



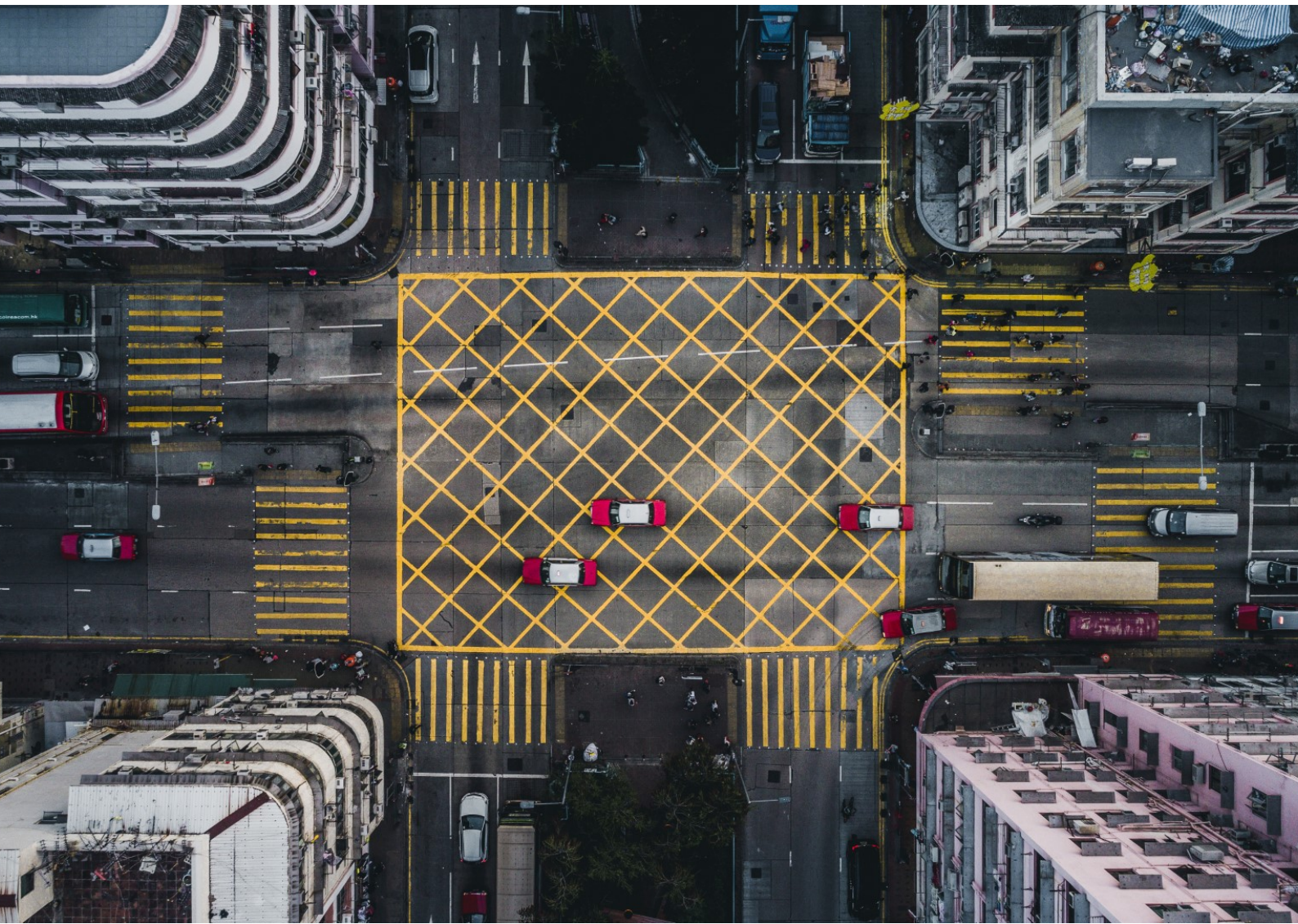
# Hydrogeological Assessment

**Large Sewage Disposal System, Rideau  
Road and Somme Street, Ottawa, Ontario**

Consolidated Fastfrate (Ottawa) Holdings Inc.

2 November 2021

→ **The Power of Commitment**



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# 1. Introduction

This report presents the results of a hydrogeologic assessment that was completed by GHD Limited (GHD) in support of a large sewage disposal system (the System) for Consolidated Fastfrate (Ottawa) Holdings Inc. The System is to be constructed on lands located southeast of the intersection of Rideau Road and Somme Street, Ottawa, ON (herein referred to as “the Site”). The location of the Site is depicted on the **Site Plan Location, Figure 1**.

The Site consists of a vacant parcel and has an overall area of 7.02 hectares (17.35 acres). The proposed development is to consist of a warehouse, cross-docks and office building that will be privately serviced for water and septic. The Site will also consist of asphalt parking and a storm water pond. The proposed layout of the Site is illustrated on the **Concept Plan, Figure 2**.

Based upon design flow values provided to GHD, the sewage effluent discharged to the septic bed will be greater than 10,000 L/day. This assessment will be used to support an application for an Environmental Compliance Approval (ECA) with the Ministry of the Environment, Conservation and Parks (MECP) for a Chapter 22 Large Subsurface Sewage Disposal System.

This hydrogeological assessment was completed to evaluate the ability of the Site to support the sewage disposal system proposed for the development as the assessment is required by the MECP to review prior to a pre-consultation meeting.

## 1.1 Terms of Reference

GHD was retained by Consolidated Fastfrate (Ottawa) Holdings Inc. (the Client) to complete this hydrogeological assessment in accordance with our proposal reference no. PG-5306, dated October 14, 2021.

GHD (formerly Inspec Sol and Conestoga-Rovers & Associates) completed a Geotechnical Investigation and Phase II Environmental Site Assessment for the Site in 2008 and 2009, respectively; a Geotechnical Investigation in 2020; a Hydrogeological Assessment related to pumping test of a water well in 2020 (report dated 2021); and a Septic Assessment and Percolation Rate Evaluation in 2021.

GHD has reviewed the following documents made available to us as part of this assessment:

- Phase II Environmental Site Assessment and Hydrogeological Assessment, Report Ref. No. 045804 (12), by Conestoga-Rovers & Associates, dated September 2008;
- Hydrogeological Investigation, Terrain Analysis and Impact Assessment, Proposed Industrial Subdivision, Report Ref. No. 08-1122-0215, by Golder Associates, dated December 2008;
- Geotechnical Study Subdivision Plan, Hawthorne Industrial Park, Report Ref. No. T020556-A1, by Inpec-Sol, dated May 4, 2009;
- Geotechnical Investigation Report, Report Ref. No. 11215612-A1 by GHD Limited, dated September 10, 2020;
- Hydrogeological Assessment Report, Report Ref. No. 11220832, by GHD Limited, dated January 19, 2021; and,
- Septic Assessment and Percolation Rate Evaluation, Report Ref. No. 11220832-01, by GHD Limited, dated April 12, 2021.

## 1.2 Purpose and Scope

The purpose of the hydrogeologic assessment was to define the prevailing hydrogeological conditions and demonstrate the ability of the Site to support a sewage disposal system. To accomplish the foregoing purposes, the following scope of work was conducted:

- A desktop review of groundwater information from existing monitoring wells and reports to assess the direction of groundwater flow. Reviewed soil stratigraphy from reports completed for the Site and local area;

- Reviewed available background information relevant to the Site such as geologic, physiographic and water resources reports and maps;
- Completed a Reasonable Use Concept (RUC) assessment for nitrate and assessed the potential for phosphorus impacts;
- Summarized our findings within this hydrogeological report to meet the general requirements of the MECP's Chapter 22 for Large Subsurface Sewage Disposal Systems.

## 1.3 Limitations

*This report has been prepared by GHD for Consolidated Fastfrate (Ottawa) Holdings Inc., and may only be used and relied on by Consolidated Fastfrate (Ottawa) Holdings Inc., for the purpose agreed between GHD and Consolidated Fastfrate (Ottawa) Holdings Inc., as set out in Section 1.1 of this report.*

*GHD otherwise disclaims responsibility to any person other than Consolidated Fastfrate (Ottawa) Holdings Inc., arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on information and assumptions made by GHD and described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.*

## 2. Site Conditions

The Site consists of vacant lands. The areas to the north, east and south are currently privately serviced. To the west is a quarry development and additional industrial / commercial properties that are municipally serviced. Surrounding land use within 500 m of the Site at the time of this report were observed to consist of:

- East – undeveloped lands;
- West – undeveloped lands; Hawthorne Road then industrial properties (Tomlinson Rideau Quarry and Plant; LaFarge);
- North – Rideau Road, forested area then residential lots; and
- South – Somme Street; undeveloped lands then industrial / commercial lots (gated equipment lay-down yard and stormwater ponds; then Renewi Canada Ltd.).

Within 500 m of the proposed development, one residential lot was observed at 4885 Hawthorne Road (north of the Site).

### 2.1 Topography

The regional topography is presented on **Figure 3**. The Site is relatively flat with the regional topography sloping from southwest to northeast. Based upon a survey plan reviewed by GHD, the topographic relief is on the order of 1 to 2 metres across the Site.

### 2.2 Physiography

The Site is situated within the physiographic region known as the Russell and Prescott Sand Plains. In the United Counties of Prescott and Russell, and the Regional Municipality of Ottawa-Carleton, there is a group of large sand plains separated by the clays of the lower Ottawa Valley. The plains cover an area of nearly 1,500 square

kilometres and a level surface of about 85 metres above sea level. The plains were originally a continuous delta that was built by the Ottawa River into the Champlain Sea. The plains are as thick as 6 to 10 m in some areas (Chapman and Putnam, 1984). The physiography of the area is illustrated on **Figure 4** showing the Site is within a sand plains with Peat and Muck to the north and Limestone Plains to the west.

## 2.3 Regional Geology

Surficial geology mapping presented on **Figure 5** indicates the Site is a mix of organic deposits, Paleozoic bedrock and coarse textured glaciolacustrine deposits.

The Quaternary geology is presented on **Figure 6** and suggests undifferentiated carbonate and clastic sedimentary rock exposed at surface or covered by a discontinuous thin layer of drift. Bedrock outcrops are common in the area.

The bedrock of this area, as presented on **Figure 7**, is comprised of shale, limestone, dolostone, and siltstone.

## 2.4 Local Geology

An investigation was previously conducted by GHD as part of an assessment of the soils and subsurface conditions in the area of the proposed septic system. The report is provided for reference in **Appendix A** of this document. An overview of our observations made during the subsurface exploration are presented in the following sub-sections.

### 2.4.1 Overburden Soil

On March 31, 2021, five (5) test pits were advanced under the supervision of GHD to depths ranging from 2.4 to 3.4 metres below ground surface (mbgs). The locations of the test pits are presented on Figure 2 of the report provided in Appendix A. Field logs were maintained of the underlying soil conditions throughout the test pit activities.

The soil stratigraphy consisted of fill at each location described as gravelly sand with silt trace clay to a silty sand with gravel and clay. Fill was observed to the bottom of each test pit. The fill also included a mix of asphalt, bricks and concrete at each location. Refusal was encountered at 2.4 m at TP-1 due to asphalt. Hydrometer testing of the fill material indicated 18 to 41% gravel, 36 to 47% sand, 12 to 23% silt, and 4 to 12% clay sized particles by weight. The percolation rate of the fill was estimated to have an average value of 12 to 20 min/cm with a medium permeability.

Based upon GHD's previous geotechnical work at the Site, the upper soils are comprised of fill to depths on the order of 6 mbgs (GHD, 2020). Underlying the fill at BH-1 documented in the geotechnical report was native silty sand to a depth of 8.2 mbgs where limestone bedrock was encountered (GHD, 2020).

Prior to GHD's investigations at the Site, drilling and test pits were advanced across the Site and a larger industrial park area as documented in Golder (2008). At the Site, monitoring well MW7-08 was drilled to a depth of 6.1 mbgs encountering fill to a depth of 5.4 mbgs then underlain by glacial till. The well is screened bridging the fill and till layers. Bedrock was not encountered. The borehole was terminated at 7 mbgs (Golder 2008).

In general, soils encountered in previous subsurface test holes at the Site and in this general area consisted of a layer of fill material described as gravelly sand with silt trace clay to a silty sand with gravel and clay overlying a native silty sand / sandy silt deposit followed by glacial till or limestone bedrock. The location of the test holes located on the Site are shown on Figure 8.

### 2.4.2 Bedrock

Bedrock was found at 8.5 mbgs based upon the well record for test well TW-2 and at a depth of 8.2 mbgs at BH-1. Bedrock was not encountered at MW7-08 to a depth of 7 mbgs and was not encountered in the test pits excavated in the area of the proposed septic bed area.

## 2.5 Description of Surface Water Features

No surface water features are present on the Site. There are no permanent water features (i.e. creeks, lakes, rivers etc) within 300 m of the Site.

## 3. Hydrogeology

The following section describes the regional and local hydrogeology including groundwater flow direction and hydrochemistry.

### 3.1 Regional Hydrogeology

Information regarding the groundwater characteristics of the area within 500 m of the Site was obtained from an inventory of existing MECP well records. A total of seventeen (17) water well records were identified for statistical breakdown. The data has been summarized in Table 1. The MECP well records and the approximate locations are provided in **Appendix B**.

### 3.2 Water Well Records

The information from the MECP data indicates a mix of overburden materials (fill, sand, clay, gravel etc.) overlying bedrock including shale, sandstone, limestone and quartz. Based upon the well records, there is one (1) primary bedrock aquifer in this immediate area that is tapped by drilled wells. Of the seventeen (17) records, seven (7) are monitoring wells and will not be considered further within this discussion.

The groundwater was generally described as “fresh” in the well records reviewed. The information from the MECP data indicates that all ten (10) wells were drilled bedrock wells averaging a depth of about 41 m. The bedrock wells encountered water at an average depth of 31 m with pumping rates averaging nearly 100 L/min. No flowing artesian wells were reported. A summary of the MECP well record data is presented in Table 1 below.

Table 1 Summary of Water Well Records

| Total Number of Wells Inventoried: 17 |                     |          |                      |          |                     |                |
|---------------------------------------|---------------------|----------|----------------------|----------|---------------------|----------------|
| Dug/Bored Wells: 0 (0%)               |                     |          |                      |          |                     |                |
| Drilled Wells (Overburden): 0 (0%)    |                     |          |                      |          |                     |                |
| Drilled Wells (Bedrock): 10 (59%)     |                     |          |                      |          |                     |                |
| Monitoring Wells*: 7 (41%)            |                     |          |                      |          |                     |                |
| Parameters                            | Statistical Summary |          | Statistical Summary  |          | Statistical Summary |                |
|                                       | Dug / Bored Wells   |          | Drilled – Overburden |          | Drilled – Bedrock   |                |
| <b>WELL YIELDS</b>                    |                     |          |                      |          |                     |                |
| Range                                 | -- L/min            | -- USgpm | -- L/min             | -- USgpm | 19 to 680 L/min     | 5 to 180 USgpm |
| Average                               | -- L/min            | -- USgpm | -- L/min             | -- USgpm | 99.1 L/min          | 26.2 USgpm     |
| <b>REPORTED YIELDS</b>                | <b>Frequency</b>    |          |                      |          |                     |                |
| Not Reported                          | 0                   | 0%       | 0                    | 0%       | 0                   | 0%             |
| Dry                                   | 0                   | 0%       | 0                    | 0%       | 0                   | 0%             |
| 0 to 1 USgpm                          | 0                   | 0%       | 0                    | 0%       | 0                   | 0%             |
| 2 to 4 USgpm                          | 0                   | 0%       | 0                    | 0%       | 0                   | 0%             |
| 5 to 9 USgpm                          | 0                   | 0%       | 0                    | 0%       | 6                   | 60%            |
| ≥10 USgpm                             | 0                   | 0%       | 0                    | 0%       | 4                   | 40%            |
| <b>STATIC WATER LEVELS</b>            |                     |          |                      |          |                     |                |
| Range                                 | N/A                 | N/A      | N/A                  | N/A      | 2.3 to 14.2 m       | 7.5 to 46.6 ft |
| Average                               | N/A                 | N/A      | N/A                  | N/A      | 8.4 m               | 27.6 ft        |
| <b>WATER ENCOUNTERED</b>              |                     |          |                      |          |                     |                |
| Range                                 | N/A                 | N/A      | N/A                  | N/A      | 9.1 to 75.0 m       | 30 to 246 ft   |
| Average                               | N/A                 | N/A      | N/A                  | N/A      | 31.2 m              | 103.5 ft       |
| <b>WELL DEPTH</b>                     |                     |          |                      |          |                     |                |
| Range                                 | N/A                 | N/A      | N/A                  | N/A      | 17.4 to 75.6 m      | 57 to 248 ft   |
| Average                               | N/A                 | N/A      | N/A                  | N/A      | 40.8 m              | 133.9 ft       |

**Notes:** Data based on MECP well record information (see Appendix B). L/m represents litres per minute, USgpm indicates US gallons per minute and m is metres. \*Monitoring wells are not included in the statistical data summarized.

### 3.3 Groundwater

Based upon information reviewed, there are two hydrogeological units identified at the Site and in this general area. The first is a shallow zone of water within either the fill, the shallow native overburden or upper bedrock. Previous reports indicate that the groundwater flow in the shallow zone is to the northeast at a gradient of approximately 0.015 m/m (Golder, 2008). Groundwater was encountered within the overburden in each of the five (5) test pits advanced by GHD in 2021 at depths observed between 1.8 and 2.4 mbgs. At MW7-08, water was encountered at a depth of 3.65 mbgs. Water levels measured at MW7-08 in November 2020 indicated a water level at 3.00 mbgs. The shallow groundwater flow direction of northeast across the Site will be utilized during the RUC impact assessment for the proposed septic system.

A deeper confined aquifer found within the bedrock, generally at depths of 25 to 35 metres below ground surface. This aquifer is proposed for water supply for the development. Based upon the water levels collected by GHD in November 2020, the regional groundwater flow within the bedrock is also in a northeasterly direction. Previous studies have indicated the groundwater flow in the bedrock to be in a west to east direction at a gradient of approximately 0.005 m/m (Golder, 2008). Test well TW-2 is constructed within the deeper confined aquifer. During pumping tests conducted by others and by GHD in 2020, the testing indicated that there was no hydraulic connectivity between the shallow water zone and deeper confined aquifer.

