TRAFALGAR ENGINEERING

# FUNCTIONAL SERVICING REPORT

Water, Sanitary, and Stormwater Management

## OPA/ZBA/DRAFT PLAN OF SUBDIVISION

TOWN OF OAKVILLE

OUR FILE: 1767

**PREPARED FOR 1816986 ONTARIO INC.**

**APRIL 6, 2026**

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## REVISION HISTORY

| DATE | REVISION | SUBMISSION |
|---|---|---|
| April 6, 2026 | 1 | Issued for Official Plan Amendment, Zoning Bylaw Amendment, and Draft Plan of Subdivision |

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# 1.0 INTRODUCTION

## 1.1 Scope of Functional Servicing Report

This report has been prepared by Trafalgar Engineering Ltd. on behalf of 1816986 Ontario Inc. ("Westerkirk") in support of Westerkirk's applications for Official Plan Amendment (OPA), Zoning Bylaw Amendment (ZBA), and Draft Plan of Subdivision for the lands municipally known as 340 Burnhamthorpe Road East and 3437 Trafalgar Road, hereafter referred to as the "subject lands".

The Town of Oakville prepared the North Oakville Creeks Sub-watershed Study (NOCSS) in 2006 in order to establish the future planned densities and determine ultimate servicing strategies. At the time, this area was proposed as "Trafalgar Road Urban Core" but did not anticipate the densities that are now being proposed within the subject lands. As a result, an Environmental Impact Report/ Functional Servicing Study (EIR/FSS) was undertaken by Urbantech Consulting to review the impacts of these higher densities and provide an updated servicing and stormwater management strategy. A draft EIR/FSS is currently under review by the Town and will ultimately provide the servicing framework for current and future development applications within the Trafalgar Road Urban Core. The subject lands are identified as "Westerkirk Trafalgar Inc." in the EIR/FSS. Refer to the Land Ownership Map (Figure 1.4) and EIR Subcatchment Area and FSS Study Area (Figure 1.3) in Appendix 'A' for further context.

Servicing information provided in this report is based on information obtained from the EIR/FSS, the Town of Oakville and the Region of Halton. The relevant information has been provided within the appendices of this report to the extent possible for reference.

The information provided in this report is preliminary. Detailed engineering designs and drawings will need to be undertaken as part of the subdivision development and site plan designs.

## 1.2 Previous Studies, Reports and Documents

The following documents have been reviewed and used to guide the findings of this report:

- Draft JC9 EIR/FSS Drawings and Figures, Urbantech Consulting, December 2025
- Trafalgar Sanitary Servicing Memo, Urbantech Consulting, May 2025
- Draft Comprehensive Water and Wastewater Servicing Strategy, Urbantech Consulting, April 2025
- Draft Overall Stormwater Management Strategy, Urbantech Consulting, April 2025
- North Oakville Creeks Sub-watershed Study, Town of Oakville, August 2006 (NOCSS)

- North Oakville Creeks Sub-watershed Study Addendum, Town of Oakville, September 2007 (NOCSS Amendment)
- North Oakville East Secondary Plan – Area Servicing Plan, MMM Group, April 2011 (ASP)
- North Oakville Environmental Implementation Report and Functional Servicing Study Terms of Reference, Town of Oakville, August 2, 2007 (Terms of Reference)
- Stormwater Management Planning and Guidelines Manual, Ministry of Environment, March 2003 (MECP Manual)
- Development Engineering Procedures & Guidelines Manual, Town of Oakville, 2016 (Town's Manual)
- Water and Wastewater Linear Design Manual, Regional Municipality of Halton, April 2015 (Region's Manual)

### 1.3 Site Location and Description

The subject lands are approximately 20.2 ha and are bounded by Burnhamthorpe Road East to the north, North Oakville park lands to the east, future development to the south, and Trafalgar Road to the west. The subject lands are located within the JC9 sub-watershed as defined in the NOCSS and confirmed through the EIR/FSS. Both Burnhamthorpe Road East and Trafalgar Road are slated to be reconstructed by the Town of Oakville and Region of Halton respectively. Detailed designs are underway and construction of both roads is expected to take place over the next several years.

The majority of the subject lands is currently underutilized farmland. There is a two-storey abandoned farmhouse on the southwest of the subject lands, which is a listed property in the Oakville Heritage Property Register. In addition, the Vic Hadfield Golf & Learning Centre, a small golf facility, is located on the northwest corner of the subject lands. The lands generally slope from north to south. A copy of the Topographic Survey completed on January 30th, 2025 by J.D. Barnes Ltd. is provided in Appendix 'A'.

The surrounding context is largely characterized by vacant farmlands and some new residential subdivisions with a mix of low, mid and high-rise buildings west of the subject lands along Burnhamthorpe Road and south of the subject lands along Trafalgar Road towards Dundas Street.

### 1.4 Proposed Development

Appendix 'A' contains the proposed Draft Plan of Subdivision showing how the proponent proposes to subdivide the property.

The proposal will develop the subject lands into a mixed-use, transit-supportive development that achieves a range of city building and urban design objectives.

The proposed development includes:

- 27 mixed-use and residential buildings across 12 development blocks;
- A new street network, inclusive of public streets (Streets A, B, C, Main Street, Settlers Road, and private access lanes);
- Access to the subject lands from Trafalgar Road and Burnhamthorpe Road West;
- A future elementary school block;
- 0.5 hectares of parks and open space; and,
- Public realm improvements throughout the proposed development.

The proposed development is comprised of 14,475 $m^2$ of commercial space and 6,420 residential units (4,142 1BD & 1BD+D, 1,628 2BD & 2BD+D, and 650 3BD). There will be approximately 65% one-bedroom or one-bedroom plus den, 25% two-bedroom or two-bedroom plus den, and 10% three-bedroom in a range of mid- and high-rise residential apartment buildings.

