Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Engineering, Inspection & Testing

May 7, 2021

File No. 1-20-0249-46.1
Brampton Office

1 Rosetta Street (Halton Hills) GP Limited
700 Lawrence Avenue West, Suite 375
Toronto, Ontario
M6A 3B4

Attention: Mr. Yaniv Geler

RE: PRE- AND POST-DEVELOPMENT WATER BALANCE ASSESSMENT AND SALT MANAGEMENT PLAN
1 ROSETTA STREET
GEORGETOWN, ONTARIO, L7G 3P1

Terraprobe Inc. (Terraprobe) was retained by 1 Rosetta Street (Halton Hills) GP Limited to conduct a pre- and post-development water balance assessment and propose a salt management plan for the above noted Site. The purpose of the study is to determine and comment on the anticipated changes in water balance components for the post-development Site in comparison with the existing conditions. Additionally, considering the location of the Site within the policy area, a risk assessment, threat analyses and risk management plan will be provided for the post-development Site.

1.0 Introduction

The Site is located at the west side of the intersection of Rosetta Street and River Drive in the Town of Halton Hills (Georgetown), Ontario, with the municipal addresses of 1 Rosetta Street, and 6 and 8 Saint Michaels Street, Town of Halton Hills (Georgetown), Ontario (the Site). The Site occupies an irregular shaped parcel of land, which covers an approximate area of 13,425 m^2. **Figure 1** shows the location of the Site.

The Site is currently occupied with one (1) industrial building along with at-grade parking lots and roadways, as well as two (2) residential dwellings and associated driveways, backyards and front yards. It is understood that the existing structures at the Site are to be demolished in support of constructing two 12-storey and one 8-storey residential buildings resting on a shared underground parking structure. Level-1 underground parking will extend to the entire Site, and the second level of underground parking will be constructed within the southern portion of the Site. The design of the proposed building's footprint will cover the entire Site.

Terraprobe completed a hydrogeological assessment project for the property with the municipal address of 1 Rosetta Street, Georgetown, Ontario, where the current industrial building and associated parking lots and roadways exist. A summary of findings is presented as follows:

- A review of the subsoil profile indicates that beneath fill material, the native soil underlaying the Site comprises sand, sand and silt/sand and gravel/sandy silt, and glacial till to the maximum termination depth of investigation at 23.0 meters below the existing ground surface (mbgs);
- The highest stabilized groundwater level was recorded at 253.5 ± meters above sea level (masl) or 6.93 mbgs;
- A groundwater quality assessment was conducted in comparison with the Regional Municipality of Halton Sanitary and Storm Sewer By-Law limits. A review of the results indicates that groundwater quality exceeds the Regional Municipality of Halton Storm Sewer By-Law limits for Total Suspended Solid (TSS). The results review indicates that Regional Municipality of Halton Sanitary Sewer By-Law limits were met.

2.0 Scope of Work

The following scope of work was undertaken for this study:

1. A pre- and post-development water balance assessment; and,
2. Salt management plan.

3.0 Pre- and Post-Development Water Balance

A pre- and post-development water balance analyses were completed to compare pre-development and post-development hydrological conditions to evaluate potential changes in recharge and runoff volumes due to the proposed development.

The discussion below provides details on the methodology used and the results obtained from the analysis. A summary of the calculations is provided in **Appendix A**.

A site scale water balance analysis was completed using the long-term (30-year average from 1981 to 2010) precipitation records for monthly and annual precipitation at a nearby weather station. The water balance method roughly estimates annual evapotranspiration, infiltration and runoff volumes. The annual evapotranspiration, infiltration and runoff volumes were obtained from Georgetown WWIP weather station (Climate ID. 6152695) located approximately 3.7 km southeast of the Site. The 30-year records for average annual and monthly temperatures were also adopted from this station.

3.1 Methodology

A Site scale water balance analysis was completed in order to estimate the components of the hydrologic cycle for the Site, and was modelled using the following equation:

$$P = DGS + ET + R + I$$

Where:

P = Precipitation, which represents the sum of all rainfall and snowfall

DGS = Change in groundwater storage

ET = Evapotranspiration

R = Runoff

I = Infiltration

Although groundwater storage experiences both gains and losses on a short-term basis, the net change in groundwater storage (DGS) over the long-term is generally zero. For this reason, the change in groundwater storage (zero (0)) has not been included in the water balance calculations.

