APPENDIX J

RISK MANAGEMENT PLAN
1161 KINGSTON ROAD
TORONTO, ONTARIO

File No. 02103035.000
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Englobe Corp.

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FIGURES:

1.0 INTRODUCTION

The Property is located on the northwest corner of the intersection of Churchill Avenue North and Byon Avenue in the City of Ottawa, Ontario and is irregular in shape and consists of one parcel of land at the address of 424 Churchill Avenue North. The total area of this property is approximately 1,006 m^2 (0.1 hectares). The property was formerly developed with a single storey commercial building with one underground basement level beneath the eastern portion of the building, and an asphalt parking lot. The building had a footprint area of approximately 350m2, and was occupied by a dry cleaner and laundromat (Laundry Land). The Site building was demolished in May 2025 and the property is currently vacant. The former Site building shop was serviced with municipal water via underground pipes, gas lines and municipal sanitary sewers. The surrounding areas are fully developed with the institutional, commercial and residential land uses

The Property is considered to be in Commercial Land Use as defined by the Ontario Ministry of the Environment, Conservation and Parks (MECP). It is understood that the Property will be redeveloped for mixed residential and commercial use with a 7-storey residential building with three levels of underground parking. The general location of the Property is presented on Figure 1.

Englobe has prepared a Risk Assessment (RA) for the purpose of evaluating potential risks to human and ecological receptors for the Property. The results of this RA are to be used to support the filing of a Record of Site Condition (RSC) for the Property under Ontario Regulation 153/04 (O.Reg.153/04) (as amended by O.Reg.511/09) under the Environmental Protection Act (EPA). This document (RMP) provides the design of the Risk Management Measures (RMMs), based on the potential risks evaluated in the RA.

1.1 Rationale and Objectives of Risk Management

The RA identified the Contaminants of Concern (COCs) based on historical evidence and Site investigation activities. Appropriate pathways and receptors were identified based on the current and proposed future land use for the Site and surrounding areas.

Based on the RA, RMMs are required to block exposure pathways and eliminate unacceptable risks for human and ecological receptors. The requirements for risk reduction are noted in Sections 4 and 5 of the RA document.

1.2 Risk Management Performance Objectives

Based on the results of the RA, unacceptable risks were identified for human and ecological receptors. Unacceptable risks via the following pathways as a result of soil and groundwater

exposure to the following substances and receptors were identified, which will need to be mitigated by the RMMs.

The main findings of the Human Health RA investigation were as follows:

- Residential occupants may be subjected to unacceptable health risks from potential direct contact (oral/dermal) exposure to Copper, Lead, Benzo[a]pyrene, Dibenz[a,h]anthracene, Total Carcinogenic PAHs and PHC F4 in soil. A surface barrier system is proposed as a RMM to mitigate potential risks for this receptor.
- Residential occupants may be subjected to unacceptable risk from potential indoor air inhalation exposure from volatilized cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Tetrachloroethylene, Trichloroethylene, Vinyl Chloride, Benzene, PHC F1 and PHC F2 from groundwater. An underground parking garage with and vapour mitigation system are proposed as RMMs to mitigate potential risks for this receptor.
- Indoor workers may be subjected to unacceptable risk from indoor air inhalation exposure from volatilized cis-1,2-Dichloroethylene, Tetrachloroethylene, Trichloroethylene, Vinyl Chloride, PHC F1 and PHC F2 from groundwater. An underground parking garage and vapour mitigation system are proposed as RMMs to mitigate potential risks for this receptor.
- Outdoor workers may be subjected to unacceptable health risk from potential direct contact exposure (oral/dermal) to Benzo[a]pyrene and Total Carcinogenic PAHs in soil. A surface barrier system is proposed as a RMM to mitigate potential risks for this receptor.
- Construction workers may be subjected to unacceptable risk from direct contact exposure to cis-1,2-Dichloroethylene, Tetrachloroethylene, Trichloroethylene and Vinyl Chloride in groundwater. A Health and Safety Plan and Soil and Groundwater Management Plan are proposed as a RMMs to mitigate potential risks for this receptor.
- Construction workers may be subjected to unacceptable risk from trench air inhalation exposure to Trichloroethylene and Vinyl Chloride in groundwater. A Health and Safety Plan and Soil and Groundwater Management Plan are proposed as a RMMs to mitigate potential risks for this receptor.
- No unacceptable risk for any receptors was determined for inhalation of volatile vapours in outdoor air sourced from either soil or groundwater for residents or the outdoor worker.
- No unacceptable risks were estimated for the construction from the inhalation of volatile vapours from soil migrating into a trench.

Based on the findings of the ERA the following conclusions are provided;

- Potential risk from direct contact soil pathways to plants and soil organisms for Copper, Lead, Zinc, Benz[a]anthracene, Indeno[1,2,3-cd]pyrene and PHC F4. An RMM in the form of a surface barrier system is proposed to mitigate potential risks from this exposure pathway.

- Potential risk from direct contact soil pathways to mammals and birds for Barium, Copper, Lead, Zinc and Fluoranthene. An RMM in the form of a surface barrier system is proposed to mitigate potential risks from this exposure pathway.
- In the absence of component values derived for Benzo[b]fluoranthene and Dibenz[a,h]anthracene, the most sensitive available value for plants and soil organisms among the PAHs—0.48 µg/g for Indeno[1,2,3-cd]pyrene—was used as a surrogate. Applying this surrogate suggests a potential for adverse effects. However, these potential effects will be mitigated through the implementation of a surface barrier system (hard and/or soft capping) as a RMM.
- In the absence of component values for mammals and birds, the potential effects of Benz[a]anthracene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Dibenz[a,h]anthracene, and Indeno[1,2,3-cd]pyrene were not quantitatively assessed in the risk assessment. However, any potential adverse effects to terrestrial wildlife receptors (mammals and birds) will be mitigated through the implementation of a surface barrier system as a RMM, involving hard and/or soft capping.
- PHC F4 is missing a mammal and birds component value and no TRVs were available, however PHCs are not typically assessed for mammals and birds as most are readily metabolized by vertebrates and thus do not tend to accumulate in tissues (CCME 2008). Nonetheless, potential negative effects to Mammals and Birds will be mitigated by the surface barrier system RMM (Hard and/or Soft Capping).
- PHC F1 and PHC F2 exceeded the GW3 component values, indicating a potential risk to on-site ecological receptors through direct contact with groundwater. However, the depth to groundwater at the Site was measured at 4.76 mbgs. Given this depth, the direct contact pathway is considered incomplete for ecological receptors, as most—including burrowing animals and plant roots—are typically limited to the upper 2.5 metres of the soil profile. Furthermore, the depth to bedrock across the Site is less than 2.5 mbgs, and it is unlikely that ecological receptors would inhabit or interact with the bedrock zone where groundwater is located. Therefore, the direct contact exposure pathway to groundwater for ecological receptors is considered functionally incomplete, and no RMMs are required for this pathway.
- None of the groundwater COCs exceeded their respective Site-Specific GW3 component values as such risk to off-Site ecological receptors due to direct contact with groundwater is considered to be negligible and an RMM is not required to mitigate this pathway.

The required reduction in exposure concentrations based on the minimum calculated effects-based standards to address soil COCs are provided in Table 1-1 and to address groundwater COCs are provided in Table 1-2. The tables below specify the required reduction in risk (as an x-fold reduction) to meet the lowest effects-based Site Condition Standards (SCS) for all pathways where risk was predicted.

The required risk reduction is a function of the final PSS divided by the minimum calculated health-based standard, which is the concentration at which no risk would be present for the pathway of concern for the COC. The health-based standard is calculated as follows and is then used as the denominator in the calculation to derive the require risk reduction.

$$\text{Health-Based Standard} = \frac{HQ_{acceptable} \text{ or } ILCR_{acceptable}}{\text{Calculated HQ or ILCR}} \times REM_{soil \text{ or } groundwater}$$

Risk reduction calculations are demonstrated in Sections 4.4.2.5 and 5.5.2.1 of the risk assessment report. Table 1-3 details the proposed RMMs and the expected risk reduction based on the experience of the QP (Professional Engineer) that will be conferred by installation of the RMMs at the Site. The use of these RMMs is sufficient to achieve the risk reductions required for each receptor and pathway outlined in Table 1-1 and Table 1-2.

Table 1-1: Risk Management Objectives for Soil

RMM and Pathway with Unacceptable Risks	COC	Final PSS (ug/g)	Health Based Standard (ug/g)	Required Risk Reduction (x-Fold)
Barrier to Site Soils - Resident Direct Contact with Soils (S1)	Copper	1.20E+03	1.99E+02	**6.03E+00**
	Lead	3.12E+02	1.09E+01	**2.87E+01**
	Benzo[a]pyrene	3.60E+00	5.65E-01	**6.37E+00**
	Dibenz[a,h]anthracene	6.48E-01	5.65E-01	**1.15E+00**
	PHC F4 Aromatic C_{34}	1.46E+03	4.89E+02	**2.98E+00**
Barrier to Site Soils - Outdoor Worker Direct Contact with Soils (S2)	Benzo[a]pyrene	3.60E+00	6.98E-01	**5.16E+00**
Barrier to Site Soils & Gardening Prohibition - All Receptors (S1)	Copper	1.20E+03	1.99E+02	**6.03E+00**
	Lead	3.12E+02	1.09E+01	**2.87E+01**
	Benzo[a]pyrene	3.60E+00	5.65E-01	**6.37E+00**
	Dibenz[a,h]anthracene	6.48E-01	5.65E-01	**1.15E+00**
	PHC F4 Aromatic C_{34}	1.46E+03	4.89E+02	**2.98E+00**
Barrier to Site Soils - Plants & Soil Invertebrates	Copper	1.20E+03	1.80E+02	**6.68E+00**
	Lead	3.12E+02	3.10E+02	**1.01E+00**
	Zinc	1.68E+03	5.00E+02	**3.36E+00**
	Benz[a]anthracene	4.20E+00	6.30E-01	**6.68E+00**
	Indeno[1,2,3-cd]pyrene	2.40E+00	4.80E-01	**5.00E+00**
	PHC F4	7.32E+03	5.60E+03	**1.31E+00**
Barrier to Site Soils - Mammals & Birds	Barium	7.56E+02	3.90E+02	**1.94E+00**
	Copper	1.20E+03	7.70E+02	**1.56E+00**
	Lead	3.12E+02	3.20E+01	**9.75E+00**
	Zinc	1.68E+03	3.40E+02	**4.94E+00**
	Fluoranthene	1.03E+01	6.90E-01	**1.49E+01**

Notes: RMM - Risk Management Measure; S&GWP - Soil and Groundwater Management Plan; H&SP - Health and Safety Plan

[a] Vapour Intrusion RMMs includes Underground Parking Structure and Sub-Slab Vapour Barrier and Venting System (VMS)

[b] The Soil and Groundwater Management Plan and Health and Safety Plan will sufficiently reduce the exposure of subsurface workers to soil and groundwater to reduce risk to acceptable levels
[c] PHC Parameter fold reductions for human receptors are the sum of all required reductions for the specific PHC sub-fractions.

Table 1-2: Risk Management Objectives from Groundwater

RMM and Pathway with Unacceptable Risks	COC	Final PSS (ug/L)	Health Based Standard (ug/L)	Required Risk Reduction (x-Fold)
Vapour Intrusion RMMs[a] - Resident Indoor Air Inhalation sourced from Groundwater (Res GW2)	Dichloroethylene, cis-1,2-	1.13E+03	9.03E+00	**1.25E+02**
	Dichloroethylene, trans-1,2-	1.68E+01	1.57E+00	**1.07E+01**
	Tetrachloroethylene	1.68E+03	4.97E-01	**3.38E+03**
	Trichloroethylene	1.92E+02	5.33E-02	**3.60E+03**
	Vinyl Chloride	3.52E+02	7.14E-03	**4.93E+04**
	Benzene	1.09E+00	1.72E-01	**6.33E+00**
	PHC F1 Aliphatic C6-C8	3.92E+02	3.02E-01	**1.30E+03**
	PHC F1 Aliphatic C8-C10	4.08E+01	3.14E-01	**1.30E+02**
	PHC F1 Aromatic C8-C10	2.15E+02	1.05E+01	**2.05E+01**
	PHC F2 Aliphatic C10-C12	1.07E+01	2.09E-01	**5.11E+01**
	PHC F2 Aliphatic C12-C16	8.88E-01	5.64E-02	**1.57E+01**
	PHC F2 Aromatic C10-C12	2.68E+02	3.59E+01	**7.47E+00**
	PHC F2 Aromatic C12-C16	1.65E+02	9.48E+01	**1.74E+00**
Vapour Intrusion RMMs[a] - Indoor Worker Indoor Air Inhalation sourced from Groundwater (Comm GW2)	Dichloroethylene, cis-1,2-	1.13E+03	1.55E+02	**7.30E+00**
	Tetrachloroethylene	1.68E+03	7.98E+00	**2.10E+02**
	Trichloroethylene	1.92E+02	8.57E-01	**2.24E+02**
	Vinyl Chloride	3.52E+02	1.15E-01	**3.07E+03**
	PHC F1 Aliphatic C6-C8	3.92E+02	5.17E+00	**7.58E+01**
	PHC F1 Aliphatic C8-C10	4.08E+01	5.38E+00	**7.58E+00**
	PHC F1 Aromatic C8-C10	2.15E+02	1.79E+02	**1.20E+00**
	PHC F2 Aliphatic C10-C12	1.07E+01	3.59E+00	**2.98E+00**
HASP & SGWMP - Construction/Sub-surface Worker Direct Contact with Groundwater (Mod GW1)	Dichloroethylene, cis-1,2-	1.13E+03	2.49E+02	**4.54E+00**
	Tetrachloroethylene	1.68E+03	3.59E+02	**4.67E+00**
	Trichloroethylene	1.92E+02	7.62E+01	**2.52E+00**
	Vinyl Chloride	3.52E+02	3.64E+01	**9.66E+00**
HASP & SGWMP - Construction/Sub-surface Worker Inhalation of	Tetrachloroethylene	1.68E+03	1.41E+03	**1.19E+00**
	Trichloroethylene	1.92E+02	2.98E+01	**6.44E+00**

RMM and Pathway with Unacceptable Risks	COC	Final PSS (ug/L)	Health Based Standard (ug/L)	Required Risk Reduction (x-Fold)
Vapours in Trench air sourced from Groundwater (Volatile GW COCs)	Vinyl Chloride	3.52E+02	2.48E+02	**1.42E+00**

Notes: RMM = Risk Management Measure; S&GWP - Soil and Groundwater Management Plan; H&SP - Health and Safety Plan
[a] Vapour Intrusion RMMs includes Underground Parking Structure and Sub-Slab Vapour Barrier and Venting System (VMS)

Table 1-3: Risk Management Measures

Proposed RMM	Impacted Medium	Mitigated Pathway / Affected Receptor	Risk Reduction
Barrier to Site Soils	Soil	S1 - Residents S2 - Outdoor Worker Plants & Soil Organisms Mammals & Birds	Complete risk mitigation where capping is present. Blocks contact with contaminated soils.
Three (3)-Level Underground Parking Garage	Groundwater	Residential GW2 - Resident & Site Visitors Commercial GW2 - Indoor Worker	Reduction in Indoor Air Concentrations* Combined RMMs are likely to provide sufficient risk reduction when working in tandem with VIMS (Below) Performance monitoring to be conducted as part of sub-slab vapour monitoring program
Vapour Mitigation System (VMS), Sub-slab Vapour Barrier and Vapour Venting System	Groundwater	Residential GW2 - Resident & Site Visitor Commercial GW2 - Indoor Worker	Reduction in Indoor Air Concentrations from Sub-Slab Vapour Barrier.* Reduction in Indoor Air Concentrations from the Active Vapour Venting System.* Combined RMMs are likely to provide sufficient risk reduction when working in tandem with one level underground parking garage (Above).* Performance monitoring to be conducted as part of sub-slab vapour monitoring program
Health & Safety Plan	Soil & Groundwater	COCs in Soil and Groundwater: Inhalation of Trench Air and Direct Contact with Groundwater - Subsurface Worker	See Note (a)
Soil & Groundwater	Soil &	COCs in Soil and	See Note (a)

Proposed RMM	Impacted Medium	Mitigated Pathway / Affected Receptor	Risk Reduction
Management Plan	Groundwater	Groundwater: Inhalation of Trench Air and Direct Contact with Groundwater – Subsurface Worker	
Waterproofed Raft Foundation and Waterproofed Foundation Walls	Groundwater	Off-Site Human and Ecological Receptors	The waterproofed raft foundation and foundation walls are expected to mitigate on and off-site migration of impacted groundwater. The effect of these RMMs will be evaluated through a groundwater monitoring program.
Administrative Landscape Restrictions prohibiting installation of vegetable gardens	Soil & Groundwater	Ingestion of Garden Produce grown in contaminated media	Complete risk mitigation where planting restriction is implemented as it blocks the pathway.