#### 3.3.1 Background Groundwater Chemistry

Background groundwater chemistry is provided in **Table 2**. Water samples were collected previously by CRA at MW7-08 on July 17, 2008 (CRA, 2008) and at TW-2 on November 19, 2020 during a pumping test conducted at this location (GHD, 2021).

The results of the chemical analysis from the original reports are summarized in **Table 2**. The analytical data is relatively low for nitrogen-based compounds within the shallow water zone and very low to non-detect within the drinking water aquifer. There were detections of bacteria within the shallow water zone; however, the deeper confined unit was non-detect for bacteria confirming there is a lack of connectivity hydraulically between the shallow and deeper units.

Table 2 Analytical Groundwater Data

| Parameter                          | Well Identifier |                    |            | ODWS |           |
|------------------------------------|-----------------|--------------------|------------|------|-----------|
|                                    | MW7-08          | TW-2*              |            | MAC  | AO/OG     |
|                                    | July 17, 2008   | November 19, 2020* |            |      |           |
| Alkalinity (as CaCO <sub>3</sub> ) | 840             | 269                | 267        | --   | 30 to 500 |
| Ammonia                            | 2.24            | 0.25               | 0.25       | --   | --        |
| Chemical Oxygen Demand             | 110             | --                 | --         | --   | --        |
| Chloride                           | 297             | 91                 | 94         | --   | 250       |
| Conductivity (µmho/cm)             | 2620            | 1390               | 1380       | --   | --        |
| Dissolved Organic Carbon           | 25              | 2.4                | 2.2        | --   | --        |
| Nitrate (N)                        | < 0.3           | <0.01              | <0.01      | 1.0  | --        |
| Nitrite (N)                        | < 0.3           | <0.05              | <0.05      | 10   | --        |
| pH                                 | 7.51            | 7.8                | 7.7        | --   |           |
| Phenol                             | 0.008           | --                 | --         |      |           |
| Phosphorus                         | 2.50            | --                 | --         | --   | --        |
| Sulfate                            | 271             | 378                | 389        | --   | 500       |
| Total Dissolved Solids             | 1710            | 930                | 940        | --   | 500       |
| Total Kjeldahl Nitrogen            | 4.20            | 0.3                | 0.4        | --   | --        |
| E.coli                             | 5               | --                 | Non-detect |      |           |
| Total Coliform                     | 3800            | --                 | Non-detect |      |           |
| Fecal Coliform                     | 6               | --                 | Non-detect |      |           |



| Parameter                 | Well Identifier |                    |     | ODWS |       |
|---------------------------|-----------------|--------------------|-----|------|-------|
|                           | MW7-08          | TW-2*              |     | MAC  | AO/OG |
|                           | July 17, 2008   | November 19, 2020* |     |      |       |
| Heterotrophic Plate Count | <500            | --                 | <10 |      |       |

**Notes:**

(<) indicates below laboratory detection limit, **bolded** values exceed ODWS

Units are in mg/L unless otherwise stated.

MAC – Maximum Acceptable Concentration; AO – Aesthetic Objective; OG – Operational Guideline

\*TW-2 sampled during a pumping test after 1 hour of pumping and at the end of the test (6 hours)

## 4. Septic Design

The septic design is being completed by others. It is GHD’s understanding that the daily design flow will be 12,800 L/day based upon the building size and warehouse loading bays. The daily design flow provided to GHD will be used to conduct the impact assessment.

As indicated within our Septic Assessment letter (Appendix A), the underlying soils was a mix of fill materials. It was recommended that the tile bed be a fully raised adsorption trench leaching bed due to the inconsistency of the fill materials observed and shallow groundwater seepage observed. The existing fill material is recommended to be compacted to ensure uneven settlement of the tiles does not occur.

The proposed tile bed area and the existing water well (i.e. TW-2) are a distance of about 50 m apart from each other. The minimum setback from a tile bed and drilled well is 15 m. It is our opinion that there is minimal potential for groundwater impact as a result of the planned development from a quality perspective provided that the septic system is constructed properly.

No further discussion of septic design is provided in this report.

## 5. Impact Assessment

### 5.1 Site Specific Considerations

Based upon our assessment, it is our opinion that the Site can be serviced with a fully raised adsorption trench leaching bed. The location of the proposed leaching bed and the dilution area, based on the groundwater flow direction is presented on **Figure 9**.

The potential impacts from the leaching bed are discussed in the following sections.

### 5.2 Nitrate Assessment

#### 5.2.1 Nitrate Loading

Primarily, nitrate impact is of particular concern from a groundwater perspective. A conventional treatment system is proposed for the septic system. Nitrate dilution was calculated in order to assess the potential impact on the downgradient receptors. Section 22.5.7 of the MECP’s Chapter 22 indicates that existing and background concentrations of critical contaminants should generally be used only for reference, not for calculation of allowable water quality limits. The following assumptions were used in the nitrate impact calculations:

- Nitrate in the untreated sewage is estimated to be on the order 40 mg/L;
- The dilution area for the leaching bed is assumed to be approximately 17,035 m<sup>2</sup> based on the proposed configuration of the leaching bed and general groundwater flow direction;
- The estimated recharge rate of 250 mm/year was used as specified in Chapter 22; and
- Design flow of 12,800 L/day.

The following equations were used to predict the potential impact of nitrate to the shallow groundwater:

Equations:                      Eq'n #

$$V_A = A_D \times k \quad (1)$$

$$V_T = V_A + V_S \quad (2)$$

$$C_{PB} = (C_S \times V_S) / V_T \quad (3)$$

Where:

$V_A$  = annual dilution volume [m<sup>3</sup>]

$A_D$  = dilution area [m<sup>2</sup>]

$V_T$  = total volume of water [m<sup>3</sup>]

$V_S$  = annual sewage volume [m<sup>3</sup>]

$C_{PB}$  = concentration at property boundary [mg/L]

$C_S$  = concentration in sewage [mg/L]

$k$  = 0.25 m Annual Dilution Precipitation Rate as per the MECP.

Based on our understanding of the groundwater flow direction and the daily design effluent loading, the following is presented:

|                              |   |
|------------------------------|---|
| $A_D = 17,035 \text{ m}^2$   | Infiltration area from <b>Figure 9</b>          |
| $V_A = 4,259 \text{ m}^3$    | Annual dilution volume                          |
| $V_S = 4,672 \text{ m}^3$    | Loading of an average of 12,800 L/day           |
| $V_T = 8,931 \text{ m}^3$    | Total water volume                              |
| $C_S = 40 \text{ mg/L}$      | Effluent Nitrate Concentration                  |
| $C_{PB} = 20.9 \text{ mg/L}$ | Nitrate concentration expected at site boundary |

Using dilution only, the nitrate concentration generated from sewage at the Site is calculated to be 20.9 mg/L. The calculations are provided in **Appendix C**.

It is understood that the MECP generally targets a RUC value of 2.5 mg/L at the property boundary (25% of the Ontario Drinking Water Standard for nitrate which is 10 mg/L). Based upon the calculations to meet a nitrate concentration of 2.5 mg/L, treatment is required to reduce nitrate to 4.8 mg/L as it is discharged into the tile bed in order for dilution to reduce the nitrate concentration to meet the RUC value. The nitrate dilution calculations do not consider other factors such as denitrification or dilution within existing groundwater.

## 5.3 Phosphorus Impact Assessment

The main source of additional phosphorus loading from the Site would be associated with the treated wastewater effluent. The distance between the Site and the nearest water body is about 12 kilometres to the Rideau River (inferred to be upgradient of the Site). The nearest downgradient surface water receiver is greater than 12 kilometres. As per Chapter 22 for Large Subsurface Sewage Disposal Systems, a separation distance of 300 m between the area of sewage infiltration and a surface water body should be sufficient to ensure that there are no appreciable effects to surface water quality due to phosphorous.

## 6. Conclusions and Recommendations

The supporting data upon which our recommendations are based, have been presented in the foregoing sections of this report. Based on the results of this assessment, it is the opinion of GHD that the Site is suitable for a fully raised bed to service the facility provided tertiary treatment is utilized to reduce the expected nitrate concentrations. Based upon the information reviewed and assumptions made by GHD, the effluent of the sewage system will flow laterally toward the northeast with minimal vertically migration into the deeper underlying bedrock aquifer accessed by the Site's groundwater well. To the northeast beyond the Site, there are no downgradient wells in close proximity.

### 6.1 Groundwater

Shallow water was encountered within the fill in the area of the proposed fully raised bed. The shallow groundwater flow direction was indicated to be toward the northeast. Based on the information assessed, it is our opinion that good construction and mitigation techniques must be used to minimize the potential for impact.

It is our opinion that there is minimal potential for groundwater impact as a result of the planned development from a quality perspective provided that the septic system is constructed properly.

### 6.2 Impact Assessment

Based on the impact assessment, tertiary treatment will be required. Following treatment, there is minimal potential impact from the proposed septic system. This is based on the distance to downgradient wells (i.e. there are no groundwater receivers of the effluent in close proximity of the Site), the presence of relatively low permeable soils above the underlying bedrock aquifer, and no surface water within 300 m that would be adversely affected by phosphorous.

It is the professional opinion of GHD that the proposed sewage system will have no significant impact on the groundwater aquifer, shallow water or any downgradient receptors that utilize groundwater.

### 6.3 Signatures

The following signatures are provided of GHD staff that prepared and conducted the hydrogeological assessment. Should questions arise regarding any aspect of our report, please contact the undersigned or our office.

Sincerely,

GHD

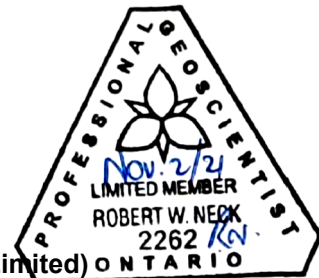


**Steven Gagné, H.B.Sc.**  
**Associate, Project Director**

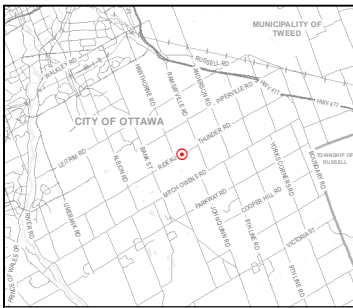
/KG/bn/sg



**Robert Neck, P. Geo. (Limited)**  
**Associate Project Director**



# Figures

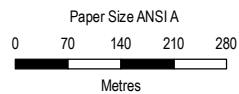


**SITE LOCATION**

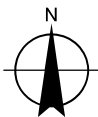
**CITY OF OTTAWA**

**Data Disclaimer**

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Map Projection: Transverse Mercator  
Horizontal Datum: North American 1983  
Grid: NAD 1983 UTM Zone 18N



**CONSOLIDATED FASTRATE (OTTAWA) HOLDINGS LTD.**  
301 SOMME STREET, OTTAWA, ON  
PT LOT 26, CON 6 FROM RIDEAU RIVER  
GEOGRAPHIC TOWNSHIP OF GLOUCESTER  
CITY OF OTTAWA

**HYDROGEOLOGICAL ASSESSMENT-  
ON-SITE SEWAGE SYSTEM  
SITE LOCATION PLAN**

Project No. 12565773  
Revision No.  
Date Oct 29, 2021

**FIGURE 1**

Legend



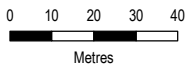
Property Limit



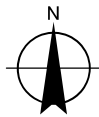
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Paper Size ANSI A



Map Projection: Transverse Mercator  
Horizontal Datum: North American 1983  
Grid: NAD 1983 UTM Zone 18N






CONSOLIDATED FASTRATE (OTTAWA) HOLDINGS LTD.  
 301 SOMME STREET, OTTAWA, ON  
 PT LOT 26, CON 6 FROM RIDEAU RIVER  
 GEOGRAPHIC TOWNSHIP OF GLOUCESTER  
 CITY OF OTTAWA

HYDROGEOLOGICAL ASSESSMENT-  
 ON-SITE SEWAGE SYSTEM  
 CONCEPT PLAN

Project No. 12565773  
 Revision No.  
 Date Oct 29, 2021

FIGURE 2

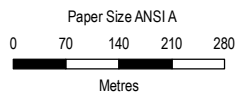
**Legend**

-  Contour (5 m)
-  Property Limit
-  Parcel Fabric

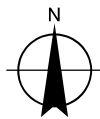


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 Grid: NAD 1983 UTM Zone 18N

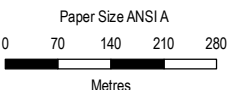
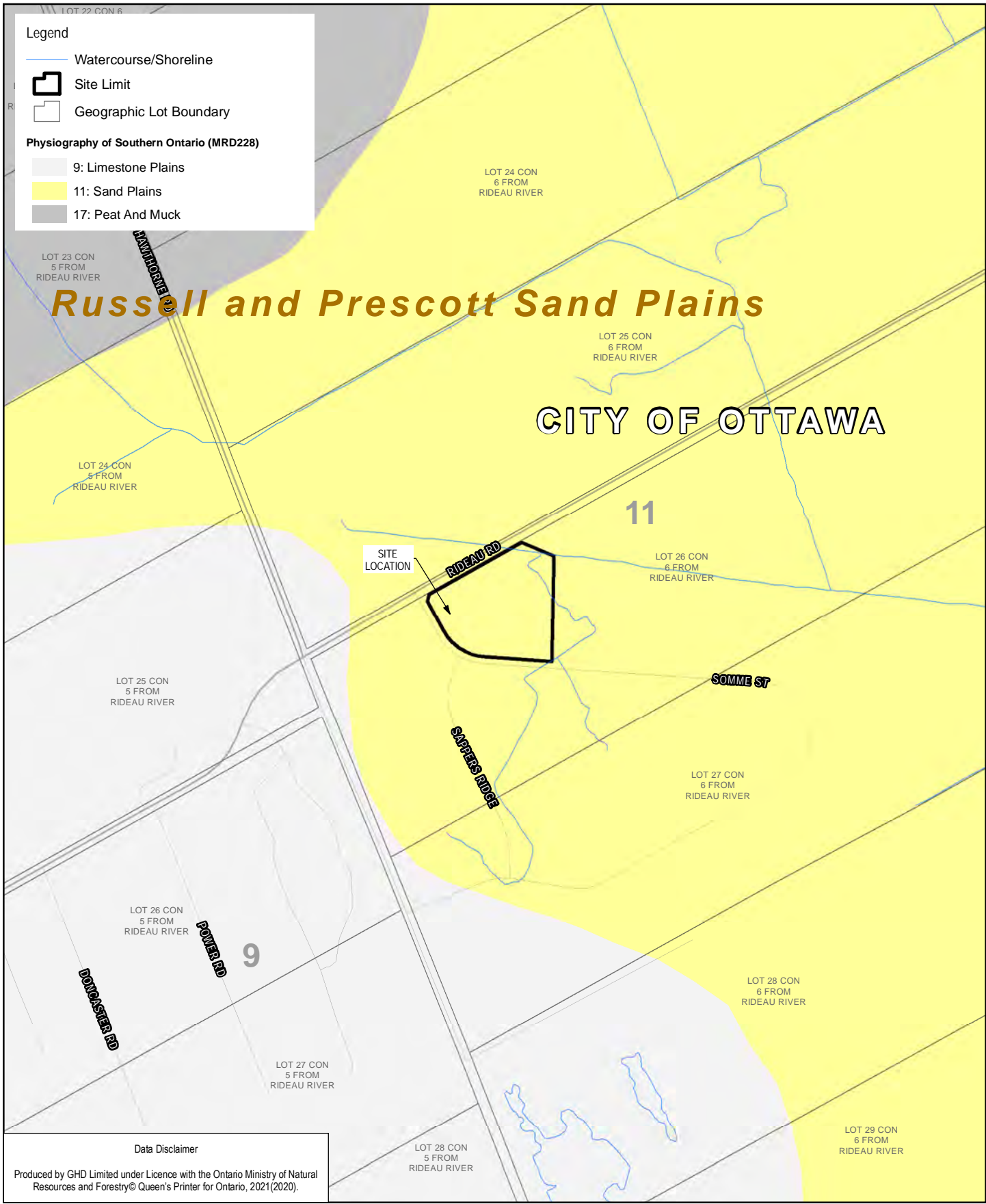


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 GEOGRAPHIC TOWNSHIP OF GLOUCESTER  
 CITY OF OTTAWA

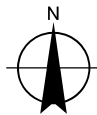
**HYDROGEOLOGICAL ASSESSMENT-  
 ON-SITE SEWAGE SYSTEM  
 REGIONAL TOPOGRAPHY**

Project No. 12565773  
 Revision No.  
 Date Oct 29, 2021

**FIGURE 3**



Map Projection: Transverse Mercator  
 Horizontal Datum: North American 1983  
 Grid: NAD 1983 UTM Zone 18N