Evapotranspiration (ET) refers to the transfer of water from vegetation and the soil surface to the atmosphere in the form of water vapour. The term considers evaporation from the soil surface and from man-made surfaces together with transpiration from plants. Chart 40 from the Climate of the Great Lakes Basin (Environment Canada 1972) suggests that the potential evapotranspiration (PET) for the Georgetown WWIP weather station should be about 558.8 to 609.6 mm/year (22 to 24 in/year). Simulations using Thornthwaite and Mather model developed by US Geological Survey (USGS) indicates that the average PET and actual evapotranspiration (AET) for the study area is about 553 and 539 mm/year, respectively, which generally agree with the mapped PET values for the general area. As such, an AET value of 539 mm/year has been applied to pre- and post-development water balance assessments for the Site.

In accordance with the former Ministry of Environment and Energy Guidance Manual (MOEE 1995), a series of infiltration components can be applied to the Site based on its slope, soil and vegetation coverage. The cumulative value of these components is termed the infiltration factor, with the values ranging from 0 to 1. The difference between the value 1 and the infiltration factor is referred to as the runoff factor.

Slope has an influence on both infiltration and runoff. The topography of the Site is considered flat, based on a review of available regional topographic map of the Site. The maximum elevation relief across the Site is approximately 3 m based on ground surface elevations measured at the boreholes' locations installed for the geotechnical investigation and hydrogeological assessment.

Based on the current conditions, the majority of the Site is paved or it is located within the footprint of the building. However, small portions of the Site are landscaped. Additionally, back yards and front yards of the existing residential lots are grass covered. Surficial soil, vegetation coverage, and cropping practices also contribute to the infiltration and runoff factors. The pervious areas at the Site are grass covered and the surficial soil beneath the fill material consists mainly of sand.

The difference between the average annual precipitation and actual evapotranspiration is termed as the water surplus. The precipitation value is 877 mm/year for the vicinity of the Site. Subtracting the averaged Thornthwaite and Mather derived AET estimate of 539 mm/year from the precipitation gives a water surplus estimate of 338 mm/year. The Site's average annual infiltration is calculated by multiplying the cumulative infiltration factor by the water surplus estimate. The Site's runoff is calculated by applying its difference from 1, or 1 minus the cumulative infiltration factor multiplied by water surplus estimate. Based on the former MOECC factors, a cumulative infiltration factor of 0.7 was considered for this assessment. The average annual depth estimates for infiltration and runoff at the Site are presented in **Table 1**.

Table 1- Summary of Water Balance Components

Site Conditions	Infiltration Factors	Estimated Water Surplus (mm/yr.)	Estimated Infiltration (mm/yr.)	Estimated Runoff (mm/yr.)
Soil Type (Sand)	0.3	**338**	I = 0.7×338	R = (1-0.7) ×338
Slope (Flat)	0.3			
Vegetation Cover: (Grass covered)	0.1			
Cumulative Infiltration Factor	**0.7**		**237**	**102**

Using the stimulated long-term data from the nearest weather station, and considering the accumulative factor, water balance components for the Site are estimated and summarized in **Table 2**.

Table 2- Summary of Water Balance Components

Precipitation (mm/year)	Evapotranspiration (mm/year)	Infiltration (mm/year)	Runoff (mm/year)
877	539	237	102

3.2 Site Water Balance

Water balance analyses were completed for pre-development and post-development conditions, separately with the details presented below:

3.2.1 Pre-Development Water Balance

The pre-development water balance for the Site is calculated by multiplying the existing pervious areas by the various, averaged annualized depth estimates for precipitation, ET, infiltration and runoff. Additionally, estimates for runoff and ET for existing impervious surfaces are 90% and 10% of the average annual precipitation, respectively.

Based on the most updated Site Plan and Project Stats prepared by Icon Architects, dated March 26, 2021, the total Site area is considered as 13,424.80 (~13,425) m^2. Water balance calculations were estimated based on the total Site area. The pre-development site statistics were established using a survey plan prepared by J.D.Barnes Limited, dated July 2, 2020, and Google Earth to estimate current impervious and pervious areas. The average annual area-based estimates for each water balance component and the estimated breakdown areas are summarized in **Table 3**.