Notes: RMM – Risk Management Measure; *Exposure Reductions are based on the Professional Opinion of the QP (Professional Engineer).

(a) The Health and Safety Plan and Soil and Groundwater Management Plan will sufficiently reduce the exposure of subsurface workers to soil and groundwater to reduce risk to acceptable levels. Through mandating use of appropriate PPE in sub-grade environments, augmenting air exchange in trench environments with fans, and properly managing any soil or groundwater exposed at the Site during intrusive work.

2.0 PROPOSED RISK MANAGEMENT MEASURES

The proposed Risk Management Measures (RMMs) for the Site will consist of the following:

Designed Risk Management Measures (Section 3.0):

- Construction of a 3-level underground parking structure/storage garage under the building at the Site (Section 3.1.1). The proposed building will cover the majority of the Site and the underground parking structure/storage garage will cover the entire building area at grade.
- Provision of a passive Vapour Mitigation System (VMS) comprised of a sub-slab vapour barrier and depressurization system beneath the entire foundation slab for the building to be constructed on the Site (Section 3.1.2) .
- Provision of surface barrier systems for the entire Site (Private Property) as well as on the lands to be conveyed to the City of Toronto (Section 3.2). This is designed to mitigate potential health risks as a result of exposure to COCs in soil through direct contact pathways. The RMMs will consist of:
    - Hard cap surface barrier systems such as pavements and asphalt on both the development land and on the land to be conveyed.
    - Fill cap barrier systems such as soil, granular fill, or topsoil or a combination for use in vegetated and landscaped areas on both the development land and on the lands to be conveyed.
- Waterproofed raft foundation and waterproofed foundation walls to mitigate groundwater flow to and from the Property.
- Provision of a Health and Safety Plan for all maintenance, utility, or construction activities to ensure that workers in contact with soil and groundwater at the Site (Section 3.3) are not at risk as a result of contact with impacted soil or groundwater. These measures are needed to address construction workers that may be performing activities within a trench setting. The use of PPE is required so that they are not subjected to unacceptable risks as a result of exposure to COCs in soil through direct contact. The augmentation of trench air exchange rates with ventilating fans to mitigate risks related to the inhalation of volatile vapours from soil and groundwater COCs in a trench environment. Additionally, provisions for the protection of workers against potential NAPL exposure in groundwater are addressed.
- Provision of a Soil and Ground Water Management Plan for all activities involving daylighting or exposing impacted soil and/or groundwater, in addition to contact with soil and groundwater at the Site (Section 3.4).
- Provision of administrative landscape restrictions prohibiting the installation of vegetable gardens and/or growing garden produce on any portion of the property (Section 3.5). This measure is needed to protect residents from the potential consumption of food grown directly in impacted soils and/or groundwater.

Specific requirements for the RMMs are described in greater detail in the following sections below. Details on the Design of the Risk Management Measures are described in Section 3.0.

Monitoring, Maintenance, and Reporting of RMMs (Section 6.0):

- Monitoring of the vapour intrusion mitigation system via sub-slab vapour sampling to confirm there are no unacceptable risks due to vapour intrusion that may affect human health and to confirm the effectiveness of vapour mitigation system (Section 6.2).
- Sub-slab vapour barrier and vapour mitigation system inspection after installation. Any significant damage or deterioration to the sub-slab vapour barrier or the vapour mitigation system are to be repaired immediately to maintain barrier integrity (Section 6.3).
- Inspection of the surface barrier systems (Section 6.4).
- Annual Report (Section 6.6)
- Site Plan Report (Section 6.7)

Contingency Measures (Section 7.0):

- Provision of contingency measures where applicable

The specific requirements for the RMMs are described in greater detail below. Some of the RMMs (such as the sub-slab vapour barrier and venting system (Vapour Mitigation System [VMS])) must be implemented by the property owner as part of the construction of the building. All the RMMs must be implemented by the property owner prior to occupancy of the building. Following implementation, regular records must be maintained which document inspection and maintenance activities.

3.0 DESIGN OF RISK MANAGEMENT MEASURES

The design of the RMMs is described below.

3.1 Vapour Mitigation Measures

3.1.1 Underground Parking Structure

The Property will be redeveloped for a mix of residential and commercial property use. The proposed development includes constructing one 7-storey residential tower with three levels of underground parking and mixed commercial and residential use on the ground floor. The floors above ground level are to be constructed as residential condominium units.

The underground parking garage must be provided with adequate ventilation to meet the requirements of the Ontario Building Code (OBC) for parking garages. This building code requirement addresses vehicle exhaust (carbon monoxide). Section 6.2.2.3 of the OBC requires an air exchange rate of 3.9 liters/sec per square meter of garage floor area.

Refrain from constructing any Building on the Property unless the Building includes a Storage Garage, and:

a. The Storage Garage is constructed at or below the Grade of the Building;

b. The Storage Garage area covers the entire Building Area at Grade; and

c. The Storage Garage complies with all applicable requirements of the Building Code, such as the provisions governing

    I. design of a mechanical ventilation system as set out in Division B, Article 6.2.2.3. (Ventilation of Storage and Repair Garages) of the Building Code;

    II. interconnection of air duct systems as set out in Division B, Sentence (2) of Article 6.2.3.9. (Interconnection of Systems) of the Building Code; and . air leakage as set out in Division B, Section 5.4. (Air Leakage) of the Building Code; and

d. The mechanical ventilation system for the Storage Garage is designed to provide a continuous supply of outdoor air at a rate of not less than 3.9 litres per second for each square metre of floor area or be activated on an as-needed basis by carbon monoxide or nitrogen dioxide monitoring devices as required by the Building Code.

It is the professional opinion of the QP that the supply of continuous (separate) ventilation to the parking garage (based on 3.9 L/sec/m^2 continuous ventilation rates) in combination with the sub-slab vapour barrier and venting system would result in a sufficient reduction in the potential for vapours to form at unacceptable levels.

Therefore, 2 levels of underground parking garage with continuous ventilation as outlined in Section 6.2.2.3 of the OBC at the Site should help to effectively reduce indoor air concentrations.

3.1.2 Sub-Slab Vapour Barrier and Venting System (VMS)

A passive vapour mitigation system must be provided for the entire building, primarily to address the volatile COC impacts that are found in the soil and groundwater on the Property. The vapour mitigation system is comprised of two components including a sub-slab vapour barrier and a passive venting system installed beneath the concrete floor slab of the building. The typical details for the system are shown on Figures 2, 3 and 4. The system will include the following components from the sub-grade to beneath the foundation:

- A non-woven geotextile layer above the subgrade;
- A clean gravel venting layer above the non-woven geotextile;
- Placement of perforated collector pipes with a minimum diameter of 100 mm within the clean gravel to allow collection and venting of soil gases from beneath the floor slab;
- Placement of perforated monitoring pipe with minimum diameter of 25 mm within the clean gravel layer and above the collector pipes.
- Venting of the soil gases to a 150 mm pipe which is routed directly to the exterior of the building for passive venting at an exhaust point 3 m away from any intake;
- A clean gravel venting layer above the perforated pipes;

- A non-woven geotextile above the clean gravel venting layer;
- A vapour barrier with a minimum thickness of 40 mil above the non-woven geotextile;
- A non-woven geotextile layer above the vapour barrier. Concrete slab above the non-woven geotextile.

The vapour barrier, which will be a minimum thickness of 30 mil and is deemed to be sufficient to be used as the vapour barrier. The vapour barrier is considered sufficient to reduce vapour intrusion into the building. The vapour barrier will be resistant to the COCs identified on the Site. Information on the material and performance specifications including maximum vapour permeability and chemical resistance requirements are presented in the Product Sheet (Attachment 1) or any other alternative having the same performance specifications.

To eliminate potential gaps between the floor and wall of the vapour barrier will be sealed to the foundation walls and column footings using stainless steel batten strips and neoprene gaskets using concrete pin anchors and caulking as shown in Figure 2. A 25 mm monitoring pipe that is installed within the clean gravel venting layer beneath the floor slab (Figure 4) has two access ports for sub-slab vapour sampling.

As part of the VMS system sump pits will be covered by a metal lid with a vapour tight seal to prevent vapours from escaping between any gaps/voids between the concrete slab and metal lid. All VMS exhaust points will be placed 3m away from any mechanical or ventilation/HVAC intake to the building (Figure 3). The vent pipe risers connected to the VMS sump pits will be routed from the P3 underground parking level to the east exterior building. The exhaust location on the exterior wall is 3 m away from any intake (HVAC intake, window opening, balcony).

The design outlined above represents the minimum design requirements and the final design will be prepared and stamped by a qualified professional engineer licensed to practice in Ontario. Certifications for all components will be provided by the manufacturers to the installer. A building science consultant will be retained to provide inspection and certification that all construction items have been sealed properly to prevent potential soil vapour from entering the occupied area. The following testing and performance verifications will be done after the vapour mitigation system is installed to ensure it was installed properly:

- Field inspections by a senior technician supervised by the Qualified Person per Section 5 (2) of O. Reg. 153/04 (a QP_{ESA}/P.Eng) must be conducted to confirm that all systems, designs, and RMMs have been implemented according to the RMP.
- A certification from the manufacturer of each product has to be provided for each component to confirm that all construction items have been sealed properly to prevent potential soil vapour from entering the occupied area.

The above system will effectively eliminate entry of vapours into the building structure. The vapours will be vented from beneath the floor slab to exterior areas of the building. Exterior

vents will be a minimum of 3 metres from any air intake. Physical inspection for this system is described in Section 6.3.

3.2 Surface Barrier Systems

The proposed building covers the majority of the Property. Areas of the Property not covered by the proposed building will require either a hard cap surface barrier that will consist of concrete, asphalt, and/or unit pavers or a fill cap surface barrier that may consist of soil fill meeting the 2011 MECP Table 7 RPI Site condition standards, virgin granular material, and/or manufactured topsoil meeting the 2011 Table 7 RPI Site condition standards or a combination thereof.

The surface barriers for future construction will include the following for the Private Property (on-Site land):

- Hard Cap Barrier: Hard surface barrier systems which is the building foundation slab or a combination of hardscape barrier such as asphalt, concrete, unit paver or equivalent underlain by granular fill to bring total thickness of barrier and granular to no less than 300 mm. Figure 4A provides details of Typical Hard Cap Barrier Design for on-Site development lands.

- Fill Cap Barrier: Soft cap barrier system which is a combination of 150mm landscape barrier such as rip-rap, granular, topsoil or landscape material underlain by a geotextile material and unimpacted soil fill (e.g., MECP Table 7 RPI soil or better) to bring total thickness to of hardscape barrier and fill barrier to no less than 1 m. Figure 4B provide details of Typical Fill Cap Barrier Design for on-Site development lands.

3.3 Groundwater Migration Mitigation Measures

The on-Site building has been constructed with a waterproofed raft foundation and waterproofed foundation walls around the three(3)-level underground parking garage. The waterproofed foundation will act as a barrier to prevent groundwater flow from the Property therefore reducing or mitigating the risk to off-site receptors. These systems are considered RMMs though they were not engineered to mitigate exposure of receptors to contaminants in groundwater and their effect of mitigating groundwater migration to and from the property is theoretical. As such, a groundwater monitoring program has been recommended as part of this RMP (Section 6.5) to monitor concentrations of groundwater at the Property boundaries to confirm whether or not the theoretical assumptions about the effect of the waterproofed raft foundation, and waterproofed foundation walls are preventing groundwater from entering / leaving the Site at concentrations greater than the target levels specified in Section 6.5. If groundwater exceedances are observed during the groundwater monitoring program a contingency plan will be developed and enacted to mitigate migration of contaminants off the Site as specified in Section 7.0 of this Appendix. Figure 2 details the waterproofed raft foundation and waterproofed foundation walls as proposed at the Site

3.4 Health and Safety Plan

A Site-specific health and safety plan is required to be developed for the Site and implemented during all intrusive, below-grade construction or maintenance activities potentially coming into contact with or exposing Site soil or groundwater.

The QP_{ESA}/ P.Eng as well as a qualified Health and Safety Professional will prepare and review the Site-specific health and safety plan to address the risk identified in the RA. The qualified persons responsible for the construction will communicate the plans to the workers and consultants and note any health and safety issues identified on the Site and record all the pertinent information on a Daily Inspection Report. A copy of the health and safety plan must be maintained on the Site for the duration of the intrusive activities.

The Health and Safety Plan will require the following:

- Prepared in accordance with applicable Ministry of Labour (MOL) health and safety regulations;
- Provision of personal protective equipment (PPE) for workers to protect against exposure to soil;
    - It is expected per the Occupational Health & Safety Act (OH&S) that trenches would be dewatered prior to commencing trenching activities to prevent direct contact with groundwater in a trench environment.
- Trench environments will require augmentation of air exchange rates within the trench/excavation where workers will be entering the subsurface through use of ventilating fans. This will mitigate risks for construction/sub-surface workers due to exposure to volatile COCs in trench environments where exposure is higher because of lower wind speeds and lower rates of air exchange.
- Provision of barriers and signage at the boundaries of any area exposed to soil and groundwater beneath the surface barrier systems to limit access from any receptors without dermal and respiratory protection.
- In addition, the HASP will specifically address potential exposure to NAPL in groundwater during subsurface activities, if preset. If NAPL-contaminated groundwater is encountered during future excavation on the Site, workers should wear appropriate PPE to prevent dermal contact and incidental ingestion. This protection would consist of wearing chemical resistant gloves in addition to standard PPE and dewatering of trench environments.

All workers who may potentially be exposed to impacted soil and groundwater beneath the surface barrier systems must be provided with adequate training and information regarding potential risks. The training will include the following:

- Identification of potential risks associated with exposure to soil and groundwater;
- Confirmation of appropriate personal protection equipment to minimize exposure to impacted soil and groundwater;
- Identification of a Health and Safety Officer that will be responsible for ensuring that all workers implement the requirements of the Health and Safety Plan.

3.5 Soil and Groundwater Management Plan

A Soil and Groundwater Management Plan (SGWMP) will be prepared and implemented for the construction and maintenance activities at the Property. There may be future construction or maintenance activities at the Site which involve exposure of the underlying soil and/or groundwater. The Soil and Groundwater Management Plan is required to properly manage soil and groundwater during construction and maintenance activities, and to ensure there are no adverse effects to human and ecological receptors. The SGWMP would be prepared by or under the supervision of a Qualified Person per Section 5 (2) of O. Reg. 153/04 (a QP_{ESA}) and comply with Clauses 30 to 39 of Schedule E of O. Reg. 153/04. The consultant acting as the QP_{ESA} for the site works has prepared the soil and groundwater management plan to ensure all risks identified in the RA are addressed. The Soil and Groundwater Management Plan includes the following elements:

- The Soil and Groundwater Management Plan must be implemented for any activities which involve removal of excess soil and any groundwater from the site during construction activities and maintenance activities.
- All soil excavated at the Site must be properly characterized for off-Site disposal and/or management in accordance with the requirements of the Soil and Groundwater Management Plan and the Certificate of Property Use (CPU) for the Site. .
- Dewatering activities are likely to take place at the site and will be completed by the dewatering contractor retained by the owner. The potential for continuous groundwater seepage within the building excavation during construction is high due to the depth to groundwater. Any groundwater encountered in excavations outside of the building footprint must also be properly controlled and managed to minimize exposure to sub-surface workers and the surrounding environment. This will generally require dewatering of all excavations and pumping of groundwater into a holding tank for testing purposes. Following testing, the water will either be:
    - discharged directly into the municipal sewer system
    - treated to meet sewer use discharge criteria
    - removed off-site by a private hauling contractor licensed by MECP.
- Site construction measures must be conducted to minimize the generation of dust. This will include wetting and/or covering of exposed soils.
- All stockpiled soils (if any) must be properly contained to ensure that there is no runoff of sediment from the stockpiles.
    - Efforts will be made to minimize stockpiling of soils on-site. However, there may be a requirement for stockpiling of soil materials on the Property for the purpose of analysis, segregation and/or staging prior to further movement and placement or removal. Management of stockpiled soils onsite will be conducted in accordance with *subsection 1 Soil Storage Rules* of *Section C Soil Management Rules* in *Part I Rules for Soil Management* of the Soil Rules. The QP has made the following recommendations for stockpiling and soil storage at the Property:
        - In general, soil and crushed rock should be managed in such a way as to prevent any adverse effects associated with the receiving, processing, storage and movement of soil, including management of noise, dust, mud

tracking, leaching, run-off and erosion; and, potential outdoor air impact(s), including odour issues.

