

Risk Assessment

Many risk assessments fail because they do not satisfy basic requirements of the Regulation and/or because of misunderstandings about risk assessment processes under the Regulation. Before submitting a Risk Assessment to the Ministry, it is strongly recommended that the QP_{RA} review the mandatory requirements for risk assessments submitted under the Regulation, as outlined in **Sections 2, 4 and 5, and Table 1 of Schedule C of the Regulation**. As well, the

QP_{RA} should refer to the Ministry's *Procedures for Use of Risk Assessment Under Part XV.1 of the Environmental Protection Act* for guidance in how to satisfy the requirements of the Regulation.

Use of Non-Standard Models

Please be advised that if the risk assessment submission uses a computer model as referred to in Schedule C, Section 9(4) and 9(5) of the Regulation, the Risk Assessment will be deemed a 'new science' risk assessment and the review timeline will be set at 22 weeks. Please note that the Qualified Person shall, upon request of the Director, include an electronic copy of the computer model in the risk assessment report in a manner that does not violate any person's copyright or other intellectual property rights.

Property Specific Standards

It is the responsibility of the QP_{RA} to ensure that the property specific standards (PSS) that are developed in the risk assessment (RA) will support filing of a Record of Site Condition (RSC) by the QP_{ESA}. This means that:

1) The correct table of site condition standards (SCS) must be used for selecting contaminants of concern (COC) in the risk assessment, and
2) PSS must be proposed for all COCs.
3) The QP_{RA} and QP_{ESA} must be able to make the requisite certifications in the RA/RSC.
4) Any parameters that do not have a PSS established in the RA must meet the applicable SCS.
5) If the QP_{ESA} finds that the RA does not support filing of the RSC (for example: the RA established PSS that are lower than concentrations found on-site; remediation has failed to reduce concentrations to below the PSS or applicable SCS), a new Pre-Submission Form (PSF) and RA must be submitted to the Ministry for review under the Regulation. RAs, once approved under the Regulation, cannot be 'reopened' or revised.

ESA Requirements and RSC Filing

Some of the comments included in this document (Schedule A) may be related to the adequacy of the environmental site assessment (ESA) work performed to support the approach and conclusions of the risk assessment (RA). Note that acceptance of the qualified person (QP's) responses on these ESA-related matters will be for the purpose of supporting a decision on the RA only; a full regulatory review of the ESAs will not be conducted as part of any future RA review. The Ministry may undertake a more in depth review of the phase one and phase two ESA reports at the time the record of site condition (RSC) is submitted for filing to ensure that all the regulatory requirements have been met. Information relevant to the phase one and two ESA reports (e.g., table of areas of environmental concern, the conceptual site models) that may be amended as part of the RA should be reflected in updated phase one and two ESA reports prior to submitting RSCs for filing. In addition, if the work on the phase one and two ESA

exceeds 18 months prior to the submission date of the RSC, the phase one and two ESA reports will need to be updated prior to submitting RSCs for filing.

If the QP_{ESA} has any questions regarding meeting the ESA requirements at the time of RSC filing, it is suggested that they contact Sri Sangaraju of Environmental Permissions Branch; email Sridhar.Sangaraju@ontario.ca.

Questions

If the $QP_{(RA)}$ has questions regarding the application of the Regulation or the above comments, they should be forwarded by email to:

Alexina Mo
Technical Assessment and Standards Development Branch
alexina.mo@ontario.ca

and

Ann Marie Deonarine
Risk Assessment Coordinator
Technical Assessment and Standards Development Branch
ann-marie.deonarine@ontario.ca

Schedule A
Comments by the MECP on Risk Assessment for 15 Denison Avenue, Toronto, Ontario
PSF2262-24
IDS Ref No. 0553-D7PKTD

	MECP Comments (November 2024) PSF2262-24 IDS Ref No. 0553-D7PKTD	EXP Responses
Specific Review Comments		
1	Introduction and General Approach:	*See response(s) below...*
a.	The QP has indicated that the Site was first developed for residential use prior to 1875. A review of City of Toronto property mapping indicates that the site was likely developed with multiple residential units at this time with development occurring as early as 1858. It is recommended that the City of Toronto property maps be referenced so development/type of development on the site can be updated for the RA.	Acknowledged, please refer to Section 3.1 of the Risk Assessment report for updates related to the date of first development for the Site.
b.	The QP has indicated that the site is not on, adjacent, or within 30 m of an area of natural significance (ANS) per the Ministry of Natural Resources and Forestry services (MNRF) Natural Heritage Areas Website. The QP should confirm that this source includes reference to all 9 ANS as defined by the Regulation.	Acknowledged, please refer to Section 3.3.1 of the Risk Assessment for a discussion of the potential for the Site to be located within 30 m of an ANS. The Site is confirmed to not be within 30 m of such an ANS.
c.	The QP has removed the elevated reporting detection limit (RDL) for ethylene dibromide in groundwater as a contaminant of concern (COC) from the risk assessment (RA). It is unclear how this parameter can be removed as a COC especially since ethylene dibromide is known to have been historically added to automotive gasoline. Due to the presence of light non aqueous phase liquid (LNAPL) on the site, the QP may wish to resample this well to confirm the presence/absence of this parameter, or alternatively include this parameter as a COC in the RA.	Acknowledged, EXP has re-sampled MW4 in December 2024. The RDL of ethylene dibromide was below the applicable Table 3 SCS in both the original and duplicate groundwater sample collected on December 18, 2024. As such, ethylene dibromide was not retained as a COC in groundwater at the Site. Please refer to Section 3.3.3 of the Risk Assessment and Section 4.0 of Appendix B for more details.
d.	The QP indicated that free product ranging from thickness between 2.26 and 0.01 m has been identified at several monitoring well and extraction well locations. Please clarify that the range is 0.01 to 2.26 m.	Since issuance of the PSF, additional characterization and removal work of the identified free product has been completed at the Site by EXP. As such, an updated discussion of the presence of free-product has been provided within the Phase Two CSM provided as Appendix B. A plan view Figure summarizing the locations where free-product has been identified across the course of the monitoring program has been provided as Figure 13A. Cross sections showing the lateral and vertical extent of the delineated free-product are presented as Figures 19B and 20B.
2	RA Approach: The QP describes the use of updated toxicity reference values (TRVs) to update the 2016 pathway specific component values. The QP is reminded that the most recent MECP TRVs were released in 2024 rather than 2022. The TRVs were not provided within the PSF and will therefore be reviewed as part of the RA submission.	Acknowledged, TRVs provided by the MECP (2024a, 2024b) were used within the risks calculations and are provided within Appendix E, and a copy of the MGRA TRV inputs is provided within Appendix G (USB).
3	RA Approach: The QP has identified several soil PAHs as COCs, the approach for assessing PAHs will be reviewed within the RA submission.	Acknowledged, please refer to Section 4.1.1 of the RA report for the approach for assessing the carcinogenci PAHs present in soil at the RA property.
4	RA Approach: The QP has not identified a Site trespasser in this section, however this receptor was included in the PSF CSMs. Please ensure consistency throughout the PSF submission.	Acknowledged, the Site visitor / trespasser receptor has been included within the HHRA presented within Section 4.0. The Site resident will be assessed as a surrogate for the Site visitor / trespasser receptor, due to the assumed greater exposure frequency and duration.
5	PSF Section 2: The QP is reminded of the limitations of certain HHRA models in the presence of LNAPL. Additionally, please note that ASTM E1739-95 has been withdrawn and therefore its use should be re-evaluated.	Acknowledged, please refer to Section 4.2.4 and 4.4.7 on the discussion of uncertainty related to the use of the vapour models in the Risk Assessment in the presence of free product.
6	Related to comment above, as a reminder, the ministry's messaging continues to be that free phase product be removed to the extent practicable. The following are provided to the QP for considerations:	*Acknowledged, please refer to the responses below...*
•	If free product cannot be removed, the RA must provide a rationale for why this is the case.	Acknowledged, at the time of the RA submission, the remediation of LNAPL free-product in groundwater at the Site is on-going. EXP and the property Owner will re-assess the need to continue or modify the program following completion of one (1) year of free product extraction and monitoring events (est. March 2025). The removals will be followed by three (3) months of monthly monitoring to determine if residual LNAPL levels are remaining stable or rebounding in the subsurface at the Site.
•	If free product is expected to remain on Site, it must be appropriately accounted for in the HH and ERA (including the HH and Eco CSMs).	Acknwoledged, please refer to Sections 4.2.2 and 5.2.2 of the Risk Assessment and Figures 21A and 22B of Appendix B.

Schedule A
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PSF2262-24
IDS Ref No. 0553-D7PKTD

MECP Comments (November 2024) PSF2262-24 IDS Ref No. 0553-D7PKTD		EXP Responses
Specific Review Comments		
•	Is it expected that the extent of any free product be well delineated and clearly illustrated on figures.	Acknowledged, please refer to Figure 13A for a Planview Figure summarizing the extent of residual LNAPL in the subsurface at the Site. Cross-Sectional Figures 19B and 20B present the lateral and vertical delineation of residual LNAPL in groundwater at the Site. The plan view Figure and cross-sectional Figures are complete with POP boxes showing the results of free-product monitoring at each well throughout the duration of the extraction program.
•	All exposure pathways related to free product must be considered (e.g., vapour intrusion, groundwater use, direct contact, migration of groundwater to surface water, odour and aesthetic considerations, acute-risk considerations, etc.).	Acknowledged, a qualitative assessment of the potential for risks to Site receptors via the presence of LNAPL free-product in groundwater has been provided within the Risk Assessment report. Please refer to Section 4.4.3 for a qualitative assessment of potential risks to human receptors and to Section 5.5.3 for a qualitative assessment of potential risks to ecological receptors.
•	Please note that the development of the generic SCS did not consider the presence of free product. Therefore, the QPRA must discuss whether the assumptions inherent to the derivation of the human health and ecological component values are still valid (e.g., use of S-IA, GW2, GW3 component values, etc.) when free product is present or suspected to be present.	Acknowledged, a discussion related to the use of component values in the HHRA and ERA, in the presence of LNAPL free product has been included within Sections 4.4.7 and 5.5.7 of the Risk Assessment report.
Gen.	The reviewer understands that the QP will try to remove LNAPL to the extent feasible, however, all of the details as part of this LNAPL removal program should be included in the RA. Please also see P2CSM comments 6d below.	No response required.
7	PSF Section 3 – The QP indicated that remediation action has taken place at the Site. Please note that all confirmatory sampling will have to conform to Schedule E requirements.	Acknowledged, however EXP notes that for the conservative purposes EXP will retain 'worst-case' pre-remedial groundwater COC concentrations for the purpose of quantitative risk evaluation. The focus of the remedial efforts being completed on-Site is to remove the bulk of LNAPL free product from the subsuface to an extent that is reasonably practicable. Pre-remedial groundwater conditions are relied upon to support a conservative approach to the identification of potential risks to on-Site receptors.
8	It would appear that pH outside the acceptable range were noted at four surficial soil samples but that confirmatory sampling was completed in March 2024 to address these. It would have been useful if the QP could have included a note in Section 3.6 to direct the reviewer to the section for clarity and transparency. Please also see P2CSM comments 6e below.	Acknowledged, EXP will ensure that this suggestion is followed for future PSF submissions.
9	PSF Section 5 HHCSM with on site RMMs – Receptors on the property: The QP has shown vapour inhalation and skin contact as a complete exposure pathway for the long-term outdoor worker but not the resident, visitor, and trespasser, please clarify as these receptors would also be expected to spend time outdoors at the Site.	Acknowledged, please refer to Section 4.2.2 and Figure 21A of Appendix B for an assessment of complete exposure pathways to human receptors. Outdoor air inhalation is a complete exposure pathway for all on-Site human receptors, with the exception of the indoor worker.
10	PSF Section 5, Terrestrial Exposure Pathways and EcoCSM: Inhalation is shown as a complete exposure pathway for offsite soil invertebrates the Eco CSM. This is in contradiction to Section 5 of the PSF where inhalation is shown as being incomplete for offsite receptors. This discrepancy should be resolved.	Acknowledged, please refer to Section 5.2.2 and Figure 22A of Appendix B for an assessment of complete exposure pathways to ecological receptors. Inhalation exposure for off-Site terrestrial receptors is identified to be a complete exposure pathway.
11	PSF Section 5, Terrestrial Exposure Pathways and EcoCSM: Dermal contact, ingestion of surface water and ingestion of prey are shown as complete pathways for offsite terrestrial birds and mammals in the EcoCSM. However, they are shown as incomplete in the PSF Section 5. Clarification should be provided.	Acknowledged, please refer to Section 5.2.2 and Figure 22A of Appendix B for an assessment of complete exposure pathways to ecological receptors. Dermal contact, ingestion of surface water and ingestion of prey are identified to be complete pathways for off-Site terrestrial birds and mammals.
12	PSF Section 8: The QP has not provided a figure showing grain size sampling locations in Appendix G, this should be provided. In addition, it would appear to the reviewer that only two (2) soil samples were collected for grain size analysis and that these were collected from the same borehole location but at different depths. Additional rationale is required as to why one location for soil grain size sample is sufficient. Alternatively, as a conservative approach, the QP may wish to use coarse textured soil SCS.	Acknowledged, please note that the grain size rationale has been moved to Appendix P within the Risk Assessment. Figure P-1 has been provided showing the location of grain size samples collected across the Site. In January 2025, EXP collected two (2) additional soil samples for grain size analysis from the northeastern and southwestern portions of the Site to confirm grain size application. A surficial soil sample was collected from BH201 and a subsurface soil sample was collected from BH202. The results of both soil samples were determined to be medium-fine textured. As such, the application of the medium-fine SCS is confirmed to be appropriate for the Site.
13	Appendix A: The following comments pertain to the Phase Two CSM	*See response(s) below...*

Schedule A
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MECP Comments (November 2024) PSF2262-24 IDS Ref No. 0553-D7PKTD		EXP Responses
Specific Review Comments		
a.	Section 2, Table 2: Due to the historical development (dating back to the late 1800s) including multiple residential units on the Site, it is unclear why fuel oil tanks and/or coal use/storage for heating purposes were not identified as PCAs/APECs for the site. Clarification is required.	Acknowledged, however EXP reviewed the historical maps and Fire Insurance Plans of the Site and no information indicating the presence of fuel tanks and/or coal storage or use associated with the former residential homes was identified. Based on the available information, EXP cannot confirm if coal and/or fuel storage occurred within the former residential homes located at the Site. Based on review of the FIP from 1880 of the Site, there were approximately fourteen (14) residences formerly located at the Site. Based on the subsequent FIPs and aerial photographs for the Site, the former residential homes along the eastern portion of the Site, fronting Augusta, appear to have remained in the same configuration from 1913 up to 1964 and demolition. None of the identified FIPs between these periods indicate that coal and/or fuel storage occurred at the Site. As such, this was not identified as a PCA to have occurred at the Site.
b.	Section 2.2, Table 3:	See response(s) below...
i.	It is unclear why pH and PHCs were not identified as COPCs for APEC 1. Clarification is required.	Acknowledged, EXP has revised the pCOCs associated with APEC 1 to also include soil pH and PHCs. Please refer to Section 2.2, Table 3 of Appendix B.
ii.	It is unclear why Na and Cl were not identified as COPCs in ground water for APEC 2. Clarification is required.	Acknowledged, EXP has revised the pCOCs associated with APEC 2 to also include sodium and chloride in groundwater, for completeness.
c.	Section 4, Table 8: Mercury is identified as a COC in soil; however, the reviewer could not locate the results of the required subsequent methylmercury analysis. Please ensure the results for methylmercury are included with the RA submission.	Acknowledged, in January 2025 EXP advanced BH203 within 2 m of BH106. A soil sample and field duplicate were collected at the same sample interval as the prior identified mercury exceedance and were analyzed for methyl mercury. Methyl mercury analytical results are presented within Table C.7 of Appendix C.
d.	Is it expected that the extent of any free product be well delineated and clearly illustrated on figures. Please ensure this is provided with the RA submission.	Acknowledged, please refer to Figure 13A for a Planview depiction of the extent of residual LNAPL in groundwater at the Site and to Figures 19B and 20B for cross-sectional Figures showing the lateral and vertical extent of residual LNAPL in the subsurface at the Site.
14	Appendix B Table B-1: Based on the data presented on the App A CSM figures, particularly at the property boundaries, it is unclear why the QP has stated no for the potential for off-site soil COCs to exceed the applicable SCS at the nearest off-site receptors, please clarify.	Acknowledged, EXP has not identified soil COCs as having the potential to migrate off-Site based on the limited mobility of soil. Off-Site soil migration is assumed to be minimal under normal Site conditions and would be primarily driven by particulate and dust movement via wind. The Site is currently covered in asphalt and has low potential for soil migration under current Site conditions. While small quantities of soil dust may migrate off-Site during redevelopment the RMP has proposed a Soil and Groundwater Management Plan which will act to mitigate the off-Site migration of soil dust. In addition, the Site will also require a soil barrier system to be completed across the property which will mitigate off-Site transport of soil COCs under future Site conditions.
15	15.Additional comments: Secondary screening of COCs to component values was not provided within the PSF report, this will be reviewed as part of the RA submission.	Acknowledged, please refer to Appendix E for the secondary screening Tables for the HHRA and ERA. The secondary screening for the HHRA is presented within Table E4-1 and E4-2 and the secondary screening for the ERA is presented within Tables E5-1 and E5-2.
16	Figure 19B presents human health CSM with RMMs. It is indicated that ingestion of homegrown garden produce pathway will be mitigated by RMM (4). Please specify what RMM (4) is. Please also note RMMs may be required to mitigate unacceptable risk identified for off-site receptors, if identified.	Acknowledged, a garden produce restriction will be required as par to the RMM for the Site. The garden produce restriction is an administrative control that will dictate that plants for human consumption will be required to be grown in raised planters or boxes, separate from impacted soils and groundwater at the RA property. Further details re provided within Section 7.0 and Appendix M.

Schedule A
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IDS Ref No. 0553-D7PKTD

	MECP Comments (November 2024) PSF2262-24 IDS Ref No. 0553-D7PKTD	EXP Responses
General Comments on the Phase Two CSM		
1	Section 24, paragraph 1 to 4 of the Regulation – This section specifies the general objectives of a phase one environmental site assessment (ESA), which are to develop a preliminary determination of the likelihood that one or more contaminants have affected any land or water on, in or under the phase one property, to determine the need for a phase two ESA, to provide a basis for carrying out any phase two ESA required and to provide adequate preliminary information about environmental conditions in the land or water on, in or under the phase one property for the conduct of a risk assessment (RA) following completion of a phase two ESA. The following issue was identified:	*See response(s) below...*
a.	It is unclear if benzene, toluene, ethylbenzene, xylenes (BTEX) is considered a contaminant of potential concern (COPC) for areas of potential environmental concern (APECs) associated with fuel storage, automotive maintenance and other industrial activities. Note that the qualified person (QP) must identify all COPCs using the Method Groups as identified in the "Protocol for Analytical Methods in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", March 9, 2004, amended as of July 1, 2011 and as of February 19, 2021, which are also listed in footnote number 3 of the approved and updated APEC table form currently available for download during the online RSC submission process. Therefore, if BTEX is considered a COPC, then BTEX should be explicitly identified as such.	It is noted that APECs associated with fuel storage, automotive maintenance and other industrial activities were located off-Site. As such, EXP has submitted groundwater for the analysis of benzene, toluene, ethylbenzene and xylenes (BTEX) from all applicable monitoring wells at the Site with APECs associated with fuel storage, automotive, maintenance and other industrial activities. EXP has adjusted the APEC table in Appendix B to include BTEX as a COPC for groundwater where applicable. It is noted that BTEX results for groundwater analysis are shown in plan view Figure 13 and cross section Figures 17H & 18H.
2	Subsection 4(1), subparagraph 4.1i of Schedule A – This subparagraph requires that the legal description of the RSC property and a list of its owners and a description of the nature of their interest and any municipal address, assessment roll number (ARN) and property identifier number (PIN) applicable to the property, prepared by a lawyer after reviewing a current plan of survey of the property that has been prepared, signed and sealed by a surveyor and all other necessary documents, be submitted with the RSC. The following issue was identified:	*See response(s) below...*
a.	The legal description for Part of PIN 21238-0045 (LT) provided in the letter prepared by the lawyer dated July 23, 2024 (and in the phase two CSM submitted with the PSF) does not appear to coincide with the RSC property highlighted on the plan of survey (Plan 66R-31627) submitted with the PSF. For example, the RSC property appears to exclude Part of 8 Ft 9 Inch Lane, Part of Lot 1 and Part of Lot 9, Plan D127 and Part of Lot 3 N/S Queen Street, Plan 65 of PIN 21238-0045 (LT). If this is the case, this should be clarified in the lawyer's letter.	Based on discussions with the MECP and the Lawyer for the City of Toronto, no changes were made to the current legal documentation provided within Appendix I. The lawyer for the City of Toronto is of the opinion that the current legal description provided accurately describes the RA property. As discussed with the City of Toronto, Plan 66R-31627 shows the boundary of the RA property in bold black, and the schedule describes the parts being examined within the provided survey. According the schedule on the referenced survey, Part 1 includes Part of 8 Ft 9 Inch Lane, and it is Part of 21238-0045 (LT), the other part of the 8 Ft 9 Inch Lane and the other part of 21238-0045 (LT) should be the horizontal closed lane, south adjacent to the Site, not examined by the referenced survey. The lawyer for the City of Toronto is of the opinion that the survey does not change the legal description of PIN 21238-0045 (LT), the legal description is still LANE PL 65 TORONTO; 10 FT LANE, 8 FT 9 INCH LANE PL D127 TORONTO; PT LT 1 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT LT 9 PL D127 TORONTO AS IN WA99649; TORONTO , CITY OF TORONTO. Based on EXP communications with the MECP, it was determined that should the MECP still require calcification on the legal boundaries of the RA property, a meeting between the MECP and the City of Toronto's lawyer can be arranged at a later date.
3	Clause 16(2)(b) of Schedule D – The table of current and past uses of the phase one property is required to be completed in a form approved by the Director as part of the phase one ESA. The following issues were identified:	*See response(s) below...*
a.	The table of current and past uses of the phase one property provided with the PSF indicates that PIN 21238-0045 (LT) is located in the western portion of the property and that PIN 21238-0046 (LT) is located in the central and southern portions of the property. These descriptions do not appear to be consistent with the plan of survey submitted with the PSF.	Acknowledged, EXP has revised the Table of current and past use based on the MECP review comment. The updated Table of current and past use will be provided again to the MECP at the time of RSC filing.
b.	There appears to be an overlapping period of ownership for the period between 1903- 1911. It is unclear how this can be the case and whether this is a typographical error in the table.	

Schedule A
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General Comments on the Phase Two CSM		
c.	The QP indicates in the table of current and past uses submitted with the PSF that the presence of a bakery at the property between the 1920's to 1970's is a commercial use. The QP should clarify the specific nature of the bakery to support the commercial property use designation, rather than industrial use (please refer to Subsection 1(3) of the Regulation (as amended) for property use definitions, and in particular item ii. under the industrial use definition). Where applicable, note that an APEC is expected for any industrial use on the phase one/RSC property and would be subject to enhanced investigation requirements.	Acknowledged, based on EXPs record review the bakery was determined to be commercial in use, and was not classified as an industrial operation. An industrial bakery would be a large-scale production facility, manufacturing baked goods for whole-sale distribution. A commercial bakery would be a small-scale bakery, in which some production may occur, but primary sells good on-Site. Based on the City Directories, the former bakery building at 13 Denison Avenue was operated by Queen City Bakery between 1929 and 1945 and by Olympic Bakery between 1950 and 1965. The 1964 FIP indicated that the bakery at 13 Denison Avenue covered a footprint of approximately 400 m^2 and was electrically powered. Three (3) small ovens were noted within the bakery. No materials storage rooms, loading bays, or other signifiers of a large scale industrial bakery were identified based upon review of the 1964 FIP. In addition, no evidence that the property was used as an industrial bakery was identified via review of the aerial photographs for the Site from the same time range. As such, EXP is of the opinion that the former on-Site bakery would constitute commercial land use.
4	During the check of the phase two CSM, the Ministry of the Environment, Conservation and Parks (MECP) noticed the following inconsistencies:	*See response(s) below...*
a.	The QP identifies hot water soluble boron (B-HWS) as a COPC in ground water in APECs 3, 5 and 6. It is unclear if this is a typographical error as there are no applicable site condition standard SCS for this parameter in ground water.	Acknowledged, this was a editorial error. EXP has removed B-HWS as a COPC in groundwater for APECs 3, 5 and 6 as the parameter B-HWS is not applicable for groundwater.
Specific Comments on Phase Two Conceptual Site Model		
5	Section 5, paragraph 2 of Schedule E – One of the specific objectives of the site investigation component of a phase two ESA is to confirm whether contaminants are present on, in or under the phase two property, and, if so, what the contaminants are, where they are located on, in or under the phase two property and at what concentrations. The following issues were identified:	*See response(s) below...*
a.	Based on the information presented in the phase two CSM submitted with the PSF, it is unclear if the phase two ESA included in the investigation of cyanide (CN-) in ground water as sampling results for this COPC in ground water for APECs 3, 5 and 6 are missing from figures in the phase two CSM.	Acknowledged, EXP has collected groundwater samples for the analysis of cyanide from monitoring wells BH/MW1, BH/MW2, BH/MW4 and BH/MW5. Please refer to the revised Figure 15 within Appendix B and the updated analytical tables within Appendix C or the analytical results of cyanide in groundwater. It is noted that cyanide was below the laboratory limit of detection in all groundwater samples collected from the Site.
b.	Mercury (Hg) is reported to have exceeded the applicable SCS in soil at BH106-2A (0.8-1.1 mbgs); however, it is unclear if sampling and analysis for methyl mercury (Me-Hg) has been conducted at this location and depth where Hg exceeded the applicable SCS. Note that, as per the Soil, Ground Water and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, analysis for Me-Hg applies when Hg (total) standard is exceeded.	Acknowledged, in January 2025 EXP advanced one (1) shallow borehole within 2 m of BH106 (2020) and collected a soil sample and field duplicate sample from the same depth. Please refer to the revised Figure 9 within Appendix B and to Appendix C for the analytical results of MeHg sampling.
6	Section 43 and Table 1, Report Section 6, Sub-Heading (x) of Schedule E – The phase two CSM submitted with the RSC is required to demonstrate the current condition of the phase two property or, where remedial actions have been undertaken, the condition of the phase two property before the remedial actions were undertaken. The following information is missing from the phase two CSM:	*See response(s) below...*
a.	A description of, and, as appropriate, figures illustrating the physical setting of the phase two property and any areas under it including:	*See response(s) below...*

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General Comments on the Phase Two CSM		
i.	Hydrogeological characteristics, including aquifers, aquitards and, in each hydrostratigraphic unit where one or more contaminants are present at concentrations above the applicable SCSs, lateral and vertical hydraulic gradients. This section of the phase two CSM should identify and include a descriptions of all distinct hydrostratigraphic units (e.g., aquifers, aquitards) investigated under the property. It is unclear if there are distinct hydrostratigraphic units under the property and, if so, the measured ground water levels in each unit should be distinguished. In addition, the phase two CSM should explain the variability in measured ground water elevations in wells installed at/in different depths/stratigraphic units. Lastly, this section of the phase two CSM should specify the direction (e.g., up/down) of the vertical hydraulic gradient.	Acknowledged, please refer to the revised Phase two CSM Section 3.2 presented within Appendix B. In brief, Section 3.2 has been revised to include additional details on the depths to groundwater measured at the Site and differentiates groundwater level measurements collected from shallow overburden monitoring wells and those installed within the bedrock and at the bedrock / overburden interface. In addition, commentary has been provided to describe the significance of the vertical hydraulic gradient identified between BH/MW24-2 and BH/MW109.
ii.	Approximate depth to water table. This section of the phase two CSM should clarify the depth to the water table. It appears that a very large 3.60 to 14.50 mbgs “water table” range is reported and it is unclear if deeper measured water levels represent the water table surface or potentiometric levels beneath the water table surface.	Acknowledged, the majority of monitoring wells were installed in the overburden between approximately 6.0 - 9.0 m bgs and several deeper monitoring wells have been installed at the bedrock interface (i.e., BH/MW24-1, BH/MW24-3, BH/MW108) and within the bedrock (i.e., BH/MW24-2). Table 5 of the Phase Two CSM has been revised to refer only to the minimum depth to groundwater observed in the shallow monitoring wells installed at the Site. The shallowest measurement to the groundwater table in overburden monitoring wells was determined to be 2.84 m bgs at BH/MW5 in December 2024. A table summarizing all groundwater level measurements collected at the Site is provided within Appendix Q (zip file) of the RA report.
iii.	Areas on, in or under the phase two property where excess soil is finally placed. The heading for Section 3.3.1 of the phase two CSM submitted with the RSC does not appear to be consistent with the current phase two CSM heading in Table 1, Report Section 6, Sub-Heading (x) of Schedule E (i.e., “areas on, in or under the phase two property where excess soil is finally placed”). The QP should ensure the CSM reporting requirements are consistent with the Regulation (as amended).	Acknowledged, EXP has adjusted the heading of Section 3.3.1 to reflect curent Phase Two CSM reporting requirements as per the Regulation (as amended).
b.	Where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable SCS, identification of:	*See response(s) below...*
i.	Climatic or meteorological conditions that may have influenced distribution and migration of the contaminants, such as temporal fluctuations in ground water levels. This section of the phase two CSM should include a discussion of how water table fluctuations may have affected light non-aqueous phase liquid (LNAPL) distribution (e.g., smearing, etc.).	Acknowledged, EXP include a discussion of how water table fluctuations may have affected light non-aqueous phase liquid (LNAPL) distribution in the subsurface at the Site. Please refer to Section 4.4.4 of the Phase Two CSM in Appendix B.
c.	Where contaminants on, in or under the phase two property are present at concentrations greater than the applicable SCS, two or more cross-sections showing, by parameter group as defined in the Analytical Protocol for which a contaminant has been analysed:	*See response(s) below...*
i.	The lateral and vertical distribution of each contaminant in each area where the contaminant is present at a concentration greater than the applicable SCS in soil, ground water and sediment. Only one cross- section was provided for petroleum hydrocarbon (PHC) impacted soil at BH5 in the southeast portion of the property.	Acknowledge, EXP has included an additional cross-sections within the Phase Two CSM, identified as cross-sections C-C' and D-D' on Figure 5A. Please refer to Figure 19C for the second cross-section showing PHC F1 impacts in soil at BH5.
ii.	Approximate depth to water table in each area referred to in each area where the contaminant is present at a concentration greater than the applicable SCS in soil, ground water and sediment. Measured ground water levels should be shown on all cross-sections showing contaminant distribution in soil.	Acknowledged, EXP has included approximate depth to water table in each area where the contaminant is present in concentration greater than the applicable SCS in soil within cross section Figures. Please refer to the revised Phase two CSM Figure set provided within Appendix B.
iii.	Any subsurface structures and utilities that may affect contaminant distribution and transport in each area where the contaminant is present at a concentration greater than the applicable SCS in soil, ground water and sediment. The QP indicates in the phase two CSM that on-site storm sewers may have acted as preferential pathways for hydrocarbon migration and, therefore, these features should be located and identified in cross-sections.	As detailed above, the exact dimensions, construction and installation depths of all subgrade utilities at the Site are unknown at this time. While it is assumed that the presence of subsurface utilities at the Site could have an impact on contaminant migration in groundwater, this would likely be a minor contributing factor. The minimum depth to groundwater identified at the Site was 2.84 m bgs or approximately 9' below grade, which is likely far greater than the depth of the catch basins and storm sewers. Given the above and the fact that exact dimensions, depths and other construction details are unknown at this time, on-Site utilities have not been displayed on cross-sections.

Schedule A
Comments by the MECP on Risk Assessment for 15 Denison Avenue, Toronto, Ontario
PSF2262-24
IDS Ref No. 0553-D7PKTD

MECP Comments (November 2024) PSF2262-24 IDS Ref No. 0553-D7PKTD		EXP Responses
General Comments on the Phase Two CSM		
d.	The phase two CSM reports LNAPL free product in several monitoring and extraction wells on-site. Firstly, the QP will need to show the lateral distribution of LNAPL in a plan view figure using wells with screens that intersect the water table (in accordance with Paragraph 2 of Section 8 of Schedule E). The QP could present this information on Figure 13 or in a separate plan view figure (e.g., Figure 13A). Secondly, the QP will need to show the distribution/delineation and thickness of LNAPL in a minimum of two cross-sections in the area on the property where LNAPL was observed. The QP could present this information on existing cross-sections showing the distribution and delineation of PHCs and BTEX in ground water and an additional cross-section (e.g., C-C') may be necessary along the northern boundary to include extraction wells where LNAPL is reported.	Acknowledged, EXP has showed the lateral distribution of LNAPL in a plan view figure using wells with screens that intersect the water table (in accordance with Paragraph 2 of Section 8 of Schedule E) in Figure 13A. EXP has also shown the distribution/delineation and thickness of LNAPL in two (2) cross new cross-sections, C-C' and D-D', as shown on Figure 5A of the Phase Two CSM. Please refer to Figures 19B and 20B.
e.	Surface soil pH is reported to have been above the specified range for surface soils in four (4) separate samples at three (3) distinct sampling locations at the property. It is acknowledged that the QP is relying upon the averaging provision in the Regulation; however, the QP should still provide an explanation for what may have resulted in elevate surface soil pH in these samples.	Acknowledged, please refer to Section 4.0 of the Phase Two CSM for a discussion of the potential source of soil pH exceedances at the Site. It is likely that the soil pH exceedances were associated with the fill materials of unknown quality identified in surficial soil across the Site.
f.	For clarity, plan view figures showing soil sampling results should specify for each sample whether the sample was collected from fill material or from native material.	Acknowledged; however, as far as EXP is aware, this is not a requirement under O.Reg. 153/04 for Phase Two CSM to display if soil samples were collected from fill or native materials present at the Site. For samples collected by EXP, please refer to the borehole logs as presented within Appendix G. While it is noted that Terrapex did not generate borehole logs for each's sampling location, the soil type the samples are collected from is also highlighted within the past report, also provided within Appendix G. In addition, soil stratigraphy is also presented within the cross-sectional figures provided within Appendix B.
g.	Figure 1 of the phase two CSM does not appear load properly and is not viewable. The contents of this figures could not be reviewed as a result.	Acknowledged, should any of the attached Figures not be viewable, please refer to Appendix G (USB) for unlocked version of the Phase two CSM Figures.
h.	Figures in the phase two CSM submitted with the RSC appear to utilize supplementary potentially contaminating activity (PCA) identifiers (e.g., PCA 1, PCA 2, PCA 3, etc.). At a minimum, the QP must identify PCAs using the numbering and wording in Table 2 of Schedule D. If the QP is of the opinion that use of additional, supplementary identifiers is necessary (above and beyond the aforementioned minimum requirement), then this may be okay; however, at a minimum, the QP must identify PCAs using the numbering and wording in Table 2 of Schedule D, including on figures. This could be addressed by including a small table on the figure that specifies what PCA each supplementary PCA identifier corresponds to.	Acknowledged, EXP has identified PCAs using the numbering and wording in Table 2 of Schedule D, including in figures. EXP has included a table specifying which PCAs using the approved wording apply to supplementary PCA identifiers in the CSM, please refer to the revised Figure 2 in Appendix B.
i.	The units of the vertical scale are missing from cross-sections in the phase two CSM submitted with the PSF.	Acknowledged, EXP has included the vertical scale from cross-sections in the Phase Two CSM provided as Appendix B.
j.	Sampling locations that are projected onto cross-sections should have their distance from the cross-section line specified on the cross-section (e.g., off-set distance specified immediately beside the sample location ID/label).	Acknowledged; however, as far as EXP is aware, this is not a formal requirement in the regulation and off-set distance from the sampling locations to the cross-section axis have not been displayed on cross-sectional figures. EXP notes that this information is already presented within Figure 5A, showing the plan view layout of the borehole/monitoring well locations and cross-section lines. Figure 5A is drawn to scale showing off-set distance from the cross-section lines.
Summary and Conclusions		

Schedule A
Comments by the MECP on Risk Assessment for 15 Denison Avenue, Toronto, Ontario
PSF2262-24
IDS Ref No. 0553-D7PKTD

MECP Comments (November 2024) PSF2262-24 IDS Ref No. 0553-D7PKTD		EXP Responses
General Comments on the Phase Two CSM		
Gen.	LNAPL removal is planned for the Site. The QP will need to document the remediation, including the volume of free-flowing product removed from the Site, provide figures showing the extent of impact, provide monitoring data and demonstrate that the LNAPL is stable and not migrating. The QP has excluded ethylene bromide based on an elevated detection limit. Additional justification for its exclusion must be provided in the RA report. Mercury has been detected in site soils at concentrations above the applicable SCS; as such methyl mercury must be analyzed. The reviewer was unable to locate this data. Please ensure that all inconsistencies are corrected for the RA report.	Acknowledged, EXP has provided a summary of the results of the free-product removal program to date. A final summary report documenting all aspects of the program will be provided within the subsequent RA submission once a final report is prepared. As noted in the response to earlier comments, additional sampling to support the exclusion of ethylene dibromide as a COC for groundwater has been completed. In addition, as discussed in the comments above, soil samples for methyl mercury have been collected from the Site at the location of the initial mercury exceedance in soil.

Schedule A
Comments by the MECP on Risk Assessment for 15 Denison Avenue, Toronto, Ontario
PSF2262-24
IDS Ref No. 0553-D7PKTD

MECP Comments (November 2024) PSF2262-24 IDS Ref No. 0553-D7PKTD		EXP Responses
Risk Management Measures (RMMs)		
•	The QP would need to provide details of the RMMs in the RA in accordance to O.Reg. 153/04 (Schedule C, Table 1) and if any RMMs include engineering designs and controls (barriers to site soils, etc.), a Professional Engineer licensed to practice in Ontario should sign and seal a design report that details these designs and specifications along with any design drawing/figures. Please do not copy out the generic MGRA RMMs legal wording as part of the RMP because it is expected that a licensed Professional Engineer with the appropriate RMM experience will be developing and designing site specific RMMs.	Acknowledged, please refer to Appendix M for the Risk Management Plan.
•	It is also expected that a QP provide details of a soil and groundwater management that includes soil sampling details for any soils excavated on the property and for reuse or for any soils being imported to the RA property and groundwater management plan for any collection and pumping of groundwater related to excavations or foundation drains. A CPU is exempted from parts of O.Reg.406/19 because a CPU is considered a legal instrument issued by this Ministry.	Acknowledged, please refer to Section 7.0 of the Risk Assessment and Appendix M for Site specific details related to the proposed soil and groundwater management to be implemented for the Site upon redevelopment. The discussion of the proposed soil management plan incudes details on the sampling requirements for soil re-use, import and export and details associated with the management of any groundwater or storm water collected during excavations. Given that the future building will be slab-on-grade, groundwater will not need to be managed for the future building.
•	If there are potential risks to off-site receptors from the RA property, then the QP would need to "propose risk management measures on the RA property that are designed to prevent, eliminate or ameliorate any adverse effects on or off the RA property" as per O.Reg. 153/04 (Schedule C, Table 1, section 7).	Acknowledged, at this time off-Site risks as a result of on-Site soil and groundwater impacts are not anticipated to occur and thus RMM to mitigate off-Site risks have not been proposed.
•	The Risk Management Plan should follow the requirements and headings outlined in Schedule C, Table 1, section 7 of O.Reg. 153/04.	Acknowledged, please refer to Appendix M for the Risk Management Plan.
•	The RA should contain a separate appendix that includes all the legal information in one place (i.e. the updated lawyer's letter, a copy of the updated PIN abstracts, copy of the legal transfer and nominee agreements etc.).	Acknowledged, please refer to Appendix I of the Risk Assessment report for a stand alone appendix containing all of the supporting legal documentation.
Phase Two CSM comments from District		
•	The QP indicated that remediation to remove the free product occurred in April and May of 2024. It is expected that the QP provide at least two rounds of groundwater monitoring after all the remediation events have been completed on the property to confirm the final concentrations of PHCs and BTEX in groundwater.	Acknowledged, however, as noted within the Risk Assessment report, EXP will continue to use maximum concentrations from pre remedial conditions at the RA property in order to provide a conservative assessment of potential impacts to human and ecological receptors at the Site. In addition, the use of pre-remedial maximum groundwater concentrations allows for a more representative assessment of potential risks should residual LNAPL free product remain on-Site following completion of the remediation program.

Appendix E: HHRA and ERA Tables

Table E4-1: Comparison of Soil COC Maximum Concentrations to MECP (2011) Table 3 Site Condition Standards and Human Health Component Values - Residential/Parkland/Institutional Land Use and Medium-Fine Textured Soils

Contaminant of Concern	Maximum Concentration / Reporting Detection Limit (µg/g)	REM Soil Concentration[1] (µg/g)	MECP (2011) Table 3 SCS (µg/g)	Human Health Component Values (µg/g)					
				S1[2]	S2[3]	S3[3]	S-IA (Residential)[2]	Indoor Air Odour (Residential)[4]	S-OA[2]
PHCs									
PHC F1	255	**306**	65	6,900	47,000	100,000	55	NV	15,000
PAHs									
[5] Acenaphthene	0.88	1.06	58	360	700	9,800	110	29,000	2,400
[5] Acenaphthylene	1.9	2.28	0.17	57	70	2,600	6	NV	180
[5] Anthracene	5.6	6.72	0.74	57	70	2,600	130	NV	950
Benzo(a)anthracene	18	**21.6**	0.63	5.7	7	260	900	NA	600
Benzo(a)pyrene	14	**16.8**	0.3	0.57	0.7	17	2,500	NA	68
Benzo(b)fluoranthene	17	**20.4**	0.78	5.7	7	260	68,000	NA	3,800
Benzo(ghi)perylene	7.8	9.36	7.8	57	70	2,600	NA	NA	NA
Benzo(k)fluoranthene	6.4	**7.68**	0.78	5.7	7	260	83,000	NA	3,800
Chrysene	14	16.8	7.8	57	70	2,600	23,000	NA	12,000
Dibenz(a,h)anthracene	2.1	**2.52**	0.1	0.57	0.7	26	310,000	NA	790
Fluoranthene	40	48	0.69	57	70	2,600	3,200	NA	4,500
Indeno(1,2,3-cd)pyrene	8.5	**10.2**	0.48	5.7	7	260	550,000	NA	7,300
[5] Phenanthrene	23	**27.6**	7.8	NV	NV	NV	NV	NV	NV
Pyrene	37	44.4	390	540	700	26,000	24,000	NA	41,000
Metals									
Barium	519	623	390	3,800	32,000	8,600	NA	NA	NA
Copper	1,300	**1,560**	180	200	1,900	1,900	NA	NA	NA
Lead	510	**612**	120	45	420	420	NA	NA	NA
Zinc	550	660	340	6,800	57,000	57,000	NA	NA	NA
ORPs									
Mercury	1.9	**2.28**	1.8	9.8	67	670	1.8	NA	36

[1] **Bolded** values are in excess of one or more component values or an applicable component value is not available.

[2] Table 3 soil components for residential/parkland/institutional land use in a non-potable ground water condition with medium-fine textured soils obtained from MECP (2016). It is noted that component values have been updated based on updated TRVs provided by MECP (2024a, 2024c), where applicable.

[3] Table 3 soil components for industrial/commercial/community land use in a non-potable ground water condition with medium-fine textured soils obtained from MECP (2016). It is noted that component values have been updated based on updated TRVs provided by MECP (2024a, 2024c), where applicable.

[4] According to the MECP (2011c), the indoor air inhalation component value is protective of indoor air odour. Therefore only the risk related to indoor air inhalation will be assessed further.

[5] Volatile PAHs as per MECP guidance (i.e., any PAH with a Henry's Law Constant greater than $1x10^{-5}$ atm-m^3/mol or vapor pressure greater than 1 torr at the average soil or groundwater temperature of 15 ºC)

NA - not applicable; NV - no value derived.

S1 - High frequency and high intensity direct contact exposure adopted from the residential land use scenario for application to site residents and visitors.

S2 - Low frequency and low intensity direct contact expsoure without children present.

S3 - Low frequency and high intensity direct contact exposure for trench works.

S-IA Soil to indoor air.

S-OA - soil to outdoor air.

Pathway to be risk assessed.

Component values not highlighted indicates that the REM concentration does not exceed the component value. Therefore no further quantitative evaluation of these pathways are warranted, excluding the assessment of the trench air inhalation pathway since no component values exist for this pathway.

The REM of this parameter is below the applicable Site Condition Standard and component values; however, the parameter will be carried forward for the quantitative analysis of total carcinogenic PAHs for applicable pathways (where a component value is exceeded for any one carcinogenic PAH).

Table E4-2: Comparison of Ground Water COC Maximum Concentrations to MECP (2011) Table 3 Site Condition Standards and Human Health Component Values - All Types of Land Use and Medium-Fine Textured Soils

Contaminant of Concern	Maximum Concentration / Reporting Detection Limit (µg/L)	REM Ground Water Concentration[1] (µg/L)	MECP (2011) Table 3 SCS (µg/L)	Human Health Component Values (µg/L)[2]			
				Modified GW1[3]	GW2 (Residential)[4]	GW2 Odour (Residential)[5]	50% Solubility
PHCs and BTEX							
Xylenes (total)	4,640	5,568	4,200	30,000	80,000	54,000,000	53,000
PHC F1	213,000	**255,600**	750	82,000	2,000	NV	**1,900**
PHC F2	160,000	**192,000**	150	30,000	25,000	NV	**150**
PHC F3	1,500	1,800	500	100,000	NA	NA	**4.90E-08**

[1] Bolded values are in excess of one or more component values or an applicable component value is not available.

[2] Component values obtained from MECP (2016). It is noted that component values have been updated based on updated TRVs provided by MECP (2024a), where applicable.

[3] Table 2 GW1 values for assessment of ingestion of groundwater used as a surrogate for construction/subsurface utility worker via direct contact with groundwater with application of a 100x multiplier.

[4] Table 3 GW2 Residential values for assessment of the vapour intrusion pathways for the future residential land use scenario.

[5] According to the MECP (2011c), the indoor air inhalation component value is protective of indoor air odour. Therefore only the risk related to indoor air inhalation will be assessed further.

NA - not applicable. Parameter is not considered volatile.

NV - no value derived.

GW1 - Ingestion of potable ground water.

GW2 - Ground water to indoor air.

Pathway to be risk assessed.

RED - Exceeds 1/2 solubility component value.

Component values not highlighted indicates that the REM concentration does not exceed the component value. Therefore no further quantitative evaluation of these pathways are warranted, excluding the assessment of the trench air and outdoor air inhalation pathway since no component values exist for these pathways.

Table E4-3: Soil COC Exposure Point Concentrations

	Contaminant of Concern	Exposure Point Concentration (µg/g)	Basis
	PHCs		
	PHC F1	306	REM
	Aliphatic C6-C8	168	REM Subfraction Concentration[1]
	Aliphatic C>8-C10	110	REM Subfraction Concentration[1]
	Aromatic C>8-C10	27.5	REM Subfraction Concentration[1]
	PAHs		
*	Acenaphthene	1.06	REM
*	Acenaphthylene	2.28	REM
*	Anthracene	6.72	REM
	Benzo(a)anthracene	21.6	REM
	Benzo(a)pyrene	16.8	REM
	Benzo(b)fluoranthene	20.4	REM
	Benzo(ghi)perylene	9.36	REM
	Benzo(k)fluoranthene	7.68	REM
	Chrysene	16.8	REM
	Dibenz(a,h)anthracene	2.52	REM
	Fluoranthene	48	REM
	Indeno(1,2,3-cd)pyrene	10.2	REM
*	Phenanthrene	27.6	REM
	Pyrene	44.4	REM
	Metals		
	Barium	623	REM
	Copper	1,560	REM
	Lead	612	REM
	Zinc	660	REM
	ORPs		
	Mercury	2.28	REM

REM - Reasonable estimate of the maximum concentration calculated as the maximum on-site concentration + 20%.

* Volatile PAHs

[1] Exposure point concentrations for the PHC aliphatic and aromatic subfractions were calculated from the maximum parent fraction concentration and the subfraction mass fractions present in CCME (2008) as cited in MECP (2011c).

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-4: Ground Water COC Exposure Point Concentrations

Contaminant of Concern	Exposure Point Concentration (µg/L)[1]	Basis
PHCs and BTEX		
Xylenes (total)	5,568	REM
PHC F1	255,600	REM
Aliphatic C6-C8	154,638	REM Subfraction Concentration[1]
Aliphatic C>8-C10	16,103	REM Subfraction Concentration[1]
Aromatic C>8-C10	84,859	REM Subfraction Concentration[1]
PHC F2	192,000	REM
Aliphatic C>10-C12	4608	REM Subfraction Concentration[1]
Aliphatic C>12-C16	384	REM Subfraction Concentration[1]
Aromatic C>10-C12	115776	REM Subfraction Concentration[1]
Aromatic C>12-C16	71232	REM Subfraction Concentration[1]
PHC F3	1,800	REM
Aliphatic C>16-C21	1,008	REM Subfraction Concentration[1]
Aliphatic C>21-C34	432	REM Subfraction Concentration[1]
Aromatic C>16-C21	252	REM Subfraction Concentration[1]
Aromatic C>21-C34	108	REM Subfraction Concentration[1]

REM - Reasonable estimate of the maximum concentration calculated as the maximum on-site concentration + 20%.

[1] Exposure point concentrations for the PHC aliphatic and aromatic subfractions were calculated from the maximum parent fraction concentration and the subfraction mass fractions present in CCME (2008) as cited in MECP (2011c).

Table E4-5: Summary of Receptor Characteristics

Exposure Parameter	Infant Site Resident	Toddler Site Resident	Child Site Resident	Teen Site Resident	Adult Site Resident	Indoor Worker	Maintenance Worker	Pregnant Female Maintenance Worker - Lead Direct Soil Contact Exposure[4]	Construction Worker	Pregnant Female Construction Worker - Lead Direct Soil Contact Exposure[4]	Reference
Age (yr)	0 - 0.5	0.5 - 4	5 - 11	12 - 19	>20	>20	>20	>20	>20	>20	MECP (2011C)
Age Group Duration (yr)	0.5	4.5	7	8	56	56	56	56	56	56	MECP (2011C)
Body weight (kg)	8.2	16.5	32.9	59.7	70.7	70.7	70.7	63.1	70.7	63.1	MECP (2011C)
Exposed Skin Surface Area (cm^2)	1105	1745	2822	3858	4343	-	3400	3090	3400	3090	MECP (2011C)
Soil Adherence Factor (kg/cm^2-d)	7.00E-08	2.00E-07	2.00E-07	7.00E-08	7.00E-08	-	2.00E-07	2.00E-07	2.00E-07	2.00E-07	MECP (2011C)
Soil Ingestion Rate (mg/day)	3.00E+01	2.00E+02	5.00E+01	5.00E+01	5.00E+01	-	1.00E+02	1.00E+02	1.00E+02	1.00E+02	MECP (2011C)
Exposure Frequency Indoors (hr/day)	24	24	22.23	21.83	22.5	9.8	-	-	-	-	MECP (2011C)
Exposure Frequency Outdoors (hr/day)	4.3	4.3	4.3	4.3	4.3	-	9.8	9.8	9.8	9.8	US EPA (2011)[1] and MECP (2011C)
Exposure Frequency in Trench (hr/day)	-	-	-	-	-	-	-	-	9.8	9.8	Assumed
Exposure Frequency Indoors and Outdoors (d/wk)	7	7	7	7	7	5	5	5	5	5	MECP (2011C) and MECP (2024B)
Exposure Frequency Indoors (wk/yr)	50	50	50	50	50	50	-	-	-	-	MECP (2011C)
Exposure Frequency Outdoors (wk/yr)[2]	39	39	39	39	39	-	39	52	39	52	MECP (2011C) and MECP (2024B)
Exposure Frequency in Trench (wk/yr)	-	-	-	-	-	-	-	-	4	-	Assumed; Professional Judgement
Exposure Duration (yr)	0.5	4.5	7	8	56	56	56	56	1.5	56	MECP (2011C)
Ground Water Dermal Contact Event Duration (hr/event)	-	-	-	-	-	-	-	-	0.25	-	Assumed
Ground Water Dermal Contact Event Frequency (events/d)	-	-	-	-	-	-	-	-	2	-	Assumed
Ground Water Incidental Ingestion Rate (L/d)	-	-	-	-	-	-	-	-	0.005	-	US EPA (2014)[2]
Inhalation rate (m^3/hr)	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	1.5	1.5	MECP (2011C)
Concentration of PM10 in Air (ug/m^3)	100	100	100	100	100	-	100	100	100	100	MECP (2011C)
Fraction of PM10 Which is Deposited (unitless)	0.6	0.6	0.6	0.6	0.6	-	0.6	0.6	0.6	0.6	MECP (2011C)
Averaging Time - non-carcinogens (yr)	0.5	4.5	7	8	56	56	56	56	1.5	56	MECP (2011C)
Averaging Time - carcinogens (yr)	76	76	76	76	76	56	56	56	56	56	MECP (2011C)
Averaging Time for Vapour Flux (s)	3.21E+08	3.21E+08	3.21E+08	3.21E+08	3.21E+08	-	3.85E+08	5.14E+08	1.03E+07	5.14E+08	Calculated

'-" - not applicable.

[1] Wiley et al. (1991), as cited by US EPA (2011), reports a total daily outdoor exposure duration of 4.3 hours for children under that age of 11. This value was conservatively assumed for all age groups.

[2] Based on recommended incidental ingestion rate of 10 ml/h while wading in surface water (US EPA, 2014).

[3] For the Construction/Subsurface Utility Worker, it is assumed that of the 39 weeks/year spent outdoors at the Site (MECP, 2011c), 35 weeks/year are spent at grade and 4 weeks/year are spent in an on-site trench.

[4] For direct contact exposure to lead by the pregnant Maintenance Workers and pregnant Construction/Subsurface Utility Workers, it is assumed that of they would be on site for 5 days per week for 52 weeks/year (MECP, 2024b).

Table E4-6A: Summary of Chemical Physical Properties for Soil COCs[1]

COC	Air Diffusion Coefficient (cm^2/s)	Water Diffusion Coefficient (cm^2/s)	Henry's Law Constant at 15°C (Unitless)	Pure Component Solubility in Water (mg/L)	Organic Carbon Partiton Coefficient (cm^3/g)	Molecular Weight (g/mol)	Octanol Water Partition Coefficient (Log (K_{ow}))
PHCs and BTEX							
PHC F1							
Aliphatic C6-C8	5.00E-02	6.00E-06	5.17E+01	5.40E+00	7.96E+03	1.00E+02	3.60E+00
Aliphatic C>8-C10	5.00E-02	6.00E-06	8.28E+01	4.30E-01	6.32E+04	1.30E+02	4.50E+00
Aromatic C>8-C10	5.00E-02	6.00E-06	4.97E-01	6.50E+01	3.17E+03	1.20E+02	3.20E+00
PAHs							
Acenaphthene	4.21E-02	7.69E-06	3.01E-03	3.90E+00	1.22E+04	1.54E+02	3.92E+00
Acenaphthylene	4.39E-02	7.53E-06	5.29E-03	1.61E+01	1.22E+04	1.52E+02	3.94E+00
Anthracene	3.24E-02	7.74E-06	8.05E-04	4.34E-02	4.08E+04	1.78E+02	4.45E+00
Benzo(a)anthracene	5.10E-02	9.00E-06	1.33E-04	9.40E-03	4.62E+05	2.28E+02	5.76E+00
Benzo(a)pyrene	4.30E-02	9.00E-06	3.65E-06	1.62E-03	1.57E+06	2.52E+02	6.13E+00
Benzo(b)fluoranthene	2.26E-02	5.56E-06	6.25E-06	1.50E-03	1.61E+06	2.52E+02	5.78E+00
Benzo(ghi)perylene[2]	2.26E-02	5.23E-06	1.40E-05	2.60E-04	5.36E+06	2.76E+02	6.63E+00
Benzo(k)fluoranthene	2.26E-02	5.56E-06	5.02E-06	8.00E-04	1.57E+06	2.52E+02	6.11E+00
Chrysene	2.48E-02	6.21E-06	5.31E-05	2.00E-03	4.72E+05	2.28E+02	5.81E+00
Dibenz(a,h)anthracene	2.02E-02	5.18E-06	3.51E-07	1.03E-03	5.24E+06	2.78E+02	6.54E+00
Fluoranthene	3.02E-02	6.35E-06	1.16E-04	2.60E-01	1.42E+05	2.02E+02	5.16E+00
Indeno(1,2,3-cd)pyrene	1.90E-02	5.66E-06	2.60E-06	1.90E-04	5.36E+06	2.76E+02	6.70E+00
Phenanthrene[3]	3.24E-02	6.69E-06	1.79E-03	1.15E+00	4.16E+04	1.78E+02	4.46E+00
Pyrene	2.72E-02	7.24E-06	1.51E-04	1.35E-01	1.39E+05	2.02E+02	4.88E+00
Metals							
Barium	NA	NA	NA	5.48E+04	0.00E+00	1.37E+02	NA
Copper	NA	NA	NA	4.21E+05	0.00E+00	6.36E+01	NA
Lead	NA	NA	NA	9.58E+03	0.00E+00	2.07E+02	NA
Zinc	NA	NA	NA	3.44E+05	0.00E+00	6.74E+01	NA
ORPs							
Mercury	3.07E-02	6.30E-06	1.99E-01	6.00E-02	6.60E+05	2.01E+02	6.20E-01

[1] Chemical Physical properties were obtained from MECP (2016).

[2] The air diffusion coefficient was not available by MECP. Benzo(b)fluoranthene used as a surrogate.

[3] The air diffusion coefficient was not available by MECP. Anthracene was used as a surrogate.

NA - not applicable.

Highlighted rows are carcinogenic PAHs not identified as COCs but were carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-6B: Summary of Chemical Physical Properties for Ground Water COCs[1]

COC	Air Diffusion Coefficient (cm^2/s)	Water Diffusion Coefficient (cm^2/s)	Henry's Law Constant at 15°C (Unitless)	Pure Component Solubility in Water (mg/L)	Organic Carbon Partiton Coefficient (cm^3/g)	Molecular Weight (g/mol)	Octanol Water Partition Coefficient (Log (K_{ow}))
PHCs and BTEX							
Xylenes (total)	2.00E-01	7.77E-06	7.62E+01	9.50E+00	2.98E+02	8.62E+01	3.90E+00
PHC F1							
Aliphatic C6-C8	5.00E-02	6.00E-06	5.17E+01	5.40E+00	7.96E+03	1.00E+02	3.60E+00
Aliphatic C>8-C10	5.00E-02	6.00E-06	8.28E+01	4.30E-01	6.32E+04	1.30E+02	4.50E+00
Aromatic C>8-C10	5.00E-02	6.00E-06	4.97E-01	6.50E+01	3.17E+03	1.20E+02	3.20E+00
PHC F2							
Aliphatic C>10-C12	5.00E-02	6.00E-06	1.24E+02	3.40E-02	5.02E+05	1.60E+02	5.40E+00
Aliphatic C>12-C16	5.00E-02	6.00E-06	5.38E+02	7.60E-04	1.00E+07	2.00E+02	6.70E+00
Aromatic C>10-C12	5.00E-02	6.00E-06	1.45E-01	2.50E+01	5.02E+03	1.30E+02	3.40E+00
Aromatic C>12-C16	5.00E-02	6.00E-06	5.49E-02	5.80E+00	1.00E+04	1.50E+02	3.70E+00
PHC F3							
Aliphatic C>16-C21	5.00E-02	6.00E-06	5.07E+03	2.50E-06	1.26E+09	2.70E+02	8.80E+00
Aliphatic C>21-C34	5.00E-02	6.00E-06	5.66E+05	2.37E-11	2.00E+13	4.00E+02	8.80E+00
Aromatic C>16-C21	5.00E-02	6.00E-06	1.35E-02	6.50E-01	3.17E+04	1.80E+02	4.20E+00
Aromatic C>21-C34	5.00E-02	6.00E-06	6.93E-04	6.60E-03	2.52E+05	2.50E+02	5.10E+00

[1] Chemical Physical properties were obtained from MECP (2016).

Shaded values indicate no value was available and PHC F3 aliphatic C>16-C21 was used as a surrogate.

Table E4-7: Summary of Soil Physical Properties

Property/Parameter	Unsaturated Zone				Capillary Fringe	
	Gravel Crush	Reference	Silty Clay	Reference	Silty Clay	Reference
Dry bulk density, ρb (g/cm^3)	1.60	MECP (2016)	1.38	MECP (2016)	1.38	MECP (2016)
Total porosity, θT (cm^3/cm^3)	0.4	MECP (2016)	0.481	MECP (2016)	0.481	MECP (2016)
Water filled porosity, θw (cm^3/cm^3)	0.01	MECP (2016)	0.216	MECP (2016)	0.216	MECP (2016)
Air filled porosity, θa (cm^3/cm^3)	0.39	Calculated	0.265	Calculated	0.265	Calculated
Fraction organic carbon content, foc (unitless)	0.00	MECP (2016)	0.005	MECP (2016)	0.005	MECP (2016)
Residual water content, θr (cm^3/cm^3)	-	-	-	-	0.111	US EPA (2004a)
Saturated water content, θs (cm^3/cm^3)	-	-	-	-	0.481	US EPA (2004a)
Maximum slope along water retention curve point of inflection, α1 (cm^{-1})	-	-	-	-	0.01622	US EPA (2004a)
Air entry pressure head, h (cm)	-	-	-	-	61.7	Calculated[1]
van Genuchten curve shape parameter, N (unitless)	-	-	-	-	1.321	US EPA (2004a)
M (= 1-(1/N), unitless)	-	-	-	-	0.243	US EPA (2004a)
Mean grain diameter, D (cm)	-	-	-	-	0.0039	US EPA (2004a)

[1] Calculated from the van Genuchten equation (Equation 5 of US EPA 2004a) and the USSCS characteristics for a sand soil type as cited in MECP (2011c).

Table E4-8: Soil Stratigraphy Applied in Vapour Transport

Thickness of Stratigraphic Unit or Dept to Impacts (cm)	Soil to Indoor Air Slab-on-Grade Building	Ground Water to Outdoor Air	Reference
Thickness of gravel crush layer, L_{gc}[1]	30	-	Assumed (MECP, 2011c)
Thickness of sand layer, $L_{sand,}$	8	-	Measured
Capillary fringe thickness, L_{Cf}	-	192.31	Calculated[2]
Minimum depth to ground water table, $L_{gw,shallow}$	-	284	Measured
Thickness of vadose zone below the bottom of trench, hv,t	-	-108.3	Calculated
Minimum depth to ground water table below trench, L_{gwt}	-	10.0	Assumed
Minimum depth to soil impacts, $L_{soil,}$	38.1	-	Measured

[1] Thickness of gravel crush layer beneath basement slab.

[2] Calculated from the mean particle diamenter for a sand soil type using Equation 10 of US EPA (2004a).