Table 3- Summary of Pre-Development Volumetric Water Balance Components

Pre-Development Site Breakdown Areas	Coverage Area (m^2)	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Existing Paved Area (paved/parking areas and drive way)	3,530	3,097	310	0	2,787
Existing Rooftop Areas (Industrial and residential buildings)	8,774	7,697	770	0	6,927
Existing Landscaped Areas	1,121	984	604	266	114
Total	**13,425**	**11,778**	**1,684**	**266**	**9,828**

3.2.2 Post-Development Water Balance

Based on a review of Site Plan and Project Stats prepared by Icon Architects, dated March 26, 2021, the total Site area is considered as 13,424.80 (~13,425) m^2. A review of the proposed underground parking plan (drawing no. A202) indicates that the proposed underground parking Level 1 (UG1) will extend to the entire Site. The post-development water balance is calculated using the same depth, based components that were used for the pre-development water balance calculations, i.e., average annual precipitation and average annual ET. The estimates for runoff and ET for proposed impervious surfaces are 90% and 10% of the average annual precipitation, respectively. The estimated post-development water balance volumes are provided in **Table 4**.

Table 4- Summary of Post-Development Volumetric Water Balance Components

Post-Development Site Breakdown Areas	Coverage Area (m^2)	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Proposed Underground Parking (Roof Top)	13,425	11,778	1,178	0	10,600
Total	**13,425**	**11,778**	**1,178**	**0**	**10,600**

3.2.3 Water Balance Analysis Results

The volumetric comparisons in evapotranspiration, infiltration and runoff between the pre-developed and post-developed Site are summarized in **Table 5**.

Table 5- Pre- and Post-Development Volumetric Water Balance Components

	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Pre-Development	11,778	1,684	266	9,828
Post-Development	11,778	1,178	0	10,600
Loss (-) and Gain (+)	0	-506	-266	+772

A review of the findings indicates that development will not impact the water balance components significantly because the proposed buildings will be constructed within the currently paved area, where much of the Site is currently impervious to infiltration. Low Impact Development (LID) measures such as infiltration trenches, and rooftop gardening could be considered to manage the generated runoff and increase infiltration. However, since the entire Site is proposed for construction of the underground parking, considering infiltration trench, may not be feasible.

4.0 Salt Management Plan

A review of the Source Protection Information Atlas provided by the Ministry of the Environment, Conservation and Parks (MECP) indicates that the Site is located within an area designated as Wellhead Protection Area E (WHPA-E), that is known as Gudi Area, with a vulnerability score of 9. Gudi area is a designated area where groundwater is under direct influence of surface water. It is also mapped within an Issue Contributing Area for chloride. As a such, a salt management plan should be provided.

4.1 Risk Assessment Analysis

4.1.1 Previous or Current Environmental Site Assessment Report

Terraprobe completed a Phase One Environmental Site Assessment (ESA) as well as a Phase Two ESA for the 1 Rosetta Street, Georgetown, Ontario. The Phase One ESA identified several on-site and off-site Potentially Contaminating Activities (PCAs) that resulted in multiple Areas of Potential Environmental Concern (APECs) on the Site. The Phase Two ESA was conducted to investigate the quality of soil and groundwater within the APECs. A review of the findings of the Phase Two ESA indicates that apparent exceedances of the applicable Site Condition Standards were identified in soil and groundwater. The apparent exceedances consisted of Electrical Conductivity and Sodium Adsorption Ratio in the earth fill and soil, as well as Chloride in groundwater. The apparent exceedances were reported at boreholes/monitoring wells that were drilled/installed within the existing parking lot and driveway. As such, the Qualified Person attributed these results to the use of de-icing salt and deemed the abovementioned parameters not exceeding the applicable Site Condition Standards. Further details can be found in the Phase One ESA and Phase Two ESA reports.

4.1.2 Anthropogenic Transport Pathways

Wells and underground services represent potential transport pathways for contamination. It is understood the proposed residential development will be provided by full municipal underground services. The hydrogeological assessment report, prepared by Terraprobe was reviewed for the current assessment. Based on a review of MECP well records completed for the hydrogeological assessment, there are no records of water supply wells within or in close proximity to the Site.

4.1.3 Identification of Vulnerable Areas

As previously mentioned, the Site is located within an area designated as WHPA-E, that is known as Gudi Area. The Vulnerability Analysis considers the WHPA and the groundwater vulnerability, as well as the potential for the vulnerability to be increased by anthropogenic activities, by means of transport pathways. Vulnerability score of 10, 8, 6, 4, and 2 (10 being most sever) are assigned to areas within the WHPA to provide an indication which activities at the surface present the greatest risk to contaminate the water supply. The Site is assessed as having a vulnerability score of 9.