- Soil should be stored in a manner that prevents any contaminants from the soil from leaching into the ground water.
- Stockpiles of potentially impacted and impacted soil should be placed on a polyethylene or tarpaulin barrier to segregate them from the underlying soils.
- Appropriate silt and erosion control measures should be implemented on all stockpiles, which will be in place for over five (5) days. This includes covering with a polyethylene barrier or tarpaulin.
- Where site conditions allow, stockpiles of dry soil should be wetted, as required, to minimize the generation of dust.
- Stockpiles should be kept as flat as practicable and generally limited to heights of less than three (3) m to minimize potential wind and water erosion.
- Soil stored at the Property must not be stored at a location as described below:
    - Within 10 m of the property line (boundary), unless any of the following apply:
- 500 m^3 or less of excess soil is stored at any one time on the Project Area;
- Excess soil storage at the Project Area is for a period of time of less than one (1) week;
- The storage location has a physical barrier (e.g., concrete wall) between the excess soil and the property line.

- All soil excavated at the Site must be properly characterized for off-Site disposal and/or management in accordance with O.Reg 406/19 under the direct supervision of an appropriately qualified person (QP).
    - Based on the building's footprint covering the majority of the Property, no earth fill is expected to be imported to the Property for use as engineered fill. For landscaping purposes, the landscaping contractor will be importing planting mixes for use in shrub planting areas in the north portion of the Property. Sources of topsoil that will be used in the planting mixes will be reviewed by Englobe's QP prior to preparation of the planting mix to ensure it meets Table 3.1 RPI Excess Soil Quality Standards (ESQS). Englobe's review of the source site will check the frequency of samples collected against the planned volume for importation and will check that the chemical parameters selected for testing satisfy the minimum requirements of O.Reg. 406/19 and the Soil Rules. Additionally, the review will ensure all applicable COCs for the Property (424 Churchill Avenue North) have been tested and meet the above-mentioned soil acceptance criteria.

3.6 Administrative Controls

Any buildings to be constructed on the property must have the following administrative controls to manage the risk:

- Landscape restrictions prohibiting the installation of vegetable gardens and/or growing garden produce on any portion of the property. This is to protect residents from the potential consumption of food grown directly in impacted soils and/or groundwater.

4.0 DURATION OF RISK MANAGEMENT MEASURES

The Risk Management Measures must remain in place until all potential sources of impact associated with the Site have been removed or reduced to acceptable levels through other means. For the purpose of the Risk Assessment, it is assumed that the concentration of the Contaminants of Concern in the groundwater will remain at their current level for the foreseeable future. While there will be on-going degradation and dilution of some COCs, this mechanism is not considered when assessing the required duration of RMMs.

Risk Management Measures at the Site, as described in Section 3.0, must be installed and maintained in perpetuity until such time as additional investigations are conducted to demonstrate that the COCs are no longer present at levels which may require RMM.

The requirements to install and maintain the RMM must be registered on the title of the Property through the Certificate of Property Use (CPU) and Record of Site Condition (RSC). The requirements include the following conditions:

- Construction of Site-specific building. The building must conform to the Site-specific design with the requisite number of underground storage garage (a.k.a underground parking structure) levels (2 levels).
    a. The Storage Garage/parking structure is constructed at or below the Grade of the Building.
    b. The Storage Garage/parking structure area covers the entire Building Area at Grade.
    c. The Storage Garage complies with all applicable requirements of the Building Code, such as the provisions governing:
        I. design of a mechanical ventilation system as set out in Division B, Article 6.2.2.3. (Ventilation of Storage and Repair Garages) of the Building Code;
        II. interconnection of air duct systems as set out in Division B, Sentence (2) of Article 6.2.3.9. (Interconnection of Systems) of the Building Code.
- Provision of a Vapour Mitigation System (VMS) comprised of a sub-slab vapour barrier and venting system beneath the entire foundation slab for the building to be constructed on the Site as detailed in Section 3.1.2.
- Provision of surface barrier systems for the entire Site as detailed in Section 3.2.
- Provision of a Health and Safety Plan for all maintenance, utility, or construction activities to ensure that workers in contact with soil and groundwater at the Site are not at risk as a result of contact with impacted soil or groundwater as detailed in Section 3.3.

- Provision of a Soil and Ground Water Management Plan for all activities involving daylighting or exposing impacted soil and/or groundwater, in addition to contact with soil and groundwater at the Site as detailed in Section 3.4.
- Provision of administrative landscape restrictions prohibiting the installation of vegetable gardens and/or growing garden produce on any portion of the property as detailed in Section 3.5.

A Certificate of Requirement must be registered on the Property title to ensure that any person with interest in the Property is made aware of the requirements for the implementation, management, and duration of the RMMs.

The proposed RMMs (underground parking structure/garage, vapour mitigation system, and hard and fill cap surface barrier systems) are conventional engineered systems that are widely applied in the construction and development industry. These systems will be subject to on-going inspection and maintenance as noted subsequently in Section 6.0 of this document and Section 7.4 of the RA.

5.0 IMPLICATIONS FOR OFF-SITE RECEPTORS

The proposed RMMs will be effective for mitigating risks to human and ecological receptors at the Site. It is not expected that the groundwater impacts will affect the ecological off-Site receptors as none of the COCs in groundwater exceeded either their Site Specific GW3 component values and groundwater in the area of the Site is found within the bedrock. Thus, potential risk to off-Site ecological receptors and off-Site aquatic receptors was not demonstrated in the risk assessment. Furthermore, given the depth to groundwater at the Site (>4m) and the property being located in an area of Ottawa that sources potable water from the Ottawa River through the municipal water supply off-Site human receptors are not expected to come into direct contact with groundwater. However, there is potential for off-Site human receptors to come into contact with volatile vapours migrating from COCs in groundwater for which unacceptable risk was denoted in the Risk Assessment. The installation of a waterproofed raft foundation and waterproofed foundation walls on the three (3)-level underground parking structure will act as a barrier to prevent groundwater flow from the property thereby reducing or mitigating risk to off-Site receptors both human and ecological. These systems are considered RMMs though they were not engineered to mitigate exposure of receptors to contaminants in groundwater and their effect of mitigating groundwater migration is theoretical. As such, a groundwater monitoring program has been recommended as part of the RMP (Section 6.5) to monitor concentrations of COCs in groundwater at the Property boundaries to confirm the theoretical assumptions about the effect of the waterproofed foundation and foundation walls for the proposed building. If groundwater exceedances are observed during the groundwater monitoring program a contingency plan will be developed and enacted to mitigate migration of contaminants off the Site.

Soil impacts are limited due to the nature of the limited migration and the locations of the exceedances. As such, there should be no adverse effects from soil to off-Site receptors. Like groundwater potential exists for the off-Site migration of soil vapour, however, the proposed development will cover the entirety of the property from lot line to lot line and will require a sub-slab vapour mitigation system (VMS). The presence of VMS should prevent lateral migration of vapours over long distances under the building envelope toward neighboring residential sites by creating a low-pressure zone beneath the on-Site building and drawing soil vapours into the VMS. As a result, no off-site vapour risks are anticipated for off-Site buildings located within 15 metres for non-recalcitrant contaminants and 30 metres for recalcitrant contaminants. Additionally, preferential flow pathways in the form of underground utility corridors exist below Churchill Avenue North and Byron Avenue which will further contribute to reducing the concentrations of contaminants expected to be encountered at downstream properties.

6.0 MONITORING, MAINTENANCE, AND REPORTING OF RISK MANAGEMENT MEASURES

The monitoring and maintenance of the RMMs will be the responsibility of the property owner or the designated agent, following development of the Site and signing of the CPU. The RMMs will be subject to ongoing inspection and maintenance and contingency plans as summarized below.

6.1 Overview

In summary, the monitoring and maintenance requirements will include the following:

- Monitoring of the vapour mitigation system via sub-slab vapour sampling.
- Inspection of the VMS for the building (during installation and during operation).
- Inspection of the surface barrier systems.
- Implementation of appropriate Health and Safety Plans for future Site excavation activities.
- Appropriate record keeping and reporting, including the Annual Report and Site Plan Report.

6.2 Sub-Slab Vapour Monitoring

The purpose of the monitoring will be to ensure that the RMMs are operating as intended, and to demonstrate that the objectives of the vapour mitigation system (VMS) are being met. Sub-slab vapour monitoring will be conducted at two (2) locations within the underground parking structure/garage. Samples will be obtained from the vapour monitoring ports which connect to perforated monitoring pipes placed in the gravel venting layer under the floor slab as presented in Figure 4. As part of the design of the VMS for the building, sub-slab soil vapour sampling ports (i.e., monitoring ports) will be installed above the concrete slab of the P3 (lowest level) underground parking to allow monitoring of the sub-slab soil vapour quality. Each of the

monitoring ports will consist of a port (fitted with shut-off valve) that is connected to an isolated network of perforated monitoring piping that will run horizontally below the P3 Level slab-on-grade and which will be installed below a specific area of the building to allow collection of sub-slab soil vapour for chemical analysis. The collective monitoring networks will cover the entire footprint of the building at the P3 Level. Conceptual details of the VMS, including the monitoring ports and monitoring networks, are included in Figure 4.

All sub-slab soil vapour samples will be collected in accordance with the protocols and procedures outlined in the following guidance document issued by the United States Environmental Protection Agency (USEPA).

- USEPA, 'Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO 15: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)', dated January 1999 (USEPA Method TO-15).

USEPA Method TO-15 will be utilized for sampling and chemical analysis of VOCs and PHCs found in the sub-slab soil vapour at the Property. Each sub-slab soil vapour sample will be collected using a dedicated six litre (6L) Summa or Silonite canister that is prepared by the laboratory and fitted with a flow controller set for a twenty-four (24) hour collection period. Appropriate Quality Assurance and Quality Control (QA/QC) procedures, including the use of duplicate samples and a trip blank.

It is noted that if the acceptable monitoring technique changes, the sampling method shall be revised such that it will be conducted in accordance with the accepted sampling method as per the current MECP Regulations and Standards. Future monitoring and maintenance programs will include pressure differentials and soil vapour assessment.

Sampling events must be initiated prior to occupancy of any building on the Site to obtain results that are representative of the sub-slab vapour monitoring prior to Site activities as part of a Baseline Performance Assessment that will last for a period of one year and will continue thereafter as Confirmation Monitoring for a minimum of one additional year.

Baseline Performance Monitoring will be conducted on a quarterly basis (every three months, four times a year). Confirmation monitoring performed beyond the first year will be conducted seasonally (three times per year: winter, spring, and summer).

Sub-slab vapour monitoring shall be completed for all COCs listed in Table 6-1 (and Table 7-3 of the RA). The results will be compared to the Sub-slab Vapour Target Levels (SSVTLs) developed for the COCs.

The Sub-Slab Vapour Target Levels developed for the COCs on the Property are as follows:

Table 6-1: Sub-Slab Vapour Target Levels for Volatile COCs

COC	Units	Residential Health-Based Indoor Air Criteria (HBIAC)	Sub-Slab Vapour Targets
Volatile Organic Compounds			
Dichloroethylene, 1,1-	µg/m^3	4.17E+01	2.09E+03
Dichloroethylene, cis-1,2-	µg/m^3	3.13E+01	1.57E+03
Dichloroethylene, trans-1,2-	µg/m^3	1.25E+01	6.25E+02
Tetrachloroethylene	µg/m^3	4.28E+00	2.14E+02
Trichloroethylene	µg/m^3	2.71E-01	1.36E+01
Vinyl chloride	µg/m^3	1.26E-01	6.30E+00
BTEX			
Benzene	µg/m^3	5.06E-01	2.53E+01
Petroleum Hydrocarbons			
PHC-F1	**µg/m^3**	**2.49E+03**	**1.25E+05**
Aliphatic C6-C8	µg/m^3	3.13E+02	1.57E+04
Aliphatic C>8-C10	µg/m^3	5.21E+02	2.61E+04
Aromatic C>8-C10	µg/m^3	1.04E+02	5.20E+03
PHC-F2	**µg/m^3**	**4.71E+02**	**2.36E+04**
Aliphatic C>10-C12	µg/m^3	5.21E+02	2.61E+04
Aliphatic C>12-C16	µg/m^3	5.21E+02	2.61E+04
Aromatic C>10-C12	µg/m^3	1.04E+02	5.20E+03
Aromatic C>12-C16	µg/m^3	1.04E+02	5.20E+03

Notes: All HBIAC are from MECP (updated Nov 1, 2016) MGRA Model HBIAC; Sub-slab Vapour Target = HBIAC / Generic Residential Attenuation Factor (0.02).

If the concentration for any COCs exceeds the Sub-Slab Vapour Target Levels, as shown in Table 6.1 above, the owner shall notify the MECP within five (5) business days. Upon detection of the exceedance, sampling will be repeated within fifteen (15) business days of receipt of the analytical results at all locations.

If the sub-slab vapour monitoring results of the second sampling event following the first exceedances do not indicate the presence of exceedances, then sub-slab vapour monitoring will be continued on a quarterly basis (every three months) for an additional twelve (12) month period (4 additional monitoring events).

If the results of the second sampling event indicate that exceedances of the Sub-Slab Vapour Target Levels continue to occur during the second sampling event, then indoor and ambient air monitoring shall commence along with sub-slab vapour monitoring for the COCs listed in Table 6-1 within fifteen (15) days of receipt of the analytical results. Outdoor air quality sampling will be required in conjunction with the indoor air quality sampling to account for potential influences of outdoor air, background sources, or sources resulting from vapour barrier implementation. Areas

indicating exceedances of the Sub-Slab Vapour Target Levels will require indoor air quality sampling. The indoor sampling will be conducted in accordance with the sampling method as per the current MECP Regulations and Standards and the ambient air sampling will be conducted in accordance with the MECPs' Draft Technical Guidance: Soil Vapour Intrusion Assessment September 2013 PIBS#8477 document.

A qualified person should conduct a Site inspection and determine a suitable location for the outdoor air samples. Sample locations should be representative of ambient air both upwind and downwind of the buildings, as necessary.

A qualified person should conduct a Site inspection and determine a suitable location for the indoor air samples. The indoor air sample stations should be placed in at least 2 locations on the lowest occupied level of the building.

The indoor air results will be compared to the Indoor Air Target Levels developed for the COCs as shown in Table 6-1. The ambient air results will be compared also with AAQC Standards. If the indoor air monitoring results do not indicate the presence of exceedances, then indoor air monitoring will be continued on a quarterly basis (every three months) for an additional three (3) month period (1 additional monitoring event) and the sub-slab vapour monitoring will be continued on a quarterly basis (every three months) for an additional twelve (12) month period (4 additional monitoring events).

In the event of an exceedance of the Indoor Air Target Levels, the owner shall notify the MECP within five (5) business days. Upon detection of the exceedance, sampling will be repeated within fifteen (15) business days at all locations where exceedances were noted, including outdoor air sampling.

The results of the second sampling event will be reported to the MECP within five (5) business days of receipt. If the results of the second sampling event indicate that the indoor air quality continues to exceed the Indoor Air Target Levels, then a Qualified Person will develop and submit to the MECP a detailed contingency plan within thirty (30) days of receipt of the analytical results. The contingency plan is described in Section 7.0.

If the results of the second sampling event do not indicate that the indoor air quality continues to exceed the Indoor Air Target Levels, then indoor air monitoring will be continued on a quarterly basis (every three months) for an additional three (3) month period (1 additional monitoring event) and the sub-slab vapour monitoring will be continued on a quarterly basis (every three months) for an additional twelve (12) month period (4 additional monitoring events).