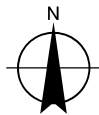
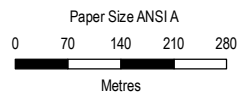
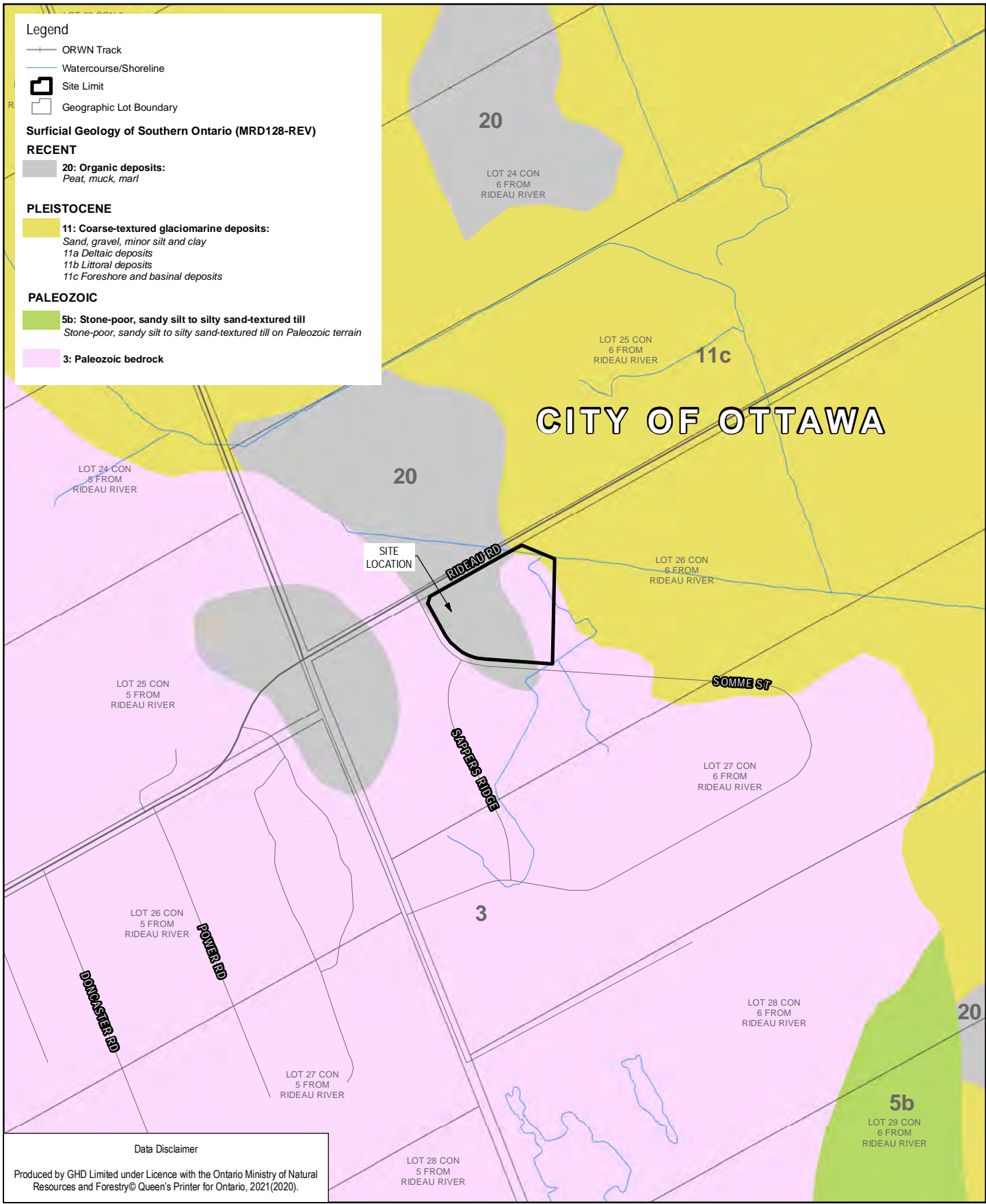


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 PT LOT 26, CON 6 FROM RIDEAU RIVER  
 GEOGRAPHIC TOWNSHIP OF GLOUCESTER  
 CITY OF OTTAWA  
 HYDROGEOLOGICAL ASSESSMENT-  
 ON-SITE SEWAGE SYSTEM  
**PHYSIOGRAPHY**

Project No. 12565773  
 Revision No.  
 Date Oct. 2021

**FIGURE 4**



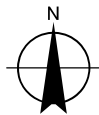
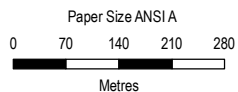
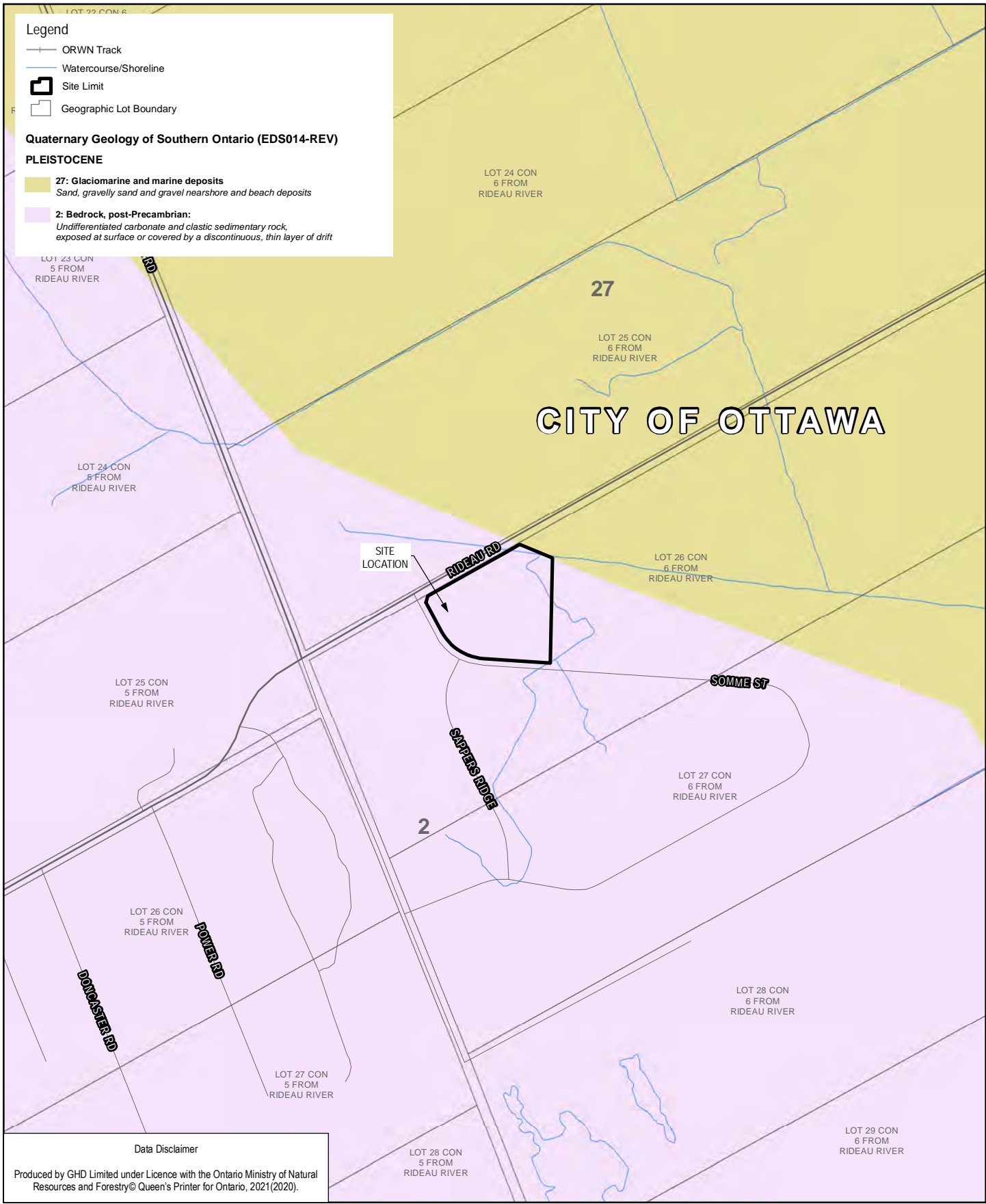


CONSOLIDATED FASTRATE (OTTAWA) HOLDINGS LTD.  
 301 SOMME STREET, OTTAWA, ON  
 PT LOT 26, CON 6 FROM RIDEAU RIVER  
 GEOGRAPHIC TOWNSHIP OF GLOUCESTER  
 CITY OF OTTAWA

HYDROGEOLOGICAL ASSESSMENT-  
 ON-SITE SEWAGE SYSTEM  
**SURFICIAL GEOLOGY**

Project No. 12565773  
 Revision No.  
 Date Oct. 2021

**FIGURE 5**



Map Projection: Transverse Mercator  
Horizontal Datum: North American 1983  
Grid: NAD 1983 UTM Zone 18N

CONSOLIDATED FASTRATE (OTTAWA) HOLDINGS LTD.  
301 SOMME STREET, OTTAWA, ON  
PT LOT 26, CON 6 FROM RIDEAU RIVER  
GEOGRAPHIC TOWNSHIP OF GLOUCESTER  
CITY OF OTTAWA




HYDROGEOLOGICAL ASSESSMENT-  
ON-SITE SEWAGE SYSTEM

**QUATERNARY GEOLOGY**



Project No. 12565773  
Revision No.  
Date Oct. 2021

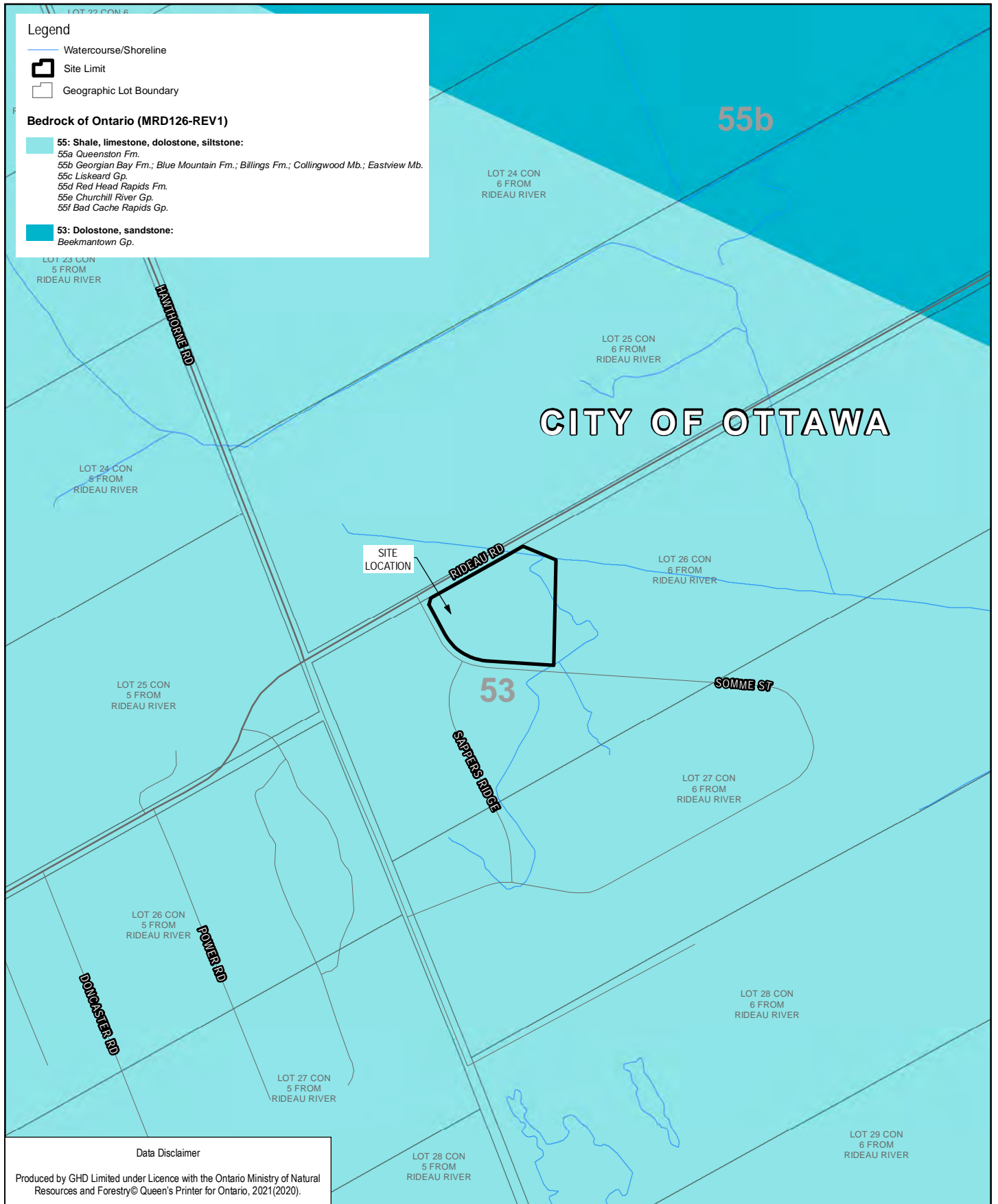
**FIGURE 6**

**Legend**

-  Watercourse/Shoreline
-  Site Limit
-  Geographic Lot Boundary

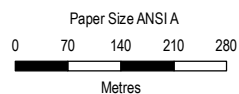
**Bedrock of Ontario (MRD126-REV1)**

-  **55: Shale, limestone, dolostone, siltstone:**
  - 55a Queenston Fm.
  - 55b Georgian Bay Fm.; Blue Mountain Fm.; Billings Fm.; Collingwood Mb.; Eastview Mb.
  - 55c Liskeard Gp.
  - 55d Red Head Rapids Fm.
  - 55e Churchill River Gp.
  - 55f Bad Cache Rapids Gp.
-  **53: Dolostone, sandstone:**
  - Beekmantown Gp.

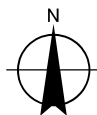


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Map Projection: Transverse Mercator  
 Horizontal Datum: North American 1983  
 Grid: NAD 1983 UTM Zone 18N






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 PT LOT 26, CON 6 FROM RIDEAU RIVER  
 GEOGRAPHIC TOWNSHIP OF GLOUCESTER  
 CITY OF OTTAWA

**ON-SITE SEWAGE & SEPTIC ASSESSMENT  
 BEDROCK GEOLOGY**

Project No. 12565773  
 Revision No.  
 Date Oct. 2021

**FIGURE 7**

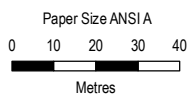
Legend

-  Monitoring Well Location
-  Test Well Location
-  Property Limit

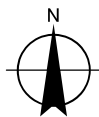


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Map Projection: Transverse Mercator  
Horizontal Datum: North American 1983  
Grid: NAD 1983 UTM Zone 18N





CONSOLIDATED FASTRATE (OTTAWA) HOLDINGS LTD.  
301 SOMME STREET, OTTAWA, ON  
PT LOT 26, CON 6 FROM RIDEAU RIVER  
GEOGRAPHIC TOWNSHIP OF GLOUCESTER  
CITY OF OTTAWA

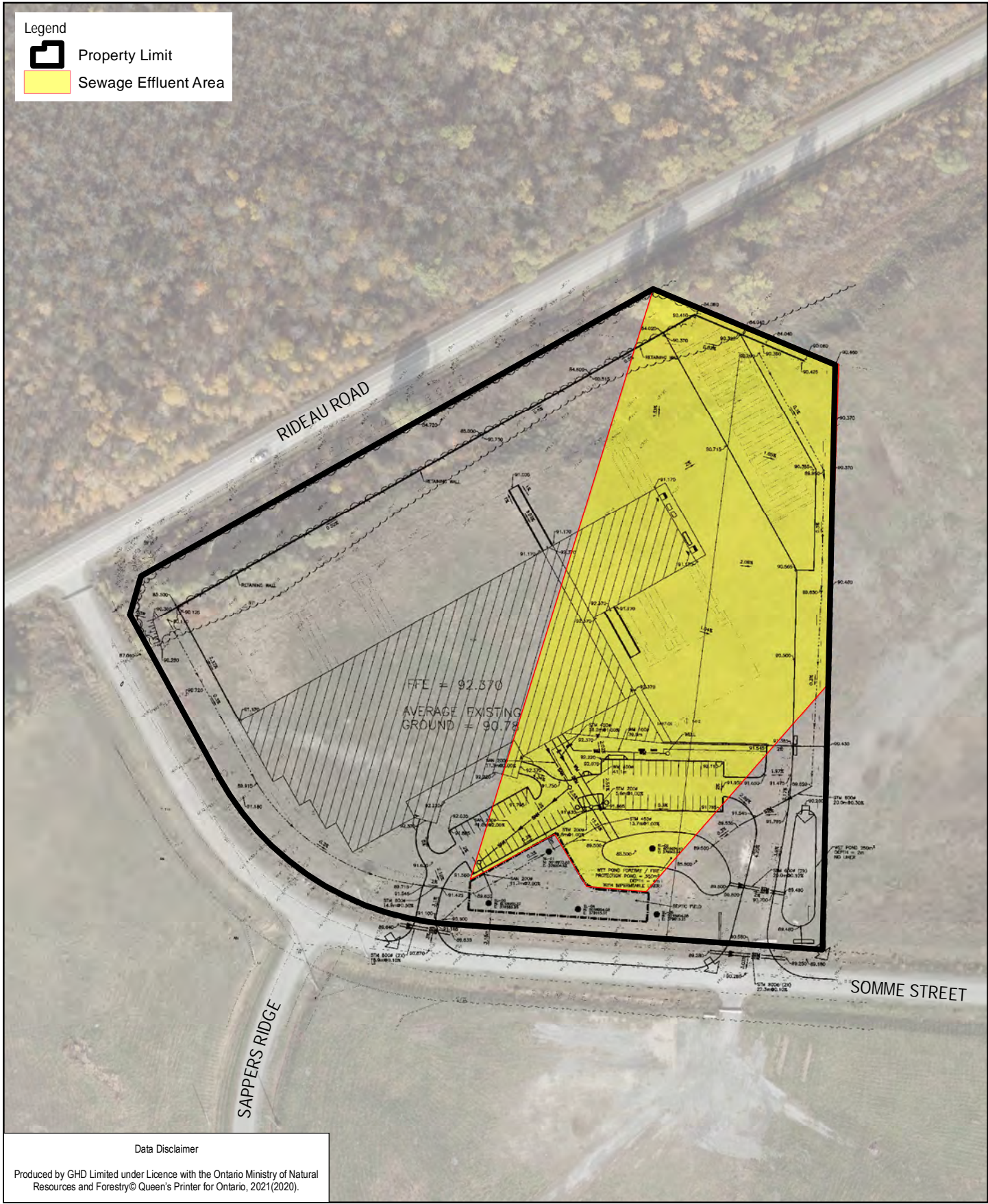
ON-SITE SEWAGE & SEPTIC ASSESSMENT  
TEST HOLE PLAN

Project No. 12565773  
Revision No.  
Date Oct. 2021

FIGURE 8

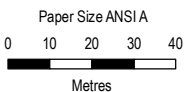
Legend

-  Property Limit
-  Sewage Effluent Area

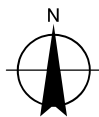


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 PT LOT 26, CON 6 FROM RIDEAU RIVER  
 GEOGRAPHIC TOWNSHIP OF GLOUCESTER  
 CITY OF OTTAWA

HYDROGEOLOGICAL ASSESSMENT-  
 ON-SITE SEWAGE SYSTEM  
 SEPTIC EFFLUENT AREA

Project No. 12565773  
 Revision No.  
 Date Oct. 2021

**FIGURE 9**

# Appendices

# **Appendix A**

**Septic Assessment and Percolation Rate  
Evaluation Letter**

Our ref: 11220832-01

12 April 2021

**Consolidated Fastfrate (Ottawa) Holdings Inc.**  
c/o Pierre Courteau  
CBRE Limited  
333 Preston Street, 7<sup>th</sup> Floor  
Ottawa, Ontario K1S 5N4

**Re: Septic Assessment and Percolation Rate Evaluation  
Proposed Commercial Development  
Rideau Road and Somme Street  
Gloucester Con 6 from Rideau River, Lot 26  
Ottawa, Ontario**

Dear Mr. Courteau:

## 1. Introduction

GHD Limited (GHD) is pleased to provide you (the Client) with the following letter documenting excavation activities completed in the general locations of a proposed septic tile bed and stormwater pond. The locations were requested by CIMA. This letter also provides a summary of approximate percolation rate (T-time) values based upon soil collected from the test pit locations.