Table E4-9: Building Characteristics Applied in Vapour Intrusion Modeling

Parameter	Units	Value
Slab-On-Grade Residential Building (MECP, 2011C)		
Enclosed space floor length	cm	1225
Enclosed space floor width	cm	1225
Enclosed space height	cm	366
Enclosed space floor thickness	cm	8
Soil-building pressure differential	$g/cm\text{-}s^2$	40
Floor Wall crack width	cm	0.1
Indoor air exchange rate	1/hr	0.3
Depth below grade to bottom of enclosed floor space[1]	cm	8

[1] Assumed to be slab-on-grade based on proposed development plans

Table E4-10: Air Mixing Zone Characteristics - Ground Surface Exposure Scenario

Characteristic	Value	Reference
Wind speed, U_a, (cm/s)	410	MECP (2011)
Mixing zone height, δ_a , (cm)	200	MECP (2011)
Width of source area parallel to air flow, w, (cm)	1300	MECP (2011)

Table E4-11: Air Mixing Zone Characteristics - Trench Scenario

Characteristic	Value	Reference
Air density at 25°C ,ρ_a, (g/cm^3)	1.18E-03	Holman (1981)
Air kinematic vicosity at 25°C , μ_a, (g/cm-s)	1.98E-04	Holman (1981)
Pooled water area, A_s,(m^2)	13	Professional judgement
Pooled water effective diameter, D_e,(m)	4.07	Calculated, US EPA (1994)
Air Exchange Rate (s^{-1})	3.15E-02	Calculated
Wind speed, U_a, (m/s)	4.10E-01	Assumed 1/10 of ground surface wind speed (professional judgment; Meridian, 2011)
Trench depth/mixing zone height, δ_a , (cm)	200	MECP as Cited in Meridian Inc., 2011
Length of trench parallel to air flow, w, (cm)	1300	MECP as Cited in Meridian Inc., 2011
Width of trench perpendicular to air flow, w, (cm)	100	MECP as Cited in Meridian Inc., 2011

Table E4-12: Exposure Estimates For the Soil to Indoor Air Pathway

COC	REM Soil Concentration (mg/kg)	Future Slab-On-Grade Residential Building		
		Predicted Soil Gas Concentration ($\mu g/m^3$)	Attenuation Factor (Unitless)	Indoor Air Concentration ($\mu g/m^3$)
PHCs				
PHC F1	306			
Aliphatic C6-C8	168	1.16E+08	3.55E-04	4.11E+04
Aliphatic C>8-C10	110	1.52E+07	3.55E-04	5.40E+03
Aromatic C>8-C10	27.5	4.59E+05	3.55E-04	1.63E+02
PAHs				
Phenanthrene	27.6	8.27E+01	3.51E-04	2.91E-02
ORPs				
Mercury	2.28	3.43E-01	3.50E-04	1.20E-04

Table E4-13: Exposure Estimates For the Ground Water to Indoor Air Pathway

COC	REM Ground Water Concentration (µg/L)	Henry's Law Constant (Dimensionless)	Future Slab-On-Grade Residential Building		
			Predicted Soil Gas Concentration (µg/m^3)	Attenuation Factor (Unitless)[1]	Indoor Air Concentration (µg/m^3)
PHCs and BTEX					
PHC F1	255,600				
Aliphatic C6-C8	154,638	5.17E+01	8.00E+09	2.00E-02	1.60E+08
Aliphatic C>8-C10	16,103	8.28E+01	1.33E+09	2.00E-02	2.67E+07
Aromatic C>8-C10	84,859	4.97E-01	4.22E+07	2.00E-02	8.43E+05
PHC F2	192,000				
Aliphatic C>10-C12	4,608	1.24E+02	5.72E+08	2.00E-02	1.14E+07
Aliphatic C>12-C16	384	5.38E+02	2.07E+08	2.00E-02	4.13E+06
Aromatic C>10-C12	115,776	1.45E-01	1.68E+07	2.00E-02	3.36E+05
Aromatic C>12-C16	71,232	5.49E-02	3.91E+06	2.00E-02	7.81E+04

[1] Default attenuation factor for a residential building of 0.02 (MECP, 2011c) was applied to be conservative.

Table E4-14A: Exposure Estimates For the Toddler Resident via Soil Direct Contact Exposure Pathway

COC	REM Soil Concentration (mg/kg)	Dermal Relative Absorption Factor[1] (Unitless)	Ingestion Relative Absorption Factor[2] (Unitless)	Lung Relative Absorption Factor[3] (Unitless)	Exposure (mg/kg-d)		Soil Particulate Air Exposure Concentration (mg/m^3)
					Dermal Contact	Incidental Ingestion	
PAHs							
Benzo(a)anthracene	21.6	1.30E-01	1.00E+00	1.00E+00	4.44E-05	1.96E-04	1.73E-07
Benzo(a)pyrene	16.8	1.30E-01	1.00E+00	1.00E+00	3.46E-05	1.52E-04	1.35E-07
Benzo(b)fluoranthene	20.4	1.30E-01	1.00E+00	1.00E+00	4.20E-05	1.85E-04	1.63E-07
Benzo(k)fluoranthene	7.68	1.30E-01	1.00E+00	1.00E+00	1.58E-05	6.96E-05	6.15E-08
Dibenz(a,h)anthracene	2.52	1.30E-01	1.00E+00	1.00E+00	5.18E-06	2.28E-05	2.02E-08
Indeno(1,2,3-cd)pyrene	10.2	1.30E-01	1.00E+00	1.00E+00	2.10E-05	9.25E-05	8.17E-08
Phenanthrene	27.6	1.30E-01	1.00E+00	1.00E+00	5.68E-05	2.50E-04	2.21E-07
Metals							
Copper	1,560	6.00E-02	1.00E+00	1.00E+00	1.48E-03	1.41E-02	1.25E-05
Lead	612	4.00E-03	6.00E-01	1.00E+00	3.87E-05	3.33E-03	4.90E-06

[1] Values obtained from MECP (2016). For the lead dermal RAF, 4.00E-03 (0.4%) was selected for the toddler life stage (MECP, 2024b).

[2] Values obtained from MECP (2016). For the lead ingestion RAF, 6.00E-01 (60%) was selected for the toddler life stage (MECP, 2024b).

[3] Assumed to be 1 for all COCs as per MECP (2011c).

Table E4-14B: Exposure Estimates For the Composite Resident via Soil Direct Contact (Dermal Contact and Incidental Ingestion) Exposure Pathway

COC	REM Soil Concentration (mg/kg)	Dermal Relative Absorption Factor[1] (Unitless)	Ingestion Relative Absorption Factor[2] (Unitless)	Dermal Exposure (mg/kg-d)						Incidental Ingestion (mg/kg-d)					
				Dermal Contact (Infant)	Dermal Contact (Toddler)	Dermal Contact (Child)	Dermal Contact (Teen)	Dermal Contact (Adult)	Dermal Contact (Composite Adult)	Incidental Ingestion (Infant)	Incidental Ingestion (Toddler)	Incidental Ingestion (Child)	Incidental Ingestion (Teen)	Incidental Ingestion (Adult)	Incidental Ingestion (Composite Adult)
PAHs															
Acenaphthene	1.06	1.30E-01	1.00E+00	6.37E-09	1.29E-07	1.62E-07	4.89E-08	3.25E-07	6.71E-07	1.90E-08	5.67E-07	1.11E-07	6.96E-08	4.12E-07	1.18E-06
Acenaphthylene	2.28	1.30E-01	1.00E+00	1.38E-08	2.78E-07	3.50E-07	1.06E-07	7.02E-07	1.45E-06	4.10E-08	1.22E-06	2.39E-07	1.50E-07	8.89E-07	2.54E-06
Anthracene	6.7	1.30E-01	1.00E+00	4.05E-08	8.18E-07	1.03E-06	3.11E-07	2.07E-06	4.27E-06	1.21E-07	3.61E-06	7.04E-07	4.43E-07	2.62E-06	7.49E-06
Benzo(a)anthracene	21.6	1.30E-01	1.00E+00	1.30E-07	2.63E-06	3.32E-06	1.00E-06	6.65E-06	1.37E-05	3.89E-07	1.16E-05	2.26E-06	1.42E-06	8.42E-06	2.41E-05
Benzo(a)pyrene	16.8	1.30E-01	1.00E+00	1.01E-07	2.05E-06	2.58E-06	7.78E-07	5.18E-06	1.07E-05	3.02E-07	9.02E-06	1.76E-06	1.11E-06	6.55E-06	1.87E-05
Benzo(b)fluoranthene	20.4	1.30E-01	1.00E+00	1.23E-07	2.48E-06	3.13E-06	9.45E-07	6.28E-06	1.30E-05	3.67E-07	1.10E-05	2.14E-06	1.35E-06	7.95E-06	2.28E-05
Benzo(ghi)perylene	9.36	1.30E-01	1.00E+00	5.65E-08	1.14E-06	1.44E-06	4.33E-07	2.88E-06	5.95E-06	1.69E-07	5.02E-06	9.80E-07	6.17E-07	3.65E-06	1.04E-05
Benzo(k)fluoranthene	7.7	1.30E-01	1.00E+00	4.63E-08	9.35E-07	1.18E-06	3.56E-07	2.37E-06	4.88E-06	1.38E-07	4.12E-06	8.04E-07	5.06E-07	2.99E-06	8.56E-06
Chrysene	16.8	1.30E-01	1.00E+00	1.01E-07	2.05E-06	2.58E-06	7.78E-07	5.18E-06	1.07E-05	3.02E-07	9.02E-06	1.76E-06	1.11E-06	6.55E-06	1.87E-05
Dibenz(a,h)anthracene	2.52	1.30E-01	1.00E+00	1.52E-08	3.07E-07	3.87E-07	1.17E-07	7.76E-07	1.60E-06	4.54E-08	1.35E-06	2.64E-07	1.66E-07	9.82E-07	2.81E-06
Fluoranthene	48.0	1.30E-01	1.00E+00	2.90E-07	5.85E-06	7.37E-06	2.22E-06	1.48E-05	3.05E-05	8.64E-07	2.58E-05	5.03E-06	3.17E-06	1.87E-05	5.35E-05
Indeno(1,2,3-cd)pyrene	10.20	1.30E-01	1.00E+00	6.15E-08	1.24E-06	1.57E-06	4.72E-07	3.14E-06	6.49E-06	1.84E-07	5.48E-06	1.07E-06	6.73E-07	3.98E-06	1.14E-05
Phenanthrene	27.6	1.30E-01	1.00E+00	1.67E-07	3.36E-06	4.24E-06	1.28E-06	8.50E-06	1.75E-05	4.97E-07	1.48E-05	2.89E-06	1.82E-06	1.08E-05	3.08E-05
Pyrene	44.4	1.30E-01	1.00E+00	2.68E-07	5.41E-06	6.82E-06	2.06E-06	1.37E-05	2.82E-05	7.99E-07	2.38E-05	4.65E-06	2.93E-06	1.73E-05	4.95E-05
Metals and Inorganics															
Copper	1560	6.00E-02	1.00E+00	4.34E-06	8.77E-05	1.11E-04	3.33E-05	2.22E-04	4.58E-04	2.81E-05	8.37E-04	1.63E-04	1.03E-04	6.08E-04	1.74E-03
Lead	612	Lifestage Dependent[1]	Lifestage Dependent[2]	1.14E-07	2.29E-06	2.89E-06	8.72E-07	1.45E-05	2.07E-05	6.61E-06	1.97E-04	2.24E-05	1.82E-05	1.43E-04	3.87E-04

[1] Values obtained from MECP (2016). For the lead dermal RAF, 4.00E-03 (0.4%) was selected for the infant to teen life stages, and 1.00E-02 (1%) was selected for the adult life stage (MECP, 2024b).

[2] Values obtained from MECP (2016). For the lead ingestion RAF, 6.00E-01 (60%) was selected for the infant, toddler and adult life stages, 3.50E-01 (35%) was selected for the child life stage, and 4.50E-01 (45%) was selected for the teen life stage (MECP, 2024b).

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-14C: Exposure Estimates For the Composite Resident via Soil Direct Contact (Soil Particulate Inhalation) Exposure Pathway

Contaminant of Concern	REM Soil Concentration (mg/kg)	Lung Relative Absorption Factor[1] (Unitless)	Soil Particulate Air Exposure Concentration (mg/m^3)					
			Soil Particulate Inhalation (Infant)	Soil Particulate Inhalation (Toddler)	Soil Particulate Inhalation (Child)	Soil Particulate Inhalation (Teen)	Soil Particulate Inhalation (Adult)	Soil Particulate Inhalation (Composite Adult)
PAHs								
Acenaphthene	1.06	1.00E+00	5.56E-11	5.01E-10	7.79E-10	8.90E-10	6.23E-09	8.46E-09
Acenaphthylene	2.28	1.00E+00	1.20E-10	1.08E-09	1.68E-09	1.92E-09	1.35E-08	1.83E-08
Anthracene	6.7	1.00E+00	3.54E-10	3.19E-09	4.96E-09	5.66E-09	3.97E-08	5.38E-08
Benzo(a)anthracene	21.6	1.00E+00	1.14E-09	1.02E-08	1.59E-08	1.82E-08	1.27E-07	1.73E-07
Benzo(a)pyrene	16.8	1.00E+00	8.85E-10	7.97E-09	1.24E-08	1.42E-08	9.91E-08	1.35E-07
Benzo(b)fluoranthene	20.4	1.00E+00	1.07E-09	9.67E-09	1.50E-08	1.72E-08	1.20E-07	1.63E-07
Benzo(ghi)perylene	9.36	1.00E+00	4.93E-10	4.44E-09	6.90E-09	7.89E-09	5.52E-08	7.50E-08
Benzo(k)fluoranthene	7.7	1.00E+00	4.05E-10	3.64E-09	5.66E-09	6.47E-09	4.53E-08	6.15E-08
Chrysene	16.8	1.00E+00	8.85E-10	7.97E-09	1.24E-08	1.42E-08	9.91E-08	1.35E-07
Dibenz(a,h)anthracene	2.52	1.00E+00	1.33E-10	1.19E-09	1.86E-09	2.12E-09	1.49E-08	2.02E-08
Fluoranthene	48.0	1.00E+00	2.53E-09	2.28E-08	3.54E-08	4.05E-08	2.83E-07	3.84E-07
Indeno(1,2,3-cd)pyrene	10.20	1.00E+00	5.37E-10	4.84E-09	7.52E-09	8.60E-09	6.02E-08	8.17E-08
Phenanthrene	27.6	1.00E+00	1.45E-09	1.31E-08	2.04E-08	2.33E-08	1.63E-07	2.21E-07
Pyrene	44.4	1.00E+00	2.34E-09	2.11E-08	3.27E-08	3.74E-08	2.62E-07	3.56E-07
Metals								
Copper	1560	1.00E+00	8.22E-08	7.40E-07	1.15E-06	1.32E-06	9.21E-06	1.25E-05
Lead	612	1.00E+00	3.22E-08	2.90E-07	4.51E-07	5.16E-07	3.61E-06	4.90E-06

[1] Assumed to be 1 for all COCs as per MECP (2011c).

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-15: Exposure Estimates For Outdoor Maintenance Worker via the Soil Direct Contact Exposure Pathway

COC	REM Soil Concentration (mg/kg)	Dermal Relative Absorption Factor[1] (Unitless)	Ingestion Relative Absorption Factor[2] (Unitless)	Lung Relative Absorption Factor[3] (Unitless)	Exposure (mg/kg-d)		Prorated Soil Particulate Air Concentration (mg/m^3)
					Dermal Contact	Incidental Ingestion	
PAHs							
Acenaphthene	1.06	1.30E-01	1.00E+00	1.00E+00	7.05E-07	7.98E-07	1.38E-08
Acenaphthylene	2.28	1.30E-01	1.00E+00	1.00E+00	1.52E-06	1.72E-06	2.97E-08
Anthracene	6.72	1.30E-01	1.00E+00	1.00E+00	4.49E-06	5.08E-06	8.76E-08
Benzo(a)anthracene	21.6	1.30E-01	1.00E+00	1.00E+00	1.44E-05	1.63E-05	2.82E-07
Benzo(a)pyrene	16.8	1.30E-01	1.00E+00	1.00E+00	1.12E-05	1.27E-05	2.19E-07
Benzo(b)fluoranthene	20.4	1.30E-01	1.00E+00	1.00E+00	1.36E-05	1.54E-05	2.66E-07
Benzo(ghi)perylene	9.36	1.30E-01	1.00E+00	1.00E+00	6.25E-06	7.07E-06	1.22E-07
Benzo(k)fluoranthene	7.68	1.30E-01	1.00E+00	1.00E+00	5.13E-06	5.80E-06	1.00E-07
Chrysene	16.8	1.30E-01	1.00E+00	1.00E+00	1.12E-05	1.27E-05	2.19E-07
Dibenz(a,h)anthracene	2.52	1.30E-01	1.00E+00	1.00E+00	1.68E-06	1.90E-06	3.29E-08
Fluoranthene	48	1.30E-01	1.00E+00	1.00E+00	3.21E-05	3.63E-05	6.26E-07
Indeno(1,2,3-cd)pyrene	10.2	1.30E-01	1.00E+00	1.00E+00	6.81E-06	7.71E-06	1.33E-07
Phenanthrene	27.6	1.30E-01	1.00E+00	1.00E+00	1.84E-05	2.09E-05	3.60E-07
Pyrene	44.4	1.30E-01	1.00E+00	1.00E+00	2.97E-05	3.36E-05	5.79E-07
Metals							
Lead	612	1.00E-02	6.00E-01	1.00E+00	4.27E-05	4.15E-04	1.06E-05

[1] Values obtained from MECP (2016). For the lead dermal RAF, 1.00E-02 (1%) was selected for the adult life stage (MECP, 2024b).

[2] Values obtained from MECP (2016). **F**or the lead ingestion RAF, 6.00E-01 (60%) was selected for the adult life stage (MECP, 2024b).

[3] Assumed to be 1 for all COCs as per MECP (2011c).

[4] For lead, direct contact exposure was evaluated for a pregnant Maintenance Worker (See Receptor Characteristics Table for details).

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-16: Exposure Estimates For Construction/Subsurface Utility Worker via Soil Direct Contact Exposure Pathway

COC	REM Soil Concentation (mg/kg)	Dermal Relative Absorption Factor[1] (Unitless)	Ingestion Relative Absorption Factor[2] (Unitless)	Lung Relative Absorption Factor[3] (Unitless)	Exposure (mg/kg-d)		Prorated Soil Particulate Air Concentration (mg/m^3)
					Dermal Contact	Incidental Ingestion	
PAHs							
Phenanthrene	27.6	1.30E-01	1.00E+00	1.00E+00	1.84E-05	2.09E-05	6.50E-07
Metals							
Lead	612	1.00E-02	6.00E-01	1.00E+00	4.27E-05	4.15E-04	1.92E-05

[1] Values obtained from MECP (2016). For the lead dermal RAF, 1.00E-02 (1%) was selected for the adult life stage (MECP, 2024b).

[2] Values obtained from MECP (2016). For the lead ingestion RAF, 6.00E-01 (60%) was selected for the adult life stage (MECP, 2024b).

[3] Assumed to be 1 for all COCs as per MECP (2011c).

[4] For lead, direct contact exposure was evaluated for a pregnant Construction/Subsurface Utility Worker (See Receptor Characteristics Table for details).

Table E4-17A: Exposure Estimates For the Soil to Outdoor Air Pathway

COC	REM Soil Concentation (mg/kg)	Unsaturated Zone Effective Diffusion Coefficient (cm^2 /s)	Soil Vapour to Outdoor Air Volatilization Factor (mg/ m^3air /mg/kg soil)	Outdoor Air Concentration (mg/m^3)
PHCs				
PHC F1	306			
Aliphatic C6-C8	168	2.59E-03	3.39E-04	5.71E-02
Aliphatic C>8-C10	110	2.59E-03	1.66E-04	1.83E-02
Aromatic C>8-C10	27.5	2.60E-03	5.86E-05	1.61E-03
PAHs				
Acenaphthene	1.06	2.25E-03	2.17E-06	2.29E-06
Acenaphthylene	2.28	2.31E-03	2.92E-06	6.66E-06
Anthracene	6.72	1.93E-03	5.71E-07	3.84E-06
Phenanthrene	27.6	1.78E-03	8.10E-07	2.23E-05
ORPs				
Mercury	2.28	1.59E-03	2.03E-06	4.62E-06

Although the REM soil concentration of all soil COCs meet the S-OA component value where available, the concentrations of soil COCs in outdoor air were calculated for application under the construction/subsurface utility worker total outdoor air (i.e. ground level and trench air) exposure scenario.

Highlighted rows are carcinogenic PAHs not identified as COCs but were carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-17B: Exposure Estimates For the Soil to Trench Air Pathway

COC	REM Soil Concentation (mg/kg)	Unsaturated Zone Effective Diffusion Coefficient (cm^2 /s)	Soil Vapour to Trench Air Volatilization Factor (mg/ m^3air /mg/kg soil)	Trench Air Concentration (mg/m^3)
PHCs				
PHC F1	306			
Aliphatic C6-C8	168	2.59E-03	1.80E-02	3.03E+00
Aliphatic C>8-C10	110	2.59E-03	8.83E-03	9.73E-01
Aromatic C>8-C10	27.5	2.60E-03	3.11E-03	8.56E-02
PAHs				
Acenaphthene	1.06	2.25E-03	1.15E-04	1.22E-04
Acenaphthylene	2.28	2.31E-03	1.55E-04	3.54E-04
Anthracene	6.72	1.93E-03	3.03E-05	2.04E-04
Phenanthrene	27.6	1.78E-03	4.30E-05	1.19E-03
ORPs				
Mercury	2.28	1.59E-03	1.08E-04	2.45E-04

Highlighted rows are carcinogenic PAHs not identified as COCs but were carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-18: Exposure Estimates for Construction Worker Ground Water Direct Contact Pathways (Dermal Contact and Incidental Ingestion)

COC	Exposure Point Concentration (µg/L)	Ingestion Absorption Factor[1] (Unitless)	Dermal Absorption Factor[1] (Unitless)	Dermal Permeability Coefficient[2] (cm/hr)	Lag Time per Event[3] (hr)	Dermal Absorbed Dose Per Event[4] (mg/cm^2-event)	Exposure (mg/kg-d)	
							Dermal Contact	Incidental Ingestion
VOCs								
PHC F1	255,600							
Aliphatic C6-C8	154638	1.00E+00	1.00E+00	1.04E-01	3.81E-01	1.37E-02	7.04E-01	5.84E-03
Aliphatic C>8-C10	16103	1.00E+00	1.00E+00	2.77E-01	5.61E-01	4.61E-03	2.37E-01	6.08E-04
Aromatic C>8-C10	84,859	1.00E+00	1.00E+00	4.37E-02	4.93E-01	3.60E-03	1.85E-01	3.21E-03
PHC F2	192,000							
Aliphatic C>10-C12	4608	1.00E+00	1.00E+00	7.38E-01	8.26E-01	4.27E-03	2.20E-01	1.74E-04
Aliphatic C>12-C16	384	1.00E+00	1.00E+00	3.18E+00	1.38E+00	1.98E-03	1.02E-01	1.45E-05
Aromatic C>10-C12	115,776	1.00E+00	1.00E+00	5.20E-02	5.61E-01	6.23E-03	3.20E-01	4.37E-03
Aromatic C>12-C16	71232	1.00E+00	1.00E+00	6.34E-02	7.26E-01	5.32E-03	2.73E-01	2.69E-03

[1] Ingestion and Dermal absorption factors of 1.0 were applied for all groundwater COCs.

[2] Permeability coefficients for organics were calculated from the octanol/water partition coefficient using Equation 3.8 of US EPA (2004b).

[3] The lag time per event was calculated using Equation A.4 of US EPA (2004b).

[4] The dermal absorbed dose per event for organics was calculated using Equation 3.2 aof US EPA (2004b).

Table E4-19: Exposure Estimates for the Ground Water to Outdoor Air Pathway

COC	REM Groundwater Concentration (mg/L)	Unsaturated Zone Effective Diffusion Coefficient (cm^2/s)	Capillary Fringe Effective Diffusion Coefficient (cm^2/s)	Overall Effective Diffusion Coefficient (cm^2/s)	Groundwater to Outdoor Air Volatilization Factor (mg/ m^3air /mg/L water)	Outdoor Air Concentration (mg/m^3)
VOCs and PHCs						
Xylenes (total)	5.57E+00	1.03E-02	1.03E-02	1.03E-02	4.39E-02	2.45E-01
PHC F1	2.56E+02					
Aliphatic C6-C8	1.55E+02	2.58E-03	2.58E-03	2.58E-03	7.46E-03	1.15E+00
Aliphatic C>8-C10	1.61E+01	2.58E-03	2.58E-03	2.58E-03	1.19E-02	1.92E-01
Aromatic C>8-C10	8.49E+01	2.58E-03	2.58E-03	2.58E-03	7.16E-05	6.08E-03
PHC F2	1.92E+02					
Aliphatic C>10-C12	4.61E+00	2.58E-03	2.58E-03	2.58E-03	1.79E-02	8.25E-02
Aliphatic C>12-C16	3.84E-01	2.58E-03	2.58E-03	2.58E-03	7.76E-02	2.98E-02
Aromatic C>10-C12	1.16E+02	2.58E-03	2.58E-03	2.58E-03	2.09E-05	2.42E-03
Aromatic C>12-C16	7.12E+01	2.59E-03	2.59E-03	2.59E-03	7.92E-06	5.64E-04

Table E4-20: Exposure Estimates for the Ground Water to Trench Air Pathway

COC	REM Groundwater Concentration (mg/L)	Unsaturated Zone Effective Diffusion Coefficient (cm^2/s)	Capillary Fringe Effective Diffusion Coefficient (cm^2/s)	Overall Effective Diffusion Coefficient (cm^2/s)	Groundwater to Trench Air Volatilization Factor (mg/ m^3air /mg/L water)	Trench Air Concentration (mg/m^3)
VOCs and PHCs						
Xylenes (total)	5.57E+00	1.03E-02	1.03E-02	1.03E-02	1.25E+01	6.95E+01
PHC F1	2.56E+02					
Aliphatic C6-C8	1.55E+02	2.58E-03	2.58E-03	2.58E-03	2.12E+00	3.27E+02
Aliphatic C>8-C10	1.61E+01	2.58E-03	2.58E-03	2.58E-03	3.39E+00	5.46E+01
Aromatic C>8-C10	8.49E+01	2.58E-03	2.58E-03	2.58E-03	2.03E-02	1.73E+00
PHC F2	1.92E+02					
Aliphatic C>10-C12	4.61E+00	2.58E-03	2.58E-03	2.58E-03	1.79E-02	8.25E-02
Aliphatic C>12-C16	3.84E-01	2.58E-03	2.58E-03	2.58E-03	7.76E-02	2.98E-02
Aromatic C>10-C12	1.16E+02	2.58E-03	2.58E-03	2.58E-03	2.09E-05	2.42E-03
Aromatic C>12-C16	7.12E+01	2.59E-03	2.59E-03	2.59E-03	7.92E-06	5.64E-04

Table E4-21A: Summary of Toxicity Reference Values for Soil COCs[1]

COC	Mode of Toxicity	Oral Reference Dose, RfD (mg/k-d)	End point	Reference	Source	Inhalation Reference Concentration, RfC (mg/m^3)	End point	Reference	Source	Oral Cancer Slope Factor, CSF $(mg/k\text{-}d)^{-1}$	End point	Reference	Source	Inhalation Unit Risk Factor, URF $(mg/m3)^{-1}$	End point	Reference	Source
PHCs																	
PHC F1																	
Aliphatic C6-C8	Threshold	5.00E+00	Neurotoxicity	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	6.00E-01	Nasal epithelial cell hyperplasia (goblet cell hyperplasia, epithelial hyperplasia, and intracytoplasmic eosinophilic material) in male rats	Biodynamics, 1993; Daughtrey et al., 1999	US EPA PPRTV, 2009	NA	-	-	-	NA	-	-	-
Aliphatic C>8-C10	Threshold	1.00E-01	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	1.00E+00	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-
Aromatic C>8-C10	Threshold	4.00E-02	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	2.00E-01	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-
PAHs																	
Acenaphthene	Non-threshold	2.00E-02	Increased relative liver weight in female mice	MDH, 2018	MECP, 2024a	NA	-	-	-	1.00E-03	TEF = 0.001	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-04	TEF = 0.001	Kalberlah et al 1995	US EPA IRIS 2017
Acenaphthylene	Non-threshold	2.00E-02	Increased relative liver weight in female mice	MDH, 2018 (proxy)	MECP, 2024a	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Anthracene	Non-threshold	1.30E-01	NOAEL (absence of developmental & reproductive toxicity studies)	MDH, 2019	MECP, 2024a	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Benzo(a)anthracene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-01	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-02	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017
Benzo(a)pyrene	Carcinogen	3.00E-04	Neurodevelopmental toxicity	IRIS 2017	IRIS 2017	2.00E-06	Reduction in embryonic survival	Archibong et al. 2002	IRIS 2017	1.00E+00	Increase in alimentary tract tumours (forestomach, esophagus, tonge and larynx)	Beland and Culp 1998	US EPA IRIS 2017	6.00E-01	Upper respiratory tract and pharynx tumours	Thyssen et al. 1981	US EPA IRIS 2017
Benzo(b)fluoranthene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-01	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-02	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017
Benzo(ghi)perylene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Benzo(k)fluoranthene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-01	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-02	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017
Chrysene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Dibenz(a,h)anthracene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E+00	TEF = 1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-01	TEF = 1	Kalberlah et al 1995	US EPA IRIS 2017
Fluoranthene	Non-threshold	4.00E-02	Nephropathy, increased liver weights, microscopic liver lesions, and hematological alterations	US EPA, 1988	IRIS 1993	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Indeno(1,2,3-cd)pyrene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-01	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-02	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017
Phenanthrene	Threshold	4.00E-02	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	2.00E-01	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	TEF = 0	Kalberlah et al 1995	US EPA IRIS 2017	NA	TEF = 0	Kalberlah et al 1995	US EPA IRIS 2017
Pyrene	Non-threshold	3.00E-02	Kidney effects (renal tubular pathology, decreased kidney weights)	US EPA, 1989	IRIS 1993	NA	-	-	-	1.00E-03	TEF = 0.001	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-04	TEF = 0.001	Kalberlah et al 1995	US EPA IRIS 2017
Metals																	
Barium	Threshold	2.00E-01	Nephropathy in mice	NTP, 1994	IRIS, 2005; MECP, 2011	1.00E-03	Cardiovascular effects (derived from oral RfD)	Vermeire et al., 1991	RIVM, 2001; MECP, 2011	NA	-	-	-	NA	-	-	-
Copper	Threshold	1.00E-02	GI effects (nausea, vomiting, diarrhea and abominal pain) in adult men and women	Araya et al., 2003	ATSDR, 2004; MECP, 2016	1.00E-03	Respitory and immunological effects in rabbits	Johansson et al., 1984	RIVM, 2001; MECP, 2016	NA	-	-	-	NA	-	-	-
Lead - for <20 years (Selected for Residents)	Non-threshold	5.00E-04	Neurotoxicity (decrease in IQ) in children	Lanphear et al., 2005; EFSA, 2013	EFSA, 2013; MECP, 2024b	NA	-	-	-	NA	-	-	-	NA	-	-	-
Lead - for > 20+ years (Selected for Workers)	Non-threshold	6.30E-04	Increase in systolic blood pressure in adults	Lanphear et al., 2005; EFSA, 2013	EFSA, 2013; MECP, 2024b	NA	-	-	-	NA	-	-	-	NA	-	-	-
Zinc	Threshold	3.60E-01	NOAEL (no adverse effects on variouis measures if copper status)	Davis et al., 2000; Milne et al, 2001; Bonham et al., 2003	EFSA, 2006	NA	-	-	-	NA	-	-	-	NA	--	--	--
ORPs																	
Mercury	Threshold	3.00E-04	Hand tremor; increases in memory disturbances; slight subjective and objective evidence of autonomic dysfunction	Several Studies	IRIS, 1995; MECP, 2011	9.00E-05	Hand tremor; increases in memory disturbances; slight subjective and objective evidence of autonomic dysfunction	Several Studies	Cal EPA ChREL, 2000; MECP, 2011	NA	-	-	-	NA	-	-	-

[1] TRVs obtained from MECP (2011), MECP(2016), MECP (2024a) or MECP (2024b), unless otherwise noted. Rationale for TRVS obtained from sources other than MECP is provided in Appendix K.

NA - not applicable

TEF = Toxic Equivalency Factors (in comparison to benzo(a)pyrene).

Values shaded in grey were obtained from sources other than MECP (2011c), MECP (2016), MECP (2024a) or MECP (2024b).

Highlighted rows are carcinogenic PAHs not identified as COCs but were carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-21B: Summary of Toxicity Reference Values for Ground Water COCs[1]

COC	Mode of Toxicity	Oral Reference Dose, RfD (mg/k-d)	End point	Reference	Source	Inhalation Reference Concentration, RfC (mg/m^3)	End point	Reference	Source	Oral Cancer Slope Factor, CSF $(mg/k\text{-}d)^{-1}$	End point	Reference	Source	Inhalation Unit Risk Factor, URF $(mg/m^3)^{-1}$	End point	Reference	Source
PHCs and BTEX																	
Xylenes	Threshold	2.00E-01	ortality, decreased body v	NTP, 1986	IRIS, 2003; ATSDR, 2007	7.00E-01	CNS effects in humans; irritation of eyes, nose and throat	Uchida et al., 1993	CalEPA ChREL, 2000;	NA	-	-	-	NA	-	-	-
PHC F1																	
Aliphatic C6-C8	Threshold	5.00E+00	Neurotoxicity	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	6.00E-01	Nasal epithelial cell hyperplasia (goblet cell hyperplasia, epithelial hyperplasia, and intracytoplasmic eosinophilic material) in male rats	Biodynamics, 1993; Daughtrey et al., 1999	US EPA PPRTV, 2009	NA	-	-	-	NA	-	-	-
Aliphatic C>8-C10	Threshold	1.00E-01	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	1.00E+00	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-
Aromatic C>8-C10	Threshold	4.00E-02	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	2.00E-01	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-
PHC F2											-	-	-				
Aliphatic C>10-C12	Threshold	1.00E-01	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	1.00E+00	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-
Aliphatic C>12-C16	Threshold	1.00E-01	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	1.00E+00	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-
Aromatic C>10-C12	Threshold	4.00E-02	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	2.00E-01	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-
Aromatic C>12-C16	Threshold	4.00E-02	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	2.00E-01	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-

[1] TRVs obtained from MECP (2011), MECP(2016) or MECP (2024a), unless otherwise noted. Rationale for TRVS obtained from sources other than MECP is provided in Appendix K.

NA - not applicable

TEF = Toxic Equivalency Factors (in comparison to benzo(a)pyrene).

Table E4-22A: Predicted Risks for Toddler Resident Exposure to COCs in Soil via Indoor Air Inhalation

COC	Future Slab-On-Grade Residential Building			Future Slab-On-Grade Residential Building Risk-Based Concentration (µg/g)
	Predicted Indoor Air Concentration (mg/m^3)	Prorated Indoor Air Exposure Concentration (mg/m^3)	Hazard Quotient[1]	
PHCs				
PHC F1			**7.17E+01**	2.13E+00
Aliphatic C6-C8	4.11E+01	3.95E+01	**6.58E+01**	-
Aliphatic C>8-C10	5.40E+00	5.18E+00	**5.18E+00**	-
Aromatic C>8-C10	1.63E-01	1.57E-01	**7.83E-01**	-
PAHs				
Phenanthrene	2.91E-05	2.79E-05	1.39E-04	3.96E+04
ORPs				
Mercury	1.20E-07	1.15E-07	1.28E-03	3.57E+02

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2. The target HQ for PHCs were set at 0.5.

Table E4-22B: Predicted Risks for Composite Resident Exposure to COCs in Soil via Indoor Air Inhalation

COC	Future Slab-On-Grade Residential Building			Future Slab-On-Grade Residential Building Risk-Based Concentration (µg/g)
	Predicted Indoor Air Concentration (mg/m^3)	Prorated Indoor Air Exposure Concentration (mg/m^3)	ILCR[1]	
PHCs				
PHC F1			NC	NC
Aliphatic C6-C8	4.11E+01	3.70E+01	NC	-
Aliphatic C>8-C10	5.40E+00	4.86E+00	NC	-
Aromatic C>8-C10	1.63E-01	1.47E-01	NC	-
PAHs				
Phenanthrene	2.91E-05	2.61E-05	NC	NC
ORPs				
Mercury	1.20E-07	1.08E-07	NC	NC

[1] Bolded values highlighted in gray exceed the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-23A: Predicted Risks for Toddler Site Resident Exposure to COCs in Ground Water via Indoor Air Inhalation

COC	Future Slab-On-Grade Residential Building			Future Slab-On-Grade Residential Building Risk-Based Concentration (µg/L)
	Predicted Indoor Air Concentration (mg/m^3)	Prorated Indoor Air Exposure Concentration (mg/m^3)	HQ[1]	
PHCs and BTEX				
PHC F1			**2.85E+05**	4.48E-01
Aliphatic C6-C8	1.60E+05	1.53E+05	**2.56E+05**	
Aliphatic C>8-C10	2.67E+04	2.56E+04	**2.56E+04**	
Aromatic C>8-C10	8.43E+02	8.09E+02	**4.04E+03**	
PHC F2			**1.69E+04**	5.67E+00
Aliphatic C>10-C12	1.14E+04	1.10E+04	**1.10E+04**	-
Aliphatic C>12-C16	4.13E+03	3.96E+03	**3.96E+03**	-
Aromatic C>10-C12	3.36E+02	3.22E+02	**1.61E+03**	-
Aromatic C>12-C16	7.81E+01	7.49E+01	**3.75E+02**	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2. The target HQ for PHCs were set at 0.5.

Table E4-23B: Predicted Risks for Composite Resident Exposure to COCs in Ground Water via Indoor Air Inhalation

COC	Future Slab-On-Grade Residential Building			Future Slab-On-Grade Residential Building Risk-Based Concentration (µg/L)
	Predicted Indoor Air Concentration (mg/m^3)	Prorated Indoor Air Exposure Concentration (mg/m^3)	ILCR[1]	
PHCs and BTEX				
PHC F1			NC	NC
Aliphatic C6-C8	1.60E+05	1.44E+05	NC	-
Aliphatic C>8-C10	2.67E+04	2.40E+04	NC	-
Aromatic C>8-C10	8.43E+02	7.58E+02	NC	-
PHC F2			NC	NC
Aliphatic C>10-C12	1.14E+04	1.03E+04	NC	-
Aliphatic C>12-C16	4.13E+03	3.72E+03	NC	-
Aromatic C>10-C12	3.36E+02	3.02E+02	NC	-
Aromatic C>12-C16	7.81E+01	7.03E+01	NC	-

[1] Bolded values highlighted in gray exceed the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-24: Predicted Risks for Site Resident Exposure to COCs in Soil via Direct Contact

COC	Toddler[1]				Composite Adult[1]				Risk Based Concentration (HQ Total Direct Contact, µg/g)	Risk Based Concentration (ILCR Total Direct Contact, µg/g)
	HQ Dermal Contact	HQ Incidental Ingestion	HQ Soil Particulate Inhalation	HQ Total Direct Contact	ILCR Dermal Contact	ILCR Incidental Ingestion	HQ Soil Particulate Inhalation	ILCR Total Direct Contact		
PAHs										
Acenaphthene	NA	NA	NA	NA	6.71E-10	1.18E-09	5.07E-12	1.85E-09	NA	5.70E+02
Acenaphthylene	NA	NA	NA	NA	1.45E-08	2.54E-08	1.10E-10	4.00E-08	NA	5.70E+01
Anthracene	NA	NA	NA	NA	4.27E-08	7.49E-08	3.23E-10	1.18E-07	NA	5.70E+01
Benzo(a)anthracene	NC	NC	NC	NC	**1.37E-06**	**2.41E-06**	1.04E-08	**3.79E-06**	NC	5.70E+00
Benzo(a)pyrene	1.15E-01	**5.08E-01**	6.73E-02	**6.90E-01**	**1.07E-05**	**1.87E-05**	8.07E-08	**2.95E-05**	4.87E+00	5.70E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	**1.30E-06**	**2.28E-06**	9.80E-09	**3.58E-06**	NC	5.70E+00
Benzo(ghi)perylene	NA	NA	NA	NA	5.95E-08	1.04E-07	4.50E-10	1.64E-07	NA	5.70E+01
Benzo(k)fluoranthene	NC	NC	NC	NC	4.88E-07	8.56E-07	3.69E-09	**1.35E-06**	NC	5.70E+00
Chrysene	NA	NA	NA	NA	1.07E-07	1.87E-07	8.07E-10	2.95E-07	NA	5.70E+01
Dibenz(a,h)anthracene	NC	NC	NC	NC	**1.60E-06**	**2.81E-06**	1.21E-08	**4.42E-06**	NC	5.70E-01
Fluoranthene	NA	NA	NA	NA	3.05E-07	5.35E-07	2.31E-09	8.43E-07	NA	5.70E+01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	6.49E-07	**1.14E-06**	4.90E-09	**1.79E-06**	NC	5.70E+00
Phenanthrene	1.42E-03	6.26E-03	1.11E-06	7.68E-03	NC	NC	NC	NC	7.19E+02	NC
Pyrene	NA	NA	NA	NA	2.82E-08	4.95E-08	2.13E-10	7.80E-08	NA	5.70E+02
Total Carcinogenic PAHs	NA	NA	NA	NA	**1.66E-05**	**2.92E-05**	1.26E-07	**4.60E-05**	NA	NA
Metals										
Copper	1.48E-01	**1.41E+00**	1.25E-02	**1.57E+00**	NC	NC	NC	NC	1.98E+02	NC
Lead	7.75E-02	**6.66E+00**	NC	**6.74E+00**	NC	NC	NC	NC	1.82E+01	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (or 0.5 for PHCs) or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable. Parameter retained for evaluation of total carcinogenic exposure only.

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-25: Predicted Risks for Maintenance Worker Exposure to COCs in Soil via Direct Contact

COC	HQ[1]				ILCR[1]				Risk Based Concentration (HQ Total Direct Contact, µg/g)	Risk Based Concentration (ILCR Total Direct Contact, µg/g)
	Dermal Contact	Incidental Ingestion	Soil Particulate Inhalation	Total Direct Contact	Dermal Contact	Incidental Ingestion	Soil Particulate Inhalation	Total Direct Contact		
PAHs										
Acenaphthene	NA	NA	NA	NA	7.05E-10	7.98E-10	8.26E-12	1.51E-09	NA	6.99E+02
Acenaphthylene	NA	NA	NA	NA	1.52E-08	1.72E-08	1.78E-10	3.26E-08	NA	6.99E+01
Anthracene	NA	NA	NA	NA	4.49E-08	5.08E-08	5.26E-10	9.62E-08	NA	6.99E+01
Benzo(a)anthracene	NC	NC	NC	NC	**1.44E-06**	**1.63E-06**	1.69E-08	**3.09E-06**	NC	6.99E+00
Benzo(a)pyrene	3.74E-02	4.23E-02	1.10E-01	1.89E-01	**1.12E-05**	**1.27E-05**	1.31E-07	**2.40E-05**	1.78E+01	6.99E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	**1.36E-06**	**1.54E-06**	1.60E-08	**2.92E-06**	NC	6.99E+00
Benzo(ghi)perylene	NA	NA	NA	NA	6.25E-08	7.07E-08	7.32E-10	1.34E-07	NA	6.99E+01
Benzo(k)fluoranthene	NC	NC	NC	NC	5.13E-07	5.80E-07	6.01E-09	**1.10E-06**	NC	6.99E+00
Chrysene	NA	NA	NA	NA	1.12E-07	1.27E-07	1.31E-09	2.40E-07	NA	6.99E+01
Dibenz(a,h)anthracene	NC	NC	NC	NC	**1.68E-06**	**1.90E-06**	1.97E-08	**3.61E-06**	NC	6.99E-01
Fluoranthene	NA	NA	NA	NA	3.21E-07	3.63E-07	3.75E-09	6.87E-07	NA	6.99E+01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	6.81E-07	7.71E-07	7.98E-09	**1.46E-06**	NC	6.99E+00
Phenanthrene	4.61E-04	5.21E-04	1.80E-06	9.84E-04	NC	NC	NC	NC	5.61E+03	NC
Pyrene	NA	NA	NA	NA	2.97E-08	3.36E-08	3.47E-10	6.36E-08	NA	6.99E+02
Total Carcinogenic PAHs	NA	NA	NA	NA	**1.75E-05**	**1.98E-05**	2.05E-07	**3.75E-05**	NA	NA
Metals										
Lead	6.78E-02	6.58E-01	NC	7.26E-01	NC	NC	NC	NC	6.75E+02	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (or 0.8 for adult exposure to lead) or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable. Parameter retained for evaluation of total carcinogenic exposure only.

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-26: Predicted Risks for Construction/Subsurface Utility Worker Exposure to COCs in Soil via Direct Contact

COC	HQ[1]				ILCR[1]				Risk Based Concentration (HQ Total Direct Contact, µg/g)	Risk Based Concentration (ILCR Total Direct Contact, µg/g)
	Dermal Contact	Incidental Ingestion	Inhalation of Particles	Total Direct Contact	Dermal Contact	Incidental Ingestion	Inhalation of Particles	Total Direct Contact		
PAHs										
Phenanthrene	4.61E-04	5.21E-04	3.25E-06	9.86E-04	NC	NC	NC	NC	5.60E+03	NC
Metals										
Lead	6.78E-02	6.58E-01	NC	7.26E-01	NC	NC	NC	NC	6.75E+02	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (or 0.8 for adult exposure to lead) or the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-27: Predicted Risks for Site Resident Exposure to COCs in Soil via Ambient Outdoor Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)	Toddler Site Resident		Composite Site Resident		Risk Based Concentration (HQ, µg/g)	Risk Based Concentration (ILCR, µg/g)
		Prorated Outdoor Air Exposure Concentration (mg/m^3)	HQ[1]	Prorated Outdoor Air Exposure Concentration (mg/m^3)	ILCR[1]		
PAHs							
Phenanthrene	2.23E-05	2.99E-06	1.50E-05	2.99E-06	NC	3.69E+05	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 or the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-28: Predicted Risks for Maintenance Worker Exposure to COCs in Soil via Ambient Outdoor Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)	Prorated Outdoor Air Exposure Concentration (mg/m^3)	Maintenance Worker		Risk Based Concentration (HQ, µg/g)	Risk Based Concentration (ILCR, µg/g)
			HQ	ILCR		
PAHs						
Phenanthrene	2.23E-05	4.87E-06	2.44E-05	NC	2.26E+05	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 or the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-29: Predicted Risks for Construction/Subsurface Utility Worker Exposure to COCs in Soil via Outdoor and Trench Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)	Predicted Trench Air Concentration (mg/m^3)	Prorated Outdoor Air Exposure Concentration (mg/m^3)	Prorated Trench Air Exposure Concentration (mg/m^3)	Inhalation of Outdoor Air[1]		Inhalation of Trench Air[1]		Inhalation of Trench Air and Ambient Outdoor Air[1]		Risk Based Concentration (HQ Total, µg/g)	Risk Based Concentration (ILCR Total, µg/g)
					HQ	ILCR	HQ	ILCR	HQ	ILCR		
VOCs and PHCs												
PHC F1					4.28E-02	NC	2.60E-01	NC	3.03E-01	NC	5.05E+02	NC
Aliphatic C6-C8	5.71E-02	3.03E+00	2.01E-02	1.22E-01	3.35E-02	NC	2.03E-01	NC	2.37E-01	NC	-	-
Aliphatic C>8-C10	1.83E-02	9.73E-01	6.46E-03	3.92E-02	6.46E-03	NC	3.92E-02	NC	4.56E-02	NC	-	-
Aromatic C>8-C10	1.61E-03	8.56E-02	5.68E-04	3.45E-03	2.84E-03	NC	1.72E-02	NC	2.01E-02	NC	-	-
PAHs												
Acenaphthene	2.29E-06	1.22E-04	8.09E-07	4.90E-06	NC	1.30E-11	NC	7.88E-11	NC	9.18E-11	NA	1.15E+04
Acenaphthylene	6.66E-06	3.54E-04	2.35E-06	1.42E-05	NC	3.77E-10	NC	2.29E-09	NC	2.67E-09	NC	8.55E+02
Anthracene	3.84E-06	2.04E-04	1.35E-06	8.21E-06	NC	2.17E-10	NC	1.32E-09	NC	1.54E-09	NC	4.37E+03
Phenanthrene	2.23E-05	1.19E-03	7.87E-06	4.78E-05	3.94E-05	NC	2.39E-04	NC	2.78E-04	NC	1.98E+04	NC
Total Carcinogenic PAHs	NA	NA	NA	NA	NA	6.08E-10	NA	3.69E-09	NA	4.29E-09	NA	NA
ORPs												
Mercury	4.62E-06	2.45E-04	1.63E-06	9.87E-06	1.81E-02	NC	1.10E-01	NC	1.28E-01	NC	3.57E+00	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (or 0.5 for PHCs) or the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NA: Not applicable .

NC: Not calculated due to no applicable toxicity reference value.

Highlighted rows are carcinogenic PAHs not identified as COCs but were carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-30: Predicted Risks for Construction Worker Direct Contact Exposure to Ground Water (Dermal Contact and Incidental Ingestion)

COC	HQ[1]			ILCR[1]			Risk Based Concentration (HQ Total, µg/L)	Risk Based Concentration (ILCR Total, µg/L)
	Dermal Contact	Incidental Ingestion	Total	Dermal Contact	Incidental Ingestion	Total		
PHCs and BTEX								
PHC F1	**7.13E+00**	8.74E-02	**7.22E+00**	NC	NC	NC	1.77E+04	NC
Aliphatic C6-C8	1.41E-01	1.17E-03	1.42E-01	NC	NC	NC	-	-
Aliphatic C>8-C10	**2.37E+00**	6.08E-03	**2.38E+00**	NC	NC	NC	-	-
Aromatic C>8-C10	**4.62E+00**	8.02E-02	**4.70E+00**	NC	NC	NC	-	-
PHC F2	**1.81E+01**	1.79E-01	**1.82E+01**	NC	NC	NC	5.26E+03	NC
Aliphatic C>10-C12	**2.20E+00**	1.74E-03	**2.20E+00**	NC	NC	NC	-	-
Aliphatic C>12-C16	**1.02E+00**	1.45E-04	**1.02E+00**	NC	NC	NC	-	-
Aromatic C>10-C12	**8.01E+00**	1.09E-01	**8.12E+00**	NC	NC	NC	-	-
Aromatic C>12-C16	**6.83E+00**	6.73E-02	**6.90E+00**	NC	NC	NC	-	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcionogens of 0.2 (0.5 for PHCs) or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable .

Table E4-31: Predicted Risks for Site Resident Exposure to COCs in Ground Water via Inhalation of Ambient Outdoor Air

COC	Predicted Outdoor Air Concentration (mg/m^3)	Toddler Resident		Composite Resident		Risk Based Concentration (HQ, µg/L)	Risk Based Concentration (ILCR, µg/L)
		Prorated Outdoor Air Exposure Concentration (mg/m^3)	HQ[1]	Prorated Outdoor Air Exposure Concentration (mg/m^3)	ILCR[1]		
PHCs and BTEX							
Xylenes (total)	2.45E-01	3.28E-02	4.68E-02	3.28E-02	NC	2.38E+04	NC
PHC F1			2.87E-01		NC	4.45E+05	NC
Aliphatic C6-C8	1.15E+00	1.55E-01	2.58E-01	1.55E-01	NC		
Aliphatic C>8-C10	1.92E-01	2.58E-02	2.58E-02	2.58E-02	NC		
Aromatic C>8-C10	6.08E-03	8.15E-04	4.07E-03	8.15E-04	NC		
PHC F2			1.71E-02		NC	5.63E+06	NC
Aliphatic C>10-C12	8.25E-02	1.11E-02	1.11E-02	1.11E-02	NC	-	-
Aliphatic C>12-C16	2.98E-02	3.99E-03	3.99E-03	3.99E-03	NC	-	-
Aromatic C>10-C12	2.42E-03	3.24E-04	1.62E-03	3.24E-04	NC	-	-
Aromatic C>12-C16	5.64E-04	7.56E-05	3.78E-04	7.56E-05	NC	-	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (0.5 for PHCs) or the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-32: Predicted Risks for Maintenance Worker Exposure to COCs in Ground Water via Outdoor Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)	Prorated Outdoor Air Exposure Concentration (mg/m^3)	HQ[1]	ILCR[1]	Risk Based Concentration (HQ, µg/L)	Risk Based Concentration (ILCR, µg/L)
PHCs and BTEX						
Xylenes (total)	2.45E-01	5.34E-02	7.62E-02	NC	1.46E+04	NC
PHC F1			4.68E-01	NC	2.73E+05	NC
Aliphatic C6-C8	1.15E+00	2.52E-01	4.19E-01	NC	-	-
Aliphatic C>8-C10	1.92E-01	4.19E-02	4.19E-02	NC	-	-
Aromatic C>8-C10	6.08E-03	1.33E-03	6.63E-03	NC	-	-
PHC F2			2.78E-02	NC	3.46E+06	NC
Aliphatic C>10-C12	8.25E-02	1.80E-02	1.80E-02	NC	-	-
Aliphatic C>12-C16	2.98E-02	6.50E-03	6.50E-03	NC	-	-
Aromatic C>10-C12	2.42E-03	5.28E-04	2.64E-03	NC	-	-
Aromatic C>12-C16	5.64E-04	1.23E-04	6.15E-04	NC	-	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 or the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-33: Predicted Risks for Construction/Subsurface Utility Worker Exposure to COCs in Ground Water Via Outdoor and Trench Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)		Prorated Outdoor Air Exposure Concentration (mg/m^3)		HQ[1]			ILCR[1]			Risk Based Concentration (HQ, µg/L)	Risk Based Concentration (ILCR, µg/L)
	Ground Level	Trench	Ground Level	Trench	Ground Level	Trench	Total	Ground Level	Trench	Total		
PHCs and BTEX												
Xylenes (total)	2.45E-01	6.95E+01	8.62E-02	2.80E+00	1.23E-01	**4.00E+00**	**4.12E+00**	NC	NC	NC	2.70E+02	NC
PHC F1					**7.56E-01**	**2.45E+01**	**2.53E+01**	NC	NC	NC	5.05E+03	NC
Aliphatic C6-C8	1.15E+00	3.27E+02	4.06E-01	1.32E+01	**6.77E-01**	**2.20E+01**	**2.27E+01**	NC	NC	NC	-	-
Aliphatic C>8-C10	1.92E-01	5.46E+01	6.78E-02	2.20E+00	6.78E-02	**2.20E+00**	**2.27E+00**	NC	NC	NC	-	-
Aromatic C>8-C10	6.08E-03	1.73E+00	2.14E-03	6.95E-02	1.07E-02	3.48E-01	3.58E-01	NC	NC	NC	-	-
PHC F2					4.48E-02	5.12E-03	5.00E-02	NC	NC	NC	1.92E+06	NC
Aliphatic C>10-C12	8.25E-02	8.25E-02	2.91E-02	3.32E-03	2.91E-02	3.32E-03	3.24E-02	NC	NC	NC	-	-
Aliphatic C>12-C16	2.98E-02	2.98E-02	1.05E-02	1.20E-03	1.05E-02	1.20E-03	1.17E-02	NC	NC	NC	-	-
Aromatic C>10-C12	2.42E-03	2.42E-03	8.53E-04	9.75E-05	4.26E-03	4.87E-04	4.75E-03	NC	NC	NC	-	-
Aromatic C>12-C16	5.64E-04	5.64E-04	1.99E-04	2.27E-05	9.94E-04	1.14E-04	1.11E-03	NC	NC	NC	-	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (or 0.5 for PHCs) or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-34A: Risk-Based Soil Concentrations Protective of the Toddler Resident

COC	REM Soil Concentration (µg/g)	Pathway Specific Risk-Based Concentration[1] (µg/g)			Candidate Risk- Based Human Health Property Specific Standard[2] (µg/g)
		Non-Carcinogens			
		Dermal Contact & Incidental Ingestion	Indoor Air Inhalation Future Slab-On-Grade Residential Building	Outdoor Air Inhalation	
PHCs					
PHC F1	306	6.90E+03	2.13E+00	1.50E+04	2.13E+00
PAHs					
Acenaphthylene	2.28	5.70E+01	6.00E+00	1.80E+02	6.00E+00
Anthracene	6.72	5.70E+01	1.30E+02	9.50E+02	5.70E+01
Benzo(a)anthracene	21.6	NC	9.00E+02	6.00E+02	6.00E+02
Benzo(a)pyrene	16.8	4.87E+00	2.50E+03	6.80E+01	4.87E+00
Benzo(b)fluoranthene	20.4	NC	6.80E+04	3.80E+03	3.80E+03
Benzo(k)fluoranthene	7.68	NC	8.30E+04	3.80E+03	3.80E+03
Chrysene	16.8	5.70E+01	2.30E+04	1.20E+04	5.70E+01
Dibenz(a,h)anthracene	2.52	NC	3.10E+05	7.90E+02	7.90E+02
Fluoranthene	48	5.70E+01	3.20E+03	4.50E+03	5.70E+01
Indeno(1,2,3-cd)pyrene	10.2	NC	5.50E+05	7.30E+03	7.30E+03
Phenanthrene	27.6	7.19E+02	3.96E+04	3.69E+05	7.19E+02
Metals					
Barium	623	3.80E+03	NA	NA	3.80E+03
Copper	1560	1.98E+02	NA	NA	1.98E+02
Lead	612	1.82E+01	NA	NA	1.82E+01
Zinc	660	6.80E+03	NA	NA	6.80E+03
ORPs					
Mercury	2.28	9.80E+00	3.57E+02	3.60E+01	9.80E+00

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Table E4-34B: Risk-Based Soil Concentrations Protective of the Composite Resident

COC	REM Soil Concentration (µg/g)	Pathway Specific Risk-Based Concentration[1] (µg/g)			Candidate Risk- Based Human Health Property Specific Standard[2] (µg/g)
		Carcinogens			
			Indoor Air Inhalation		
		Dermal Contact & Incidential Ingestion	Future Slab-On-Grade Residential Building	Outdoor Air Inhalation	
PHCs					
PHC F1	306	6.90E+03	NC	1.50E+04	6.90E+03
PAHs					
Acenaphthylene	2.28	5.70E+01	6.00E+00	1.80E+02	6.00E+00
Anthracene	6.72	5.70E+01	1.30E+02	9.50E+02	5.70E+01
Benzo(a)anthracene	21.6	5.70E+00	9.00E+02	6.00E+02	5.70E+00
Benzo(a)pyrene	16.8	5.70E-01	2.50E+03	6.80E+01	5.70E-01
Benzo(b)fluoranthene	20.4	5.70E+00	6.80E+04	3.80E+03	5.70E+00
Benzo(k)fluoranthene	7.68	5.70E+00	8.30E+04	3.80E+03	5.70E+00
Chrysene	16.8	5.70E+01	2.30E+04	1.20E+04	5.70E+01
Dibenz(a,h)anthracene	2.52	5.70E-01	3.10E+05	7.90E+02	5.70E-01
Fluoranthene	48	5.70E+01	3.20E+03	4.50E+03	5.70E+01
Indeno(1,2,3-cd)pyrene	10.2	5.70E+00	5.50E+05	7.30E+03	5.70E+00
Phenanthrene	27.6	NC	NC	NC	NC
Metals					
Barium	623	3.80E+03	NA	NA	3.80E+03
Copper	1560	NC	NA	NA	NC
Lead	612	NC	NA	NA	NC
Zinc	660	6.80E+03	NA	NA	6.80E+03
ORPs					
Mercury	2.28	9.80E+00	NC	3.60E+01	9.80E+00

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Table E4-35: Risk-Based Soil Concentrations Protective of the Outdoor Maintenance Worker

COC	REM Soil Concentration (µg/g)[1]	Pathway Specific Risk-Based Concentration[1] (µg/g)				Candidate Risk-Based Human Health Property Specific Standard[2] (µg/g)
		Direct Contact		Inhalation of Outdoor Air		
		Non-Carcinogens	Carcinogens	Non-Carcinogens	Carcinogens	
PHCs						
PHC F1	306	4.70E+04	4.70E+04	1.50E+04	1.50E+04	1.50E+04
PAHs						
Acenaphthylene	2.28	7.00E+01	7.00E+01	1.80E+02	1.80E+02	7.00E+01
Anthracene	6.72	7.00E+01	7.00E+01	9.50E+02	9.50E+02	7.00E+01
Benzo(a)anthracene	21.6	NC	6.99E+00	6.00E+02	6.00E+02	6.99E+00
Benzo(a)pyrene	16.8	1.78E+01	6.99E-01	6.80E+01	6.80E+01	6.99E-01
Benzo(b)fluoranthene	20.4	NC	6.99E+00	3.80E+03	3.80E+03	6.99E+00
Benzo(k)fluoranthene	7.68	NC	6.99E+00	3.80E+03	3.80E+03	6.99E+00
Chrysene	16.8	7.00E+01	7.00E+01	1.20E+04	1.20E+04	7.00E+01
Dibenz(a,h)anthracene	2.52	NC	6.99E-01	7.90E+02	7.90E+02	6.99E-01
Fluoranthene	48	7.00E+01	7.00E+01	4.50E+03	4.50E+03	7.00E+01
Indeno(1,2,3-cd)pyrene	10.2	NC	6.99E+00	7.30E+03	7.30E+03	6.99E+00
Phenanthrene	27.6	5.61E+03	NC	2.26E+05	NC	5.61E+03
Metals						
Barium	623	3.20E+04	3.20E+04	NA	NA	3.20E+04
Copper	1560	1.90E+03	1,900.0	NA	NA	1.90E+03
Lead	612	6.75E+02	NC	NA	NA	6.75E+02
Zinc	660	5.70E+04	5.70E+04	NA	NA	5.70E+04
ORPs						
Mercury	2.28	6.70E+01	6.70E+01	3.60E+01	3.60E+01	3.60E+01

[1]Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Table E4-36: Risk-Based Soil Concentrations Protective of the Construction/Subsurface Utility Worker

COC	REM Soil Concentration (µg/g)[1]	Pathway Specific Risk-Based Concentration[1] (µg/g)				Candidate Risk- Based Human Health Property Specific Standard[2] (µg/g)
		Direct Contact		Inhalation of Outdoor and Trench Air		
		Non-Carcinogens	Carcinogens	Non-Carcinogens	Carcinogens	
VOCs and PHCs						
PHC F1	306	1.00E+05	1.00E+05	5.05E+02	NC	5.05E+02
PAHs						
Acenaphthylene	2.28	2.60E+03	2.60E+03	NC	8.55E+02	8.55E+02
Anthracene	6.72	2.60E+03	2.60E+03	NC	4.37E+03	2.60E+03
Benzo(a)anthracene	21.6	2.60E+02	2.60E+02	6.00E+02	6.00E+02	2.60E+02
Benzo(a)pyrene	16.8	1.70E+01	1.70E+01	6.80E+01	6.80E+01	1.70E+01
Benzo(b)fluoranthene	20.4	2.60E+02	2.60E+02	3.80E+03	3.80E+03	2.60E+02
Benzo(k)fluoranthene	7.68	2.60E+02	2.60E+02	3.80E+03	3.80E+03	2.60E+02
Chrysene	16.8	2.60E+03	2.60E+03	1.20E+04	1.20E+04	2.60E+03
Dibenz(a,h)anthracene	2.52	2.60E+01	2.60E+01	7.90E+02	7.90E+02	2.60E+01
Fluoranthene	48	2.60E+03	2.60E+03	4.50E+03	4.50E+03	2.60E+03
Indeno(1,2,3-cd)pyrene	10.20	2.60E+02	2.60E+02	7.30E+03	7.30E+03	2.60E+02
Phenanthrene	27.6	5.60E+03	NC	1.98E+04	NC	5.60E+03
Metals						
Barium	623	8.60E+03	8.60E+03	NA	NA	8.60E+03
Copper	1560	1.90E+03	1.90E+03	NA	NA	1.90E+03
Lead	612	6.75E+02	NC	NA	NA	6.75E+02
Zinc	660	5.70E+04	5.70E+04	NA	NA	5.70E+04
ORPs						
Mercury	2.28	6.70E+02	6.70E+02	3.57E+00	NC	3.57E+00

[1]Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Table E4-37: Summary of Human Health Risk-Based Soil Concentrations Protective of Individual Exposure Scenarios

COC	Maximum Soil Concentration (µg/g)	REM Soil Concentration (µg/g)	MECP (2011) Table 3 SCS	Individual Receptor Risk-Based Concentration (µg/g)				Minimum RBC (µg/g)	Dominant Exposure Pathway	Candidate Risk-Based Human Health PSS (µg/g)[1]	Risk Management Required?
				Maintenance Worker	Construction Worker	Toddler Resident	Composite Resident				
PHCs											
PHC F1	255	306	65	15000	505	2.13	6900	2.13	Indoor Air Inhalation	306	Yes
PAHs											
Acenaphthylene	1.9	2.28	0.17	70	855	6	6	6	Indoor Air Inhalation	6	Yes*
Anthracene	5.6	6.72	0.74	70	2600	57	57	57	Direct Contact	57	Yes*
Benzo(a)anthracene	18	21.6	0.63	7	260	600	5.7	5.7	Direct Contact	21.6	Yes
Benzo(a)pyrene	14	16.8	0.3	0.7	17	4.87	0.57	0.57	Direct Contact	16.8	Yes
Benzo(b)fluoranthene	17	20.4	0.78	7	260	3800	5.7	5.7	Direct Contact	20.4	Yes
Benzo(k)fluoranthene	6.4	7.68	0.78	7	260	3800	5.7	5.7	Direct Contact	7.68	Yes
Chrysene	14	16.8	7.8	70	2600	57	57	57	Direct Contact	57	Yes*
Dibenz(a,h)anthracene	2.1	2.52	0.1	0.7	26	790	0.57	0.57	Direct Contact	2.52	Yes
Fluoranthene	40	48	0.69	70	2600	57	57	57	Direct Contact	57	Yes*
Indeno(1,2,3-cd)pyrene	8.5	10.2	0.48	7	260	7300	5.7	5.7	Direct Contact	10.2	Yes
Phenanthrene	23	27.6	7.8	5609	5601	719	NC	719	Direct Contact	719	No
Metals											
Barium	519	623	390	32000	8600	3800	3800	3,800	Direct Contact	3,800	No
Copper	1300	1560	180	1900	1900	198	NC	198	Direct Contact	1,560	Yes
Lead	510	612	120	675	675	18	NC	18.2	Direct Contact	612	Yes
Zinc	550	660	340	57000	57000	6800	6800	6,800	Direct Contact	6,800	No
ORPs											
Mercury	1.9	2.28	1.8	36	3.57	9.8	9.8	3.57	Outdoor/Trench Air	2.3	No

[1]The final risk-based candidate PSS is the lower of the pathway specific PSS and/or component values. Where RMM is required, the PSS was set to the REM.