Monitoring will be conducted for two years. Monitoring locations will be finalized by the QP and the Client's mechanical engineer. Note that the indoor air sampling locations, if required, will be finalized based on the locations of sub-slab vapour exceedances.

As noted above and if required, indoor air quality sampling shall continue until there is a minimum of two (2) consecutive quarters where the indoor air quality meets the Indoor Air

Target Levels, following any monitoring event where any exceedances within the sub-slab vapour monitoring are found. An application may then be made by the owner to the Director to discontinue or alter the air quality sampling program.

At the end of the second year of the initial monitoring, the Qualified Person will provide a revised monitoring plan based on the results found in the air quality at the Site.

6.3 Inspection of Vapour Mitigation System (VMS) and Underground Parking Structure

The vapour mitigation system for the future building consists of a passive venting and barrier system. The components are protected by the floor slab of the building; therefore, the requirements for inspection and maintenance would not be significant. However, an inspection and maintenance program for the VMS is required post construction of the VMS. Inspections are required to be carried out on a semi-annual basis (i.e., every 6 months). The inspection and maintenance requirements would generally consist of the following:

Vapour Barrier

Semi-annual inspection of the exposed floor areas within the building to ensure that there are no obvious cracks, distress or damage to the floor which may result in damage to the underlying venting and barrier system. There is no requirement for direct inspection of the vapor barrier. The barrier is made of durable polymer. Deterioration of material may be caused through exposure to sunlight. Since the material will be beneath the floor slab, there will be no exposure to sunlight. The expected life of the material is several hundred years, which is greater than the expected lifespan of the building.

Replacement or reinstatement of the venting and barrier system as required, in the event that there are construction activities which result in removal or disturbance of the concrete floor.

Sump Pits, Ports, Plumbing & Piping

Semi annual inspection of the exhaust port vent pipe at the exterior of the building to ensure that the insect screen is intact, and the pipe is not clogged or damaged.

All P2 Parking Level surface barriers (including floor slab and walls), and visible mechanical and plumbing components, such as sump pits, sampling ports and piping, must be inspected for evidence of repair/damage and/or breach. Any areas indicating a potential breach are required to be thoroughly inspected by a qualified person in order to determine the extent of damage, if any. Any damaged components are required to be repaired immediately to maintain the integrity of VMS.

Repair of the VMS is required to be conducted by a qualified contractor and is to be inspected by a qualified inspector under the supervision of a QP.

Walls and Floor of Parking Garage

Visual inspection of the walls and floor of the parking garage should be conducted on a semi-annual basis [once every six (6) months] to ensure that there is no visual evidence of seepage of groundwater through the walls or floor. Any areas of seepage must be promptly repaired. Settlement, voids, or obvious structural damage will be inspected by a Professional Engineer and appropriate repair measures will be implemented.

Ventilation of Parking Garage

The mechanical engineer will provide a report on ventilation performance in the parking garage for review to ensure that the requirements of the Ontario Building Code (OBC) for parking garages requiring an air exchange rate of 3.9 liters/sec per square meter of garage floor area is being met. Any indications that performance of the ventilation system is not meeting the required specifications will be repaired immediately.

Operational Monitoring

The undertaking operational monitoring, including the recording of the monitoring results, at least once before occupancy, quarterly during the first two years after occupancy and semi-annually thereafter, shall commence. Measuring of the (lower) air pressure differential below the foundation floor slab across the building area, relative to the indoor air pressure within the building being achieved by the soil vapour venting layer.

6.4 Inspection of Surface Barrier Systems

All surface barrier systems must be inspected on a quarterly basis for evidence of damage or deterioration. Any areas of significant damage or deterioration must be repaired immediately to maintain the integrity of the surface barrier.

There may be maintenance or construction activities which result in disturbance to the surface barrier systems (including utility corridors and/or trench plugs). In this case, the surface barrier systems shall be restored to the configurations noted in Figures 5a,b and 6a,b, 7 and 10 and described in Section 3.2 (Surface Barrier System).

6.5 Groundwater Monitoring Program

The purpose of the groundwater monitoring program is to assess the performance of the waterproofed raft foundation and waterproofed foundation walls in preventing migration of impacted groundwater to and from the Site. The groundwater monitoring program will be

conducted to assess groundwater quality for a period of two years to gauge performance of the Site groundwater mitigation measures.

The ground water monitoring program includes wells that are situated at the upgradient (north) and downgradient (south) boundary of the Site, as shown in Figure 5. This will provide groundwater quality information to assess potential impacts with respect to concentrations of COCs in groundwater entering and leaving the Property. The location for each monitoring well is summarized below:

Table 6-2: Groundwater Monitoring Well Locations

Well ID	Location
MW1	Northeastern corner of property
MW2	Northwestern corner of the Property
MW203	Southwestern corner of the Property
MW204	Southeastern corner of the Property

The monitoring wells will be installed on the prior to building occupancy for the purposes of the groundwater monitoring program.

Ground water quality testing will be conducted in each of the wells semi-annually (two (2) times over a one (1) year period) for a period of two consecutive years.

Groundwater monitoring shall be completed for all COCs listed in Table 6-4 below. The results will be compared to the Groundwater Property Specific Standards developed for the COCs and noted in Table 6-4 below, as well as the applicable off-site site condition standards (MECP Table 3 SCS).

Table 6-3: Property Specific Standards for COCs in Groundwater

COC	Units	Max. conc.	PSS	Basis of PSS	Off-Site SCS (Table 3 SCS)
Volatile Organic Compounds					
Dichloroethylene, 1,1-	µg/L	2.00E+00	2.40E+00	Max.+20%	1.6
Dichloroethylene, cis-1,2-	µg/L	9.40E+02	1.13E+03	Max.+20%	1.6
Dichloroethylene, trans-1,2-	µg/L	1.40E+01	1.68E+01	Max.+20%	1.6
Tetrachloroethylene	µg/L	1.40E+03	1.68E+03	Max.+20%	1.6
Trichloroethylene	µg/L	1.60E+02	1.92E+02	Max.+20%	1.6
Vinyl Chloride	µg/L	1.00E+02	3.52E+02	Theoretical Future Max.	0.5
BTEX					
Benzene	µg/L	9.10E-01	1.10E+00	Max.+20%	44
Petroleum Hydrocarbons					
PHC F1	µg/L	5.40E+02	6.48E+02	Max.+20%	750
PHC F2	µg/L	3.70E+02	4.44E+02	Max.+20%	150
PHC F3	µg/L	7.50E+02	9.00E+02	Max.+20%	500

Notes: concentrations in µg/L;PSS - Property Specific Standards

In the event of an exceedance of the applicable criteria, the owner shall notify the MECP within five (5) business days. An additional sampling round will be conducted in all wells that demonstrate an exceedance of the applicable criteria within 30 business days.

The results of the second sampling event will be provided to the MECP within a further five (5) business days of their receipt.

If the second set of samples has concentrations which continue to exceed the applicable criteria, then a Qualified Person shall develop and submit to the MECP a detailed contingency plan within 30 days of receipt of the results of the second set of samples. The nature of the proposed contingency plans, with respect to ground water monitoring, is provided in Section 7.2.4.

The Site owner may make an application to the Director of the MECP to discontinue the ground water monitoring program in the following circumstances:

If the ground water quality in all monitoring wells remains below the applicable standards for four (4) consecutive sampling events.

6.6 Annual Report

An Annual Report will be prepared by March 31 each year, documenting activities relating to the Risk Management Measures undertaken during the previous calendar year. The report will provide the results of the monitoring of sub-slab soil vapour quality and groundwater monitoring. The report will identify any soil or ground water management activities, and any contingency plans which have been implemented (as noted subsequently in Section 7.0).

The Annual Report will be prepared by a Qualified Person. The report will present the following:

- All of the factual information gathered during the monitoring activities;
- The performance of the RMMs;
- The implementation of any required contingency measures;
- Recommendations for the requirements, if any, for implementation of additional RMMs or upgrading of the current RMMs; and
- Recommendations regarding the requirements for further monitoring.

6.7 Site Plan Report

The Owner shall retain a copy of the Site plan prepared and signed by a Qualified Person prior to occupancy which will describe the Property, placement and quality of all of the barriers to Site soils. The Site plan will include a plan and cross section drawings specifying the vertical and lateral extent of the barriers. This Site plan shall be retained by the Owner for inspection upon request by a Provincial Officer. The Site plan shall be revised following the completion of any alteration to the extent of the barriers to Site soils.

6.8 Site Excavation and Construction Activities

There may be a requirement for construction or maintenance activities at the Site which involve disturbance of the surface barriers, or soil and groundwater at the Site. All future maintenance or construction activities will be subject to the Health and Safety Plan noted in Section 3.3.

6.9 Record Keeping and Reporting

All inspection and maintenance activities required under Section 6.0 must be recorded in a logbook. The logbook should be completed by the Site owner or a designated agent. The logbook should be kept as a permanent record and should be available to the MECP and other agencies for their review if requested. The logbook must identify the following:

- The name of the person and/or firm designated to conduct monitoring or maintenance activities.
- The signature of the person that conducts the monitoring or maintenance activities.
- The date of the monitoring activities.
- A brief summary of all monitoring activities which have been conducted and their outcome.
- Identification of any areas, actions or activities which require maintenance based on the inspection or monitoring activities.
- Compilation of the results of all sub-slab soil vapour quality monitoring activities, and all related correspondence with the MECP or other agencies.
- A description of the date and nature of any repair and/or maintenance activities which may be required to maintain the RMMs.
- Provision of as-built plans for any future construction activities (such as Site alterations) which require RMMs. This will include as-built plans for the VMS, surface barrier systems, and underground utilities. The as-built plans must be prepared and sealed by a Professional Engineer.

7.0 CONTINGENCY MEASURES

7.1 Overview

Monitoring programs will be conducted to assess the effectiveness and condition of the RMMs. These include the following:

- Monitoring of sub-slab vapour quality (Section 7.2.1).
- Monitoring of the condition of the RMMs (Section 7.2.2 and 7.2.3).

7.2 Contingency Plan

Monitoring programs will be conducted to assess the effectiveness and condition of the RMMs. Contingency plans are available in the event that the monitoring indicates deterioration or unacceptable performance of the RMMs. The contingency plans and appropriate action levels are provided below:

7.2.1 Sub-Slab Vapour Quality

The sub-slab vapour quality under the vapour mitigation system will be monitored. The building will be fitted with a passive vapour mitigation system which includes a vapour barrier and passive venting system. In the event the sub-slab vapour quality exceeds the Sub-Slab Vapour Target Levels noted in Table 6-1 (above) for two consecutive sampling events, then an appropriate contingency plan will be developed by a Qualified Person. As noted in Section 6.2, at the end of the second year of the initial monitoring, the Qualified Person will provide a revised monitoring program based on the results found in the air quality at the Site. A summary of potential outcomes of the monitoring, and contingency plans is provided below.

Step	Action and Results	Procedure/Contingency
1	Sub-slab vapour monitoring results do not indicate exceedances of Sub-Slab Vapour Target Levels.	• Sub-slab vapour monitoring is conducted on a quarterly basis (every three months) for the first year (4 monitoring events) and conducted seasonally (three times per year: winter, spring, and summer) for the following year.
	Sub-slab vapour monitoring results indicate exceedances of Sub-Slab Vapour Target Levels.	• The owner shall notify the MECP within five (5) business days of the exceedances. Sub-slab vapour monitoring will be repeated within fifteen (15) business days of receipt of the analytical results at all locations. Proceed to Step 2.
2	Sub-slab vapour monitoring results do not indicate exceedances of Sub-Slab Vapour Target Levels for re-sampling event.	• Sub-slab vapour monitoring will be continued quarterly basis (every three months) for an additional twelve (12) month period (4 additional monitoring events).
	Sub-slab vapour monitoring results indicate exceedances of Sub-Slab Vapour Target Levels for re-sampling event.	• Indoor and ambient air monitoring shall commence along with sub-slab vapour monitoring within fifteen (15) days of receipt of the analytical results. Only areas indicating exceedances of the

Step	Action and Results	Procedure/Contingency
		Sub-slab Vapour Screening Criteria will require indoor air quality sampling. Proceed to Step 3.
	Sub-slab vapour monitoring results indicate exceedances of Sub-Slab Vapour Target Levels for additional two re-sampling events.	• Indoor and ambient air monitoring shall commence along with sub-slab vapour monitoring within thirty (30) days of receipt of the analytical results. Only areas indicating exceedances of the Sub-slab Vapour Target Levels will require indoor air quality sampling. Proceed to Step 3.
3	Indoor air and ambient air quality do not indicate exceedances of the Indoor Air Target Levels for the COCs.	• Indoor air monitoring will be continued on a quarterly basis (every three months) for an additional three (3) month period (1 additional monitoring event). The monitoring will be discontinued if there are no further indoor air exceedances.
	Indoor air and ambient air quality indicate exceedances of the Indoor Air Target Levels for the COCs.	• The owner shall notify the MECP within five (5) business days. Upon detection of the exceedance, sampling will be repeated within fifteen (15) business days at all locations where exceedances were noted. Proceed to Step 4.
4	Indoor air and ambient air quality do not indicate exceedances of the Indoor Air Target Levels for the COCs for re-sampling event.	• Indoor air monitoring will be continued on a quarterly basis (every three months) for an additional three (3) month period (1 additional monitoring event). The monitoring will be discontinued if there are no further indoor air exceedances. Sub-slab vapour monitoring will be continued quarterly basis (every three months) for an additional twelve (12) month period (4 additional monitoring events).
	Indoor air and ambient air quality indicate exceedances of the Indoor Air Target Levels for the COCs for re-sampling event.	• A Qualified Person will develop and submit to the MECP a detailed contingency plan within thirty (30) days of receipt of the analytical results. • The ***"contingency plan"*** will include the following items: ○ Review of all monitoring data including ground water, sub-slab, indoor air, and outdoor air monitoring results. ○ Further inspection of passive venting system to determine if components are plugged or damaged. ○ Conduct inspection of building floors and walls, and provide sealing of cracks or discontinuities • After the contingency plan is in place, sub-slab vapour monitoring, indoor air, and ambient air quality sampling will take place. Proceed to Step 5
5	Indoor air quality does not indicate exceedances of the Indoor Air Target Levels for the COCs for the sampling event after contingencies are in place.	• Indoor air monitoring will be continued on a quarterly basis (every three months) for an additional three (3) month period (1 additional monitoring event). The monitoring will be discontinued if there are no further indoor air exceedances.
	Indoor air quality indicates exceedances of the Indoor Air Target Levels for the COCs for the sampling event after contingencies are in place.	• ***"Contingency Plan"***: Adjust the flow of air and the magnitude of depressurization within the system below the floor slab. • A Qualified Person is to provide a revised air quality monitoring plan based on the results collected over the period of monitoring.

7.2.2 Vapour Mitigation System and Underground Parking Structure

Item	Action Level	Contingency Plan
Damage to floors or wall of parking garage including cracks, settlement, or voids.	Any cracks or voids of greater than 2 mm aperture and 1 m length will require action.	Cracks or voids will be repaired, as appropriate, with concrete caulking or other sealant. Settlement, voids or obvious structural damage will be inspected by a qualified Professional Engineer and appropriate repair measures will be implemented. All repair measures will be completed in accordance with the requirements of the RMM.

7.2.3 Surface Barrier Systems

There is generally no requirement for contingency plans for the surface barrier systems for future conditions. There will be a requirement for inspection, maintenance and repair of these systems if they are disturbed or damaged as noted in Section 6.4.

7.2.4 Groundwater Quality

Groundwater quality monitoring is conducted to determine the effectiveness of the waterproofed raft foundation and waterproofed foundation walls in mitigating the migration of impacted groundwater to and from the Site. . In the event that the concentrations of the COCs in the groundwater exceed the target levels listed in Table 6-3, a contingency plans will be implemented to manage potential risks to human and ecological receptors. The Table below details the action levels and contingency plan framework based on operational monitoring of groundwater to assess the effectiveness of groundwater migration mitigation measures at the Site.