The general location is illustrated on the Site Location Plan, Figure 1. The test pit locations are illustrated on the Test Pit Location Plan, Figure 2.

## 2. Field Activities

Test pits were advanced under the supervision of GHD on March 31, 2021. The test pits were excavated at five (5) locations to depths ranging from 2.4 to 3.4 m. The soil stratigraphy consisted of fill at each location described as gravelly sand with silt trace clay to a silty sand with gravel and clay. Fill was observed to the bottom of each test pit. The fill also included a mix of asphalt, bricks and concrete at each location. Refusal was encountered at 2.4 m at TP-1 due to asphalt. Test pit logs are provided in Appendix A.

Soil samples were collected from each test pit. Hydrometer testing was conducted at GHD's laboratory. The grain size data, included in Appendix A, indicated:

- 18 – 41% gravel; 36 – 47% sand; 12 – 23% silt; and, 4 – 12% clay size particles by weight.

Groundwater seepage was encountered at each test pit. The shallow groundwater was observed between 1.8 and 2.4 metres below ground surface (mbgs). Test pits TP-2, TP-3, TP-4 and TP-5 encountered groundwater at 1.8 mbgs.

Based upon the Supplementary Guidelines to the Ontario Building Code 1997, the percolation rate is estimated (based upon the gradation test results only) to have an average value of 12 to 20 min/cm with a medium permeability.



### 3. Conclusions and Recommendations

Due to the inconsistency of the fill materials observed and shallow groundwater seepage encountered it is recommended the septic disposal system be a fully raised bed absorption trench leaching bed. It is recommended prior to placement if the imported fill that any surficial organics be removed from the tile bed and mantle area. It is also suggested that that the existing fill material be compacted to ensure uneven settlement of the tiles does not occur.

The waste disposal system should meet Ontario Regulation 350/06 made under the Building Code Act, 1992 and incorporate the following design features:

1. Organics should be stripped from the area of the leaching bed and downgradient mantle.
2. The exposed subgrade below the tile bed should be trimmed and scarified, and provided with a gentle slope of 0.5% in the direction of the mantle.
3. The tile bed should be constructed as a fully raised leaching type bed up to the full height of at least 1 m above existing grade. The raised bed should consist of clean, granular fill capable of providing an in-place T-time of 4 to 8 min/cm.
4. The mantle should be constructed along the downgradient margin of the raised bed. Each mantle should extend along the full width of the bed and for a minimum of 15 m downgradient from the bed. The mantle should consist of similar granular fill raised to a minimum of 250 mm above the surrounding grade. Surface runoff should be diverted away from the leaching bed by means of proper site drainage.
5. The waste disposal system should be kept clear of surface drainage swales, roof leader drains, and other sources of surface water.
6. The tile bed should be kept away from shade trees and a healthy cover of vegetation should be developed and maintained over the bed to promote evapotranspiration.
7. When sighting a tile bed on sloping ground, it is recommended that procedures outlined in the Building Code be followed closely.
8. Minimum set back distances from septic tank (plus 2 times height raised):
  - Building – 1.5 m
  - Drilled well – 15 m
  - Property line – 3 m
  - Open water course – 15 m
9. Minimum set back distances from septic tile bed (plus 2 times height raised):
  - Building – 5 m
  - Drilled well, properly sealed – 15 m
  - Open water course – 15 m
  - Property line – 3 m
  - Shallow well – 30 m
10. The layout, design and construction of the waste disposal bed should be subject to inspection by experienced hydrogeologic personnel.

We trust that this report meets your immediate requirements. Should you have any questions, please contact our office.

Regards

GHD



Robert Neck, M.Eng., P.Geo. (Limited)  
Project Manager



Nyle McIlveen, P. Eng  
Senior Engineer



Encl.: Appendix A (Test Pit Logs and Gradation Results)

Email to Pierre Courteau

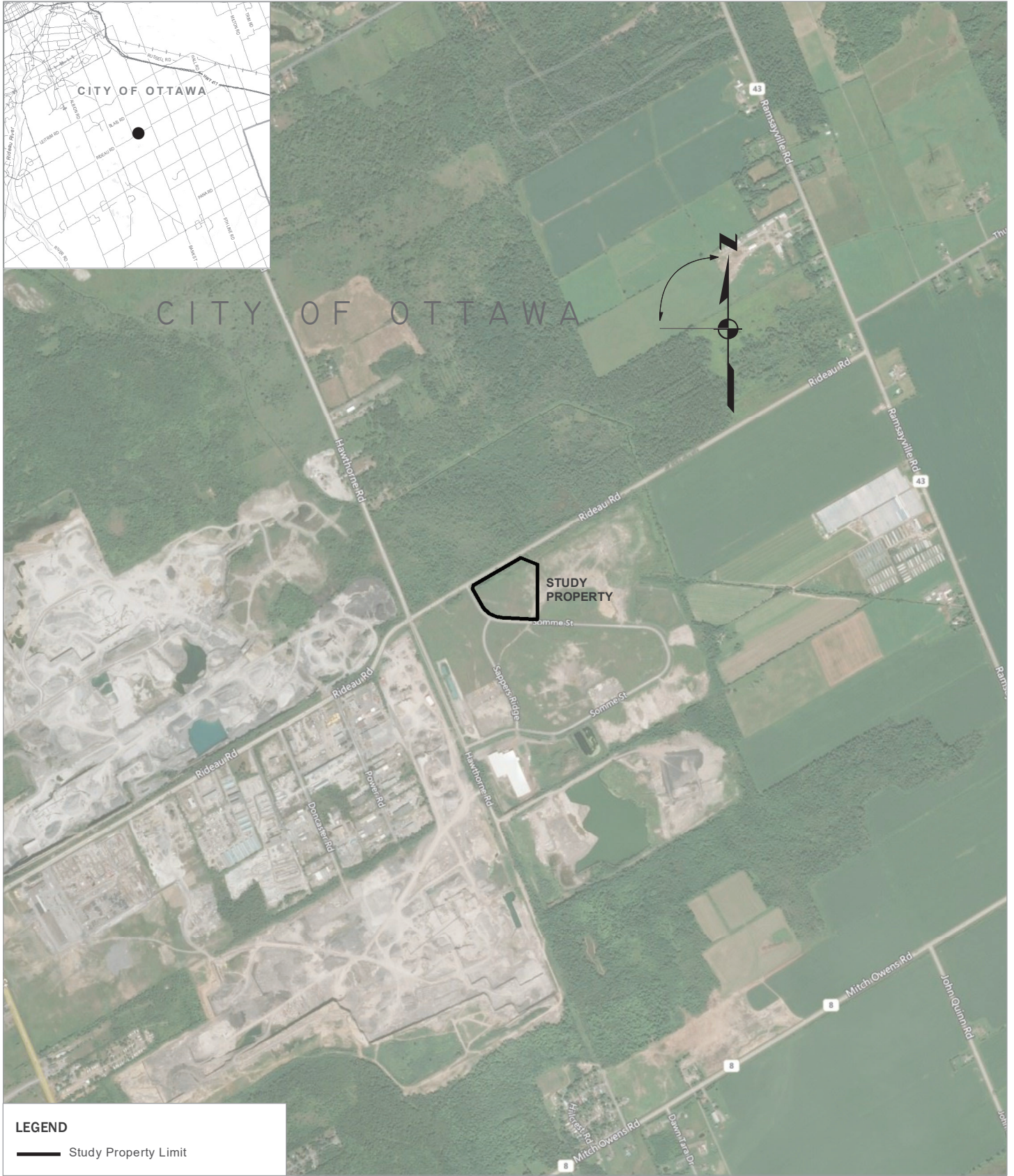
Cc: Christian Lavoie-Lebel (Christian.Lavoie-Lebel@cima.ca)

# Attachment 1

Figures



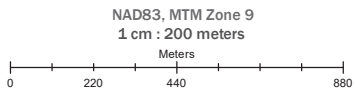
CITY OF OTTAWA



**LEGEND**

— Study Property Limit

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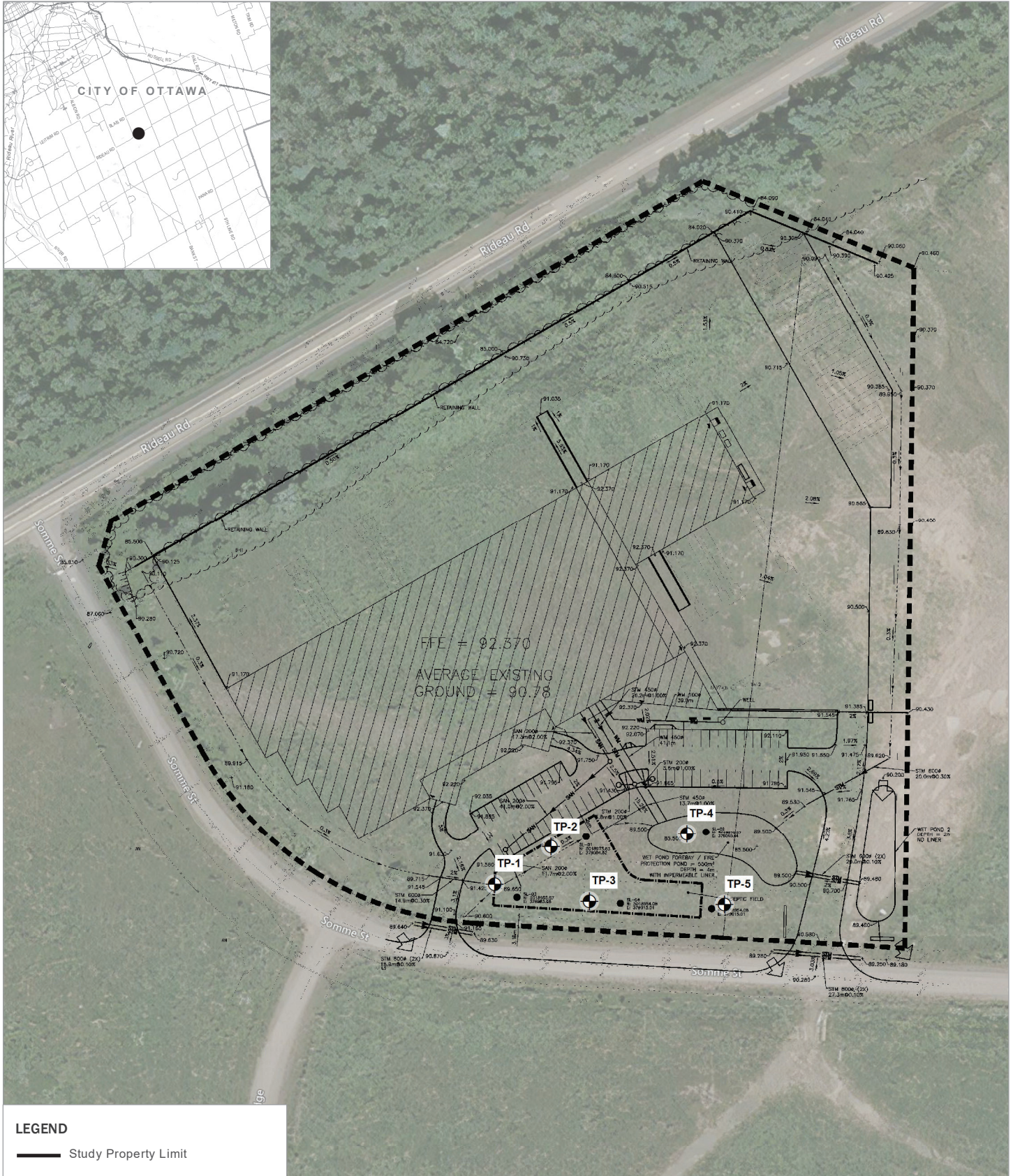
Consolidated Fastfrate (Ottawa) Holdings Inc.  
RIDEAU ROAD & SOMME STREET  
CITY OF OTTAWA  
ONTARIO

Project No. 11220832-01  
Revision No. 1  
Date Apr 2021

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**SEPTIC ASSESSMENT  
SITE LOCATION PLAN**

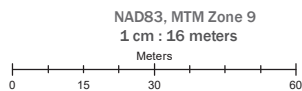
**FIGURE 1**



**LEGEND**

— Study Property Limit

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**SEPTIC ASSESSMENT  
 TEST HOLE LOCATION PLAN**

**FIGURE 2**

# Appendix A

## **Test Pit Logs and Gradation Results**



TEST HOLE No.: TP-1  
 ELEVATION: Existing grade

**TEST HOLE REPORT**

Page: 1 of 1

CLIENT: Consolidated Fastrate  
 PROJECT: Septic Assessment  
 LOGGED BY: J. Scott DATE: 31 March 2021  
 EXCAVATION COMPANY: Goldie Mohr Ltd. METHOD: Backhoe  
 NOTES: 18T E: 456548 N: 5017167

**LEGEND**

- GS - GRAB SAMPLE
- WATER LEVEL

| Depth | m Below Existing Grade | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK   | Type and Number | Moisture Content | Soil Test Parameters |                 |                   |                      |       |     |    |    |    |   | COMMENTS |
|-------|------------------------|--------------|---|-----------------|------------------|----------------------|-----------------|-------------------|----------------------|-------|-----|----|----|----|---|----------|
|       |                        |              |   |                 |                  | Shear test (Cu)      | Sensitivity (S) | Water content (%) | Atterberg limits (%) | Field | Lab |    |    |    |   |          |
| ft    | m                      |              |   |                 | %                | 10                   | 20              | 30                | 40                   | 50    | 60  | 70 | 80 | 90 |   |          |
|       | 0.0                    |              | GROUND SURFACE  |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |
|       | 0.2                    |              | TOPSOIL (178mm)   |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |
| 1     | 0.5                    |              | SM - Gravelly sand (fill), with silt, trace clay, concrete, brick, asphalt, compact, brown, moist |                 |                  |                      |                 |                   |                      |       |     |    |    |    | - Test pit open upon completion   |          |
| 2     | 1.0                    |              |   | GS-1            | --               |                      |                 |                   |                      |       |     |    |    |    | - GS-1<br>37% Gravel<br>47% Sand<br>12% Silt<br>4% Clay   |          |
| 3     | 1.5                    |              |   |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |
| 4     | 2.0                    |              |   |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |
| 5     | 2.1                    |              | With clay, loose  |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |
| 6     | 2.1                    |              | Wet   |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |
| 7     | 2.4                    |              | END OF TEST HOLE  |                 |                  |                      |                 |                   |                      |       |     |    |    |    | - GS-2<br>41% Gravel<br>36% Sand<br>16% Silt<br>7% Clay<br>- Groundwater infiltration observed at approximately 2.1 mbgs<br>- Refusal at 2.4m (asphalt) |          |
| 8     | 3.0                    |              |   |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |
| 9     | 3.5                    |              |   |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |
| 10    | 4.0                    |              |   |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |
| 11    | 4.5                    |              |   |                 |                  |                      |                 |                   |                      |       |     |    |    |    |   |          |

TEST HOLE LOG GEOTECH 11220832 TEST PIT GINT LOGS.GPJ - GEOLOGIC.GDT 12/4/21



**TEST HOLE No.:** TP-2  
**ELEVATION:** Existing grade

**TEST HOLE REPORT**

Page: 1 of 1

CLIENT: Consolidated Fastfrate

**LEGEND**

PROJECT: Septic Assessment

- GS - GRAB SAMPLE
- WATER LEVEL

LOGGED BY: J. Scott DATE: 31 March 2021

EXCAVATION COMPANY: Goldie Mohr Ltd. METHOD: Backhoe

NOTES: 18T E: 456572 N: 5017175

| Depth |   | m Below Existing Grade | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK   | Type and Number | Moisture Content | Shear test (Cu)<br>Sensitivity (S)<br>Water content (%)<br>Atterberg limits (%) | Field<br>Lab | COMMENTS  |
|-------|---|------------------------|--------------|---|-----------------|------------------|---|--------------|---|
| ft    | m | 0.0                    |              | GROUND SURFACE  |                 | %                | 10 20 30 40 50 60 70 80 90  |              |   |
|       |   | 0.1                    |              | <b>TOPSOIL (102mm)</b><br><b>SM</b> - Gravelly sand (fill), with silt, concrete, brick, asphalt, brown, moist |                 |                  |   |              |   |
| 1     |   |                        |              |   |                 |                  |   |              | - Test pit open upon completion                               |
|       |   | 0.5                    |              |   |                 |                  |   |              |   |
| 2     |   |                        |              |   |                 |                  |   |              |   |
|       |   | 1.0                    |              |   | GS-1            | --               |   |              |   |
| 3     |   |                        |              |   |                 |                  |   |              |   |
|       |   | 1.5                    |              |   |                 |                  |   |              |   |
| 4     |   |                        |              |   |                 |                  |   |              |   |
|       |   | 1.8                    |              | Wet   |                 |                  |   |              | - Groundwater infiltration observed at approximately 1.8 mbgs |
| 5     |   |                        |              |   |                 |                  |   |              |   |
|       |   | 2.0                    |              |   |                 |                  |   |              |   |
| 6     |   |                        |              |   |                 |                  |   |              |   |
|       |   | 2.5                    |              |   |                 |                  |   |              |   |
| 7     |   |                        |              |   |                 |                  |   |              |   |
|       |   | 2.7                    |              | END OF TEST HOLE  |                 |                  |   |              |   |
| 8     |   |                        |              |   |                 |                  |   |              |   |
|       |   | 3.0                    |              |   |                 |                  |   |              |   |
| 9     |   |                        |              |   |                 |                  |   |              |   |
|       |   | 3.5                    |              |   |                 |                  |   |              |   |
| 10    |   |                        |              |   |                 |                  |   |              |   |
|       |   | 4.0                    |              |   |                 |                  |   |              |   |
| 11    |   |                        |              |   |                 |                  |   |              |   |
|       |   | 4.5                    |              |   |                 |                  |   |              |   |