* Although no unacceptable risk was predicted for this parameter individually, RMM is required for total carcinogenic PAHs.

Table E4-38: Risk-Based Groundwater Concentrations Protective of Site Residents

COC	REM Groundwater Concentration (µg/L)	Pathway Specific Risk-Based Concentration[1] (µg/L)				Candidate Human Health Property-Specific Standard (µg/L)[2]
		Inhalation of Indoor Air Future Slab-On-Grade Residential Building		Inhalation of Ambient Outdoor Air		
		Non-Carcinogens	Carcinogens	Non-Carcinogens	Carcinogens	
VOCs						
Xylenes (total)	5,568	8.00E+04	8.00E+04	2.38E+04	NC	2.38E+04
PHC F1	255,600	4.48E-01	NC	4.45E+05	NC	4.48E-01
PHC F2	192,000	5.67E+00	NC	5.63E+06	NC	5.67E+00
PHC F3	1,800	NA	NA	NA	NA	NA

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Table E4-39: Risk-Based Groundwater Concentrations Protective of Outdoor Maintence Workers

COC	REM Groundwater Concentration (µg/L)	Pathway Specific Risk-Based Concentration Outdoor Air Inhalation[1] (µg/L)		Candidate Human Health Property-Specific Standard (µg/L)[2]
		Non-Carcinogens	Carcinogens	
VOCs				
Xylenes (total)	5,568	1.46E+04	NC	1.46E+04
PHC F1	255,600	2.73E+05	NC	2.73E+05
PHC F2	192,000	3.46E+06	NC	3.46E+06
PHC F3	1,800	NA	NA	NA

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Table E4-40: Risk-Based Groundwater Concentrations Protective of Construction/Subsurface Utility Workers

COC	REM Groundwater Concentration (µg/L)[1]	Pathway Specific Risk-Based Concentration[1] (µg/L)				Candidate Human Health Property-Specific Standard - Excavation (µg/L)[2]
		Dermal Contact & Incidental Ingestion		Inhalation of Outdoor and Trench Air		
		Non-Carcinogens	Carcinogens	Non-Carcinogens	Carcinogens	
VOCs						
Xylenes (total)	5,568	3.00E+04	3.00E+04	2.70E+02	NC	2.70E+02
PHC F1	255,600	1.77E+04	NC	5.05E+03	NC	5.05E+03
PHC F2	192,000	5.26E+03	NC	1.92E+06	NC	5.26E+03
PHC F3	1,800	1.00E+05	1.00E+05	NA	NA	1.00E+05

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-41: Summary of Human Health Risk-Based Groundwater Concentrations Protective of Individual Exposure Scenarios

COC	Maximum Concentration (µg/L)	REM Groundwater Concentration (µg/L)	MECP (2011) Table 3 SCS (µg/L)	Individual Receptor Risk-Based Concentration (µg/L)			Minimum RBC (µg/L)	Dominant Exposure Pathway	Candidate Human Health Risk-Based PSS (µg/L)[1]	Risk Management Required?
				Maintenance Worker	Construction Worker	Site Resident				
PHCs and BTEX										
Xylenes (total)	4,640	5,568	4200	14,606	270	23,777	270	Outdoor/Trench Air	5,568	Yes
PHC F1	213,000	255,600	750	273,192	5,055	0.45	0.45	Indoor Air Inhalation	255,600	Yes
PHC F2	160,000	192,000	150	3,458,182	5,264	5.67	5.67	Indoor Air Inhalation	192,000	Yes
PHC F3	1,500	1,800	500	NA	100,000	NA	100,000	Direct Contact	100,000	No

[1] The final risk-based candidate PSS is the lower of the pathway specific PSS and/or component values. Where RMM is required, the PSS was set to the REM.

Table E5-1: Comparison of Soil COC Maximum Concentrations to MECP (2011) Table 3 Site Condition Standards and Ecological Component Values - Residential/Parkland/Institutional Land Use and Medium-Fine Textured Soils

Contaminant of Concern	Maximum Soil Concentration (mg/kg)	REM Soil Concentration[1] (mg/kg)	Table 3 Site Condition Standards 2011	Ecological Component Values (mg/kg)			
				Plants and Soil Invertebrates	Mammals and Birds	Soil Leaching (S-GW3)	Modified Soil Leaching (S-GW3) Component Value[3]
Acenaphthylene	1.9	**2.28**	0.17	NV	NV	0.17	4.7
Anthracene	5.6	**6.72**	0.74	3.1	38,000	0.74	16
Barium	519	**623**	390	1000	390	NV	NV
Benz[a]anthracene	18	**21.6**	0.63	0.63	NV	5.6E+11	-
Benzo[a]pyrene	14	16.8	0.3	25	1,600	4.2E+13	-
Benzo[b]fluoranthene	17	**20.4**	0.78	NV	NV	8.6E+13	-
Benzo[k]fluoranthene	6.4	**7.68**	0.78	9.5	NV	2.8E+13	-
Chrysene	14	**16.8**	7.8	8.8	NV	4.0E+11	-
Copper	1300	**1560**	180	180	770	NV	NV
Dibenz[a h]anthracene	2.1	**2.52**	0.1	NV	NV	2.7E+13	-
Fluoranthene	40	**48**	0.69	63	0.69	45,000	-
Indeno[1 2 3-cd]pyrene	8.5	**10.2**	0.48	0.48	NV	9.5E+13	-
Lead	510	**612**	120	310	32	NV	NV
Mercury	1.9	2.28	1.8	15	20	1.3E+14	-
PHC F1[2]	255	**306**	65	210	11,000	65	1700
Phenanthrene	23	**27.6**	7.8	7.8	2,700	300	-
Zinc	550	**660**	340	500	340	NV	NV

Bolded values are either in excess of the ecotoxicity component value or a component value is not provided.

Shaded boxes indicate where component values are exceeded by the measured concentration or no component value is available.

NV = no value.

NA = not applicable. Parameter not sufficiently soluble.

[1]Reasonable estimate of the maximum concentration (REM) calculated as the maximum measured concentration + 20%.

[2] Component Value for animal life was obtained from AEP, 2024. See Appendix L.

[3] Modified component value protective of exposure pathway to aquatic biota via soil leaching to groundwater and subsequent discharge to the nearest surface water body of 1.3 km (Lake Ontario).

Table E5-2 Comparison of Groundwater COC Maximum Concentrations to MECP (2011) Table 3 Site Condition Standards and Ecological Component Values - All Types of Land Use and Medium-Fine Textured Soils

Contaminant of Concern	Maximum Groundwater Concentration (µg/L)	REM Groundwater Concentration[1] (µg/L)	Table 3 Site Condition Standards 2011	GW3 Component Value (µg/L)	Modified GW3 Component Value[2] (µg/L)
PHC F1	213,000	**255,600**	750	750	20,000
PHC F2	160,000	**192,000**	150	970	27,000
PHC F3	1,500	1,800	500	NA	NA
Xylene Mixture	4,640	**5,568**	4200	4.20E+03	120,000

Bolded values are either in excess of the ecotoxicity component value or a component value is not provided.

Shaded boxes indicate where component values are exceeded by the measured concentration.

NV = no value

NA = not applicable. Parameter not sufficiently soluble as per MECP (2011c).

[1]Reasonable estimate of the maximum concentration (REM) calculated as the maximum measured concentration + 20%.

[2] Modified component value protective of exposure pathway to aquatic biota via groundwater discharge to the nearest surface water body of 1.3 km (Lake Ontario).

Table E5-3: Comparison of Maximum Groundwater Concentrations of Soil COCs Without S-GW3 Component Values

Contaminant of Concern	Concentration(s) in Excess of SCS (mg/kg)	Location(s) of Soil COC Concentrations in Excess of S-GW3	Maximum Groundwater Concentration (ug/L)	Groundwater Site Condition Standard (ug/L)	Generic Table 3 GW3 Component Value (ug/L)
Barium [1]	410 470 519	BH101-1B (2020) BH102-1B (2020) BH110 SS1	712	MW3	29,000
Copper [1]	1,300	BH102-1B (2020)	5.1	MW2	87
Lead [1]	510 450 180 220 280 130 126 309 390	BH101-1B (2020) BH102-1B (2020) BH105-1B (2020) BH106-2A (2020) BH107-1B (2020) BH108-1B (2020) BH1 SS1 BH4 SS1 BH110 SS1	0.5	MW2	25
Zinc [1]	550 448 343	BH102-1B (2020) BH4 SS1 BH110 SS1	297	MW2	1100

Bolded value indicates corresponding groundwater concentrations are in excess of the GW3 component value. This pathway is further assessed in Section 5.5.6.

Shaded boxes indicate where the GW3 component values are exceeded by the groundwater concentration.

[1] Given no S-GW3 value exists, only the maximum concentration in soil is provided.

Table E5-4: Avian and Mammalian Wildlife Receptor Parameters[1]

Parameter	Meadow Vole	Short-Tailed Shrew	Red Fox	American Woodcock	Red-Winged Blackbird	Red-Tailed Hawk
Body weight (kg)	0.044	0.015	4.5	0.198	0.064	1.13
Dietary breakdown	Assumed 100% terrestrial vegetation	Assumed 100% soil invertebrates (earthworms)	100% small mammals (i.e. 50% Meadow Vole + 50% Short-Tailed Shrew)	Assumed 100% soil invertebrates (earthworms)	Assumed 100% terrestrial vegetation	100% small mammals (i.e. 50% Meadow Vole + 50% Short-Tailed Shrew)
Food consumption rate (kg wet weight/day)	0.005	0.009	0.43	0.15	0.091	0.0987
Food consumption rate of vegetation (kg dry weight/day)	0.0015	-	-	-	0.0273	-
Food consumption rate of invertebrates (kg dry weight/day)	-	0.00144	-	0.024	-	-
Food Consumtion rate of small mammals (kg dry weight/day)	-	-	0.138	-	-	0.032
Food consumtion rate of birds (kg dry weight/day)	-	-	-	-	-	-
Soil ingestion (kg dry weight/day)	0.000018	0.000187	0.00385	0.0025	0.00109	0.0018
Home range[2] (ha)	0.037	0.39	96	3.1	-	233
Fraction of time on Site (assumed)	1	1	1	1	1	1

[1]Exposure parameters were obtained from MECP (2011c), unless otherwise noted.

[2] Home range is the most conservative value (where mutilple values are listed) from Sample and Suter (1994). Home range is listed for reference only as it is assumed VECs spend the entirely of their time on-site.

Moisture content of vegetation was assumed to be 70%.

Moisture content of soil invertebrates was assumed to be 84%.

Moisture content of small mammals was assumed to be 68%.

Table E5-5: Physical/ Chemical Properties, Uptake Factors in Soil Plants and Estimated Mammal Biotransfer Factors[1,2]

Contaminant of Concern	Log K_{OW}	BCF Soil to Plant	Biotransfer Factor $_{Mammals}$ (d/kg ww)	Biotransfer Factor $_{Mammals}$ (d/kg dw)	F_{OC}	K_{OC} (cm^3/g)
Acenaphthylene	3.94E+00	2.04E-01	2.19E-04	1.49E-04	0.005	6.12E+03
Benz[a]anthracene	5.76E+00	1.81E-02	1.45E-02	9.83E-03	0.005	2.31E+05
Benzo[b]fluoranthene	5.78E+00	1.77E-02	1.51E-02	1.03E-02	0.005	8.03E+05
Benzo[k]fluoranthene	6.11E+00	1.14E-02	3.24E-02	2.20E-02	0.005	7.87E+05
Chrysene	5.81E+00	1.70E-02	1.62E-02	1.10E-02	0.005	2.36E+05
Dibenz[a h]anthracene	6.54E+00	6.43E-03	8.71E-02	5.92E-02	0.005	2.62E+06
Fluoranthene	5.16E+00	4.03E-02	3.63E-03	2.47E-03	0.005	7.09E+04
Indeno[1 2 3-cd]pyrene	6.70E+00	5.19E-03	1.26E-01	8.56E-02	0.005	2.68E+06

[1] Barium, copper, lead and zinc not shown in this table as predicted concentration in food parameters were not estimated using biotransfer factors.
[2] Chemical properties obtained from MECP (2016).
[3] MECP default foc of 0.005.

Table E5-6: Predicted Concentration of COCs in Wildlife Food Items

Contaminant of Concern	Concentration in Plants (mg/kg dw)	Concentration in Invertebrates (mg/kg dw)	Concentration in Meadow Vole (mg/kg dw)	Concentration in Short-Tailed Shrew (mg/kg dw)
Acenaphthylene	4.66E-01	1.25E+01	1.62E-07	4.02E-06
Barium	9.72E+01	5.67E+01	7.29E-01	4.25E-01
Benz[a]anthracene	3.92E-01	1.20E+02	1.41E-05	2.55E-03
Benzo[b]fluoranthene	3.60E-01	3.39E+01	1.37E-05	7.97E-04
Benzo[k]fluoranthene	8.75E-02	2.52E+01	8.72E-06	1.22E-03
Chrysene	2.85E-01	1.01E+02	1.18E-05	2.41E-03
Copper	3.53E+01	8.03E+02	2.23E+01	2.23E+01
Dibenz[a h]anthracene	1.62E-02	5.89E+00	6.07E-06	7.79E-04
Fluoranthene	1.94E+00	2.61E+02	1.37E-05	1.40E-03
Indeno[1 2 3-cd]pyrene	5.30E-02	3.21E+01	3.31E-05	6.06E-03
Lead	9.70E+00	1.43E+02	1.84E+01	1.84E+01
Zinc	1.76E+02	7.19E+02	1.24E+02	1.24E+02

Table E5-7: Predicted Dose of COCs to Wildlife (mg/kg-bw d)

Contaminant of Concern	Meadow Vole	Short-Tailed Shrew	Red Fox	American Woodcock	Red-Winged Blackbird	Red-Tailed Hawk
Acenaphthylene	1.68E-02	1.23E+00	1.95E-03	1.54E+00	2.38E-01	3.63E-03
Barium	3.57E+00	1.32E+01	5.50E-01	1.47E+01	5.21E+01	1.01E+00
Benz[a]anthracene	2.22E-02	1.18E+01	1.85E-02	1.48E+01	5.35E-01	3.44E-02
Benzo[b]fluoranthene	2.06E-02	3.51E+00	1.75E-02	4.37E+00	5.01E-01	3.25E-02
Benzo[k]fluoranthene	6.12E-03	2.52E+00	6.59E-03	3.16E+00	1.68E-01	1.23E-02
Chrysene	1.66E-02	9.90E+00	1.44E-02	1.24E+01	4.08E-01	2.68E-02
Copper	1.84E+00	9.66E+01	2.02E+00	1.17E+02	4.16E+01	3.11E+00
Dibenz[a h]anthracene	1.58E-03	5.96E-01	2.17E-03	7.45E-01	4.98E-02	4.03E-03
Fluoranthene	8.56E-02	2.57E+01	4.11E-02	3.22E+01	1.64E+00	7.65E-02
Indeno[1 2 3-cd]pyrene	5.98E-03	3.21E+00	8.82E-03	4.02E+00	1.96E-01	1.63E-02
Lead	5.81E-01	2.13E+01	1.09E+00	2.50E+01	1.46E+01	1.49E+00
Zinc	6.28E+00	7.73E+01	4.36E+00	9.55E+01	8.64E+01	4.52E+00

Table E5-8A: Soil Benchmark and Exposure Limits Selected for Plants and Soil Invertebrates

Contaminant of Concern	Plants Benchmark (mg/kg)	Invertebrates Benchmark (mg/kg)	Reference[1] (Soil Benchmarks)
Acenaphthylene	23	23	Sverdrup et al., 2002
Anthracene	3.1	3.1	MECP, 2011c
Benz[a]anthracene	0.63	0.63	MECP, 2011c
Benzo[b]fluoranthene	1.2	360	Sims and Overcash, 1983 (plants); Sverdrup et al., 2002 (invertebrates)
Chrysene	8.8	8.8	MECP, 2011c
Copper	180	180	MECP, 2011c
Dibenz[a h]anthracene	155	780	Henner et al., 1999 (plants); Sverdrup et al., 2002 (invertebrates)
Indeno[1 2 3-cd]pyrene	0.48	0.48	MECP, 2011c
Lead	310	310	MECP, 2011c
PHC F1	210	210	MECP, 2011c
Phenanthrene	7.8	7.8	MECP, 2011c
Zinc	500	500	MECP, 2011c

Shaded value indicates benchmark obtained from source other than MECP (2011c).

[1]For soil benchmarks obtained from sources other than MECP (2011c), a rationale for the selection of the benchmark is provided in Appendix L.

Table E5-8B: Exposure Limits Selected for the Ecotoxicity Evaluation of Mammals and Birds

Contaminant of Concern	Tested Species	Endpoint	Benchmarks Applied in this ERA for Protection of Mammals				Benchmarks Applied in this ERA for Protection of Birds				Reference[1]
			Meadow Vole	Short-Tailed Shrew	Red Fox	Units	American Woodcock	Red-Winged Black Bird	Red-Tailed Hawk	Units	
Acenaphthylene	Mouse	LOEL (liver weight)	175	175	175	mg/kg-bw d	35	35	35	mg/kg-bw d	Modified MECP, 2011c
Barium	Rat (mammals); Chicks (birds)	Subchronic LOEL (mortality)	20	20	20	mg/kg-bw d	42	42	42	mg/kg-bw d	MECP, 2011c
Benz[a]anthracene	Wistar Rat	NOAEL (hepatic, renal, gastrointestinal)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Benzo[b]fluoranthene	Mouse	LOAEL (immunocompetence)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Benzo[k]fluoranthene	Mouse	LOAEL (immunocompetence)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Chrysene	Rat	LOAEL (immunocompetence)	10	10	10	mg/kg-bw d	2	2	2	mg/kg-bw d	Silkworth et al., 1995 (mammals); Trust et al., 1994 (birds)
Copper	1) Mink (mammals); 2) Chicks (birds)	1) LOEL (reproduction) 2) LOEL (growth/mortality)	15	15	15	mg/kg-bw d	62	62	62	mg/kg-bw d	MECP, 2011c
Dibenz[a h]anthracene	Multiple species (mammals); European starling (birds)	Multiple (mammals); NOAEL (weight) (birds)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Fluoranthene	Mouse	LOEL (liver weight)	125	125	125	mg/kg-bw d	125	125	125	mg/kg-bw d	MECP, 2011c
Indeno[1 2 3-cd]pyrene	Multiple species (mammals); European starling (birds)	Multiple (mammals); NOAEL (weight) (birds)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Lead	1) Rat (mammals); 2) Chicken (birds); 3) American kestral (Hawk)	1) and 2) Chronic LOEL (reproduction) 3) Chronic NOEL (survival/body weight)	80	80	80	mg/kg-bw d	3.3	3.3	28	mg/kg-bw d	MECP, 2011c
Zinc	Rat (mammals); Chicken (birds)	LOEL (reproduction)	320	320	320	mg/kg-bw d	131	131	131	mg/kg-bw d	MECP, 2011c

NA - not applicable.
Shaded value indicates benchmark obtained from source other than MECP (2011c).
Lowest MECP (2011c) TRV derived for other VECs applied.
[1]For soil benchmarks obtained from sources other than MECP (2011c), a rationale for the selection of the benchmark is provided in Appendix L.

Table E5-9: Hazard Quotient and Property Specific Soil Standards for Plants and Soil Invertebrates

Contaminant of Concern	REM Soil Concentration (mg/kg)	HQ Plants	HQ Invertebrates	Risk-Based Concentration for Plants (mg/kg)	Risk-Based Concentration for Invertebrates (mg/kg)	Minimum Risk-Based Concentration[1] (mg/kg)
Acenaphthylene	2.3	9.91E-02	9.91E-02	23	23	2.30E+01
Anthracene	7	**2.17E+00**	**2.17E+00**	3.1	3.1	3.10E+00
Benz[a]anthracene	21.6	**3.43E+01**	**3.43E+01**	6.30E-01	6.30E-01	6.30E-01
Benzo[b]fluoranthene	20.4	**1.70E+01**	5.67E-02	1.20E+00	3.60E+02	1.20E+00
Chrysene	17	**1.91E+00**	**1.91E+00**	8.80E+00	8.80E+00	8.80E+00
Copper	1560	**8.67E+00**	**8.67E+00**	1.80E+02	1.80E+02	1.80E+02
Dibenz[a h]anthracene	2.5	1.63E-02	3.23E-03	1.55E+02	7.80E+02	1.55E+02
Indeno[1 2 3-cd]pyrene	10.2	**2.13E+01**	**2.13E+01**	4.80E-01	4.80E-01	4.80E-01
Lead	612	**1.97E+00**	**1.97E+00**	3.10E+02	3.10E+02	3.10E+02
PHC F1	306	**1.46E+00**	**1.46E+00**	2.10E+02	2.10E+02	2.10E+02
Phenanthrene	28	**3.54E+00**	**3.54E+00**	7.80E+00	7.80E+00	7.80E+00
Zinc	660	**1.32E+00**	**1.32E+00**	5.00E+02	5.00E+02	5.00E+02

Bolded values highlighted in grey exceed the acceptable HQ of 1.

[1] Minimum risk-based back-calculated values protective of plants and soil invertebrates.

Table E5-10A: Hazard Quotient for Mammals and Birds Exposed to Soil COCs

Contaminant of Concern	REM Soil Concentration (mg/kg)	HQ					
		Meadow Vole	Short-Tailed Shrew	Red Fox	American Woodcock	Red-Winged Black Bird	Red-Tailed Hawk
Acenaphthylene	2.28	9.62E-05	7.00E-03	1.11E-05	4.40E-02	6.79E-03	1.04E-04
Barium	622.8	1.78E-01	6.60E-01	2.75E-02	3.51E-01	**1.24E+00**	2.40E-02
Benz[a]anthracene	21.6	3.61E-02	**1.92E+01**	3.01E-02	**7.41E+00**	2.68E-01	1.72E-02
Benzo[b]fluoranthene	20.4	3.35E-02	**5.71E+00**	2.84E-02	**2.18E+00**	2.51E-01	1.63E-02
Benzo[k]fluoranthene	7.68	9.96E-03	**4.09E+00**	1.07E-02	**1.58E+00**	8.41E-02	6.13E-03
Chrysene	16.8	1.66E-03	9.90E-01	1.44E-03	**6.22E+00**	2.04E-01	1.34E-02
Copper	1560	1.23E-01	**6.44E+00**	1.34E-01	**1.89E+00**	6.72E-01	5.01E-02
Dibenz[a h]anthracene	2.52	2.57E-03	9.70E-01	3.53E-03	3.73E-01	2.49E-02	2.01E-03
Fluoranthene	48	6.85E-04	2.05E-01	3.29E-04	2.58E-01	1.31E-02	6.12E-04
Indeno[1 2 3-cd]pyrene	10.2	9.72E-03	**5.22E+00**	1.43E-02	**2.01E+00**	9.82E-02	8.17E-03
Lead	612	7.26E-03	2.67E-01	1.36E-02	**7.58E+00**	**4.41E+00**	5.32E-02
Zinc	660	1.96E-02	2.42E-01	1.36E-02	7.29E-01	6.60E-01	3.45E-02

Bolded values highlighted in grey exceed the acceptable HQ of 1.

Table E5-10B: Risk Based Soil Concentrations for Individual Mammals and Birds

Contaminant of Concern	REM Soil Concentration (mg/kg)	Risk-Based Concentration for Individual VECs (mbg/kg)						Minimum Risk-Based Concentration[1] (mg/kg)
		Meadow Vole	Short-Tailed Shrew	Red Fox	American Woodcock	Red-Winged Black Bird	Red-Tailed Hawk	
Acenaphthylene	2.28	2.37E+04	3.26E+02	2.05E+05	5.18E+01	3.36E+02	2.20E+04	52
Barium	623	3.49E+03	9.43E+02	2.26E+04	1.78E+03	5.03E+02	2.59E+04	503
Benz[a]anthracene	21.6	5.98E+02	1.13E+00	7.17E+02	2.92E+00	8.07E+01	1.25E+03	1.13
Benzo[b]fluoranthene	20.4	6.08E+02	3.57E+00	7.18E+02	9.34E+00	8.14E+01	1.26E+03	3.57
Benzo[k]fluoranthene	7.68	7.71E+02	1.88E+00	7.17E+02	4.87E+00	9.14E+01	1.25E+03	1.88
Chrysene	16.8	1.01E+04	1.70E+01	1.17E+04	2.70E+00	8.24E+01	1.25E+03	2.70
Copper	1560	1.27E+04	2.42E+02	1.16E+04	8.26E+02	2.32E+03	3.11E+04	242
Dibenz[a h]anthracene	2.52	9.79E+02	2.60E+00	7.15E+02	6.76E+00	1.01E+02	1.25E+03	2.60
Fluoranthene	48	7.01E+04	2.34E+02	1.46E+05	1.86E+02	3.65E+03	7.85E+04	186
Indeno[1 2 3-cd]pyrene	10.2	1.05E+03	1.96E+00	7.11E+02	5.08E+00	1.04E+02	1.25E+03	1.96
Lead	612	8.43E+04	2.30E+03	4.50E+04	8.07E+01	1.39E+02	1.15E+04	81
Zinc	660	3.36E+04	2.73E+03	4.84E+04	9.05E+02	1.00E+03	1.91E+04	905

[1] Minimum risk-based back-calculated value protective of mammals and birds.

Table E5-11: Final Candidate ERA Property Specific Standards for Soil COCs

Contaminant of Concern	Maximum Soil Concentration (mg/kg)	REM Soil Concentration (mg/kg)	Risk-Based Concentration (Plants and Soil Invertebrates) (mg/kg)	Risk-Based Concentration (Mammals and Birds) (mg/kg)	Risk-Based Concentration (S-GW3) (mg/kg)[1]	Minimum Risk-Based Concentration Protective of Ecological Receptors (mg/kg)	Final Candidate PSS Protective of Ecological Receptors[2] (mg/kg)	Dominant Pathway	Risk Management Required
Acenaphthylene	1.9	2.28	23	52	4.7	4.7	4.7	Soil Leaching	NO
Anthracene	5.6	6.72	3.1	38,000	16	3.1	**6.72**	Plants and Invertebrates	YES
Barium	519	623	1000	503	623	503	**623**	Mammals and Birds	YES
Benz[a]anthracene	18	21.6	0.63	1.1	5.6E+11	0.63	**21.6**	Plants and Invertebrates	YES
Benzo[a]pyrene	14	16.8	25	1,600	4.2E+13	25	25	Plants and Invertebrates	NO
Benzo[b]fluoranthene	17	20.4	1.2	3.6	8.6E+13	1.2	**20.4**	Plants and Invertebrates	YES
Benzo[k]fluoranthene	6.4	7.68	9.5	1.9	2.8E+13	1.9	**7.7**	Mammals and Birds	YES
Chrysene	14	16.8	8.8	2.7	4.00E+11	2.7	**16.8**	Mammals and Birds	YES
Copper	1300	1560	180	242	1,560	180	**1560**	Plants and Invertebrates	YES
Dibenz[a h]anthracene	2.1	2.52	155	2.6	2.7E+13	2.60	2.6	Mammals and Birds	NO
Fluoranthene	40	48	63	186	45,000	63.00	63	Plants and Invertebrates	NO
Indeno[1 2 3-cd]pyrene	8.5	10.2	0.48	2.0	9.5E+13	0.48	**10.2**	Plants and Invertebrates	YES
Lead	510	612	310	80.7	612	80.7	**612**	Mammals and Birds	YES
Mercury	1.9	2.28	15	20	1.3E+14	15	15	Plants and Invertebrates	NO
PHC F1	255	306	210	11,000	1700	210	**306**	Plants and Invertebrates	YES
Phenanthrene	23	27.6	7.8	2,700	300	7.8	**27.6**	Plants and Invertebrates	YES
Zinc	550	660	500	905	660	500	**660**	Plants and Invertebrates	YES

Shaded boxes indicate that the RBC is based on the component value. Unshaded boxes are the risk-based back-calculated value. Underlined values indicate the RBC was set to the REM based on the qualitative assessment.

Bolded values indicate the final candidate ecological PSS was set to the REM concentration in the presence of RMM.

NA - not applicable.

[1]RBC for risk to off-Site aquatic receptors based on either the generic or the Site specific S-GW3 component values as presented within Table E4-1.

[2] The final candidate ecological health risk-based concentration is the lower of the pathway specific risk-based concentrations and/or component values. Where the pathway specific risk-based concentration is lower than the REM concentration, the REM concentration is set as the candidate PSS and RMM are required.

Table E5-12: Final ERA Property Specific Standards for Groundwater COCs

Contaminant of Concern	Maximum Groundwater Concentration (µg/L)	REM Groundwater Concentration (µg/L)	Risk-Based Concentration for Off-Site Aquatic Life (µg/L)	Minimum Risk-Based Concentration Protective of Ecological Receptors (µg/L)	Final Candidate PSS[1] (µg/L)	Basis of Candidate PSS	Risk Management Required
PHC F1	213,000	255,600	2.00E+04	2.00E+04	255,600	REM	NO
PHC F2	160,000	192,000	2.70E+04	2.70E+04	192,000	REM	NO
PHC F3	1,500	1,800	NA	1.80E+03	1,800	REM	NO
Xylene Mixture	4,640	5,568	1.20E+05	1.20E+05	5,568	REM	NO

Shaded boxes indicate that the RBC is based on the component value. Unshaded boxes are the risk-based back-calculated value. Underlined values indicate the RBC was set to the REM based on the qualitative assessment.

Bolded values indicate the candidate PSS was set to the REM concentration in the presence of RMM.

[1] The final candidate ecological health risk-based concentration is the lower of the pathway specific risk-based concentrations and/or component values. Where the pathway specific risk-based concentration is lower than the REM concentration, the REM concentration is set as the candidate PSS and RMM are required.

Table E6-1: Final Property Specific Standards for Soil COCs

Contaminant of Concern	Maximum Concentration / Reporting Detection Limit (µg/g)	REM Soil Concentration[1] (µg/g)	MECP (2011) Table 3 SCS (µg/g)	Candidate Human Health Risk-Based PSS (µg/g)	Candidate Ecological Risk-Based PSS (µg/g)	Dominant Exposure Pathway	Final Property Specific Standard (µg/g)	Basis of PSS	RMM Required	Likelihood to Exceed SCS Off-Site
PHCs										
PHC F1	255	306	65	306	306	HH - Indoor Air Inhalation	306	REM	Yes [1,5]	No
PAHs										
Acenaphthylene	1.9	2.28	0.17	6	4.7	ECO - Soil Leaching	2.28	REM	No	No
Anthracene	5.6	6.7	0.74	57	6.72	ECO - Direct Contact (plants and invertebrates)	6.72	REM	Yes [5]	No
Benzo(a)anthracene	18	21.6	0.63	21.6	21.6	ECO - Direct Contact (plants and invertebrates)	21.6	REM	Yes [2,3,4,5,6]	No
Benzo(a)pyrene	14	16.8	0.3	16.8	25	HH - Direct Contact	16.8	REM	Yes [2,3,4]	No
Benzo(b)fluoranthene	17	20.4	0.78	20.4	20.4	ECO - Direct Contact (plants and invertebrates)	20.4	REM	Yes [2,3,4,5,6]	No
Benzo(k)fluoranthene	6.4	7.68	0.78	7.68	7.68	ECO - Direct Contact (mammals and birds)	7.68	REM	Yes [2,3,4,6]	No
Chrysene	14	16.8	7.8	57	16.8	ECO - Direct Contact (mammals and birds)	16.8	REM	Yes [4,5,6]	No
Dibenz(a,h)anthracene	2.1	2.52	0.1	2.52	2.6	HH - Direct Contact	2.52	REM	Yes [2,3,4]	No
Fluoranthene	40	48	0.69	57	63	HH - Direct Contact	48	REM	Yes [4,6]	No
Indeno(1,2,3-cd)pyrene	8.5	10.20	0.48	10.2	10.2	ECO - Direct Contact (plants and invertebrates)	10.2	REM	Yes [2,3,4,5,6]	No
Phenanthrene	23	27.6	7.8	719	27.6	ECO - Direct Contact (plants and invertebrates)	27.6	REM	Yes [5]	No
Metals										
Barium	519	623	390	3,800	623	ECO - Direct Contact (mammals and birds)	623	REM	Yes [4,6]	No
Copper	1,300	1,560	180	1,560	1,560	ECO - Direct Contact (plants and invertebrates)	1560	REM	Yes [2,4,5,6]	No
Lead	510	612	120	612	612	HH - Direct Contact	612	REM	Yes [2,4,5,6]	No
Zinc	550	660	340	6,800	660	ECO - Direct Contact (plants and invertebrates)	660	REM	Yes [4,5]	No
ORPs										
Mercury	1.9	2.28	1.8	2.3	15	HH - Trench/Outdoor Air Inhalation	2.28	REM	No	No

HH - Human Health; ECO - Ecological Health

[1] RMM required for the protection of Site resident (also surrogate for Site visitor and indoor worker) exposure to soil COCs via indoor air inhalation.

[2] RMM required for protection of Site resident (also surrogate for site visitor) exposure to soil COCs via direct contact.

[3] RMM required for protection of maintenance worker exposure to soil COCs via direct contact.

[4] RMM required for the protection of site resident (also surrogate for site visitor) exposure to soil COCs via garden produce ingestion.

[5] RMM required for the protection of terrestrial plants and soil invertebrates.

[6] RMM required for the protection of mammals and birds.

Table E6-2: Final Property Specific Standards for Groundwater COCs

Contaminant of Concern	Maximum Concentration / Reporting Detection Limit (µg/L)	REM Groundwater Concentration[1] (µg/L)	MECP (2011) Table 3 SCS (µg/L)	Candidate Human Health Risk-Based PSS (µg/L)	Candidate Ecological Risk-Based PSS (µg/L)	Dominant Exposure Pathway	Final Property Specific Standard (µg/L)	Basis of PSS	RMM Required	Likelihood to Exceed SCS Off-Site
PHCs and BTEX										
Xylenes	4,640	5,568	4200	5,568	5,568	HH - Trench/Outdoor Air Inhalation	5,568	REM	Yes [3]	No
PHC F1	213,000	255,600	750	255,600	255,600	HH - Indoor Air Inhalation	255,600	REM	Yes [1,2,3]	No
PHC F2	160,000	192,000	150	192,000	192,000	HH - Indoor Air Inhalation	192,000	REM	Yes [1,2]	No
PHC F3	1,500	1,800	500	100,000	1,800	HH - Direct Contact	1,800	REM	No	No

HH - Human Health; ECO - Ecological Health

[1] RMM required for the protection of site resident (also surrogate for site visitor and indoor worker) exposure to groundwater COCs via indoor air inhalation.

[2] RMM required for protection of subsurface worker/utility worker exposure to groundwater COCs via direct contact.

[3] RMM required for protection of the subsurface worker/utility worker exposure to groundwater COCs via inhalation of combined outdoor and trench air.

Appendix F: Qualifications of the Risk Assessment Team

Shane Ward, B.Sc., QPRA

Senior Risk Assessment Specialist

Professional Registrations

- QPRA - ON

Education + Training

- B.Sc., Environmental Toxicology Program, University of Guelph, 2009
- Soil Vapour Training, 1-day course, Maxxam Analytics Inc., 2016
- Conceptual Site Models in Environmental Site Assessments, Golder Associates Inc., 2014
- Technical Writing, Golder Associates Inc., 2013
- Quality Assurance Program for Environmental Investigations in Ontario, Golder Associates Inc., 2011

Affiliations + Memberships

- Ontario Environmental Industrial Association (ONEIA)
- Qualified Person Community of Ontario (QPCO)
- Society of Environmental Toxicology and Chemistry – Laurentian Chapter (L-SETAC)

Languages Spoken

- English

Mr. Ward has over thirteen (13) years of experience in the areas of human health and ecological risk assessment (RA), fate and transport modelling, risk assessment modeling, project management, due diligence and risk management. He is currently a Senior Risk Assessment Specialist at EXP and provides senior oversight and technical review on risk assessment projects. Mr. Ward has conducted numerous human health and ecological risk assessments for contaminated sites in Ontario (under Ontario Regulation 153/04, as amended) and across Canada (under Federal Contaminated Sites Action Plan protocols). To date, he has been involved in over twenty (20) RAs that have been successfully accepted by the Ontario Ministry of the Environment, Conservation and Parks (MECP). He has also conducted over one-hundred (100) Screening Level Risk Assessments in Ontario and across Canada to support due diligence and financing purposes. Moreover, he has conducted third-party peer review of O. Reg. 153/04 and due diligence RAs on behalf of local municipalities or clients.

Mr. Ward graduated from the University of Guelph with an Honours Bachelor of Science degree in Environmental Toxicology.

Prior to joining EXP in 2024, Mr. Ward was a Senior Environmental Risk Assessor at Pinchin Limited, a Risk Assessment Specialist at EXP, and an Environmental Risk Assessor at Golder Associates, where he specialized in environmental risk assessments.

Since joining EXP, Mr. Ward has been involved with senior technical review of RAs. The next page presents highlights of projects Mr. Ward has been involved with.

Shane Ward, B.Sc., QPRA - *continued*

Senior Risk Assessment Specialist

Project Experience

Tier 3 Risk Assessment (2022 to 2023) – Proposed Residential Development, Toronto, Ontario.

QPRA and Human Health and Ecological Risk Assessor for a Tier 3 RA being conducted at a commercial property. The RA was being conducted to assess human and ecological risk and facilitate site permitting of a proposed residential development. Contaminants of concern (COCs) include polycyclic aromatic hydrocarbons (PAHs) in soil, and volatile organic compounds (VOCs) in groundwater.

Tier 3 Risk Assessment (2022 to 2023) – Commercial Property, Niagara Falls, Ontario.

QPRA and Human Health and Ecological Risk Assessor for a Tier 3 RA being conducted at a commercial property. The RA was being conducted to assess human and ecological risk as a part of the lease agreement between the tenant and owner. COCs include VOCs in groundwater.

Tier 3 Risk Assessment (2019-2023) – Former Industrial Property, Kitchener, Ontario.

Human Health and Ecological Risk Assessor for multiple Tier 3 RAs being conducted at a former industrial property with a surface water body. The RAs were being conducted to assess human and ecological risk and facilitate site permitting of a mixed-use redevelopment, including commercial, residential and parkland parcels. COCs include petroleum hydrocarbons (PHCs), VOCs, PAHs, metals and inorganics in soil and groundwater. One of the RAs was accepted by MECP in 2023.

Modified Generic Risk Assessment (2021-2022) – Residential Development, Mount Forest, Ontario.

QPRA and Senior Human Health and Ecological Risk Assessor for an MGRA to support the development of a former industrial property to a residential townhome development. COC) include metals and polycyclic aromatic hydrocarbons (PAHs) in soil. The MGRA was accepted by MECP in 2022.

Tier 3 Risk Assessment (2019-2020) – Mixed-Use Development, Trenton, Ontario.

Human Health and Ecological Risk Assessor for a Tier 3 RAs being conducted at a commercial property. The RAs were being conducted to assess human and ecological risk and facilitate site permitting of a potential mixed-use redevelopment, including commercial and residential buildings. COCs include metals in soil and VOCs in groundwater. One of the RAs was accepted by MECP in 2020.

Tier 3 Risk Assessment (2019-2021) – Proposed Residential Development, Toronto Ontario.

Human Health and Ecological Risk Assessor for a Tier 3 RA being conducted at a residential property where contamination was identified related to fill materials and former underground storage tanks (USTs). The RA was being conducted to assess human and ecological risk and facilitate site permitting of a proposed residential development. COCs include PHCs, benzene and PAHs in soil and/or groundwater. The RA was accepted by MECP in 2021.

Modified Generic Risk Assessment (2019-2020) – Residential Development, Welland, Ontario.

Human Health and Ecological Risk Assessor for an MGRA to support the redevelopment of a former commercial property to a retirement home. COCs include electrical conductivity and sodium adsorption ratio in soil. The MGRA was accepted by MECP in 2020.

Preliminary Quantitative Risk Assessments and Screening Level Risk Assessments (2016-2017) – Public Works and Government Services Canada, Various Locations.

**Work performed at previous firm.*

Shane Ward, B.Sc., QPRA - *continued*

Senior Risk Assessment Specialist

Human health and ecological Risk Assessor for multiple PQRAs and SLRAs for various properties in Ontario, including penitentiaries, lighthouses and remote contaminated sites. This work was completed for Public Works and Government Services Canada (PWGSC).

Risk Assessment – Former Uranium Mines (2011-2013).

Ecological Risk Assessor for two former uranium mine sites in Ontario. Previous monitoring in the surrounding watershed had noted elevated radionuclides and metals in surface water and sediment. The RAs were completed to evaluate potential risks to human and ecological receptors both on-Site and within the surrounding area. The RAs were submitted to the MECP and the Canadian Nuclear Safety Commission for review.

Risk Assessment (2011 to 2022) – Various Projects.

Significant experience with the Modified Generic Risk Assessment, former Streamlined Tier 3, and Tier 3 Risk Assessment approaches. Completed over twenty (20) O. Reg. 153/04-compliant human health and ecological RAs for sites impacted by contaminants of concern including metals and inorganic parameters, VOCs, PHCs, and PAHs in soil, groundwater, and/or sediment.

Employment History

EXP Services Inc. – Senior Risk Assessment Specialist

Employment: Jan 2024 – Present

Pinchin Ltd. – Senior Environmental Risk Assessor

Employment: 2021 – Jan 2024

Pinchin Ltd. – Environmental Risk Assessor

Employment: Apr 2018 – 2021

Golder Associates Ltd. – Environmental Risk Assessor

Employment: Oct 2017 – Apr 2018

EXP Services Inc. – Risk Assessment Specialist

Employment: Jan 2016 – Sep 2017

Golder Associates Ltd. – Environmental Risk Assessor

Employment: Jan 2011 – Nov 2015

**Work performed at previous firm.*

Robert Helik, P.Eng. (QP_{ESA} and QP_{RA})

Vice President, Environmental Services

Professional Registrations

- P.Eng. – ON

Education + Training

- B.Sc. Eng. – Chemical and Biochemical Engineering, University of Western Ontario, 2003

Affiliations + Memberships

- Professional Engineers of Ontario
- Ontario Society of Professional Engineers

Languages Spoken

- English
- French

Robert has 20 years of experience as an environmental specialist, having worked on a variety of environmental assessment, remediation, and risk assessment projects in support of property management and land redevelopment, as well as on numerous hazardous materials and mould assessment and abatement projects. Rob has also acted as an expert witness in construction lien law.

His current responsibilities include the management and coordination of the environmental groups, including the site assessment, hydrogeological, air quality, hazardous materials, and risk assessment teams. As part of his responsibilities, Rob's role is to ensure the environmental operations are completed in a timely manner to Client satisfaction. Rob oversees various contracts for nationwide clients and routinely coordinates with the regional offices to ensure project and contract performance.

Rob is a registered Qualified Person (QP) with the Ontario Ministry of the Environment who manages and coordinates Phase One and Two Environmental Site Assessments (ESAs) for residential, commercial and industrial properties in support of risk assessment projects. Rob is also a registered Qualified Person for the purpose of overseeing Risk Assessment projects in Ontario (QPRA). Rob also has extensive experience working within the various provincial environmental frameworks across Canada, and in accordance with the Federal guidelines for all types of environmental projects.

Project Experience

Environmental Site Assessment and Remediation, Former Oakville Trafalgar Memorial Hospital, Oakville, ON

EXP was the environmental consultant of record to complete all environmental consulting services associated with the decommissioning of the Oakville Trafalgar Memorial Hospital. EXP's scope of services included the completion of Phase One and Two Environmental Site Assessments, the completion of Designated Substance Surveys, the preparation of Remedial Action Plans, Coordination with Regulatory Agencies, Air and Noise Assessments, Tender Specifications, and Client consultations. Rob was responsible for all communications with the Town of Oakville, providing budgetary estimates, ensuring project completion, providing high level technical expertise, and overseeing the final reporting.

Robert Helik, P.Eng. (QP_{ESA} and QP_{RA}) - *continued*

Vice President, Environmental Services

Crosstown Development

The Celestica facility is a well known piece of land situated within the heart of Toronto that is comprised of two (2) main parcels (North and South). The North Parcel of the Site is located at the northwest corner of Eglinton Avenue East and Don Mills Road and covers an area of approximately 22.9 ha (56.7 acres). This project transforms a historic Brownfield with extensive contamination into a vibrant community with approximately 5,000 residential units and 800,000 ft^2 of commercial/retail space, immediately adjacent to the new Eglinton LRT. This includes 17 development blocks, 4 blocks to be conveyed to the TRCA, and multiple new roadways to be conveyed to the City of Toronto.

Rob was the overall Technical Lead and Qualified Person for all environmental work completed at the Site, responsible for the preparation of the remedial management plan, the execution of the plan, and the coordination with all Stakeholders. Due to the nature of the impacts at the Site, the Site was divided into 14 separate parcels to support the efficient environmental management. EXP's work included the advancement of hundreds of boreholes/monitoring wells, the completion of multiple risk assessments, the design and oversight of multiple remediation programs, excess soil management, and the filing of RSCs, with all work being completed per the applicable Ontario Regulations.

Lakeview Village

The site is situated south of Lakeshore Road East along the shoreline of Lake Ontario, comprising approximately 64 hectares (159 acres). The site operated as the Lakeview Coal Generating Station, a coal-fired power plant, from the late 1950s until 2005. The Lakeview Village Brownfield project comprises of the redevelopment of the lands that were formerly occupied by Ontario Power Generation's (OPG) coal burning station in the Lakeview community, immediately east of Port Credit in Mississauga, Ontario.

Rob was the overall Technical Lead and Qualified Person for all environmental work completed at the Site, responsible for the preparation of the remedial management plan, the execution of the plan, and the coordination with all Stakeholders. Due to the nature of the impacts at the Site, the Site was divided into 8 separate parcels to support the efficient environmental management. EXP's work included the advancement of hundreds of boreholes/monitoring wells, the completion (and approval) of multiple risk assessments, the design and oversight of multiple remediation programs, including hazardous levels of PCBs, excess soil management, and the filing of RSCs, with all work being completed per the applicable Ontario Regulations.

Risk Assessment – Former City Works Yard, Ottawa, ON

The Risk Assessment Property was a former City works yard that was contaminated with VOCs, PHC, Metals, and Salt in groundwater and soil. The Site was proposed to be rezoned and redeveloped for a mixed use residential, parkland, and community facility. As part of this project, Rob provided high level technical risk assessment expertise to the project team, including coordination with the City of Ottawa and the MOECC Ottawa District Office. The human health assessment focused on the potential risks to the on site receptors from the impacts in the soil and groundwater, as well as the potential risks to the off-site receptors via the migration of groundwater to the adjacent properties.

Regional Express Rail – Davenport Diamond Rail Grade Separation, ON

This project involves an addition of a grade separation between north / south GO Barrie rail corridor and east / west CP rail corridor; replacement of Bloor Street West Bridge; pedestrian underpass to restore east / west connection at Paton Road; new retaining walls, noise barrier walls, and superimposed cladding; modification of an existing at-grade road crossing; construction of a temporary diversion track to enable construction of a new two-track elevated guideway; and provisions for future electrification implemented within upgraded rail infrastructure to accommodate future electrified GO train service. Rob's role is the Environmental Lead responsible for the execution of all

Robert Helik, P.Eng. (QP_{ESA} and QP_{RA}) - *continued*

Vice President, Environmental Services

environmental components of the project, including site assessment, soil management, noise dust, hydrogeology and dewatering, ecological services, and approvals.

Risk Assessment – Former Landfill, Ottawa, ON

The Risk Assessment Property was a former land fill site that was contaminated with VOCs, PAHs and metals in both groundwater and soil. Following its closure, numerous walking trails were situated across the capped landfill. In addition to the soil and groundwater impacts, various seeps were situated across the low lying areas of the property which routinely flowed over the walking trails as well as on to the adjacent agricultural fields. In addition to the agricultural fields, there were numerous residential buildings surrounding the property that obtained their water from potable wells situated on their respective properties. The human health assessment focused on the potential risks to the on site receptors from the impacts in the soil, groundwater and seepage water, as well as the potential risks to the off-site receptors via the migration of seepage water and the potable groundwater to the adjacent properties. As part of this project, risk management measures were designed in order to mitigate the seeps flowing onto the walking trails and into the adjacent agricultural properties.

Phase II and III Environmental Site Assessment – Whitby Harbour, Whitby, ON

Exp was retained by Public Works and Government Services Canada (PWGSC) to conduct a Phase II Environmental Site Assessment at the five (5) separate Land Lots that were owned by DFO, situated around the Whitby Harbour. The objective of the Phase II ESA was to investigate the areas for the potential presence of soil and groundwater impacts, which may have resulted from the areas of potential environmental concern identified in the Phase I ESA for the Site. Mr. Helik's role was the key client lead and technical lead in the completion of the Phase II ESA and for presenting the findings of the investigation to the project stakeholders, including PWGSC, DFO, the Town of Whitby, and the MOECC. Rob was also responsible for adhering to all of the Client's internal requirements related to change processes, communication protocols, weekly budget updates, and ensuring the project schedule stayed on track.

Environmental Site Assessment, Remediation and Risk Assessment – Commercial Development, Toronto, Ontario, Canada

The Site is situated on a former industrial facility that had historically been contaminated with various parameters in soil and groundwater due to the historic on and off-site operations. The subject property, which had historically been used as an industrial facility, was being re-developed into a commercial plaza within the midtown core of Toronto. Due to the complexities associated with the Site conditions, including the layout of lands to be conveyed to the City of Toronto, and multiple ownerships, four (4) RSCs were filed for the Site, including a generic RSC, an RSC based on remediation of impacted groundwater, and two (2) RSCs based on risk assessments. All four (4) RSCs have been obtained for the Site, per the requirements of O.Reg. 153/04.

Exp's scope of work included the completion of a Phase One ESA, Phase Two ESA, Hydrogeological Investigation, Geotechnical Investigation, Supplemental Phase Two ESA, Soil Management Oversight, UST Removal Oversight, Confirmatory Soil and Groundwater Sampling, Stockpile sampling, Soil and Groundwater Remediation Reporting, Risk Assessment and Record of Site Condition Submission.

Mr. Helik was also required to correspond, on the Client's behalf, with their insurance provider in order to assist in the processing of an environmental claim with respect to the environmental contamination identified at the Site.

Risk Assessment – Commercial Lakefront Property, Toronto, Ontario, Canada

The Risk Assessment was conducted on a commercial property situated on the East Bayfront at the shore of Lake Ontario in Toronto. The Site is situated on reclaimed land that had historically been contaminated with polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs) and metals in soil and groundwater due to the placement of fill materials on the property.

Robert Helik, P.Eng. (QP_{ESA} and QP_{RA}) - *continued*

Vice President, Environmental Services

The subject property, which had historically been used as a commercial parking lot, was being re-developed into a landmark commercial building as part of the first stage of the Toronto Waterfront Revitalization Program. The human health assessment focused on the potential risks posed to the various building occupants and construction personnel from exposure to the various soil, groundwater, and indoor air exposure pathways. As part of this project, risk management measures were designed which included the installation of a vapour membrane beneath the commercial building, and the implementation of a soil cover. The risk assessment has been accepted by the Ministry of the Environment, and a Record of Site Condition has been obtained for the Site.

Throughout the project duration, Rob played an extensive role in meeting the project objectives, including project management, human health risk modeling, overseeing environmental site assessments, preparation of preliminary risk management measures, coordination with 3rd party peer reviewers and regulators, and client communication.

Environmental Remediation – Former Burtch Correctional Centre, County of Brant, Ontario, Canada

Mr. Helik acted as the Project Manager responsible for the clean-up of the former Burtch Correctional Centre located in the County of Brant, Ontario. Prior to its use as the correctional facility, the Site was used as a military airfield for training aircraft radio operators. The Site was formerly made up of 38 buildings, including dormitories, a power house, sewage facilities, a paint shop, a cannery, a small motors building, a pump house, and runways. A former on-site landfill was also situated on the western portion of the Site. As part of its original development, the Site also featured an on-Site creek (Burtch Creek), and a former pond.

EXP's on-site activities included the completion of environmental assessment and delineation activities, the preparation of tender documents, the assistance in the procurement process, the oversight of the Burtch Campus and Creek and Pond rehabilitation activities, and the coordination with regulatory bodies (MOE, DFO, GRCA). In addition to the technical component of the project, as prime consultant to IO, exp was required to coordinate and liaise with two (2) additional consultants, who were on-site full time as representatives of First Nations and the Confederacy Chiefs.

As part of the Site rehabilitation activities over 200,000 tonnes of soil were excavated and stockpiled on-Site for characterization, with over 150,000 tonnes requiring off-Site disposal.

Risk Assessment – Riverfront Property, Lansdowne, Ontario, Canada

The Risk Assessment was conducted on a property approximately 18 ha in size that is situated almost entirely on a peninsula extending along the north shore of the St. Lawrence River in Ontario. The Site is situated on a property that had been contaminated with PHCs, VOCs, and metals in soil and groundwater, which had likely resulted from the historic on-Site use of the Site as a marina. The subject property, which had historically been used as a recreational resort facility - including boating /marina related purposes, was being re-developed to accommodate the additional of new residential homes.

The human health assessment focused on the potential risks posed to the various residential receptor and construction personnel from exposure to the various soil, groundwater, and indoor air exposure pathways. To support the completion of the risk assessment, and given the Site's proximity to significant ecological habitat, a Natural Habitat Study was completed at the Site to identify any potentially rare, endangered and/or threatened ecological species. As part of this project, risk management measures, were designed in order to ensure the protection of the on-Site receptors. The risk assessment has been accepted by the Ministry of the Environment and a Record of Site Condition has been filed.

Risk Assessment – Former Industrial Riverfront Properties, Cambridge, Ontario, Canada

Robert Helik, P.Eng. (QP_{ESA} and QP_{RA}) - *continued*

Vice President, Environmental Services

The Risk Assessment was conducted on two (2) historic industrial properties situated on the south side of the Speed River in Cambridge, Ontario. The Site is situated on a former industrial property that had been contaminated with PAHs, PHCs, VOCs, polychlorinated biphenyls (PCBs), and metals in soil and groundwater, which had resulted from the historic industrial operations. The subject properties, which had historically been used for industrial manufacturing operations, were being re-developed into a residential loft style building adjacent to the Speed River, and a commercial parking lot. The human health assessment focused on the potential risks posed to the various building occupants and construction personnel from exposure to the various soil, groundwater, and indoor air exposure pathways. As part of this project, risk management measures, including contingency measures, were designed in order to ensure the protection of the on-Site receptors. Based on the two (2) different types of land use, separate sets of property specific standards were developed for the residential and commercial land uses. The risk assessment has been accepted by the Ministry of the Environment and two (2) Record of Site Conditions have been filed for the Site.

Risk Assessment – Institutional Property, Elmira, Ontario, Canada

The Risk Assessment was conducted on an assisted living retirement facility situated in a potable groundwater condition that had been impacted with PHCs, VOCs, and metals in soil and groundwater resulting from a historic gasoline service station on a portion of the property. Although there were no future plans to change the type of property use, the Risk Assessment was being conducted in order to obtain a Record of Site Condition (RSC) as part of a real estate transaction. The human health risk assessment identified that there were potential risks associated some of the building occupants, which required the implementation of various risk management measures. The risk assessment has been accepted by the Ministry of the Environment and an RSC has been obtained for the Site.

Risk Assessment – Residential Development, Kitchener, Ontario, Canada

The Risk Assessment Property was a commercial property situated in Kitchener that had been impacted with PHCs and BTEX in soil and groundwater that resulted from historical underground storage tanks (UST) on the property. Although the USTs had been removed, and large quantities of soil had been removed from the site, impacted soil and groundwater remained under a portion of the existing building that could not be accessed due to structural and financial limitations. In addition, the PHC/BTEX impacted groundwater had also migrated off-site into various residential properties adjacent to the Site.

The purpose of the risk assessment was to obtain an RSC for the re-development of the site into a residential building. The human health assessment identified that unacceptable levels of risk were associated with various building receptors. As such, risk management measures were designed which included a passive vapour mitigation system coupled with an impermeable vapour membrane. The risk assessment has been accepted by the Ministry of the Environment and an RSC has been obtained for the Site.

Various Risk Assessments, Canada

Rob also has extensive experience in conducting and reviewing other risk assessment projects that are prepared in accordance with O.Reg. 153/04, as well as those which are not governed by the provincial regulation. Rob has a wide range of experience in conducting Preliminary Quantitative Risk Assessments (PQRA) for various impacted properties situated in Federal jurisdiction, including sites located throughout Ontario and British Columbia. Based on the Federal process, Rob has gained extensive experience in communicating with the Federal regulatory bodies, Health Canada, Environment Canada and the Department of Fisheries and Oceans.

Robert Helik, P.Eng. (QP_{ESA} and QP_{RA}) - *continued*

Vice President, Environmental Services

Environmental Site Assessments - Loblaw Properties Limited, Canada

Served as a Project Manager for due diligence work consisting of completion on Phase I and II Environmental Site Assessment, Risk Assessment and Remediation projects at more than 200 commercial properties across Canada. The Properties we comprised of single and multi-level building sites, offices, gas stations and distribution centres.

Environmental Site Assessments King West Village, Toronto, Ontario, Canada

Served as a Technical Specialist for King West Village Brownfield Development. The project involved multi-disciplinary services including Environmental Assessments, Characterization of soil and groundwater impacts, developments of remedial strategy, oversight of soil remediation and dealing with bedrock groundwater impacts. The project was completed in two years and upon completion a Record of Site Condition was issued and acknowledged by the Ministry of Environment and Climate Change.

Project Manager for Federal Risk Assessment of a National Wildlife Area, Ontario, Canada

The Risk Assessment Property included three (3) separate areas of concern on a significant National Wildlife Area. The properties had been impacted via the former use of the areas, and were situated in immediate vicinity of a large water body, as well as marshlands. The sites had previously been impacted with metals and PAH impacts in soil, groundwater, surface water, and/or sediment. The human health and ecological assessment focused on the adverse effects posed to the Site occupants and the numerous sensitive wildlife species on the Site.

Environmental Site Assessments

Conducted and managed numerous Phase I and II ESAs at various residential, commercial, and industrial properties throughout Ontario for numerous clients, including property developers, financial institutions, property management firms, and government organizations. As part of the Phase II ESAs, Rob is responsible for coordinating the Site investigations, including the organization of field activities and coordination with subcontractors. Rob has completed Phase II ESAs, including delineation programs at various Brownfield properties that have been impacted by a variety of chemical parameters, including metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, volatile organic compounds, and polychlorinated biphenyls. As a Project Manager, Rob implements extensive QA/QC measures to ensure consistency and accuracy throughout the various ESA reports.

These measures include the selection of field duplicates and laboratory control samples during field investigations, as well as the review and evaluation of vast quantities of analytical data, technical writing, exposure modeling, and reference material.

Hazardous Materials Services

Rob has conducted and managed numerous designated substances and mould assessments for industrial, commercial, and residential land uses throughout Ontario. His experience includes the management and oversight of the initial Site assessments; the management of asbestos abatement monitoring services for Type 1, 2 and 3 removal of asbestos-containing materials; the oversight of mould abatement services; air clearance sampling; and the preparation of closeout documents. Rob's expertise also included the oversight of exp personnel, client communication, and contract administration.

Publications

- "Affordable Housing Project, Victoria Place, Cambridge, Ontario" Published by Hazmat Magazine, Winter 2009 Edition.

Robert Helik, P.Eng. (QP_{ESA} and QP_{RA}) - *continued*

Vice President, Environmental Services

Seminars and Conferences

- Vapor Intrusion Pathway: A Practical Guideline, Interstate Technology & Regulatory Council Vapor Intrusion Team, Atlanta, GA, 2010
- Technical Training Session (Risk Assessment), Ontario Ministry of the Environment, 2007
- HAZWOPER Safety Training Course, 2005
- Asbestos Management and Abatement in Facilities, Brampton, Ontario, 2003
- Investigating and Assessing Biological and Microbiological Contamination in the Indoor Environment, Philadelphia, PA, 2003
- Mould Abatement Projects: The Remediation Strategy and Project Oversight, Philadelphia, PA, 2003Subhead

Samuel A. Patterson, B.Sc., M.E.S.

Risk Assessment Specialist / Project Manager

Education + Training

- B.Sc. (Honours), Queen's University, Environmental Science, specialization in Eco-Toxicology, 2017
- M.E.S., Queen's University, Master of Environmental Studies, 2019
- WHIMS, EXP services Inc.
- ATV Trained and Certified by the MTO (2018)
- Standard First Aid & CPR (2020)
- Transportation of Dangerous Goods (2017)

Languages Spoken

- English

Years of Experience

- 4.0

Publications

Patterson, Samuel A., et al. "Resilience of Larval Wood Frogs (Rana Sylvatica) to Hydrocarbons and Other Compounds Released from Naturally Weathered Diluted Bitumen in a Boreal Lake." Aquatic Toxicology, 2022, p. 106128.

Areas of Expertise

- Phase I and Phase II Environmental Site Assessments (CSA Standards)
- Phase One, Phase Two and Tier II & III Risk Assessments (O.Reg. 153)
- Screening Level Risk Assessments (SLRA) and Due-Diligence Risk Assessments (DDRA)
- Remediation Programs and Risk Management Plans (RMP)
- Industrial Hygiene and Occupational Exposure Assessments
- Environmental Site Investigation (groundwater sampling, soil sampling, drilling oversight, indoor air sampling, soil gas sampling, sub-slab vapour sampling, particulate and inhalation sampling)

Samuel Patterson is a Risk Assessment Specialist at EXP's Stony Creek Office with over four (4) years of combined experience in the risk assessment field and technical training as an environmental toxicologist. Samuel obtained his Honours, Bachelor of Science degree in Environmental Science with a specialization in Eco-Toxicology in 2017 and his Master of Environmental Studies degree (M.E.S.) at Queen's University (Kingston, Ontario) in 2019. Through his graduate degree, Samuel participated in several collaborative ecotoxicological research projects studying the fate and effects of crude oil in aquatic ecosystems, resulting in several published research articles.

Samuel has valued project experience in conducting Phase One and Phase Two Environmental Site Assessments (ESAs), Modified Generic Risk Assessments (MGRA), Screening Level Risk Assessments (SLRAs), and Tier III Risk Assessments in Ontario under Ontario Regulation 153/04, as amended. In addition, Samuel has experience working on projects under Federal framework and regulations, being involved with several Preliminary Quantitative Risk Assessments (PQRA). Samuel's responsibilities include data analysis, technical report writing and review for Risk Assessments, as well as conducting select field work activities such as air sampling, ground and surface water sampling, sediment sampling and soil sampling. The next page presents highlights of projects Samuel Patterson has been involved with during his employment with EXP Services.

Samuel A. Patterson, MES *- continued*

Risk Assessment Specialist / Project Manager

Project Experience

Risk Assessment

Screening Level Risk Assessment (2020) – Terra Canada – National Research Council of Canada (NRC) Campus, Ottawa, Ontario, Canada

Technical Risk Assessor for a Screening Level Risk Assessment (SLRA) of a Site in Ottawa, Ontario. The SLRA was completed in support of the redevelopment of the National Research Council of Canada Campus in Ottawa, Ontario. Risk Assessor responsible for the assessment of ecological and human health impacts and compilation of the SLRA.

Screening Level Risk Assessment (2023) – Sawmill Community Center and Pool - 3380 and 3386 D'Aoust Avenue (Sawmill Creek), Ottawa, Ontario, Canada

Technical Risk Assessor for a Screening Level Risk Assessment of a Site in Ottawa, Ontario currently operated as a community center and public pool undergoing redevelopment and expansion. Responsible for oversight of sampling programs for indoor air quality, groundwater, and soil vapor at the Site. Involved with the impact delineation and sampling program planning for the Site. Risk Assessor responsible for the assessment of ecological and human health impacts and compilation of the SLRA.

Screening Level Risk Assessment (2022) – Deep River, Ottawa, Ontario, Canada

Technical Risk Assessor for a Screening Level Risk Assessment of a Site in Deep River, Ontario currently operated as a grocery store. Responsible for oversight of sampling programs for groundwater, soil vapor and sub-slab vapour at the Site. Risk Assessor responsible for the assessment of ecological and human health impacts and compilation of the SLRA.