Item	Action Level	Contingency Plan
Groundwater quality shows trends to increase in concentration of COCs for three consecutive sampling events, but concentrations remain below the trigger values (i.e., Table 3 SCS).	Continue groundwater monitoring program as described in Section 6.5, and continue air quality monitoring programs described in Section 6.2.	Investigate possible sources of groundwater quality impact to determine if they are related to on-Site activities or off-Site upgradient activities.
Groundwater quality exceeds the trigger values (i.e., Table 3 SCS).	Continue groundwater monitoring program as described in Section 6.5, and continue sub-slab vapour/air quality monitoring programs described in Section 6.2.	Determine if increase in groundwater concentrations could result in potential adverse effects to human or ecological receptors. Determine potential impact of exceedances of the trigger values (i.e., Table 3 SCS) on RMM (vapour mitigation system, surface barrier system, soil and groundwater management plan, health and safety plan).

Item	Action Level	Contingency Plan
Groundwater quality exceeds the trigger (i.e., Table 3 SCS) and studies indicate potential adverse effects to human or ecological receptors on-Site.	Continue groundwater monitoring program as described in Section 6.5, and continue sub-slab vapour/air quality monitoring programs described in Section 6.3.	Implement appropriate additional RMM. The appropriate measures will be designed by a Qualified Person.

8.0 FINANCIAL ASSURANCE

Financial assurance is required for the expected monitoring and maintenance of the RMMs.

Financial assurance will generally be required for the following components:

- Sub-Slab vapour quality monitoring program.
- Inspection and maintenance of surface barrier systems.
- Inspection of Vapour Mitigation System.
- Preparation of annual monitoring report.
- Preparation of Site Plan report

The costs for maintenance, monitoring and inspection are approximately $185,900. It is noted that the financial assurance is provided for a two-year period of monitoring, maintenance and inspection.

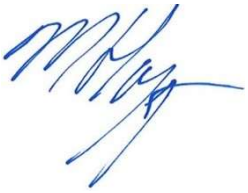
Item	*Components*	*Total*
Inspection of Vapour Mitigation System Program	2 years monitoring program – 4 events	$10,000.00
Sub-Slab Vapour Quality Monitoring	Sampling at locations for 2 years monitoring – 7 events include blanks and duplicates.	$100,000.00
Groundwater Monitoring Program	2 yar monitoring program – 4 Events	$30,000.00
Inspection of Surface Barriers	2 years – 4 events	$7,000.00
Preparation of Annual Report	Preparation of two Annual Reports	$12,000.00
Site Plan Report	Preparation of one Report	$10,000.00
Contingency Plan Report	Contingency Costs (10% Total Cost)	$13,900.00
	TOTAL (excl. HST)	**$185,900.00**

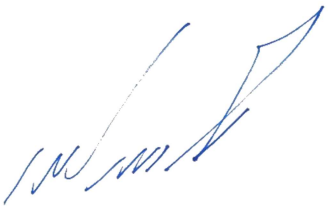
As noted above, the total cost of the monitoring, maintenance and inspection is $185,900 over the initial two-year period and is based on the schedules noted herein. This represents the financial assurance required for the proposed RMMs at the Property.

We trust that the above-noted information is sufficient for your present purposes. Should you have any questions concerning the above, please do not hesitate to contact me at your convenience.

Yours truly,

Englobe Inc.





Michael Hozjan, M.Env.Sc.
Environmental Risk Assessor

Baker Wohayeb, P.Eng., QP_{ESA}, QP_{RA}
Director

RMP Figures

ENGLOBE

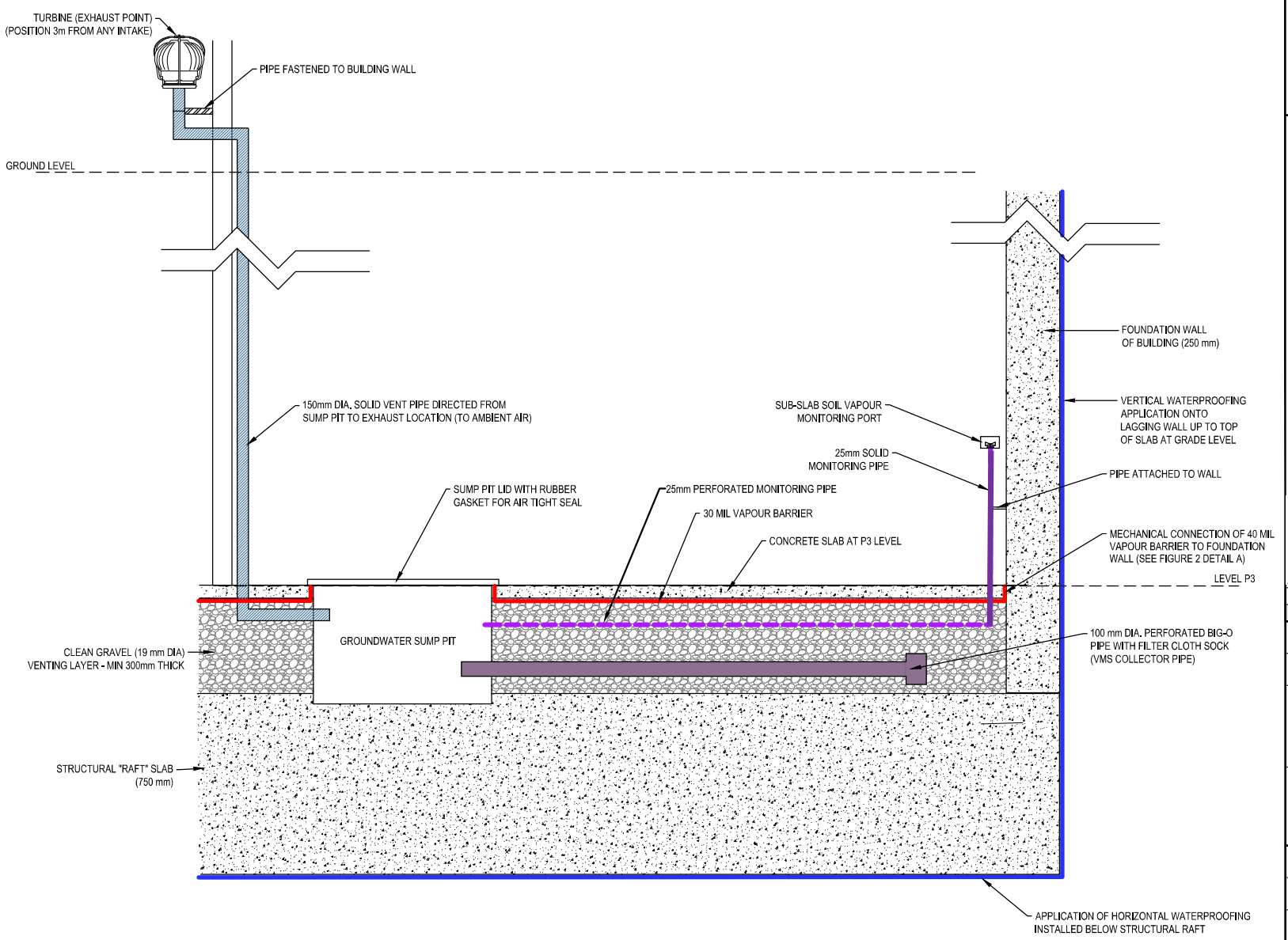
Note

1. This drawing shall be read in conjunction with the associated technical report.

Revision	Date	Issue	Approval
A	06/18/2025	FINAL	B.W.

Client: Churchill Properties Inc.	Site: 424 Churchill Avenue North, Ottawa, ON
Report Title: Risk Assessment	Designed By: M.H. / Date: June 2025
	Drawn By: K.M. / Project No.: 02103035.000
Drawing Title: Site Location Map	Approved By: B.W. / Figure No.: 1
	Scale: As shown

2713 Lancaster Road Suite 101, Ottawa, Ontario K1B 5R6 Tel: 1-877-300-4800 Website: www.englobecorp.com



Note

1. This drawing shall be read in conjunction with the associated technical report.
2. Do not scale drawing.

Legend

- 100mm Perforated VMS Collector Pipe
- 50mm Vent Pipe
- 25mm Perforated Monitoring Pipe
- 40 mil Vapour Barrier
- Waterproofing
- 25mm Solid Monitoring Pipe

LICENSED PROFESSIONAL ENGINEER
B.W.
R. B. WOHAYEB
100051508
2025-07-10
PROVINCE OF ONTARIO

Revision	Date	Issue	Approval
A	01/27/2025	Preliminary	

Client

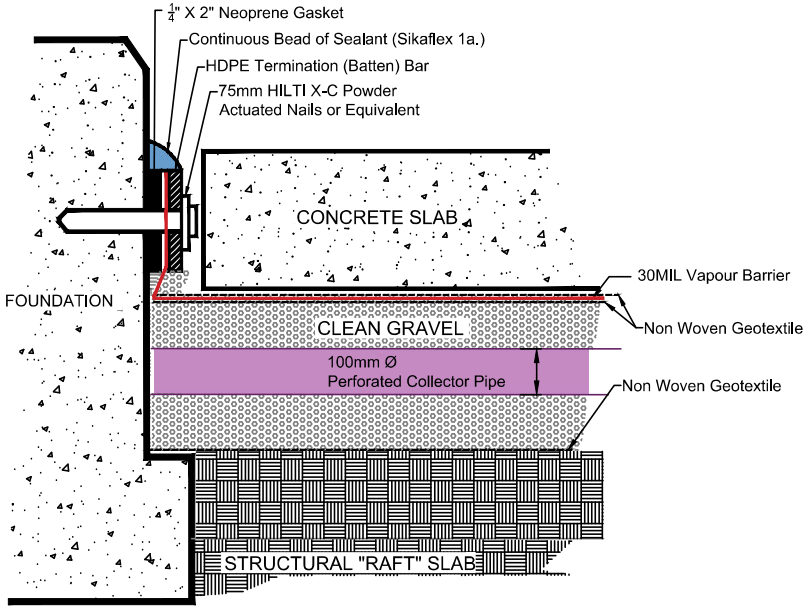
Site
424 Churchill Avenue North, Ottawa, ON

Report Title
Vapour Mitigation System (VMS) Conceptual Design

Drawing Title
Section A-A'

Designed By: J.K.	Scale: NTS
Drawn By: K.M.	Date: June 2025
Approved By: B.W.	Project No.: 02103035.000
Figure No.: 2	

2713 Lancaster Road Suite 101, Ottawa, Ontario K1B 5R6 Tel: 1-877-300-4800 Website: www.englobecorp.com



Detail A - Typical Mechanical Attachment of Vapour Barrier

eNGLOBe

REFERENCE:

NOTES:

LEGEND:

- 25mm Monitoring Pipe (Perforated)
- 100mm Collector Pipe (Perforated)
- 40 mil Vapour Barrier

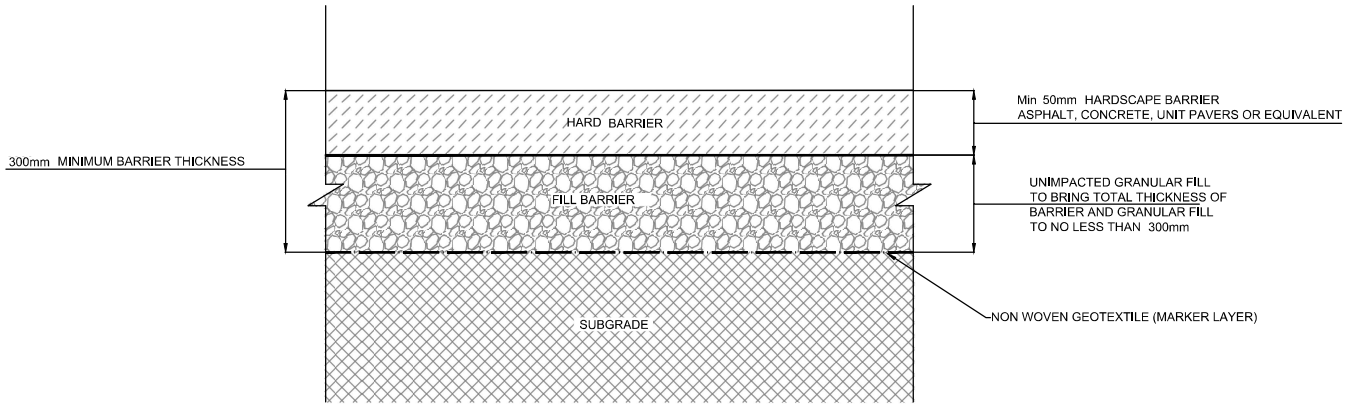
LICENSED PROFESSIONAL ENGINEER
B.W.
R. B. WOHAYEB
100051508
2025-07-10
PROVINCE OF ONTARIO

PROJECT TITLE:
VAPOUR MITIGATION SYSTEM (VMS)
CONCEPTUAL DESIGN

SITE LOCATION:
424 CHURCHILL AVENUE NORTH
OTTAWA, ONTARIO

FIGURE TITLE:
CONCEPTUAL DESIGN DETAIL A:
VAPOUR BARRIER MECHANICAL CONNECTION

REV NO.:	FILE NO.:
1	02103035.000
SCALE: N.T.S	FIGURE NO.: 3
DATE: JUNE 2025	



TYPICAL HARD CAP BARRIER - PRIVATE PROPERTY

1 NTS

Notes:

1). MINIMUM THICKNESS REQUIRED FOR RISK MANAGEMENT PURPOSES ARE SHOWN. FINAL HARD CAP DESIGN REQUIREMENTS SHOULD BE CONFIRMED BY A GEOTECHNICAL ENGINEER BASED ON STRUCTURAL SUPPORT CONSIDERATIONS.

2). GRANULAR FILL MUST BE A GRANULAR A OR B MATERIAL OR AS APPROPRIATE FOR REQUIRED STRUCTURAL CAPACITY AND MAY INCLUDE THE USE OF UNIMPACTED SOILS. "UNIMPACTED SOIL" MEANS SOIL IN WHICH ONE OR MORE CONTAMINANTS ARE PRESENT AT CONCENTRATIONS LESS THAN THE **RESIDENTIAL/PARKLAND/ INSTITUTIONAL PROPERTY USE STANDARDS WITHIN TABLE 7 "FULL DEPTH GENERIC SITE CONDITION STANDARD IN A NON-PORTABLE GROUND WATER CONDITION"** OF THE ***SOIL, GROUND WATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ACT*** PUBLISHED BY THE MINISTRY AND DATED APRIL 15, 2011 FOR COARSE TEXTURED SOIL.(2011 MECP TABLE 7 STANDARDS)

3). ALL IMPORTED MATERIALS BROUGHT TO THE PROPERTY ARE REQUIRED TO MEET THE **RESIDENTIAL/PARKLAND/ INSTITUTIONAL PROPERTY USE STANDARDS WITHIN TABLE 7 "FULL DEPTH GENERIC SITE CONDITION STANDARD IN A NON-POTABLE GROUND WATER CONDITION"** OF THE ***SOIL GROUND WATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ACT"*** PUBLISHED BY MECP AND DATED APRIL 15, 2011 FOR ALL TEXTURED SOIL(2011 MECP TABLE 7 STANDARDS).

ENGLOBE

REFERENCE:

NOTES:

LEGEND:

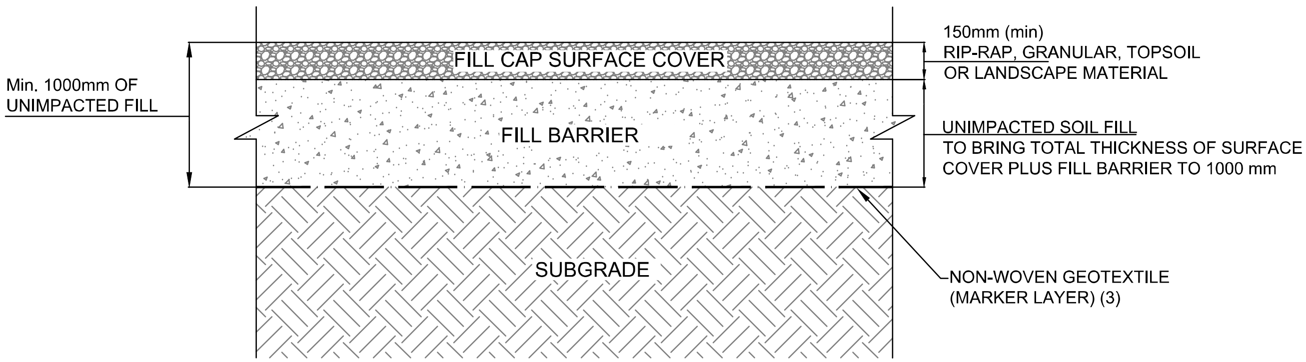
LICENSED PROFESSIONAL ENGINEER
B.W.
R. B. WOHAYEB
100051508
2025-07-10
PROVINCE OF ONTARIO

PROJECT TITLE:
Design of Risk Management Measures

SITE LOCATION:
424 CHURCHILL AVENUE NORTH
OTTAWA, ONTARIO

FIGURE TITLE:
Typical Hard Cap Barrier - Design Concept - Private Property

REV NO.:	FILE NO.:
1	02103035.000
SCALE: NTS	FIGURE NO.:
DATE: June 2025	4a



TYPICAL FILL CAP BARRIER (LANDSCAPED AREAS) - PRIVATE PROPERTY

1 NTS

Notes:

1). SOIL FILL IN FILL CAP BARRIER MUST MEET ONE OF THE FOLLOWING STANDARDS:
- SOIL FILL QUALITY MEETING THE 2011 MECP TABLE 7 RPI STANDARDS.
- VIRGIN GRANULAR FILL IMPORTED FROM LICENSED PIT OR QUARRY AND/OR
- MANUFACTURED TOPSOIL OR GROWING MEDIA MEETING THE 2011 MECP TABLE 7 RPI STANDARDS.