TEST HOLE LOG GEOTECH 11220832 TEST PIT GINT LOGS.GPJ GEOLOGIC.GDT 12/4/21



TEST HOLE No.: TP-3  
 ELEVATION: Existing grade

**TEST HOLE REPORT**

Page: 1 of 1

CLIENT: Consolidated Fastrate  
 PROJECT: Septic Assessment  
 LOGGED BY: J. Scott DATE: 31 March 2021  
 EXCAVATION COMPANY: Goldie Mohr Ltd. METHOD: Backhoe  
 NOTES: 18T E: 456599 N: 5017156

**LEGEND**

- GS - GRAB SAMPLE
- WATER LEVEL

| Depth | m Below Existing Grade | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK                                       | Type and Number | Moisture Content | Soil Test Parameters |                 |                   |                      |    |    |    |    |    |  | COMMENTS |
|-------|------------------------|--------------|---|-----------------|------------------|----------------------|-----------------|-------------------|----------------------|----|----|----|----|----|--|----------|
|       |                        |              |   |                 |                  | Shear test (Cu)      | Sensitivity (S) | Water content (%) | Atterberg limits (%) |    |    |    |    |    |  |          |
| ft    | m                      | 0.0          | GROUND SURFACE  |                 | %                | 10                   | 20              | 30                | 40                   | 50 | 60 | 70 | 80 | 90 |  |          |
|       |                        | 0.2          | TOPSOIL (152 mm)  |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 0.2          | SM - Gravelly sand (fill), with silt, concrete, asphalt, brown, moist |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 1     |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 0.5          |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 2     |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 1.0          |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 3     |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 1.2          | Grey, cobbles   | GS-1            | --               |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 4     |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 1.5          |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 5     |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 1.8          | Wet   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 6     |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 2.0          |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 7     |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 2.5          |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 8     |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 3.0          | END OF TEST HOLE  | GS-2            | --               |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 9     |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 3.5          |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 10    |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 4.0          |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
| 11    |                        |              |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |
|       |                        | 4.5          |   |                 |                  |                      |                 |                   |                      |    |    |    |    |    |  |          |

TEST HOLE LOG GEOTECH 11220832 TEST PIT GINT LOGS.GPJ GEOLOGIC.GDT 12/4/21

- 0.2 m

- Test pit open upon completion

- Groundwater infiltration observed at approximately 1.8 mbgs

- 50 mm diameter monitoring well installed to 2.7 mbgs





**TEST HOLE No.:** TP-4  
**ELEVATION:** Existing grade

**TEST HOLE REPORT**

Page: 1 of 1

CLIENT: Consolidated Fastfrate

**LEGEND**

PROJECT: Septic Assessment

- GS - GRAB SAMPLE
- WATER LEVEL

LOGGED BY: J. Scott DATE: 31 March 2021

EXCAVATION COMPANY: Goldie Mohr Ltd. METHOD: Backhoe

NOTES: 18T E: 456656 N: 5017172

| Depth |   | m Below Existing Grade | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK   | Type and Number | Moisture Content | Soil Properties |                 |                   |                      |       |    |    |    |    |  | COMMENTS |  |  |  |  |  |  |  |  |
|-------|---|------------------------|--------------|---|-----------------|------------------|-----------------|-----------------|-------------------|----------------------|-------|----|----|----|----|--|----------|--|--|--|--|--|--|--|--|
| ft    | m |                        |              |   |                 |                  | Shear test (Cu) | Sensitivity (S) | Water content (%) | Atterberg limits (%) | Field |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   |                        |              |   |                 |                  | w <sub>p</sub>  | w <sub>L</sub>  |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 0.0                    |              | GROUND SURFACE  |                 | %                | 10              | 20              | 30                | 40                   | 50    | 60 | 70 | 80 | 90 |  |          |  |  |  |  |  |  |  |  |
|       |   | 0.1                    |              | <b>TOPSOIL (102mm)</b><br><b>SM</b> - Gravelly sand (fill), with silt, with clay, concrete, asphalt, brown, moist |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 1     |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 0.5                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 2     |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 1.0                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 3     |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 1.8                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 4     |   |                        |              |   | GS-1            | --               |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 1.5                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 5     |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 2.0                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 6     |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 2.5                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 7     |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 3.0                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 8     |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 3.4                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 9     |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 3.5                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 10    |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 4.0                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
| 11    |   |                        |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |
|       |   | 4.5                    |              |   |                 |                  |                 |                 |                   |                      |       |    |    |    |    |  |          |  |  |  |  |  |  |  |  |

TEST HOLE LOG GEOTECH 11220832 TEST PIT GINT LOGS.GPJ GEOLOGIC.GDT 12/4/21

Wet

- Test pit open upon completion

- GS-1  
32% Gravel  
44% Sand  
17% Silt  
7% Clay

- Groundwater infiltration observed at approximately 1.8 mbgs

END OF TEST HOLE



**TEST HOLE No.:** TP-5  
**ELEVATION:** Existing grade

**TEST HOLE REPORT**

Page: 1 of 1

CLIENT: Consolidated Fastrate

**LEGEND**

PROJECT: Septic Assessment

- GS - GRAB SAMPLE
- WATER LEVEL

LOGGED BY: J. Scott DATE: 31 March 2021

EXCAVATION COMPANY: Goldie Mohr Ltd. METHOD: Backhoe

NOTES: 18T E: 456601 N: 5017160

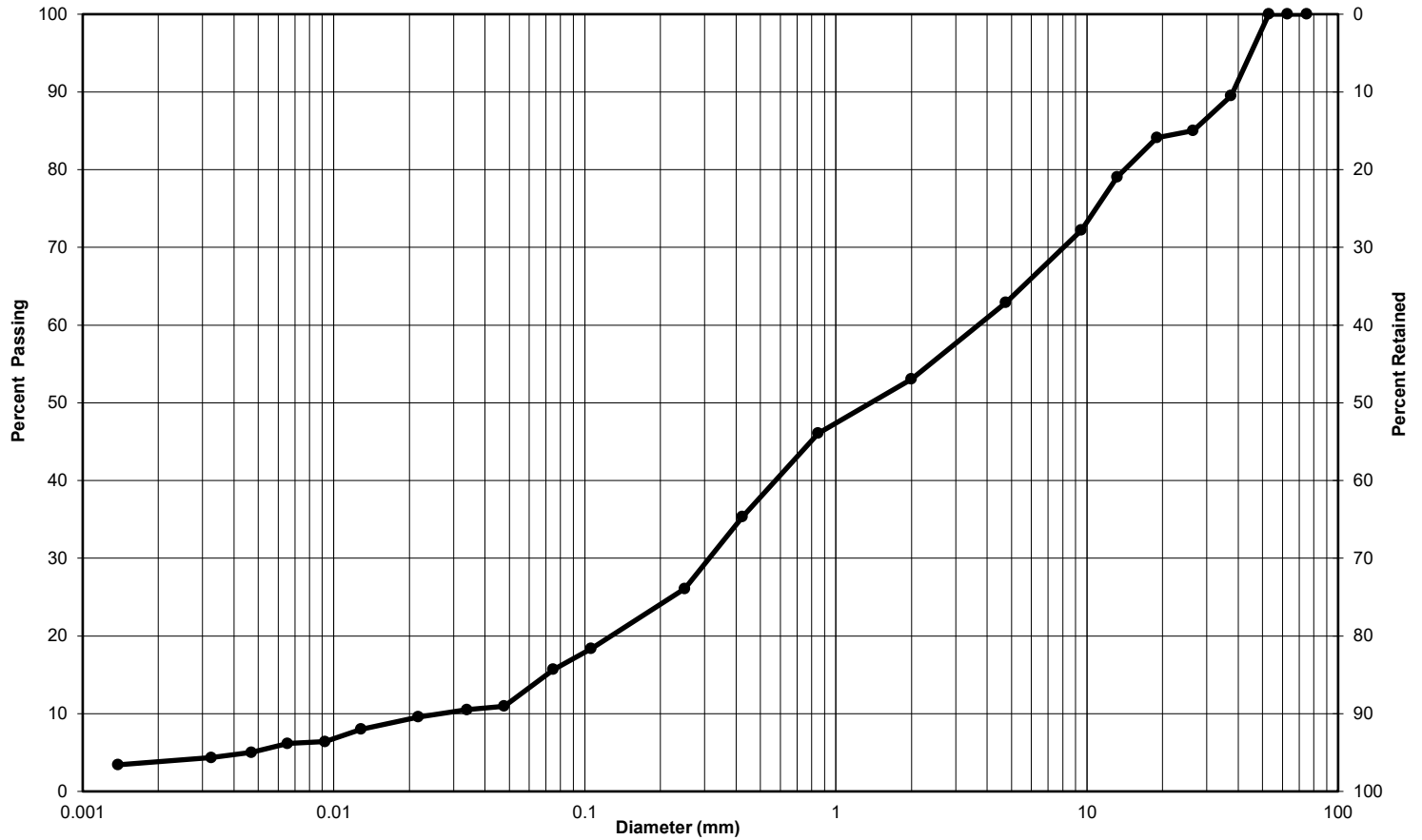
| Depth |     | m Below Existing Grade | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK  | Type and Number | Moisture Content | Shear test (Cu)<br>Sensitivity (S)<br>Water content (%)<br>Atterberg limits (%) | Field<br>Lab | COMMENTS  |
|-------|-----|------------------------|--------------|--|-----------------|------------------|---|--------------|---|
| ft    | m   | 0.0                    |              | GROUND SURFACE   |                 | %                | 10 20 30 40 50 60 70 80 90  |              |   |
|       |     | 0.1                    |              | <b>TOPSOIL (102mm)</b><br>SM - Silty sand (fill), with gravel, with clay, with asphalt, concrete, brown, moist |                 |                  |   |              |   |
| 1     | 0.5 |                        |              |  |                 |                  |   |              | - Test pit open upon completion                               |
| 2     |     |                        |              |  |                 |                  |   |              |   |
| 3     | 1.0 |                        |              |  | GS-1            | --               |   |              |   |
| 4     | 1.2 |                        |              | Grey   |                 |                  |   |              |   |
| 5     | 1.5 |                        |              |  |                 |                  |   |              |   |
| 6     | 1.8 |                        |              | Wet  |                 |                  |   |              | - Groundwater infiltration observed at approximately 1.8 mbgs |
| 7     | 2.0 |                        |              |  |                 |                  |   |              |   |
| 8     | 2.5 |                        |              |  |                 |                  |   |              |   |
| 9     |     |                        |              |  | GS-2            | --               |   |              | - GS2<br>18% Gravel<br>47% Sand<br>23% Silt<br>12% Clay       |
| 10    | 3.0 | 3.0                    |              | END OF TEST HOLE   |                 |                  |   |              |   |
| 11    | 3.5 |                        |              |  |                 |                  |   |              |   |
| 12    |     |                        |              |  |                 |                  |   |              |   |
| 13    | 4.0 |                        |              |  |                 |                  |   |              |   |
| 14    |     |                        |              |  |                 |                  |   |              |   |
|       | 4.5 |                        |              |  |                 |                  |   |              |   |

TEST HOLE LOG GEOTECH 11220832 TEST PIT GINT LOGS.GPJ\_GEOLOGIC.GDT 12/4/21



**Particle-Size Analysis of Soils (Geotechnical)  
(USCS) (ASTM D422)**

|                      |  |                     |          |
|----------------------|--|---------------------|----------|
| <b>Client:</b>       | Consolidated Fastfrate                   | <b>Lab No.:</b>     | SS-21-25 |
| <b>Project/Site:</b> | Rideau Street & Somme Street, Ottawa, ON | <b>Project No.:</b> | 11220832 |
| <b>Borehole no.:</b> | TP1                                      | <b>Sample no.:</b>  | GS1      |
| <b>Depth:</b>        | 0.6 - 0.9 m                              | <b>Enclosure:</b>   | A-6      |



|   |             |        |        |               |        |
|---|-------------|--------|--------|---------------|--------|
| <b>Clay &amp; Silt</b>                    | <b>Sand</b> |        |        | <b>Gravel</b> |        |
|   | Fine        | Medium | Coarse | Fine          | Coarse |
| <b>Unified Soil Classification System</b> |             |        |        |               |        |

| Soil Description                              | Gravel (%) | Sand (%) | Clay & Silt (%) |
|---|------------|----------|-----------------|
|   | 37         | 47       | 16              |
| <b>Silt-size particles (%):</b>               |            | 12       |                 |
| <b>Clay-size particles (%) (&lt;0.002mm):</b> |            | 4        |                 |

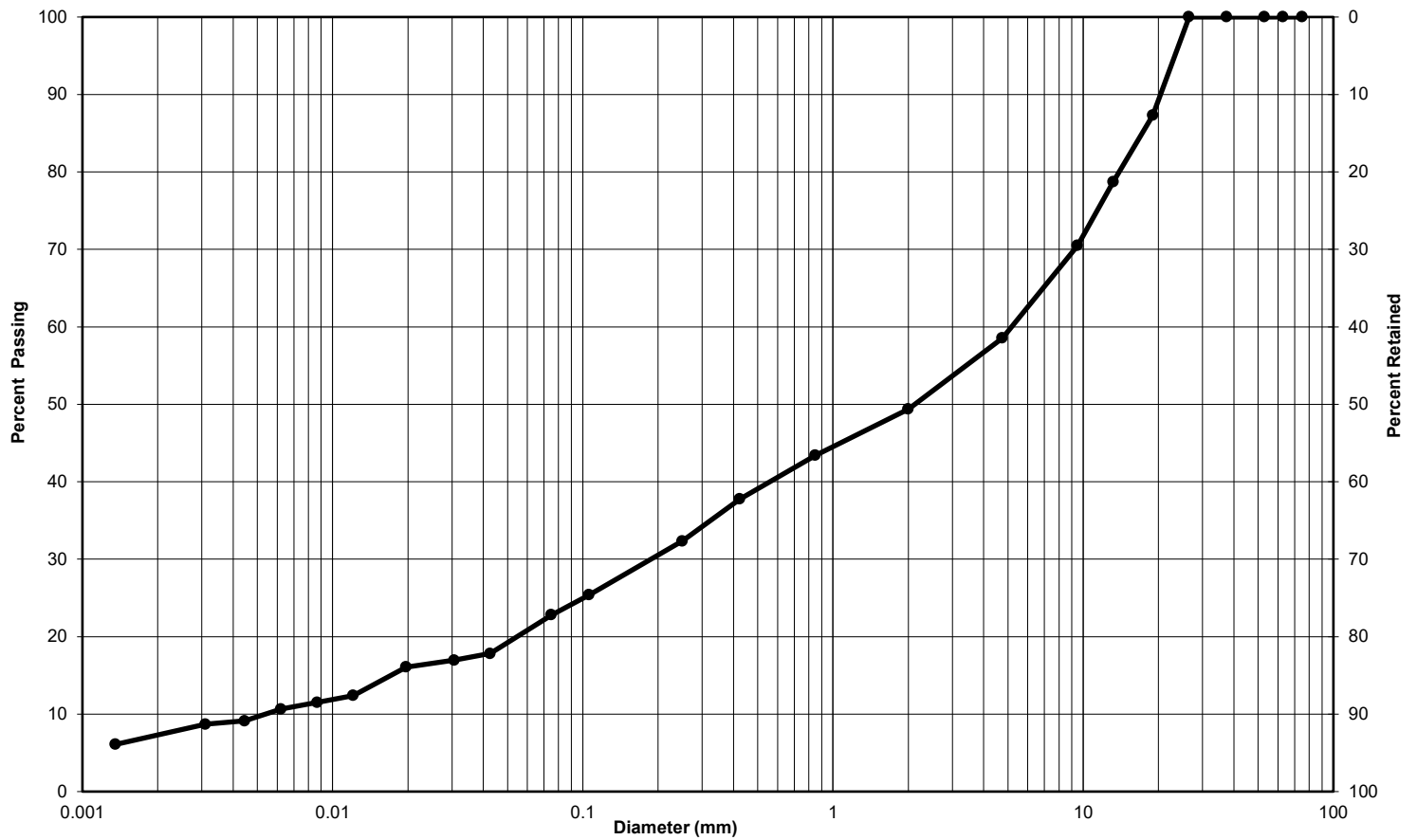
**Remarks:** Moisture Content = 7.1% as per, ASTM D2216.

|                      |               |              |               |
|----------------------|---------------|--------------|---------------|
| <b>Performed by:</b> | Josh Sullivan | <b>Date:</b> | April 7, 2021 |
| <b>Verified by:</b>  | Joe Sullivan  | <b>Date:</b> | April 7, 2021 |



**Particle-Size Analysis of Soils (Geotechnical)  
(USCS) (ASTM D422)**

|                      |  |                     |          |
|----------------------|--|---------------------|----------|
| <b>Client:</b>       | Consolidated Fastfrate                   | <b>Lab No.:</b>     | SS-21-25 |
| <b>Project/Site:</b> | Rideau Street & Somme Street, Ottawa, ON | <b>Project No.:</b> | 11220832 |
| <b>Borehole no.:</b> | TP1                                      | <b>Sample no.:</b>  | GS2      |
| <b>Depth:</b>        | 1.8 - 2.1 m                              | <b>Enclosure:</b>   | A-7      |



|   |             |        |        |               |        |
|---|-------------|--------|--------|---------------|--------|
| <b>Clay &amp; Silt</b>                    | <b>Sand</b> |        |        | <b>Gravel</b> |        |
|   | Fine        | Medium | Coarse | Fine          | Coarse |
| <b>Unified Soil Classification System</b> |             |        |        |               |        |

| Soil Description                              | Gravel (%) | Sand (%) | Clay & Silt (%) |
|---|------------|----------|-----------------|
|   | 41         | 36       | 23              |
| <b>Silt-size particles (%):</b>               | 16         |          |                 |
| <b>Clay-size particles (%) (&lt;0.002mm):</b> | 7          |          |                 |