Modified Generic Risk Assessment and Certificate of Property Use Management (2021 - Present) – Boys and Girls Club of Ottawa Clubhouse, 1770 Heatherington Road, Ottawa, Ontario, Canada

Risk Assessment Specialist for a Modified Generic Risk Assessment (MGRA) being conducted under O.Reg. 153/04 for a former City of Ottawa Public Works Yard. Responsible for the compilation of all components of the MGRA report, planning of additional Site characterization and field work oversight. Assisted in the completion of the Phase One and Two Environmental Site Assessment Update Reports used to support the MGRA. Assisted in the filing of Record of Site Condition Filing (RSC) and Certificate of Property Use (CPU) management.

Tier III Risk Assessment (2019 - Present) – Future Residential Development, 1770 Heatherington Road, Ottawa, Ontario, Canada

Risk Assessment specialist for a Tier III Risk Assessment being conducted in accordance with the O.Reg. 153/04 to support the filing of a RSC for the property. Responsible for data entry, data QA/QC, summarizing previous investigations, gathering information on species at risk, evaluating the ecological characteristics of the Site and acting as a liaison for communications with the provincial and municipal governments. Assisted in the completion of the Phase One and Two Environmental Site Assessment Update Reports used to support the Tier III RA.

Enhanced Environmental Site Assessment (2021) – Golf Course, Kahnawà:ke, Quebec, Canada

Technical Risk Assessor for an Enhanced Environmental Investigation of a Site in Quebec currently operated as a golf course. Responsible for the collation and assessment of soil, groundwater, sediment, and surface water data analyzed for the presence of mercury, with respect to human health impacts from future developments.

Preliminary Quantitative Risk Assessment (2019 to 2020) – Golf Course, Kahnawà:ke, Quebec, Canada

Samuel A. Patterson, MES *- continued*

Risk Assessment Specialist / Project Manager

Technical Risk Assessor for a Preliminary Quantitative Risk Assessment (PQRA) of a Site in Quebec, currently operated as a golf course. Responsible for data analysis, figure composition, summarizing previous investigations, gathering information on species at risk, gathering information on ecological characteristics of the Site and acting as a liaison for communications with local stakeholder groups. A major component of this project was supporting the analysis and interpretation of data related to the multi-year collection of soil, groundwater, sediment and surface water samples at the Site.

Tier III Risk Assessment (2019 to Present) – Former Industrial Property, Gananoque, Ontario, Canada

Risk Assessment Specialist for a Tier III Risk Assessment being conducted in accordance with the O.Reg. 153/04. Responsible for data entry, data QA/QC, liaison with municipal contacts and report writing and review. Major components of this project included the review, entry and amalgamation of soil, groundwater, and surface water data to support both quantitative and qualitative assessments of human and ecological health.

Tier III Risk Assessment (2019 to Present) – Active Industrial Property, 110 – 130 Herzberg Road, Ottawa, Ontario, Canada

Risk Assessment Specialist for a Tier III Risk Assessment being conducted in accordance with the O.Reg. 153/04. Responsible for data entry, data QA/QC, summarizing previous investigations, gathering information on species at risk, evaluating the ecological characteristics of the Site and acting as a liaison for communications with the provincial and municipal governments.

Tier III Risk Assessment (2023) – Private School Redevelopment, 60-68 Rideau Street Kingston, Ontario, Canada

Technical Risk Assessor for a Tier III Risk Assessment being conducted in accordance with the O.Reg. 153/04 for a former commercial Site located in Kingston, Ontario. Responsible for oversight of sampling programs for soil, groundwater and soil vapour at the Site. Involved with the impact delineation and sampling program planning for the Site. Risk Assessor responsible for the assessment of ecological and human health impacts and compilation of the Tier III RA.

Indoor Air Sampling and Sub-Slab Vapour Sampling (2020) – Current Industrial Property, Burlington, ON, Canada

Responsible for the conceptualization and completion of a sub-slab vapour and indoor air sampling program conducted at a property in Burlington, Ontario. Oversaw and conducted the installation, collection and submission of air samples. In addition, Samuel was responsible for the composition of several letter reports to aid in the potential human health risks posed from vapour intrusion.

Pre-Remedial Investigation (2020) – Current Commercial Property, Toronto, ON, Canada

Responsible for overseeing all Site investigative activities. Direct oversight and implementation of a High-Resolution Sub-Surface Characterization (HRSC) program aimed to delineate the presence of free-product plumes at the Site. Responsible for the compilation of the subsequent report characterizing the existing Site conditions and recommending future risk management measures.

Appendix G: List of Documents Relied Upon

List of Reports Relied Upon

1. Terrapex Environmental Ltd. (2020) *Summary of Environmental Investigation, 15 Denison Avenue, Toronto, Ontario,* dated April 30, 2020.
2. EXP (2022a) *Phase One Environmental Site Assessment, 15 Denison Avenue, Toronto, Ontario,* dated April 27, 2022.
3. EXP (2022b) *15 Denison Avenue, Toronto, Ontario, M5T 2M4, Hydrogeological Investigation,* dated June 28, 2022.
4. EXP (2022c) *Phase Two Environmental Site Assessment, 15 Denison Avenue, Toronto, Ontario,* dated August 31, 2022.
5. EXP (2025a) *Phase Two Environmental Site Assessment Update, 15 Denison Avenue, Toronto, Ontario*, In-Progress.
6. EXP (2025b) *Free Product Removal Program, 15 Denison Avenue, Toronto, Ontario*, In-Progress.

Appendix H: Mandatory Certifications of the Qualified Person

APPENDIX H: MANDATORY CERTIFICATIONS

In accordance with O. Reg. 153/04, the following mandatory certifications are submitted with this Risk Assessment conducted for 15 Denison Avenue, Toronto, Ontario:

1. I have conducted or supervised a risk assessment report in accordance with the regulation.
2. I am a qualified person, as defined in section 168.1 of the Act, and have the qualifications required by section 6 of the regulation.
3. I have in place an insurance policy that satisfies the requirements of section 7 of the regulation.
4. The risk assessment team included members with expertise in all of the disciplines required to complete the risk assessment in accordance with the regulation.
5. The opinions expressed in the risk assessment are engineering or scientific opinions made in accordance with generally accepted principles and practices as recognized by members of the environmental engineering or science profession or discipline practicing at the same time and in the same or similar location.
6. To the best of my knowledge, the certifications and statements in this risk assessment are true as of March 20, 2025.
7. By making these certifications in this risk assessment report, I make no express or implied warranties or guarantees.

Shane Ward
Qualified Person Risk Assessment

EXP Services Inc.

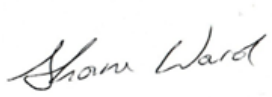
March 20, 2025
Date

1. As of March 20, 2025, it is my opinion that based on the phase one environmental site assessment and the phase two environmental site assessment and other relevant property information, the approach taken in the conduct of the risk assessment,
    a. is appropriate to evaluate human health and ecological risks from the contaminants of concern at the concentrations proposed as the standards specified in the risk assessment and assuming no measures have been taken at the RA property which have the effect of reducing the risk from the contaminants, and
    b. is consistent with the approach set out in the pre-submission form with the exception of those deviations listed in Report Section 1 (Summary of Recommendations/Findings) of the report under the heading "Deviations from Pre-Submission Form".

2. As of March 20, 2025, it is my opinion that, taking into consideration the assumptions specified in the risk assessment report, including the use of the property specified in Report Section 3 (Property Information Site Plan and Geological Interpretation) of the risk assessment and any risk management measures recommended in the report, as long as the RA property satisfies those assumptions and meets the standards specified in the risk assessment report, the contaminants of concern are unlikely to pose a human health or ecological risk greater than the level of risk that was intended in the development of the applicable full-depth site condition standards for those contaminants.

3. As of March 20, 2025, it is my opinion that the implementation of the risk management plan described in Report Section 7 (Risk Management Plan) of the risk assessment report is necessary for a contaminant of concern addressed in the risk assessment report to prevent, eliminate or ameliorate any adverse effect from that contaminant to the human or ecological receptors addressed in the report and located on the RA property and is sufficient to address the current and potential future transport and exposure pathways.

4. As of March 20, 2025, the risk assessment report completely and accurately reflects the risk assessment assumptions and conclusions and all pertinent information has been included in the report and the appendices to the report.



March 20, 2025

Shane Ward
Qualified Person Risk Assessment

Date

EXP Services Inc.

Appendix I: Survey Plan and Legal Documents

Wendy Walberg LL.B., LL.M., C.S.
City Solicitor
Legal Services
55 John Street
Stn. 1260, 26th Flr., Metro Hall
Toronto ON M5V 3C6
Tel. (416) 392-8047
Fax (416) 397-5624
** Certified by the Law Society as a Specialist in Municipal Law: Local Government*

File No. 2800.A77.4727 24 (MX)

Reply To: Michelle Xu
Tel: 416-392-8571
Fax: 416-397-5624
E-Mail: Michelle.xu@toronto.ca

July 23, 2024

Ministry of Environment, Conservation and Parks
1st Floor, 135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

Dear Sir/Madame:

RE: Pre-Submission Form over a portion of lands municipally known as 15 Denison Avenue, Toronto, Ontario (the "Property"), shown as Parts 1, 2, 3 and 4 on Reference Plan 66R31627 (the "RSC Lands")

I am a solicitor for the City of Toronto (the "**City**") being the owner of the Property, and I have reviewed the parcel registers for the Property being Part of PIN 21238-0045 (LT), the whole of PIN 21238-0046 (LT) and PIN 21238-0047 (LT) updated as of July 11, 2024 (collectively, the "**Parel Register**"), MPAC Roll Number Report updated as of July 11, 2024 (the "**MPAC Report**") and Geo-warehouse reports for the Parcel Register updated as of July 11, 2024 (the "**Geowarehouse Report**"), a copy of each is attached hereto.

The legal description of the Property as of July 11, 2024 is as follows:

- Part of PIN 21238-0045 (LT)
- LANE PL 65 TORONTO; 10 FT LANE, 8 FT 9 INCH LANE PL D127 TORONTO; PT LT 1 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT LT 9 PL D127 TORONTO AS IN WA99649; TORONTO , CITY OF TORONTO

- PIN 21238-0046 (LT)
- LT 1-5 PL D127 TORONTO EXCEPT WA95815, WA99649; TORONTO , CITY OF TORONTO

- PIN 21238-0047 (LT)
- LT 6-8 PL D127 TORONTO; PT LT 9 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT UNLETTERED LT TO REAR OF LT 3 N/S QUEEN ST PL 65 TORONTO PT 5, EXPROP PL WA91330; PT 1 & 2, EXPROP PL WA88833 & AS IN

WA90829 WA88489, WA88331, WA88288, WA88252 EXCEPT WA99649, WA95819; S/T WA90829; S/T INTEREST IN WA90829; S/T DEBTS IN WA97766; TORONTO , CITY OF TORONTO

Please find attached the following:

1. PIN 21238-0045(LT), PIN 21238-0046 (LT) and PIN 21238-0047 (LT);

2. Plan 66R-31627;

3. Transfers and Plans of Expropriation registered as Instrument Nos. WA89024, WA88489, WA88252, WA88288, WA88331, WA88833, WA89463, WA90829, WA91330 and WA97766 pursuant to which the Property was conveyed to The Corporation of the City of Toronto (now City of Toronto);

4. MPAC Roll Number Report updated as of July 11, 2024; and

5. Geowarehouse Report PIN 21238-0045 (LT), PIN21238-0046 (LT) and PIN 21238-0047 (LT).

Owner

The Fee Simple (LTCQ) owner of the Property as shown on the Parcel Register for the Property is “The Corporation of the City of Toronto”.

Pursuant to the City of Toronto Act, 1997, S.O. 1997, chap. 2, on January 1, 1998, the assets of The Corporation of the City of Toronto and certain other municipalities were vested in a body corporate under the name of City of Toronto and pursuant to the City of Toronto Act, 2006, S.O. 2006, chap. 11, Sched. A, s. 125, the City of Toronto was continued.

The City is the legal and beneficial owner of the Property.

Assessment Roll Number

The assessment roll number is: 19 04 065 28000 400.

Municipal Address

The Geowarehouse Reports show the Property as having a municipal address of 15 Denison Avenue, Toronto, Ontario.

If you have any questions or concerns, do not hesitate to contact the undersigned.

Yours truly,

Michelle Xu

Michelle Xu
/Attachments

I require this plan to be deposited under the Land Titles Act.

Date NOVEMBER 19, 2020

G.V.

GARY B. VANDERVEEN O.L.S.

PLAN 66R-31627

RECEIVED AND DEPOSITED

Date December 1, 2020

DURHAM/YORK

Representative for the Land Registrar for the Land Titles Division of THE TORONTO REGISTRY OFFICE (No. 66)

SCHEDULE					
PART	LOTS/LANE	PLAN	PIN	NAME OF MOST RECENT TRANSFEREE	AREA (M^2)
1	ALL OF 10 FT LANE AND PART OF 8 FT 9 INCH LANE	D127	PART OF 21238-0045	THE CORPORATION OF THE CITY OF TORONTO	145
2	ALL OF LOTS 2 AND 3 AND PART LOTS 1, 4 AND 5		ALL OF 21238-0046		1005
3	ALL OF LOTS 6, 7 AND 8 AND PART LOT 9		ALL OF 21238-0047		1231
	PART LOT 3 (NSQS) AND PART OF UNLETTERED LOT (REAR OF LOT 3) (NSQS)	65			
4	PART OF UNLETTERED LOT (REAR OF LOT 3) (NSQS)				20

PART 4 – SUBJECT TO EASEMENT AS IN INST. WA90829.

PLAN OF SURVEY OF
LOTS 2, 3, 6, 7 AND 8
PART OF LOTS 1, 4, 5 AND 9 AND
ALL OF 10 FT LANE
(CLOSED BY BY-LAW No. 149-70) AND
PART OF 8 FT 9 INCH LANE
(CLOSED BY BY-LAW No. 149-70)
REGISTERED PLAN D127
AND
PART OF LOT 3
(NORTH SIDE OF QUEEN STREET) AND
PART OF UNLETTERED LOT
(REAR OF LOT 3, NORTH SIDE OF QUEEN STREET)
REGISTERED PLAN 65
CITY OF TORONTO

SCALE 1 : 200

3 0 5 10 METRES

HOLDING JONES VANDERVEEN INC.
ONTARIO LAND SURVEYORS

NOTES

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
CP	DENOTES	CONCRETE PIN
WIT	DENOTES	WITNESS
CTS	DENOTES	CITY OF TORONTO SURVEY DEPARTMENT
SCP	DENOTES	SPECIFIED CONTROL POINT
NSQS	DENOTES	NORTH SIDE OF QUEEN STREET
D	DENOTES	INST. WA90829

BEARING, DISTANCE AND CO-ORDINATE NOTES

BEARINGS AND CO-ORDINATES ARE GRID AND ARE DERIVED FROM SPECIFIED CONTROL POINTS No. 02219740238 AND No. 02219740700 AND ARE REFERRED TO THE 3° MODIFIED TRANSVERSE MERCATOR GRID PROJECTION, ZONE 10, CENTRAL MERIDIAN 79°30' WEST LONGITUDE, TOR_H-1974.

CO-ORDINATES TO URBAN ACCURACY PER SEC. 14(2) OF O. REG. 216/10.

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.99988622.
AREAS SHOWN HEREON ARE CALCULATED FROM GROUND DISTANCES.

POINT ID	EASTING	NORTHING
SCP 02219740238	312885.890	4834012.414
48	312796.815	4834085.810
49	312840.508	4834098.178

CO-ORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

DISTANCES AND CO-ORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SURVEYOR'S CERTIFICATE

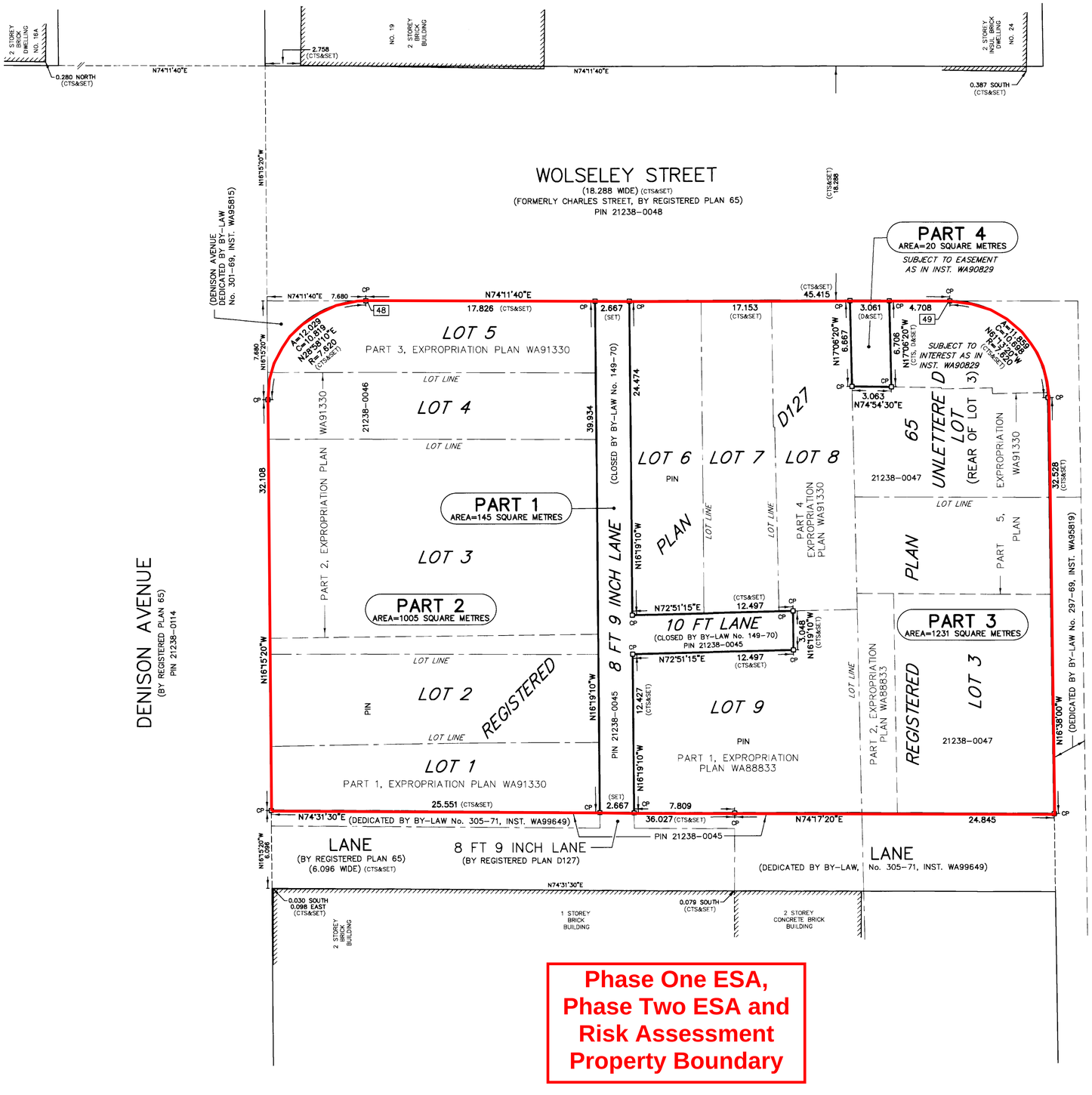
I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON NOVEMBER 19, 2020.

NOVEMBER 19, 2020
DATE

G.V.
GARY B. VANDERVEEN
ONTARIO LAND SURVEYOR

HOLDING JONES VANDERVEEN INC.
ONTARIO LAND SURVEYORS
1700 LANGSTAFF ROAD, SUITE 1002
VAUGHAN, ON L4K 3S3
PHONE: 905-660-4000 EMAIL: hjv@hjv-ols.ca

SCALE: 1:200	DRAWN BY: V.P.	CHKD. BY: G.V.	JOB NO: 20-2863-REF1



Phase One ESA, Phase Two ESA and Risk Assessment Property Boundary

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

PROPERTY DESCRIPTION: LANE PL 65 TORONTO; 10 FT LANE, 8 FT 9 INCH LANE PL D127 TORONTO; PT LT 1 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT LT 9 PL D127 TORONTO AS IN WA99649; TORONTO , CITY OF TORONTO

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
FIRST CONVERSION FROM BOOK

PIN CREATION DATE:
2002/04/08

OWNERS' NAMES
THE CORPORATION OF THE CITY OF TORONTO

CAPACITY SHARE
BENO

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
*** PRINTOUT INCLUDES ALL DOCUMENT TYPES AND DELETED INSTRUMENTS SINCE 2002/04/05 ****						
***SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:*						
*** SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES *						
*** AND ESCHEATS OR FORFEITURE TO THE CROWN.*						
*** THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF*						
*** IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY*						
*** CONVENTION.*						
*** ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.*						
DATE OF CONVERSION TO LAND TITLES: 2002/04/08 *						
PLCW65	1853/07/04	PLAN SUBDIVISION				C
PLD127	1872/08/08	PLAN SUBDIVISION				C
WA82293	1964/02/24	BYLAW				C
	REMARKS: C52920					
WA88489	1966/09/15	TRANSFER	$2		THE CORPORATION OF THE CITY OF TORONTO	C
WA89682	1967/03/20	BYLAW			THE CORPORATION OF THE CITY OF TORONTO	C
WA91291	1967/11/09	BYLAW				C
WA91407	1967/11/27	BYLAW			THE CORPORATION OF THE CITY OF TORONTO	C
WA99649	1971/12/23	BYLAW				C
	REMARKS: SKETCH ATTACHED.					

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
66R31627	2020/12/01	PLAN REFERENCE				C
AT6487032	2023/12/27	NOTICE		METROLINX		C
REMARKS: DESIGNATION OF TRANSIT CORRIDOR						

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

PROPERTY DESCRIPTION: LT 1-5 PL D127 TORONTO EXCEPT WA95815, WA99649; TORONTO , CITY OF TORONTO

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
FIRST CONVERSION FROM BOOK

PIN CREATION DATE:
2002/04/08

OWNERS' NAMES
THE CORPORATION OF THE CITY OF TORONTO

CAPACITY SHARE
BENO

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
*** PRINTOUT INCLUDES ALL DOCUMENT TYPES AND DELETED INSTRUMENTS SINCE 2002/04/05 **						
**SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:						
** SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES *						
** AND ESCHEATS OR FORFEITURE TO THE CROWN.						
** THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF						
** IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY						
** CONVENTION.						
** ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.						
**DATE OF CONVERSION TO LAND TITLES: 2002/04/08 **						
WA82293	1964/02/24	BYLAW				C
REMARKS: C52920						
WA89024	1966/11/17	TRANSFER	$19,500		THE CORPORATION OF THE CITY OF TORONTO	C
WA91330	1967/11/15	PLAN EXPROPRIATION				C
WA91407	1967/11/27	BYLAW			THE CORPORATION OF THE CITY OF TORONTO	C
66R31627	2020/12/01	PLAN REFERENCE				C
AT6487032	2023/12/27	NOTICE		METROLINX		C
REMARKS: DESIGNATION OF TRANSIT CORRIDOR						

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

PROPERTY DESCRIPTION: LT 6-8 PL D127 TORONTO; PT LT 9 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT UNLETTERED LT TO REAR OF LT 3 N/S QUEEN ST PL 65 TORONTO PT 5, EXPROP PL WA91330; PT 1 & 2, EXPROP PL WA88833 & AS IN WA90829 WA88489, WA88331, WA88288, WA88252 EXCEPT WA99649, WA95819; S/T WA90829; S/T INTEREST IN WA90829; S/T DEBTS IN WA97766; TORONTO , CITY OF TORONTO

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
FIRST CONVERSION FROM BOOK

PIN CREATION DATE:
2002/04/08

OWNERS' NAMES
THE CORPORATION OF THE CITY OF TORONTO

CAPACITY SHARE
BENO

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
** PRINTOUT INCLUDES ALL DOCUMENT TYPES AND DELETED INSTRUMENTS SINCE 2002/04/05 **						
**SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:						
** SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES *						
** AND ESCHEATS OR FORFEITURE TO THE CROWN.						
** THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF						
** IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY						
** CONVENTION.						
** ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.						
**DATE OF CONVERSION TO LAND TITLES: 2002/04/08 **						
WA82293	1964/02/24	BYLAW				C
REMARKS: C52920						
WA88252	1966/08/17	TRANSFER	$2		THE CORPORATION OF THE CITY OF TORONTO	C
WA88288	1966/08/23	TRANSFER	$12,300		THE CORPORATION OF THE CITY OF TORONTO	C
WA88331	1966/08/30	TRANSFER	$2		THE CORPORATION OF THE CITY OF TORONTO	C
WA88489	1966/09/15	TRANSFER	$2		THE CORPORATION OF THE CITY OF TORONTO	C
WA88833	1966/10/26	PLAN EXPROPRIATION				C
WA89026	1966/11/17	LEASE			BAJCER, JOHN ANTCZAK, GEORGE	C
WA89463	1967/01/31	TRANSFER	$15,500		THE CORPORATION OF THE CITY OF TORONTO	C

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

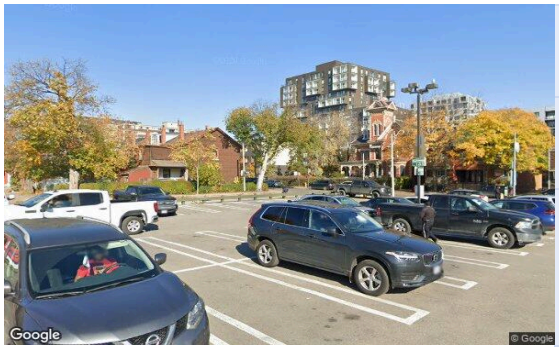
REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
WA89682	1967/03/20	BYLAW			THE CORPORATION OF THE CITY OF TORONTO	C
WA90829	1967/08/30	TRANSFER	$15,000		THE CORPORATION OF THE CITY OF TORONTO	C
WA91330	1967/11/15	PLAN EXPROPRIATION				C
WA91407	1967/11/27	BYLAW			THE CORPORATION OF THE CITY OF TORONTO	C
WA91490	1967/12/08	ASSIGNMENT LEASE			CAIN, ERNEST A.	C
WA91539	1967/12/18	ASSIGNMENT LEASE			BRACZEK, JOHN R.	C
WA95730	1969/11/05	SURRENDER OF LEASE				C
REMARKS: PARTIAL						
WA96303	1970/03/06	ASSIGNMENT LEASE			MARKOVICH, JOHN	C
WA97766	1971/01/26	TRANSFER	$2		THE CORPORATION OF THE CITY OF TORONTO	C
66R31627	2020/12/01	PLAN REFERENCE				C
AT6487032	2023/12/27	NOTICE		METROLINX		C
REMARKS: DESIGNATION OF TRANSIT CORRIDOR						

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

mpac | propertyline™

Roll Number Report

Lisa Palumbo
CreateTO
61 Front Street West, 3rd Floor, Union Station, East Wing
Toronto ON
M5J 1E5
(M):+14169812462
lpalumbo@createto.ca



Property Address	15 DENISON AVE
Municipality	CITY OF TORONTO
Roll Number	190406528000400

Purchase Date:
2024-07-11

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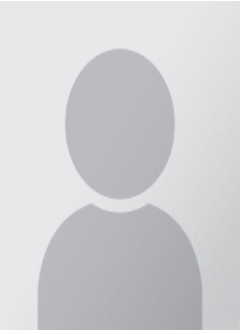
15 Denison Ave (central / lane portion)

TORONTO

PIN 212380045



This report was prepared by:

Jennifer Kowalski
Manager Real Estate Services
Cell: 4377784882

jennifer.kowalski@toronto.ca

ML -- City of Toronto - Real Estate Services

Ontario, Canada

PROPERTY REPORT

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Property Details

GeoWarehouse Address:

Not Available
TORONTO

PIN:	212380045
Land Registry Office:	METROPOLITAN TORONTO (80)
Land Registry Status:	Active
Registration Type:	Certified (Land Titles)
Ownership Type:	Freehold

Ownership

Owner Name:

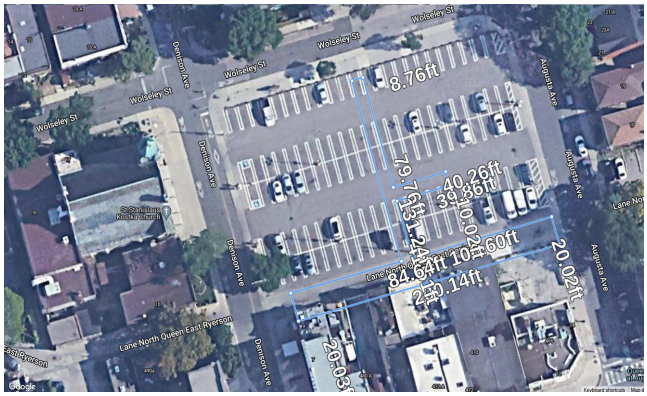
THE CORPORATION OF THE CITY OF TORONTO

Legal Description

LANE PL 65 TORONTO; 10 FT LANE, 8 FT 9 INCH LANE PL D127 TORONTO; PT LT 1 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT LT 9 PL D127 TORONTO AS IN WA99649; TORONTO , CITY OF TORONTO

Lot Size

Area:	5554.17 sq.ft (0.128 ac)
Perimeter:	780.84 ft.
Measurements:	200.14ft. x 20.02ft. x 106.6ft. x 41.51ft. x 39.86ft. x 10.02ft. x 40.26ft. x 79.76ft. x 8.76ft. x 131.24ft. x 84.64ft. x 20.03ft. Lot Measurement Accuracy : LOW These lot boundaries may have been adjusted to fit within the overall parcel fabric and should only be considered to be estimates.



Sales History

Sale Date	Sale Amount	Type	Party To	Notes
Sep 15, 1966	$2	Transfer	THE CORPORATION OF THE CITY OF TORONTO;	See Notes 1

Notes :

1. The following Pins were transferred together with the subject Property

212380047, 212380113

Terms and Conditions

Reports Not the Official Record. Reports, other than the Parcel Register, obtained through Geowarehouse are not the official government record and will not necessarily reflect the current status of interests in land.

Currency of Information. Data contained in the Geowarehouse reports are not maintained real-time. Data contained in reports, other than the Parcel Register, may be out of date ten business days or more from data contained in POLARIS.

Coverage. Data, information and other products and services accessed through the Land Registry Information Services are limited to land registry offices in the areas identified on the coverage map.

Completeness of the Sales History Report. Some Sales History Reports may be incomplete due to the amount of data collected during POLARIS title automation. Subject properties may also show nominal consideration or sales price (e.g. $2) in cases such as transfers between spouses or in tax exempt transfers.

Demographic Information. Demographic Information is obtained from Environics Analytics. Environics Analytics acquires and distributes Statistics Canada files in accordance with the Government of Canada's Open Data Policy. No information on any individual or household was made a vailable to Environics Analytics by Statistics Canada. PRIZM and selected PRIZMC2 nicknames are registered trademarks of The Nielsen Company (U.S.) and are used with permission.

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Parcel Mapping shown on the site was compiled using plans and documents recorded in the Land Registry System and has been prepared for property indexing purposes only. It is not a Plan of Survey. For actual dimensions of property boundaries, see recorded plans and documents.

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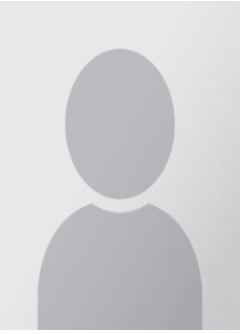
15 Denison Ave (western portion)

TORONTO

PIN 212380046



This report was prepared by:

Jennifer Kowalski
Manager Real Estate Services
Cell: 4377784882

jennifer.kowalski@toronto.ca

ML -- City of Toronto - Real Estate Services

Ontario, Canada

PROPERTY REPORT

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Property Details

GeoWarehouse Address:

Not Available
TORONTO

PIN:	212380046
Land Registry Office:	METROPOLITAN TORONTO (80)
Land Registry Status:	Active
Registration Type:	Certified (Land Titles)
Ownership Type:	Freehold

Ownership

Owner Name:

THE CORPORATION OF THE CITY OF TORONTO

Legal Description

LT 1-5 PL D127 TORONTO EXCEPT WA95815, WA99649; TORONTO , CITY OF TORONTO

Lot Size

Area:	10968.41 sq.ft (0.252 ac)
Perimeter:	419.95 ft.
Measurements:	84.64ft. x 131.24ft. x 64.34ft. x 6.19ft. x 6.19ft. x 6.19ft. x 6.19ft. x 6.19ft. x 110.29ft.

Lot Measurement Accuracy : LOW

These lot boundaries may have been adjusted to fit within the overall parcel fabric and should only be considered to be estimates.

Sales History

Sale Date	Sale Amount	Type	Party To	Notes
Nov 17, 1966	$19,500	Transfer	THE CORPORATION OF THE CITY OF TORONTO;	

Terms and Conditions

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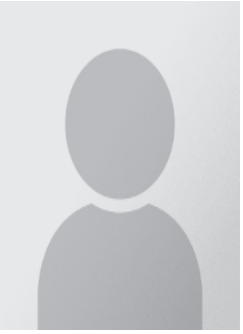
15 Denison Ave (eastern portion)

TORONTO

PIN 212380047



This report was prepared by:

Jennifer Kowalski
Manager Real Estate Services
Cell: 4377784882

jennifer.kowalski@toronto.ca

ML -- City of Toronto - Real Estate Services

Ontario, Canada

PROPERTY REPORT

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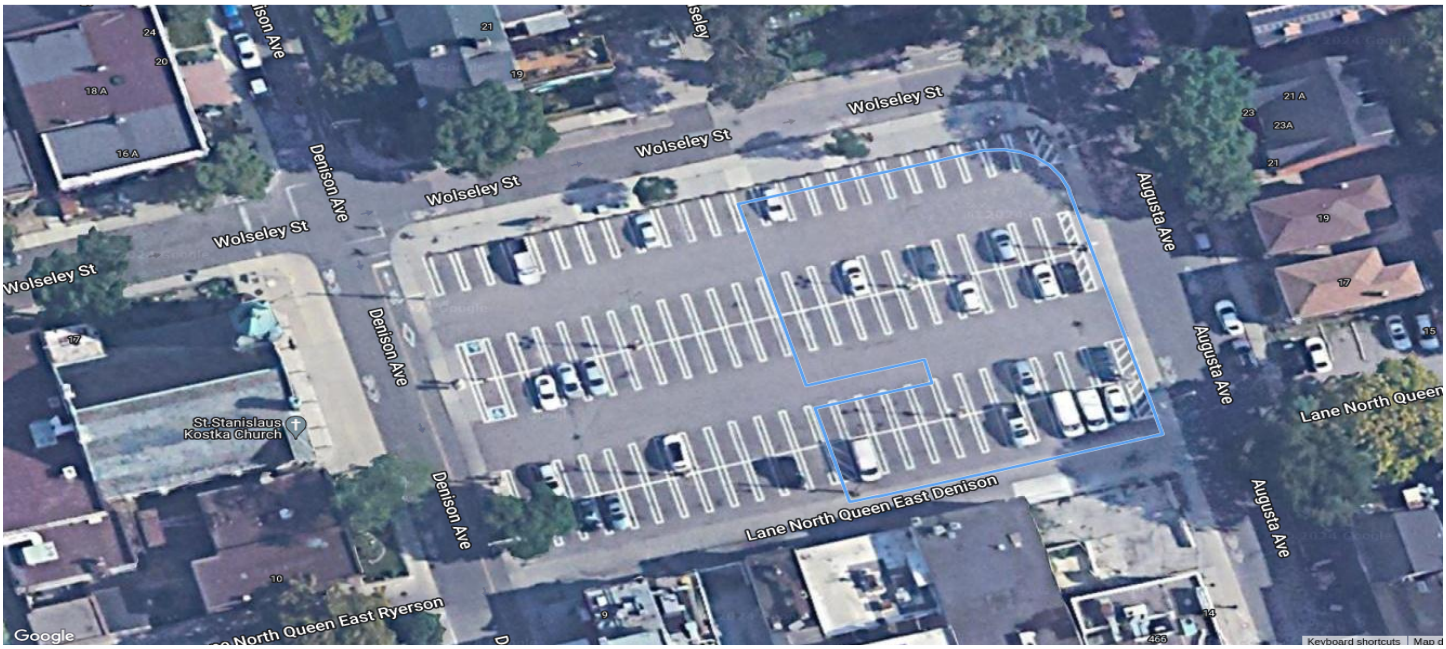
Property Details

GeoWarehouse Address:

Not Available
TORONTO

PIN:	212380047
Land Registry Office:	METROPOLITAN TORONTO (80)
Land Registry Status:	Active
Registration Type:	Certified (Land Titles)
Ownership Type:	Freehold



Ownership

Owner Name:

THE CORPORATION OF THE CITY OF TORONTO

Legal Description

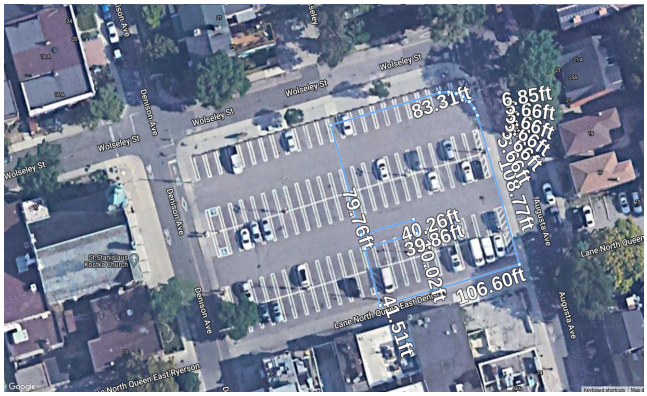
LT 6-8 PL D127 TORONTO; PT LT 9 PL D127 TORONTO; PT LT 3 N/S QUEEN ST PL 65 TORONTO; PT UNLETTERED LT TO REAR OF LT 3 N/S QUEEN ST PL 65 TORONTO PT 5, EXPROP PL WA91330; PT 1 & 2, EXPROP PL WA88833 & AS IN WA90829 WA88489, WA88331, WA88288, WA88252 EXCEPT WA99649, WA95819; S/T WA90829; S/T INTEREST IN WA90829; S/T DEBTS IN WA97766; TORONTO , CITY OF TORONTO

Lot Size

Area:	13433.35 sq.ft (0.308 ac)
Perimeter:	544.62 ft.
Measurements:	83.31ft. x 79.76ft. x 40.26ft. x 10.02ft. x 39.86ft. x 41.51ft. x 106.6ft. x 108.77ft. x 5.66ft. x 5.66ft. x 5.66ft. x 5.66ft. x 5.66ft. x 6.85ft.

Lot Measurement Accuracy : LOW

These lot boundaries may have been adjusted to fit within the overall parcel fabric and should only be considered to be estimates.



Sales History

Sale Date	Sale Amount	Type	Party To	Notes
Jan 26, 1971	$2	Transfer	THE CORPORATION OF THE CITY OF TORONTO;	
Aug 30, 1967	$15,000	Transfer	THE CORPORATION OF THE CITY OF TORONTO;	
Jan 31, 1967	$15,500	Transfer	THE CORPORATION OF THE CITY OF TORONTO;	
Sep 15, 1966	$2	Transfer	THE CORPORATION OF THE CITY OF TORONTO;	
Aug 30, 1966	$2	Transfer	THE CORPORATION OF THE CITY OF TORONTO;	
Aug 23, 1966	$12,300	Transfer	THE CORPORATION OF THE CITY OF TORONTO;	
Aug 17, 1966	$2	Transfer	THE CORPORATION OF THE CITY OF TORONTO;	

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THIS SPACE TO BE RESERVED FOR REGISTRY OFFICE

No. 89024 W.A.

I certify that the within Instrument is duly Entered, Registered and Microfilmed in the Registry Office for the Registry Division of Toronto at 2.55 o'clock P.M. of the 17 day of NOV A.D. 1966

REGISTRAR

2Y3
D127
L.L. Vol.

THIS INSTRUMENT
IS THE PROPERTY OF
THE REGISTRY OFFICE FOR THE
REGISTRY DIVISION OF TORONTO
TORONTO

Dated 89024 WA
SEPTEMBER 23rd 19 66

STELLA MIZERNY

39.00 47252

TO

THE CORPORATION OF THE CITY OF TORONTO

Address:

Deed of Land

SITUATE

re: Premises 9 Denison Avenue

Dye & Durham Limited — Toronto, Canada
Printers to the Legal Profession

6.50 2.55

NOV 17 1966

RETURN TO

W. R. CALLOW, Q.C.,
CITY SOLICITOR,
CITY HALL,
TORONTO 1.

A Commissioner for taking Affidavits, etc.

COUNTY
OF
YORK
TO WIT:

I, Stella Mizerny of the City of Toronto in the County of York make oath and say:

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by Stella Mizerny - - -

This Indenture

made (in duplicate) the 23rd day of September
in the year of our Lord, one thousand nine hundred and sixty-six.
In Pursuance of the Short Forms of Conveyances Act:

Between

STELLA MIZERNY, of the City of Toronto, in the County of York, Widow,

hereinafter called the Grantor
of the First Part

– AND –

THE CORPORATION OF THE CITY OF TORONTO

hereinafter called the Grantee
of the Second Part

Witnesseth that in consideration of NINETEEN THOUSAND FIVE HUNDRED - - - - - - - - - - - - - - - - ($19,500.00) - - - - - - - - - - - - - - - -

of said Lot Number Two Eighty three feet ten inches (83' 10") more or less to a point in the easterly or rear limit of said lot Number Three;

THENCE Southerly along the easterly or rear limits of said lots Numbers Three and Two twenty-seven feet nine and one-half inches (27' 9½") more or less to the south limit of said lot Number two;

THENCE Westerly following the south limit of said Lot Number Two Eighty-three feet ten inches more or less to the point of commencement.

To have and to hold unto the said Grantee its successor and assigns, to and for its and their sole and only use for ever. **Subject Nevertheless** to the reservations, limitations, provisoes and conditions, expressed in the original grant thereof from the Crown.

For the Consideration aforesaid the said Grantor(s) hereby release(s) remise(s) and forever discharge(s) the said Grantee, its successors and assigns from and of all manner of actions, causes of action, debts, claims and demands whatsoever which against the said Grantee xxx (she, they, xx) ever had, now has (have) or which xxx (her, xxxx, xxx) heirs, executors, administrators or assigns (xxxxxxxxxxxxxxxxxx) or any of them hereafter can, shall or may have for or by reason of the acquisition of the hereinbefore described lands by the said Grantee xxxxxxxxxxxxxxxxx

The said Grantor Covenants with the said Grantee That she has the right to convey the said lands to the said Grantee notwithstanding any act of the said Grantor.

And That the said Grantor shall have quiet possession of the said lands free from all encumbrances.

And the said Grantor Covenants with the said Grantee that she will execute such further assurances of the said lands as may be requisite.

And the said Grantor Covenants with the said Grantee that she has done no act to encumber the said lands.

And the said Grantor Releases to the said Grantee All her claims upon the said land.

~~And the said party of the Third Part hereby bars her dower in the said lands~~

And the said Grantor doth grant, release and quit claim unto the said Grantee its successors and assigns forever all estate, right, title, interest, claim and demand whatsoever both at law and in equity or otherwise howsoever and whether in possession or expectancy of ~~him~~ her ~~them~~ the said Grantor of, in, to or out of all the lands abutting the said lands hereinbefore described.

In Witness Whereof the said parties hereto have hereunto set their respective hands and seals.

Signed, Sealed and Delivered
IN THE PRESENCE OF

Stella Mizerny
STELLA MIZERNY

060-456-037

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I/~~We~~ STELLA MIZERNY
of the City of Toronto
in the County of York,

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. I was of the full age of twenty-one years;

If Attorney see footnote.

~~I am the Attorney for the Grantee named in the within instrument and I was of the full age of twenty-one years~~

4. I was ~~unmarried/divorced/~~widow~~ed~~.

SWORN before me at the City
of Toronto
in the York
this 15th day of November
A.D. 19 66

Stella Mizerny

A Commissioner for taking Affidavits, etc.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and he/she was of the full age of twenty-one years."

Affidavit, Land Transfer Tax Act

IN THE MATTER OF THE LAND TRANSFER TAX ACT

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I, WILLIAM ERNEST WARD
of the City of Toronto
in the County of York, Solicitor for the Grantee
named in the within (or annexed) transfer make oath and say:

This affidavit may be made by the purchaser or vendor or by any one acting, for them under power of attorney or by an agent accredited in writing by the purchaser or vendor or by the solicitor of either of them.

1. I am a solicitor for the Grantee named in the within (or annexed) transfer.
2. I have a personal knowledge of the facts stated in this affidavit.
3. The true amount of the monies in cash and the value of any property or security included in the consideration is as follows:

(a)	Monies paid in cash		$ 19,500.00
(b)	Property transferred in exchange; Equity value	$	$ nil
	Encumbrances	$	$ nil
(c)	Securities transferred to the value of		$ nil
(d)	Balances of existing encumbrances with interest owing at date of transfer		$ nil
(e)	Monies secured by mortgage under this transaction		$ nil
(f)	Liens, annuities and maintenance charges to which transfer is subject		$ nil
	Total consideration		$ 19,500.00

all blanks must be filled in.

4. If consideration is nominal, is the transfer for natural love and affection?
5. If so, what is the relationship between Grantor and Grantee?
6. Other remarks and explanations, if necessary

Sworn before me at the City
of Toronto
in the County of York
this 17th
day of November A.D. 19 66

William E. Ward

A Commissioner, etc.

Examined 29 Nov 66

88489 WA

Dated 7th September, 1966

I.C.B.

HRYHORIJ GOSHULAK and
TETIANA GOSHULAK

21.80 37473

TO

THE CORPORATION OF THE
CITY OF TORONTO

Address: City Hall,
Toronto 1, Ontario.

Deed of Land

SITUATE

Part Lot 3, Plan 65, Torontop
being 14 Augusta Avenue,
Toronto, Ont. SEP 15 2.39 1966

Dye & Durham Limited, 10 Adelaide Street West, Toronto.
Law and Commercial Stationers

6.50

GOLDSMITH, & CASWELL
BARRISTERS & SOLICITORS
BOARD OF TRADE BLDG.
11 ADELAIDE STREET WEST
TORONTO 1, — ONTARIO

RETURN TO

W.R. Caswell
City Solicitor

A Commissioner for taking Affidavits, etc.

COUNTY OF YORK } TO WIT:

I, BOHDAN GOSHULAK of the City of Toronto in the County of York, MECHANIC make oath and say:

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by HRYHORIJ GOSHULAK and TETIANA GOSHULAK BY HER ATTORNEY, HRYHORIJ GOSHULAK two of the parties thereto.
2. THAT the said Instrument and duplicate were executed by the said parties at the City of Toronto.
3. THAT I know the said parties.
4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the City of Toronto in the County of York this 7th day of September, A.D. 1966.

A Commissioner for taking Affidavits, etc.
HELEN ELEANOR GOSHULAK, a Commissioner for taking Affidavits, I, County of York, for DUNCAN GOLDSMITH & CASWELL, Barristers. of the in the My Commission expires on the 1st. Dec., 1967.

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by of the parties thereto. at the of in the County of this day of A.D. 19 make oath and say:
2. THAT the said Instrument and duplicate were executed by the said part at the of
3. THAT I know the said part
4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the of in the County of this day of A.D. 19

A Commissioner for taking Affidavits, etc.

THIS SPACE TO BE RESERVED FOR REGISTRY OFFICE CERTIFICATION

No. 88489 W.A.

I certify that the within Instrument is duly Entered, Registered and Microfilmed in the Registry Office for the Registry Division of Toronto at 2.39 o'clock P.M. of the 15 day of SEP A.D. 1966

REGISTRAR

3/45 P. 63 Lot 3A. City N. S. Queen (Unlettered lot St to rear (Desc as lot 2 in Deed)

THIS INSTRUMENT
IS THE PROPERTY OF
THE REGISTRY OFFICE FOR THE
REGISTRY DIVISION OF TORONTO
TORONTO

Deed — Without Dower

This Indenture

made (in duplicate) the 7th day of September, one thousand nine hundred and sixty-six.

In Pursuance of The Short Forms of Conveyances Act

Between HRYHORIJ GOSHULAK, of the City of Toronto, in the County of York, Esquire, and TETIANA GOSHULAK, his wife, of the same place, as joint tenants and not as tenants in common,

(hereinafter called the "GRANTORS"),

OF THE FIRST PART

- and -

THE CORPORATION OF THE CITY OF TORONTO,

(hereinafter called the "GRANTEE"),

OF THE SECOND PART

Dye & Durham Limited Toronto, Canada

Form 1 to 4

W H E R E A S the said Tetiana Goshulak did, by instrument dated the 1st day of September, 1966 and registered in the Registry Office for the Registry Division of Toronto on the 14th day of September, 1966 as No. 143167 G.R., appoint her husband, the said Hryhorij Goshulak, her attorney to execute the within conveyance on her behalf.

Witnesseth that in consideration of other good and valuable consideration and of the sum of TWO * ($2.00) * * Dollars of lawful money of Canada now paid by the said Grantee to the said Grantors (the receipt whereof is hereby by them acknowledged), they the said Grantors Do Grant unto the said Grantee in fee simple.

All and Singular that certain parcel or tract of land and premises situate lying and being in the City of Toronto, in the County of York and Province of Ontario, and being composed of part of Lot 3 on the north side of Queen Street West, according to a Plan filed in the Registry Office for the City of Toronto as No. 65, which said parcel may be more particularly described as follows:

COMMENCING at a point in the westerly limit of Augusta Avenue, formerly Esther Street, as widened by Deed No. 16143B, said point being distant 113 feet 7 inches measured northerly thereon from the northerly limit of Queen Street West;

THENCE NORTHERLY along the westerly limit of Augusta Avenue as widened aforesaid, north 17 degrees 40 minutes west, 14 feet 4½ inches;

THENCE WESTERLY to and along the center line of partition wall between the dwelling standing in 1955 on the herein described parcel and the parcel immediately to the north thereof, south 73 degrees west, 18 feet 3 inches to an angle therein;

THENCE NORTHERLY along said center line of partition wall and parallel to Augusta Avenue, 2 inches to an angle therein;

THENCE WESTERLY and continuing along the center line of said partition wall, south 73 degrees west and continuing westerly along a fence line in all a distance of 30 feet 4 inches to the easterly limit of a lane used as a right-of-way;

THENCE SOUTHERLY along the easterly limit of said lane, 13 feet 3½ inches to a point distant 113 feet 7 inches measured northerly from the northerly limit of Queen Street West;

THENCE EASTERLY along the existing northerly limit of said lane, 48 feet 5 inches to the point of commencement.

TOGETHER WITH a right-of-way at all times for all persons entitled thereto over, along and upon those parts of Lots 2 and 3 according to said Plan No. 65 and now used as a lane, which said parcel may be more particularly known and described as follows:

COMMENCING at a point in the westerly limit of Augusta Avenue, formerly Esther Street, as widened by Deed No. 16143B, said point being distant 103 feet 7 inches measured northerly thereon from the northerly limit of Queen Street West;

THENCE NORTHERLY along the westerly limit of Augusta Avenue as widened aforesaid, 10 feet; to the northerly limit of said lane running westerly from the westerly limit of Augusta Avenue;

THENCE WESTERLY along the existing northerly limit of said lane, 48 feet 5 inches;

THENCE NORTHERLY along a fence line, being the easterly limit of said lane, north 17 degrees 46 minutes west, 138 feet 8½ inches more or less to the southerly limit of Woolseley Street, formerly Charles Street;

THENCE WESTERLY along the southerly limit of Woolseley Street, 9 feet 3 inches to the westerly limit of said Lot 2;

THENCE SOUTHERLY along the westerly limit of said lane, being the westerly limits of lots 2 and 3, 148 feet 8½ inches more or less to a point distant 103 feet 7 inches measured northerly thereon from the northerly limit of Queen Street West;

THENCE EASTERLY along the southerly limit of said lane, and parallel to the northerly limit of Queen Street West, 57 feet 7 3/4 inches to the point of commencement.

To have and to hold unto the said Grantee its successors and assigns, to and for its and their sole and only use for ever. **Subject Nevertheless** to the reservations, limitations, provisoes and conditions, expressed in the original grant thereof from the Crown.

FOR THE CONSIDERATION aforesaid the said Grantors hereby release, remise and forever discharge the said Grantee, its successors and assigns from and of all manner of actions, causes of action, debts, claims and demands whatsoever which against the said Grantee they ever had, now have or which their heirs, executors, administrators or assigns or any of them hereafter can, shall or may have for or by reason of the acquisition of the hereinbefore described lands by the said Grantee and/or any work done or to be done on the said lands in connection with the said acquisition.

The said Grantors Covenant with the said Grantee That they have the right to convey the said lands to the said Grantee notwithstanding any act of the said Grantors.

And that the said Grantee shall have quiet possession of the said lands, free from all encumbrances.

And the said Grantors Covenant with the said Grantee that they will execute such further assurances of the said lands as may be requisite.

And the said Grantors Covenant with the said Grantee that they have done no act to encumber the said lands.

And the said Grantors Release to the said Grantee All their claims upon the said lands.

AND the said Grantors do grant, release and quit claim unto the said Grantee, its successors and assigns, forever all estate, right, title, interest, claim and demand whatsoever both at law and in equity orotherwise howsoever and whether in possession or expectancy of them the said Grantors of, in, to or out of all the lands abutting the said lands hereinbefore described.

In Witness Whereof the said parties hereto have hereunto set their hands and seals.

Signed, Sealed and Delivered
IN THE PRESENCE OF

R. Goshulak

HRYHORIJ GOSHULAK, in his personal capacity and in his aforesaid capacity as Attorney for TETIANA GOSHULAK:-

H. Goshulak

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF York
To Wit:

I/~~We~~ HRYHORIJ GOSHULAK
of the City of Toronto
in the County of York,

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. I was of the full age of twenty-one years;

If Attorney see footnote.

2. And that TETIANA GOSHULAK

who also executed the within instrument was of the full age of twenty-one years.

3. I was legally married to the person named therein as my wife~~[illegible]~~

~~[illegible]~~

SWORN before me at the City
of Toronto
in the County of York ~~September~~ October,
this 7th day of
A.D. 19 66.

H. Goshulak

A Commissioner for taking Affidavits, etc.

HELEN ELEANOR GOSHULAK, a Commissioner for taking Affidavits, County of York, for DUNCAN GOLDSMITH & CASWELL, Barristers.

My Commission expires on the 1st. Dec., 1967.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and ~~he~~/she was of the full age of twenty-one years."

Affidavit, Land Transfer Tax Act

IN THE MATTER OF THE LAND TRANSFER TAX ACT

PROVINCE OF ONTARIO
COUNTY OF York
To Wit:

I, HRYHORIJ GOSHULAK
of the City of Toronto,
in the County of York, one of ~~or~~ the grantors
named in the within (or annexed) transfer make oath and say:

This affidavit may be made by the purchaser or vendor or by any one acting for them under power of attorney or by an agent accredited in writing by the purchaser or vendor or by the solicitor of either of them.

1. I am one of the grantors named in the within (or annexed) transfer.
2. I have a personal knowledge of the facts stated in this affidavit.
3. The true amount of the monies in cash and the value of any property or security included in the consideration is as follows:

(a)	Monies paid in cash		$ 10,900.00
(b)	Property transferred in exchange; Equity value	$	$ nil
	Encumbrances	$	$ nil
(c)	Securities transferred to the value of		$ nil
(d)	Balances of existing encumbrances with interest owing at date of transfer		$ nil
(e)	Monies secured by mortgage under this transaction		$ nil
(f)	Liens, annuities and maintenance charges to which transfer is subject		$ nil
	Total consideration		$ 10,900.00

all blanks must be filled in.

4. If consideration is nominal, is the transfer for natural love and affection? N/A
5. If so, what is the relationship between Grantor and Grantee? N/A
6. Other remarks and explanations, if necessary N/A

Sworn before me at the City
of Toronto
in the County of York
this 7TH day of ~~October~~ SEPTEMBER, A.D. 1966.

H. Goshulak

A Commissioner, etc.

HELEN ELEANOR GOSHULAK, a Commissioner for taking Affidavits, County of York, for DUNCAN GOLDSMITH & CASWELL, Barristers.

My Commission expires on the 1st. Dec., 1967.

COUNTY OF YORK
TO WIT:

I, Y.R. BOTIUK
of the City of Toronto in the
County of York
Solicitor make oath and say:

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by George Kapuszczak and Natalie Kapuszczak

two of the parties thereto.

2. THAT the said Instrument and duplicate were executed by the said parties at the City of Toronto

3. THAT I know the said parties

4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the City
of Toronto in the County
of York this 17th
day of August A.D. 1966

Y.R. Botiuk

A Commissioner for taking Affidavits, etc.

OF
TO WIT:

I,
of the of
of
make oath and say:

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by

of the parties thereto.

2. THAT the said Instrument and duplicate were executed by the said part at the of

3. THAT I know the said part

4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the
of in the County
of this
day of A.D. 19

A Commissioner for taking Affidavits, etc.

88252WA

Dated August 15th, 1966 19

GEORGE KAPUSZCZAK AND
NATALIE KAPUSZCZAK

TO

CORPORATION OF THE
CITY OF TORONTO

Address: 18 Augusta Avenue

Deed of Land

SITUATE

Part lot 3, Plan 65, City
of Toronto

Dye & Durham Limited, 10 Adelaide St. E., Toronto, Canada
Law and Commercial Stationers

RETURN TO

Y.R. BOTIUK
Barrister, Solicitor
527A Bloor St. West
TORONTO 4, Ontario

R. M. KOSTYK, B.A.
BARRISTER AND SOLICITOR
527A BLOOR STREET WEST
TORONTO 4, ONTARIO

THIS SPACE TO BE RESERVED FOR REGISTRY OFFICE CERTIFICATES

88252W.A.

I certify that the within Instrument is duly Entered, Registered and Microfilmed in the Registry Office for the Registry Division of Toronto at 11:00 o'clock A.M. of the 17 day of AUG 1966

REGISTRAR

2 + 3
65 R 266

33041

CITY SOLICITOR

THIS INSTRUMENT
IS THE PROPERTY OF
THE REGISTRY OFFICE FOR THE
REGISTRY DIVISION OF TORONTO
TORONTO

Deed — Without Dower

This Indenture

made (in duplicate) the sixteenth day of August
one thousand nine hundred and sixty-six

In Pursuance of The Short Forms of Conveyances Act

Between GEORGE KAPUSZCZAK, of the City of Toronto, in the County of York, and NATALIE KAPUSZCZAK, his wife, of the same place, as joint tenants and not as tenants in common,

hereinafter called the "GRANTORS"

of the FIRST PART

- and -

THE CORPORATION OF THE CITY OF TORONTO,

hereinafter called the GRANTEE"

of the SECOND PART

Dye & Durham Limited
10 Adelaide St. W.
Toronto, Canada
Form 1 to 4

Witnesseth that in consideration of other good andvaluable consideration and the sum of TWO ---------- ---------- ($2.00)---------- Dollars of lawful money of Canada now paid by the said Grantee to the said Grantors (the receipt whereof is hereby by them acknowledged), the said Grantors Do Grant unto the said Grantee in fee simple.

All and Singular th at certain parcel or tract of land and premises situate lying and being in the City of Toronto, in the County of York and Province of Ontario, and being composed of part of Lot 3 on the north side of Queen Street West according to a plan filed in the Registry Office for the City of Toronto as number 65; which said parcel may be more particularly known and described as follows:

COMMENCING at a point in the westerly limit of Augusta Avenue, formerly Esther Street, as widened by Deed no. 16143 B. said point being distant 141 feet 11 inches measured northerly thereon from the northerly limit of Queen Street West:

THENCE northerly along the westerly limit of Augusta Avenue as widened aforesaid, north 17 degrees 40 minutes west, 16 feet 4 inches;

THENCE westerly to and along the centre line of partition wall between the dwellings standing in 1955 on the herein described parcel and the parcel immediately to the north thereof, south 73 degrees west, 2 feet 9 inches to an angle therein;

THENCE continuing westerly south 58 degrees west,3 feet 4 inches to an angle therein;
THENCE continuing westerly along said centre line of said partition wall, south 73 degrees west, 15 feet 11 inches to an angle therein;
THENCE northerly along said centre line of said partition wall and parallel to Augusta Avenue 1 foot 7 1/2 inches to an angle therein;
THENCE westerly along said centre line of said partition wall and continuing westerly along a fence line, in all a distance of 26 feet 6 inches to the easterly limit of a lane used as a right of way;
THENCE southerly along the easterly limit of said lane, 16 feet 4 inches to a fence line running easterly therefrom;
THENCE easterly along the last mentioned fence line26 feet 3 inches to the westerly face of the westerly wall of the dwelling standing on the herein described parcel and the parcel immediately to the southethereof;
THENCE southerly along the westerly face of said westerly wall, 9 inches;
THENCE easterly along the centre line of partition wall between the dwellings on the herein described parcel and the parcel immediately to the south thereof, north 73 degrees east, 22 feet 6 inches to the point of commencement.

TOGETHER WITH A RIGHT OF WAY at all times for all persons entitled thereto, over, along and upon those parts of Lots 2 and 3 according to said plan No. 65 and now used as a lane, which said parcel may be more particularly known and described as follows:

COMMENCING at a point in the westerly limit of Augusta Avenue,formerly Esther Street, as widened by Deed no. 16143B, said point being distant 103 feet 7 inches measured northerly thereon fromthe northerly limit of Queen Street West;
THENCE northerly along the westerly limit of Augusta Avenue as widened aforesaid, 10 feet to the northerly limit of saidlane running westerly from the westerly limit of Augusta Avenue;
THENCE westerly along the existing northerly limit of said lane,48 feet 5 inches;
THENCE northerly along a fence line being the easterly limit of said lane, north 17 degrees 46 minutes west, 138 feet 8 1/2 inches more or less to the southerly limit of Woolselely Street,formerly Charles Street;
THENCE westerly along the southerly limit of Woolselely Street, 9 feet 3 inches to the westerly limit of said Lot 2;
THENCE southerly along the westerly limit of said lane, being the westerly limits of Lots 2 and 3, 148 feet 8 1/2 inches more or less to a point distant 103 feet 7 inches measured northerly thereon from the northerly limit of Queen Street West;
THENCE easterly along the southerly limit of said lane, and parallel to the northerly limit of Queen Street West, 57 feet 7 3/4 inches to the point of commencement.

TO HAVE AND TO HOLD unto the said Grantee, its heirs and assigns, to and for their sole and only use forever. SUBJECT NEVERTHLESS to the reservations,limitations,provisoes and conditions expressed in the original grant thereof from the Crown.

The said Grantors Covenant with the said Grantee That they have the right to convey the said lands to the said Grantee notwithstanding any act of the said Grantors.

And that the said Grantee shall have quiet possession of the said lands, free from all encumbrances.

And the said Grantors Covenant with the said Grantee that they will execute such further assurances of the said lands as may be requisite.

And the said Grantors Covenant with the said Grantee that they have done no act to encumber the said lands.

And the said Grantors Release to the said Grantee All their claims upon the said lands.

AND THE SAID Grantors do grant, release and Quit Claim unto the said Grantee, its successors and assigns forever, all estate, right, title, interest, claim and demand whatsoever both at law and in equity or otherwise howsoever and whether in possession or expectancy of them, the said Grantors of, into, or out of all the lands abutting the said lands hereinbefore described.

In Witness Whereof the said parties hereto have hereunto set their hands and seals.

Signed, Sealed and Delivered
IN THE PRESENCE OF

Y. R. Bolink

George Kapuszczak
George Kapuszczak

Natalie Kapuszczak
Natalie Kapuszczak

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I/WE George Kapuszczak and Natalie Kapuszczak
of the City of Toronto
in the County of York

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. We were both of the full age of twenty-one years;

If Attorney see footnote.

2. And that we are legally married to each other.

who also executed the within instrument of the full age of twenty one years.

4.

SWORN before me at the City
of Toronto
in the County of York
this 16th day of August
A.D. 19 66

George Kapuszczak
George Kapuszczak

Natalja Kapuszczak
Natalie Kapuszczak

Y.R. Bolink
A Commissioner for taking Affidavits, etc.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and he/she was of the full age of twenty-one years."

Affidavit, Land Transfer Tax Act

IN THE MATTER OF THE LAND TRANSFER TAX ACT

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I, Y.R. BOTTUK
of the City of Toronto
in the County of York, Solicitor for the Grantors
named in the within (or annexed) transfer make oath and say:

This affidavit may be made by the purchasers or vendor of by any one acting for them under power of attorney or by an agent accredited in writing by the purchaser or vendor or by the solicitor of either of them.