4.2 Threat Assessment Analysis

A threat assessment analysis review was conducted for the Site and the proposed development. Source Water Protection Tables of Threat and Circumstances 2017 was reviewed for the chemicals and pathogens. Significant Drinking Water (pathogen) table indicates that no significant, moderate or low pathogenic threats are anticipated considering the proposed residential development, which will be fully connected to the existing underground services.

Additionally, a review of the Significant Drinking Water (chemical) table, indicates that handling and storage of fuel and handling and storage of salt are considered as significant threats; and application of road salt is considered as a moderate threat with respect to the proposed residential development.

Furthermore, since the proposed development will consist of residential buildings, there is no concern regarding potential storage, handling or application of agricultural/non-agricultural source material to land; application of commercial fertilizer to land; establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage; the establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act (waste disposal site,…), and storage of snow.

4.3 Risk Management Plan

Handling and storage of fuel, as well as handling, storage and application of road salt are considered significant threats for the Site.

The risk associated with the presence of proposed municipal servicing (e.g., sanitary sewers) was found to be low. Since sewers have to be installed as per Regional Standards, they are not anticipated to cause any adverse effects. As such, the sewers do not require a monitoring or management plan.

4.3.1 Fuel Handling and Storage

Fuel handling and storage was identified as a drinking water quality threat during construction. The contractor should provide copies of their environmental management policies and commitments and develop an Environmental Protection Plan, including a Spill Control and Response Plan, to be implemented during construction. The Spill Control and Response Plan should be in line with the measures outlined in **Section 4.5.1**. In addition, fuel must be stored in accordance with the requirements of the MECP, Technical Standards Safety Authority (TSSA) and other applicable authorities. Care should be taken to avoid spillage during refueling of any machinery on Site.

4.3.1 Handling and Storage of Road Salt

The storage of road salt in an area, where it is exposed to precipitation or runoff from precipitation or snow melt, with a quantity stored of 5,000 tonnes is considered as a significant threat within WHPA-E with vulnerability score of 9 (https://swpip.ca/Threats/TSCs). Since a residential building complex is considered for future development, no concern is anticipated with respect to handling and storage of road salt.

4.3.2 Application of Road Salt

The Site is located within the WHPA-E. In order to prepare risk management and mitigation plan and to conduct a risk management analysis, the Toronto Region Conservation Authority's (TRCA) Risk Management Measures Catalogue for applying, handling and storage of road salt was reviewed (http://www.trcagauging.ca/RmmCatalogue/QualityThreat.aspx). Findings of the review are summarized as below:

- Optimizing road salt application efficiency: This measure reduces the negative environmental impacts of salt applications by delivering the correct amount of road salt at the right place and at the right time.
- Implementing road design that minimizes salt application, de-icing, and snow storage requirements: An increase in the roadway and bridge designers' awareness of techniques, configurations, and design parameters will reduce the amount of snow and ice accumulation, which can lead to reduced salt application.

Additionally, hiring winter maintenance contractors who use best management practices for snow and ice control to maintain safe conditions can reduce the potential impacts of road salt on drinking water sources and the environment (Halton Region, Source Water Protection). Details for each road salt application should be provided and documented by the contractor.

Location of the snow pile(s), in which collected snow from the ground surface will be piled, should be proposed in advance. The proposed snow piling location(s) should be close to catch basins to prevent any frozen surface that will be developed during snow melting and freezing season. Considering this approach will minimize the application of salt for de-icing. Additionally, designing and distributing the proposed catch basins should consider collecting melted water as fast as possible to prevent developing frozen surfaces and reduce the application of salt for de-icing.

The threat associated with the application of road salt can be managed through optimization of road salt application efficiency. This could be accomplished by retaining a contractor who is certified by Smart About Salt® and trained in the practices identified in the Transportation Association of Canada (TAC) *Synthesis of Best Management Practices for Road Salt Management* (TAC, 2013). Practices of road salt management to be considered so as to reduce the amount of salt needed and minimize associated groundwater and surface water impacts include (TAC, 2013):

- The 4 R's of snow and ice control:
    1. Right Material: the right material will depend on the conditions being treated. In situations where the pavement temperature is extremely cold, chemicals with lower working temperatures and sand/salt mixtures may be warranted.
    2. Right Amount: The right amount of material is dependent upon the type of slippery condition being treated, the amount of residual chemical on the pavement surface, the expected pavement temperature and the amount of precipitation that is expected.
    3. Right Place: Placement of materials is important to keeping it in the right place to be effective rather than wasted to the environment. Proper material placement requires the right equipment and skilled operators.