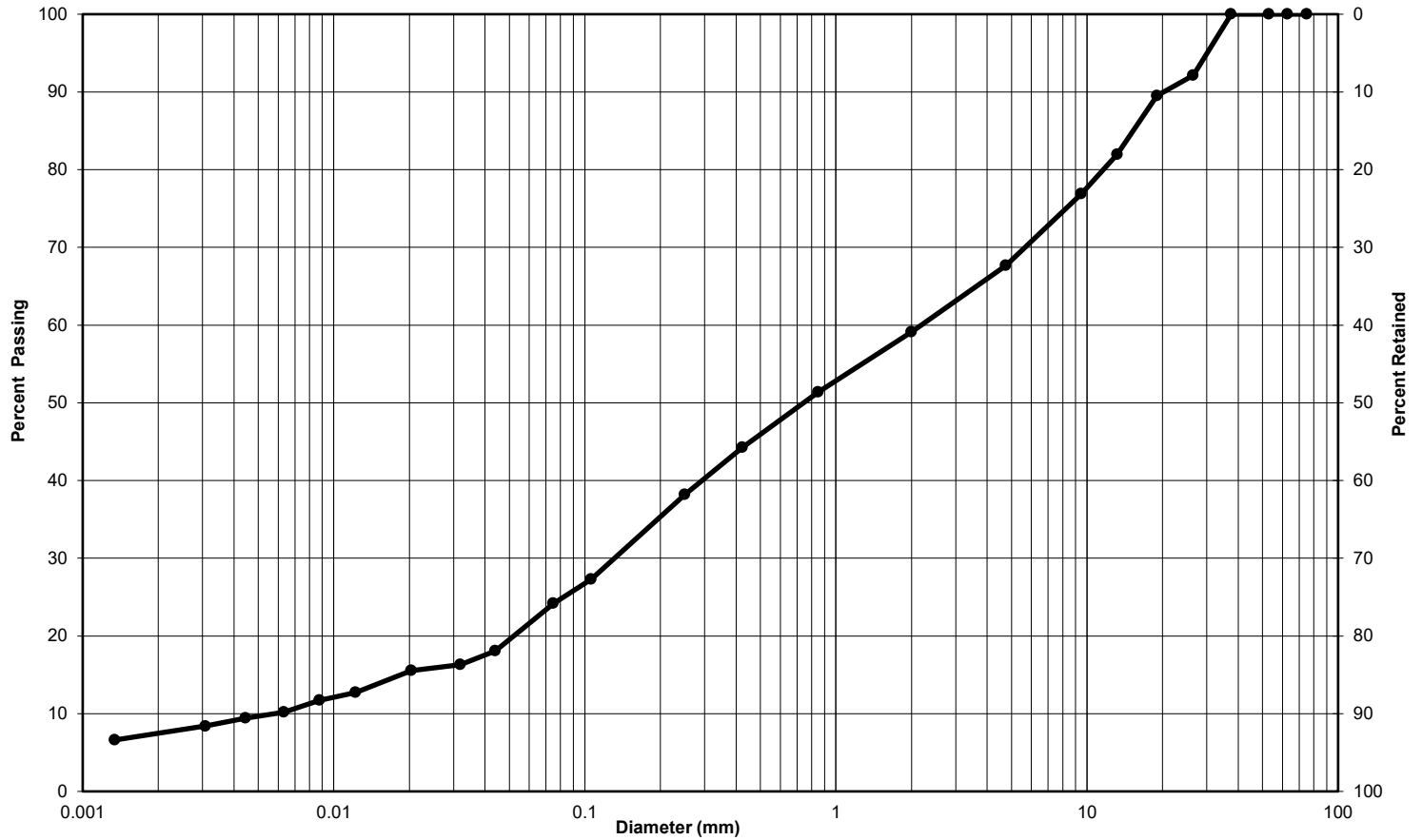
**Remarks:** Moisture Content = 8.7% as per, ASTM D2216.

|                      |               |              |               |
|----------------------|---------------|--------------|---------------|
| <b>Performed by:</b> | Josh Sullivan | <b>Date:</b> | April 7, 2021 |
| <b>Verified by:</b>  | Joe Sullivan  | <b>Date:</b> | April 7, 2021 |



## Particle-Size Analysis of Soils (Geotechnical) (USCS) (ASTM D422)

|                      |  |                     |          |
|----------------------|--|---------------------|----------|
| <b>Client:</b>       | Consolidated Fastfrate                   | <b>Lab No.:</b>     | SS-21-25 |
| <b>Project/Site:</b> | Rideau Street & Somme Street, Ottawa, ON | <b>Project No.:</b> | 11220832 |
| <b>Borehole no.:</b> | TP4                                      | <b>Sample no.:</b>  | GS1      |
| <b>Depth:</b>        | 0.9 - 1.2 m                              | <b>Enclosure:</b>   | A-8      |



| Clay & Silt                        | Sand |        |        | Gravel |        |
|------------------------------------|------|--------|--------|--------|--------|
|                                    | Fine | Medium | Coarse | Fine   | Coarse |
| Unified Soil Classification System |      |        |        |        |        |

| Soil Description                              | Gravel (%) | Sand (%) | Clay & Silt (%) |
|---|------------|----------|-----------------|
|   | 32         | 44       | 24              |
| <b>Silt-size particles (%):</b>               | 17         |          |                 |
| <b>Clay-size particles (%) (&lt;0.002mm):</b> | 7          |          |                 |

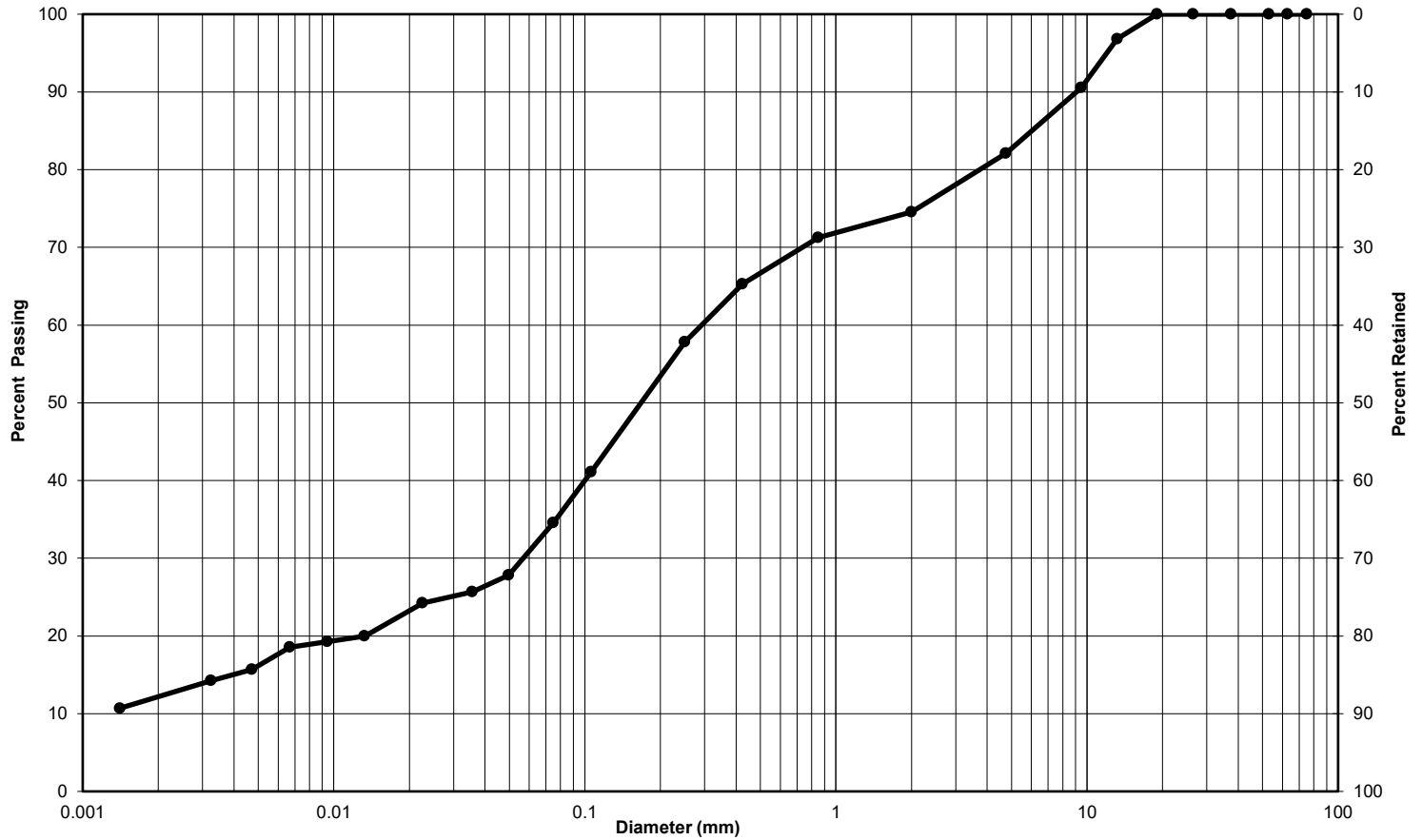
**Remarks:** Moisture Content = 10.6% as per, ASTM D2216.

|                      |               |              |               |
|----------------------|---------------|--------------|---------------|
| <b>Performed by:</b> | Josh Sullivan | <b>Date:</b> | April 7, 2021 |
| <b>Verified by:</b>  | Joe Sullivan  | <b>Date:</b> | April 7, 2021 |



## Particle-Size Analysis of Soils (Geotechnical) (USCS) (ASTM D422)

|                      |  |                     |          |
|----------------------|--|---------------------|----------|
| <b>Client:</b>       | Consolidated Fastfrate                   | <b>Lab No.:</b>     | SS-21-25 |
| <b>Project/Site:</b> | Rideau Street & Somme Street, Ottawa, ON | <b>Project No.:</b> | 11220832 |
| <b>Borehole no.:</b> | TP5                                      | <b>Sample no.:</b>  | GS2      |
| <b>Depth:</b>        | 2.75 - 3.05 m                            | <b>Enclosure:</b>   | A-9      |



|   |             |        |        |               |        |
|---|-------------|--------|--------|---------------|--------|
| <b>Clay &amp; Silt</b>                    | <b>Sand</b> |        |        | <b>Gravel</b> |        |
|   | Fine        | Medium | Coarse | Fine          | Coarse |
| <b>Unified Soil Classification System</b> |             |        |        |               |        |

| Soil Description                              | Gravel (%) | Sand (%) | Clay & Silt (%) |
|---|------------|----------|-----------------|
|   | 18         | 47       | 35              |
| <b>Silt-size particles (%):</b>               | 23         |          |                 |
| <b>Clay-size particles (%) (&lt;0.002mm):</b> | 12         |          |                 |

**Remarks:** Moisture Content = 22.4% as per, ASTM D2216.

|                      |               |              |               |
|----------------------|---------------|--------------|---------------|
| <b>Performed by:</b> | Josh Sullivan | <b>Date:</b> | April 7, 2021 |
| <b>Verified by:</b>  | Joe Sullivan  | <b>Date:</b> | April 7, 2021 |



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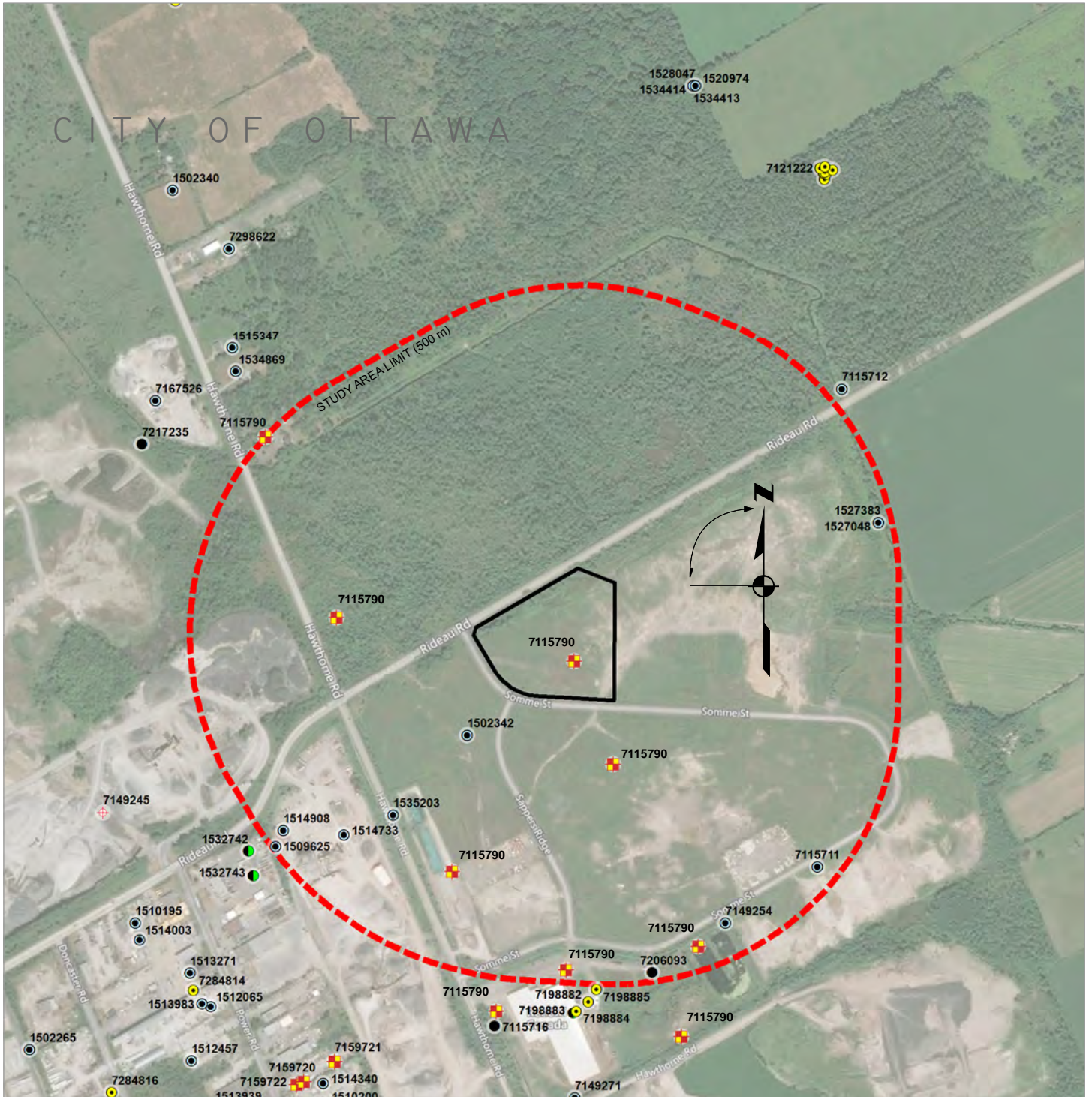
→ **The Power of Commitment**

# **Appendix B**

**MECP Water Well Records**



# CITY OF OTTAWA



## LEGEND

- Study Property Limit
- 500 m Radius

### MECP Well, Final Status

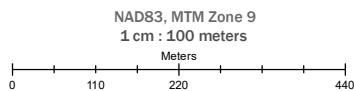
- Abandoned Monitoring and Test Hole
- Abandoned-Other
- Abandoned-Quality
- Abandoned-Supply

- Alteration
- Dewatering
- Monitoring and Test Hole
- Observation Wells

- Recharge Well
- Replacement Well
- Test Hole
- Unfinished

- Water Supply
- Other Status
- No Data
- Not A Well

Service Layer Credits: © 2020 Microsoft Corporation © 2020 Maxar ©CNES (2020)  
Distribution Airbus DS © 2020 HERE



Consolidated Fastfrate (Ottawa) Holdings Inc.  
RIDEAU ROAD & SOMME STREET  
CITY OF OTTAWA  
ONTARIO

Project No. 12565773  
Revision No. -  
Date Jan 21

### ATTRIBUTION STATEMENTS

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## HYDROGEOLOGY ASSESSMENT MECP WATER WELLS

## APPENDIX B

K:\GIS\_PROJECTS\IGHDICA-

Created by: Will Pridham

# WELL RECORD LISTINGS

Ministry of the Environment Conservation & Parks (MECP)

Database Currency: 2020-04-30

Date Accessed: 2020-11-13

Project ID: 11220832 Office: Peterborough, ON



**Lot:** LOT 27 **Well ID:** 7206093  
**Con:** CON 6 FROM RIDEAU RIVER **Borehole ID:** 1004500104  
**Township:** GLOUCESTER **Completion Date:** 7/18/2013  
**County:** OTTAWA-CARLETON **Received Date:** 8/12/2013  
**Street:** 35 SAPPERS RIDGE **Tag:** A089801  
**City:** Ottawa **Audit No:** Z103282  
**Site:** **Contractor License:** 3749  
**Elevation:** 89.57 *masl.*  
**UTM:** 18 E 456749 N 5016668 **Long/Lat:** -75.552 , 45.302

## DETAILS

**Primary Use:** Public **Secondary Use:** Public **Final Status:**

**Well Depth:** 47.2 m **Depth to Bedrock:** 0 m **Static Level:** 7.6 m **Well Type:**

**Pump Rate:** 10 GPM **Boring Method:** Rotary (Convent.)

### CASING DETAILS

| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u> | - | <u>Bottom</u> |
|-----------------|----------------------|------------|---|---------------|
| STEEL           | 14.29                | 12.19      |   | -0.61         |

### DEPTH IN METERS

### FORMATION DETAILS

| <u>Colour</u> | <u>Material</u> | <u>Top</u> | - | <u>Bottom</u> |
|---------------|-----------------|------------|---|---------------|
|               | LIMESTONE       | 7.32       |   | 47.24         |
|               | FILL            | 0.00       |   | 2.44          |
| GREY          | CLAY            | 2.44       |   | 7.32          |

### DEPTH IN METERS

**Lot:** LOT 27 **Well ID:** 7115790  
**Con:** CON 6 FROM RIDEAU RIVER **Borehole ID:** 1002782554  
**Township:** GLOUCESTER **Completion Date:** 7/7/2008  
**County:** OTTAWA-CARLETON **Received Date:** 11/26/2008  
**Street:** HAWTHORNE ROAD AT RIDEAU ROAD **Tag:** A074584  
**City:** Ottawa **Audit No:** M02897  
**Site:** **Contractor License:** 1844  
**Elevation:** 90.95 *masl.*

UTM: 18 E 456598 N 5016675 Long/Lat: -75.554 , 45.302

### DETAILS

Primary Use: Monitoring Secondary Use: Monitoring Final Status: Test Hole

Well Depth: 0 m Depth to Bedrock: 0 m Static Level: 1 m Well Type:

Pump Rate: Boring Method: H.S.A.