1. I am Solicitor for the Grantors named in the within (or annexed) transfer.
2. I have a personal knowledge of the facts stated in this affidavit.
3. The true amount of the monies in cash and the value of any property or security included in the consideration is as follows:

(a)	Monies paid in cash		$ 11,000.00
(b)	Property transferred in exchange; Equity value	$	$ NIL
	Encumbrances	$	$ NIL
(c)	Securities transferred to the value of		$ NIL
(d)	Balances of existing encumbrances with interest owing at date of transfer		$ NIL
(e)	Monies secured by mortgage under this transaction		$ NIL
(f)	Liens, annuities and maintenance charges to which transfer is subject		$ NIL
	Total consideration		$ 11,000.00

all blanks must be filled in.

4. If consideration is nominal, is the transfer for natural love and affection? N/A
5. If so, what is the relationship between Grantor and Grantee? N/A
6. Other remarks and explanations, if necessary N/A

Sworn before me at the City
of Toronto
in the County of York
this 17th
day of August A.D. 19 66

Y.R. Bolink

A Commissioner, etc.

COUNTY OF YORK
TO WIT:

I, Roy Michael Kostuk
of the City of Toronto in the
County of York,
make oath and say:

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by Roman Olarnyk and Zofia Olarnyk
two of the parties thereto.
2. THAT the said Instrument and duplicate were executed by the said parties at the City of Toronto
3. THAT I know the said parties.
4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the City
of Toronto, in the County
of York, this 23rd
day of August, A.D. 1966.

A Commissioner for taking Affidavits, etc.

OF
TO WIT:

I,
of the of in the
of
make oath and say:

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by
of the parties thereto.
2. THAT the said Instrument and duplicate were executed by the said part at the of
3. THAT I know the said part
4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the
of in the County
of this
day of A.D. 19

A Commissioner for taking Affidavits, etc.

88288 W.A.

Dated August 22nd, 1966.

ROMAN OLARNYK and
ZOFIA OLARNYK

TO

THE CORPORATION OF THE CITY OF TORONTO

Address:

Deed of Land

SITUATE
Part of Lot 3, Plan 65, 18½
Augusta Avenue, Toronto.

Dye & Durham Limited, 10 Adelaide Street West, Toronto, Canada
Law and Commercial Stationers

50 403

AUG 23 1966

RETURN TO

R. M. KOSTUK, B.A.
BARRISTER AND SOLICITOR
527A BLOOR STREET WEST
TORONTO 4, ONTARIO

No. 88288 W.A.

I certify that the within Instrument was duly Entered, Registered and Microfilmed in the Registry Office for the Registry Division of Toronto at 4:03 o'clock P.M. of the 23 day of AUG A.D. 1966

REGISTRAR

243 - P.266
65

THIS SPACE TO BE RESERVED FOR REGISTRY OFFICE CERTIFICATE

THIS INSTRUMENT
IS THE PROPERTY OF
THE REGISTRY OFFICE FOR THE
REGISTRY DIVISION OF TORONTO
TORONTO 2nd.

Deed — Without Dower

This Indenture

made (in duplicate) the 22nd day of August, one thousand nine hundred and sixty-six.

In Pursuance of The Short Forms of Conveyances Act

Between

Dye & Durham Limited Toronto, Canada

Form 1 to 4

ROMAN OLARNYK, Esquire, and ZOFIA OLARNYK, his wife, both of the City of Toronto, in the County of York, as joint tenants and not as tenants in common,

hereinafter called the Grantors

of the FIRST PART,

and

THE CORPORATION OF THE CITY OF TORONTO,

hereinafter called the Grantee

of the SECOND PART.

Witnesseth that in consideration of twelve thousand three hundred----------

---

---------- ($12,300.00)----------Dollars of lawful money of Canada now paid by the said Grantee to the said Grantor s (the receipt whereof is hereby by them acknowledged), the said Grantors **Do Grant** unto the said Grantee in fee simple.

All and Singular th at certain parcel or tract of land and premises situate lying and being in the City of Toronto, in the County of York, and Province of Ontario; and being composed of part of Lot 3 on the north side of Queen Street West according to a plan filed in the Registry Office for the City of Toronto as No. 65; which said parcel may be more particularly known and described as follows:

COMMENCING at a point in the westerly limit of August Avenue, formerly Ester Street, as widened by Deed No. 16143 B, said point being distant one hundred and fifty-eight feet three inches (158'3") measured northerly thereon from the northerly limit of Queen Street West;

THENCE NORTHERLY along the westerly limit of Augusta Avenue as widened aforesaid, north 17 degrees 40 minutes west, eighteen feet ten inches (18'10");

THENCE WESTERLY to and along the centre line of partition wall between the dwellings standing in 1955 on the herein described parcel and the parcel immediately to the south thereof, south 73 degrees west, twenty-two feet six inches (22'6") to the westerly face of the westerly wall of said dwelling.

THENCE continuing westerly south 74 degrees west along a fence line parallel to the northerly limit of Queen Street West, twenty-six feet three inches (26'3") to the easterly limit of a lane used as a right of way;

THENCE SOUTHERLY along the easterly limit of said lane, seventeen feet eleven inches (17'11") to a fence line running easterly therefrom;

THENCE EASTERLY along the last mentioned fence line, to and along the centre line of partition wall between the dwellings on the herein described parcel and the parcel immediately to the south thereof, in all a distance of twenty-six feet six inches (26'6") to an angle in said centre line of said partition wall;

THENCE SOUTHERLY and parallel to the westerly limit of Augusta Avenue, along said centre line of wall one foot seven and one-half inches (1'7½") to an angle therein;

THENCE EASTERLY along said centre line of said wall north seventy-three degrees east, fifteen feet eleven inches (15'11") to an angle therein;

THENCE NORTH 58 degrees east along said centre line of wall three feet four inches (3'4") to an angle therein;

THENCE continuing easterly along the centre line of said partition wall, north 73 degrees east, two feet nine inches (2'9") to the point of commencement.

TOGETHER WITH a right of way at all times for all persons entitled thereto, over, along and upon those parts of Lots 2 and 3 according to said Plan No. 65 and now used as a lane, which said parcel may be more particularly known and described as follows:

COMMENCING at a point in the westerly limit of Augusta Avenue, formerly Esther Street, as widened by Deed No. 16143 B, said point being distant one hundred and three feet seven inches (103'7") measured northerly thereon from the northerly limit of Queen Street West;

THENCE NORTHERLY along the westerly limit of Augusta Avenue as widened aforesaid, ten feet (10'), to the northerly limit of said lane running westerly from the westerly limit of Augusta Avenue;

THENCE WESTERLY along the existing northerly limit of said lane, forty-eight feet five inches (48'5");

THENCE NORTHERLY along a fence line, being the easterly limit of said lane, north 17 degrees 46 minutes west, one hundred and thirty-eight feet eight and one-half inches (138'8½") more or less to the southerly limit of Wolseley Street, formerly Charles Street;

THENCE WESTERLY along the southerly limit of Wolseley Street, nine feet three inches (9'3") to the westerly limit of said Lot 2;

THENCE SOUTHERLY along the westerly limit of said lane, being the westerly limits of Lots 2 and 3, one hundred and forty-eight feet eight and one-half inches (148'8½") more or less to a point distant one hundred and three feet seven inches (103'7") measured northerly thereon from the northerly limit of Queen Street West;

THENCE EASTERLY along the southerly limit of said lane, and parallel to the northerly limit of Queen Street West, fifty-seven feet seven and three-quarter inches (57'7 3/4") to the point of commencement.

And the said Grantors do grant, release and quit claim unto the said Grantee its successors and assigns forever all their estate, right, title, interest, claims and demands whatsoever both at law and in equity or otherwise howsoever and whether in possession or expectancy of them the said Parties of the First Part, of, in, to or out of all and singular the lands abutting the said lands hereinbefore described.

To have and to hold unto the said Grantee its heirs and assigns, to and for it and their sole and only use for ever. **Subject Nevertheless** to the reservations, limitations, provisoes and conditions, expressed in the original grant thereof from the Crown.

The said Grantor S **Covenant** with the said Grantee **That** the y have the right to convey the said lands to the said Grantee notwithstanding any act of the said Grantors .

And that the said Grantee shall have quiet possession of the said lands, free from all encumbrances.

And the said Grantor s **Covenant** with the said Grantee that t he y will execute such further assurances of the said lands as may be requisite.

And the said Grantor s **Covenant** with the said Grantee that they have done no act to encumber the said lands.

And the said Grantor s **Release** to the said Grantee **All** claims upon the said lands.

In Witness Whereof the said parties hereto have hereunto set their hands and seals.

Signed, Sealed and Delivered
IN THE PRESENCE OF

Roman Olamyk
S Olamyk

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF York
To Wit:

I/WE Roman Olarnyk and Zofia Olarnyk
of the City of Toronto
in the County of York,

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. ~~I~~/~~WE~~ were of the full age of twenty-one years;

If Attorney see footnote.

We were both

~~I/WE also executed the within instrument~~

~~I was legally married to the person named therein as my wife~~

~~I was not legally married~~

SEVERALLY

SWORN before me at the City
of Toronto
in the County of York,
this 22nd day of August,
A.D. 19 66.

Roman Olarnyk
S Olarnyk

A Commissioner for taking Affidavits, etc.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and he/she was of the full age of twenty-one years."

Affidavit, Land Transfer Tax Act

IN THE MATTER OF THE LAND TRANSFER TAX ACT

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I, ROY MICHAEL KOSTUK
of the City of Toronto
in the County of York solicitor for the grantors
named in the within (or annexed) transfer make oath and say:

This affidavit may be made by the purchaser or vendor or by any one acting for them under power of attorney or by an agent accredited in writing by the purchaser or vendor or by the solicitor of either of them.

1. I am solicitor for the grantors named in the within (or annexed) transfer.
2. I have a personal knowledge of the facts stated in this affidavit.
3. The true amount of the monies in cash and the value of any property or security included in the consideration is as follows:

(a)	Monies paid in cash		$ 12,300.-
(b)	Property transferred in exchange; Equity value	$	$ NIL
	Encumbrances	$	$ NIL
(c)	Securities transferred to the value of		$ NIL
(d)	Balances of existing encumbrances with interest owing at date of transfer		$ NIL
(e)	Monies secured by mortgage under this transaction		$ NIL
(f)	Liens, annuities and maintenance charges to which transfer is subject		$ NIL
	Total consideration		$ 12,300.-

all blanks must be filled in.

4. If consideration is nominal, is the transfer for natural love and affection?
5. If so, what is the relationship between Grantor and Grantee?
6. Other remarks and explanations, if necessary

Sworn before me at the City
of Toronto
in the County of York
this 22nd
day of August A.D. 19 66.

A Commissioner, etc.

THIS SPACE TO BE RESERVED FOR REGISTRY OFFICE CERTIFICATE

No. 88331 W.A.

I certify that the within Instrument is duly Entered, Registered and Microfilmed in the Registry Office for the Registry Division of Toronto at 12.11 o'clock P.M. on the 30 day of AUG A.D. 1966

REGISTRAR

243 - P63
65. City

THIS INSTRUMENT
IS THE PROPERTY OF
THE REGISTRY OFFICE FOR THE
REGISTRY DIVISION OF TORONTO
TORONTO

88331 WA

Dated August 26th **19 66**

IVAN MISKO and
NADIA MISKO

2120

TO 34630

THE CORPORATION OF THE CITY OF TORONTO

Address:

Deed of Land

SITUATE

16 Augusta Ave

Dye & Durham Limited — Toronto, Canada
Printers to the Legal Profession

AUG 30 1966

RETURN TO

Ag Solicitor

L.W. Litwin,
Barrister & Solicitor,
575 Queen St. West,
Toronto, Ontario.

A Commissioner for taking Affidavits, etc.

County OF York } I, Ivan Misko and Nadia Misko of the City of Toronto in the County of York

TO WIT: } 1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by Ivan Misko and Nadia Misko two of the parties thereto.

2. THAT the said Instrument and duplicate were executed by the said parties at the City of Toronto in the County of York

3. THAT I know the said part ies

4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the Toronto in the County of York this 26th day of August A.D. 19 66

A Commissioner for taking Affidavits, etc.

OF } I, ... of the ..... in the ..... of ..... make oath and say:

TO WIT: } 1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by ..... of the parties thereto.

2. THAT the said Instrument and duplicate were executed by the said part ies at the ..... of the parties thereto.

3. THAT I know the said part

4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the ..... in the County of ..... this ..... day of ..... A.D. 19

Deed — Without Dower

This Indenture

made (in duplicate) the 26th day of August
one thousand nine hundred and Sixty-Six

In Pursuance of The Short Forms of Conveyances Act

Between IVAN MISKO, of the City of Toronto, in the County of York, and NADIA MISKO, his wife, of the same place as joint tenants,

hereinafter called the Grantors
OF THE FIRST PART

THE CORPORATION OF THE CITY OF TORONTO,

hereinafter called the Grantee
OF THE SECOND PART

Dye & Durham
Limited
Toronto, Canada

Form 1 to 4

Witnesseth that in consideration of other good and valuable consideration and the sum of TWO----------

----------($2.00)---------- Dollars of lawful money of Canada now paid by the said Grantee to the said Grantors (the receipt whereof is hereby by them acknowledged), the said Grantors Do Grant unto the said Grantee in fee simple.

All and Singular that certain parcel or tract of land and premises situate lying and being in the City of Toronto, in the County of York and Province of Ontario; and being composed of part of lot 3 on the north side of Queen Street West according to a plan filed in the Registry Office for the City of Toronto as No. 65; which said parcel may be more particularly known and described as follows:

COMMENCING at a point in the westerly limit of Augusta Avenue, formerly Esther Street, as widened by Deed No. 16143 B, said point being distant 127 feet 11½ inches measured northerly thereon from the northerly limit of Queen Street West;

THENCE NORTHERLY along the westerly limit of Augusta Avenue as widened aforesaid, north 17 degrees 40 minutes west, 13 feet 11½ inches;

THENCE WESTERLY to and along the centre line of partition wall between the dwellings standing in 1955 on the herein described parcel and the parcel immediately to the north thereof, south 73 degrees west 22 feet 6 inches to the westerly face of the westerly wall of said dwellings;

THENCE NORTHERLY along the westerly face of the westerly wall of said dwellings 9 inches to a fence line running westerly therefrom;

THENCE WESTERLY along said fence line, 26 feet 3 inches to the easterly limit of a lane used as a right of way;

THENCE SOUTHERLY along the easterly limit of said lane, 15 feet 8½ inches to a fence line running easterly therefrom;
THENCE EASTERLY along the last mentioned fence line to and along the centre line of partition wall between the dwellings on the herein described parcel and the parcel immediately to the south thereof, north 73 degrees east in all a distance of 30 feet 4 inches to an aggle therein;
THENCE SOUTHERLY along the centre line of said partition wall and parallel to Augusta Avenue, 2 inches to an angle therein;
THENCE continuing easterly along the centre line of said partition wall north 73 degrees east, 18 feet 3 inches to the point of commencement.
TOGETHER WITH A RIGHT OF WAY at all times for all persons entitled thereto, over, along and upon those parts of Lots 2 and 3 according to said plan No. 65 and now used as a lane, which said parcel may be more particularly known and described as follows:
COMMENCING at a point in the westerly limit of Augusta Avenue, formerly Esther Street, as widened by Deed No. 16143B, said point being distant 103 feet 7 inches measured northerly thereon from the northerly limit of Queen Street West;
THENCE NORTHERLY along the westerly limit of Augusta Avenue as widened aforesaid, 10 feet; to the northerly limit of said lane running westerly from the westerly limit of Augusta Avenue;
THENCE WESTERLY along the existing northerly limit of said lane, 48 feet 5 inches;
THENCE NORTHERLY along a fence line, being the easterly limit of said lane, north 17 degrees 46 minutes west, 138 feet 8½ inches more or less to the southerly limit of Woolseley Street, formerly Charles Street;
THENCE WESTERLY along the southerly limit of Woolseley Street, 9 feet 3 inches to the westerly limit of said Lot 2;
THENCE SOUTHERLY along the westerly limit of said lane, being the westerly limits of Lots 2 and 3, 148 feet 8½ inches more or less toa point distant 103 feet 7 inches measured northerly thereon from the northerly limit of Queen Street West;
THENCE EASTERLY along the southerly limit of said lane, and parallel to the northerly limit of Queen Street West, 57 feet 7¾ inches to the point of commencement.

To have and to hold unto the said Grantee its heirs and assigns, to and for its their sole and only use for ever. **Subject Nevertheless** to the reservations, limitations, provisoes and conditions, expressed in the original grant thereof from the Crown.

The said Grantors Covenant with the said Grantee That they have the right to convey the said lands to the said Grantee notwithstanding any act of the said Grantors.

And that the said Grantee shall have quiet possession of the said lands, free from all encumbrances.

And the said Grantors Covenant with the said Grantee that they will execute such further assurances of the said lands as may be requisite.

And the said Grantors Covenant with the said Grantee that they have done no act to encumber the said lands.

And the said Grantors Release to the said Grantee All their claims upon the said lands.

AND the said Grantors do grant, release and quit claim unto the said grantee its successors and assigns forever all estate, right, title interest claim and demand whatsoever both at law and in equity or otherwise howsoever and whether in possession or expectancy of them the said Grantors of, in, to or out of all the lands abutting the said lands hereinbefore described.

In Witness Whereof the said parties hereto have hereunto set their hands and seals.

Signed, Sealed and Delivered
IN THE PRESENCE OF

M. Kowalenko

Ivan Misko

Nadia Misko

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF York
To Wit:

I/~~WE~~ IVAN MISKO
of the City of Toronto
in the County of York

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. I was of the full age of twenty-one years;

If Attorney see footnote.

2. And that NADIA MISKO

who also executed the within instrument was of the full age of twenty-one years

3. I was legally married to the person named therein as my wife/~~husband~~;

4. ~~I was a widow/widower/divorced~~

SWORN before me at the City
of Toronto
in the County of York
this 26th day of August
A.D. 19 66

A Commissioner for taking Affidavits, etc.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and he/she was of the full age of twenty-one years."

Affidavit, Land Transfer Tax Act

IN THE MATTER OF THE LAND TRANSFER TAX ACT

PROVINCE OF ONTARIO
COUNTY OF York
To Wit:

I, Ivan Misko
of the City of Toronto
in the County of York for the
named in the within (or annexed) transfer make oath and say:

This affidavit may be made by the purchaser or vendor or by any one acting for them under power of attorney or by an agent accredited in writing by the purchaser or vendor or by the solicitor of either of them.

1. I am one of the grantors named in the within (or annexed) transfer.
2. I have a personal knowledge of the facts stated in this affidavit.
3. The true amount of the monies in cash and the value of any property or security included in the consideration is as follows:

(a)	Monies paid in cash		$ 10,600
(b)	Property transferred in exchange; Equity value	$	$ nil
	Encumbrances	$	$ nil
(c)	Securities transferred to the value of		$ nil
(d)	Balances of existing encumbrances with interest owing at date of transfer		$ nil
(e)	Monies secured by mortgage under this transaction		$ nil
(f)	Liens, annuities and maintenance charges to which transfer is subject		$ nil
	Total consideration		$ 10,600

all blanks must be filled in.

4. If consideration is nominal, is the transfer for natural love and affection?
5. If so, what is the relationship between Grantor and Grantee?
6. Other remarks and explanations, if necessary

Sworn before me at the City
of Toronto
in the County of York
this 26th
day of August A.D. 19 66

A Commissioner, etc.

88489 WA

Dated 7th September, 1966

I.C.B.

HRYHORIJ GOSHULAK and
TETIANA GOSHULAK

21.80 37473

TO

THE CORPORATION OF THE
CITY OF TORONTO

Address: City Hall,
Toronto 1, Ontario.

Deed of Land

SITUATE

Part Lot 3, Plan 65, Torontop
being 14 Augusta Avenue,
Toronto, Ont. SEP 15 2.39 1966

Dye & Durham Limited, 10 Adelaide Street West, Toronto.
Law and Commercial Stationers

6.50

GOLDSMITH, & CASWELL
BARRISTERS & SOLICITORS
BOARD OF TRADE BLDG.
11 ADELAIDE STREET WEST
TORONTO 1, — ONTARIO

RETURN TO

W.R. Caswell
City Solicitor

A Commissioner for taking Affidavits, etc.

COUNTY OF YORK } TO WIT:

I, BOHDAN GOSHULAK of the City of Toronto in the County of York, MECHANIC make oath and say:

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by HRYHORIJ GOSHULAK and TETIANA GOSHULAK BY HER ATTORNEY, HRYHORIJ GOSHULAK two of the parties thereto.
2. THAT the said Instrument and duplicate were executed by the said parties at the City of Toronto.
3. THAT I know the said parties.
4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the City of Toronto in the County of York this 7th day of September, A.D. 1966.

A Commissioner for taking Affidavits, etc.
HELEN ELEANOR GOSHULAK, a Commissioner for taking Affidavits, I, County of York, for DUNCAN GOLDSMITH & CASWELL, Barristers. of the in the My Commission expires on the 1st. Dec., 1967.

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by of the parties thereto. at the of in the County of this day of A.D. 19 make oath and say:
2. THAT the said Instrument and duplicate were executed by the said part at the of
3. THAT I know the said part
4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the of in the County of this day of A.D. 19

A Commissioner for taking Affidavits, etc.

THIS SPACE TO BE RESERVED FOR REGISTRY OFFICE CERTIFICATION

No. 88489 W.A.

I certify that the within Instrument is duly Entered, Registered and Microfilmed in the Registry Office for the Registry Division of Toronto at 2.39 o'clock P.M. of the 15 day of SEP A.D. 1966

REGISTRAR

3/45 P. 63 Lot 3A. City N. S. Queen (Unlettered lot St to rear (Desc as lot 2 in Deed)

THIS INSTRUMENT
IS THE PROPERTY OF
THE REGISTRY OFFICE FOR THE
REGISTRY DIVISION OF TORONTO
TORONTO

Deed — Without Dower

This Indenture

made (in duplicate) the 7th day of September, one thousand nine hundred and sixty-six.

In Pursuance of The Short Forms of Conveyances Act

Between HRYHORIJ GOSHULAK, of the City of Toronto, in the County of York, Esquire, and TETIANA GOSHULAK, his wife, of the same place, as joint tenants and not as tenants in common,

(hereinafter called the "GRANTORS"),

OF THE FIRST PART

- and -

THE CORPORATION OF THE CITY OF TORONTO,

(hereinafter called the "GRANTEE"),

OF THE SECOND PART

Dye & Durham Limited Toronto, Canada

Form 1 to 4

W H E R E A S the said Tetiana Goshulak did, by instrument dated the 1st day of September, 1966 and registered in the Registry Office for the Registry Division of Toronto on the 14th day of September, 1966 as No. 143167 G.R., appoint her husband, the said Hryhorij Goshulak, her attorney to execute the within conveyance on her behalf.

Witnesseth that in consideration of other good and valuable consideration and of the sum of TWO * ($2.00) * * Dollars of lawful money of Canada now paid by the said Grantee to the said Grantors (the receipt whereof is hereby by them acknowledged), they the said Grantors Do Grant unto the said Grantee in fee simple.

All and Singular that certain parcel or tract of land and premises situate lying and being in the City of Toronto, in the County of York and Province of Ontario, and being composed of part of Lot 3 on the north side of Queen Street West, according to a Plan filed in the Registry Office for the City of Toronto as No. 65, which said parcel may be more particularly described as follows:

COMMENCING at a point in the westerly limit of Augusta Avenue, formerly Esther Street, as widened by Deed No. 16143B, said point being distant 113 feet 7 inches measured northerly thereon from the northerly limit of Queen Street West;

THENCE NORTHERLY along the westerly limit of Augusta Avenue as widened aforesaid, north 17 degrees 40 minutes west, 14 feet 4½ inches;

THENCE WESTERLY to and along the center line of partition wall between the dwelling standing in 1955 on the herein described parcel and the parcel immediately to the north thereof, south 73 degrees west, 18 feet 3 inches to an angle therein;

THENCE NORTHERLY along said center line of partition wall and parallel to Augusta Avenue, 2 inches to an angle therein;

THENCE WESTERLY and continuing along the center line of said partition wall, south 73 degrees west and continuing westerly along a fence line in all a distance of 30 feet 4 inches to the easterly limit of a lane used as a right-of-way;

THENCE SOUTHERLY along the easterly limit of said lane, 13 feet 3½ inches to a point distant 113 feet 7 inches measured northerly from the northerly limit of Queen Street West;

THENCE EASTERLY along the existing northerly limit of said lane, 48 feet 5 inches to the point of commencement.

TOGETHER WITH a right-of-way at all times for all persons entitled thereto over, along and upon those parts of Lots 2 and 3 according to said Plan No. 65 and now used as a lane, which said parcel may be more particularly known and described as follows:

COMMENCING at a point in the westerly limit of Augusta Avenue, formerly Esther Street, as widened by Deed No. 16143B, said point being distant 103 feet 7 inches measured northerly thereon from the northerly limit of Queen Street West;

THENCE NORTHERLY along the westerly limit of Augusta Avenue as widened aforesaid, 10 feet; to the northerly limit of said lane running westerly from the westerly limit of Augusta Avenue;

THENCE WESTERLY along the existing northerly limit of said lane, 48 feet 5 inches;

THENCE NORTHERLY along a fence line, being the easterly limit of said lane, north 17 degrees 46 minutes west, 138 feet 8½ inches more or less to the southerly limit of Woolseley Street, formerly Charles Street;

THENCE WESTERLY along the southerly limit of Woolseley Street, 9 feet 3 inches to the westerly limit of said Lot 2;

THENCE SOUTHERLY along the westerly limit of said lane, being the westerly limits of lots 2 and 3, 148 feet 8½ inches more or less to a point distant 103 feet 7 inches measured northerly thereon from the northerly limit of Queen Street West;

THENCE EASTERLY along the southerly limit of said lane, and parallel to the northerly limit of Queen Street West, 57 feet 7 3/4 inches to the point of commencement.

To have and to hold unto the said Grantee its successors and assigns, to and for its and their sole and only use for ever. **Subject Nevertheless** to the reservations, limitations, provisoes and conditions, expressed in the original grant thereof from the Crown.

FOR THE CONSIDERATION aforesaid the said Grantors hereby release, remise and forever discharge the said Grantee, its successors and assigns from and of all manner of actions, causes of action, debts, claims and demands whatsoever which against the said Grantee they ever had, now have or which their heirs, executors, administrators or assigns or any of them hereafter can, shall or may have for or by reason of the acquisition of the hereinbefore described lands by the said Grantee and/or any work done or to be done on the said lands in connection with the said acquisition.

The said Grantors Covenant with the said Grantee That they have the right to convey the said lands to the said Grantee notwithstanding any act of the said Grantors.

And that the said Grantee shall have quiet possession of the said lands, free from all encumbrances.

And the said Grantors Covenant with the said Grantee that they will execute such further assurances of the said lands as may be requisite.

And the said Grantors Covenant with the said Grantee that they have done no act to encumber the said lands.

And the said Grantors Release to the said Grantee All their claims upon the said lands.

AND the said Grantors do grant, release and quit claim unto the said Grantee, its successors and assigns, forever all estate, right, title, interest, claim and demand whatsoever both at law and in equity orotherwise howsoever and whether in possession or expectancy of them the said Grantors of, in, to or out of all the lands abutting the said lands hereinbefore described.

In Witness Whereof the said parties hereto have hereunto set their hands and seals.

Signed, Sealed and Delivered
IN THE PRESENCE OF

R. Goshulak

HRYHORIJ GOSHULAK, in his personal capacity and in his aforesaid capacity as Attorney for TETIANA GOSHULAK:-

H. Goshulak

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF York
To Wit:

I/~~We~~ HRYHORIJ GOSHULAK
of the City of Toronto
in the County of York,

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. I was of the full age of twenty-one years;

If Attorney see footnote.

2. And that TETIANA GOSHULAK

who also executed the within instrument was of the full age of twenty-one years.

3. I was legally married to the person named therein as my wife~~[illegible]~~

~~[illegible]~~

SWORN before me at the City
of Toronto
in the County of York ~~September~~ October,
this 7th day of
A.D. 19 66.

H. Goshulak

A Commissioner for taking Affidavits, etc.

HELEN ELEANOR GOSHULAK, a Commissioner for taking Affidavits, County of York, for DUNCAN GOLDSMITH & CASWELL, Barristers.

My Commission expires on the 1st. Dec., 1967.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and ~~he~~/she was of the full age of twenty-one years."

Affidavit, Land Transfer Tax Act

IN THE MATTER OF THE LAND TRANSFER TAX ACT

PROVINCE OF ONTARIO
COUNTY OF York
To Wit:

I, HRYHORIJ GOSHULAK
of the City of Toronto,
in the County of York, one of ~~or~~ the grantors
named in the within (or annexed) transfer make oath and say:

This affidavit may be made by the purchaser or vendor or by any one acting for them under power of attorney or by an agent accredited in writing by the purchaser or vendor or by the solicitor of either of them.

1. I am one of the grantors named in the within (or annexed) transfer.
2. I have a personal knowledge of the facts stated in this affidavit.
3. The true amount of the monies in cash and the value of any property or security included in the consideration is as follows:

(a)	Monies paid in cash		$ 10,900.00
(b)	Property transferred in exchange; Equity value	$	$ nil
	Encumbrances	$	$ nil
(c)	Securities transferred to the value of		$ nil
(d)	Balances of existing encumbrances with interest owing at date of transfer		$ nil
(e)	Monies secured by mortgage under this transaction		$ nil
(f)	Liens, annuities and maintenance charges to which transfer is subject		$ nil
	Total consideration		$ 10,900.00

all blanks must be filled in.

4. If consideration is nominal, is the transfer for natural love and affection? N/A
5. If so, what is the relationship between Grantor and Grantee? N/A
6. Other remarks and explanations, if necessary N/A

Sworn before me at the City
of Toronto
in the County of York
this 7TH day of ~~October~~ SEPTEMBER, A.D. 1966.

H. Goshulak

A Commissioner, etc.

HELEN ELEANOR GOSHULAK, a Commissioner for taking Affidavits, County of York, for DUNCAN GOLDSMITH & CASWELL, Barristers.

My Commission expires on the 1st. Dec., 1967.

01163 WA

1

No. 89463 W.A.

I certify that the within Instrument is duly Entered, Registered and Microfilmed in the Registry Office for the Registry Division of Toronto at 4.01 *o'clock* P.M. *of the* 31 *day of* JAN A.D. 1967

REGISTRAR

7
D127
LL Vol. 86A

THIS INSTRUMENT
IS THE PROPERTY OF
THE REGISTRY OFFICE FOR THE
REGISTRY DIVISION OF TORONTO
TORONTO

Dated NOVEMBER 30th 1966

JOAQUIM BARBOSA et ux

3633

31.3

– TO –

The Corporation of the
City of Toronto

Deed of Land

re: Premises 7 Wolsely Street

6.3

4.01
JAN 31 1967

W.L. CALLOW, Q.C.,
City Solicitor
CITY HALL,
TORONTO 1.

060-456-035

County of York

I, JOSEPH ABRAMSKY
of the Borough North York (Name in full)
of the City of Toronto, in the County of York, Solicitor
(Occupation)
make oath and say:

TO WIT:

1. THAT I was personally present and did see the within Instrument and Duplicate thereof duly signed, sealed and executed by Joaquim Barbosa and Maria Barbosa - - -

This Indenture

made (in duplicate) the 30th day of November
in the year of our Lord, one thousand nine hundred and sixty-six.
In Pursuance of the Short Forms of Conveyances Act:

Between

JOAQUIM BARBOSA and MARIA BARBOSA, his wife, both of the City of Toronto, in the County of York, AS JOINT TENANTS AND NOT AS TENANTS IN COMMON,

hereinafter called the Grantors
of the First Part

– AND –

THE CORPORATION OF THE CITY OF TORONTO

hereinafter called the Grantee
of the Second Part

~~the wife of the said Grantor hereinafter called the Party of the Third Part~~

Witnesseth that in consideration of FIFTEEN THOUSAND FIVE HUNDRED - - - - - - - - - - - - - - - - ($15,500.00) - - - - - - - - - - - - - - - -

To have and to hold unto the said Grantee its successor and assigns, to and for its and their sole and only use for ever. **Subject Nevertheless** to the reservations, limitations, provisoes and conditions, expressed in the original grant thereof from the Crown.

For the Consideration aforesaid the said Grantor(s) hereby releases) remises) and forever discharge(s) the said Grantee, its successors and assigns from and of all manner of actions, causes of action, debts, claims and demands whatsoever which against the said Grantee ~~he, she~~, they, it) ever had, now ~~has~~ (have) or which ~~his, her~~ their, its) heirs, executors, administrators or assigns ~~successors and assigns~~) or any of them hereafter can, shall or may have for or by reason of the ~~expropriation~~ acquisition of the hereinbefore described lands by the said Grantee by ~~By-law Number xxxxxxxxxxxxxxxx passed the xxxxxxxxxxxxxxxxxx day of xxxxxxxxxxxxxxxxxxxx 19xx~~, and/or any work done or to be done on the said lands in connection with the said ~~expropriation~~ acquisition.

The said Grantors Covenant with the said Grantee That they have the right to convey the said lands to the said Grantee notwithstanding any act of the said Grantors.

And That the said Grantee shall have quiet possession of the said lands free from all encumbrances.

And the said Grantors Covenant with the said Grantee that they will execute such further assurances of the said lands as may be requisite.

And the said Grantors Covenant with the said Grantee that they have done no act to encumber the said lands.

And the said Grantors Release to the said Grantee All their claims upon the said land.

~~And the said party of the Third Part hereby bars her dower in the said lands.~~

And the said Grantors do grant, release and quit claim unto the said Grantee its successors and assigns forever all estate, right, title, interest, claim and demand whatsoever both at law and in equity or otherwise howsoever and whether in possession or expectancy of ~~him, her~~ them the said Grantors of, in, to or out of all the lands abutting the said lands hereinbefore described.

In Witness Whereof the said parties hereto have hereunto set their respective hands and seals.

Signed, Sealed and Delivered
IN THE PRESENCE OF

J. Abramsky

060-456-033

J Joaquim Barbosa
JOAQUIM BARBOSA

Maria Barbosa
MARIA BARBOSA

THE REGISTRY ACT | THE DOWER ACT

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

Affidavit as to Marriage Status

Strike out words and parts not applicable and initial.

WE, JOAQUIM BARBOSA and MARIA BARBOSA in the within instrument named make oath and say:

HUSBAND

THAT at the time of the execution and delivery by us of the within instrument we were (married), to each other, and of the full age of twenty-one years, or

~~THAT at the time of the execution and delivery by me of the within instrument I was legally married to the person joining therein as wife to her husband, and of the full age of twenty-one years.~~

WIFE

~~THAT at the time of the execution and delivery by me of the within instrument I was legally married to the person named as husband and of the full age of twenty-one years.~~

SEVERALLY

SWORN before me at the City of Toronto in the County of York this 28th day of Jan. A.D. 1961

Joaquim Barbosa
Maria Barbosa

J. Abramsky
A Commissioner, etc.

Affidavit, Land Transfer Tax Act

IN THE MATTER OF THE LAND TRANSFER TAX ACT

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I, HENRY PASTUSZAK
of the City of Toronto
in the County of York, a solicitor for the Grantee
named in the within (or annexed) transfer make oath and say:

This affidavit may be made by the purchaser or vendor or by any one acting for them under power of attorney or by an agent accredited in writing by the purchaser or vendor or by the solicitor of either of them

1. I am a solicitor for the Grantee named in the within (or annexed) transfer.
2. I have a personal knowledge of the facts stated in this affidavit.
3. The true amount of the monies in cash and the value of any property or security included in the consideration is as follows:

(a)	Monies paid in cash	$15,500.00
(b)	Property transferred in exchange to the equity value of	$ nil
(c)	Securities transferred to the value of	$ nil
(d)	Balances of existing encumbrances with interest owing at date of transfer	$ nil
(e)	Monies secured by mortgage under this transaction	$ nil
(f)	Liens, annuities and maintenance charges to which transfer is subject	$ nil
	Total consideration	$15,500.00

4. If consideration is nominal, is the transfer for natural love and affection ?
5. If so, what is the relationship between Grantor and Grantee ?
6. Other remarks and explanations, if necessary

SWORN before me at the City of Toronto in the County of York this 2nd day of December A.D. 1960

Henry Pastuszak

A Commissioner, etc.

County of York

TO WIT:

I, CARL VIPAVEC
Names in full

of the City of Toronto, in the County of York,
Occupation

make oath and say:

1. THAT I was personally present and did see the within Instrument and Duplicate thereof duly signed, sealed and executed by Joao Firmino Martins Francisco and Bela Goncalves Francisco - - - - - - two of - - - - - - - - - - the parties thereto;—

2. THAT the said Instrument and Duplicate were executed by the said parties at the City of Toronto:—

3. THAT I know the said parties :—

4. THAT I am a subscribing Witness to the said Instrument and Duplicate:—

Sworn before me at the City of Toronto, in the County of York, the 29th day of AUGUST A.D. 1967.

Henry Rackauskas
A Commissioner, Etc.

90829 W.A.

I certify that the within Instrument was duly Entered, Registered and Microfilmed in the Registry Office for the Registry Division of Toronto at 2:30 o'clock P.M. of the 30 day of AUG A.D. 1967

REGISTRAR

90829 W.A.

Dated AUGUST 16th 1967

JOAO FIRMINO MARTINS FRANCISCO et ux

- TO -

The Corporation of the City of Toronto

30.00

Deed of Land

Re: 22½ Augusta Avenue

Form 35

W.R. CALLOW, Q.C.,
City Solicitor
CITY HALL,
TORONTO 1.

AUG 30 1967

3/65 P.64

M. Queen St.

(and 2 others)

THIS INSTRUMENT IS THE PROPERTY OF THE REGISTRY OFFICE FOR THE REGISTRY DIVISION OF TORONTO.

This Indenture

made (in duplicate) the 16th day of August
in the year of our Lord, one thousand nine hundred and sixty-seven
In Pursuance of the Short Forms of Conveyances Act:

Between

JOAO FIRMINO MARTINS FRANCISCO and BELA GONCALVES FRANCISCO, his wife, both of the City of Toronto, in the County of York, AS JOINT TENANTS AND NOT AS TENANTS IN COMMON,

hereinafter called the Grantors
of the First Part

– AND –

THE CORPORATION OF THE CITY OF TORONTO

hereinafter called the Grantee
of the Second Part

~~the wife of the said Grantor~~
~~hereinafter called the Party of the Third Part~~

Witnesseth that in consideration of FIFTEEN THOUSAND - ($15,000.00) - - - - - - - - - - - - - - - - - - -

THENCE SOUTHERLY along the said westerly limit of Augusta Avenue 23 feet, 2½ inches, to the easterly production of the centre line of the easterly part of the main division wall between the dwelling standing in April 1962 upon the lands herein described and the dwelling immediately adjoining to the south thereof;

THENCE WESTERLY along the said production and the said centre line 22 feet, 1 inch, more or less, to its intersection with the centre line of division wall running northerly;

THENCE NORTHERLY along the said centre line 1 foot, 6 inches, more or less, to its intersection with the centre line of the westerly part of the said division wall;

THENCE WESTERLY along the said centre line and its westerly production 13 feet, more or less, to the westerly face of the westerly wall of the aforesaid dwelling standing on the lands herein described;

THENCE NORTHERLY along the said westerly face of wall 4 inches, more or less, to the line of a board fence running westerly;

THENCE WESTERLY along the said line of fence and its westerly production 23 feet, ½ inch, more or less, to the westerly limit of the said Lot 2;

THENCE NORTHERLY along the said westerly limit of Lot 2, 21 feet, 10½ inches, more or less, to the said southerly limit of Wolseley Street;

THENCE EASTERLY along the said southerly limit of Wolseley Street 58 feet, 1¼ inches, more or less, to the Point of Commencement.

TOGETHER WITH a right-of-way over, along and upon the following described lands:

COMMENCING AT a point in the line of an old board fence distant 22 feet measured southerly therealong from its intersection with the southerly limit of Wolseley Street, the said point of intersection being distant 48 feet, 1¼ inches, measured westerly along the said southerly limit from the westerly limit of Augusta Avenue as widened by Instrument No. 161433;

THENCE SOUTHERLY along the said line of fence 117 feet, 2¼ inches, more or less, to the line of a board fence running easterly;

THENCE EASTERLY along the line of said last mentioned fence, to and along the southerly face of the southerly wall of the dwelling known in April 1962 as No. 14 Augusta Avenue, in all a distance of 47 feet, 9½ inches, more or less, to the said westerly limit of Augusta Avenue;

THENCE SOUTHERLY along the said westerly limit of Augusta Avenue 9 feet, 5 inches, more or less, to a point distant 103 feet, 7 inches, measured northerly therealong from the northerly limit of Queen Street West;

THENCE WESTERLY in a straight line to and along the northerly face of an old frame shed to the westerly end thereof and continuing thence westerly in a straight line, in all a distance of 56 feet, 7 inches, more or less, to a point in the westerly limit of the said Lot 3 distant 148 feet, 8½ inches, measured southerly therealong from the said southerly limit of Wolseley Street;

THENCE NORTHERLY along the westerly limits of the said Lots 3 and 2, 126 feet, 10 inches, to a point distant 21 feet, 10½ inches, measured southerly therealong from the said southerly limit of Wolseley Street;

THENCE EASTERLY in a straight line 10 feet, ½ inch, more or less, to the Point of Commencement;

SUBJECT TO a right-of-way, over, along and upon the following described lands;

COMMENCING AT a point in the southerly limit of Wolseley Street distant 48 feet, 1¼ inches, measured westerly therealong from the westerly limit of Augusta Avenue as widened by Instrument No. 16143B;

THENCE SOUTHERLY to and along the line of an old board fence 22 feet;

THENCE WESTERLY in a straight line 10 feet, ½ inch, more or less, to a point in the westerly limit of the said Lot 2 distant 21 feet, 10½ inches, measured southerly therealong from the said southerly limit of Wolseley Street;

THENCE NORTHERLY along the said westerly limit of Lot 2, 21 feet, 10½ inches, to the said southerly limit of Wolseley Street;

THENCE EASTERLY along the said southerly limit of Wolseley Street 10 feet, more or less, to the Point of Commencement.

SUBJECT ALSO to the right to maintain in its present position that portion of the easterly part of the first storey division wall between the said dwelling standing on the lands herein described and the dwelling immediately adjoining to the south thereof, which said portion extends easterly from the herein before described centre line of division wall to the centre of the doorway between the said dwellings, and subject also to a right of way over, along and upon that part of the first storey of the said dwelling immediately to the south which lies between the said centre line and the said portion of division wall.

WHICH SAID parcel is shown on a Plan of Survey prepared by Harold Wheeler Associates, Ontario Land Surveyors, dated 12th April 1962.

To have and to hold unto the said Grantee its successor and assigns, to and for its and their sole and only use for ever. **Subject Nevertheless** to the reservations, limitations, provisoes and conditions, expressed in the original grant thereof from the Crown.

For the Consideration aforesaid the said Grantor(s) hereby release(s) remise(s) and forever discharge(s) the said Grantee, its successors and assigns from and of all manner of actions, causes of action, debts, claims and demands whatsoever which against the said Grantee ~~he/she~~ they, ~~it~~ ever had, now ~~has~~ (have) or which ~~his/her~~ their, ~~its~~ heirs, executors, administrators or assigns ~~(successors and assigns)~~ or any of them hereafter can, shall or may have for or by reason of the ~~expropriation~~ acquisition of the hereinbefore described lands by the said Grantee ~~by By-law Number ... passed the ... day of ... 19..~~, and/or any work done or to be done on the said lands in connection with the said ~~expropriation~~ acquisition.

The said Grantors Covenant with the said Grantee That they have the right to convey the said lands to the said Grantee notwithstanding any act of the said Grantors

And That the said Grantee shall have quiet possession of the said lands free from all encumbrances.

And the said Grantors Covenant with the said Grantee that they will execute such further assurances of the said lands as may be requisite.

And the said Grantors Covenant with the said Grantee that they have done no act to encumber the said lands.

And the said Grantors Release to the said Grantee All their claims upon the said land.

~~And the said party of the Third Part hereby bars her dower in the said lands~~

And the said Grantors doth grant, release and quit claim unto the said Grantee its successors and assigns forever all estate, right, title, interest, claim and demand whatsoever both at law and in equity or otherwise howsoever and whether in possession or expectancy of ~~him her~~ them the said Grantors of, in, to or out of all the lands abutting the said lands hereinbefore described.

In Witness Whereof the said parties hereto have hereunto set their respective hands and seals.

Signed, Sealed and Delivered
IN THE PRESENCE OF

JOAO FIRMINO MARTINS FRANCISCO

BELA GONCALVES FRANCISCO

60-456-033

THE REGISTRY ACT **THE DOWER ACT**

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

Affidavit as to Marriage Status

WE, JOAO FIRMINO MARTINS FRANCISCO and BELA GONCALVES FRANCISCO

Strike out words and parts not applicable and initial.

HUSBAND

WIFE

in the within instrument named make oath and say:

THAT at the time of the execution and delivery by us of the within instrument we were (married), to each other we were both and of the full age of twenty-one years, ~~or~~

~~THAT at the time of the execution and delivery by me of the within instrument I was legally married to the person described as my wife therein and of the full age of twenty-one years.~~

~~THAT at the time of the execution and delivery by me of the within instrument I was legally married to the person described as my husband and of the full age of twenty-one years.~~

SEVERALLY

SWORN before me at the City of Toronto in the County of York this 28th day of AUGUST A.D. 1967

João F. M. Francisco

Bela Gonçalves Francisco

A Commissioner, etc.

Affidavit, Land Transfer Tax Act

IN THE MATTER OF THE LAND TRANSFER TAX ACT

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I, HENRY PASTUSZAK
of the City of Toronto
in the County of York, a solicitor for the Grantee
named in the within (or annexed) transfer make oath and say:

This affidavit may be made by the purchaser or vendor or by any one acting for them under power of attorney or by an agent accredited in writing by the purchaser or vendor or by the solicitor of either of them

1. I am a solicitor for the Grantee named in the within (or annexed) transfer.

2. I have a personal knowledge of the facts stated in this affidavit.

3. The true amount of the monies in cash and the value of any property or security included in the consideration is as follows:

(a)	Monies paid in cash	$15,000.00
(b)	Property transferred in exchange to the equity value of	$ nil
(c)	Securities transferred to the value of	$ nil
(d)	Balances of existing encumbrances with interest owing at date of transfer	$ nil
(e)	Monies secured by mortgage under this transaction	$ nil
(f)	Liens, annuities and maintenance charges to which transfer is subject	$ nil
	Total consideration	$15,000.00

4. If consideration is nominal, is the transfer for natural love and affection ?

5. If so, what is the relationship between Grantor and Grantee ?

6. Other remarks and explanations, if necessary

SWORN before me at the City of Toronto in the County of York this 29th day of AUGUST A.D. 1967

Henry Pastuszak

A Commissioner, etc.

No. 97766 W.A.

I certify that the within Instrument is duly Entered, Registered and Microfilmed in the Registry Office for the Registry Division of Toronto at 11.58 o'clock A.M. of the 26 day of JAN A.D. 1971

Norman Rice

REGISTRAR

THIS SPACE TO BE RESERVED FOR REGISTRY OFFICE CERTIFICATES

6
D127
Vol 86 A LL

PROPERTY OF THE REGISTRY OFFICE

97766 W.A.

Dated February 14th 19 67

18.00 9.00

HELEN BAWOLINSKI ET AL

TO 2467

THE CORPORATION OF THE CITY OF TORONTO

Address:

Deed of Land

SITUATE

Lot 6, Plan 127, Toronto

Dye & Durham Limited — Toronto, Canada
Printers to the Legal Profession

7.5

1158

JAN 26 1971

RETURN TO City Solicitor

ROMANKO AND LIBER
BARRISTERS & SOLICITORS
SUITE 302, 372 BAY STREET
TORONTO, ONTARIO

A Commissioner for taking Affidavits, etc.

I, JULIAN ROMANKO of the CITY of TORONTO in the COUNTY of YORK SOLICITOR make oath and say:

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by JOHN LEWIS, BERNICE DIANNA LEWIS AND HELEN BAWOLINSKI THREE of the parties thereto.

2. THAT the said Instrument and duplicate were executed by the said parties at the City of Toronto.

3. THAT I know the said parties.

4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the City of Toronto in the County of York this 9th day of May A.D. 19 67

A Commissioner for taking Affidavits, etc.

I, ... of the ..... in the County of ..... make oath and say:

1. THAT I was personally present and did see the within or annexed Instrument and a duplicate thereof duly signed, sealed and executed by ..... of the parties thereto, at the ..... of .....

2. THAT the said Instrument and duplicate were executed by the said part at the ..... of .....

3. THAT I know the said part.

4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the ..... in the County of ..... this ..... day of ..... A.D. 19 .....

A Commissioner for taking Affidavits, etc.

ET 90 REV. 6-63

[redacted]

MINISTÈRE DU REVENU NATIONAL
DIVISION DE L'IMPÔT

CANADA

ESTATE TAX ACT

LOI DE L'IMPÔT SUR LES BIENS TRANSMIS PAR DÉCÈS

DISTRICT TAXATION OFFICE / BUREAU DE DISTRICT D'IMPÔT: Toronto

DATE: November 8, 1966

B 640992

CONSENT TO THE TRANSFER OF PROPERTY

PERMIS DE DISPOSER DE BIENS

Estate of / Succession de	Date of Death / Date du décès
William Lewczuk	Nov. 27, 1964

Consent is hereby given to the transfer, delivery, [redacted]

Il est par les présentes permis de céder, livrer ou remettre les biens indiqués ci-après:

Real Estate - Premises [redacted] Roselawn Street Toronto, being lot 6, Plan D-127, Toronto as described in Deed No. 13413 W.A./77

Any lien in respect of the aforesaid property created under the provisions of Section 43 of the Estate Tax Act is hereby discharged.

Est par les présentes libéré tout privilège sur les biens susdits créé en vertu des dispositions de l'article 43 de la Loi de l'impôt sur les biens transmis par décès.

The description of the property covered by this Consent is followed by three typed oblique strokes. Any addition, alteration or erasure renders this Consent null and void.

Trois traits obliques faits à la machine à écrire suivent la désignation des biens visés par le présent permis. Toute addition, modification ou rature rend le présent permis nul et de nul effet.

/sf

DEPUTY MINISTER OF NATIONAL REVENUE FOR TAXATION
SOUS-MINISTRE DU REVENU NATIONAL POUR L'IMPÔT

ORIGINAL

THIS INDENTURE made (in duplicate) this 14th day February, one thousand nine hundred and sixty-seven.

IN PURSUANCE OF THE SHORT FORMS OF CONVEYANCES ACT:

BETWEEN:

HELEN BAWOLINSKI, Married Woman, JOHN LEWIS, Clerk, RUDY RACK, Chartered Accountant, all of the Municipality of Metropolitan Toronto, in the County of York, and THOMAS RAYMOND, Sales Supervisor, of the Town of Brampton, in the County of Peel, the next-of-kin of Antonina Lewczuk, late of the City of Toronto in the County of York, Housewife, deceased,

(hereinafter called the Grantors)

OF THE FIRST PART,

AND

THE CORPORATION OF THE CITY OF TORONTO,

(hereinafter called the Grantee)

OF THE SECOND PART,

AND

BERNICE DIANNA LEWIS, wife of the said JOHN LEWIS and IRENE RAYMOND, wife of the said Thomas Raymond,

(hereinafter called the Parties)

OF THE THIRD PART.

WHEREAS title to the lands and premises hereinafter more particularly described stands registered in the name of Antonina Lewczuk;

AND WHEREAS the said Antonina Lewczuk died intestate on or about the 26th day of November, 1930, leaving her surviving as her heirs-at-law and next-of-kin the Parties hereto of the first part and her husband William Lewczuk;

AND WHEREAS the said William Lewczuk died at the City of Toronto, in the County of York on or about the 27th day of November, 1964, testate and a widower, and by his Last Will and Testament he did Devise and Bequeath the whole of his Estate to his daughter, Helen Bawolinski and his son John Lewis in equal share;

AND WHEREAS the original Last Will and Testament of the said William Lewczuk was registered at the Registry Office for the Registry Division of Toronto on the 21 day of January, A. D. 1971, as Instrument No. 165920 G. R.;

AND WHEREAS Certificate for Registration No. 358856 issued by the Treasurer of Ontario on the 4th day of November, 1966, and having reference to the Estate of Antonina Lewczuk was registered at the Registry Office for the Registry Division of Toronto on the 18th day of April, 1967, as Instrument No. 146048 G. R.;

AND WHEREAS Certificate for Registration No. [illegible] issued by the Treasurer of Ontario on the 4th day of November, 1966, and having reference to the Estate of William Lewczuk was registered at the Registry Office for the Registry Division of Toronto on the 18th day of April, 1967, as Instrument No. 146049 G. R.;

AND WHEREAS Consent to the Transfer of Property No. B 640992 issued under the Estate Tax Act on the 8th day of November, 1966, and having reference to the Estate of William Lewczuk is hereto annexed.

W I T N E S S E T H that in consideration of other good and valuable consideration and the sum of ----------

TWO and to boh ($2.00) ----------Dollars

of lawful money of Canada now paid by the said Grantee to the said Grantors (the receipt whereof is hereby by them acknowledged), the said Grantors Do Grant unto the said Grantee [illegible] remise and forever discharge the said Grantee its successors and [illegible] from and of all manner of actions, causes of action, in fee simple.

D. 19 70.

ALL AND SINGULAR that certain parcel or tract of land and premises situate lying and being in the City of Toronto, in the County of York, and being lot number six fronting on Monk Street now Wolseley Street, in the said City of Toronto, as shewn on plan of lots registered in the registry office for the City of Toronto as "D" number 127.

To have and to hold unto the said Grantee its successors ~~heirs~~ and assigns, to and for their sole and only use for ever. **Subject Nevertheless** to the reservations, limitations, provisoes and conditions, expressed in the original grant thereof from the Crown.

FOR THE CONSIDERATION aforesaid the said Cantors hereby release remise and forever discharge the said Grantee its successors and assigns from and of all manner of actions, causes of action, debts, claims and demands whatsoever which against the said Grantee they ever had, now have or which their heirs, executors, administrators or assigns or any of them hereafter can, shall or may have for or by reason of the acquisition of the hereinbefore described lands by the said Grantee and/or any work done or to be done on the said lands in connection with the said acquisition.

The said Grantor s Covenant with the said Grantee That the y ha vethe right to convey the said lands to the said Grantee notwithstanding any act of the said Grantor s.

And that the said Grantee shall have quiet possession of the said lands, free from all encumbrances.

And the said Grantors Covenant with the said Grantee that the y will execute such further assurances of the said lands as may be requisite.

And the said Grantors Covenant with the said Grantee that the y have done no act to encumber the said lands.

And the said Grantors Release to the said Grantee All their claims upon the said lands.

And the said Bernice Diana Lewis, wife of John Lewis, Dorothy Rack wife of Rudy Rack and Irene Raymond wife of Thomas Raymond, Grantors hereby bars her dower in the said lands.

AND the said Grantors do grant, release and quit claim unto the said Grantee Its successors and assigns forever all estate, right title, interest, claim and demand whatsoever both at law and in equity or otherwise howsoever and whether in possession or expectancy of them the said grantors of, in, to or out of all the lands abutting the said lands hereinbefore described.

In Witness Whereof the said parties hereto have hereunto set their hands and seals.

Signed, Sealed and Delivered
IN THE PRESENCE OF

Romanko

P Romanko

W Baworowski

John Lewis

Bernice D Lewis

Thomas Raymond

Constance Irene Raymond.

Rudy Rack

Dye & Durham Limited — Toronto, Canada
Printers to the Legal Profession
Form No. 71

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I/WE JOHN LEWIS
of the CITY of TORONTO
in the County of YORK

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. I was of the full age of twenty-one years;

If Attorney see footnote.

2. And that BERNICE DIANNA LEWIS, MY WIFE,

who also executed the within instrument is of the full age of twenty-one years

3. I was legally married to the person named therein as my wife/h[illegible]

[illegible]

SWORN before me at the City
of Toronto
in the County of York
this 8th day of May
A.D. 19 67

John Lewis

A Commissioner for taking Affidavits, etc.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and he/she was of the full age of twenty-one years."

[redacted]

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I/WE RUDY RACK
of the CITY of TORONTO
in the County of YORK

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. I was of the full age of twenty-one years; and legally married to Dorothy Rack who is of the full age of Twenty-one years.

If Attorney see footnote.

[illegible]

2. [illegible]

[illegible]

SWORN before me at the City
of Toronto
in the County of York
this 28th day of JULY
A.D. 19 67

Rudy Rack

A Commissioner for taking Affidavits, etc.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and he/she was of the full age of twenty-one years."

[redacted]

Dye & Durham Limited — Toronto, Canada
Printers to the Legal Profession
Form No. 71

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I/WE THOMAS RAYMOND
of the TOWN of BRAMPTON
in the County of PEEL

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. I was of the full age of twenty-one years;

If Attorney see footnote.

2. And that IRENE RAYMOND, MY WIFE,

who also executed the within instrument is of the full age of twenty-one years

3. I was legally married to the person named therein as my wife/XXXXXX

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

SWORN before me at the City
of Toronto
in the County of York
this 22nd day of MAY
A.D. 19 67

Thomas Raymond

P6 -

P Semenko

A Commissioner for taking Affidavits, etc.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and he/she was of the full age of twenty-one years."

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I/WE HELEN BAWOLINSKI
of the City of Toronto
in the County of York

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. I was of the full age of twenty-one years;

If Attorney see footnote.

XXXXXXXXXXXXXXXXXXXX

Affidavit of Execution of Documents

Dye & Durham Limited — Toronto, Canada
Printers to the Legal Profession
Form No. 347

COUNTY OF YORK
To Wit:

I, PAUL DEMIANENKO,
of the City of Toronto,
in the County of York,
make oath and say

1. THAT I was personally present and did see the within or annexed Instrument and a Duplicate thereof duly signed, sealed and executed by RUDY RACK,

one of the parties thereto

2. That the said Instrument and Duplicate were executed by the said part y.
at the City of Toronto.

3. That I know the said part y

4. That I am a subscribing witness to the said Instrument and Duplicate

SWORN before me at the City
of Toronto,
in the County
of York,
this 8 TH.
day of December 19 70.

P Demianenko

A Commissioner for taking Affidavits, etc.

[redacted]

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I/We RUDY RACK,
of the City of Toronto,
in the County of York,

Strike out words and parts not applicable and initial

in the within instrument named, make oath and say that [redacted]

1. I am of the full age of twenty-one years;

If Attorney see footnote.

2. [redacted]

[redacted]

3. [redacted]

4. I am [redacted]/divorced/[redacted] and have not re-married.

SWORN before me at the City
of Toronto,
in the County of York,
this 8 TH. day of December,
A.D. 19 70.

Rudy Rack

P Demianenko.

A Commissioner for taking Affidavits, etc.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and he/she was of the full age of twenty-one years."

some and Gilbert, Limited, Toronto
Form 98

AFFIDAVIT OF EXECUTION OF DOCUMENTS

CANADA
PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I, PAUL DEMIANENKO of the CITY of TORONTO in the COUNTY of YORK SOLICITOR make oath and say:

1. THAT I was personally present and did see the within Instrument and a duplicate duly signed, sealed and executed by RUDY RACK ~~AND DOROTHY RACK~~

~~TWO~~ ONE OF the parties thereto.

2. THAT the said Instrument and duplicate were executed by the said parties
at the City of Toronto
in the County of York

3. THAT I know the said parties.

4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the City
of Toronto
in the County of York
this 27th.
day of MARCH 1968

P. Demianenko

A Commissioner for taking Affidavits, &c.

CANADA
PROVINCE OF ONTARIO
COUNTY OF YORK
To Wit:

I, [redacted] of the City of Toronto in the County of York SOLICITOR make oath and say:

1. THAT I was personally present and did see the within Instrument and a duplicate duly signed, sealed and executed by THOMAS RAYMOND AND IRENE RAYMOND

TWO OF the parties thereto.

2. THAT the said Instrument and duplicate were executed by the said parties
at the City of Toronto
in the County of York

3. THAT I know the said parties.

4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the City
of Toronto
in the County of York
this 27th
day of MARCH 1968

P. Demianenko

A Commissioner for taking Affidavits, &c.

AFFIDAVIT AS TO LEGAL AGE AND MARITAL STATUS

PROVINCE OF ONTARIO
COUNTY OF
To Wit:

I/WE.....
of the.....of.....
in the County of.....

Strike out words and parts not applicable and initial.

in the within instrument named, make oath and say that at the time of the execution of the within instrument,

1. I was of the full age of twenty-one years;

If Attorney see footnote.

2. And that

who also executed the within instrument of the full age of twenty-one years

3. I was legally married to the person named therein as my wife/husband;

4. I was unmarried/divorced/widower.

SWORN before me at the.....
of .....
in the.....
this.....day of.....
A.D. 19.....

A Commissioner for taking Affidavits, etc.

NOTE: If Attorney, substitute in space provided "I am Attorney for.....(State name)....., one of the parties named therein and he/she was of the full age of twenty-one years."

Affidavit, Land Transfer Tax Act

IN THE MATTER OF THE LAND TRANSFER TAX ACT

D.C.L.

PROVINCE OF ONTARIO
COUNTY OF
DISTRICT
To Wit:

I, ~~[illegible]~~ HENRY PASTUSZAK
of the CITY OF TORONTO, IN THE MUNICIPALITY OF METROPOLITAN TORONTO
in the County of YORK, SOLICITOR for the ~~GRANTORS~~ GRANTEE NH
named in the within (or annexed) transfer make oath and say:

D.C.L.

1. I am SOLICITOR FOR THE ~~GRANTORS~~ GRANTEE named in the within (or annexed) transfer.
2. I have a personal knowledge of the facts stated in this affidavit.
3. The true amount of the monies in cash and the value of any property or security included in the consideration is as follows:

(a) Monies paid in cash		$ 9000.00
(b) Property transferred in exchange; Equity value	$	$ NIL
Encumbrances	$	$ NIL
(c) Securities transferred to the value of		$ NIL
(d) Balances of existing encumbrances with interest owing at date of transfer		$ NIL
(e) Monies secured by mortgage under this transaction		$ NIL
(f) Liens, annuities and maintenance charges to which transfer is subject		$ NIL
Total consideration		$ 9000.00

all blanks must be filled in.

4. If consideration is nominal, is the transfer for natural love and affection?.....
5. If so, what is the relationship between Grantor and Grantee?.....
6. Other remarks and explanations, if necessary.....

This be per... dor a... acting under... attor... agai... in ... purs... day ... effe... then...

Sworn before me at the CITY
of TORONTO
in the YORK IN THE MUNICIPALITY
OF METROPOLITAN TORONTO
this 20th
day of January A.D. 19 84

D.C. Lyons

A Commissioner, etc.

Henry Pastuszak

AMENDING NOTE

APRIL 7, 1967.

THE REFERENCE BEARING NORTH 74 DEGREES 18 MINUTES AND 15 SECONDS EAST AS SHOWN ON A PLAN OF EXPROPRIATION AND REGISTERED UNDER INSTRUMENT NO. 88833 W.A. INDICATED ON THE NORTH LIMIT OF QUEEN STREET WEST AND IN THE BEARING REFERENCE NOTE IS IN ERROR AND SHOULD READ NORTH 74 DEGREES 32 MINUTES AND 55 SECONDS EAST.