4. Right Timing: The timing of salt placement is important to minimizing waste and maximizing chemical effectiveness. There are times when the pavement temperature is, and is expected to remain, above freezing and therefore may not warrant salt application. Proactive anti-icing is key to achieving safer conditions quickly with less salt.

- The mechanical removal of snow from the treatment area prior to the application of a freeze point depressant (e.g., salt) to minimize the amount of material needed, and the potential for dilution and re-freeze.
- The application of freeze point depressants after plowing only when pavement temperatures are below freezing and the remaining snow/ice that could not be removed by mechanical means presents a hazard.
- The use of liquid rather than solid salt in the right conditions to speed up the melting process.
- The application of only enough material to do the maintenance.
- The understanding that salt should not be used to promote rapid melting of stockpiled snow.
- Salt storage on Site should be kept to a minimum. Any storage units should be kept away from exposure to water and in a system with secondary containment.
- Application of a Road Salt Alternative – Calcium Magnesium Acetate: Calcium Magnesium Acetate has a low environmental impact but can contribute to biochemical oxygen demand (BOD). It also has a high purchase cost relative to NaCl. In addition, Potassium Acetate (KA) is often used as a base for commercial chloride-free liquid de-icer formulations as a road salt alternative, having low corrosion, relatively high performance, and a low environmental impact. The above risk management and risk mitigation measures should be considered for the proposed development.

4.4 Monitoring Program and Mitigation Plan

As mentioned previously, the risk associated with the application of road salt was determined to be moderate. The local surficial soil beneath the Site is primarily comprised of sand. However, the proposed first level of underground parking will extend throughout the entire Site, and the ground surface, where the salt will be applied, is expected to have an asphalt or paved cover on top of the proposed underground parking. As such, it was determined that there is no significant downward pathway into the underlying municipal aquifer.

The nearby surface watercourses are Black Creek and Credit River, which are located approximately 500 m and 700 m to the west/southwest and east/northeast of the Site, respectively. It is anticipated that the generated runoff from the post-development Site will be conveyed to the municipal service. As such, impact of the winter maintenance and using road salt will be low, and a long-term monitoring plan for road salt is not considered necessary.

4.5 Emergency Response Plan

4.5.1 Fuel Spills (During Construction)

For fuel spills that may occur during construction, the following steps can be taken:

1. Prior to beginning construction, spill kits should be available on the Site with absorbent material for spills containment. Contractors should be properly trained in the use of the spill kit materials. Equipment and materials to handle spills should be properly maintained at all times.

2. If a spill occurs, it should be reported to the contractor's onsite supervisor. The contractor should assess if the spill could be of environmental significance (based on material, quantity, spill-receiving body, and potential sensitive receptors).
3. If there is an injury onsite, a 911 call should be made in addition to notifying any Site-emergency personnel.
4. All steps should be taken to contain the liquid at the source. If it has already entered (or has the potential to enter) any existing ditch, the ditch should be blocked further downstream to contain the spill and ensure it does not migrate offsite.
5. The MECP Spills Action Centre (1-800-268-6060) should be contacted immediately.
6. If the spill has the potential of reaching the stormwater system, the Town of Halton Hills (Georgetown) should be contacted. If Regional systems have the potential to be affected, contact the Halton Region Environmental Services Department. Ensure that Regional staff is aware that the spill has occurred within a WHPA.
7. Contact a remediation company to clean up the spill. The remediation contractor will also be responsible for the removal and disposal of hazardous materials from the Site.

4.5.2 Salt Spills

The threats to drinking water quality after the development is completed primarily involve the use of road salt. Given that road salt is typically applied in a solid form, immediate clean-up should be conducted by Site maintenance staff in the event of a spill. The Halton Region Risk Management Official/Inspector (RMO/RMI) should be notified for any spill incidence.

4.5.3 Review Schedule

The Emergency Response Plan should be reviewed annually and after any incidents, for as long as it is to remain effective, to ensure that it remains up to date and that it functions as intended.

4.5.4 Implementation and Termination of Plan

The Risk Management Plan outlined above is to be implemented prior to beginning construction of the development and maintained as long as the currently proposed Site plan is in force. Should the property usage change or be sold, Halton Region's Risk Management Office/Water Resources Department should be notified and this plan is to be amended as necessary.