#### CASING DETAILS

#### DEPTH IN METERS

Material Diameter (cm) Top - Bottom

#### FORMATION DETAILS

#### DEPTH IN METERS

| <u>Colour</u> | <u>Material</u> | <u>Top</u> | - | <u>Bottom</u> |
|---------------|-----------------|------------|---|---------------|
| BROWN         | FILL            | 0.27       |   | 1.43          |
| GREY          | SAND            | 1.43       |   | 1.83          |
| BROWN         | TILL            | 1.83       |   | 2.32          |
| GREY          | FINE SAND       | 0.00       |   | 0.27          |

Lot: LOT 27 Well ID: 7115790  
Con: CON 6 FROM RIDEAU RIVER Borehole ID: 1002782518  
Township: GLOUCESTER Completion Date: 7/7/2008  
County: OTTAWA-CARLETON Received Date: 11/26/2008  
Street: HAWTHORNE ROAD AT RIDEAU ROAD Tag: A074584  
City: Ottawa Audit No: M02897  
Site: Contractor License: 1844  
Elevation: 94.41 *masl.*  
UTM: 18 E 456831 N 5016712 Long/Lat: -75.551 , 45.303

### DETAILS

Primary Use: Monitoring Secondary Use: Monitoring Final Status: Test Hole

Well Depth: 0 m Depth to Bedrock: 0 m Static Level: 1.3 m Well Type:

Pump Rate: Boring Method: H.S.A.

CASING DETAILS

DEPTH IN METERS

| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u> | - | <u>Bottom</u> |
|-----------------|----------------------|------------|---|---------------|
| STEEL           | 15.86                | -0.45      |   | 6.40          |

FORMATION DETAILS

DEPTH IN METERS

| <u>Colour</u> | <u>Material</u> | <u>Top</u> | - | <u>Bottom</u> |
|---------------|-----------------|------------|---|---------------|
| GREY          | SANDSTONE       | 1.30       |   | 9.10          |
| BROWN         | TOPSOIL         | 0.00       |   | 1.30          |

|                   |                         |                            |                  |
|-------------------|-------------------------|----------------------------|------------------|
| <b>Lot:</b>       | LOT 27                  | <b>Well ID:</b>            | 7149254          |
| <b>Con:</b>       | CON 6 FROM RIDEAU RIVER | <b>Borehole ID:</b>        | 1003262503       |
| <b>Township:</b>  | GLOUCESTER              | <b>Completion Date:</b>    | 5/25/2010        |
| <b>County:</b>    | OTTAWA-CARLETON         | <b>Received Date:</b>      | 8/4/2010         |
| <b>Street:</b>    | TW#7 HOAWTHORNE RD.     | <b>Tag:</b>                | A082844          |
| <b>City:</b>      | GLOUCESTER              | <b>Audit No:</b>           | Z101832          |
| <b>Site:</b>      |                         | <b>Contractor License:</b> | 1558             |
| <b>Elevation:</b> | 88.61 <i>masl.</i>      |                            |                  |
| <b>UTM:</b>       | 18 E 456879 N 5016752   | <b>Long/Lat:</b>           | -75.550 , 45.303 |

**DETAILS**

**Primary Use:** Monitoring      **Secondary Use:** Monitoring      **Final Status:** Water Supply

**Well Depth:** 29.9 m      **Depth to Bedrock:** 0 m      **Static Level:** 4.4 m      **Well Type:**

**Pump Rate:** 27.3 LPM      **Boring Method:** Rotary (Reverse)

CASING DETAILS

DEPTH IN METERS

| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u> | - | <u>Bottom</u> |
|-----------------|----------------------|------------|---|---------------|
| STEEL           | 15.86                | -0.45      |   | 6.40          |

FORMATION DETAILS

DEPTH IN METERS

| <u>Colour</u> | <u>Material</u> | <u>Top</u> | - | <u>Bottom</u> |
|---------------|-----------------|------------|---|---------------|
| GREY          | SANDSTONE       | 1.30       |   | 9.10          |
| BROWN         | TOPSOIL         | 0.00       |   | 1.30          |

**Lot:** LOT 26 **Well ID:** 7115790  
**Con:** CON 6 FROM RIDEAU RIVER **Borehole ID:** 1001905211  
**Township:** GLOUCESTER **Completion Date:** 7/14/2008  
**County:** OTTAWA-CARLETON **Received Date:** 11/26/2008  
**Street:** HAWTHORNE ROAD AT RIDEAU ROAD **Tag:** A074584  
**City:** Ottawa **Audit No:** M02897  
**Site:** **Contractor License:** 1844  
**Elevation:** 89.13 *masl.*  
**UTM:** 18 E 456400 N 5016852 **Long/Lat:** -75.556 , 45.304

**DETAILS**

**Primary Use:** Monitoring **Secondary Use:** Monitoring **Final Status:** Test Hole  
**Well Depth:** 7.6 m **Depth to Bedrock:** 0 m **Static Level:** 1.7 m **Well Type:**  
**Pump Rate:** **Boring Method:** H.S.A.

**CASING DETAILS**

**DEPTH IN METERS**

**Material** **Diameter (cm)** **Top** - **Bottom**

**FORMATION DETAILS**

**DEPTH IN METERS**

| <b><u>Colour</u></b> | <b><u>Material</u></b> | <b><u>Top</u></b> | - | <b><u>Bottom</u></b> |
|----------------------|------------------------|-------------------|---|----------------------|
| GREY                 | FINE SAND              | 0.00              |   | 0.27                 |
| BROWN                | FILL                   | 0.27              |   | 1.43                 |
| BROWN                | TILL                   | 1.83              |   | 2.32                 |
| GREY                 | SAND                   | 1.43              |   | 1.83                 |

**Lot:** LOT 27 **Well ID:** 7115711  
**Con:** CON 6 FROM RIDEAU RIVER **Borehole ID:** 1001904894  
**Township:** GLOUCESTER **Completion Date:** 9/26/2008  
**County:** OTTAWA-CARLETON **Received Date:** 12/2/2008  
**Street:** TW #5 **Tag:** A068335  
**City:** GLOUCESTER **Audit No:** Z84410  
**Site:** **Contractor License:** 1558

Elevation: 87.38 *masl.*

UTM: 18 E 457043 N 5016848 Long/Lat: -75.548 , 45.304

### DETAILS

**Primary Use:** Domestic      **Secondary Use:** Domestic      **Final Status:** Water Supply  
**Well Depth:** 29.9 m      **Depth to Bedrock:** 0 m      **Static Level:** 6.8 m      **Well Type:** Bedrock  
**Pump Rate:** 180 GPM      **Boring Method:** Cable Tool

#### CASING DETAILS

| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u> | - | <u>Bottom</u> |
|-----------------|----------------------|------------|---|---------------|
| STEEL           | 25.40                |            |   | 5.49          |
| OPEN HOLE       | 22.86                |            |   | 58.52         |

#### DEPTH IN METERS

#### FORMATION DETAILS

| <u>Colour</u> | <u>Material</u> | <u>Top</u> | - | <u>Bottom</u> |
|---------------|-----------------|------------|---|---------------|
| BROWN         | SANDSTONE       | 0.00       |   | 15.85         |
| GREY          | QUARTZITE       | 15.85      |   | 21.95         |
| WHITE         | SANDSTONE       | 21.95      |   | 48.77         |
| GREY          | SANDSTONE       | 48.77      |   | 58.52         |

#### DEPTH IN METERS

Lot: LOT 26

Con: CON 5 FROM RIDEAU RIVER

Township: GLOUCESTER

County: OTTAWA-CARLETON

Street:

City:

Site:

Elevation: 103.27 *masl.*

UTM: 18 E 456091 N 5016902 Long/Lat: -75.560 , 45.304

Well ID: 1509625

Borehole ID: 10031657

Completion Date: 5/4/1968

Received Date: 6/12/1968

Tag:

Audit No:

Contractor License: 3002

### DETAILS

**Primary Use:** Domestic      **Secondary Use:** Domestic      **Final Status:** Water Supply  
**Well Depth:** 58.5 m      **Depth to Bedrock:** 0 m      **Static Level:** 11 m      **Well Type:** Bedrock  
**Pump Rate:** 180 GPM      **Boring Method:** Cable Tool

#### CASING DETAILS

| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u> | - | <u>Bottom</u> |
|-----------------|----------------------|------------|---|---------------|
| OPEN HOLE       | 22.86                |            |   | 58.52         |

#### DEPTH IN METERS

STEEL | 25.40 | 5.49

| FORMATION DETAILS |                 | DEPTH IN METERS |               |
|-------------------|-----------------|-----------------|---------------|
| <u>Colour</u>     | <u>Material</u> | <u>Top</u>      | <u>Bottom</u> |
| BROWN             | SHALE           | 0.61            | 3.05          |
| BROWN             | TOPSOIL         | 0.00            | 0.61          |
| GREY              | LIMESTONE       | 3.05            | 35.36         |

**Lot:** LOT 26 **Well ID:** 1514733  
**Con:** CON 5 FROM RIDEAU RIVER **Borehole ID:** 10036703  
**Township:** GLOUCESTER **Completion Date:** 4/15/1975  
**County:** OTTAWA-CARLETON **Received Date:** 7/8/1975  
**Street:** **Tag:**  
**City:** **Audit No:**  
**Site:** **Contractor License:** 1517  
**Elevation:** 99.42 *masl.*  
**UTM:** 18 E 456211 N 5016920 **Long/Lat:** -75.559 , 45.304

#### DETAILS

**Primary Use:** Commerical **Secondary Use:** Commerical **Final Status:** Water Supply  
**Well Depth:** 35.4 m **Depth to Bedrock:** 0.6 m **Static Level:** 12. m **Well Type:** Bedrock  
**Pump Rate:** 10 GPM **Boring Method:** Cable Tool

| CASING DETAILS  |                      | DEPTH IN METERS |               |
|-----------------|----------------------|-----------------|---------------|
| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u>      | <u>Bottom</u> |
| OPEN HOLE       | 12.70                |                 | 35.36         |
| STEEL           | 12.70                |                 | 5.49          |

| FORMATION DETAILS |                 | DEPTH IN METERS |               |
|-------------------|-----------------|-----------------|---------------|
| <u>Colour</u>     | <u>Material</u> | <u>Top</u>      | <u>Bottom</u> |
| BROWN             | TOPSOIL         | 0.00            | 0.61          |
| BROWN             | SHALE           | 0.61            | 3.05          |
| GREY              | LIMESTONE       | 3.05            | 35.36         |

**Lot:** LOT 26 **Well ID:** 1514908  
**Con:** CON 5 FROM RIDEAU RIVER **Borehole ID:** 10036875  
**Township:** GLOUCESTER **Completion Date:** 8/15/1975  
**County:** OTTAWA-CARLETON **Received Date:** 9/11/1975

Street: 3500 RIDEAU ROAD

Tag: A018916

City: GLOUCESTER

Audit No: Z19099

Site:

Contractor License: 1119

Elevation: 90.37 *masl.*

UTM: 18 E 456105 N 5016929 Long/Lat: -75.560 , 45.304

### DETAILS

Primary Use: Domestic      Secondary Use: Domestic      Final Status: Water Supply

Well Depth: 75.6 m      Depth to Bedrock: 0 m      Static Level: 12. m      Well Type: Bedrock

Pump Rate: 75.71 LPM      Boring Method: Air Percussion

#### CASING DETAILS

#### DEPTH IN METERS

| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u> | - | <u>Bottom</u> |
|-----------------|----------------------|------------|---|---------------|
| OPEN HOLE       |                      | 6.09       |   | 42.67         |
| STEEL           | 15.88                | 0.00       |   | 6.70          |

#### FORMATION DETAILS

#### DEPTH IN METERS

| <u>Colour</u> | <u>Material</u> | <u>Top</u> | - | <u>Bottom</u> |
|---------------|-----------------|------------|---|---------------|
| GREY          | LIMESTONE       | 10.68      |   | 13.01         |
| GREY          | SANDSTONE       | 0.37       |   | 10.68         |
|               | GRAVEL          | 0.00       |   | 0.37          |

Lot: <null>

Well ID: 1535203

Con:

Borehole ID: 11172955

Township: GLOUCESTER

Completion Date: 10/27/2004

County: OTTAWA-CARLETON

Received Date: 11/26/2004

Street: 3500 RIDEAU ROAD

Tag: A018916

City: GLOUCESTER

Audit No: Z19099

Site:

Contractor License: 1119

Elevation: 90.37 *masl.*

UTM: 18 E 456298 N 5016953 Long/Lat: -75.557 , 45.305

### DETAILS

Primary Use: Domestic      Secondary Use: Domestic      Final Status: Water Supply

Well Depth: 42.7 m      Depth to Bedrock: 1.2 m      Static Level: 14. m      Well Type: Bedrock

Pump Rate: 75.71 LPM      Boring Method: Air Percussion

#### CASING DETAILS

#### DEPTH IN METERS



**Material**                      **Diameter (cm)**                      **Top**      -      **Bottom**

| FORMATION DETAILS |                 | DEPTH IN METERS |               |
|-------------------|-----------------|-----------------|---------------|
| <u>Colour</u>     | <u>Material</u> | <u>Top</u>      | <u>Bottom</u> |
| GREY              | FINE SAND       | 0.00            | 0.27          |
| GREY              | SAND            | 1.43            | 1.83          |
| BROWN             | TILL            | 1.83            | 2.32          |
| BROWN             | FILL            | 0.27            | 1.43          |

|                   |                               |                            |                  |
|-------------------|-------------------------------|----------------------------|------------------|
| <b>Lot:</b>       | LOT 26                        | <b>Well ID:</b>            | 7115790          |
| <b>Con:</b>       | CON 6 FROM RIDEAU RIVER       | <b>Borehole ID:</b>        | 1002782572       |
| <b>Township:</b>  | GLOUCESTER                    | <b>Completion Date:</b>    | 7/15/2008        |
| <b>County:</b>    | OTTAWA-CARLETON               | <b>Received Date:</b>      | 11/26/2008       |
| <b>Street:</b>    | HAWTHORNE ROAD AT RIDEAU ROAD | <b>Tag:</b>                | A074584          |
| <b>City:</b>      | Ottawa                        | <b>Audit No:</b>           | M02897           |
| <b>Site:</b>      |                               | <b>Contractor License:</b> | 1844             |
| <b>Elevation:</b> | 85.10 <i>masl.</i>            |                            |                  |
| <b>UTM:</b>       | 18 E 456687 N 5017036         | <b>Long/Lat:</b>           | -75.552 , 45.305 |

**DETAILS**

**Primary Use:** Monitoring      **Secondary Use:** Monitoring      **Final Status:** Test Hole

**Well Depth:** 0 m      **Depth to Bedrock:** 0 m      **Static Level:** 3 m      **Well Type:**

**Pump Rate:**                      **Boring Method:**

**CASING DETAILS**    **DEPTH IN METERS**

H.S.A.

**Material**                      **Diameter (cm)**                      **Top**      -      **Bottom**

| FORMATION DETAILS |                 | DEPTH IN METERS |               |
|-------------------|-----------------|-----------------|---------------|
| <u>Colour</u>     | <u>Material</u> | <u>Top</u>      | <u>Bottom</u> |
| BROWN             | TILL            | 1.83            | 2.32          |
| BROWN             | FILL            | 0.27            | 1.43          |
| GREY              | SAND            | 1.43            | 1.83          |

GREY | FINE SAND | 0.00 0.27

**Lot:** LOT 26 **Well ID:** 1502342  
**Con:** CON 6 FROM RIDEAU RIVER **Borehole ID:** 10024385  
**Township:** GLOUCESTER **Completion Date:** 11/30/1950  
**County:** OTTAWA-CARLETON **Received Date:** 12/6/1951  
**Street:** **Tag:**  
**City:** **Audit No:**  
**Site:** **Contractor License:** 3504  
**Elevation:** 87.74 *masl.*  
**UTM:** 18 E 456431 N 5017092 **Long/Lat:** -75.556 , 45.306

**DETAILS**

**Primary Use:** Livestock **Secondary Use:** Livestock **Final Status:** Water Supply  
**Well Depth:** 17.4 m **Depth to Bedrock:** 8.2 m **Static Level:** 4 m **Well Type:** Bedrock  
**Pump Rate:** 1 GPM **Boring Method:** Cable Tool

**CASING DETAILS**

**DEPTH IN METERS**

| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u> | - | <u>Bottom</u> |
|-----------------|----------------------|------------|---|---------------|
| STEEL           | 12.70                |            |   | 8.23          |
| OPEN HOLE       | 12.70                |            |   | 17.37         |

**FORMATION DETAILS**

**DEPTH IN METERS**

| <u>Colour</u> | <u>Material</u> | <u>Top</u> | - | <u>Bottom</u> |
|---------------|-----------------|------------|---|---------------|
|               | PREV. DRILLED   | 0.00       |   | 8.23          |
|               | SANDSTONE       | 8.23       |   | 17.37         |

**Lot:** LOT 26 **Well ID:** 7115790  
**Con:** CON 6 FROM RIDEAU RIVER **Borehole ID:** 1002782563  
**Township:** GLOUCESTER **Completion Date:** 7/14/2008  
**County:** OTTAWA-CARLETON **Received Date:** 11/26/2008  
**Street:** HAWTHORNE ROAD AT RIDEAU ROAD **Tag:** A074584  
**City:** Ottawa **Audit No:** M02897  
**Site:** **Contractor License:** 1844  
**Elevation:** 84.01 *masl.*  
**UTM:** 18 E 456622 N 5017219 **Long/Lat:** -75.553 , 45.307

**DETAILS**

**Primary Use:** Monitoring      **Secondary Use:** Monitoring      **Final Status:** Test Hole  
**Well Depth:** 0 m      **Depth to Bedrock:** 0 m      **Static Level:** 3.6 m      **Well Type:**  
**Pump Rate:**      **Boring Method:**  
H.S.A.