Wm J. Salter

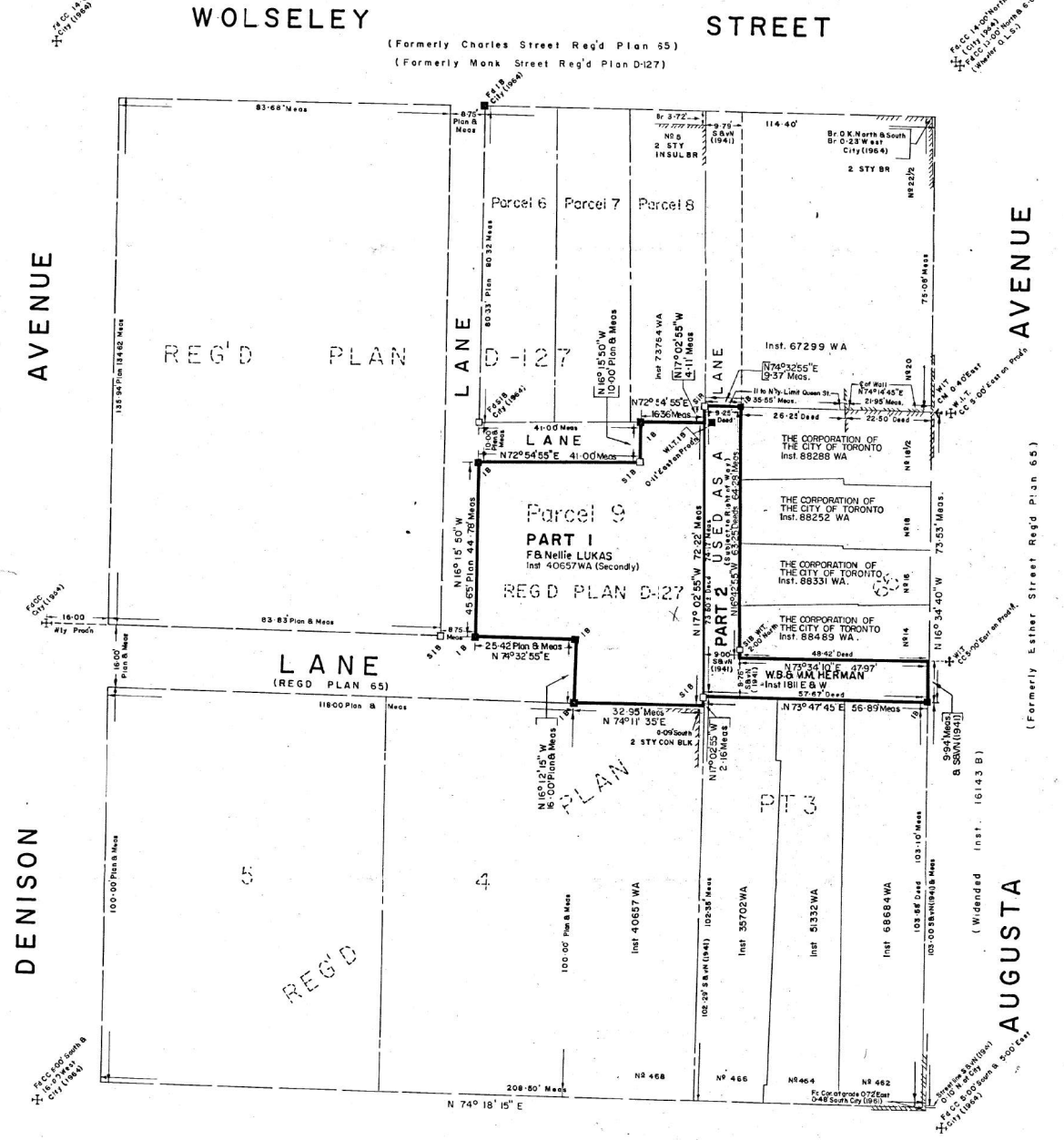
W. J. SALTER O.L.S.

A. Douglas Ford

A. DOUGLAS FORD O.L.S.
CITY SURVEYOR

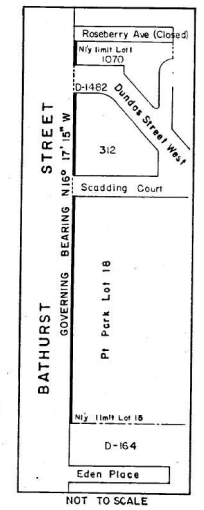
E. Lynn

E. LYNN REGISTRAR



SCHEDULE		
THE PARTS ENUMERATED HEREUNDER REFER TO LANDS IN WHICH ALL RIGHT, TITLE AND INTEREST ARE EXPROPRIATED BY THE CORPORATION OF THE CITY OF TORONTO FOR REDEVELOPMINT PURPOSES		
PART	LOT	REG'D PLAN
1	PARCEL 9	D-127
2	S ON THE N'S OF QUEEN ST. W	65

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE N 74° 18' 15" E OF QUEEN STREET WEST, DERIVED FROM THE N 16° 17' 15" W OF THE EAST LIMIT OF BATHURST STREET ACCORDING TO REGISTERED PLAN D-1482



NOT TO SCALE

88833 W.A.

CITY SURVEYORS DEPARTMENT
CITY OF TORONTO

EXPROPRIATION PLAN
OF
PART OF LOT 3 ON THE NORTH SIDE OF QUEEN STREET WEST, REGISTERED PLAN 65
AND
PARCEL 9, REGISTERED PLAN D-127
CITY OF TORONTO

THE PORTIONS SHOWN HEREON AS PARTS 1 AND 2 ARE REQUIRED FOR REDEVELOPMENT PURPOSES BY THE CORPORATION OF THE CITY OF TORONTO IN ACCORDANCE WITH R.S.O. 1960 C-249, S-333 THIS PLAN IS PREPARED IN ACCORDANCE WITH S-4 OF THE EXPROPRIATION PROCEDURES ACT 1962-3, C-43

SCALE 1 INCH = 20 FEET

W. SALTER O.L.S. – 1966

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE REGISTRY ACT AND THE REGULATIONS MADE THEREUNDER
2. THE SURVEY WAS COMPLETED ON THE 21st DAY OF JULY 1966.

Sept. 9, 1966 — W. J. Salter
W. SALTER
ONTARIO LAND SURVEYOR

REGISTRY OFFICE CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN REGISTERED IN THE REGISTRY OFFICE FOR THE REGISTRY DIVISION OF TORONTO
THIS 26 DAY OF OCTOBER 1966, AT 954 O'CLOCK A.M
AS NUMBER 88833 WA

E. LYNN REGISTRAR

EXPROPRIATING AUTHORITY

THE COUNCIL OF THE CORPORATION OF THE CITY OF TORONTO AT ITS MEETING HELD ON OCTOBER 3rd 1966 EXPROPRIATED ALL RIGHT, TITLE AND INTEREST IN THE LANDS HEREON DESIGNATED AS PARTS 1 AND 2 FOR REDEVELOPMENT PURPOSES BY BY-LAW № 22987 THIRDLY AND AUTHORIZED THE EXECUTION AND REGISTRATION OF THIS PLAN OF SURVEY BY BY-LAW № 22988

PHILIP G. GIVENS Q.C. MAYOR

W.M. CAMPBELL CITY TREASURER

C.E. NORRIS CITY CLERK

NOTE:
DEED NUMBERS AND REGISTERED OWNERS SHOWN HEREON, ARE IN ACCORDANCE WITH REGISTERED INSTRUMENTS ON FILE IN THE REGISTRY OFFICE FOR TORONTO AS OF SEPT 15 1966

STANDARD IRON BAR ——— SIB — IRON BAR ——— IB
CUT CROSS ——— CC — WITNESS MONUMENT ——— WIT
CUT MARK ——— CM — CITY OF TORONTO ——— CITY
SPEIGHT, VAN NOSTRAND, WARD AND ANDERSON O.L.S. ——— SBVN

Drawn by T.C.V. Survey Approved by [illegible]
Traced by B.D.J. Checked by [illegible] Approved by [illegible]
A. DOUGLAS FORD, CITY SURVEYOR Sept 23/1966

FILING REFERENCES

FIELD NOTES	SEARCH	FILE	
65-53 FILE VI	12E-3 (4a)	B5 — RPI	PLAN SYB 51

SYB 51

88833 WA

43610

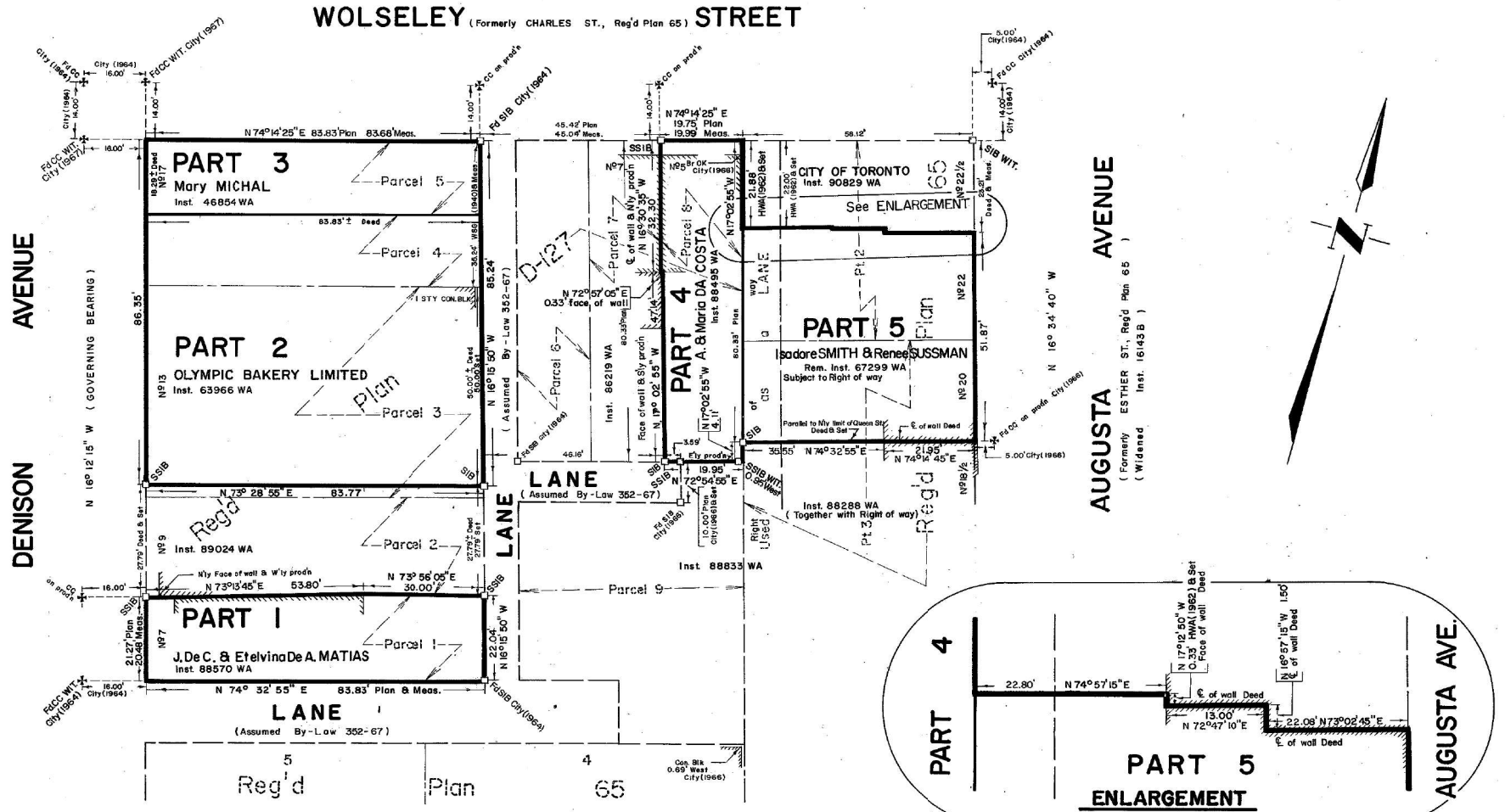
43610

600
50 EXTRA LOT
650

954

OCT 26 1988

9330 WA.



SCHEDULE			
THE PARTS ENUMERATED HEREUNDER REFER TO LANDS IN WHICH ALL RIGHT, TITLE AND INTEREST ARE EXPROPRIATED BY THE CORPORATION OF THE CITY OF TORONTO FOR REDEVELOPMENT PURPOSES			
PART	PARCEL	LOT	REGD PLAN
1	1		D-127
2	3 AND 4		D-127
3	5		D-127
4	8		D-127
5		3 on South side of QUEEN STREET W. & pt. of unlettered lot, rear of lot 3, North side of QUEEN ST.W. (Described as lot 2 in deed).	65

CITY SURVEYORS DEPARTMENT
CITY OF TORONTO

EXPROPRIATION PLAN

OF

PARCELS 1,4,5 AND 8 AND PT. OF PARCEL 3 REGISTERED PLAN D-127, PART OF UNLETTERED LOT, REAR OF LOT 3, NORTH SIDE OF QUEEN STREET WEST (DESCRIBED AS LOT 2 IN DEED) AND PART OF LOT 3 ON NORTH SIDE OF QUEEN STREET WEST REGISTERED PLAN 65

CITY OF TORONTO

EXPROPRIATED IN ACCORDANCE WITH THE MUNICIPAL ACT R.S.O., 1960., C 249, S 333, AND THE EXPROPRIATIAN PROCEDURES ACT 1962-63, C 43, S 4.

SCALE : 1 INCH = 20 FEET

Wm. J. SALTER O.L.S. - 1967

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT:
1. AS TO THE PORTION OF THIS PLAN BASED ON ACTUAL SURVEY, THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT AND THE REGISTRY ACT AND THE REGULATIONS MADE THEREUNDER, AND THE SURVEY WAS COMPLETED ON THE 31st. DAY OF JULY, 1967
2. THIS PLAN WAS PARTIALLY COMPILED FROM, AND IS A GRAPHIC ILLUSTRATION OF INFORMATION OBTAINED FROM THE SOURCES INDICATED HEREON

OCTOBER 10, 1967

Wm. J. Salter
Wm. J. SALTER
ONTARIO LAND SURVEYOR

REGISTRY OFFICE CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN REGISTERED IN THE REGISTRY OFFICE FOR THE REGISTRY DIVISION OF TORONTO
THIS 13TH DAY OF NOVEMBER 1967, AT 10.00 O'CLOCK A.M.
AS NUMBER 9330 WA.

E. LYNN REGISTRAR

EXPROPRIATING AUTHORITY

THE COUNCIL OF THE CORPORATION OF THE CITY OF TORONTO AT ITS MEETING HELD ON NOVEMBER 8, 1967 EXPROPRIATED ALL RIGHT, TITLE AND INTEREST IN THE LANDS HEREON DESIGNATED AS PARTS 1, 2, 3, 4 AND 5 FOR REDEVELOPMENT PURPOSES BY BY-LAW 422-67 AND AUTHORIZED THE EXECUTION AND REGISTRATION OF THIS PLAN OF SURVEY BY BY-LAW 423-67

William Dennison
WILLIAN DENNISON MAYOR

W.A.WILFORD DEPUTY CITY TREASURER

C. E. NORRIS CITY CLERK

NOTES :

DEED NUMBERS AND OWNERS ARE IN ACCORDANCE WITH REGISTERED INSTRUMENTS ON FILE IN THE REGISTRY OFFICE ON AUGUST 10, 1967

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE N16°12'15"W OF DENISON AVENUE, DERIVED FROM THE N16°17'15"W OF THE EAST LIMIT OF BATHURST ST. ACCORDING TO REGISTERED PLAN D-1482

STANDARD IRON BAR	SIB	SHORT STANDARD IRON BAR	SSIB
CUT CROSS	CC	WITNESS MONUMENT	WIT.
CITY OF TORONTO	CITY	GIBSON W.S. & SON O.L.S.	WSG
HAROLD WHEELER ASSOCIATES O.L.S.			HWA

Drawn by B.D.D. Survey Approved by [illegible]
Traced by L.S. Checked by [illegible] Approved by [illegible] A. Douglas Ford O.L.S.
A. DOUGLAS FORD, CITY SURVEYOR, OCT. 10, 1967

FILING REFERENCES

FIELD NOTES	SEARCH	FILE	
65-53 File VI	12E-134 (4d)	B5-RP1	PLAN SY C197

SY C197

Plan 12-10-67

Appendix J: Summary of Phase One and Two Environmental Assessments

APPENDIX J: SUMMARY OF PHASE ONE AND TWO ENVIRONMENTAL SITE ASSESSMENTS

1 Summary of Phase One Environmental Site Assessments

EXP Services Inc. (EXP) reviewed all available Phase One Environmental Site Assessment (ESA) reports that were completed for the Risk Assessment (RA) property.

The following Phase One ESAs were available for review:

- EXP (2022a). "*15 Denison Avenue, Toronto, Ontario: Phase One Environmental Site Assessment*" completed by EXP for Build Toronto Inc, dated April 27, 2022.

A copy of this report is included on the ZIP file attached in Appendix Q. All figures referenced can be found in the Phase Two Conceptual Site Model (CSM) in Appendix B.

A Phase One ESA Update was used to determine potentially contaminating activity (PCA) and areas of potential environmental concerns (APECs) on the Site. Specific reference to those APECs identified for the Site are provided in the subsequent sections below.

The Phase One Environmental Site Assessment (ESA) was conducted for a parcel of land with the municipal address as 15 Denison Street, Toronto, Ontario (hereinafter referred to as the "Site" or "RA Property"). The Site is located on the east side of Denison Avenue, west side of Augusta Avenue, and south side of Wolseley Street, approximately 45 metres north of Queen Street West. The Site has an area of approximately 0.24 hectares (0.59 acres) and consisted of a parking lot.

Based on a review of fire insurance plans, municipal records, historical aerial photographs, chain of title information, and other records, the Site was first developed for residential use prior to 1875, and a commercial use bakery was opened at 13 Denison Avenue (central-western portion of the Site) in the 1920s. Circa 1970, the structures on Site were demolished and the Site was redeveloped into the current parking lot.

Based on the Phase One ESA (EXP, 2022a), there were two-hundred fifty-one (251) PCAs identified to within the Phase One ESA Study Area. Refer to the Phase Two CSM in Appendix B to review which PCAs were identified to contribute to an APEC, and which were identified as having a *de-minimis* impact on the Site.

Based on the evaluation of the PCAs located within the Phase One Study Area, the following APECs were identified:

Table J-1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)1	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
APEC 1: Potential presence of fill material brought to site for construction of parking lot and infilling of former building cavities (PCA identifier 1)	Entire Site	PCA#30 - Importation of Fill Material of Unknown Quality	On-Site	PHCs, PAHs, metals, As, Sb, Se, HWS-B, CN-, Hg, Cr(VI), Soil pH	Soil
APEC 2: Potential use of de-icing salts in the parking lot (PCA identifier 2)	Entire Site	PCA#Other – de-icing salts	On-Site	EC, SAR, Na+, Cl-	Soil and Groundwater
APEC 3: Off-site PCAs to the south – historical dry cleaning, light manufacturing, metals work, coal storage and fuel tank (PCA identifiers 3, 4, 5, 6, 7, 8)	Southern portion of Site	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used) PCA#Other - historical manufacturing PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used) PCA#33 – Metal Treatment, Coating, Plating and Finishing PCA#Other – Coal Storage	Off-Site	PAHs, metals, As, Sb, Se, CN-, Hg, Cr(VI), PHCs, BTEX, VOCs	Groundwater

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)1	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
		PCA#28 Gasoline and Associated Products in Fixed Tanks			
APEC 4: Off-site PCAs to the southeast – historic chemists, dry cleaning and dye works (PCA identifiers, 9, 10, 11)	Southeastern portion of site	PCA#8 – Chemical Manufacturing, Processing and Bulk Storage PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used) PCA#17 – Dye Manufacturing, Processing and Bulk Storage	Off-site	PHCs, BTEX, VOCs, PAHs	Groundwater
APEC 5: Historic fuel oil tank to the west (PCA identifier 12)	Northwestern portion of site	PCA#28 Gasoline and Associated Products in Fixed Tanks	Off-site	PHCs, BTEX, PAHs, Metals, As, Sb, Se, CN-, Hg, Cr(VI)	Groundwater
APEC 6: Historic repair garage to the north (PCA identifier 13)	Northeastern portion of site	PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems	Off-site	PHCs, BTEX, VOCs, PAHs, Metals, As, Sb, Se, CN-, Hg, Cr(VI)	Groundwater

(1) Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D (O.Reg.153/04, as amended) that is occurring or has occurred in a phase one Study area.
As = Arsenic
BTEX = benzene, toluene, ethylbenzene and xylenes
CN- = free cyanide
Cr(VI) = hexavalent chromium
Hg = mercury
HWS-B = hot water soluble boron
PAHs = polycyclic aromatic hydrocarbons
PHCs = petroleum hydrocarbons
Sb = antimony
Se = selenium
VOCs = volatile organic compounds

2 Summary of Phase Two Environmental Site Assessments

EXP reviewed all available Phase Two ESAs and other subsurface investigation reports that were completed for the RA property.

The following Phase Two ESA or other subsurface investigation reports relevant to the RA were available for review:

- Terrapex (2020). "Summary of Environmental Investigation" prepared by Terrapex Environmental Ltd. for City of Toronto, dated April 30, 2020.
- EXP (2022c). "15 Denison Avenue, Toronto, Ontario: Phase Two Environmental Site Assessment" completed by EXP for Build Toronto, dated August 31, 2022.
- EXP (2025a, *in-progress)*. "15 Denison Avenue, Toronto, Ontario: Phase Two Environmental Site Assessment Update" completed by EXP for Build Toronto, *in-progress*.

A copy of each completed report, including the laboratory Certificates of Analysis (CoAs), are included on the USB attached in Appendix Q. The data tables are provided in Appendix C, the borehole logs and CoAs are provided in Appendix Q, and the CSM and figures associated with EXP's current Phase Two ESA (2025a; *In-Progress*) is provided in Appendix B.

Appropriate Standards Selection

As part of the RA process, EXP determined the appropriate soil and groundwater Standards for the screening of the contaminants of concern (COCs) on the RA property. The Standards were determined per O. Reg. 153/04. Parameters that did not meet the appropriate Standards in soil and/or ground water were considered COCs and will be further evaluated in the RA.

As a part of the soil investigation conducted by Terrapex in 2020, a pH value for surface soil was reported as 9.11 at BH106-2A, collected at a depth of 0.8-1.1 m bgs, which is outside the range for the application of the Table 3 SCS. In addition, as a part of the Phase Two ESA conducted by EXP (2022c), pH values for surface soil were reported at 12.1 and 11.3 at BH2-SS1 and BH2-SS2 respectively, at depths ranging from 0.76 to 1.37 m bgs, and 10.0 at BH5 SS1 at a depth of 0.17-0.75 m bgs, which are also outside the range for the application of the Table 3 SCS.

From March 25th to March 27th, 2024, EXP returned to the Site and advanced nine (9) additional shallow boreholes in proximity to BH106, BH2, and BH5 (i.e., within <2 m radius). Three (3) soil samples were collected from the surrounding shallow boreholes for each sample location, at the same depths where out-of-range pH values were found. The collected samples were submitted for pH analysis. Following the MECP (2016) guidance and as per Section 48.(2) of O.Reg. 153/04, the three (3) pH results for each sampling location were logarithmically averaged and yielded a value of 8.90 at BH2-SS1, 8.19 at BH2-SS2, 8.33 at BH5 SS1, and 8.43 at BH106-2A which are within the acceptable range for the application of Table 3 SCS. As such, Section 41 was not applied to the Site, and the Site was not classified as environmentally sensitive.

Section 43.1 of O. Reg. 153/04 defines restrictions in the application of Site Condition Standards (Standards for a shallow soil property or sites within 30 metres of a water body). More than 2/3 of the Site has an overburden thickness greater than 2 m and the Site is not located within 20 m of a water body. Therefore, Section 43.1 does not apply to the Site.

The Site is serviced by the City of Toronto water distribution system; and, to the best of EXP's knowledge, all properties within 250 m of the Site are serviced by the municipal water supply (i.e. there are no potable water supply wells located within the Phase One Study Area). A letter notifying of EXP's intent to apply non-potable standards at the Site was sent to the City of Toronto on April 18, 2024. A response was received from the City on April 23, 2024,

indicating no objection. EXP's notification and the City's response are provided in Appendix O.

Based on the information in the EXP Phase Two ESA Update borehole logs (2025a; *In-Progress*), the predominant soil type on the Site is considered to be medium / fine-textured soil. As such, standards for medium/fine soil at the property are applicable.

Based on the information above, MECP (2011a) Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for Residential/Parkland/Institutional Property Use and medium-fine textured soil (herein referred to as Table 3 SCS), as listed in the MECP technical document *Soil, groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* referenced by O. Reg. 153/04 were applied at the site.

The following section provides a brief summary of the main findings of past Phase Two and related reports relevant to this RA.

Phase Two Environmental Site Assessments

Terrapex (2020). "Summary of Environmental Investigation" prepared by Terrapex Environmental Ltd. for City of Toronto, dated April 30, 2020.

- Eight (8) boreholes (BH101 to BH108) were advanced at the Site to a maximum depth of 4.4 m below ground surface (m bgs).
- Soil samples were analyzed for petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs), metals and inorganics, and polycyclic aromatic hydrocarbons (PAHs).
- Laboratory results were compared to the Table 3 Site Condition Standards for RPI land use in a non-potable groundwater condition with coarse texture soil (Table 3 SCS). It is noted that the current standards applicable for the EXP (2025a) Phase Two Update are for medium-fine textured soil.
- Elevated concentrations of metals and inorganics, PAHs, and/or VOCs in soil exceeding the Table 3 SCS were identified at six (6) of eight (8) sampling locations. The results of PHCs analysis met the Table 3 SCS in all tested soil samples.
- Details of the frequency and distribution of the soil contaminants exceeding the Table 3 SCS are provided below:
    - Several PAH parameters (acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b/j) fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h) anthracene, fluoranthene, indeno(1,2,3,-cd)pyrene, and/or phenanthrene) were identified at an elevated concentration exceeding the Table 3 SCS at four (4) of the eight (8) boreholes (BH101, BH102, BH 104 and BH108). The impacted soil was identified at a depth ranging from 0.3 to 0.6 m bgs in the fill unit at the northwest, central, and southeast portion of the Site and is suspected to be related to poor quality fill material used at the Site for backfilling and grading purposes;
    - Chloroform was identified at an elevated concentration exceeding the Table 3 SCS at BH102. The impacted soil was identified at a depth ranging from 0.8 to 1.1 m bgs in the fill unit in the north central portion of the Site and was suspected to be related to a water main leak in the Wolsely street road allowance (*It is noted that the chloroform exceedance was only to the Table 3 SCS for coarse textured soils and chloroform does not exceed the now applicable medium-fine Table 3 SCS*);
    - Several metals parameters (barium, copper, lead, and/or zinc) and mercury were identified at elevated concentration exceeding the Table 3 SCS at six (6) of the eight boreholes (BH101, BH102,

BH105, BH106, BH107 and BH108). The impacted soil was generally identified at a depth ranging from 0.3 to 1.1 m bgs in the fill unit across the entire site with the exception of the northeast corner of the Site. Metal and mercury exceedances are suspected to be related to poor quality of fill material used for backfilling and grading purposes.

  - Salt-related parameters, electrical conductivity (EC) and/or sodium adsorption ratio (SAR), were identified at an elevated level exceeding the Table 3 SCS at all eight (8) borehole locations advanced at the Site. The impacted soil was identified at a depth ranging from 0.3 to 4.4 m bgs in the fill and native silty clay till unit. It is suspected to be related to road salt placed on the parking lot surface for the purpose of safety of vehicular and pedestrian traffic under conditions of snow or ice.

- Based on the findings and conclusions of the Environmental Investigation, the following were recommended by Terrapex Environmental Ltd.:
  - If the site is selected for redevelopment with Emergency Housing, it is understood that the filing of an RSC will be required by the MECP. As such, additional environmental investigations in the form of a Phase One and Phase Two ESA and Site Remediation and/or a Risk Assessment would be required prior to the RSC filing; and,
  - A Soil Management Plan should be developed and implemented that meets the requirements of O. Reg. 406/19 prior to undertaking any earthwork activities.

EXP (2022c). "15 Denison Avenue, Toronto, Ontario: Phase Two Environmental Site Assessment" completed by EXP for Build Toronto, dated August 31, 2022:

- Between December 6th and 11th, 2021, five (5) boreholes (BH1 to BH5) were advanced to a maximum depth of 21.34 metres below ground surface (m bgs). In addition, ten (10) delineation boreholes (BH101 to BH110) were advanced to a maximum depth of 16.0 m bgs between February 6th and 9th, 2022.
- Boreholes, BH1 through BH5 were outfitted as monitoring wells, BH/MW1, BH/MW2, BH/MW3, BH/MW4 and BH/MW5, up to a maximum screen depth of 9.35 m bgs. In addition, boreholes BH107, BH108 and BH109 were also outfitted as monitoring wells with a maximum screen depth of 15.30 m bgs at BH/MW108.
- The general stratigraphy at the Site, as observed in the boreholes, consisted of the fill material below asphaltic concrete pavement, was underlaid by clayey silt, silt and sandy silt till with traces of sand and gravel at all borehole locations.
- Groundwater levels were measured at one (1) or more monitoring well between December 14 and February 22, 2022. Based on the groundwater contour map for the Site, the groundwater was anticipated to flow in a southwesterly direction.
- Soil samples were submitted for the analysis of PHCs, benzene, toluene, ethylbenzene and xylenes (BTEX), VOCs, metals, hydride forming metals, other regulated parameters (ORPs), and PAHs.
- The analytical results of the tested parameters in the soil samples were either not detected or detected below the Table 3 SCS, except for the following:
  - PHC F1 – BTEX in sample BH5 SS6;
  - Lead, EC, SAR in sample BH1 SS1;
  - Lead, zinc and EC in sample BH4 SS1;

- SAR in sample BH107 SS1;
- EC and SAR in sample BH1 SS5, BH1 SS55, BH2 SS1, BH3 SS1 and BH5 SS1;
- Barium, lead, zinc, EC and SAR in sample BH110 SS1;
- Acenaphthylene, anthracene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthrancene in sample BH4 SS1;
- Fluoranthene, benz(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene in sample BH1 SS1, and BH4 SS1; and,
- Fluoranthene, ben(a)anthracene and benzo(a)pyrene in sample BH102 SS1.

- The reported pH value for surface soil ranged between 7.2 and 12.1 and subsurface ranged between 7.2 and 11.3, both of which are outside of the applicable surface soil (pH of 5 to 9) and sub-surface soil (pH of 5 to 11) pH range as detailed in the derivation of the Table 3 SCS.
- Groundwater samples were submitted for the analysis of metals, hydride forming metals, ORPs, PAHs, PHCs, BTEX and VOCs.
- The analytical results of the tested parameters in the groundwater samples were either not detected or detected below the Table 3 SCS, except for the following:
  - PHC F1 - BTEX, PHC F2 in a sample from MW4;
  - PHC F2 in a sample from MW107;
  - PHC F1, PHC F2 and Xylenes in a sample from MW108 and MW109; and,
  - Benzo(g,h,i)perylene in a sample from MW1.
- Free product (i.e. visible film or sheen) and/or petroleum odours was observed in several monitoring wells located at the central and northeastern portion of the Site during groundwater purging and groundwater sampling activities.
- Based on the soil and groundwater exceedances of Table 3 SCS found on Site, EXP recommended additional delineation to support future remediation and/or risk assessment for the Site.

EXP (2025a, *in-progress*). "15 Denison Avenue, Toronto, Ontario: Phase Two Environmental Site Assessment Update" completed by EXP for Build Toronto, *in-progress*.

- Between March 25 and April 10, 2024, twenty-two (22) boreholes were advanced on Site to a maximum depth of 19.8 m bgs.
- Three (3) of the advanced boreholes were equipped with telescopic monitoring wells for vertical delineation of groundwater impacts. Ten (10) of the advanced boreholes were equipped with four-inch diameter extraction wells for groundwater remediation purposes.
- The general stratigraphy at the Site, as observed in the boreholes, was generally consistent with the observations made as a part of the previous Phase Two ESA (EXP, 2022c).
- Groundwater levels were measured between December 24, 2021, and December 18, 2024. Based on the groundwater contour map for the Site, the groundwater was anticipated to flow in a southwesterly direction.
- Twelve (12) soil samples were submitted for the analysis of pH. The additional pH samples were collected within 2 m of previously advanced boreholes where soil samples were collected with pH values out of range for the

application of Table 3 SCS. By logarithmically averaging the pH values of the previous soil samples and the new soil samples, the following new pH values were determined: 8.90 at BH2-SS1, 8.19 at BH2-SS2, 8.33 at BH5 SS1, and 8.43 at BH106-2A which are within the acceptable range for the application of Table 3 SCS.

- Groundwater samples were submitted for the analysis of PAHs, PHCs, and BTEX.
- The analytical results of the tested parameters in the groundwater samples were either not detected or detected below the Table 3 SCS, except for the following:
    - PHC F1-BTEX, and PHC F2 in a sample collected from MW4; and,
    - PHC F1-BTEX, PHC F2, PHC F3 in a sample collected from MW108 and MW109.
- Free product (i.e. visible film or sheen) and/or petroleum odours were observed in several monitoring wells located at the northern and northeastern portion of the Site during groundwater purging and groundwater sampling activities. On-going removal of free-product are occurring at the RA property.
- Based on the exceedances of the O. Reg. 153/04 Table 3 Standards (residential land use) of PHCs, PAHs, Metals and ORPs in soil, and PHCs and BTEX in groundwater at the Site, EXP recommended remediation and/or risk assessment before an RSC can be filed.

3 Site-Specific Hydrogeological and Geological Interpretations

In order to support the assumptions of the RA, the site-specific hydrogeological and geological interpretations were compared with the generic MECP assumptions for medium / fine soil as shown in Table J-2.

Table J-2: Comparison between Site-Specific Hydrogeological and Geological Interpretations and the Generic MECP Assumptions for Coarse Textured Soil

Parameters	Site Specific Value	Rationale	Generic MECP Value
Soil Above Water Table			
Soil type	Silty Clay	Field observations	Coarse
Fraction of organic carbon (g/g)	0.005	MECP default value	0.005
Dry bulk density (g/cm^3)	1.38	MECP default value	1.70
Temperature (°C)	15	MECP generic value	15
Depth to water table (m bgs)	2.84	Minimum depth measured on-site from grade.	3.00
Aquifer Soil			
Soil type	Silty Clay	Field observation	Coarse
Hydraulic conductivity (m/s)	3.0 x 10^{-5}	MECP default value	3.0 x 10^{-5}
Horizontal hydraulic gradient (m/m)	0.005	Measured on-site	0.003
Effective porosity (v/v)	0.25	MECP default value	0.25
Fraction of organic carbon	0.0003	MECP default value	0.0003

4 Justification for Sampling Program

As summarized in Section 1.0, several subsurface investigations were completed on Site to assess the impact of the PCAs on soil and groundwater within the APECs. A summary of the assessment of each potential contaminant of concern (pCOC) within each APEC is provided in Section 3.2 of the Phase Two CSM (Appendix B).

5 Summary of Quality Assurance and Quality Control used during the Sampling Programs

The quality assurance and quality control (QA/QC) measures were implemented during all EXP sampling and analysis programs, to ensure the collection of high-quality data that met the objectives of the RA.

The EXP sampling programs were performed in accordance with the MECP document *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, December 1996 (MOEE, 1996) and O. Reg. 153/04.

Written Standard Operating Procedures for field and laboratory sampling for soil and groundwater developed by EXP were used to ensure collection of representative and unbiased samples, the collection of quality control samples to evaluate sample precision and accuracy, and the implementation of measures to preserve sample integrity and minimize the potential for cross contamination.

The staff involved in the field sampling have participated in regular, ongoing, EXP training programs and were qualified and experienced in collecting, describing, and preparing environmental samples for laboratory analysis.

Data quality objectives for the parameters of concern were set to meet acceptable RDLs to achieve the goal of defining areas where such parameters are present at levels in excess of applicable generic Standards, as defined in the Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MECP, 2011a). This included providing written instruction to the participating analytical laboratory describing the required analyses on a Chain of Custody prepared and delivered with the samples.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by EXP. EXP field sampling QA/QC protocols are tailored to the investigations and include, where appropriate:

- The collection of field duplicate samples for soil and groundwater;
- Instrument calibration checked on a daily basis, and re-calibrated prior to use, if required per EXP SOPs;
- Use of dedicated sampling equipment – bailer, Waterra inertial pump or LDPE tubing for low flow sampling, latex gloves, nylon string;
- Thorough cleaning of groundwater level measuring meter and hand tools using soap and water, followed by a distilled water rinse and a methanol rinse. Equipment is allowed to air dry between sampling locations; and,
- Inclusion of one (1) trip blank for volatiles in groundwater analyses.

As part of EXP's Phase Two ESA program, at least one (1) trip blank was submitted with each groundwater submission. On December 22, 2021, one (1) trip blank was submitted for the analysis of F1 PHCs / BTEX. On April 23, 2024, one (1) trip blank was submitted for PHCs / BTEX. On July 12, 2022, one (1) trip blank was submitted for the analysis of PAHs.

Laboratory analyses for all investigative programs relied upon in the Phase Two CSM and RA were performed using generally accepted principles in accordance with the MECP document Protocol for Analytical methods used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (Protocol) (MECP, 2011b).

EXP has accepted the data provided by BV based on their assurance that, at minimum, the following requirements have been met and documentation to demonstrate compliance can be produced upon request:

- The method performance criteria in the Protocol were met;
- Sampling storage requirements, pre-analysis processing techniques, and holding times for all sample types as identified in the Protocol were met following receipt and sign-off of the samples from EXP staff;
- The results of all laboratory QC samples were within statistically determined control limits; and,
- A Certificate of Analysis with all the QA/QC sample data, has been received from the laboratory and is included within the appropriate reports on the USB in Appendix Q.

Table J-3 presents the number of duplicates taken per parameter group in soil while Table J-4 presents the number of duplicates taken per parameter group in groundwater based on all Phase Two ESAs.

Table J-3: Summary of QA/QC programs (Soil)

Sampling Group	Total number of Original Samples	Number of Field Duplicate Samples	Alert Criteria Met (Yes/No)
PHCs/BTEX	18	1	Yes
VOCs	16	1	Yes
PAHs	27	3	Yes
Metals (including hydride forming)	26	3	**No**
HWS Boron	25	3	Yes
Chromium VI	25	3	Yes
Cyanide	25	3	Yes
Mercury	25	3	**No**
Methylmercury	1	1	Yes
EC	25	3	Yes
SAR	25	3	Yes

Table J-4: Summary of QA/QC programs (Groundwater)

Sampling Group	Total number of Original Samples	Number of Field Duplicate Samples	Alert Criteria Met (Yes/No)
PHCs/BTEX	19	3	Yes
VOCs	6	2	Yes
PAHs	7	3	**No**
Metals (including hydride-forming)	5	1	Yes
Chromium VI	5	1	Yes
Mercury	5	1	Yes
Sodium	2	0	N/A

The RPD alert criteria is presented in Table J-5-1 and the RPD for each original and field duplicate sample set is provided in the Tables J-6A through J-6D for soil and J-7A through J-7D for groundwater in the appendix.

The calculated RPD between the duplicate samples and the original samples for soil and groundwater were below alert limits for all of the parameters analyzed with the following exceptions:

- Lead, zinc, and mercury in soil in the sample duplicate pair BH105-1B and BH9105-1B collected by Terrapex on April 22, 2020.
- Lead in the soil sample duplicate pair BH1 SS5 and BH1 SS55 collected by EXP on December 6, 2021.
- Phenanthrene in the groundwater sample duplicate pair MW1 and DUP 3 collected by EXP on April 22, 2024.

The RPD exceedances in soil may be attributed to heterogeneity of soil. The RPD exceedances in groundwater may be attributable to potential sediment bias in the sample. It is noted that the higher concentration between the original and duplicate sample was carried forward for consideration when determining COCs and maximum concentrations as a conservative approach. As such, these alert limit exceedances are not anticipated to alter the conclusions of the assessment.

All field and trip blanks analyzed for VOCs as part of EXP's groundwater sampling programs returned non-detectable concentrations with RDLs within Table 3 SCS.

Adequacy of Data

Based on the completed subsurface assessments, all APECs have been addressed. Soil and groundwater samples were collected within APECs and analyzed for the various pCOCs as summarized in Tables J-3 and J-4.

Overall, it is in the opinion of the QP_{ESA} and QP_{RA} that the sampling program is adequate for the RA objectives for the following reasons:

- APECs identified in Phase One ESA have been assessed;
- Soil and groundwater impacts have been sufficiently delineated horizontally and vertically;
- Site geology and hydrogeology have been sufficiently characterized; and,
- QA/QC measures were in place during EXP sampling and based on the results of the QA/QC, the quality of the data was considered sufficient to meet the objectives of the RA.

A Phase Two CSM has been prepared based on the environmental assessments conducted at the site and is provided as Appendix B.

Table J-5-1: ALERT LIMITS FOR RELATIVE PERCENT DIFFERENCES

GTR-21018382-B0

15 Denison Avenue, Toronto, ON

Parameters	Alert Limit[1] (%)	
	Water	Soil
PAHs	30	40
1,4-Dioxane	30	50
Dioxins/Furans	30	40
Pesticides	30	40
PCBs	30	40
PHCs	30	30
VOCs	30	50
Electrical Conductivity	-	10
Cr (VI), Cyanide	20	35
Metals, Hydride-Forming Metals, SAR, Hg	20	30
methyl-Hg	30	40
HWS-B	-	40
pH units	-	0.3 units

[1] As per MECP (2011) Analytical Protocol.

Table J-6A: SOIL FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES PETROLEUM HYDROCARBONS AND BTEX

GTR-21018382-B0

15 Denison Avenue, Toronto, ON

Sample ID	BH107-2 (2020)	BH9107-2 (2020) (DUP of BH107-2)		
Lab ID	MMM525	MMM526		
Sampling Date	22-Apr-20	22-Apr-20		
Soil Sample Depth (m)	0.8-1.4	0.8-1.4		
Consultant	Terrapex	Terrapex		
Laboratory	BV	BV		
Certificate of Analysis Number	C099980	C099980	RDL	RPD
PHC F1 (C6-C10) - BTEX	<10	<10	10	nc
PHC F2 (C10-C16)	<10	<10	10	nc
PHC F3 (C16-C34)	<50	<50	50	nc
PHC F4 (C34-C50)	<50	<50	50	nc

NOTES:

All results in ppm (µg/g) and based on dry weight basis.

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL.

Exceedences of alert limits are shown in **bold**.

Table J-6B: SOIL FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES VOLATILE ORGANIC COMPOUNDS

GTR-21018382-B0

15 Denison Avenue, Toronto, ON

Sample ID	BH107-2 (2020)	BH9107-2 (2020) (DUP of BH107-2)		
Lab ID	MMM525	MMM526		
Sampling Date	22-Apr-20	22-Apr-20		
Soil Sample Depth (m)	0.8-1.4	0.8-1.4		
Consultant	Terrapex	Terrapex		
Laboratory	BV	BV		
Certificate of Analysis Number	C099980	C099980	RDL	RPD
Acetone	<0.50	<0.50	0.500	nc
Benzene	<0.050	<0.050	0.050	nc
Bromodichloromethane	<0.050	<0.050	0.050	nc
Bromoform	<0.050	<0.050	0.050	nc
Bromomethane	<0.050	<0.050	0.050	nc
Carbon Tetrachloride	<0.050	<0.050	0.050	nc
Chlorobenzene	<0.050	<0.050	0.050	nc
Chloroform	<0.050	<0.050	0.050	nc
Dibromochloromethane	<0.050	<0.050	0.050	nc
1,2-Dichlorobenzene	<0.050	<0.050	0.050	nc
1,3-Dichlorobenzene	<0.050	<0.050	0.050	nc
1,4-Dichlorobenzene	<0.050	<0.050	0.050	nc
Dichlorodifluoromethane	<0.050	<0.050	0.050	nc
1,1-Dichloroethane	<0.050	<0.050	0.050	nc
1,2-Dichloroethane	<0.050	<0.050	0.050	nc
1,1-Dichloroethylene	<0.050	<0.050	0.050	nc
Cis-1,2-Dichloroethylene	<0.050	<0.050	0.050	nc
Trans-1,2-Dichloroethylene	<0.050	<0.050	0.050	nc
1,2-Dichloropropane	<0.050	<0.050	0.050	nc
cis- & trans-1,3-Dichloropropene	<0.050	<0.050	0.050	nc
Ethylbenzene	<0.020	<0.020	0.020	nc
Ethylene Dibromide (1,2-Dibromoethane)	<0.050	<0.050	0.050	nc
Hexane (n)	<0.050	<0.050	0.050	nc
Methyl ethyl ketone (2-Butanone)	<0.50	<0.50	0.500	nc
Methylene chloride (Dichloromethane)	<0.050	<0.050	0.050	nc
Methyl Isobutyl Ketone	<0.50	<0.50	0.500	nc
Methyl t-butyl ether (MTBE)	<0.050	<0.050	0.050	nc
Styrene	<0.050	<0.050	0.050	nc
1,1,1,2-Tetrachloroethane	<0.050	<0.050	0.050	nc
1,1,2,2-Tetrachloroethane	<0.050	<0.050	0.050	nc
Toluene	<0.020	<0.020	0.020	nc
Tetrachloroethylene	<0.050	<0.050	0.050	nc
1,1,1-Trichloroethane	<0.050	<0.050	0.050	nc
1,1,2-Trichloroethane	<0.050	<0.050	0.0500	nc
Trichloroethylene	<0.050	<0.050	0.050	nc
Trichlorofluoromethane	<0.050	<0.050	0.050	nc
Vinyl Chloride	<0.020	<0.020	0.020	nc
m-Xylene + p-Xylene	<0.020	<0.020	0.020	nc
o-Xylene	<0.020	<0.020	0.020	nc
Xylenes (total)	<0.020	<0.020	0.020	nc

NOTES:

All results in ppm (µg/g) and based on dry weight basis.

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL.

Exceedences of alert limits are shown in **bold**.

Table J-6C SOIL FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
POLYCYCLIC AROMATIC HYDROCARBONS

GTR-21018382-B0

15 Denison Avenue, Toronto, ON

Sample ID	BH105-1B (2020)	BH9105-1B (2020) (DUP of BH105-1B)			BH1-SS5	BH1-SS55 (DUP of BH1 SS5)			BH4-SS6	BH4-SS66 (DUP of BH4 SS6)		
Lab ID	MMM515	MMM518			3439065	3439066			3439063	3439064		
Sampling Date	22-Apr-20	22-Apr-20			6-Dec-21	6-Dec-21			7-Dec-21	7-Dec-21		
Soil Sample Depth (m)	0.3-0.6	0.3-0.6			3.05-3.66	3.05-3.66			4.57-5.18	4.57-5.18		
Consultant	Terrapex	Terrapex			EXP	EXP			EXP	EXP		
Laboratory	BV	BV			AGAT	AGAT			AGAT	AGAT		
Certificate of Analysis Number	C099980	C099980	RDL	RPD	22T855232	22T855232	RDL	RPD	22T855232	22T855232	RDL	RPD
Naphthalene	<0.0050	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Acenaphthylene	0.019	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Acenaphthene	0.007	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Fluorene	0.007	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Phenanthrene	0.14	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Anthracene	0.037	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Fluoranthene	0.320	0.0053	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Pyrene	0.33	0.0057	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Benzo(a)anthracene	0.15	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Chrysene	0.14	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Benzo(b/j)fluoranthene	0.2	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Benzo(k)fluoranthene	0.068	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Benzo(a)pyrene	0.16	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Indeno(1,2,3-cd)pyrene	0.11	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Dibenz(a,h)anthracene	0.024	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
Benzo(ghi)perylene	0.11	<0.0050	0.005	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc
1&2-Methylnaphthalene	<0.0071	<0.0071	0.0071	nc	<0.05	<0.05	0.050	nc	<0.05	<0.05	0.050	nc

NOTES:

All results in ppm (µg/g) and based on dry weight basis.

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL.

Exceedences of alert limits are shown in **bold**.

Table J-6D: SOIL FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
METALS, HYDRIDE-FORMING METALS AND ORPs

GTR-21018382-B0

15 Denison Avenue, Toronto, ON

Sample ID	BH105-1B (2020)	BH9105-1B (2020) (DUP of BH105-1B)			BH1 SS5	BH1 SS55 (DUP of BH1 SS5)			BH4 SS6	BH4 SS66 (DUP of BH4 SS6)		
Lab ID	MMM517	MMM518			3439065	3439066			3439063	3439064		
Sampling Date	22-Apr-20	22-Apr-20			6-Dec-21	6-Dec-21			7-Dec-21	7-Dec-21		
Soil Sample Depth (m)	0.3-0.6	0.3-0.6			3.05-3.66	3.05-3.66			4.57-5.18	4.57-5.18		
Consultant	Terrapex	Terrapex			EXP	EXP			EXP	EXP		
Laboratory	BV	BV			AGAT	AGAT			AGAT	AGAT		
Certificate of Analysis Number	C099980	C099980	RDL	RPD	22T855232	22T855232	RDL	RPD	22T855232	22T855232	RDL	RPD
Antimony	0.57	0.39	0.2	nc	<0.8	<0.8	0.8	nc	<0.8	<0.8	0.8	nc
Arsenic	5.8	4.9	1	17	4.0	4.0	1	nc	4.0	4.0	1	nc
Barium	170	160	0.5	6	128	121	2	6	89	96	2	8
Beryllium	0.81	1.00	0.2	nc	0.50	0.50	0.4	nc	0.60	0.60	0.4	nc
Boron (total)	9.8	11	5	nc	9	7	5	nc	10	12	5	nc
Boron (Hot Water Soluble)	1	1	0.05	7	0	0	0.1	nc	0	0	0.1	nc
Cadmium	0	0	0.1	nc	<0.5	<0.5	0.5	nc	<0.5	<0.5	0.5	nc
Chromium (total)	31	35	1	12	40	38	5	5	32	34	5	6
Cobalt	11.0	13.00	0.1	17	11.9	12.10	0.5	2	12.7	12.90	0.5	2
Copper	30	30	0.5	0	22	23.0	1	4	25	24.3	1	1
Lead	180	67	1	**91**	11	15	1	**31**	11	10	1	10
Molybdenum	1.30	0.99	0.99	nc	0.50	0.50	0.5	nc	<0.5	<0.5	0.5	nc
Nickel	22	29	0.5	27	27	27	1	0	29	29	1	0
Selenium	1	<0.50	0.5	nc	<0.8	<0.8	0.8	nc	<0.8	<0.8	0.8	nc
Silver	0.3	<0.20	0.2	nc	<0.5	<0.5	0.5	nc	<0.5	<0.5	0.5	nc
Thallium	0.17	0.19	0.05	nc	<0.5	<0.5	0.5	nc	<0.5	<0.5	0.5	nc
Uranium	0.51	0.63	0.05	21	0.87	0.91	0.5	nc	0.68	0.73	0.5	nc
Vanadium	38	42	5	10	44.6	42.2	0.4	6	37.2	41.5	0.4	11
Zinc	130	91	5	**35**	59.000	60.000	5	2	58	58	5	0
Chromium VI	<0.18	0.24	0.18	nc	<0.2	<0.2	0.2	nc	<0.2	<0.2	0.2	nc
Free Cyanide	<0.01	<0.01	0.01	nc	<0.040	<0.040	0.04	nc	<0.040	<0.040	0.04	nc
Mercury	1	0	0.05	**87**	<0.10	<0.10	0.1	nc	<0.10	<0.10	0.1	nc
Electrical Conductivity (mS/cm)	2.2	2.0	0.002	10	1.9	1.9	0.005	1	0.6	0.6	0.005	1
Sodium Adsorption Ratio (unitless)	4.9	4.0	-	20	5.44	6.03	-	10	1.44	1.34	-	7
pH (pH units)	7.4	7.6	-	2	7.22	7.17	-	1	7.39	7.34	-	0.7

NOTES:

ORP (Other Regulated Parameters): Cr VI, mercury, cyanide, HWS-B, pH, EC, SAR

All results in ppm (µg/g) and based on dry weight basis.

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL.

Exceedences of alert limits are shown in **bold**.

Table J-7A: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
PETROLEUM HYDROCARBONS

GTR-21018382-B0

15 Denison Avenue, Toronto, ON

Sample ID	MW5	MW55 (DUP of MW5)			MW5	DUP 1 (DUP of MW5)			MW24-2	DUP 2 (DUP of MW24-2)		
Lab ID	3397295	3397296			YZG821	YZG831			YZG827	YZG832		
Sampling Date	24-Dec-21	24-Dec-21			22-Apr-24	22-Apr-24			23-Apr-24	23-Apr-24		
Screen Depth Interval (m)	6.09-9.14	6.09-9.14			6.09-9.14	6.09-9.14			16.8 - 19.8	16.8 - 19.8		
Consultant	EXP	EXP			EXP	EXP			EXP	EXP		
Laboratory	AGAT	AGAT			BV	BV			BV	BV		
Certificate of Analysis Number	21T849562	21T849562	RDL	RPD	C4C1812	C4C1812	RDL	RPD	C4C1812	C4C1812	RDL	RPD
Benzene	<0.40	<0.40	0.4	nc	<0.20	<0.20	0.2	nc	<0.20	<0.20	nc	nc
Toluene	2.18	2.37	0.4	8	<0.20	<0.20	0.2	nc	<0.20	<0.20	nc	nc
Ethylbenzene	0.76	0.88	0.2	nc	<0.20	<0.20	0.2	nc	<0.20	<0.20	nc	nc
Total Xylenes	8.97	10.2	0.2	13	<0.40	<0.40	0.4	nc	<0.40	<0.40	nc	nc
F1 (C6-C10)	353	291	25	19	<25	<25	25	nc	<25	<25	25	nc
F1 (C6-C10) - BTEX	341	278	25	20	<25	<25	25	nc	<25	<25	25	nc
F2 (C10-C16)	<100	<100	100	nc	<100	<100	100	nc	<100	<100	100	nc
F3 (C16-C34)	<100	<100	100	nc	<200	<200	200	nc	<200	<200	200	nc
F4 (C34-C50)	<100	<100	100	nc	<200	<200	200	nc	<200	<200	200	nc
Reached Baseline at C50	YES	YES	-	-	YES	YES	-	-	YES	YES	-	-
F4 Gravimetric	-	-	-	-	-	-	-	-	-	-	-	-

NOTES:

All results in ppB (µg/L).

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL.

Exceedences of alert limits are shown in **bold**.

Table J-7B: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
VOLATILE ORGANIC COMPOUNDS

GTR-21018382-B0

15 Denison Avenue, Toronto, ON

Sample ID	MW5	MW55 (DUP of MW5)			BH/MW4	BH/MW0 (DUP of MW4)		
Lab ID	3397295	3397296			AMCQ39	AMCQ40		
Sampling Date	24-Dec-21	24-Dec-21			18-Dec-24	18-Dec-24		
Screen Depth Interval (m)	6.09-9.14	6.09-9.14			6.09-9.14	6.09-9.14		
Consultant	EXP	EXP			EXP	EXP		
Laboratory	AGAT	AGAT			BV	BV		
Certificate of Analysis Number	21T849562	21T849562	RDL	RPD	C4BL754	C4BL754	RDL	RPD
Dichlorodifluoromethane	<0.40	<0.40	0.4	nc	<1.0	<1.0	1	nc
Vinyl Chloride	<0.34	<0.34	0.34	nc	<0.20	<0.20	0.2	nc
Bromomethane	<0.40	<0.40	0.4	nc	<0.50	<0.50	0.5	nc
Trichlorofluoromethane	<0.80	<0.80	0.8	nc	<0.50	<0.50	0.5	nc
Acetone	<2.0	<2.0	2	nc	<10	<10	10	nc
1,1-Dichloroethylene	<0.60	<0.60	0.6	nc	<0.20	<0.20	0.2	nc
Methylene chloride (Dichloromethane)	<0.60	<0.60	0.6	nc	<2.0	<2.0	2.00	nc
trans-1,2-Dichloroethylene	<0.40	<0.40	0.4	nc	<0.50	<0.50	0.5	nc
Methyl t-butyl ether (MTBE)	<0.40	<0.40	0.4	nc	<0.50	<0.50	0.5	nc
1,1-Dichloroethane	<0.60	<0.60	0.6	nc	<0.20	<0.20	0.2	nc
Methyl ethyl ketone (2-Butanone)	<2.0	<2.0	2	nc	<10	<10	10	nc
cis-1,2-Dichloroethylene	<0.40	<0.40	0.4	nc	0.97	0.96	0.96	nc
Chloroform	0.69	0.55	0.2	nc	<0.20	<0.20	0.2	nc
1,2-Dichloroethane	<0.40	<0.40	0.4	nc	<0.49	<0.49	0.49	nc
1,1,1-Trichloroethane	<0.60	<0.60	0.6	nc	<0.20	<0.20	0.2	nc
Carbon Tetrachloride	<0.40	<0.40	0.4	nc	<0.19	<0.19	0.19	nc
Benzene	<0.40	<0.40	0.4	nc	2.00	2.00	0.20	nc
1,2-Dichloropropane	<0.40	<0.40	0.4	nc	<0.20	<0.20	0.2	nc
Trichloroethylene	<0.40	<0.40	0.4	nc	0.92	0.94	0.20	nc
Bromodichloromethane	<0.40	<0.40	0.4	nc	<0.50	<0.50	0.5	nc
Methyl Isobutyl Ketone	<2.0	<2.0	2	nc	<5.0	<5.0	5	nc
1,1,2-Trichloroethane	<0.40	<0.40	0.4	nc	<0.40	<0.40	0.4	nc
Toluene	2.18	2.37	0.2	8	13.00	14.00	0.20	7
Dibromochloromethane	<0.20	<0.20	0.2	nc	<0.50	<0.50	0.5	nc
Ethylene Dibromide (1,2-Dibromoethane)	<0.20	<0.20	0.2	nc	<0.40	<0.40	0.4	nc
Tetrachloroethylene	<0.40	<0.40	0.4	nc	0.40	0.43	0.20	nc
1,1,1,2-Tetrachloroethane	<0.20	<0.20	0.2	nc	<0.50	<0.50	0.5	nc
Chlorobenzene	<0.20	<0.20	0.2	nc	<0.20	<0.20	0.20	nc
Ethylbenzene	0.76	0.88	0.1	15	130.00	130.00	0.20	nc
m-Xylene + p-Xylene	5.32	6.05	0.2	13	550.00	600.00	1.0	9
Bromoform	<0.20	<0.20	0.2	nc	<1.0	<1.0	1.00	nc
Styrene	<0.20	<0.20	0.2	nc	<17	<18	18.00	nc
1,1,2,2-Tetrachloroethane	<0.20	<0.20	0.2	nc	<0.40	<0.40	0.4	nc
o-Xylene	3.65	4.13	0.1	12	610.00	650.00	1.0	6
1,3-Dichlorobenzene	<0.20	<0.20	0.2	nc	<0.40	<0.40	0.4	nc
1,4-Dichlorobenzene	<0.20	<0.20	0.2	nc	<0.40	<0.40	0.4	nc
1,2-Dichlorobenzene	<0.20	<0.20	0.2	nc	<0.40	<0.40	0.4	nc
1,3-Dichloropropene	<0.30	<0.30	0.3	nc	<0.50	<0.50	0.5	nc
Xylenes (Total)	8.97	10.20	0.2	13	1200	1200	1200	nc
Hexane (n)	<0.40	<0.40	0.4	nc	<1.0	<1.0	1.00	nc

NOTES:

All results in ppB (µg/L).

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL.

Exceedences of alert limits are shown in **bold**.

Table J-7C: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
POLYCYCLIC AROMATIC HYDROCARBONS

GTR-21018382-B0

15 Denison Avenue, Toronto, ON

Sample ID	MW1	MW11 (DUP of MW1)			MW1	DUP 3 (DUP of MW1)			MW5	MW55 (DUP of MW5)		
Lab ID	TD0305	TD0306			YZG823	YZG833			3397295	3397296		
Sampling Date	12-Jul-22	12-Jul-22			22-Apr-24	22-Apr-24			24-Dec-21	24-Dec-21		
Screen Depth Interval (m)	6.09-9.14	6.09-9.14			6.09-9.14	6.09-9.14			6.09-9.14	6.09-9.14		
Consultant	EXP	EXP			EXP	EXP			EXP	EXP		
Laboratory	BV	BV			BV	BV			AGAT	AGAT		
Certificate of Analysis Number	C2J4227	C2J4227	RDL	RPD	C4C1812	C4C1812	RDL	RPD	21T849562	21T849562	RDL	RPD
Naphthalene	0.530	0.46	0.050	14	0.051	0.08	0.050	nc	<0.20	<0.20	0.200	nc
Acenaphthylene	<0.050	<0.050	0.050	nc	<0.050	<0.050	0.050	nc	<0.20	<0.20	0.200	nc
Acenaphthene	<0.050	<0.050	0.050	nc	0.280	0.24	0.050	15	<0.20	<0.20	0.200	nc
Fluorene	<0.050	<0.050	0.050	nc	0.220	0.18	0.050	nc	<0.20	<0.20	0.200	nc
Phenanthrene	0.060	0.07	0.030	nc	0.310	0.22	0.030	**34**	<0.10	<0.10	0.100	nc
Anthracene	<0.050	<0.050	0.050	nc	<0.050	<0.050	0.050	nc	<0.10	<0.10	0.100	nc
Fluoranthene	0.055	0.06	0.050	nc	0.140	0.10	0.050	nc	<0.20	<0.20	0.200	nc
Pyrene	0.064	0.07	0.050	nc	0.110	0.08	0.050	nc	<0.20	<0.20	0.200	nc
Benzo(a)anthracene	<0.050	<0.050	0.050	nc	<0.050	<0.050	0.050	nc	<0.20	<0.20	0.200	nc
Chrysene	<0.050	<0.050	0.050	nc	<0.050	<0.050	0.050	nc	<0.10	<0.10	0.100	nc
Benzo(b/j)fluoranthene	<0.050	<0.050	0.050	nc	<0.050	<0.050	0.050	nc	<0.10	<0.10	0.100	nc
Benzo(k)fluoranthene	<0.050	<0.050	0.050	nc	<0.050	<0.050	0.050	nc	<0.10	<0.10	0.100	nc
Benzo(a)pyrene	<0.0090	<0.0090	0.009	nc	<0.0090	<0.0090	0.009	nc	<0.01	<0.01	0.010	nc
Indeno(1,2,3-cd)pyrene	<0.050	<0.050	0.050	nc	<0.050	<0.050	0.050	nc	<0.20	<0.20	0.200	nc
Dibenz(a,h)anthracene	<0.050	<0.050	0.050	nc	<0.050	<0.050	0.050	nc	<0.20	<0.20	0.200	nc
Benzo(ghi)perylene	<0.050	<0.050	0.050	nc	<0.050	<0.050	0.050	nc	<0.20	<0.20	0.200	nc
1&2-Methylnaphthalene	0.220	0.19	0.071	nc	<0.071	<0.071	0.071	nc	<0.20	<0.20	0.200	nc

NOTES:

All results in ppB (µg/L).

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL.

Exceedences of alert limits are shown in **bold**.

Table J-7D: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES METALS, HYDRIDE-FORMING METALS AND ORPs

GTR-21018382-B0

15 Denison Avenue, Toronto, ON

Sample ID	MW5	MW55 (DUP of MW5)		
Lab ID	3397295	3397296		
Sampling Date	24-Dec-21	24-Dec-21		
Screen Depth Interval (m)	6.09-9.14	6.09-9.14		
Consultant	EXP	EXP		
Laboratory	AGAT	AGAT		
Certificate of Analysis Number	21T849562	21T849562	RDL	RPD
Antimony	1.20	1	1	nc
Arsenic	3.2	3	1	nc
Barium	183	181	2	1
Beryllium	<0.5	<0.5	0.5	nc
Boron (total)	215	215	10	0
Cadmium	<0.20	<0.20	0.2	nc
Chromium (total)	<2.0	<2.0	2	nc
Cobalt	1.31	1.41	0.5	nc
Copper	<1.0	<1.0	1	nc
Lead	<0.50	<0.50	0.5	nc
Molybdenum	89	93	0.5	5
Nickel	4.4	4.70	1	nc
Selenium	5	4.1	1	nc
Silver	<0.20	<0.20	0.2	nc
Thallium	<0.30	<0.30	0.3	nc
Uranium	4.63	4.63	0.5	0
Vanadium	1.18	1.28	0.4	nc
Zinc	13.50	19.200	5	nc
Mercury	<0.02	<0.02	0.02	nc
Chromium VI	<2.000	3.41	2	nc
Sodium	-	-	-	nc
Chloride	-	-	-	nc

NOTES:

ORPs: Cr VI, mercury, cyanide, sodium

All results in ppB (µg/L), except Chloride which is in ppm (mg/L).

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL.

Exceedences of alert limits are shown in **bold**.

Appendix K: Human Health Toxicity Reference Values and Assumptions Regarding Bioavailability

Appendix K: Human Health Toxicity Reference Profiles

The exposure limits used in this RA were those recommended by the MECP (2011c), MECP (2016), MECP (2024a) or MECP (2024b). In these cases, no rationale was provided for the selection of the TRV. TRVs were derived for phenanthrene as oral and inhalation exposure limits were not provided by MECP. The rationale for the selection of this TRV is provided in Section K-1.

A discussion of the assumptions made in the RA, concerning contaminant bioavailability, is provided in Section K-2.