5.0 Conclusions and Recommendations

The conclusions of this study are based on the existing conditions and future development at the Site and are as follow:

- A review of the findings of the pre- and post-development water balance indicates a decrease of 506 m^3/yr, and 266 m^3/yr for ET and infiltration, respectively, where the generated runoff will increase by 772 m^3/yr. As such, the proposed development will not impact the water balance components significantly because the proposed buildings will be developed within the currently paved area, where much of the Site is currently impervious to infiltration.

- The proposed development will not impact the water balance components (ET, infiltration and runoff) significantly because the proposed buildings will be constructed within the currently paved area, where much of the Site is currently impervious to infiltration. Low Impact Development (LID) measures such as infiltration trenches, and rooftop gardening could be considered to create opportunities to gain back infiltration and ET loss. However, since the entire Site is proposed for construction of the underground parking, considering infiltration trench, may not be feasible.
- The Site is located within an area designated as Wellhead Protection Area E (WHPA-E), that is known as Gudi Area, with a vulnerability score of 9. The handling and storage of fuel as well as the handling and storage of salt are considered as significant threats. The application of road salt is considered as a moderate threat with respect to the proposed residential development.
- It is understood that the post-construction Site will be fully serviced with municipal sanitary and water as well as heated and cooled with natural gas. As such, handling and storage of fuel are not considered for the future residential development. However, fuel handling and storage was identified as a drinking water quality threat during construction. As such, the contractor should provide copies of their environmental management policies and commitments and develop an Environmental Protection Plan, including a Spill Control and Response Plan, to be implemented during construction.
- The storage of road salt in an area, where it is exposed to precipitation or runoff from precipitation or snow melt, with a quantity storage of 5,000 tonnes is considered as a significant threat within WHPA-E with vulnerability score of 9. Since a residential building complex is considered for future development, no concern is anticipated with respect to handling and storage of road salt.
- Road salt application is considered a moderate threat for the vicinity of the Site. As such, optimizing road salt application efficiency, and implementing road design that minimizes salt application, de-icing, and snow storage requirements should be considered.
- The proposed first level of underground parking will extend to the entire Site, and the ground surface, where the salt will be applied, is expected to have an asphalt or paved cover on top of the proposed underground parking. As such, it was determined that there is no significant downward pathway into the underlying municipal aquifer.

8.0 Closure

Should you have any questions, or require additional information, please do not hesitate to contact this office.

Yours truly,

Terraprobe Inc.

Yousr Hiweish, B.Eng., EIT
Project Manager

Naries Alijani, M.Sc., P.Geo.
Senior Hydrogeologist

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R. Baker Wohayeb, M.A.Sc., P.Eng., QP_{RA}
Principal

Figure 1 – Site Location Plan
Appendix A – Pre- and Post-Development Water Balance Analyses

7.0 References

1. CTC Source Protection Region, 2015, Approved Source Protection Plan.
2. Government of Ontario, 2017, Drinking Water Threats and Circumstances.
3. Halton Region, Source Water Protection, 2021.
4. Ministry of the Environment, Conservation and Parks, 2020. Source Water Protection Information Atlas Interactive Map.
5. Terraprobe Inc., 2020, Phase One Environmental Site Assessment, 1 Rosetta Street, Georgetown, Ontario.
6. Terraprobe Inc., 2021, Phase Two Environmental Site Assessment, 1 Rosetta Street, Georgetown, Ontario.
7. Terraprobe Inc., 2021, Hydrogeological Assessment (Draft), 1 Rosetta Street, Georgetown, Ontario.
8. Toronto Region Conservation Authority's (TRCA) Risk Management Measures Catalogue, Threat Assessment Tool.