2). ALL IMPORTED MATERIALS BROUGHT TO THE PROPERTY ARE REQUIRED TO MEET THE 2011 MECP TABLE 7 STANDARDS.

3). MARKER LAYER OR GEOTEXTILE IS REQUIRED AT INTERFACE WITH SUBGRADE.

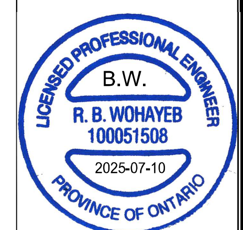
4). DEEP ROOTING PLANTS WITH A ROOT SYSTEM >1 MBGS TO BE PLANTED IN RAISED PLANTING BEDS THAT CONTAIN GROWTH MEDIA MEETING TABLE 7 RPI STANDARDS. TREES AND OTHER PLANTS WITH A ROOT SYSTEM <0.4 MBGS WILL BE WITHIN THE 1000 MM FILL CAP BARRIER MEETING TABLE 7 RPI STANDARDS.

ENGLOBE

REFERENCE:

NOTES:

LEGEND:



PROJECT TITLE: Design of Risk Management Measures

SITE LOCATION: 424 CHURCHILL AVENUE NORTH OTTAWA, ONTARIO

FIGURE TITLE: Typical Fill Cap Barrier - Design Concept - Private Property

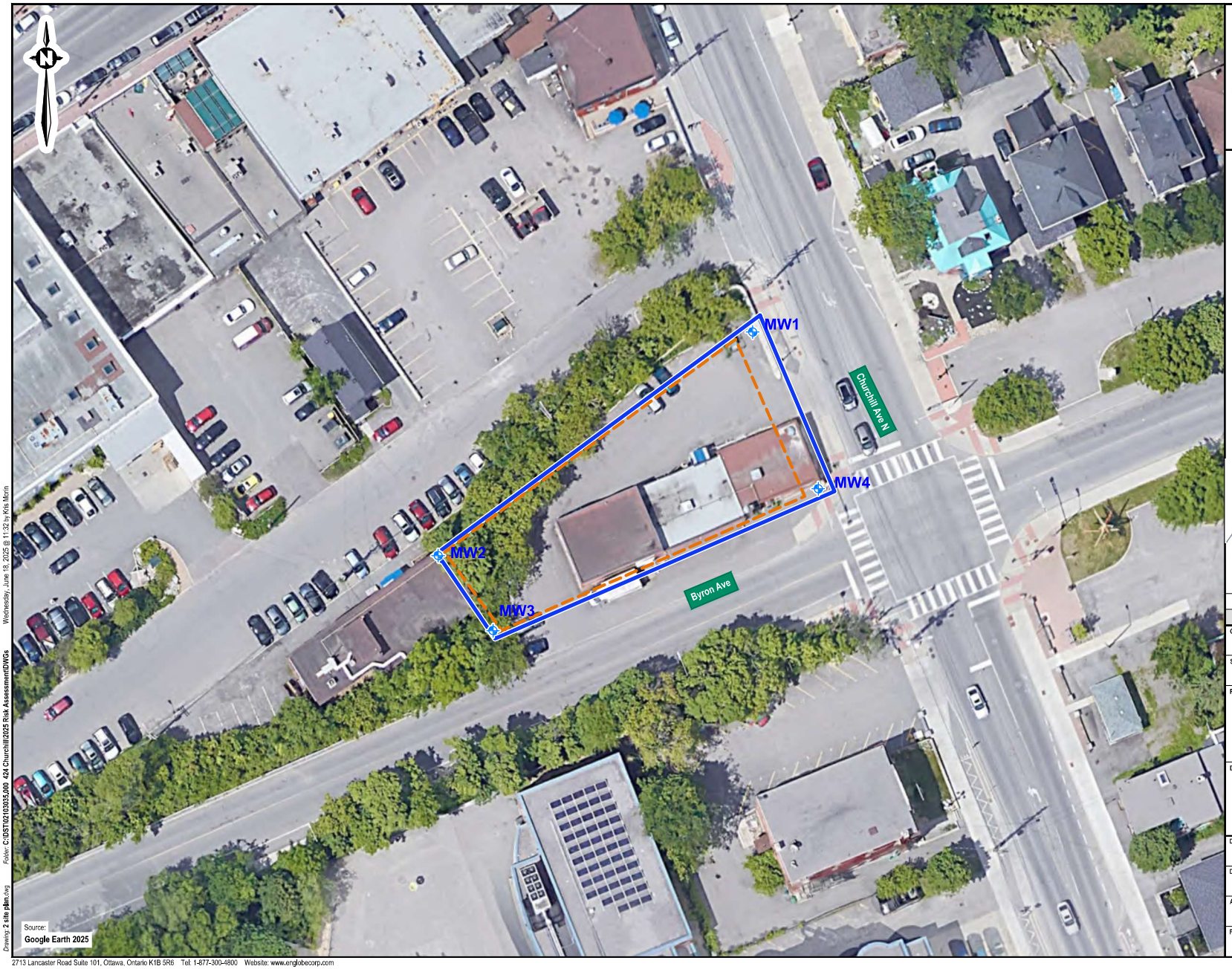
REV NO.: 1

FILE NO.: 02103035.000

SCALE: NTS

FIGURE NO.: 4b

DATE: June 2025



Note

1. This drawing shall be read in conjunction with the associated technical report.

Legend

- Phase One, Phase Two and Record of Site Condition (RSC) Property Boundary
- Approx Proposed Building Footprint
- Proposed Monitoring Well Location

LICENSED PROFESSIONAL ENGINEER
B.W.
R. B. WOHAYEB
100051508
2025-07-10
PROVINCE OF ONTARIO

1:500
0 5 10 15 20 25 m
1:1
0 5 cm
Scale accurate when printed at 100% using paper size ANSI full bleed B (11.0 x 17.0 inches)

Revision	Date	Issue	Approval
A	06/18/2025	Preliminary	

Client: Churchill Properties Inc.

Site: 424 Churchill Avenue North, Ottawa, ON

Report Title: Risk Assessment

Drawing Title: Groundwater Monitoring Plan
Well Placement

Designed By: M.H.	Scale: As shown
Drawn By: K.M.	Date: June 2025
Approved By: B.W.	Project No.: 02103035.000
Figure No.: 5	

Drawing: 2 site plan.dwg Folder: C:\DST\02103035.000_424 Churchill\2025 Risk Assessment\DWGs Wednesday, June 18, 2025 @ 11:32 by Kris Morin

Attachment 1
Soil Vapour Barrier Specifications

ENGLOBE

ABSOLUTE BARRIER® Y30BAC

HIGH PERFORMANCE LLDPE/EVOH GEOMEMBRANE GAS BARRIER

PRODUCT DESCRIPTION

Absolute Barrier® Y30BAC is a seven-layer co-extruded geomembrane consisting of very flexible, linear-low-density polyethylene (LLDPE) with an inner core of chemically resistant EVOH barrier resin, designed specifically as a barrier against radon, methane and VOCs. High strength LLDPE provides exceptional tear and impact resistance. A robust stabilization package that exceeds the industry standard; provides long-term protection from thermal oxidation and ultraviolet degradation in exposed applications.

PRODUCT USE

Absolute Barrier® Y-Series is designed to stop gas vapor migration on Brownfield sites, in residential and commercial buildings, as well as geomembrane containment and covering systems. When installed under concrete slabs as a gas barrier, a passive system is recommended to include a ventilated system with sump(s) that could be converted to an active control system with properly designed ventilation fans. Y30BAC is over 800 times less permeable to methane gas than LLDPE vapor barriers in a comparable thickness.

Absolute Barrier® performs extremely well preventing the degradation of EPS geofoam by protecting it from harsh VOCs including direct gasoline or diesel fuel contact.

Absolute Barrier® Y30BAC is a highly effective, temporary and long-term, landfill caps with VOC diffusion coefficients ranging from 40 to 240 times less than standard 80 mil HDPE geomembranes. Contaminants found in leachate and gas in municipal and hazardous waste landfills can migrate through standard HDPE; contributing to both atmospheric and groundwater contaminations. Absolute Barrier® Y-Series is an effective barrier to a wide range of VOCs including benzene, toluene, trichloroethylene, perchloroethylene, and many others.

SIZE & PACKAGING

Absolute Barrier® Y30BAC is available in 16′ c-fold or in fabricated panels up to 50,000 sq. ft. All fabricated panels are accordion folded and tightly rolled onto a heavy-duty core for ease of handling and time saving installation.

EPS Geofoam Protection

PRODUCT	PART #
ABSOLUTE BARRIER®	Y30BAC

APPLICATIONS

- EPS Geofoam Protection
- Landfill Cap
- Temporary Landfill Gas Cover
- Floating Gas Cover
- Underslab VOC Barrier
- Underslab Radon Barrier
- Underslab Methane Barrier
- Underslab Vapor Barrier
- Remediation Cover / Liner
- Leachate Collection Ponds
- Odor Control Barrier
- Secondary Containment

Absolute Barrier®

THE ULTIMATE IN GAS CONTAINMENT

ABSOLUTE BARRIER® Y30BAC

HIGH PERFORMANCE LLDPE/EVOH GEOMEMBRANE GAS BARRIER

		ABSOLUTE BARRIER® Y30BAC			
		IMPERIAL		METRIC	
PROPERTIES	TEST METHOD	MINIMUM	TYPICAL	MINIMUM	TYPICAL
Appearance		Black		Black	
Thickness	ASTM D5199	30 Mils Average	30 Mils Nominal	0.76 mm Average	0.76 mm Nominal
Weight		150 lbs/msf		732 g/m^2	
Tensile Strength at Break	ASTM D6693	85 lbs/in	100 lbs/in	149 N/cm	175 N/cm
Tensile Elongation at Break	ASTM D6693	500 %	600 %	500 %	600 %
Tear Strength	ASTM D1004	18 lbs	22 lbs	80 N	98 N
Puncture Resistance	ASTM D4833	60 lbs	75 lbs	267 N	334 N
Oxidation Induction Time (OIT) or High Pressure OIT (HPOIT)	ASTM D3895 ASTM D5885	100 min 400 min	250 min -	100 min 400 min	250 min -
Carbon Black Content [7]	ASTM D4218	2.0 %	2.3 %	2.0 %	2.3 %
Carbon Black Dispersion	ASTM D5596	Pass			
Benzene Permeance	See Note [6]	2.13 x 10^{-10} m^2/sec or 1.93 x 10^{-13} m/s			
Toluene Permeance	See Note [6]	2.95 x 10^{-10} m^2/sec or 7.77 x 10^{-14} m/s			
Ethylbenzene Permeance	See Note [6]	2.31 x 10^{-10} m^2/sec or 1.78 x 10^{-14} m/s			
M & P-Xylenes Permeance	See Note [6]	2.19 x 10^{-10} m^2/sec or 2.03 x 10^{-14} m/s			
O-Xylene Permeance	See Note [6]	2.07 x 10^{-10} m^2/sec or 1.83 x 10^{-14} m/s			
Methane Permeance	ASTM D1434	< 4.93E^{-13} m/s			
Hydrogen Sulfide	See Note [9]	1.45E^{-09} m/s			
Trichloroethylene (TCE)	See Note [6]	1.44 x 10^{-10} m^2/sec or 5.60 x 10^{-15} m/s			
Perchloroethylene (PCE)	See Note [6]	1.35 x 10^{-10} m^2/sec or 5.57 x 10^{-15} m/s			
Cold Temperature Impact	ASTM D746	-40° F		-40° C	
Maximum Static Use Temperature		180° F		82° C	
Low Temperature Bend Test	ASTM D2136	-70° F			
FACTORY SEAM REQUIREMENTS					
Bonded Seam Strength	ASTM D6392 Mod. [5]	57 lbs/in.	75 lbs/in.	100 N/cm	131 N/cm
Seam Peel Adhesion	ASTM D6392 Mod. [5]	45 lbs/in.	60 lbs/in.	79 N/cm	105 N/cm

[5] Raven Industries performs seam testing at 20" per minute.

[6] Aqueous Phase Film Permeance.

Permeation of Volatile Organic Compounds through EVOH Thin Film Membranes and Coextruded LLDPE/EVOH/LLDPE Geomembranes, McWatters and Rowe, Journal of Geotechnical and Geoenvironmental Engineering© ASCE/ September 2015. (Permeation is the Permeation Coefficient adjusted to actual film thickness - calculated at 1 kg/m^3.)

[7] The study used to determine PCE and TCE is titled: Evaluation of diffusion of PCE & TCE through high performance geomembranes by Di Battista and Rowe, Queens University 8 Feb 2018.

[9] No carbon black in barrier layers.

The study used to determine diffusion coefficients is titled: Hydrogen Sulfide (H_2S) Transport through Simulated Interim Covers with Conventional and Co-Extruded Ethylene-Vinyl Alcohol (EVOH) Geomembranes.

Absolute Barrier® Y30BAC is a seven-layer co-extruded geomembrane consisting of very flexible, linear-low-density polyethylene (LLDPE) with an inner core of chemically resistant EVOH barrier resin, designed specifically as a barrier against radon, methane and VOCs. High strength LLDPE provides exceptional tear and impact resistance. A robust stabilization package that exceeds the industry standard; provides long-term protection from thermal oxidation and ultraviolet degradation in exposed applications.

Note: To the best of our knowledge, unless otherwise stated, these are typical property values and are intended as guides only, not as specification limits. Chemical resistance, odor transmission, longevity as well as other performance criteria is not implied or given and actual testing must be performed for applicability in specific applications and/or conditions. VIAFLEX MAKES NO WARRANTIES AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and disclaims all liability for resulting loss or damage. Limited Warranty available at www.viaflex.com

Scan QR Code to download technical data sheets.

VIAFLEX, INC.
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Ph: +1 (605) 335-0174 • TF: +1 (800) 635-3456
sales@viaflex.com
www.viaflex.com

July 11, 2025

Churchill Properties Inc.
145 Select Avenue
Scarborough, Ontario
M1V 5M8

Attention: Mr. Michael Hopkins

Subject: **Phase Two Environmental Site Assessment Update**
424 Churchill Avenue North, Hamilton
Englobe Reference: 02103035.000

1 Introduction

Englobe Corp. (Englobe) has been retained by Churchill Properties Inc to complete a Phase Two Environmental Site Assessment (ESA) Update for the property located at 424 Churchill Avenue North, in Ottawa, Ontario (the "Property").

The Phase Two ESA Update was completed to satisfy the intent of the requirements, methodology and practices for a Phase Two ESA as described in O.Reg 153/04, as amended. The location and extent of the Property is identified on Figure 1 of the Phase Two CSM (Appendix A).

1.1 Background

The requirement for a Phase Two ESA Update is to describe an additional environmental investigation which took place following the issuance of the Englobe Phase Two ESA report in March 2024. The purpose of the additional environmental investigation was to further delineate and assess soil and groundwater conditions for multiple chemical parameters including, Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), Metals, Hydride Forming Metals (HFMs) and Inorganics. The requirement stemmed from a review of the Conceptual Site Model and Pre-Submission Form by the Ministry of the Environment Conservation and Parks (MECP).