K-1 Human Health Exposure Limits

Phenanthrene

Oral Exposure Limit

The MECP does not provide an oral exposure limit for phenanthrene and US EPA has concluded there is insufficient information to recommend one. As cited in CCME (2008), PHC F2 is comprised of phenanthrene along with several other aromatic hydrocarbons with carbon chain length ranges from C10 to C16. The RfD value recommended by MECP for the aromatic fractions of PHC F2 (0.04 mg/kg/d) was considered as a surrogate RfD for phenanthrene. This value is equivalent to the value adopted as the Tolerable Daily Intake (TDI) for phenanthrene recommended by RIVM (2011). This RfD is based on the lowest of several NOELs (50 mg/kg/d) reported by TPHCWG (1997) and based on an unpublished NTP (1980) report, for studies in rats and mice, using several PAHs (isopropylbenzene, naphthalene, acenaphthene, biphenyl, fluorene, anthracene, fluoranthene, pyrene and mixtures of naphthalenes and methylnaphthalenes). The lowest NOEL, upon which the RfD is based, was based on decreased body weight and exposure to naphthalene.

The Massachusetts Department of Environmental Protection (MA DEP, 2003) recommends a RfD of 0.03 mg/kg/d for phenanthrene based on a RfD for aromatic hydrocarbons with carbon chain length ranges from C9 through C32. This value is assigned to chemicals that fall into the C9 - C32 aromatic fraction and do not have an assigned US EPA IRIS value. This value is selected based on the RfD for pyrene (C16) derived by US EPA IRIS (1990). Given the selection of the RfD by MA DEP (2003) is based on a high molecular weight PAH and is applied to a larger range of carbon chain lengths, this value was not considered a suitable surrogate for phenanthrene in the RA.

While there is uncertainty associated with the application of the oral RfD for PHC F2 as a surrogate for phenanthrene, it is assumed to be sufficiently conservative for the following reasons:

- The structural similarity between phenanthrene and other PAHs evaluated/reviewed in the determination of the RfD for the aromatic fractions of PHC F2 (e.g., anthracene);
- The RfD is based on the most toxic compound tested;
- The RfD was derived from a NOEL, and no LOEL was reported by the authors; and,
- The use of an RfD for a range of carbon chain lengths as surrogates for individual PAHs has been adopted by various other agencies (e.g., MA DEP and RIVM).

Based on the above, the oral RfD for the aromatic fractions for PHC F2, equivalent to the RfD recommended by RIVM for phenanthrene, was applied for phenanthrene in this RA.

For the carcinogenic oral TRV, MECP (2018) has identified a Toxic Equivalency Factor of 0 for phenanthrene, which indicates that this PAH is not considered to be carcinogenic. As a result, a carcinogenic inhalation TRV was not

recommended for phenanthrene.

Inhalation Exposure Limit

The MECP does not provide an inhalation exposure limit for phenanthrene and US EPA has concluded there is insufficient information to recommend one. As cited in CCME (2008), PHC F2 contains phenanthrene along with several other aromatic hydrocarbons, with carbon chain lengths ranging from C10 to C16. The RfC value recommended by MECP for the aromatic fraction of PHC F2 is 0.2 mg/m^3, and was considered as a surrogate RfC for phenanthrene. This RfC (derived by TPHCWG, 1997) is based on a study by Clark et al. (1989). In this study, rats were exposed via inhalation to a high aromatic naphtha petroleum distillate blend (50/50 blend of SHELLSOL A* and SOLVESSO 100***) at concentrations of 0, 450, 900 or 1,800 mg/m^3 for 6 hours per day, 5 days per week for 12 months. Increased liver and kidney weights were observed in male rats exposed to 1,800 mg/m^3 petroleum distillate. A NOEL of 900 mg/m^3 was reported. TPHCWG (1997) derived an inhalation RfC of 0.2 mg/m^3 by accounting for continuous exposure and applying an uncertainty factor of 1,000.

For the carcinogenic inhalation TRV, MECP (2018) has identified a Toxic Equivalency Factor of 0 for phenanthrene, which indicates that this PAH is not considered to be carcinogenic. As a result, a carcinogenic inhalation TRV was not recommended for phenanthrene.

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K-2 Assumptions Regarding Bioavailability

During the estimation of risks, a number of assumptions are made concerning the ability of each COC to reach target tissues within the body and exert predicted toxicological effects. One of the key assumptions that is generally made is that COCs are 100% bioavailable. Bioavailability is defined by US EPA as "the amount of a contaminant that is absorbed into the body following skin contact, ingestion, or inhalation" (US EPA, 2011). Thus, bioavailability determines the amount of a substance reaching target tissues or organs, where it can produce an adverse effect. The bioavailable amount of a substance is not necessarily equal to the external dose, but is otherwise known as the "effective" dose. An "administered" dose is the application of a substance to a test organism under controlled conditions, in a reproducible manner, by a defined route (IUPAC Glossary of Terms definition). During risk assessment, it is not appropriate to use toxicity values based on administered doses to predict risks from absorbed doses without some adjustment of values.

The relative bioavailability of a compound, or ratio of chemical absorbed from one medium versus another, is also an important factor in risk assessment, if the toxicity reference value assigned for one medium was derived from toxicity data using another.

If an exposure estimate is adjusted for bioavailability then it must be compared to an equivalent exposure limit, that is, one which is based on an absorbed and not an administered dose. Failure to do so will increase the uncertainty of the risk estimate and may result in an underestimate of risks. Likewise, comparison of an exposure estimate that is not adjusted for bioavailability, to an absorbed dose may result in an overestimation of risks. Since most exposure limits are derived from studies reporting administered doses, the latter circumstance is less likely.

A comparison of relative bioavailability is often a better approach to estimating risks, if sufficient information is available. Systemic absorption of chemicals differs depending on the route of exposure, medium in which the chemical is found and/or delivery mode and medium utilized during laboratory testing. Toxicity at the target tissue also differs depending on absorption, metabolism and distribution within the body. Route-to-route extrapolation, and Physiologically Based Pharmacokinetic (PBPK) modeling methods must take into consideration each of these factors, if an exposure limit is not available for a particular exposure route of concern, or specifically for humans. In this case, and in the absence of pharmacokinetic data, use of route-to-route extrapolation is considered acceptable. For example, dermal absorption risks are commonly estimated using exposure limits derived from oral exposures. The dermal dose absorbed systemically is adjusted accordingly, to an oral "equivalent", for comparison to the oral exposure limit, by correcting for bioavailability.

Where available, MECP (2011c) or MECP (2024c) relative absorption factors were applied in this RA. As MECP (2011c) does not provide RAF values for dermal contact with groundwater, the RAFs for all groundwater COCs were assumed to be equal to 1. As discussed in MECP (2011c), there are insufficient quantitative data to develop inhalation RAFs. Therefore, in keeping with the MECP (2011c), the inhalation RAF was assumed to be equal to 1 for all COCs.

An RAF of 1 means that it has been assumed the degree of absorption in the exposure model is equal to that of the test study upon which the TRV for that pathway is based. This is recognized as a source of uncertainty for exposure estimates, particularly when oral TRVs are used to predict dermal exposure. Assuming an RAF of 1 in any case may result in over- or under-estimations of exposure and, likewise, risk.

References

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Appendix L: Ecotoxicity Reference Profiles for Ecological Receptors

Appendix L: Ecotoxicity Reference Profiles

This appendix addresses the process of choosing TRVs for ecological receptors exposed to soil COCs where none were provided by the MECP. The selected toxicity values were considered protective of sensitive plants, invertebrates, avian, and/or mammalian species exposed to PHC F1 and various PAHs in soil. The rationales for selection of the TRVs are provided below.

Toxicological effects data were more readily available for domestic and laboratory mammals, such as rats and mice than for any of the specific VECs included in the RA. Whenever possible, mammalian toxicity data were used for mammalian receptors and avian toxicity data for avian receptors.

The use of surrogate species introduces an additional level of uncertainty in the assessment of the potential toxicity of contaminants to wildlife species. Research has demonstrated that numerous physiological functions, such as metabolic rates and responses to toxic chemicals, are functions of body size (Sample et al., 1997). However, body weight scaling in not considered appropriate by MECP. For birds, differences in toxicological reactions appear to be more a factor of whether the species is passerine or non-passerine (Fischer and Hancock, 1997). However, Van der Wal et al. (1995) reported that the differences in toxicity among 14 species of birds did not vary by more than a factor of 100. These and other observations were considered when deriving TRVs for mammalian and avian VECs. Uncertainties associated with the toxicological assessment are discussed in the main RA report.

PAHs

Acenaphthylene

The TRV for plants and terrestrial invertebrates was obtained from the CCME (2010) document entitled "*Canadian Soil Quality Guidelines Carcinogenic and Other Polyaromatic Hydrocarbons (PAHs)*". The value was derived based on a study by Sverdrup et al. (2002) and Springtail reproduction. This value was used for both terrestrial plants and invertebrates in the absence of suitable plant study. It is acknowledged that this represents some uncertainty in the ERA as this may under or over-predict risks to plants if plants are more or less sensitive to acenaphthylene.

An acenaphthylene-specific TRV was not available for mammals and birds. In the Eco-SSL document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*", a benchmark value was derived for low molecular weight (LMW) compounds composed of fewer than four rings (US EPA, 2007). A literature review was undertaken which identified 46 papers with potentially acceptable toxicity data. Seventy-six endpoints were reported and used to derive a TRV of 65.6 mg/kg-bw/d. This value was based on a NOAEL for growth and reproduction of rats fed 1-naphthaleneacetic acid within their food. The TRV was the highest bounded NOAEL of the dataset and was used because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

Acenaphthylene is insoluble in water, therefore likely to be very lipophilic, unlike naphthalene. Thus, other surrogate compounds were also considered. Acenaphthylene, naphthalene and acenaphthene have somewhat similar volatilities and structures. Acenaphthylene and acenaphthene are more structurally similar, with the only difference being a double bond in the ethylene bridge. For that reason, the TRV recommended by MECP (2011) for acenaphthene (175 mg/kg/d), based on mouse data, was also considered as a surrogate TRV. Since the majority of toxicity tests investigated by the US EPA (2007), in deriving their TRV, were conducted using naphthalene, the latter candidate TRV (MECP 2011 value for acenaphthene) was chosen for use in this RA.

There is no Eco-SSL for birds due to the unavailability of toxicity data. However, Landis Assoc. Inc. (1985) measured food consumption, growth and mortality parameters in Bobwhite after exposure to naphthalene. In this study, the NOAEL was reported as 1,653 mg/kg body weight/day. This value was considered as a surrogate value and candidate TRV for birds. However, for reasons discussed above, alternative surrogates to naphthalene were also considered.

In a study conducted by Netherland National Institute for Public Health and the Environment (RIVM) on the variation in sensitivity of birds and mammals to pesticides, it was shown that the sensitivity differences between birds and mammals are limited (for pesticides) and, for RA purposes, it was indicated that extrapolation of toxicity data would have little influence on the outcome of the RA due to other sources of uncertainty (Van der Wal et al., 1995). Also, authors reported that the differences in toxicity among 14 species of birds did not vary by more than a factor of 100. Furthermore, in a study conducted by Head et al. (2015), it was shown that the potency of PAH sensitivity between chicken, Pekin duck and greater sculp, for induction of ethoxyresorufin-Odeethylase (EROD) activity in primary hepatocyte cultures, did not vary by more than a factor of 10. Kapustka (2004) reviewed over 325 scientific papers on PAH toxicity on plants, invertebrates and wildlife and reported that, for the compounds that had toxicological results for bird species, mammals were always more sensitive. On the basis of this observation, the authors suggested that mammalian TRVs can be assumed to also be protective of avian species. These and other observations were considered when deriving TRVs for mammalian and avian VECs. If data were available only for mammals, the mammalian toxicity data were used to estimate a TRV for avian receptors. This approach was supported by CCME (2008) in deriving the daily threshold effects doses (DTEDs) for PAHs in vertebrate species including birds. CCME applied an uncertainty factor of 1-5 for deriving the DTEDs from the lowest LOAEL endpoint. Although Kapustka (2004) suggests mammalian TRVs are likely protective of avian species, to be conservative, a UF of 5 was used to derive TRVs from mammalian data here. Using the UF, the mammalian TRV for acenaphthene was converted to 35 mg/kg/d and considered a surrogate candidate TRV for birds.

Of the two candidate TRVs for birds, the value for acenaphthene was selected, because it is based on a surrogate of similar structure and is more conservative than the TRV for naphthalene, derived from the avian study.

Ecotoxicity Information for Terrestrial Organisms - Acenaphthylene

Tested Species	End-point	TRV	VEC	Applied
Springtail	EC10 (reproduction)	23 mg/kg soil	Plants and Invertebrates	23 mg/kg soil
Mouse	LOEL (liver weight)	175 mg/kg-bw/day	Terrestrial Mammals	175 mg/kg-bw/day
Mouse	LOEL (liver weight)	175 mg/kg-bw/day	Birds	35 mg/kg-bw/day

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Benz(a)anthracene

There is limited information in the literature on the ecotoxicity of benzo(a)anthracene to terrestrial species. Two studies were cited in CCME (2010) on toxicity of benzo(a)anthracene in mammals. Silkworth et al. (1995) investigated immunosuppression in mice by administering a single oral dose of benzo(a)anthracene. The authors reported a LOAEL of 100 mg/kg/d, and a NOAEL at the next lower dose of 10 mg/kg/d, for the above endpoint. Nousiainen et al. (1984) studied the acute toxicity of benzo(a)anthracene on Wistar rats via an oral exposure pathway. The oral exposure of benzo(a)anthracene on rats during a 4-day study resulted in a NOAEL of 150 mg/kg-bw/d reported for hepatic, renal and gastrointestinal toxicity effects. Neither of the above studies is particularly suitable for deriving a chronic TRV as they are acute tests for endpoints other than survival, growth and reproduction. Therefore, a TRV was adopted from the US EPA document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for HMW PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to there being insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for benz(a)anthracene in the ERA.

Ecotoxicity Information for Terrestrial Organisms - Benz(a)anthracene

Tested Species	Endpoint	TRV	VEC	Applied
Multiple	Multiple	0.615 mg/kg-bw/day	Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

References

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. of Toxicol. Environ. Health, Part A. 73: 540-551.

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

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Benzo(b)fluoranthene

The TRV for terrestrial plants was taken from the Office of Solid Waste US EPA Region 6 Document entitled "*Screening Level Ecological Risk Assessment Protocol*" (US EPA, 1999) and was based on the work of Sims and Overcash (1983) and wheat growth.

As cited in CCME (2010), Sverdrup et al. (2002) investigated the reproduction and survival effects of exposure to benzo(b)fluoranthene on Springtail, *Folsomia Fimetaria,* during a 21-day experiment. The EC10 and LC50 were reported to be >360 mg/kg for both endpoints. Based on the above studies, a candidate TRV for invertebrates was set to the reported EC10. As this TRV was compound-specific, it was considered the more defensible of the two candidate values thus, this was the value adopted for use in the current RA.

For mammals, as cited in CCME (2010), Silkworth et al. (1995) investigated the immunocompetence of mice exposed via a single oral dose to several PAH including benzo(b)fluoranthene, at concentrations of 0.1, 1, 10 and 100 mg/kg bw. A NOAEL of 10 mg/kg was reported on the immunocompetence endpoint. In addition, a LOAEL of 100 mg/kg was reported based on 50% suppression of immune responses observed in mice. This study is not particularly suitable for deriving a chronic TRV as it is an acute test and measured endpoints other than survival, growth and reproduction. Therefore, a TRV was adopted from the US EPA document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for HMW PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to there being insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene and pyrene (both HMW PAHs) via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for

adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for benzo(b)fluoranthene in the ERA.

Ecotoxicity Information for Terrestrial Organisms - Benzo(b)fluoranthene

Tested Species	End-point	TRV	VEC	Applied
Wheat	Chronic NOAEL (growth)	1.2 mg/kg soil	Terrestrial Plant	1.2 mg/kg soil
Springtail	LC50/EC10 (mortality and reproduction)	360 mg/kg soil	Terrestrial Invertebrate	360 mg/kg soil
Multiple	Multiple	0.615 mg/kg-bw/day	Terrestrial Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

References

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. Toxicol. Environ. Health, Part A. 73: 540-551.

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US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Benzo(k)fluoranthene

For mammals, as cited in CCME (2010), Silkworth et al. (1995) investigated the immunocompetence of mice exposed via a single oral dose to several PAH including benzo(k)fluoranthene, at concentrations of 0.1, 1, 10 and 100 mg/kg bw. A NOAEL of 10 mg/kg was reported based on an immunocompetence endpoint. In addition, a LOAEL of 100 mg/kg was reported based on 50% suppression of immune responses observed in mice. This study is not particularly suitable for deriving a chronic TRV as it is an acute test and measured endpoints other than survival, growth and reproduction. Therefore, a TRV was adopted from the US EPA document entitled "*Ecological Soil Screening Levels*

for Polycyclic Aromatic Hydrocarbons (PAHs)" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for HMW PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene and pyrene (both HMW PAHs) via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for benzo(k)fluoranthene in the ERA.

Ecotoxicity Information for Terrestrial Organisms - Benzo(k)fluoranthene

Tested Species	End-point	TRV	VEC	Applied
Multiple	Multiple	0.615 mg/kg-bw/day	Terrestrial Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

References

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. Toxicol. Environ. Health, Part A. 73: 540-551.

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Trust, K.A., Fairbrother, A., and Hooper, M.J. 1994. *Effects of 7,12-Dimethylbenz[a]anthracene on Immune Function and Mixed-Function Oxygenase Activity in the European Starling*. Environ. Toxicol. Chem. 13(5): 821-830.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Chrysene

For mammals, as cited in CCME (2010), Silkworth et al. (1995) investigated the immunocompetence of mice exposed via a single oral dose to several PAH including chrysene, at concentrations of 0.1, 1, 10 and 100 mg/kg bw. A NOAEL of 10 mg/kg was reported based on an immunocompetence endpoint. In addition, a LOAEL of 100 mg/kg was reported based on >50% suppression of immune responses observed in mice. However, in the current RA, an

uncertainty factor of 10 is applied to the LOAEL reported by Silkworth et al (1995) to account for the use of an acute study. The resulting TRV is 10 mg/kg bw/d.

Several endpoints were reported by Lambelin et al. (1967) for 6-aminochrysene, as cited in the US EPA Eco-SSLs document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" (US EPA, 2007) and summarized below. This study was used in the derivation of Eco-SSLs for HMW-PAHs. Out of the literature reviewed by the EPA, the minimum LOAEL was reported by Lambelin et al. (1967) and the LOAEL value was considered most suitable for deriving a TRV for mammals in the present RA. The study was conducted for 360 days and assessed adverse effects on physiology and growth. The authors reported a growth LOAEL of 24 mg/kg bw/d.

With the added confidence that the LOAEL reported by Silworth et al. (1995) multiplied by the uncertainty factor of 10 is below the concentration at which no effect was observed during the study conducted by Lambelin et al (1967), it was considered suitable to use 10 mg/kg/d as the TRV.

No data are available to evaluate or predict the long-term effects of chrysene to birds. Mammalian toxicity data were used to derive a TRV for birds by applying a confidence factor of five in accordance with the guidance of Van der Wal (1995) and the CCME.

Ecotoxicity Information for Terrestrial Organisms - Chrysene

Tested Species	End-point	TRV	VEC	Applied
Rat	NOAEL (reproduction, growth and survival)	13.3 mg/kg-bw/d	Mammals	10 mg/kg-bw/d
Rat	NOAEL (growth)	11.8 mg/kg-bw/d		
Rat	NOAEL (physiology)	24 mg/kg-bw/d		
Rat	NOAEL (physiology)	26.4 mg/kg-bw/d		
Rat	LOAEL (reproduction, growth and survival)	26.4 mg/kg-bw/d		
Rat	LOAEL (growth)	24 mg/kg-bw/d		
Mouse	NOAEL (immunocompetence)	10 mg/kg-bw/d		
Mouse	LOAEL (immunocompetence)	100 mg/kg/d		
Mouse	LOAEL (immunocompetence)	100 mg/kg-bw/d	Birds	2 mg/kg-bw/d

References

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Dibenz(a,h)anthracene

The TRVs for terrestrial plants and invertebrates was taken from CCME (2010) document entitled "*Canadian Soil Quality Guidelines Carcinogenic and Other Polyaromatic Hydrocarbons (PAHs)*". The terrestrial plant value was based on the growth and mortality of Lupin (Henner et al., 1999). The invertebrate value was derived based on a study by Sverdrup et al. (2002) on Springtail reproduction.

A dibenzo(a,h)anthracene-specific TRV was not available for mammals and birds. In this RA, a TRV was adopted from Eco-SSLs document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to there being insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene and pyrene (both HMW PAHs) via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for dibenz(a,h)anthracene in the ERA.

Ecotoxicity Information for Terrestrial Organisms - Dibenz(a,h)anthracene

Tested Species	End-point	TRV	VEC	Applied
Lupin	LOEC (growth and mortality)	155 mg/kg soil	Terrestrial Plants	155 mg/kg soil
Springtail	EC10 (reproduction)	780 mg/kg soil	Invertebrates	780 mg/kg soil
Multiple	Multiple	0.615 mg/kg-bw/day	Terrestrial Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

References

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. Toxicol. Environ. Health, Part A. 73: 540-551.

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Henner, P, Schiavon, M, Druelle, V, and Lichtfouse, E. 1999. *Phytotoxicity of Ancient Gaswork Soils. Effect of Polycyclic Aromatic Hydrocarbons (PAHs) on Plant Germination*. Organic Geochemistry 30(8b): 963-969.

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Trust, KA, Fairbrother, A, Hooper, MJ. 1994. *Effects of 7,12-Dimethylbenz[a]anthracene on Immune Function and Mixed-Function Oxygenase Activity in the European Starling*. Environmental Toxicology and Chemistry. 13(5): 821-830.

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Indeno(1,2,3-cd)pyrene

There is limited information in the literature on the ecotoxicity of indeno(1,2,3-cd)pyrene on terrestrial species. As no ecotoxicity information was available in the ECOTOX database and CCME (2010) on toxicity of this parameter in mammals and birds, a TRV was adopted from the US EPA document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for HMW PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene and pyrene (both HMW PAHs) via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for indeno(1,2,3-cd)pyrene in the ERA.

Ecotoxicity Information for Terrestrial Organisms - Indeno(1,2,3-cd)pyrene

Tested Species	End-point	TRV	VEC	Applied
Multiple	Multiple	0.615 mg/kg-bw/day	Terrestrial Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

References

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. Toxicol. Environ. Health, Part A. 73: 540-551.

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PHCs

PHC Fraction F1 - Soil

The primary route of exposure to soil COCs for mammals and birds is through ingestion, inhalation and dermal contact exposure pathways. However, this RA follows the guidance of the US EPA (1999) and Environment Canada (1994) who consider ingestion to be the major pathway of concern for wildlife and consider the inhalation and dermal contact exposure pathways to be negligible in relative terms. AEP (2019) has developed guidelines protective of soil and food ingestion by wildlife (including secondary and tertiary consumers) that have been incorporated into the exposure scenario for natural areas and should be considered for other land uses (AEP, 2024 and CCME, 2006). This value was used as component value and benchmark for PHC fraction F1 in the current ERA.

Most PHCs are readily metabolized by vertebrates and modified into forms that can be readily excreted (CCME, 2008). As a result, PHCs do not show a tendency for accumulation within animal tissues, nor are they readily absorbed and accumulated within the tissues of plants. As a result, it is generally assumed that mammalian and avian receptors will not receive significant levels of exposure through food chain pathways. As such, AEP (2024) only considered soil ingestion when deriving the guideline value protective of soil and food ingestion by wildlife. The AEP guideline was developed using parameters for a meadow vole. AEP (2024) used the meadow vole as a surrogate receptor that would be protective of other wildlife due to its small home range and high soil ingestion rates relative to its bodyweight.

The TRVs used to derive the AEP soil guideline (benchmark soil concentration) was obtained from CCME (2008). The TRVs were derived based on a study on unweather crude oil (Stober, 1962 as cited by CCME, 2008) where a threshold dose (LOAEL) of 2.5 mL/kg was reported. This was converted to a TRV of 210 mg/kg-bw/day by accounting for the specific gravity of oil (0.85 g/mL) and applying an uncertainty factor of 10 (CCME, 2008). TRVs for the individual subfractions was then calculated assuming a PHC fraction distribution in crude oil of 23.2% for PHC fraction F1, 21.3% for PHC fraction F2, 34.5% for PHC fraction F3 and 18.2% for PHC fraction F4. Where an exceedance of an AEP component value was identified, quantitative evaluation of mammals and birds were completed using the TRVs presented in the table below and used by AEP (2019) to derive the soil guideline value.

Ecotoxicity Information for Terrestrial Organisms – PHC Fractions F1 to F3

Parameter	Tested Species	Endpoint	TRV	VEC	Applied
PHC Fraction F1	Meadow Vole (modelled)	Not Provided	11,000 mg/kg soil	Mammals/Birds	11,000 mg/kg soil

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Appendix M: Risk Management Plan

APPENDIX M: RISK MANAGEMENT PLAN

The following risk management measures (RMM) are recommended for the risk assessment (RA) property associated with the property municipally addressed as 15 Denison Avenue, Toronto Ontario (herein referred to as the "Site").

The designs, recommendations and specifications included in this Appendix are not intended to be building/structural designs or specifications for use during construction but rather schematics provided for the purpose of depicting risk management measures deemed appropriate for addressing environmental issues at the RA property, as outlined in the RA and to be later included in structural designs prepared, signed and stamped by a Professional Engineer with expertise in structural design and/or plans (e.g., Soil Management Plan) prepared, signed and stamped by an appropriately qualified person. Likewise, all information provided in this Appendix is intended for the purpose of mitigating risks arising from exposure of human and/or ecological receptors on-Site to the environmental contaminants identified in the RA report and is not intended for any other use. The signature and stamp of the environmental engineer thus enclosed represents approval for the suitability of the proposed measures only, and for the sole purpose of mitigating risks per the RA report.

The RA property is municipally located at 15 Denison Avenue in Toronto, Ontario and comprises an area of approximately 0.24 hectares (0.59 acres), as shown in Figure 3 of Appendix B. The intended redevelopment of the Site includes a multi-storey residential tower, cultural space and parkland (mixed residential, community, parkland use). The future Site building will be constructed as a slab-on-grade structure, and no basement or other subgrade structures are planned to be constructed at the Site. The Site is intended to be redeveloped for indigenous housing and is a priority redevelopment project for the City of Toronto.

The results of the RA indicated that unacceptable risks may be associated with certain receptors, both human and ecological, as a result of exposure to contaminants of concern (COCs) in soil and groundwater as summarized in Table M-1. In addition, several of the RMM to be completed at the Site will also need to be designed and implemented to account for the presence of residual light non-aqueous phase liquid (LNAPL) free-product in groundwater at the Site. Therefore, a risk management plan (RMP) is required, describing RMMs to be noted on a Certificate of Property Use (CPU) for the property.

Table M-1: Summary of Unacceptable Risks to Human and Ecological Health

Receptor	Pathway with Risk	Media	Contaminant of Concern
Site Resident (also surrogate for site visitor and indoor worker)	Indoor Air Inhalation	Soil	PHC F1
		Groundwater	PHC F1, PHC F2
		LNAPL	LNAPL
	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, copper, lead
	Ingestion of garden produce	Soil	Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, barium, copper, lead, zinc
Outdoor Maintenance Worker	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene
Construction Worker	Direct Contact (dermal contact and incidental ingestion)	Groundwater	PHC F1, PHC F2
		LNAPL	LNAPL
	Outdoor and Trench Air Inhalation	Groundwater	Xylenes, PHC F1
		LNAPL	LNAPL
Plants and Soil Invertebrates	Direct Contact	Soil	Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, copper, indeno(1,2,3-cd)pyrene, lead, PHC F1, phenanthrene and zinc
Mammals and Birds	Direct Contact	Soil	Barium, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, copper, indeno(1,2,3-cd)pyrene, lead

* No unacceptable risks were predicted for soil particulate inhalation.

M-1 Risk Management Performance Objectives

Risk reduction can be achieved by addressing any component of the exposure pathway by a) removing or treating the source, b) interrupting contaminant transport mechanisms, or c) controlling activities at the point of exposure. The RMP outlines the RMMs that may be implemented, where applicable and once the intended land use, on-Site activities and/or construction plans for the property are finalized, to achieve risk reduction.

The COCs and pathways which require RMM, the proposed RMMs and their performance objectives are summarized in Table M-2. The required reduction in exposure concentration to achieve acceptable target levels (HQ less than or equal to 0.2 (0.5 for PHCs or 0.8 for adult exposure to lead) for human health, or 1 for ecological health and/or a

cancer risk level to less than or equal to 1E-06) is provided in Tables M-3A and M-3B for soil and groundwater, respectively. Details of the RMMs are discussed in Section M-2.

Table M-2: Summary of RMM Performance Objectives

Proposed RMM	Pathway Mitigated	Affected Receptors	Performance Objectives
Vapour Mitigation System (Vapour Collection System and Membrane)	Indoor air inhalation (sourced from soil, groundwater and residual LNAPL)	Residents, Indoor Workers, Site Visitors	Reduction of COC concentrations in indoor air to within target levels.
Soil Barrier	Direct contact with soil	Residents, Outdoor Maintenance Workers, Site Visitors, terrestrial plants and soil invertebrates, mammals and birds	100% blockage of direct contact pathways through implementation of a physical barrier.
Health and Safety Plan (HASP)	Direct contact with groundwater (and residual LNAPL) and inhalation of trench air (sourced from groundwater and residual LNAPL)	Construction/Subsurface Utility Workers	100% blockage of direct and indirect contact pathways by use of personal protective equipment (PPE).
Soil and Groundwater Management Plan (SGMP)	Direct contact with groundwater and residual LNAPL	Construction/Subsurface Utility Workers, Off-site receptors	100% blockage of direct contact pathways by soil and groundwater management and administrative restrictions minimizing potential exposure during earthworks.
Prohibition of planting of fruit and vegetables for consumption	Ingestion of garden produce	Residents and Site visitors	100% blockage of exposure to soil COCs via ingestion of homegrown garden produce through an administrative control prohibiting gardening for consumption in on-site soils unless they are isolated from subsurface conditions.
Administrative control for slab-on-grade building design	Indoor air inhalation (sourced from groundwater and residual LNAPL)	Residents, Indoor Workers, Site Visitors	Maintain sufficient separation distance from the foundational slab and the groundwater table, such that the assumptions relied upon in the RA remain valid upon redevelopment.

Table M-3A: Summary of Required Exposure Concentration Reduction Levels for Soil COCs

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Minimum RBC[1]	Target Concentration[2]	Percent Concentration Reduction[3]
Indoor Air Inhalation (Resident, Indoor Worker, Site Visitor)	PHC F1	306	65	2.13	65	79%
Direct Contact (Resident, Site Visitor)	Benzo(a)anthracene	21.6	0.63	5.7	5.7	74%
	Benzo(a)pyrene	16.8	0.3	0.57	0.6	97%
	Benzo(b)fluoranthene	20.4	0.78	5.7	5.7	72%
	Benzo(k)fluoranthene	7.68	0.78	5.7	5.7	26%
	Dibenz(a,h)anthracene	2.52	0.1	0.57	0.6	77%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	5.70	5.7	44%
	Copper	1560	180	198	198	87%
	Lead	612	120	18.2	120	80%
Ingestion of Garden Produce (Resident, Site Visitor)	Benzo(a)anthracene	21.6	0.63	0.63	0.63	97%
	Benzo(a)pyrene	16.8	0.3	0.3	0.3	98%
	Benzo(b)fluoranthene	20.4	0.78	0.78	0.78	96%
	Benzo(k)fluoranthene	7.68	0.78	0.78	0.78	90%
	Chrysene	16.8	7.8	7.8	7.8	54%
	Dibenz(a,h)anthracene	2.52	0.1	0.1	0.1	96%
	Fluoranthene	48	0.69	0.69	0.69	99%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	0.48	0.48	95%
	Barium	623	390	390	390	37%
	Copper	1560	180	180	180	88%
	Lead	612	120	120	120	80%
	Zinc	660	340	340	340	48%
Direct Contact (Outdoor Maintenance Worker)	Benzo(a)anthracene	21.6	0.63	7	7	68%
	Benzo(a)pyrene	16.8	0.3	0.7	0.7	96%
	Benzo(b)fluoranthene	20.4	0.78	7	7	66%
	Benzo(k)fluoranthene	7.68	0.78	7	7	9%
	Dibenz(a,h)anthracene	2.52	0.1	0.7	0.7	72%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	7	7	32%
Direct Contact (Plants and Soil Invertebrates)	Anthracene	6.72	0.74	3.1	3.1	54%
	Benzo(a)anthracene	21.6	0.63	0.63	0.63	97%

	Benzo(b)fluoranthene	20.4	0.78	1.2	1.2	94%
	Chrysene	16.8	7.8	8.8	8.8	48%
	Copper	1560	180	180	180	88%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	0.48	0.48	95%
	Lead	612	120	310	310	49%
	PHC F1	306	65	210	210	31%
	Phenanthrene	27.6	7.8	7.8	7.8	72%
	Zinc	660	340	500	500	24%
Direct Contact (Mammals and Birds)	Barium	623	390	503	503	19%
	Benzo(a)anthracene	21.6	0.63	1.13	1	95%
	Benzo(b)fluoranthene	20.4	0.78	3.57	4	82%
	Benzo(k)fluoranthene	7.68	0.78	1.88	2	76%
	Chrysene	16.8	7.8	2.7	8	54%
	Copper	1560	180	242	242	84%
	Indeno(1,2,3-cd)pyrene	10.2	0.48	1.96	2	81%
	Lead	612	120	80.7	120	80%

All values in µg/g.
[1] Minimum risk-based concentration (RBC) for given exposure pathway for all relevant receptors from Human and Ecological Candidate Property Specific Standard (PSS) Tables (Tables E4-34A/B to E4-36 and E5-11, respectively, Appendix E).
[2] Where the minimum RBC was lower than the Table 3 SCS, the target concentration was set as the SCS.
[3] % concentration reduction = (PSS – Target Concentration)/PSS x 100%.
NA – not applicable. No reduction required.

Table M-3B: Summary of Required Exposure Concentration Reduction Levels for Groundwater COCs

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Minimum RBC[1]	Target Concentration[2]	Percent Concentration Reduction[3]
Indoor Air Inhalation (Resident, Indoor Worker, Site Visitor)	PHC F1	255,600	750	0.45	750	100%
	PHC F2	192,000	150	5.67	150	100%
Direct Contact (Construction Worker)	PHC F1	255,600	750	17,702	17,702	93%
	PHC F2	192,000	150	5,264	5,264	97%
Outdoor and Trench Air Inhalation (Construction Worker)	Xylenes	5,568	4,200	270	4,200	25%
	PHC F1	255,600	750	5,055	5,055	98%

All values in µg/L.
[1] Minimum RBC for given exposure pathway for all relevant from Human Candidate PSS Tables (Tables E4-38 to E4-40, Appendix E).
[2] Where the minimum RBC was lower than the Table 3 SCS, the target concentration was set as the SCS.
[3] % concentration reduction = (PSS – Target Concentration)/PSS x 100%.

It is noted that the required reduction in exposure concentration cannot be calculated for pathways where exposure to LNAPL may present an unacceptable risk. Therefore, the required exposure reduction is assumed to be 100% for exposure to LNAPL.

M-2 Risk Management Measures

The following sub-sections describe the proposed RMMs for the Site.

M-2.1 Administrative Control – Slab-On-Grade Building

To ensure that the assumptions relied upon within the RA's evaluation of potential risks to human health via vapour intrusion remain valid upon redevelopment of the Site, the CPU will be required to include an administrative control governing the final form of the future building to be developed at the RA property. The administrative control will dictate that the future building to be developed at the RA property will need to be a slab-on-grade structure. The slab-on-grade building design will ensure that impacted groundwater will not be present within the gravel crush of the foundational slab upon redevelopment, thus ensuring the assumptions relied upon within the evaluation of potential human health risks remain valid.

M-2.2 Engineered Measures for Vapour Intrusion

Passive Soil Vapour Intrusion Mitigation System (SVIMS) (with the Option of Converting into an Active System)

A combined sub-slab vapour membrane and passive sub-slab venting system (with the option of converting into an active system as a contingency measure) may be implemented as a vapour intrusion mitigation measure for new building construction.

The venting system is to be a passive system with the option of converting to an active – mechanically/fan driven – sub-slab depressurization system. The combined system of the vapour membrane and venting system provides two (2) complementary mechanisms for interrupting the transport of volatile COCs and operational redundancy in the event of failure in one of the component systems. In the case of a membrane barrier, the vacuum field created by a passive or active venting system limits the potential for possible preferential vapour transport along membrane seams and penetrations. Due to the varying vacuum field propagated by a passive venting system, the membrane barrier limits vapour transport along areas where the vacuum field may be weak or non-existent.

A conceptual drawing showing an overview of this system for a slab-on-grade building is presented as Figure M-2. Conceptual details for membrane vapour barriers and passive and active venting systems are presented in the following sections.

Sub-Slab Vapour Membrane

A continuous vapour membrane barrier system should be installed across the full areal extent of any foundation floor slab structure and along the vertical walls of any subsurface structures to provide a continuous barrier against the advective and diffusive transport of volatile COCs into building indoor air spaces. Where a sub-slab venting system is being installed, the vapour membrane is required below the foundation floor slab, above the soil vapour venting layer.

The membrane system may be constructed from different materials including:

1- Sheet Membranes: thermoplastic or elastomeric flexible membranes, e.g. high-density polyethylene (HDPE), polyvinylchloride, or EPDM (ethylene propylene diene monomer) rubber, polyolefin sheet membrane and fiber reinforced polyethylene materials, or a combination of multi-layer advanced membrane material technologies.

2- Fluid-applied Membranes: Fluid-applied or cured-in-place membranes are rubberized asphalt emulsions spray-applied.

The membrane system should be constructed in such a fashion to provide a gas tight barrier beneath a building slab including all seams, penetrations, horizontal to vertical and vertical to horizontal transitions.

Vapour membrane barriers must be of appropriate thickness and meet the appropriate gas permeability and chemical resistance specifications to be considered substantially impermeable to soil vapour, in accordance with the appropriate ASTM standards such as D412, D543 and 1434, as applicable.

Design specifications of the vapour membrane have been provided below. Several specifications are based on ASTM E1745 (Standard Specification for Plastic Water Vapour Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs), which provides three (3) classifications for vapour barriers/retarders known as Class "A", "B" or "C". Class A has the highest performance objectives while Classes B and C have lower strength and puncture resistance requirements; all Classes require a permeance of 0.1 perms or less. At a minimum, vapour barriers should meet or exceed the Class "A" permeance, strength, and puncture requirements as outlined in ASTM E1745.
ASTM E1745-09 does not specify a minimum material thickness. The American Concrete Institute previously recommended a thickness of no less than 10 mils (0.25 mm) (ACI 302.1R-04); however, it is acknowledged that the updated guidance (ACI 302.1R-15) indicates that the thickness of the material be selected on the basis of protective needs and durability during and after installation. Generally, thicknesses of vapour membranes satisfying the requirements of ASTM E1745 typically vary between 10 mils (0.25 mm) and 15 mils (0.38 mm), with increased thickness providing additional durability during and after construction. Therefore, it is recommended that the minimum thickness of the vapour membrane should be 15 mils (0.38 mm).

There are no gas permeability criteria in Ontario, or Canada for the COCs identified as a potential vapour intrusion risk. As the proposed vapour barrier must also demonstrate acceptable permeability to the COCs, or suitable surrogate molecules, where information is unavailable on specific parameters, the vapour barrier manufacturer should conduct additional product testing and/or provide a letter from their technical department verifying that the barrier will be acceptable with respect to the concentrations of COCs on-Site, which will be reviewed and approved by the design engineer prior to installation. Methane is provided as an example surrogate parameter in Table M-4, below, given the small size of this molecule relative to the COCs. It is noted that while gas permeability criteria for methane is also not provided for Ontario, or Canada, the City of Los Angeles criteria[1] considers an average methane gas transmission rate not exceeding 40.0 ml/day.m^2.atm as acceptable and has been applied in this RMP.

For chemical resistance, manufacturers typically provide "PASS/ GOOD/ EXCELLENT/UNAFFECTED" ratings based on various testing scenarios, and no specific value/number is available in Ontario or Canada. The vapour barrier manufacturer should provide a letter from their technical department verifying that the barrier will be acceptable with respect to the actual Site conditions and concentrations of COCs on-Site, which will be reviewed and approved by the design engineer prior to installation. In addition, regardless of chemical resistance ratings, it is important that the building design incorporate components to ensure that direct contact of the barrier with liquid or solid phase of the COC is mitigated. It is recommended such design components should be reviewed prior to selection of the soil gas barrier.

Table M-4: Vapour Membrane Characteristics

Property	Test Method	Value
Minimum thickness	Not Applicable	Minimum: 15 mil (0.38 mm)
Classification	ASTM E1745	Class A
Water Vapour Permeance	ASTM E96	Maximum: 0.1 perms

[1] https://dpw.lacounty.gov/epd/swims/docs/pdf/methane/DPW%20METHANE%20BARRIER%20CERTIFICATION.pdf

Property	Test Method	Value
Tensile Strength	ASTM E154	Minimum: 7.9 kilonewton per metre (kN/m) (45 pound-force per inch [lbf/in])
Puncture Resistance	ASTM D1709	Minimum: 2,200 g
Oil and Chemical Resistance	ASTM D543	Pass/Good/Excellent/Unaffected[1]
Gas Permeability	ASTM 1434	Suitably Impermeable[1]
Methane Transmission Rate	ASTM 1434	< 40.0 ml/day.m^2.atm

[1] Suitability should be based on review of manufacture's data specific for COCs identified on-Site, or suitable surrogates, to allow further assessment by the design engineer and/or a letter of reliance based on the actual Site conditions and concentrations of COCs from the manufacturer confirming their assessment for the suitability.

The construction of the membrane system should incorporate the following:

- Installation in a manner that minimizes the number of seams.
- Installation in a manner that avoids tears or punctures from building construction materials (e.g. rebar, conduits, etc). In the event of a puncture or tear, the membrane barrier must be sealed and repaired prior to pouring the concrete slab.
- Installation with underlying and overlying non-woven geotextile protective barriers to minimize the risk of puncture. However, other means of preventing damage to the vapour barrier may also be applied, as applicable and depending on the methods and type of vapour barrier implemented.
- Seams with a minimum overlap of 150 mm that are chemically or thermally welded.
- Termination on the exterior vertical surfaces of all exterior footings and installation beneath all interior footings.
- Installation around the vertical surfaces of all penetrations extending above the elevation of the membrane.
- The membrane should be overlapped at all horizontal to vertical transitions and penetrations with a minimum of 75 and 150 mm overlap on vertical and horizontal surfaces, respectively, or as per manufacturer's recommendations, and should be mechanically fastened to all vertical penetrations.
- The membrane should be chemically or thermally bonded to all vertical concrete surfaces.

In order to prevent any preferential pathways for vapour intrusion, all piping, sumps or other penetrations that are made through the membrane are to be sealed to ensure the presence of a continuous barrier against the transport of volatiles sourced from soil and groundwater into a building indoor air space. Finally, the selection of the membrane type should also include an assessment of the potential for residual LNAPL free-product in the subsurface to act as a continuous source of volatile soil and groundwater COCs.

The final design specifications for construction of the vapour barrier must be reviewed and sealed by a Professional Engineer, licensed in Ontario, as part of the final building design and specification preparation process and modified as required to meet the requirements of the building. A copy of the plan shall be provided to the Ontario Ministry of the Environment, Conservation and Parks (MECP), when available.

Figure M-3 presents the specifications and details of a proposed sub-slab vapour barrier membrane system where a sub-slab venting system is installed.

Passive Venting System (with the Option of Converting into an Active System)

A membrane vapour barrier system as discussed above is to be implemented in combination with a passive venting system (with the option to convert to an active system). As such, the following section provides an overview of the

passive system components in addition to those required to convert the system to active.

As passive and active venting systems share many similarities, apart from the mechanisms by which air flow is induced, conceptual descriptions of both systems are presented together below.

The implementation of a passive or active sub-slab depressurization (SSD) system involves the creation of a weak negative pressure (i.e. vacuum) field beneath concrete floor structure to intercept and convey volatile contaminant-containing soil gas to the atmosphere. The system objective is to maintain a minimum negative pressure beneath the whole of the slab structure to control the transport of volatile contaminant-containing soil gas and prevent target contaminants from accumulating within the indoor space at concentrations that pose risks above acceptable levels. These systems implemented as a combined RMM with a membrane barrier shall be in place for as long as concentrations of target volatile COCs in soil and groundwater at the Site continue to exceed the applicable MECP (2011) Table 3: Full Depth Generic Site Condition Standards (SCS) for Residential/Parkland/Institutional (RPI) property use with medium-fine textured soils (Table 3 SCS).

Sub-slab venting systems should consist of a gas permeable layer and a soil gas interception system installed beneath the building concrete slab and either an internal or external vertical vent pipe system discharging collected soil gas to the atmosphere. Passive venting systems rely on pressure gradients and air flow induced by stack buoyancy and wind effects whereas an active venting system relies on air flow induced mechanically by blowers or fans.

The gas permeable layer should consist of a coarse textured – high permeability gravel material installed beneath the building concrete slab that provides a permeability contrast with the surrounding unsaturated zone soil material; and therefore, acts as a preferential layer for the transport of soil gas.

The gas interception/collection system may consist of a network of perforated/slotted collection pipes and solid header pipes embedded within the gas permeable layer to collect and convey soil gas to the vent pipe system. The piping network should consist of 100 or 150 mm diameter collection pipe of polyvinyl chloride (PVC) or HDPE construction connected to header pipes of similar or greater diameter. Alternatively, the sub-grade component may consist of a proprietary low profile collection system if there are restrictions on the gravel venting layer thickness. These systems, reportedly, have comparable friction loss characteristics as pipe systems for axial flow and greater losses for the transverse flow component. The low-profile system would connect to the header pipe components in a similar manner to a conventional collection pipe network.

The configuration and spacing of the collection pipe network are building specific depending on the characteristics of the gravel venting layer, the materials and diameters of the collection header and vent pipes, fitting losses, the locations of footings and penetrations and whether an active or passive mode of operation is employed. The typical collection spacing for a passive system can range from 6 to 12 m, whereas greater spacing can be realized for active systems due to more extended pressure and flow fields. Passive collection systems should be constructed with as few bends as possible to minimize pressure losses.

For any configuration, pressure losses arising from gas transport through the porous gravel venting layer and piping networks must be estimated to evaluate vent pipe locations and blower/fan requirements. General design considerations include a minimum of 3 to 6 air exchanges of the gas permeable layer void space per hour (i.e. 20 to 10 minute pore volume extraction times) and to maintain a lower air pressure differential (at least 1 Pa) below the foundation floor slab, relative to the indoor air pressure within the building (passive system) or a minimum negative pressure of 6 Pa (active system), across at least 90% of the building area during all seasons.

The vent pipe component may consist of one or more vertical vent riser pipe(s) connected to the interception system header pipes and, which, may run through the building interior or exterior to roof level. The number of vent riser pipes is building specific and would be determined by factors such as pipe size and construction, fitting losses and

mode of operation (i.e., active versus passive). Due to limited and less predictable pressure fields, more vent riser pipes are required for passive systems. Vent riser pipes for passive systems must be installed within the building interior to roof level to enable air flow induced by thermal buoyancy effects as well as wind effects. The pipe spacing for any system must be evaluated iteratively by estimating pressure losses for all system components and different configurations. System performance also must be evaluated in the field by measuring gas pressures at strategically placed soil gas probes and monitoring system air flow.

Blowers/fans for active systems may be installed at the end of the vent riser pipes at roof level where the exhaust is discharged directly to the atmosphere. Alternatively, fans may be installed in line along exterior vent riser pipe sections. Fan requirements are determined by system configuration and an analysis of system pressure losses must be performed for proper fan sizing and to determine the number of units that are required. The objective in sizing fans for SSD systems is to minimize pressure losses to less than 500 Pa or 2 inches of water column, which can generally be achieved by utilizing pipes of sufficient diameter and minimizing the number of pipe bends. Fan operation must be continuous and maintained by interlocking sensors and controls with notification of system status.

A sub-slab venting system may be designed to be passive (i.e., in conjunction with a membrane barrier) with provisions for conversion to an active system, should it be warranted upon assessment of system performance. Such a conversion would generally involve the installation of a roof level fan with the necessary controls and sensors.

General Details for Passive and Active (SSD) Venting Systems

General details for passive sub-slab venting systems and active SSD systems employing roof mounted blowers/fans are presented below.

Subgrade Components

- The gas permeable venting layer should be constructed directly beneath the building slab with a maximum 200 mm thickness of 19 mm clear stone.
- Collection pipes should consist of perforated – SDR (Standard Dimensionless Ratio) 21/Schedule 40 – smooth walled -100 mm (inside) diameter rigid pipe of PVC, or HDPE construction and should be wrapped in non-woven geotextile fabric.
- Header pipes should consist of solid – SDR 21/Schedule 40 – 100 mm (inside) diameter – smooth wall - rigid pipe of PVC or HDPE construction.
- Although the groundwater table is not anticipated to be in contact with the subgrade components of the system, as a conservative measure, collection pipes should be designed to include clean-outs, drains or openings to ensure drainage and removal of condensate or water, including any entrained dust, that may enter collection pipes, geocomposite strips or vent risers. Additionally, any building drainage system for stormwater management at the future development (if required) shall be designed to ensure that the sub-slab venting system shall be maintained under dry conditions at all times.

Vent Riser Pipes

- Vertical vent riser pipes for passive systems must extend through the interior to the building roof.
- Riser pipes for active systems may extend through the building interior to roof level or be mounted along the building exterior.
- The vent pipe spacing should be determined from an evaluation of pressure loss estimates for the venting layer, collection and header piping and vent pipes. For passive systems, the maximum distance between vent riser pipes should be 30 m and the maximum distance between any collection pipe point and a riser pipe should be 40 m.

- Vent riser pipes should consist of solid – Schedule 40 – a minimum of 100 mm (inside) diameter – smooth wall pipe of PVC (height less than two stories), cast iron, galvanized or black steel construction with welded gas tight connections.
- Vent riser pipe outlets (fan exhaust) should be positioned a minimum of 3000 mm from the nearest operating inlet/open window and are to be terminated a minimum of 600 mm above such openings.
- Vent riser pipes should be equipped with one or more gas tight sample ports to monitor air flow and collect samples for chemical analysis.

Blowers/Fans (For Active System Only)

As noted in the preceding sections, the future SSD system is intended to be initially constructed as a passive system, with the option of conversion to active should building conditions warrant this in the future. Fans/blowers are only required to be installed in the event of a system conversion to active. Passive systems do not require powered fans/blowers as these types of system rely on natural pressure gradients. The following requirements are only applicable in the event of system conversion from passive to active.

- Fans for an active system should be sized to provide a minimum of 3 air exchanges per hour (pore volume extraction time of 20 minutes) of the venting layer void space.
- Fans for an active system should be provided with isolation valves, manual or actuated flow control valves, pressure and electrical sensors and interlocked with a control panel with alarm and notification functions.
- Fans for an active system should be installed, connected and housed in a manner to minimize vibrations and noise levels in accordance with applicable standards.

As noted above, the conversion of a passive to an active SSD system will require the instillation of sensors interlocked with a control panel to ensure the continuous operation of the mechanically driven fan/blower. For an active system the control panel, at a minimum, should be equipped with a manual – auto fan switch and visual indicators of the fan operational status. The control panel should be equipped with visual and audible alarms and an autodial function providing notification to designated personnel in the event of a system breakdown or failure.

The operational status of the fan should be monitored by a differential pressure or flow switch positioned either in the upstream fan manifold or in the fan exhaust pipe. The inclusion of a differential pressure or flow switch/sensor will be contingent on the magnitude of the system pressure losses and the sensitivity range of the sensors. The signal from the pressure or flow switch will provide real time confirmation of system operation.

The control panel alarm and call out functions will provide immediate notification of a system breakdown or power failure for the active SSD. For a system breakdown lasting more than three hours for an active SSD, contingency measures should be in place for the system to be attended by designated service technicians to assess its status.

The overall sub-slab venting system design for both passive and active systems should include the installation of sub-slab soil gas probes to provide for the measurement of pressure differentials between soil gas and indoor air at the design and operational stages, to ensure that a negative pressure is maintained below the foundational slab relative to the indoor air pressure across at least 90% of the building footprint for a passive system or to ensure that a minimum pressure differential of at least 6 Pa is maintained across 90% of the building footprint for an active system. The soil gas probes may be used in the design/construction stage to assist in fan sizing and confirm design calculations and at the commissioning and operational stages to evaluate system performance. The former measurements would require the use of a temporary fan (i.e. shop vac) with test sections for flow rate and applied pressure measurements.

The soil gas probes should be positioned to provide coverage of every 100 to 150 m^2 of the ground level slab area. The soil gas probes should be constructed of 13 to 15 mm diameter stainless steel and extend at least 150 mm into

the underlying gravel venting layer. The ends of the probes should be equipped with a gas tight fitting or valve to enable differential pressure measurements by means of a micro-monometer sensitive to a pressure of 1 Pa. The soil gas probes also may be used to sample the sub-slab soil gas for target analytes and assess requirements for continual operation of the SSD.

Details of sub-slab venting system components for both passive and active modes of operation are presented in Figures M-3 and M-4, and for above grade components in Figure M-5.

System Commissioning and Operation

Testing and monitoring would be required during system commissioning and operation. Testing during system commissioning should include measurements of system air flow and differential pressure measurements between indoor air and the soil gas within the gravel venting layer.

As described in the previous section, sub-slab pressure measurements should be made by means of sub-slab soil gas probes installed beneath the slab within the gravel venting layer. The objective of the vacuum testing is to confirm that that the system is capable to achieve and maintain a lower air pressure differential below the foundational slab, relative to indoor air pressure within the building, across at least 90% of the slab during all seasons for a passive system or to maintain a negative sub-slab (i.e. vacuum) pressure of 6 Pa below the foundation floor slab across the building area, relative to the indoor air pressure within the building across at least 90% of the building footprint during all seasons for an active system. For a passive SVIMS, vacuum testing of the soil vapour venting system must be conducted using temporary or permanently installed electrically powered fan(s). Vacuum testing of the soil vapour venting system should be conducted at least once before occupancy and as considered appropriate by a Licensed Professional Engineer after occupancy has commenced. Please refer to Section M-4.1.

In accordance with the requirements of O. Reg. 415/05 and O. Reg. 1/17, an application will have to be made to the MECP for an Environmental Compliance Approval (ECA) or registration with MECP Environmental Activity and Sector Registry (EASR) for the operation of any SSD system. An ECA (Air)/ EASR will be required to demonstrate compliance with the regulation by ensuring contaminant atmospheric concentrations at points of impingement (POI) relevant to the Site meet applicable POI standards. Compliance with the regulation will require assessing contaminant emission rates and applying recognized air dispersion models to evaluate POI concentrations. The preparation of an emission summary and dispersion modeling (ESDM) report is required.

M-2.3 Soil Barrier

The proposed soil barrier RMM serves to mitigate risks for all receptors from all direct soil contact pathways by blocking these pathways. The nature of the barrier may vary in thickness and in type across the Site. All soil imported to the Site must meet the soil importation requirements in Section M-2.5.1. The following barrier requirements provide minimum criteria. For the purpose of this RMP, granular material is defined as fill from a commercial sand and gravel pit or quarry licensed by the Ministry of Natural Resources pursuant to the *Aggregate Resources Act*, R.S.O. 1990, c. A .8. For the purpose of this RMP, clean soil means soil which meets the MECP (2011) Table 3 SCS.

The soil barrier may provide some level of protection to off-Site human and ecological receptors by minimizing off-Site migration of soil/dust and preventing exposure to soil COCs through direct contact, ingestion and dust inhalation pathways. However, as migration of soil/dust is generally considered insignificant in terms of being an off-Site exposure pathway, it is assumed the implications for off-Site receptors are minimal.

Hard Cap

Concrete/asphalt, or equivalent material used for a hard cap, must have a minimum thickness of 75 mm plus 150 mm underlying fill of "Granular A" or equivalent base material underlain by clean granular material, gravel and/or soil (which meets the Table 3 SCS) for a total barrier thickness of 225 mm (0.225 metres). Details for the Hard Cap design are shown in detail M-1.1 of Figure M-1.

Fill/Soft Cap

A fill/soft cap may consist of a minimum 1,000 mm (1.0 m) thick barrier of consist of granular material, gravel and/or soil meeting the Table 3 SCS. Details for the Fill Cap design are shown in detail M-1.2 of Figure M-1.

Where trees or shrubs with roots that extend below 1,000 mm (1.0 mbgs) are being placed, clean fill must be present to a depth of 1.5 mbgs. In addition, the root ball must be placed entirely within clean soil. As illustrated in detail M-1.3 of Figure M-1, the root ball must be placed in the subsurface such that there is a minimum of 500 mm (0.5 m) lateral radius of clean fill surrounding the root ball.

M-2.4 Health and Safety Plan

Under the Ontario Occupational Health and Safety Act, every employer is required to provide a health and safety policy and program. The Act also provides the framework and the tools to provide a safe and healthy workplace. It sets out the rights and duties of all parties in the workplace and establishes procedures for dealing with workplace hazards. Where compliance has not been achieved voluntarily, the Act provides for enforcement of the law. The implementation of a health and safety plan (HASP) is, therefore, the duty of every employer and would not be within the scope of this RMP. However, in this RMP, recommendations for inclusion in a HASP which is specific to unacceptable risks identified for the construction worker, are discussed below. At the time of work, the HASP should be prepared by a qualified person with respect to health and safety practices in the workplace and pertaining to exposure to the COCs noted in Table M-1. The HASP is to be specific to the exposure pathways that may pose potential risks above acceptable levels and is to be developed in accordance with all Ministry of Labour (MOL) and other occupational health and safety requirements.

It is the responsibility of the RA property owner to ensure that the HASP is developed by a suitably qualified person, as appropriate, and that the HASP be reviewed by a QP_{RA} to ensure it is adequate for meeting the intent of the RMP.

Prior to initiation of any project that involves activities potentially resulting in contact with or exposing contaminated soil or groundwater at the Site, where that Act requires the provision of notice, the local MOL office shall be notified of the proposed activities and that the Site contains contaminated soil and groundwater. Implementation of the HASP shall be overseen by persons qualified to review the provisions of the plan with respect to the proposed work and to conduct inspections.

The HASP for on-Site workers will have no impact on off-Site human or ecological receptors.

The following one or more measures (depending on the nature of the work) are recommended to be included in a HASP to address predicted unacceptable risks to a construction/subsurface utility worker as a result of on-Site contamination.

Personal Protective Equipment (PPE)
In the HASP prepared by a qualified person, workers should be notified that on-Site groundwater poses an unacceptable risk via direct contact and the trench air inhalation pathway. In addition, workers should be notified and properly educated on the potential for the presence of residual LNAPL within the subsurface at the Site. The

HASP will need to provide information on the use of and selection of PPE suitable for use in excavations or trenches where residual LNAPL free-product may be present. The HASP will need to include details on decontamination protocols, working practices and monitoring methods to ensure any potential risks posed by the presence of residual free-product in the subsurface at the Site are adequately addressed during any earthworks on-Site.

The HASP should also include an advisory for workers to practice good hygiene by washing hands, face and any other skin exposed to soil and/or ground water immediately following work completion.

Excavation/Trench Dewatering
Where an excavation/trench extends below the groundwater table, to mitigate direct contact with groundwater or residual LNAPL by construction/subsurface utility workers, the excavation must be fully dewatered prior to worker entry and should remain dewatered as long as workers are present within the trench or excavation. All dewatering activities must comply with the Groundwater Management Plan as described in Section M-2.5. Any residual free-product identified within an excavation or trench will need to be containerized and disposed of off-Site, in accordance with the requirements specified in Section M-2.5

HASP while working in a Trench
The HASP is required during subsurface work where there is potential for exposure to volatile COCs released from groundwater or residual LNAPL to trench air.

A HASP containing provisions for trench air quality and/or wind speed monitoring with contingency measures is required as RMM. Under this scenario, the HASP shall include a monitoring and exposure control plan for measuring trench air quality or wind speed to ensure worker exposure to concentrations of volatile COCs with predicted risk in air within the trench (i.e., PHC F1 and xylenes) is acceptable while workers are present. The monitoring plan shall be prepared by a qualified person in occupational exposure (e.g., Certified Industrial Hygienist, Registered Occupational Hygienist or equivalent) and shall also take into account the potential presence of residual-residual free product.

Contingency measures should be included in the HASP, and available on-Site, outlining an appropriate course of action, as determined by a qualified person in occupational exposure, should target analytes within the trench be measured above the action trigger values. Contingency measures may include, but are not limited to, covering of exposed ground surface, limiting excavation, ventilation or additional PPE to block exposure to COC vapours.

M-2.5 Soil and Groundwater Management Plan

M-2.5.1 Soil Management Plan

In the event that an excavation exposes contaminated soil, a soil management plan (SMP) must be implemented for the protection of human and ecological receptors on-site from exposure to impacted soil. The following is an outline of recommended measures for the management of soil, to ensure the protection of human and ecological receptors. In addition, during site development, the SMP provides the mechanism by which it will be determined whether imported soil meets the SCS for use in the fill cap.

A key aspect of the SMP is the implementation of a soil tracking control and characterization program. The SMP should be designed to fit the scope of any proposed ground intrusive work program in terms of soil movement and stockpiling, sampling and chemical analysis requirements. All activities should be implemented under the supervision of a Qualified Person for environmental site assessments (QP_{ESA}).

The SMP may provide some level of protection to off-site human and ecological receptors by minimizing off-site migration of soil/dust and preventing exposure to soil COCs through direct contact, ingestion and dust inhalation

pathways. However, as migration of soil/dust is generally considered insignificant in terms of being an off-site exposure pathway, it is assumed the implications for off-site receptors are minimal.

The following soil management measures represent the highest degree of management, as would be required in the case of significant development and construction activities. These measures are not necessarily applicable to all soil excavation activities and may be adapted as required according to the scope of work.

Soil Segregation and Characterization

- Excavated impacted soil should be segregated from non-impacted material, if any, using applicable field screening practices, and stockpiled within designated bermed containment zones and placed on an impermeable barrier. The volume of impacted soil excavated and stockpiled should also be recorded.
- Should any residual LNAPL free-product be encountered during earthworks at the Site, the impacted soil should be segregated from other soils at the Site, using applicable field screening practices, such as visual and olfactory identification and the use of hand-held instruments to detect elevated hydrocarbon volatiles (i.e., PIDs). Materials impacted with residual LNAPL free-product should be placed onto an impermeable barrier within containment zones or should be immediately loaded into suitable containers for off-Site disposal. The volume of soil impacted with residual LNAPL free-product excavated and stockpiled from the Site should be recorded.
- Soil characterization is not required for any excavated soil which is to be placed back beneath a soil barrier (Section M-2.3). It is assumed that the Site maximum has been reasonably identified per the Phase Two Conceptual Site Model (CSM) and thus it is assumed that any excavated soil would meet the PSS.
- Soil intended to remain on-site as part of the soil barrier must be characterized. The characterization should be overseen by a QPESA and undertaken at a sampling frequency in accordance with O. Reg. 153/04, Schedule E, Sections 34.1, 35 and 36. Chemical analysis should include all potential contaminants of concern based on the Phase Two CSM for the area being excavated.
- Soil intended to be disposed off-site must be characterized and undertaken at a sampling frequency in accordance with applicable regulations (e.g., O. Reg. 153/04, O. Reg. 406/19) and/or at a frequency deemed appropriate by the site QP_{ESA}. In the event that the excavated soil is to be sent off-site to a receiving site that is either a licensed landfill or a non-RSC property, soil characterization must be conducted in accordance with the requirements of the licensed landfill facility and/or applicable regulations (e.g., O. Reg. 406/19). Chemical analysis should include all contaminants of concern based on the Phase Two CSM for the area being excavated. Documentation should be procured by the RA property owner from the receiving site confirming that soil to be disposed at the receiving Site(s) is accepted based on the characterization prior to exporting soil.

Soil Importation

All soil to be imported to the site must meet the Table 3 SCS for Residential/Parkland/Institutional property use and medium-fine textured soils. Soil to be imported to the Site must be sampled at a frequency and for potential COCs in accordance with O. Reg. 153/04, Schedule E Section 31 and determined to meet the Table 3 SCS prior to importation.

Dust Control

Dust control measures will be implemented as part of the SMP to minimize movement of via airborne dust. This will include monitoring of dust emissions generated from on-Site vehicular traffic or other construction activities and implementation of dust control measures, as required which may include, but not be limited to: misting or wetting

with potable water or use of an approved dust suppressant, limiting vehicular traffic and speeds within the work area, modification of work schedules in high wind (> 30 km/hr) conditions, covering of stockpiles etc.