8.0 Limitations of Liability

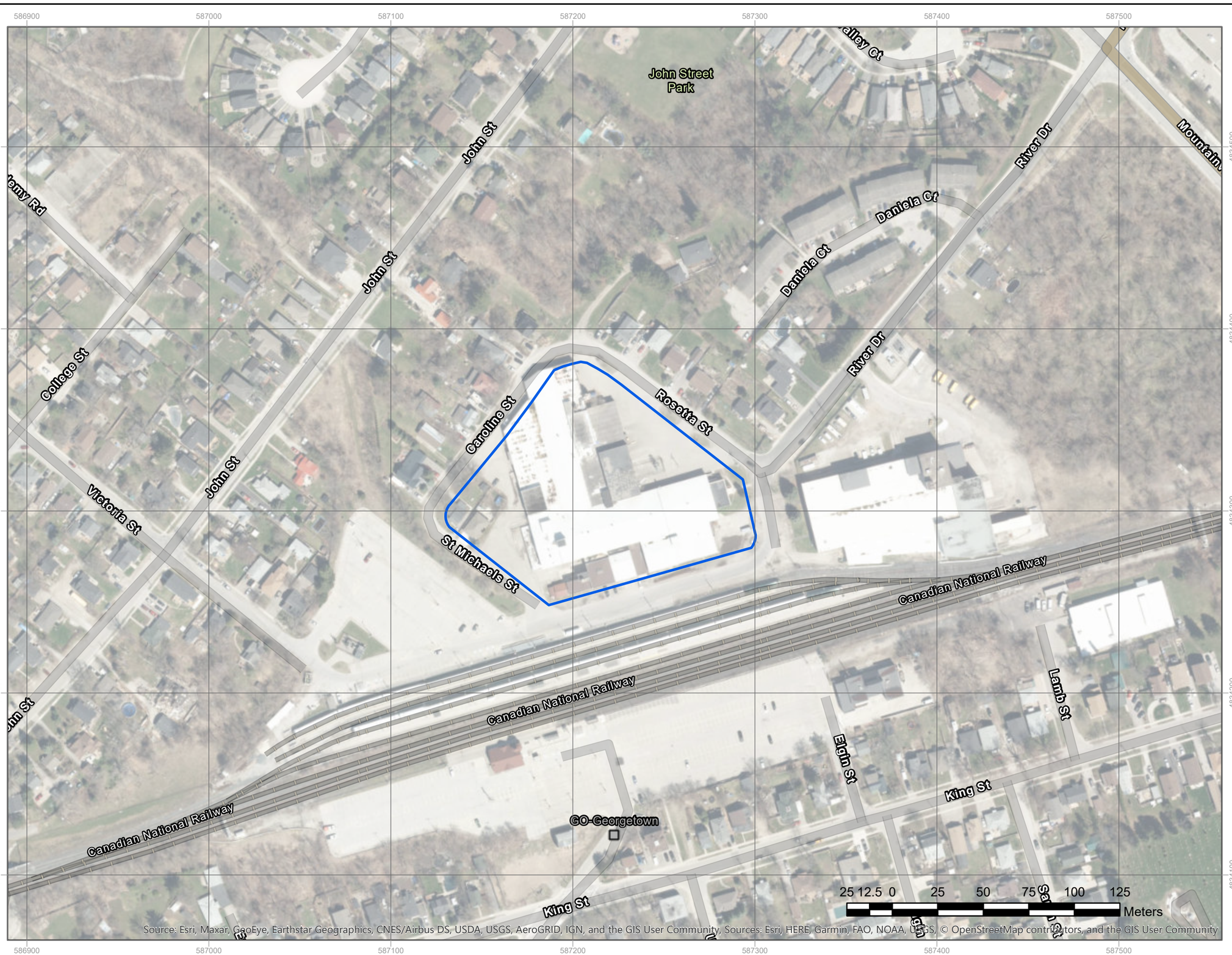
This report was prepared at the request of, and for the exclusive use of 1 Rosetta Street (Halton Hills) GP Limited and its affiliates ("the Intended User") and is intended to provide a water balance and salt management plan of the Site with the municipal addresses of 1 Rosetta Street, and 6 and 8 Saint Michaels Street, in the Town of Halton Hills (Georgetown), Ontario (the Site). No one other than the Intended User has the right to use and rely on the work without first obtaining the written authorization of Terraprobe Inc. and 1 Rosetta Street (Halton Hills) GP Limited.

Terraprobe Inc. expressly excludes liability to any party except the Intended User for any use of, and/or reliance upon, the work. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Terraprobe Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report, including consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The study should not be considered a comprehensive audit that eliminates all risks of encountering private water (groundwater) problems. The information presented in this report is based on information collected during the completion of the foundation drainage study by Terraprobe Inc. It was based on the conditions on the Site at the time of the foundation drainage study by a review of historical information and field investigation to assess the private water (groundwater) conditions of the Site, as reported herein.

There is no warranty expressed or implied by this report regarding the private water (groundwater) conditions for the Site. Professional judgement was exercised in gathering and analysing information collected by reviewing previous reports, data provided by government and are open to public and field work investigation. The conclusions presented are the product of professional care and competence, and cannot be construed as an absolute guarantee.