1.2 Previous Phase Two ESA

In March 2024 Englobe conducted a Phase Two ESA which was completed to assess Contaminants of Concern (COCs) in Areas of Potential Environmental Concern (APECs) identified on the Property in the Phase One ESA. The findings of the Phase Two ESA recommended that a Risk Assessment be performed on the Property prior to filing a Record of Site Condition (RSC).

The Phase Two ESA report dated March 2024, encompassed all on-Site investigations conducted on the Property until the date of the report.

2 Additional Environmental Investigation

In support of the Risk Assessment for the Property entitled '*Risk Assessment, 424 Churchill Avenue North, Ottawa, Ontario*', Dated July 11, 2025, an additional subsurface investigation was completed on the Property consisting of soil and groundwater sampling.

2.1 Soils Sampling

In March 2025, Englobe returned to the Property to collect soil samples for Metals, HFMs, PHCs, BTEX, VOC, pH and PAH chemical analysis. Soil samples were collected within APECs 1, 2, and 3 to delineate soil quality.

Soil sampling methodology followed that outlined in O.Reg 153/04, as amended.

In total, five (5) soil samples plus one duplicate samples were collected at the Property for chemical analysis of the above stated parameters. The location and depths of samples are shown in the Figures of the Phase Two CSM (Appendix A).

The results of the sampling indicated that Metals, PHCs, and PAHs exceeded the applicable Site Condition standards at one or more of the soil sampling locations and were therefore carried forward as COCs in the Risk Assessment.

Soil sample results for all environmental investigations until the date of the Phase Two CSM (July 11, 2025) are presented in Table 1. Laboratory certificates of analysis for the same time period are presented in Appendix B.

2.2 Groundwater Sampling

In April 2025, Englobe returned to the Property to collect groundwater samples for Metals, HFMs, PHCs, BTEX, VOC, and PAH chemical analysis. Groundwater samples were collected within APECs 1, 2, and 3 to delineate groundwater quality.

Groundwater sampling methodology followed that outlined in O.Reg 153/04, as amended.

In total, eight (8) groundwater samples plus one (1) duplicate sample was collected at the property for chemical analysis of the above stated parameters. The location and depths of the samples are shown in the Figures of the Phase Two CSM (Appendix A).

The results of the sampling indicated that VOCs exceeded the applicable Site Condition Standards at one or more of the groundwater sampling locations and were therefore carried forward as COCs in the Risk Assessment.

Groundwater sample results for all environmental investigations until the date of the Phase Two CSM (July 11, 2025) are presented in Table 2. Laboratory certificates of analysis for the same time period are presented in Appendix B.

3 Conclusions

Based on the information presented in this Phase Two ESA Update a Risk Assessment is currently being undertaken for the Property under O.Reg 153/04, as amended.

Please note that the findings of all environmental investigations conducted up to July 11, 2025 are also reported in the Phase Two Conceptual Site Model (CSM) found in Appendix A.

The Risk Assessment is currently under review by the MECP. The RSC for the Property may not be filed until the Risk Assessment is completed and accepted by the MECP and the Certificate of Property Use (CPU) for the Site is registered to the Property Title.

4 Closure

We trust this report meets your requirements. Should you have any questions regarding the information presented, please do not hesitate to contact our office.

Yours truly,

Englobe Corp.

Michael Hozjan, M.EnvSc.
Environmental Risk Assessor

Baker Wohayeb, M.A.Sc., P.Eng., QP$_{ESA-RA}$
Director – Environmental GTA

Attached:
Table 1: Soil Sampling Results
Table 2: Groundwater Sampling Results
Appendix A: Phase Two Conceptual Site Model
Appendix B: Laboratory Certificates of Analysis

Result Tables

ENGLOBE

Table 1. Summary of Soil Analytical Results.

Sample ID	MECP Table 7 SCS	Units	MW21-01 SS2	MW21-02 SS2	MW21-03 SS1	MW23-01 SS1	MW23-03 SS1	MW23-04 SS1	MW25-01A	MW25-02A	MW25-03	MW25-04A	DUP	MW25-05
Sample Depth (mbgs)			0.9 - 1.2	0.9 - 1.0	0.3 - 0.8	0.3 - 0.9	0.15 - 0.45	0 - 0.3	0.2 - 0.4	0.25 - 0.4	0.3 - 0.4	0.35 - 0.7	0.35 - 0.7	0.4 - 0.6
Sample Date (yyyy-mm-dd)			2021-04-21	2021-04-21	2021-04-22	2023-07-11	2023-07-20	2023-07-12	2025-03-28	2025-03-27	2025-03-27	2025-03-28	2025-03-28	2025-03-26
Inorganics														
pH	5 to 9	-	-	7.86	-	-	-	-	8.04	7.84	7.91	7.81	7.8	7.69
Conductivity (ms/cm)	0.7	mS/cm	-	-	-	-	-	-	0.44	0.24	**0.84**	0.24	0.26	-
Sodium Adsorption Ratio	5	N/A	-	-	-	-	-	-	**5.5**	2.5	3.6	4.7	**5.6**	-
Cyanide, Free	0.051	µg/g	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-
Metals and Hydride-Forming Metals														
Antimony	7.5	µg/g	-	-	-	0.25	0.37	0.37	<0.20	2.3	0.67	<0.20	<0.20	1.8
Arsenic	18	µg/g	-	-	-	2	2.2	3	1.1	1.3	3	1.2	1.3	8.3
Barium	390	µg/g	-	-	-	**630**	180	310	130	93	130	260	210	270
Beryllium	5	µg/g	-	-	-	0.32	0.32	0.29	0.39	<0.20	0.28	0.35	0.37	0.49
Boron (Total)	120	µg/g	-	-	-	9.8	12	8.4	11	<5.0	7.6	9.7	10	12
Boron (Hot Water Soluble)	1.5	µg/g	-	-	-	-	-	-	0.44	0.2	0.67	0.16	0.2	-
Cadmium	1.2	µg/g	-	-	-	0.11	0.1	0.18	<0.10	0.15	0.57	<0.10	<0.10	0.89
Chromium	160	µg/g	-	-	-	9	14	13	11	7.8	15	9	9.3	18
Chromium VI	10	µg/g	-	-	-	-	-	-	<0.18	<0.18	<0.18	<0.18	<0.18	-
Cobalt	22	µg/g	-	-	-	5.3	9.4	4.5	4.9	2.9	6.2	4.6	4.9	8.4
Copper	180	µg/g	-	-	-	12	27	44	4.8	24	63	6.7	7	**1000**
Lead	120	µg/g	-	-	-	48	46	**200**	6.3	99	**260**	8.1	8.8	**210**
Mercury	1.8	µg/g	-	-	-	-	-	-	<0.050	<0.050	0.093	<0.050	<0.050	-
Molybdenum	6.9	µg/g	-	-	-	0.69	1.3	1.7	0.64	0.87	1.1	<0.50	<0.50	1.5
Nickel	130	µg/g	-	-	-	11	18	11	12	6.5	18	11	11	29
Selenium	2.4	µg/g	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Silver	25	µg/g	-	-	-	<0.20	<0.20	1.3	<0.20	<0.20	0.21	<0.20	<0.20	0.31
Thallium	1	µg/g	-	-	-	0.17	0.32	0.15	0.12	0.078	0.2	0.1	0.1	0.27
Uranium	23	µg/g	-	-	-	0.35	0.46	0.36	0.19	0.38	0.32	0.19	0.21	0.4
Vanadium	86	µg/g	-	-	-	16	14	22	10	12	18	8.3	8.8	19
Zinc	340	µg/g	-	-	-	25	57	92	11	36	140	10	11	**1400**
Petroleum Hydrocarbons (PHCs)														
F1 (C6-C10)	65	µg/g	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F1 (C6-C10) - BTEX	65	µg/g	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16)	150	µg/g	<10	<10	<10	<10	<10	<10	13	<7.0	26	<7.0	<7.0	7.8
F3 (C16-C34)	1300	µg/g	<50	100	<50	340	<50	420	140	140	340	<50	<50	170
F4 (C34-C50)	5,600	µg/g	<50	290	95	1300	170	880	190	140	180	<50	<50	680
Reached Baseline at C50	NG	µg/g	YES	NO	YES	NO	NO	NO	YES	YES	NO	YES	YES	NO
F4 Gravimetric	5,600	µg/g	-	1100	-	**6100**	640	3200	-	-	710	-	-	2900
Volatile Organic Compounds (VOCs)														
Acetone	28	µg/g	<0.50	<0.50	<0.50	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49
Benzene	0.17	µg/g	<0.020	<0.020	<0.020	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Bromodichloromethane	13	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Bromoform	0.26	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Bromomethane	0.05	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Carbon Tetrachloride	0.12	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Chlorobenzene	2.7	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Chloroform	0.18	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Dibromochloromethane	9.4	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,2-Dichlorobenzene	4.3	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,3-Dichlorobenzene	6	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,4-Dichlorobenzene	0.097	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1-Dichloroethane	11	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,2-Dichloroethane	0.05	µg/g	<0.050	<0.050	<0.050	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
1,1-Dichloroethylene	0.05	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Cis-1,2-Dichloroethylene	30	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	0.058	<0.040	<0.040	<0.040
Trans-1,2-Dichloroethylene	0.75	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,2-Dichloropropane	0.085	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Cis-1,3-Dichloropropylene	NG	µg/g	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Trans-1,3-Dichloropropylene	NG	µg/g	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	15	µg/g	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylene Dibromide	0.05	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Methyl Ethyl Ketone	44	µg/g	<0.5	<0.5	<0.5	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Methylene Chloride	0.96	µg/g	<0.05	<0.05	<0.05	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
Methyl Isobutyl Ketone	4.3	µg/g	<0.5	<0.5	<0.5	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Methyl-t-Butyl Ether	1.4	µg/g	<0.05	<0.05	<0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Styrene	2.2	µg/g	<0.05	<0.05	<0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1,1,2-Tetrachloroethane	0.05	µg/g	<0.05	<0.05	<0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1,2,2-Tetrachloroethane	0.05	µg/g	<0.05	<0.05	<0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Toluene	6	µg/g	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.022	<0.020
Volatile Organic Compounds (VOCs)														
Tetrachloroethylene	2.3	µg/g	0.72	0.27	0.32	2	0.23	0.16	0.19	0.75	1.7	0.75	1.7	1
1,1,1-Trichloroethane	3.4	µg/g	<0.05	<0.05	<0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1,2-Trichloroethane	0.05	µg/g	<0.05	<0.05	<0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Trichloroethylene	0.52	µg/g	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	0.089	<0.010	<0.010	<0.010
Vinyl Chloride	0.022	µg/g	<0.02	<0.02	<0.02	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019
m-Xylene & p-Xylene	NG	µg/g	<0.02	<0.02	<0.02	0.035	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene	NG	µg/g	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	25	µg/g	<0.02	<0.02	<0.02	0.035	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Dichlorodifluoromethane	25	µg/g	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Hexane(n)	34	µg/g	<0.050	<0.050	<0.050	0.054	0.062	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Trichlorofluoromethane	5.8	µg/g	<0.05	<0.05	<0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,3-Dichloropropene (cis + trans)	0.083	µg/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	58	µg/g	-	-	-	<0.050	<0.050	0.58	<0.0050	0.096	<0.0050	<0.0050	<0.0050	<0.050
Acenaphthylene	0.17	µg/g	-	-	-	<0.050	<0.050	0.059	<0.0050	0.018	0.022	<0.0050	<0.0050	<0.050
Anthracene	0.74	µg/g	-	-	-	<0.050	0.059	**1.2**	<0.0050	0.24	0.037	<0.0050	<0.0050	0.073
Benzo(a)anthracene	0.63	µg/g	-	-	-	0.072	0.21	**3.5**	<0.0050	**0.92**	0.062	0.0084	0.014	0.2
Benzo(a)pyrene	0.3	µg/g	-	-	-	0.085	0.19	**3**	0.007	**0.85**	0.091	0.0094	0.011	0.18
Benzo(b/j)fluoranthene	0.78	µg/g	-	-	-	0.11	0.26	**4.3**	0.0074	**1.2**	0.12	0.012	0.019	0.24
Benzo(ghi)perylene	7.8	µg/g	-	-	-	0.079	0.12	1.8	0.016	0.67	0.19	0.0061	0.011	0.086
Benzo(k)fluoranthene	0.78	µg/g	-	-	-	<0.050	0.095	**1.7**	<0.0050	0.49	0.04	<0.0050	0.0069	0.091
Chrysene	7.8	µg/g	-	-	-	0.088	0.16	3.3	0.0073	0.81	0.06	0.0088	0.011	0.17
Dibenzo(a,h)anthracene	0.1	µg/g	-	-	-	<0.050	<0.050	**0.54**	<0.0050	**0.17**	0.023	<0.0050	<0.0050	<0.050
Fluoranthene	0.69	µg/g	-	-	-	0.15	0.41	**8.8**	<0.0050	**2**	0.11	0.023	0.019	0.59
Fluorene	62	µg/g	-	-	-	<0.050	<0.050	0.63	<0.0050	0.087	<0.0050	<0.0050	<0.0050	<0.050
Indeno(1,2,3-cd)pyrene	0.48	µg/g	-	-	-	0.064	0.12	**2**	<0.0050	**0.72**	0.13	0.0063	0.0076	0.078
1-Methylnaphthalene	NG	µg/g	-	-	-	<0.050	<0.050	0.24	<0.0050	0.014	0.0054	<0.0050	<0.0050	<0.050
2-Methylnaphthalene	NG	µg/g	-	-	-	<0.050	<0.050	0.24	<0.0050	0.011	<0.0050	<0.0050	<0.0050	<0.050
Naphthalene	0.75	µg/g	-	-	-	<0.050	<0.050	0.45	<0.0050	0.016	<0.0050	<0.0050	<0.0050	<0.050
Phenanthrene	7.8	µg/g	-	-	-	0.1	0.2	7.5	0.0072	1.1	0.059	0.011	0.0095	0.42
Pyrene	78	µg/g	-	-	-	0.14	0.34	6.6	0.0094	1.5	0.1	0.019	0.017	0.48
Methylnaphthalene, 2-(1-)	3.4	µg/g	-	-	-	<0.071	<0.071	0.48	<0.0071	0.025	<0.0071	<0.0071	<0.0071	<0.071

Notes

MECP Table 7 SCS	Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition for Residential/Parkland/Institutional Property Use, medium-fine textured soil, Ontario Ministry of the ENGironment "Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" (MECP July 2011).
NG	No Guideline Available
-	Parameter not Analyzed
<	Less Than Reportable Detection Limit
X	Exceeds MECP Table 7 SCS

Table 2. Summary of Groundwater Analytical Results.