Mitigation of Off-Site Soil Tracking

During movement of contaminated soils off-Site, if any, soil tracking and decontamination of all vehicles and equipment exiting the Site must be monitored. To ensure tracking of soil off-Site is mitigated, mud mats and aggregate roadways may be used and must be inspected and maintained as they deteriorate. Sweepers should be used during movement of contaminated soil off-Site to cleanup roadways, as needed, to remove any soil tracked off-Site as much as reasonably practicable. Inspection of vehicles by personnel designated by the Construction Manager must occur at the vehicle/equipment cleaning station at the exit of the Site, prior to exit. Record keeping of inspection procedures should be conducted by the designated personnel.

Record Keeping
Daily monitoring of earthworks must be conducted by on-Site personnel to ensure compliance with the SMP. Monitoring and record keeping, as per the future CPU, may include:

- Details on materials coming to and/or leaving the Site;
- Material volume estimates;
- Dates and duration of work;
- Weather and Site conditions at time of work;
- Location and depth of excavation activities;
- Dust control measures;
- Stockpile management and drainage;
- All material characterization results provided by a Qualified Person;
- Tracking, decontamination inspection and record keeping;
- Records related to Permits to Take Water and Discharge Agreements as well as volumes, management and characterization records for any ground water disposed outside of the bounds of the PTTW and Discharge Agreement;
- Names of contractors, haulers and receiving Sites for any materials (including soil and/ or ground water) removed from the Site; and
- Any complaints received related to Site activities potentially coming in contact with or exposing Site soils and groundwater.

The property owner must retain a copy of all records relating to the SMP, including weigh bills. A copy of the SMP should be kept on-Site at all times.

M-2.5.2 Groundwater Management Plan

While the driver for the groundwater management plan (GMP) is to predict risks for a construction worker exposed to groundwater or residual LNAPL via direct contact, this RMM is intended to be implemented for any on-Site activity where groundwater is collected on-Site. This measure is also intended to address rainwater and snowmelt that may accumulate in excavations. It should be noted that based on the depth to groundwater measured at the Site of 2.84 m bgs and the proposed slab-on-grade building design, it is not anticipated that excavations in support of redevelopment will extend to within the groundwater table. In addition, it is noted that the measured depths to groundwater within the vicinity of the identified free-product are deeper than those identified at the southeastern portion of the Site in proximity to BH/MW5 were the minimum depth to groundwater was identified.

If an excavation extends below the groundwater table and groundwater and/or residual LNAPL collects in the excavation, measures are to be implemented for the management of the groundwater and/or residual LNAPL during

the dewatering of the excavation. The measures are as follows:

- Groundwater proposed for discharge to a municipal sanitary or storm sewer system is to be sampled, analyzed and assessed against applicable Sewer Use Discharge By-Law Parameter Criteria. Such waters are not to be discharged to the sanitary or storm sewer system until application has been submitted and authorization has been received from the governing municipality and/or Region and the quality of these waters meets the municipality's/Region's Sewer Use By-Law Parameter Criteria. Discharge approval from the municipality/region should be obtained prior to beginning any excavation works which may require dewatering;
- Prior to pumping of collected groundwater, storm water or melt water, the water within the excavation must be visually assessed for the presence of sheen or measurable residual LNAPL. Any residual LNAPL present within the excavation must be collected and containerized on-Site, prior to off-Site transport and disposal at an accredited waste management facility. LNAPL must not be discharged to municipal sanitary or storm sewer systems;
- If no discharge permits are obtained, groundwater is to be containerized for off-Site disposal at a licensed facility;
- Additional analysis of parameters that are COCs identified in the groundwater but do not have applicable sewer discharge criteria must also be conducted. Discharge criteria for these parameters should be proposed in the discharge permit application and be acceptable by the governing municipality;
- All equipment used to pump or transfer waters collected from the excavation is to be decontaminated and wash waters collected and containerized. The wash waters are to be disposed of in a similar manner as other water collected from excavations; and,
- In the event that an exceedance of the discharge criteria is identified, contingency measures such as treatment of the water prior to discharge into the municipal sewer system, or off-Site disposal at a licensed facility, should be implemented and overseen by a QP_{ESA}. Prior to ceasing the contingency measures, characterization of water should be undertaken and overseen by a QP_{ESA} to confirm that the groundwater meets the discharge criteria, and contingency measures are no longer required.

The GMP may provide some level of protection to off-Site human and ecological receptors by minimizing off-Site migration of groundwater.

M-2.6 Prohibition of Planting of Fruit and Vegetables for Consumption

Given that there may be potential unacceptable risks if a community or individual garden is planted in native soils, prohibition of planting fruit or vegetables for consumption, unless planted in above ground containers, such that they are isolated from the subsurface conditions, is required as RMM. Property Management will be responsible for ensuring all occupants are aware of this condition and that this condition continues to be met.

M-3 Duration of Risk Management Measures

Slab-On-Grade Building Construction
The slab-on-grade administrative RMM is required on-Site for as long as groundwater COCs exceed the Table 3 SCS.

Passive SVIMS (with the Option of Converting into an Active System)
The proposed engineering controls protective of the indoor air vapour intrusion pathway are permanent RMMs. These RMMs must be maintained as long as the concentrations of the applicable volatile COCs in soil and groundwater posing potential risks above acceptable levels are in excess of the MECP Table 3 SCS for soil and groundwater COCs, and while residual LNAPL is present.

Soil Barrier
The installation and maintenance of the soil barrier is required for as long as the applicable soil COC concentrations exceed the Table 3 SCS.

Health and Safety Plan
The implementation of HASP, where applicable, is required for as long as the applicable groundwater COCs exceed the Table 3 SCS, and while residual LNAPL is present.

Soil and Groundwater Management Plan
The SGMP is required for as long as soil and groundwater COC concentrations exceed the Table 3 SCS, and while residual LNAPL is present.

Prohibition on the Planting of Fruit and Vegetables for Consumption
The prohibition on the planting of fruit and vegetables for consumption is required as long as soil COC concentrations exceed the Table 3 SCS.

M-4 Requirements for Maintenance and Monitoring

No maintenance is necessary for RMM pertaining to the slab-on-grade building restriction or for the prohibition on the planting of fruit and vegetables for human consumption.

No maintenance is necessary for RMM pertaining to the HASP or SGMP. When work is to be undertaken which requires implementation of a HASP or SGMP, these plans must be specific to the work to be undertaken, including outlining the necessary monitoring requirements, and must be prepared prior to initiating the work. Monitoring of the proper implementation of the HASP and SGMP will be required for the duration of time that the HASP and SGMP are implemented.

The maintenance and monitoring requirements for other RMM are discussed further below.

M-4.1 Vapour Intrusion Mitigation

Maintenance and monitoring requirements associated with the engineered measure for vapour intrusion are outlined in the sections below.

Passive SVIMS (with the Option of Converting into an Active System)

Maintenance and monitoring requirements associated with the SVIMS RMM are outlined in the sections below.

Vapour Membrane Barrier System

For any new buildings constructed on-Site, monitoring and maintenance programs are required for construction activities during installation of a membrane barrier system, and for post-construction confirmation that the controls are achieving the required performance objectives as presented in Table M-2 of this document. The monitoring programs should include appropriate quality assurance/quality control measures during and post membrane installation and may include, but are not limited to, smoke testing, membrane thickness and seam/sealing integrity inspection.

During construction, when installing a vapour barrier, it must be ensured that building construction materials (e.g. rebar, conduits) do not puncture or tear the vapour barrier. In the event that a puncture or tear occurs, the affected area is to be properly sealed and repaired prior to pouring the concrete slab. A logbook is to be kept outlining the methods used to install and seal the barrier and describing the inspection of the barrier prior to laying the building foundation. The inspections must be documented by an individual with expertise in the area of vapour barrier installation and the logbook is to be kept by the RA property owner. The name of the individual(s) overseeing installation and performing the inspections must be included in the log.

The objective of post-construction monitoring is to ensure the integrity of all barriers applicable. The integrity of a vapour membrane barrier shall be ensured when performing any work involving excavation through the concrete floor slab. Post-construction maintenance of a membrane barrier will involve the continued repair of any damage, deterioration or breaches that may occur as a result of excavation through a building slab. A logbook will be kept outlining the activities performed on-Site that resulted in a breach of the barrier, and measures taken to reseal the barrier and building foundation. These activities must be documented by an individual with expertise in the area of vapour barrier installation and the logbook must be maintained by the RA property owner. The name of the individual(s) overseeing the activities must be included in the log.

Sub-Slab Venting Systems

Monitoring and maintenance programs will be required for the implementation and operation of any sub-slab venting system beneath any new building that may be constructed at the Site. During system installation, monitoring and inspections will be required to document that the materials used and construction are in conformance with design specifications. Monitoring and inspections should be performed by a Professional Engineer with suitable experience and expertise related to sub-slab venting systems.

Upon completion of construction, monitoring and inspections will be conducted during sub-slab venting system commissioning to confirm that its operation meets the RMM performance objectives. System commissioning should be conducted by qualified individuals experienced in the testing of such systems and should be documented by an experienced Professional Engineer or Qualified Person. Commissioning testing should include the measurement of pressure differentials between indoor air and sub-slab soil gas, air flow measurements and the collection of indoor air samples for laboratory analysis of target COCs. The performance objective for the passive SSD system is to achieve a lower air pressure differential below the foundation floor slab, relative to the indoor air pressure within the building, across at least 90% of the building area during all season; for an active SSD system the objective is to achieve a sub-slab depressurization/vacuum of at least 6 Pa. Testing should be performed under normal operating conditions. An inspection should also be made of the floor slab for cracks and penetrations that may potentially result in air leakages affecting the propagation of vacuum and air flow fields beneath the slab structures. The observations made during the system construction and commissioning monitoring programs and modifications to the system or its operation should be documented in a system commissioning report prepared by a Professional Engineer or Qualified Person.

Following system commissioning, monitoring and maintenance should be undertaken to ensure the continual operation within the RMM performance objectives. All visible and accessible above grade components should be inspected for damage or other signs of deterioration and for the sub-grade components, the overlying floor slabs for cracks that may result in leakage. Where leakage is suspected, the affected portions of the concrete slab should be repaired and re-inspected accordingly. For active systems, bi-annual inspections of mechanical components (fans, motors, etc.) should be undertaken.

As discussed in Section M-2.2, performance monitoring for the sub-slab depressurization system should include differential pressure measurements between indoor air and soil gas to confirm that an adequate vacuum field, of at least 6 Pa for an active system or a lower air pressure differential below the foundation floor slab, relative to the

indoor air pressure within the building (at least 1 Pa) for a passive system, across at least 90% of the building footprint during all seasons. For a passive SVIMS, vacuum testing of the soil vapour venting system must also be conducted using temporary or permanently installed electrically powered fan(s) to ensure a 6 Pa or lower air pressure differential can be met in the event conversion to an active system is required. Pressure differential/vacuum testing of the soil vapour venting system should be conducted at least once before occupancy. Additionally, for passive SVIMS only, quarterly pressure differential/vacuum testing should be conducted until written agreement from the Director to modify or discontinue the program is received at the request of the property owner. Alternatively, continuous data logging instrumentation could be considered.

Post construction monitoring will also include an indoor air or sub-slab vapour quality monitoring program. Details on indoor air quality monitoring are described below.

Contingency measures are to be implemented in the event that one (1) or more monitoring ports do not meet pressure differential requirements specified above. The proposed contingency measures comprise the development and implementation of an action plan providing mitigation measures. The contingency measures may include:

- If the measured pressure differentials are not within the specification provided above, then an additional check of the soil vapour collection system and associated equipment (e.g., exhaust fans, piping, etc.) will be conducted, followed by repairs, if necessary, and an additional round of pressure differential monitoring. This inspection (and confirmatory monitoring) will be conducted by trained personnel under the direction of a Professional Engineer within 30 days of the discovery of the failure.
- In the event the confirmatory pressure differential measurements verify that inadequate depressurization is present beneath the building, indoor air sampling will be conducted, within 30 days of the identification of failure of the confirmatory monitoring event (if not already completed as part of the Indoor Air or Sub-Slab Vapour Quality Monitoring Program discussed below). The number and locations of the indoor air samples will be determined by an industrial hygienist, a licensed engineer or other appropriate qualified person.
- If the concentration of a target analyte exceeds the comparative criterion, the contingencies measures outlined as part of the indoor air or sub-slab vapour quality monitoring program discussed below, will be implemented.

System inspections should be conducted by experienced individuals with suitable expertise in sub-slab venting systems. The observations should be documented in a log book to be maintained by the RA property owner. Maintenance of the below grade components is not required, however, in the event of any activities, which may have caused damage and warrant repair to these components, any repairs shall be documented in the system log. The names of all individuals undertaking or overseeing these activities shall be reported in the system log.

Indoor Air Monitoring Program

To verify the efficacy of the passive SVIMS, an indoor air quality (IAQ) sampling program will be implemented.

The IAQ program is to be developed and implemented by a qualified person and is to incorporate currently accepted sampling and analytical protocols. The property owner will ensure that all sampling is executed by individuals who are properly trained for collection of samples, and that the samples are analyzed by an accredited laboratory. The program will require approval from the MECP and cannot be modified without the concurrence and approval of the MECP.

The IAQ sampling is to be conducted by experienced and trained individuals using accepted procedures, and samples are to be analyzed using accepted methodologies by an accredited laboratory. Indoor air quality sampling should be

conducted following US EPA Method TO-15A. The number of IAQ samples to be collected should be in accordance with the minimum sampling densities presented within Table 8b.2, of Appendix 8b of the (Modified Generic Risk Assessment) MGRA Model User Guide (MECP, 2016).

Based on current conceptual design plans, the future Site building is anticipated to cover a footprint of approximately 1,500 m^2. As shown in Table 8b.2 of Appendix 8b, a minimum of four (4) IAQ samples would be required for the program. The sampling program should incorporate applicable QA/QC measures including ambient outdoor air background samples, field duplicates and travel blanks to ensure the collection of representative and non-biased samples. Prior to monitoring, the property owner shall retain the appropriate specialist to provide a sampling plan outlining the sampling locations and the number of samples to be collected. The RA property owner shall keep a written record of all sampling events, sample locations and analytical test results for a minimum of seven (7) years. These records will be made available for inspection, upon request, by a Provincial Officer.

Upon completion of building construction, but prior to occupancy, one (1) round of IAQ monitoring will be completed. After occupancy, the IAQ program is proposed to take place over a minimum five (5) year period, with the recommended sampling frequency of quarterly for the first year; semi-annually for the second year, with sampling events being conducted in the summer and winter; and, on an annual basis for the third, fourth and fifth years (during the worst-case season based on previous sampling events), and thereafter, until such time as the Owner has received MECP approval to reduce the frequency or discontinue monitoring.

Any indoor air concentrations are to be compared against the criteria derived from the MECP (2011c) Tier 2 Approved Model Health Based Indoor Air Criteria (HBIAC) for residential land use. The target levels for indoor air are outlined in Table M-5. Indoor Air samples will be collected using Summa™ canisters prepared and certified by an analytical laboratory and will be analyzed using EPA Method TO-15A for all parameters.

Table M-5: Indoor Air Quality Criteria for Target COCs for Residential Building Scenario

COC	Indoor Air Target Level[1] – Residential (µg/m^3)
PHC F1 Subfractions	
Aliphatic C6-C8	3.13E+02
Aliphatic C>8-C10	5.21E+02
Aromatic C>8-C10	1.04E+02
PHC F2 Subfractions	
Aliphatic C>10-C12	5.21E+02
Aliphatic C>12-C16	5.21E+02
Aromatic C>10-C12	1.04E+02
Aromatic C>12-C16	1.04E+02

[1] Health-based indoor air criteria (HBIAC) for a residential property as provided in MECP (2016) in consideration of the updated MECP (2024) TRVs.

In the event that concentrations of one (1) or more of the target COCs exceed the IAQ criteria, the MECP will be notified within two (2) weeks of receiving the laboratory analysis. The notice to the MECP will include the IAQ sampling results and the laboratory certificates of analysis. Confirmatory sampling will be conducted at the same location with the exceedance for the same COCs which exceed the criteria within one (1) month of receipt of the original sample analytical results. If the results reported for the second sample meet the IAQ criteria, no additional work would be required until the next scheduled sampling round. If the second air sample exceeds the IAQ criteria, the MECP will again be notified within two (2) weeks of receiving the laboratory analysis and a Professional Engineer

will be retained by the property owner to prepare and submit a report outlining contingency RMM within one (1) month for review by the MECP. Additional RMM will not be implemented without the concurrence of the MECP.

Contingency Measures

Possible contingency RMM would depend on the existing mitigation measures and evaluation of the risk. The proposed contingency measures comprise the development and implementation of an action plan providing mitigation measures.

Possible contingency RMM would depend on the mitigation measures already in place and may include:

- Implementation of engineering measures to increase building ventilation/pressurization (e.g., conversion to an active system).
- Additional inspection of the building concrete slab and sealing of cracks and penetrations where there may be leakage.
- Regular IAQ monitoring to identify building or environmental conditions that may be resulting in increased rates of vapour intrusion;
- Remediation of the soil and groundwater impacts. Potential remedial options may include in-situ bioremediation or remedial excavation.

All engineered contingency measures must be designed and sealed by a Professional Engineer licensed in Ontario.

M-4.2 Soil Barriers

The maintenance and monitoring of all soil barriers will be the responsibility of the RA property owner, who must keep a written record of all inspections including visual observations and, where applicable, analytical test results. The property owner will ensure that a full program of monitoring is conducted and documented for as long as COCs exceed the applicable MECP SCS, or until a new RA is performed resulting in a new RSC. An inspection and maintenance program shall be prepared and implemented to ensure the integrity of all barriers intended to prevent exposure to soil COCs. The program shall include, at a minimum, semi-annual inspections and the timely repair to any barrier deficiencies.

The following outlines situations of barrier compromise:

- Weathered/broken asphalt pavement including potholes or similar which result in exposed underlying soil.
- Damaged interlock, cracked sidewalk slabs or concrete slabs or equivalent damage to hard open space surfaces resulting in exposed underlying soil.
- Reduced thickness of soil or gravel barriers in open space caused by heavy traffic (human, ecological or other) or erosion.
- Unauthorized excavation etc.

It is the responsibility of the property owner to arrange for restoration of the barriers within a timely manner. Restoration of the barriers must be made to the original design specifications outlined in Section M-2.3, with written confirmation by a Professional Engineer licensed in Ontario that the barrier has been properly repaired.

If maintenance and restoration of any of the above involves disturbance, excavation or exposure of underlying soil exceeding the applicable MECP SCS, the property owner shall inform the contracted personnel of the exposure risk and the RMP requirements (i.e., SMP, HASP) during maintenance and repair activities. This notification will also serve to ensure contingency measures are implemented in the event a barrier compromise is identified and cannot be repaired in a timely manner, (e.g., limiting access to the compromised area through the use of temporary barriers

such as construction fencing or pylons until the barrier can be repaired).

M-5 Reporting

Upon implementation of RMM, a Site plan must be prepared showing the locations and extent of all engineering RMM protective of indoor air vapour intrusion and all barriers to Site soil installed across the RA property. As built-drawings including cross-sections should be prepared providing details on the vapour intrusion and soil barrier RMM. These drawings will be completed within 90 days of completion of development, kept on file by the property owner and made available to the MECP, upon request.

The Owner shall prepare, by March 31 each year, an annual report documenting the activities relating to the RMM undertaken during the previous calendar year. A copy of this report shall be kept by the Owner for inspection and be available upon request by the MECP.

The RA property owner will retain the following at the property, for inspection upon request by a Provincial Officer:

- A copy of all records related to the removal of LNAPL free-product at the Site, and any subsequent records related to the identification and removal of residual LNAPL encountered during earthworks at the RA property;
- A copy of all records relating to the SGMP, HASP and sub-grade work on the RA property;
- A copy of as-built plans confirming that the Site building was constructed to be slab-on-grade;
- A copy of all records relating to soil barriers (design specifications, construction, as-built drawings, inspections and maintenance);
- A copy of all records relating to the soil vapour mitigation measures (design specifications, construction, inspections and maintenance);
- A log of all monitoring events, and copies of air sampling data, and reports pertaining to the monitoring programs, and;
- A log of any modifications and/ or maintenance efforts carried out to mitigate concerns identified as a result of any monitoring programs and implementation of any RMM.

Records and as-built for all engineered plans for construction and RMM will be maintained by the property owner, for as long as the RMM applies. Records pertaining to monitoring, inspection and maintenance activities will be maintained by the property owner for a minimum of seven (7) years.

M-6 Financial Assurance

It is noted that the Site is currently owned by the City of Toronto and is intended to be conveyed to a indigenous community group for redevelopment. As per Section 3.9 of document F-15: Financial Assurance Guideline, financial assurance will not normally be required of municipalities, other provincial ministries, and other public bodies or institutions. As such, financial assurance is not required to be posted by the City of Toronto under current ownership.

M-7 Limitations and Closure

A risk assessment is a complex study that involves many areas including toxicology, geology, chemical transport and others. In completing this study, numerous conservative assumptions were made to manage scientific limitations and uncertainties. The information in this report is considered to be privileged and confidential and has been prepared exclusively for the property owner and review by the MECP. The information presented in this report is based on Site specific information, assumptions, and conclusions reported in the risk assessment. The contents of this report should be read in conjunction with the information contained within the risk assessment. Should additional Site information or new toxicity information become available, the risk assessment should be re-evaluated to determine if the conclusions presented in the report are still valid.

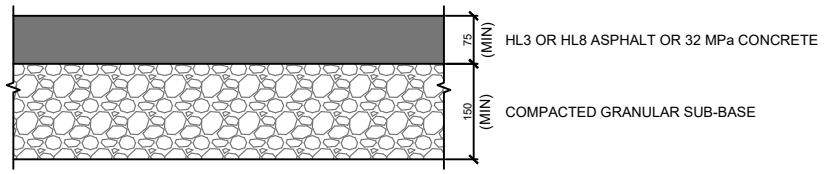
Achieving the objectives stated in this report has required us to arrive at conclusions based upon the best information presently known to us. Professional judgment was exercised in gathering and analyzing the information obtained and in the formulation of the conclusions. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

The design and specifications presented in this report are limited to the functions of the engineering measures describe herein as they relate to mitigation of potential risks from exposure to contaminants of concern at the Site and not to the operations, functions or requirements of other engineering systems or components. Design and specifications for such requirements should be addressed and developed by the applicable engineering discipline.

This report was prepared for the exclusive use of the property owner and may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever with the exception of the MECP. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

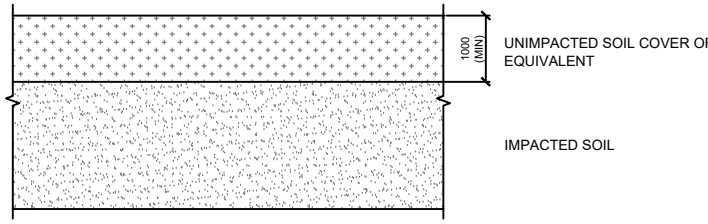
Robert Helik, P.Eng.
Vice President, Environmental Services

Figures



DETAIL M-1-1 HARD CAP CONSTRUCTION

NTS



DETAIL M-1-2 FILL / SOFT CAP CONSTRUCTION

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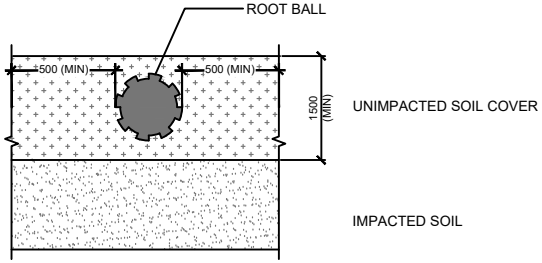

DETAIL M-1-3 TREE PLANTING SPECIFICATIONS

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NOTES:

1. ALL DIMENSIONS IN MILLIMETERS
2. THE QUALITY OF ALL UNIMPACTED SOIL COVER AND GRANULAR SUB-BASE MATERIALS ARE TO MEET THE MECP (2011) TABLE 3 SITE CONDITION STANDARDS

TITLE AND LOCATION:

SOIL BARRIER DETAILS
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	JA
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	M-1

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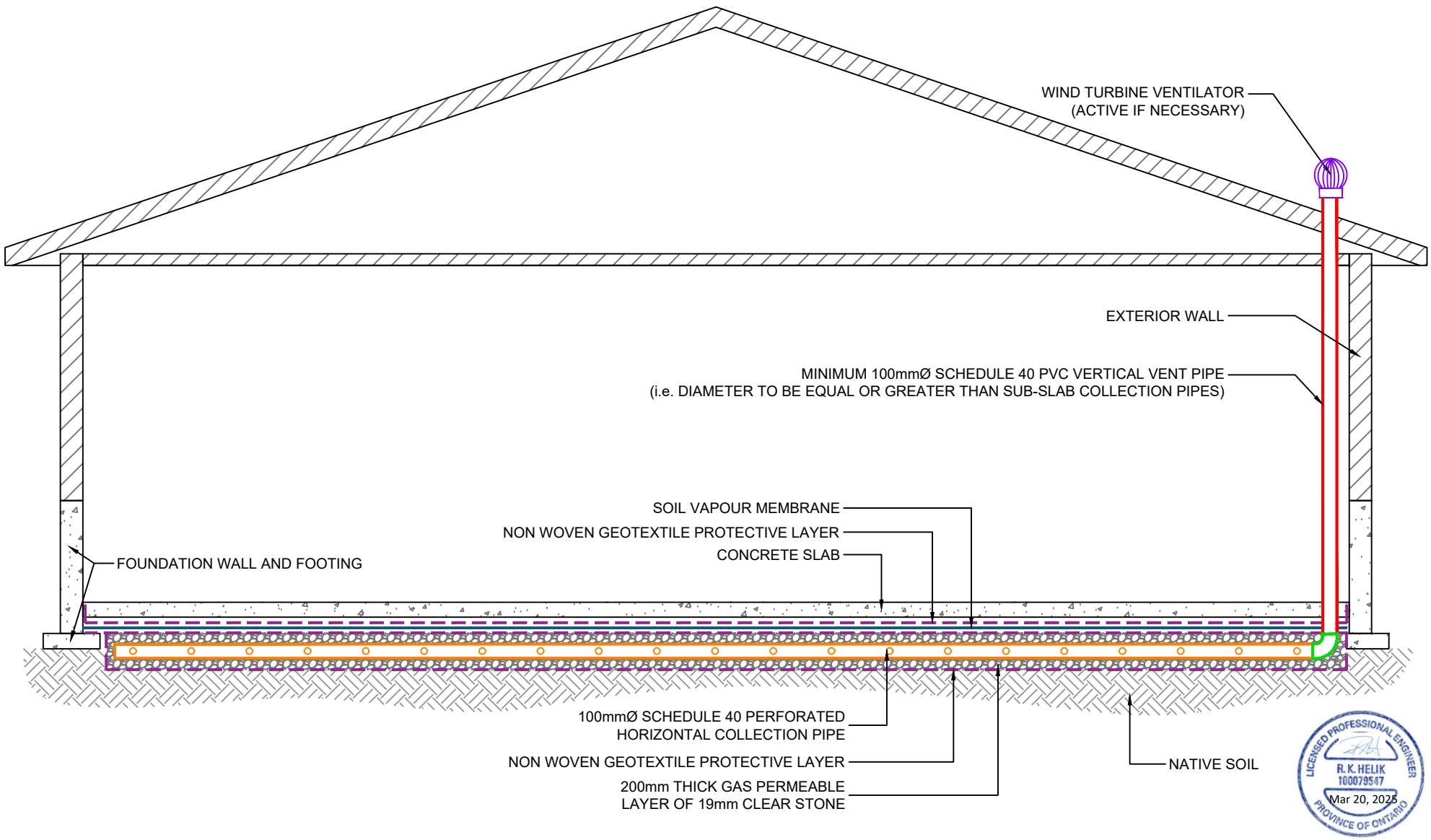

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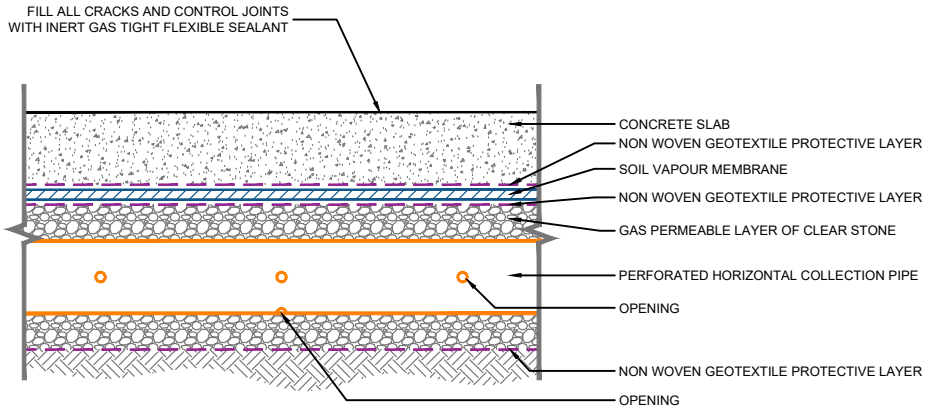
LEGEND:
- COLLECTION PIPE
- SOIL VAPOUR MEMBRANE
- GEOTEXTILE PROTECTIVE LAYER
- VERTICAL RISER

TITLE AND LOCATION:

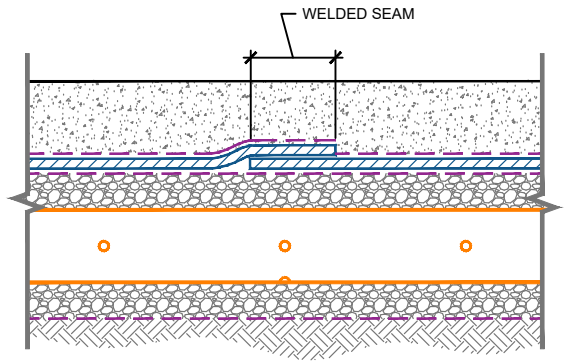
CONCEPTUAL PASSIVE SOIL VAPOUR COLLECTION SYSTEM (FUTURE BUILDING)

15 DENISON AVENUE
TORONTO, ONTARIO

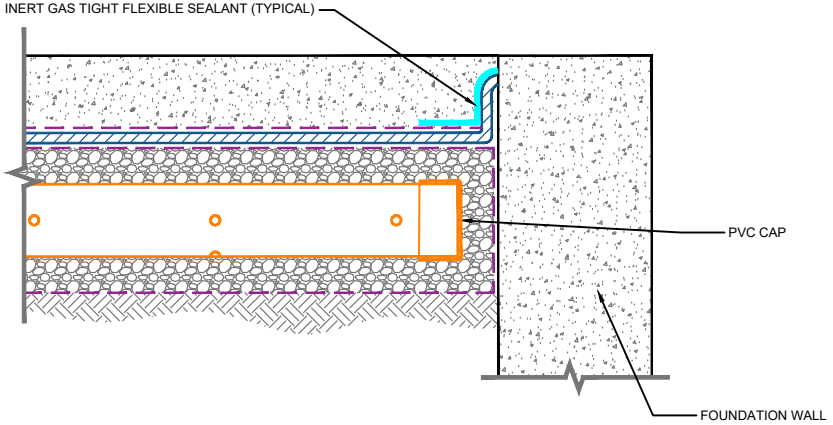
PROJECT NO.: GTR-21018382-B0	DWN.: JA
SCALE: AS NOTED	CK: SP
DATE: JANUARY 2025	FIG. NO.: M-2



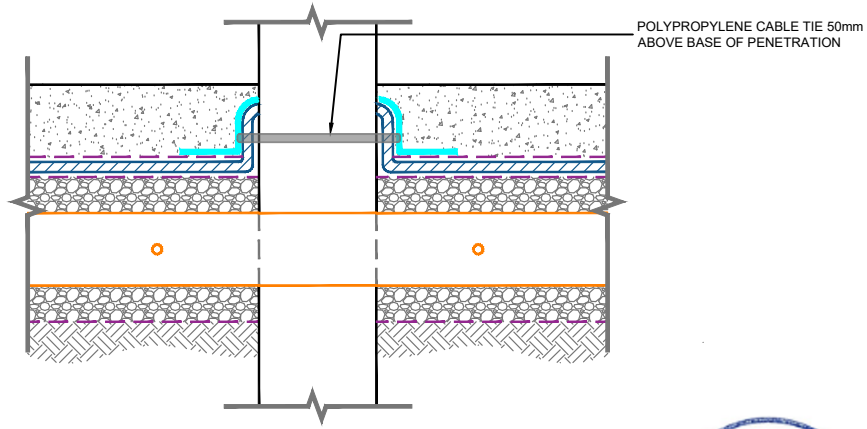
DETAIL M-3-1 SOIL VAPOUR BARRIER INSTALLATION BENEATH CONCRETE SLAB / FOUNDATION



DETAIL M-3-2 SOIL VAPOUR BARRIER OVERLAP DETAIL



DETAIL M-3-3 SOIL VAPOUR BARRIER AT FOOTING



DETAIL M-3-4 SOIL VAPOUR BARRIER INSTALLATION AT VERTICAL BARRIER

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TITLE AND LOCATION:

CONCEPTUAL VAPOUR MITIGATION SYSTEM DETAILS - VAPOUR MEMBRANE (FUTURE BUILDING)

15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	JA
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	M-3

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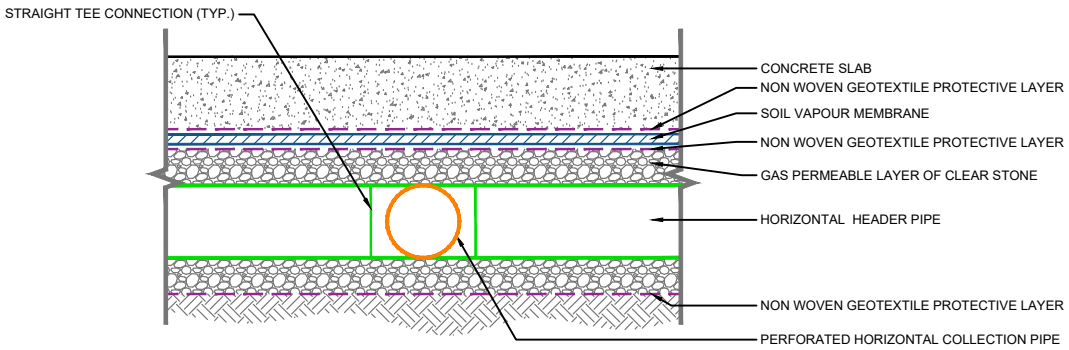
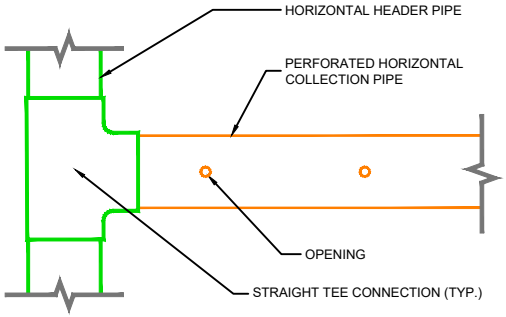
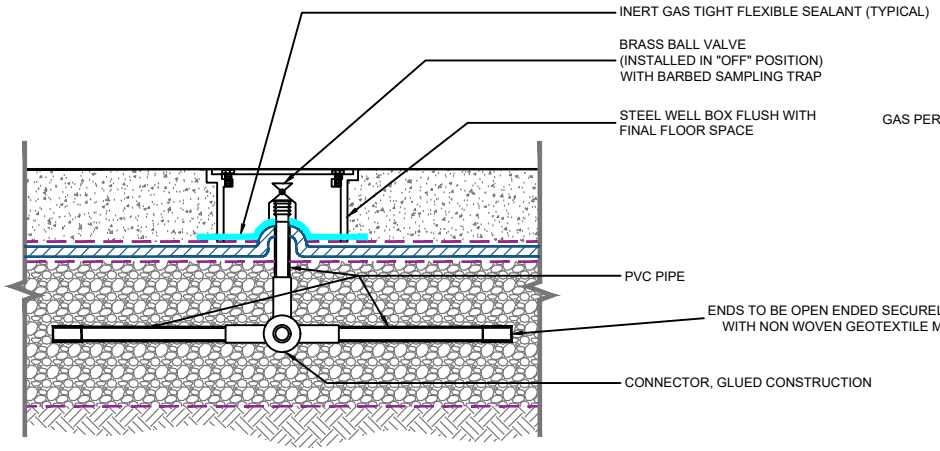


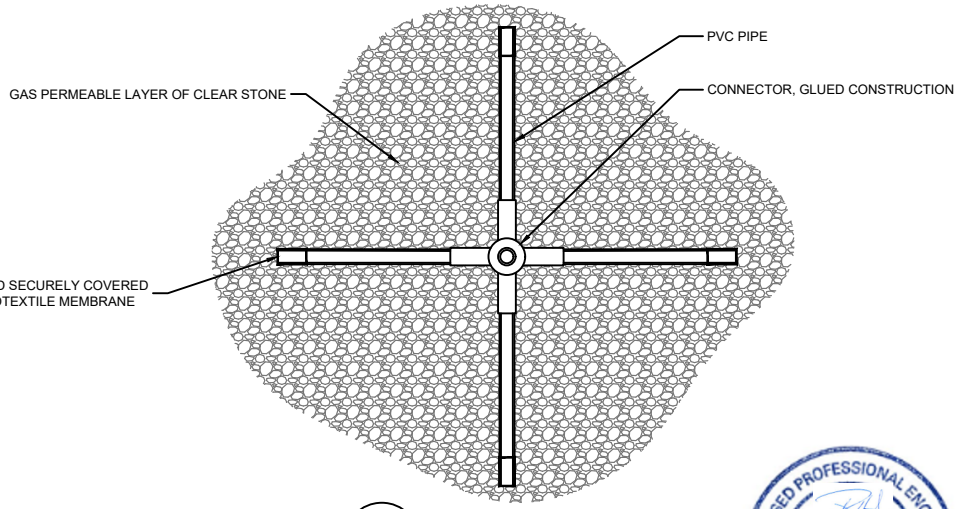
DETAIL M-4-1 HORIZONTAL COLLECTION PIPE HORIZONTAL HEADER SECTION



DETAIL M-4-2 HORIZONTAL HEADER PIPE - HORIZONTAL HEADER STRAIGHT TEE CONNECTION



DETAIL M-4-3 MONITORING PORT DETAIL



DETAIL M-4-4 MONITORING PORT PLAN VIEW

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TITLE AND LOCATION:

CONCEPTUAL VAPOUR MITIGATION SYSTEM DETAILS - SUB SLAB COMPONENTS (FUTURE BUILDING)

15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	JA
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	M-4

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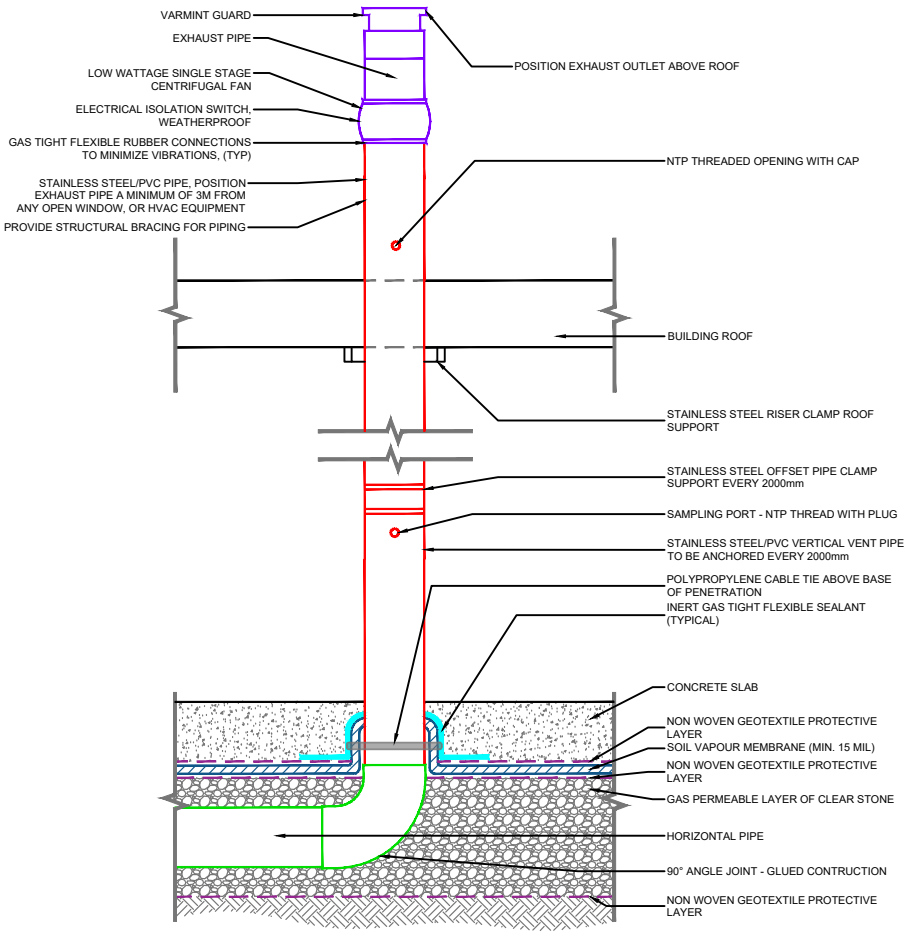
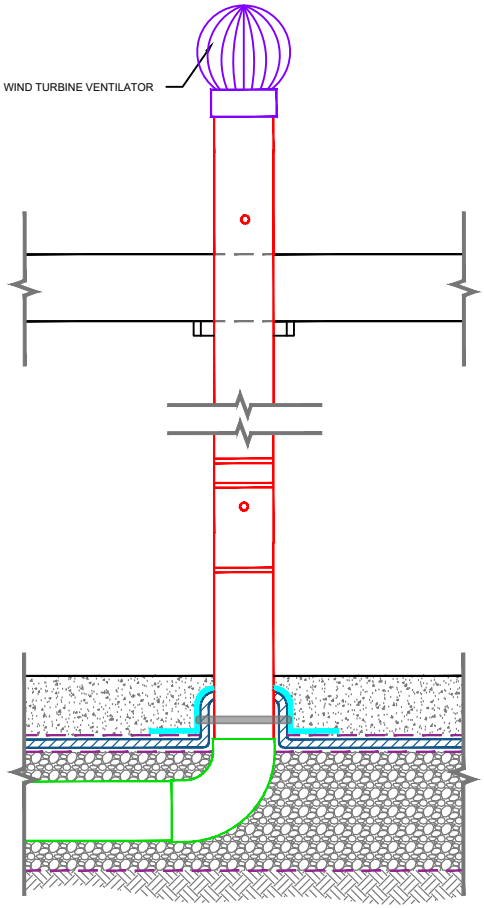
ACTIVE OPTION



DETAIL M-5-1 — VERTICAL VENT RISER PIPE AND EXHAUST FAN

PASSIVE OPTION



DETAIL M-5-2 — VERTICAL VENT RISER PIPE AND WIND TURBINE VENTILATOR

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TITLE AND LOCATION:

CONCEPTUAL VAPOUR MITIGATION SYSTEM DETAILS - ABOVE GRADE COMPONENTS (FUTURE BUILDING)
15 DENISON AVENUE
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21018382-B0	JA
SCALE:	CK:
AS NOTED	SP
DATE:	FIG. NO.:
JANUARY 2025	M-5

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Appendix N: References

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Appendix O: Notifications

April 18, 2024

Office of the City Clerk
City of Toronto
13th Floor West, 100 Queen Street West
Toronto, Ontario
M5H 2N2

Re: GTR-21018382-B0 Notification of Risk Assessment and Use of Non-Potable Standards
15 Denison Avenue, Toronto, Ontario

To Whom it May Concern:

EXP Services Inc. (EXP) has been retained to undertake Risk Assessment (RA) work and file a Record of Site Condition (RSC) under Ontario Regulation (O. Reg.) 153/04 for the above noted property (the 'Site' The Site is located on the east side of Denison Avenue, west side of Augusta Avenue and south side of Wolseley Street, approximately 45 metres north of Queen Street West. The Site has an area of approximately 0.24 hectares (0.59 acres) and is currently in use as a parking lot. The Site is located in a highly urban area of mixed-commercial, institutional and residential land use.

Notification of RA

Environmental assessment work has been conducted on-Site by Terrapex Environmental Ltd. and EXP Services Inc. between 2020 and 2024. All soil and groundwater sampling and analysis was performed in full compliance with O. Reg. 153/04.

The contaminants of concern that are the subject of the RA are barium, lead, zinc, electrical conductivity, sodium adsorption ratio, acenaphthylene, anthracene, fluoranthene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, F1 PHCs, and BTEX in soil and PHCs F1-F2 and xylene in groundwater.

Notification of Non-Potable Standards

As per O. Reg. 153/04, this letter serves to notify you of the intention to apply non-potable Standards (Ministry of the Environment, Conservation and Parks (MECP) Table 3 Standards) as listed in the *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* to the above noted property.

The MECP non-potable site condition standards were deemed to be applicable because:

- The property, and all other properties located, in whole or in part, within 250 metres of the boundaries of the property, are supplied by a municipal drinking water system and have no potable water wells installed;
- The property is not located in an area designated in a municipal official plan as a well-head protection area or other designation identified by the City of Toronto for the protection of groundwater; and,
- The RSC does not specify agricultural or other use as the type of property use for which the RSC is being filed.

By submitting this letter, EXP is addressing the RSC requirement whereby the municipality must be informed of the intention to apply non-potable groundwater site condition standards in the preparation of the RSC.

We trust that this provides the information required at this time. However, if you have questions or require any additional information, please do not hesitate to contact the undersigned.

Sincerely,
EXP Services Inc.

Samuel Patterson
(Samuel.Patterson@exp.com)
Risk Assessment Specialist / Project Manager
Environmental Services

TORONTO

Pat Scanga P.Eng. FEC.
Manager, Engineering Review

Engineering & Construction Services

Metro Hall
55 John Street, 16th Floor
Toronto, Ontario M5V 3C6

Tel: 416.392.8320
Fax: 416.392.4426
Pat Scanga@toronto.ca
www.toronto.ca

April 23, 2024

EXP
1595 Clark Boulevard
Brampton, ON L6T 4V1
CANADA

ATTENTION: Gabriel Spizzirri

Dear Gabriel:

Re: 15 Denison Avenue, Toronto Ontario

Your Notice of Intention dated April 18, 2024, pursuant to Section 35(3)(d) of Ontario Regulation 153/04 to apply non-potable ground water site condition standards.

Please be advised that we have no objection to non-potable ground water site condition standards being applied in the preparation of a Record of Site Condition for the subject property.

Yours truly,

Stephanie Macri

SM for PS
Pat Scanga, P.Eng. FEC.
Manager, Development Engineering
Toronto East York District

311
toronto at your service

Appendix P: Grain Size Rationale

APPENDIX P: RATIONALE FOR SOIL TEXTURE SELECTION

Based on previous subsurface investigations completed by EXP (2022c, 2025~~4~~a) and Terrapex (2020), the Site stratigraphy is generally described as consisting of asphalt overlaying fill comprising of sand and gravel to clay, underlain by silty sand till, then followed by silty clay till down to a depth of approximately 3.05 to 16.0 mbgs. Bedrock was encountered at depths ranging between 14.93 m to 21.34 mbgs.

Two (2) soil samples were collected as a part of the 2022 EXP Phase Two ESA (2022c) and analyzed by AGAT for grain size from BH3 located in the center of the Site. Soil samples collected from BH3 were collected from surficial and subsurface soil. Subsequently, two (2) additional soil samples were collected by EXP (2025a) and analyzed by BV labs for grain size to supplement the soil texture classification. BH201 was advanced at the northeastern portion of the Site and was sampled for surficial soil grain size. BH202 was advanced at the southwestern portion of the Site and was sampled for subsurface soil grain size. The results of the grain size data are presented below in Table P~~G~~.1.

Based on the observations made during previous drilling investigations and the results of the grain size analysis, as per Section 42 of O. Reg. 153/04, the QP_{ESA} has determined that less than 1/3 of the soil at the property, measured by volume, consists of coarse textured soil and hence standards for medium and fine textured soil at the property are applicable.

As per Section 42 of O. Reg. 153/04, coarse textured soil means soil that contains more than 50 percent by mass of particles that are 75 µm or larger in mean diameter and medium and fine textured soil means soil that contains 50 percent or more by mass of particles that are smaller than 75 µm in mean diameter.

Please refer to Table P~~G~~.1 below for a summary of grain size sample location, depth and sample description. Please refer to Figure P1, following this appendix, ~~5A of the Phase Two CSM (Appendix A)~~ for a visual depiction of sampling locations at the Site. A copy of the laboratory certificates of analysis are attached following this appendix. ~~Grain Size Analysis report is attached to this Appendix.~~

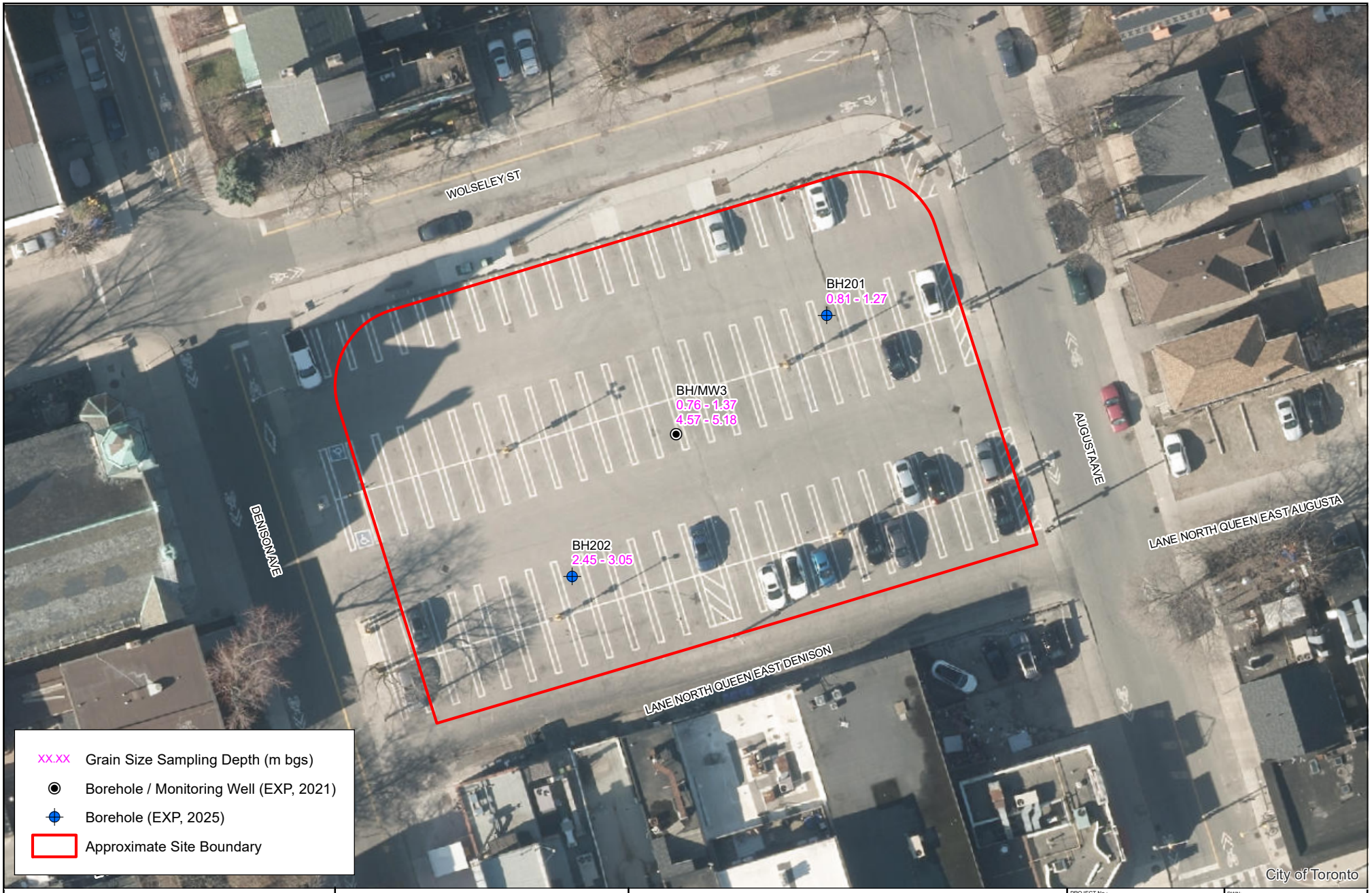
Table P~~G~~.1: Grain Size Sample Information

Sample ID	Sample Depth (mbgs)	Soil Texture	Soil Type	Sample Location
BH3 SS2	0.8 – 1.4	Medium - Fine	Sandy silt; trace clay and gravel	Central
BH3 SS6	4.6 – 5.2	Medium – Fine	Clayey silt	Central
BH201 SS1B	0.8 – 1.4	Medium-Fine	Silty clay fill, some gravel, trace sand	Northeastern
BH202 SS2B	2.4 – 3.1	Medium-Fine	Silty clay till	Southwestern

References:

- Terrapex Environmental Ltd. (2020) *Summary of Environmental Investigation, 15 Denison Avenue, Toronto, Ontario*, dated April 30, 2020.
- EXP (2022c) *Phase Two Environmental Site Assessment, 15 Denison Avenue, Toronto, Ontario*, dated August 31, 2022.
- EXP (2025~~4~~a*) Phase Two Environmental Site Assessment Update, 15 Denison Avenue, Toronto, Ontario*, In-Progress.

Schedule I – Grain Size Analysis Location Figure



EXP Services Inc.
t: +1.905.793.9800 | f: +1.905.793.0641
1595 Clark Boulevard
Brampton, ON L6T 4V1
Canada
www.exp.com

•BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

N

0 5 10 15 20 25 m

TITLE AND LOCATION:

GRAIN SIZE SAMPLING LOCATIONS
Phase Two Environmental Site Assessment
15 Denison Avenue
Toronto, Ontario

PROJECT No.: GTR-21018382-B0	DWN: AC
SCALE: AS NOTED	CHKD: SP
DATE: JANUARY 2025	FIG. No.: P1

Schedule II – Certificate of Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: EXP SERVICES INC
1595 CLARK BLVD.
BRAMPTON, ON L6T4V1
(905) 793-9800
ATTENTION TO: Jason Slidders
PROJECT: GTR-21018382-A0
AGAT WORK ORDER: 21T846789
SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Lab Manager
DATE REPORTED: Dec 30, 2021
PAGES (INCLUDING COVER): 6
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21T846789

PROJECT: GTR-21018382-A0

CLIENT NAME: EXP SERVICES INC

ATTENTION TO: Jason Slidders

SAMPLING SITE:15 Denison Ave.

SAMPLED BY:M.K

O. Reg. 153(511) - ORPs (Soil)

DATE RECEIVED: 2021-12-17 **DATE REPORTED: 2021-12-30**

		SAMPLE DESCRIPTION:		BH2 SS2	BH2 SS5
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		2021-12-17	2021-12-17
Parameter	Unit	G / S	RDL	3362030	3362031
pH, 2:1 CaCl2 Extraction	pH Units		NA	11.3	7.89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3362030-3362031 pH was determined on the 0.01M CaCl2 extract obtained from 2:1 leaching procedure (2 parts extraction fluid:1 part wet soil).

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21T846789

PROJECT: GTR-21018382-A0

CLIENT NAME: EXP SERVICES INC

ATTENTION TO: Jason Slidders

SAMPLING SITE:15 Denison Ave.

SAMPLED BY:M.K

Particle Size by Sieve (Wet)

DATE RECEIVED: 2021-12-17 **DATE REPORTED: 2021-12-30**

		SAMPLE DESCRIPTION:		BH3 SS2	BH3 SS6
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		2021-12-17	2021-12-17
Parameter	Unit	G / S	RDL	3362032	3362033
Sieve Analysis - 75 µm (retained)	%		NA	20.18	18.80
Sieve Analysis - 75 µm (passing)	%		NA	79.82	81.20
Soil Texture (Toronto)				Fine	Fine

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3362032-3362033 Value reported is the amount of sample passing through or retained on sieve after wash with water and represents proportion by weight particles smaller or larger than indicated sieve size.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 21T846789

PROJECT: GTR-21018382-A0

ATTENTION TO: Jason Slidders

SAMPLING SITE:15 Denison Ave.

SAMPLED BY:M.K

Soil Analysis

RPT Date: Dec 30, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - ORPs (Soil)															
pH, 2:1 CaCl2 Extraction	3362744		6.88	7.32	6.2%	NA	99%	80%	120%	NA			NA		

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Particle Size by Sieve (Wet)															
Sieve Analysis - 75 µm (retained)	3362032	3362032	20.18	19.46	3.6%	NA	104%	70%	130%	NA			NA		
Sieve Analysis - 75 µm (passing)	3362032	3362032	79.82	80.54	0.9%	NA	NA			NA			NA		

Comments: NA Signifies Not Applicable

Certified By:

Amanjot Bhela

CHARTERED CHEMIST AMANJOT BHELA — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 21T846789

PROJECT: GTR-21018382-A0

ATTENTION TO: Jason Slidders

SAMPLING SITE:15 Denison Ave.

SAMPLED BY:M.K

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
pH, 2:1 CaCl2 Extraction	INOR-93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER
Sieve Analysis - 75 µm (retained)	INOR-93-6065	ASTM D1140	SIEVE
Sieve Analysis - 75 µm (passing)	INOR-93-6065	ASTM D1140	SIEVE

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 21T846~~313~~789

Cooler Quantity: 1 Large

Arrival Temperatures: 1.4 3.2 2.7

Custody Seal Intact: ☐ Yes ☐ No ☑ N/A

Notes: Frozen

Report Information:

Company: EXP services Inc.
Contact: Jason Slidders
Address: 1595 Clark Blvd

Phone: 905 793 9800 Fax:

Reports to be sent to:
1. Email: Jason.Slidders@exp.com
2. Email:

Project Information:

Project: GTR-21018382-A0
Site Location: 15 Denison Ave
Sampled By: M.K
AGAT Quote #: PO:

Please note: if quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company: EXP
Contact:
Address: AP@exp.com
Email: Karen.Burke@exp.com

Regulatory Requirements:

(Please check all applicable boxes)

☑ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☑ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☑ Fine

☐ Excess Soils R406
Table _____ *Indicate One*
☐ Regulation 558
☐ CCME

☐ Sewer Use
☐ Sanitary ☐ Storm
_____ *Region*
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☑ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: PCBs	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	pH	Grain Size (75 micrometre)	Potentially Hazardous or High Concentration (Y/N)
BH2 SS2	17/12/21	AM PM	1	S													✓		
BH2 SS5	17/12/21	AM PM	1	S													✓		
BH3 SS2	17/12/21	AM PM	1	S														✓	
BH3 SS6	17/12/21	AM PM	1	S														✓	
		AM PM																	
		AM PM																	
		AM PM																	
		AM PM																	
		AM PM																	
		AM PM																	
		AM PM																	

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Matthew Kwan Matthew	17/12/21	12:00	HEAC		
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

21 DEC 17 12:00

Page _____ of _____

Nº: T 127760

Your Project #: GTR-21018382-B0
Site Location: 15 DENISON STREET, TORONTO, ONTARIO
Your C.O.C. #: N/A

Attention: Samuel Patterson

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2025/01/09
Report #: R8468411
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BUREAU VERITAS JOB #: C501321
Received: 2025/01/07, 13:52

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Sieve, 75um	2	N/A	2025/01/09	CAM SOP-00467	ASTM D1140 -17 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

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

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Bureau Veritas - Partial/Rush Results

Your Project #: GTR-21018382-B0
Site Location: 15 DENISON STREET, TORONTO, ONTARIO
Your C.O.C. #: N/A

Attention: Samuel Patterson

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2025/01/09
Report #: R8468411
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BUREAU VERITAS JOB #: C501321
Received: 2025/01/07, 13:52

Encryption Key

Trushna Patel
Project Manager
09 Jan 2025 16:28:57

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas - Partial/Rush Results

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C501321
Report Date: 2025/01/09

exp Services Inc
Client Project #: GTR-21018382-B0
Site Location: 15 DENISON STREET, TORONTO, ONTARIO
Sampler Initials: GS

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		AMZU52	AMZU53		
Sampling Date		2025/01/07 10:00	2025/01/07 12:00		
COC Number		N/A	N/A		
	UNITS	**BH202 SS2B**	**BH201 SS1B**	**RDL**	**QC Batch**
Miscellaneous Parameters					
Grain Size	%	FINE	FINE	N/A	9856265
Sieve - #200 (<0.075mm)	%	83	82	1	9856265
Sieve - #200 (>0.075mm)	%	17	18	1	9856265

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas - Partial/Rush Results

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

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

Package 1	0.0°C

Results relate only to the items tested.

Bureau Veritas - Partial/Rush Results

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C501321
Report Date: 2025/01/09

exp Services Inc
Client Project #: GTR-21018382-B0
Site Location: 15 DENISON STREET, TORONTO, ONTARIO
Sampler Initials: GS

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9856265	SIA	QC Standard	Sieve - #200 (<0.075mm)	2025/01/09		55	%	53 - 58
			Sieve - #200 (>0.075mm)	2025/01/09		45	%	42 - 47
9856265	SIA	RPD	Sieve - #200 (<0.075mm)	2025/01/09	1.7		%	20
			Sieve - #200 (>0.075mm)	2025/01/09	3.1		%	20

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

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

Bureau Veritas - Partial/Rush Results

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C501321
Report Date: 2025/01/09

exp Services Inc
Client Project #: GTR-21018382-B0
Site Location: 15 DENISON STREET, TORONTO, ONTARIO
Sampler Initials: GS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas - Partial/Rush Results

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

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BUREAU VERITAS

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/6

CHAIN OF CUSTODY RECORD

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: EXP Services Inc.	Company Name: EXP Services Inc.	Quotation #:	[X] Regular TAT (5-7 days) Most analyses
Contact Name: Samuel Patterson	Contact Name: Accounts Payable	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 1595 Clark Blvd, Brampton ON	Address: 1595 Clark Blvd, Brampton ON	Project #: GTR-21018382-B0	Rush TAT (Surcharges will be applied)
Phone: Fax:	Phone: Fax:	Site Location: 15 Denison Street, Toronto, Ontario	[ ] 1 Day [ ] 2 Days [ ] 3-4 Days
Email: Samuel.Patterson@exp.com ; Gabriel.Spizzirri@exp.com	Email: AP@exp.com ; Karen.burke@exp.com	Site #:	Date Required:
		Site Location Province: Ontario	Rush Confirmation #:
		Sampled By: Gabriel Spizzirri	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153

[ ] Table 1 [X] Res/Park [X] Med/ Fine
[ ] Table 2 [ ] Ind/Comm [ ] Coarse
[X] Table 3 [ ] Agri/ Other
[ ] Table ____
FOR RSC (PLEASE CIRCLE) (Y) / N NO

Other Regulations

[ ] CCME [ ] Sanitary Sewer Bylaw
[ ] MISA [ ] Storm Sewer Bylaw
[ ] PWQO Region ____
[ ] Other (Specify) ____
[ ] REG 558 (MIN. 3 DAY TAT REQUIRED)
[ ] REG 406 Table ____

Include Criteria on Certificate of Analysis: (Y) / N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

LABORATORY USE ONLY

CUSTODY SEAL Y / N Present	CUSTODY SEAL Y / N Intact	COOLER TEMPERATURES
Y	Y	-01-01-0

COOLING MEDIA PRESENT: (Y) / N

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr VI, ICPMS Metals, HWS - B)	Grainsize	MeHg							HOLD- DO NOT ANALYZE	COMMENTS
1	BH203 SS1A	2025/01/07	10:00	S										X								
2	BH203 SS1B	"	"	"										X							X	HOLD
3	BH 203 SS Ø	"	"	"										X								
4	BH 202 SS2AB	"	10:00	"									X									
5	~~BH201~~ BH201 SS1B	"	12:00	"									X									
6																						
7																						
8																						
9																						
10																						

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Gabriel Spizzirri G.S.	2025/01/07	13:50	Sharon Anthony-De Fonseca SDF	2025/01/07	13:52

NONT-2025-01-677

Bureau Veritas - Partial/Rush Results

Appendix Q: Additional Supporting Information

The following information is provided in the included zip file:

1. Laboratory Certificates of Analysis
2. Borehole Logs
3. Previous Environmental Reports
4. Groundwater Level Measurements
5. Modified Generic Risk Assessment Model Input & Output
6. Unlocked Conceptual Site Model
7. Unlocked Plan of Survey