In the event that during future work new information regarding the private water (groundwater) conditions of the Site is encountered, or in the event that the outstanding responses from the regulatory agencies indicate outstanding issues on file with respect to the Site, Terraprobe Inc. should be notified in order that we may re-evaluate the findings of this assessment and provide amendments, as required.

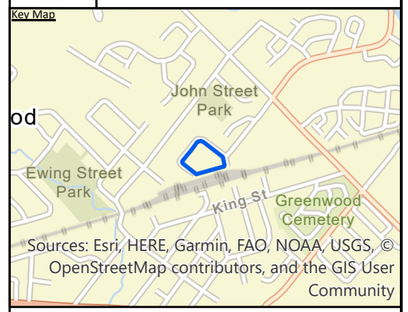


Terraprobe Inc.
Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing

References:

ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/ Airbus Ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community.Basemaps

Key Map



Notes:

Legend:

Approximate Site Boundary

Project Title:
Hydrogeological Assessment

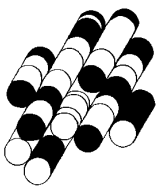
Site Location:
1 Rosetta Street, Georgetown, Ontario

Figure Title:
Site Location Plan

Designed By: TS	*File No.:* 1-20-0249-46.1
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 1
Date: April 2021	

Appendix A
Pre- and Post-Development Water Balance

TERRAPROBE INC.



Pre- and Post Water Balance - 1 Rosetta Street, and 6 and 8 Saint Michaels Street, Georgetown, Ontario

Former MOE Infiltration Factor

Topography (Average slope not exceeding 0.6 m per km)	0.3	
Soil (open sandy loam)	0.3	
Cover (Cultivated land)	0.1	Small portions of the Site are currently landscaped
Infiltration Factor	**0.7**	

1. Climate Information (using USGS Thonthwaite USGS Model)

Precipitation	877 mm/a	0.877 m/a
Evapotranspiration (Average Lat 43 and 44)	539 mm/a	0.539 m/a
Surplus	338 mm/a	0.338 m/a
Runoff (Pervious Surface)	102 mm/a	0.102 m/a
Infiltration (Pervious Surface)	237 mm/a	0.237 m/a
Runoff (Impervious Surface)	790 mm/a	0.790 m/a
Infiltration (Impervious Surface)	88 mm/a	0.088 m/a

The site development area is mainly underlain by sand/sandy silt fill.

2. Site Statistics

Pre- Development Site Coverage

	Subcatchment Areas		
Existing Impervious Area (Paved Area)	3,530 m^2	0.35 ha	
Existing Buildings (Rooftop Area)	8,774 m^2	0.88 ha	
Existing Landscaped Area	1,121 m^2	0.11 ha	
TOTAL	13,425 m^2	1.34 ha	

Post-Development Site Coverage

	Subcatchment Areas	
Proposed Underground Parking (Roof Top)	13,425 m^2	1.34 ha
Area Covered by Proposed Landscaped Area	0 m^2	0.00 ha
TOTAL:	13,425 m^2	1.34 ha

3. Annual Pre-Development Water Balance

Land Use	Area (m^2)	Precipitation (m^3/yr)	Evapotranspiration (m^3/yr)	Infiltration (m^3/yr)	Runoff (m3/yr)
Existing Impervious Area (Paved Area)	3,530	3,097	310	0	2,787
Existing Buildings (Rooftop Area)	8,774	7,697	770	0	6,927
Existing Landscaped Area	1,121	984	604	266	114
TOTAL	**13,425**	**11,778**	**1,684**	**266**	**9,828**

4. Annual Post-Development Water Balance

Land Use	Area (m^2)	Precipitation (m^3/yr)	Evapotranspiration (m^3/yr)	Infiltration (m^3/yr)	Runoff (m3/yr)
Proposed Underground Parking (Roof Top)	13,425	11,778	1,178	0	10,600
Proposed Landscaped Area	0	0	0	0	0
TOTAL	**13,425**	**11,778**	**1,178**	**0**	**10,600**

	Precipitation (m^3/yr)	Evapotranspiration (m^3/yr)	Infiltration (m^3/yr)	Runoff (m3/yr)
Pre-Development	**11,778**	**1,684**	**266**	**9,828**
Post-Development	**11,778**	**1,178**	**0**	**10,600**
Gain/Loss (-)		**-506**	**-266**	**772.00**