CASING DETAILS

DEPTH IN METERS

**Material**      **Diameter (cm)**      **Top**      -      **Bottom**

**FORMATION DETAILS**

DEPTH IN METERS

| <b>Colour</b> | <b>Material</b> | <b>Top</b> | - | <b>Bottom</b> |
|---------------|-----------------|------------|---|---------------|
| GREY          | FINE SAND       | 0.00       |   | 0.27          |
| BROWN         | TILL            | 1.83       |   | 2.32          |
| BROWN         | FILL            | 0.27       |   | 1.43          |
| GREY          | SAND            | 1.43       |   | 1.83          |

**Lot:** LOT 25      **Well ID:** 7115790  
**Con:** CON 6 FROM RIDEAU RIVER      **Borehole ID:** 1002782590  
**Township:** GLOUCESTER      **Completion Date:** 7/15/2008  
**County:** OTTAWA-CARLETON      **Received Date:** 11/26/2008  
**Street:** HAWTHORNE ROAD AT RIDEAU ROAD      **Tag:** A074584  
**City:** Ottawa      **Audit No:** M02897  
**Site:**      **Contractor License:** 1844  
**Elevation:** 84.01 *masl.*  
**UTM:** 18 E 456206 N 5017303      **Long/Lat:** -75.559 , 45.308

**DETAILS**

**Primary Use:** Monitoring      **Secondary Use:** Monitoring      **Final Status:** Test Hole  
**Well Depth:** 0 m      **Depth to Bedrock:** 0 m      **Static Level:** 1.6 m      **Well Type:**  
**Pump Rate:**      **Boring Method:**

CASING DETAILS

DEPTH IN METERS

H.S.A.

| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u> | - | <u>Bottom</u> |
|-----------------|----------------------|------------|---|---------------|
| OPEN HOLE       | 15.24                |            |   | 30.48         |
| STEEL           | 15.24                |            |   | 11.89         |

| FORMATION DETAILS |                 | DEPTH IN METERS |   |               |
|-------------------|-----------------|-----------------|---|---------------|
| <u>Colour</u>     | <u>Material</u> | <u>Top</u>      | - | <u>Bottom</u> |
| GREY              | SANDSTONE       | 8.53            |   | 30.48         |
| GREY              | HARDPAN         | 1.52            |   | 8.53          |
| BROWN             | SAND            | 0.00            |   | 1.52          |

**Lot:** LOT 26 **Well ID:** 1527383  
**Con:** CON 6 FROM RIDEAU RIVER **Borehole ID:** 10049033  
**Township:** GLOUCESTER **Completion Date:** 8/16/1993  
**County:** OTTAWA-CARLETON **Received Date:** 9/21/1993  
**Street:** **Tag:**  
**City:** **Audit No:** 135946  
**Site:** **Contractor License:** 1558  
**Elevation:** 82.18 *masl.*  
**UTM:** 18 E 457162 N 5017453 **Long/Lat:** -75.546 , 45.309

## DETAILS

**Primary Use:** Domestic **Secondary Use:** Domestic **Final Status:** Water Supply  
**Well Depth:** 30.5 m **Depth to Bedrock:** 8.5 m **Static Level:** 2.1 m **Well Type:** Bedrock  
**Pump Rate:** 20 GPM **Boring Method:** Air Percussion

| CASING DETAILS  |                      | DEPTH IN METERS |   |               |
|-----------------|----------------------|-----------------|---|---------------|
| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u>      | - | <u>Bottom</u> |
| STEEL           | 15.24                |                 |   | 11.89         |
| OPEN HOLE       | 15.24                |                 |   | 30.48         |

| FORMATION DETAILS |                 | DEPTH IN METERS |   |               |
|-------------------|-----------------|-----------------|---|---------------|
| <u>Colour</u>     | <u>Material</u> | <u>Top</u>      | - | <u>Bottom</u> |
| BROWN             | SAND            | 0.00            |   | 1.52          |

|      |           |      |       |
|------|-----------|------|-------|
| GREY | HARDPAN   | 1.52 | 8.53  |
| GREY | SANDSTONE | 8.53 | 30.48 |

**Lot:** LOT 26 **Well ID:** 1527048  
**Con:** CON 6 FROM RIDEAU RIVER **Borehole ID:** 10048727  
**Township:** GLOUCESTER **Completion Date:** 4/19/1993  
**County:** OTTAWA-CARLETON **Received Date:** 5/6/1993  
**Street:** **Tag:**  
**City:** **Audit No:** 130025  
**Site:** **Contractor License:** 1558  
**Elevation:** 82.18 *masl.*  
**UTM:** 18 E 457162 N 5017453 **Long/Lat:** -75.546 , 45.309

### DETAILS

**Primary Use:** Domestic **Secondary Use:** Domestic **Final Status:** Water Supply  
**Well Depth:** 41.1 m **Depth to Bedrock:** 0 m **Static Level:** 9.4 m **Well Type:** Bedrock  
**Pump Rate:** 15 GPM **Boring Method:** Air Percussion

#### CASING DETAILS

| <u>Material</u> | <u>Diameter (cm)</u> | <u>DEPTH IN METERS</u> |               |
|-----------------|----------------------|------------------------|---------------|
|                 |                      | <u>Top</u>             | <u>Bottom</u> |
| OPEN HOLE       | 15.24                |                        | 22.86         |
| STEEL           | 15.24                |                        | 9.45          |
| OPEN HOLE       | 15.24                |                        | 41.15         |

#### FORMATION DETAILS

| <u>Colour</u> | <u>Material</u> | <u>DEPTH IN METERS</u> |               |
|---------------|-----------------|------------------------|---------------|
|               |                 | <u>Top</u>             | <u>Bottom</u> |
| WHITE         | SANDSTONE       | 10.06                  | 41.15         |
| GREY          | HARDPAN         | 2.74                   | 4.57          |
| BROWN         | CLAY            | 0.00                   | 2.74          |
| GREY          | LIMESTONE       | 4.57                   | 10.06         |

**Lot:** LOT 26 **Well ID:** 1527384  
**Con:** CON 6 FROM RIDEAU RIVER **Borehole ID:** 10049034  
**Township:** GLOUCESTER **Completion Date:** 8/16/1993  
**County:** OTTAWA-CARLETON **Received Date:** 9/21/1993  
**Street:** **Tag:**  
**City:** **Audit No:** 135944  
**Site:** **Contractor License:** 1558

Elevation: 82.18 *masl.*

UTM: 18 E 457162 N 5017453 Long/Lat: -75.546 , 45.309

## DETAILS

Primary Use: Domestic

Secondary Use: Domestic

Final Status: Water Supply

Well Depth: 30.5 m

Depth to Bedrock: 0 m

Static Level: 6.7 m

Well Type: Bedrock

Pump Rate: 15 GPM

Boring Method: Air Percussion

### CASING DETAILS

| <u>Material</u> | <u>Diameter (cm)</u> | <u>Top</u> | - | <u>Bottom</u> |
|-----------------|----------------------|------------|---|---------------|
| STEEL           | 15.24                |            |   | 6.71          |
| OPEN HOLE       | 15.24                |            |   | 30.48         |

### DEPTH IN METERS

### FORMATION DETAILS

| <u>Colour</u> | <u>Material</u> | <u>Top</u> | - | <u>Bottom</u> |
|---------------|-----------------|------------|---|---------------|
| GREY          | SANDSTONE       | 0.00       |   | 30.48         |

### DEPTH IN METERS

1. PRINT ONLY IN SPACES PROVIDED

2. CHECK  CORRECT BOX WHERE APPLICABLE

11

1527383

MUNICIP 15002

CON. CON.

106

COUNTY OR DISTRICT: [redacted] TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: **Windsor** CON. BLOCK, TRACT, SURVEY ETC: **6** LOT: **26**

DATE COMPLETED: DAY **16** MO **8** YR **93**

Box 4208 stn. "E" Ottawa, Ontario K1S 5B2

**LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)**

| GENERAL COLOUR | MOST COMMON MATERIAL | OTHER MATERIALS | GENERAL DESCRIPTION | DEPTH - FEET |     |
|----------------|----------------------|-----------------|---------------------|--------------|-----|
|                |                      |                 |                     | FROM         | TO  |
| Brown          | Sand                 | Stone           |                     | 0            | 5   |
| Gray           | Hardpan              | Boulders        |                     | 5            | 28  |
| Gray           | Sandstone            |                 | Hard                | 28           | 100 |

31

32

**41 WATER RECORD**

| WATER FOUND AT - FEET | KIND OF WATER   |
|-----------------------|---|
| 58                    | 1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR<br>2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERALS<br>6 <input type="checkbox"/> GAS |
| 88                    | 1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR<br>2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERALS<br>6 <input type="checkbox"/> GAS |
| 20-23                 | <b>NOT TESTED</b>   |
| 25-28                 | 1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR<br>2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERALS<br>6 <input type="checkbox"/> GAS |
| 30-33                 | 1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR<br>2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERALS<br>6 <input type="checkbox"/> GAS |

**51 CASING & OPEN HOLE RECORD**

| INSIDE DIAM. INCHES | MATERIAL   | WALL THICKNESS INCHES | DEPTH - FEET |     |
|---------------------|--|-----------------------|--------------|-----|
|                     |  |                       | FROM         | TO  |
| 6 1/4               | 1 <input checked="" type="checkbox"/> STEEL<br>2 <input checked="" type="checkbox"/> GALVANIZED<br>3 <input type="checkbox"/> CONCRETE<br>4 <input type="checkbox"/> OPEN HOLE<br>5 <input type="checkbox"/> PLASTIC | .188                  | 0            | 39  |
| 5 15/16             | 1 <input type="checkbox"/> STEEL<br>2 <input type="checkbox"/> GALVANIZED<br>3 <input type="checkbox"/> CONCRETE<br>4 <input type="checkbox"/> OPEN HOLE<br>5 <input type="checkbox"/> PLASTIC                       |                       | 39           | 100 |

**SCREEN**

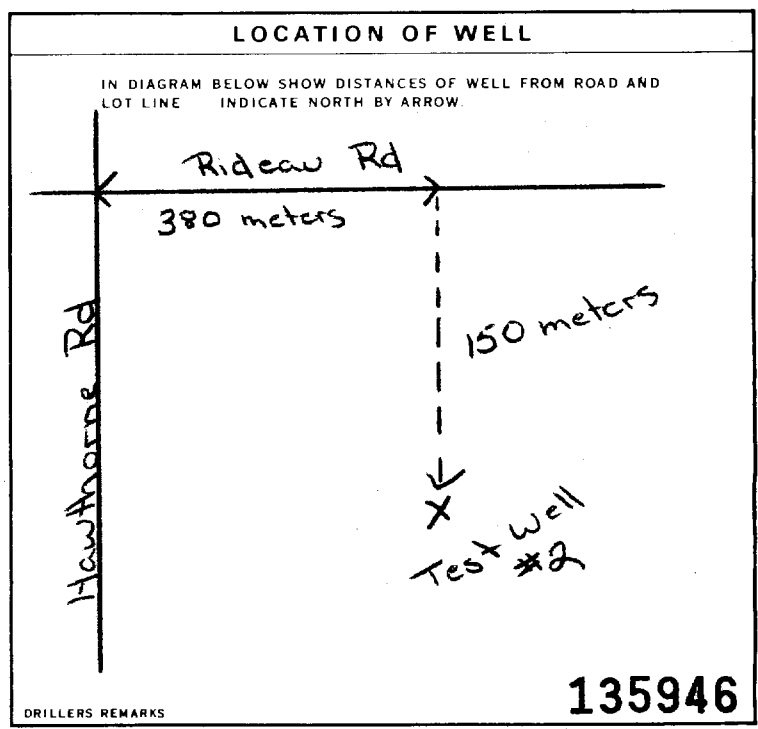
| SIZE (S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET |
|--------------------------------|-----------------|-------------|
|                                |                 |             |

**61 PLUGGING & SEALING RECORD**

| DEPTH SET AT - FEET | MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC) |
|---------------------|--|
| 37.5                | Cement - Grouted                                 |

**71 PUMPING TEST**

| PUMPING TEST METHOD  | PUMPING RATE               | DURATION OF PUMPING  |
|--|----------------------------|--|
| 1 <input checked="" type="checkbox"/> PUMP 2 <input type="checkbox"/> BAILER | 20 GPM                     | 1 15-18 HOURS  |
| STATIC LEVEL   | WATER LEVEL END OF PUMPING | WATER LEVELS DURING  |
| 7'6" FEET  | 14'6" FEET                 | 15 MINUTES: 13'11" FEET<br>30 MINUTES: 14 FEET<br>45 MINUTES: 14'4" FEET<br>60 MINUTES: 14'6" FEET |
| IF FLOWING GIVE RATE   | PUMP INTAKE SET AT         | WATER AT END OF TEST   |
|  | 50 GPM                     | 1 <input type="checkbox"/> CLEAR 2 <input checked="" type="checkbox"/> CLOUDY                      |
| RECOMMENDED PUMP TYPE  | RECOMMENDED PUMP SETTING   | RECOMMENDED PUMPING RATE   |
| <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP    | 50 FEET                    | 5 GPM  |



**FINAL STATUS OF WELL**

|  |   |
|--|---|
| 1 <input checked="" type="checkbox"/> WATER SUPPLY | 5 <input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY |
| 2 <input type="checkbox"/> OBSERVATION WELL        | 6 <input type="checkbox"/> ABANDONED POOR QUALITY         |
| 3 <input type="checkbox"/> TEST HOLE               | 7 <input type="checkbox"/> UNFINISHED                     |
| 4 <input type="checkbox"/> RECHARGE WELL           | <input type="checkbox"/> DEWATERING                       |

**WATER USE**

|  |  |
|--|--|
| 1 <input checked="" type="checkbox"/> DOMESTIC | 5 <input type="checkbox"/> COMMERCIAL                  |
| 2 <input type="checkbox"/> STOCK               | 6 <input type="checkbox"/> MUNICIPAL                   |
| 3 <input type="checkbox"/> IRRIGATION          | 7 <input type="checkbox"/> PUBLIC SUPPLY               |
| 4 <input type="checkbox"/> INDUSTRIAL          | 8 <input type="checkbox"/> COOLING OR AIR CONDITIONING |
| <input type="checkbox"/> OTHER                 | 9 <input type="checkbox"/> NOT USED                    |

**METHOD OF CONSTRUCTION**

|  |   |
|--|---|
| 1 <input type="checkbox"/> CABLE TOOL                | 6 <input type="checkbox"/> BORING                               |
| 2 <input type="checkbox"/> ROTARY (CONVENTIONAL)     | 7 <input type="checkbox"/> DIAMOND                              |
| 3 <input type="checkbox"/> ROTARY (REVERSE)          | 8 <input type="checkbox"/> JETTING                              |
| 4 <input type="checkbox"/> ROTARY (AIR)              | 9 <input type="checkbox"/> DRIVING                              |
| 5 <input checked="" type="checkbox"/> AIR PERCUSSION | <input type="checkbox"/> DIGGING <input type="checkbox"/> OTHER |

**CONTRACTOR**

NAME OF WELL CONTRACTOR: **Capital Water Supply Ltd.** WELL CONTRACTOR'S LICENCE NUMBER: **1558**

ADDRESS: **Box 490 Stittsville, Ontario K2S 1A6**

NAME OF WELL TECHNICIAN: **S. Miller/T. Harrison** WELL TECHNICIAN'S LICENCE NUMBER: **T0097/T2251**

SIGNATURE OF TECHNICIAN/CONTRACTOR: [Signature] SUBMISSION DATE: DAY **18** MO **8** YR **93**

**OFFICE USE ONLY**

DATA SOURCE: **1558** CONTRACTOR: **1558** DATE RECEIVED: **SEP 21 1993**

DATE OF INSPECTION: \_\_\_\_\_ INSPECTOR: \_\_\_\_\_

REMARKS: \_\_\_\_\_

# **Appendix C**

## **Nitrate Loading Calculations**



## Appendix C

### Mass Balance Calculation - Nitrate Loading using Average Flows

Calculations based upon Septic Effluent Area, Figure 9.

Equations                      Eq'n #

$$V_A = A_D \times k \quad (1)$$

$$V_T = V_A + V_S \quad (2)$$

$$C_{PB} = (C_S \times V_S) / V_T \quad (3)$$

Where:

$V_A$  = annual dilution volume [ $m^3$ ]

$A_D$  = dilution area [ $m^2$ ]

$V_T$  = total volume of water [ $m^3$ ]

$V_S$  = annual sewage volume [ $m^3$ ]

$C_{PB}$  = concentration at property boundary [mg/L]

$C_S$  = concentration in sewage [mg/L]

$k$  = 0.25 m (Precipitation rate - can be adjusted. Assumed rate from MECP document)

|            |              |   |
|------------|--------------|---|
| $A_D$ =    | 17035 $m^2$  | Infiltration area based upon Figure 9               |
| $V_A$ =    | 4258.8 $m^3$ |   |
| $V_S$ =    | 4672 $m^3$   | Loading of 12,800 L/day provided (1 $m^3$ = 1000 L) |
| $V_T$ =    | 8930.8 $m^3$ |   |
| $C_S$ =    | 40 mg/L      | Assumed value                                       |
| $C_{PB}$ = | 20.9 mg/L    | Nitrate concentration expected at property boundary |

Therefore, if 40 mg/L of nitrate is in the effluent, 20.9 mg/L will be at the property boundary.

$$C_S = (C_{PB} \times V_T) / V_S \quad (4)$$

$C_{PB}$  = 2.5 mg/L                      As per MECP guidance manual Chapter 22

$C_S$  = 4.8 mg/L                      Nitrate concentration into leaching bed to meet 2.5 mg/L downgradient at property boundary

Tertiary treatment would be required to reduce Nitrate to 4.8 mg/L or lower in order to meet 2.5 mg/L at the property boundary.

**Note:** MECP Design Guidelines for Sewage Works (2008) used in above calculations (Chapter 22)



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