Sample ID	MECP Table 7 SCS	Units	MW21-01	MW21-02	MW21-03	MW21-09	F. BLANK	T. BLANK	MW23-01	MW23-11 (DUP OF MW23-01)	MW23-01	MW23-02	MW23-20 (DUP OF MW23-02)	MW23-02 (2)	MW23-02	MW23-02	MW23-03	MW23-03	T.BLANK	F.BLANK	MW23-04	F. BLANK	T. BLANK	MW24-1
Sample Date (yyyy-mm-dd)			2021-04-30	2021-04-30	2021-04-30	2023-08-15	2023-08-15	2023-08-15	2023-08-28	2023-08-28	2023-11-28	2023-08-28	2023-08-28	2023-08-13	2023-11-29	2024-01-25	2023-08-14	2023-08-28	2023-08-28	2023-08-28	2023-08-14	2023-08-14	2023-08-14	2024-01-25
Inorganics																								
Dissolved Chloride (Cl-)	1800000	µg/L	-	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WAD Cyanide (Free)	52	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	NG	µg/L	-	7.92	-	-	-	-	-	-	-	-	-	7.78	-	-	-	-	-	-	-	-	-	-
Metals and Hydride Forming Metals																								
Dissolved Antimony (Sb)	16000	µg/L	-	-	-	<0.50	-	-	<0.50	<0.50	-	-	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-
Dissolved Arsenic (As)	1500	µg/L	-	-	-	<1.0	-	-	1.1	<1.0	-	-	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-
Dissolved Barium (Ba)	23000	µg/L	-	-	-	64	-	-	100	110	-	-	-	-	-	-	65	-	-	-	76	-	-	-
Dissolved Beryllium (Be)	53	µg/L	-	-	-	<0.40	-	-	<0.40	<0.40	-	-	-	-	-	-	<0.40	-	-	-	<0.40	-	-	-
Dissolved Boron (B)	36000	µg/L	-	-	-	250	-	-	220	230	-	-	-	-	-	-	230	-	-	-	95	-	-	-
Dissolved Cadmium (Cd)	2.1	µg/L	-	-	-	<0.090	-	-	<0.090	<0.090	-	-	-	-	-	-	<0.090	-	-	-	<0.090	-	-	-
Dissolved Chromium (Cr)	640	µg/L	-	-	-	<5.0	-	-	<5.0	<5.0	-	-	-	-	-	-	<5.0	-	-	-	<5.0	-	-	-
Chromium (VI)	110	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Cobalt (Co)	52	µg/L	-	-	-	<0.50	-	-	<0.50	<0.50	-	-	-	-	-	-	24	-	-	-	0.62	-	-	-
Dissolved Copper (Cu)	69	µg/L	-	-	-	3.4	-	-	<0.90	<0.90	-	-	-	-	-	-	1.4	-	-	-	4.7	-	-	-
Dissolved Lead (Pb)	20	µg/L	-	-	-	<0.50	-	-	<0.50	<0.50	-	-	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-
Mercury (Hg)	0.1	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Molybdenum (Mo)	7300	µg/L	-	-	-	8.9	-	-	0.73	<0.50	-	-	-	-	-	-	6.9	-	-	-	1.9	-	-	-
Dissolved Nickel (Ni)	390	µg/L	-	-	-	5.5	-	-	<1.0	1.2	-	-	-	-	-	-	6.8	-	-	-	2.2	-	-	-
Dissolved Selenium (Se)	50	µg/L	-	-	-	<2.0	-	-	<2.0	<2.0	-	-	-	-	-	-	<2.0	-	-	-	<2.0	-	-	-
Dissolved Silver (Ag)	1.2	µg/L	-	-	-	<0.090	-	-	<0.090	<0.090	-	-	-	-	-	-	<0.090	-	-	-	<0.090	-	-	-
Dissolved Sodium (Na)	1800000	µg/L	-	-	-	340000	-	-	550000	540000	-	-	-	-	-	-	410000	-	-	-	490000	-	-	-
Dissolved Thallium (Tl)	400	µg/L	-	-	-	0.38	-	-	<0.050	<0.050	-	-	-	-	-	-	0.18	-	-	-	0.21	-	-	-
Dissolved Uranium (U)	330	µg/L	-	-	-	1.8	-	-	0.48	0.45	-	-	-	-	-	-	0.74	-	-	-	0.82	-	-	-
Dissolved Vanadium (V)	200	µg/L	-	-	-	<0.50	-	-	<0.50	<0.50	-	-	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-
Dissolved Zinc (Zn)	890	µg/L	-	-	-	6.1	-	-	<5.0	<5.0	-	-	-	-	-	-	<5.0	-	-	-	<5.0	-	-	-
Petroleum Hydrocarbons (PHCs)																								
F1 (C6-C10) - BTEX	420	µg/L	320	340	<25	<25	-	-	54	61	<25	**490**	**540**	-	**480 (1)**	-	-	100	<25	<25	<25	-	-	<25
F1 (C6-C10)	420	µg/L	320	340	<25	<25	-	-	54 (1)	61 (1)	<25	**500**	**540**	-	**480**	-	-	100	<25	<25	<25	-	-	<25
F2 (C10-C16 Hydrocarbons)	150	µg/L	<100	**370**	<100	<100	-	-	<100	<100	<100	-	-	-	<100	-	<100	-	-	-	<100	-	-	<100
F3 (C16-C34 Hydrocarbons)	500	µg/L	240	**760**	<200	<200	-	-	<200	<200	<200	-	-	-	<200	-	<200	-	-	-	<200	-	-	<200
F4 (C34-C50 Hydrocarbons)	500	µg/L	<200	<200	<200	<200	-	-	<200	<200	<200	-	-	-	<200	-	<200	-	-	-	<200	-	-	<200
Polycyclic Aromatic Hydrocarbons (PAHs)																								
Acenaphthene	17	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	-	-	-	<0.050	-	-	-	<0.050	-	-	-
Acenaphthylene	1	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	-	-	-	<0.050	-	-	-	<0.050	-	-	-
Anthracene	1	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
Benzo(a)anthracene	1.8	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
Benzo(a)pyrene	0.81	µg/L	-	-	-	<0.0090	-	-	<0.0090	<0.0090	-	-	-	<0.2	-	-	<0.0090	-	-	-	<0.0090	-	-	-
Benzo(b)fluoranthene	0.75	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
Benzo(g,h,i)perylene	0.2	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
Benzo(k)fluoranthene	0.4	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
Chrysene	0.7	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
Dibenzo(a,h)anthracene	0.4	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
Fluoranthene	44	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
Fluorene	290	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.3	-	-	<0.050	-	-	-	<0.050	-	-	-
Indeno(1,2,3-cd)pyrene	0.2	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
1-Methylnaphthalene	1500	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.3	-	-	<0.050	-	-	-	0.12	-	-	-
2-Methylnaphthalene	1500	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.3	-	-	<0.050	-	-	-	0.16	-	-	-
Methylnaphthalene, 2-(1-)	1500	µg/L	-	-	-	<0.071	-	-	<0.071	<0.071	-	-	-	-	-	-	<0.071	-	-	-	0.28	-	-	-
Naphthalene	7	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.3	-	-	<0.050	-	-	-	<0.050	-	-	-
Phenanthrene	380	µg/L	-	-	-	<0.030	-	-	<0.030	<0.030	-	-	-	<0.2	-	-	<0.030	-	-	-	0.044	-	-	-
Pyrene	5.7	µg/L	-	-	-	<0.050	-	-	<0.050	<0.050	-	-	-	<0.2	-	-	<0.050	-	-	-	<0.050	-	-	-
Semi-Volatile Organic Compounds (SVOCs)																								
Diethyl phthalate	30	µg/L	-	-	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	3700	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.30	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	30	µg/L	-	-	-	-	-	-	-	-	-	-	-	<2	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																								
Acetone (2-Propanone)	100000	µg/L	<50	<50	<10	<10	<10	<10	<10	<10	<10	-	-	-	<10	<10	<10	-	-	-	<10	<10	<10	<10
Benzene	0.5	µg/L	<0.20	<0.20	<0.20	<0.17	<0.20	<0.20	0.22	0.25	<0.17	0.33	0.38	<0.20	<0.17	<0.20	<0.20	<0.20	<0.20	<0.20	<0.17	<0.20	<0.20	0.39
Bromodichloromethane	67000	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	<0.50
Bromoform	5	µg/L	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	<1.0	<1.0	<1.0	<1.0	-	-	-	<1.0	<1.0	<1.0	<1.0
Bromomethane	0.89	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	0.2	µg/L	<0.20	<0.20	<0.20	<0.20	<0.19	<0.19	<0.20	<0.20	<0.20	-	-	<0.19	<0.20	<0.19	<0.19	-	-	-	<0.20	<0.19	<0.19	<0.20
Chlorobenzene	140	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20
Chloroform	2	µg/L	<1.0	<1.0	<0.20	0.27	<0.20	<0.20	1	0.96	0.48	-	-	0.82	0.55	0.56	0.45	-	-	-	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	65000	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	150	µg/L	<0.50	<0.50	<0.50	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	-	-	<0.40	<0.50	<0.40	<0.40	-	-	-	<0.50	<0.40	<0.40	<0.50
1,3-Dichlorobenzene	7600	µg/L	<0.50	<0.50	<0.50	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	-	-	<0.40	<0.50	<0.40	<0.40	-	-	-	<0.50	<0.40	<0.40	<0.50
1,4-Dichlorobenzene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	-	-	<0.40	<0.50	<0.40	<0.40	-	-	-	<0.50	<0.40	<0.40	<0.50
Dichlorodifluoromethane (FREON 12)	3500	µg/L	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	<1.0	<1.0	<1.0	-	-	-	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	11	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	<0.20	0.26	<0.20	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.49	<0.49	<0.50	<0.50	<0.50	-	-	<0.49	<0.50	<0.49	<0.49	-	-	-	<0.50	<0.49	<0.49	<0.50
1,1-Dichloroethylene	0.5	µg/L	<0.20	**0.88**	<0.20	<0.20	<0.20	<0.20	**1.2**	**1.2**	<0.20	-	-	<0.20	0.25	<0.20	**2**	-	-	-	<0.20	<0.20	<0.20	<0.20
cis-1,2-Dichloroethylene	1.6	µg/L	**220**	**860**	1.5	<0.50	<0.50	<0.50	**930**	**890**	**40**	-	-	**16**	**33**	**27**	**940**	-	-	-	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	1.6	µg/L	**8.7**	**12**	<0.50	<0.50	<0.50	<0.50	**4.7**	**4.8**	0.69	-	-	**1.7**	0.94	1.4	**14**	-	-	-	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	0.58	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	NG	µg/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	-	<0.30	<0.30	<0.30	<0.30	-	-	-	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	NG	µg/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	-	-	<0.40	<0.40	<0.40	<0.40	-	-	-	<0.40	<0.40	<0.40	<0.40
1,3-Dichloropropene (cis+trans)	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	54	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylene Dibromide	0.2	µg/L	<0.20	<0.20	<0.20	<0.20	<0.19	<0.19	<0.20	<0.20	<0.20	-	-	<0.19	<0.20	<0.19	<0.19	-	-	-	<0.20	<0.19	<0.19	<0.20
Hexane	5	µg/L	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	<1.0	<1.0	<1.0	-	-	-	<1.0	<1.0	<1.0	<1.0
Methylene Chloride(Dichloromethane)	26	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	<2.0	<2.0	<2.0	<2.0	-	-	-	<2.0	<2.0	<2.0	<2.0
Methyl Ethyl Ketone (2-Butanone)	21000	µg/L	<50	<50	<10	<10	<10	<10	<10	<10	<10	-	-	-	<10	<10	<10	-	-	-	<10	<10	<10	<10
Methyl Isobutyl Ketone	5200	µg/L	<25	<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	-	-	<5.0	<5.0	<5.0	-	-	-	<5.0	<5.0	<5.0	<5.0
Methyl t-butyl ether (MTBE)	15	µg/L	<2.5	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	<0.50
Styrene	43	µg/L	<0.50	<0.50	<0.50	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	-	-	<0.40	<0.50	<0.40	<0.40	-	-	-	<0.50	<0.40	<0.40	<0.50
1,1,1,2-Tetrachloroethane	1.1	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	-	-	<0.40	<0.50	<0.40	<0.40	-	-	-	<0.50	<0.40	<0.40	<0.50
Tetrachloroethylene	0.5	µg/L	**990**	**860**	**32**	**2.4**	<0.20	<0.20	**13**	**12**	**0.57**	-	-	**720**	**1400**	**760**	**9.9**	-	-	-	**8.4**	<0.20	<0.20	<0.20
Toluene	320	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.25	0.27	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.21
1,1,1-Trichloroethane	23	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	-	-	<0.40	<0.50	<0.40	<0.40	-	-	-	<0.50	<0.40	<0.40	<0.50
Trichloroethylene	0.5	µg/L	**100**	**160**	**2**	**0.72**	<0.20	<0.20	**110**	**110**	**1.2**	-	-	**44**	**120**	**81**	**23**	-	-	-	**0.85**	<0.20	<0.20	<0.20
Trichlorofluoromethane (FREON 11)	2000	µg/L	<2.5	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	0.5	µg/L	**7**	**31**	<0.20	<0.20	<0.20	<0.20	**100**	**100**	**7.3**	-	-	**0.98**	**4**	**3.2**	**88**	-	-	-	<0.20	<0.20	<0.20	<0.20
p+m-Xylene	NG	µg/L	<1.0	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
o-Xylene	NG	µg/L	<1.0	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Xylenes	72	µg/L	<1.0	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Organochlorine Pesticides (OCPs)																								
Hexachlorobenzene	3.1	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	-	-	-	-	-	-
Polychlorinated Biphenyls (PCBs)																								
Total PCBs	0.2	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-

Notes

MECP Table 7 SCS	Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition for all Types of Property Use, medium-fine textured soil, Ontario Ministry of the Environment "Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the ENGironmental Protection Act" (MECP July 2011).
NG	No Guideline Available
-	Parameter Not Analyzed
<	Less Than Reportable Detection Limit
X	Exceeds MECP Table 7 SCS
F. Blank	Field Blank
T. Blank	Trip Blank

(1) Result reported was mainly due to chlorinated compounds eluting inside the F1 range.
(2) Conducted in Support of Evaluating Potential Discharge to Municipal Sewer System for Development Purposes Only.

Phase Two ESA Update
424 Churchill Avenue North
Ottawa, Ontario
Englobe File No.: 02103035.000

MW25-1A	MW25-1B	MW25-2A	DUP 250416	MW25-2B	MW25-3	MW25-4A	MW25-4B	MW25-5	TRIP BLANK
2025-04-17	2025-04-21	2025-04-16	2025-04-16	2025-04-17	2025-04-23	2025-04-17	2025-04-21	2025-04-17	2025-04-17
2700000	-	2800000	2800000	-	1100000	790000	-	2000000	-
<1	-	<1	<1	-	-	<1	-	<1	-
-	-	-	-	-	-	-	-	-	-
<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	-
<1.0	-	<1.0	<1.0	-	<1.0	1.7	-	<1.0	-
350	-	300	290	-	160	250	-	190	-
<0.40	-	<0.40	<0.40	-	<0.40	<0.40	-	<0.40	-
150	-	220	220	-	1000	410	-	120	-
<0.090	-	<0.090	<0.090	-	<0.090	<0.090	-	<0.090	-
<5.0	-	<5.0	<5.0	-	<5.0	<5.0	-	<5.0	-
<1.0	-	<1.0	<1.0	-	<0.50	<1.0	-	<1.0	-
<0.50	-	0.85	0.99	-	1.9	0.52	-	<0.50	-
<0.90	-	1.9	0.97	-	1.1	<0.90	-	<0.90	-
<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	-
<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	-
3.8	-	3.4	3.3	-	6.8	7.8	-	0.76	-
4.4	-	8.8	8.8	-	11	3.2	-	<1.0	-
<2.0	-	<2.0	<2.0	-	<2.0	<2.0	-	<2.0	-
<0.090	-	<0.090	<0.090	-	<0.090	<0.090	-	<0.090	-
1700000	-	1700000	1700000	-	700000	600000	-	1200000	-
<0.050	-	0.59	0.54	-	0.56	<0.050	-	<0.050	-
1.6	-	1.5	1.5	-	1.8	1.8	-	0.28	-
<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	-
<5.0	-	<5.0	<5.0	-	<5.0	<5.0	-	<5.0	-
58	<25	<25	<25	<25	<25	<25	<25	<25	-
59	<25	<25	<25	<25	<25	<25	<25	<25	-
<90	<90	<90	<90	<90	<90	<90	<90	<90	-
<200	<200	<200	<200	<200	<200	<200	<200	<200	-
<200	<200	<200	<200	<200	<200	<200	<200	<200	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.0090	<0.0090	<0.0090	<0.0090	-	<0.0090	<0.0090	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.071	<0.071	<0.071	<0.071	-	<0.071	<0.071	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	-	-	-
<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
<10	<10	<10	<10	<10	<10	12	<10	<10	<10
0.57	<0.17	0.33	0.28	<0.17	<0.17	0.91	0.65	<0.17	<0.20
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.19
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.40
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.40
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.40
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49
0.61	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.62	<0.20
300	50	11	11	5.4	<0.50	210	24	390	<0.50
4.5	0.93	1.1	0.97	1.1	<0.50	1.5	<0.50	8.4	<0.50
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.19
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.40
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.40
120	2.2	39	31	17	0.23	0.25	<0.20	1.1	<0.20
0.61	<0.20	0.21	<0.20	<0.20	<0.20	0.37	0.25	<0.20	<0.20
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.40
98	4.9	25	23	5.3	<0.20	0.51	0.47	5.7	<0.20
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
41	0.7	0.22	<0.20	<0.20	<0.20	60	5	95	<0.20
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

ENGLOBE

Appendix A
Phase Two Conceptual Site Model (CSM)

ENGLOBE