The proposed development will be anchored by public realm features, including Neighbourhood Park south of Street B, between Streets A and C, Green Gate Parkette at the end of Main Street, and The Square at the heart of the property along Main Street. Neighbourhood Park and Green Gate Parkette will be conveyed to the Town as public parks, while The Square will be maintained as a Privately-Owned Publicly Accessible Space (POPS). The proposed development will also deliver 2.3 ha of landscaped open space across the subject lands that will animate the public realm.

The proposed development will be a pedestrian-focused neighbourhood with numerous pedestrian connections and cycling routes. Access to loading and underground parking will be from the internal street network to mitigate their impact on the public realm. A copy of the Architectural Concept Plan is included in Appendix ‘A’ for reference.

The development statistics are as follows:

| Lots/Blocks | Description | Area (Ha) |
|---|---|---|
| Block 1 to 12 | High Density Residential/Mixed-Use | 14.794 Ha |
| Block 13 | Institutional | 0.731 Ha |
| Block 14, 15 | Park Lands (Public) | 0.526 Ha |
| Block 16 | R.O.W. Widening (Trafalgar Rd) | 0.218 Ha |
| Block 17 | R.O.W. Widening (Burnhamthorpe Rd) | 0.067 Ha |
| Block 18, 19, 20 | 0.3m Reserves | 0.002 Ha |
| Main Street, Street A, Street B, Street C, Settlers Road | Public Roads | 3.869 Ha |
| | **TOTAL** | **20.206 Ha** |

The following sections will demonstrate that there are or will be adequate municipal infrastructure to support the above development scenario.

## 2.0 MUNICIPAL WATER

The following sections identify the existing and proposed water infrastructure and demonstrates how the proposed development can be serviced in keeping with the recommendations outlined the EIR/FSS.

### 2.1 Water Pressure Zones

The subject lands are located within the Zone 4 district of the Region of Halton's water distribution system. It is noted that Zone 4 is currently undergoing a zone realignment. Currently, the subject lands are within subzone O4, with an existing TWL of 236 m. The expected pressure is approximately 72 to 77 psi. The Region of Halton has planned both interim and future adjustments to the zone boundaries. It is noted that there will be no impact to the TWL within the subject lands in the interim condition. In the future, the subject lands will transition to a TWL of 223.50m, with an expected pressure of approximately 54 to 59 psi. Refer to Appendix 'B' for existing, interim, and future water zone boundaries as provided by the Region.

### 2.2 Water Infrastructure

#### 2.2.1 Existing Water Infrastructure

Based on record drawings from the Region of Halton, there is an existing 1200 mm diameter concrete pressure pipe (CPP) trunk watermain located along Burnhamthorpe Road West west of Trafalgar Road and along Trafalgar Road north of Burnhamthorpe Road East. There is also an existing 750 mm diameter CPP watermain (Zone 4) on Trafalgar Road. There are existing

hydrants on both of the above mains. There are no local watermains along the subject lands' respective frontages.

#### 2.2.2 Proposed Water Infrastructure

The Region's ASP identifies the need for a 400 mm diameter watermain on Burnhamthorpe Road, and 300 mm diameter watermains on the collector roads within the subject lands. Refer to the Ultimate Water Supply & Distribution System Plan in Appendix 'B' for further detail.

In keeping with the ASP, the EIR/FSS study recommends a 400 mm diameter watermain on Burnhamthorpe Road, east of Trafalgar Road. Refer to the Water Servicing Plan prepared by Urbantech in Appendix 'B' for further detail. It is expected that the 400 mm diameter watermain will be constructed in conjunction with the reconstruction of Burnhamthorpe Road by the Town of Oakville.

The EIR/FSS also identifies the network of local watermains envisioned for development lands within the study area. Within the subject lands, sizing for proposed local mains along the proposed collector roads (Settlers Road and Street C) is 300 mm in diameter, as per the ASP. Local watermains are depicted beyond the 300 mm diameter mains on local roads but not sized.

The proposed 300 mm diameter watermains within the subject lands will connect to the existing 750 mm diameter watermain on Trafalgar Road and the future 400 mm diameter watermain on Burnhamthorpe Road to create a looped system. The local watermains within the subject lands will include fire hydrants spaced to suit fire flow demands based on the proposed land uses. Refer to the Water Servicing Plans in Appendix 'F' for further detail.

Approval of the local watermains will be sought as part of the detailed engineering submissions for the subdivision.

## 3.0 MUNICIPAL WASTEWATER

The following sections identify the existing and proposed wastewater infrastructure and demonstrates how the proposed development can be serviced in keeping with the recommendations outlined the EIR/FSS.

### 3.1 Wastewater Infrastructure

#### 3.1.1 Existing Wastewater Infrastructure

Currently, there are no wastewater mains along the subject lands' frontage on Trafalgar Road or Burnhamthorpe Road. As mentioned, both roads are slated to be reconstructed in the near future.

### 3.1.2 Proposed Wastewater Infrastructure

The Region's ASP indicates that the JC9 lands will drain to the sub-trunk on Dundas Street via the Trafalgar Road Sub-Trunk sewer, which will be constructed as part of the Trafalgar Road reconstruction. Refer to the Ultimate Wastewater Drainage Plan prepared by MMM Group in Appendix 'C' for context.

Sanitary drainage for the subject lands will follow the concepts established in the EIR/FSS, which comply with the Region's ASP. The NOCSS included the subject lands in the tributary of the Trafalgar Road sewer as Trafalgar Road Urban Core Lands. As established through the JC9 EIR/FSS, the Trafalgar Road sanitary sewer will be sized to accommodate the increased population density in this area. The sanitary sewers for the subject lands have been designed to convey the expected peak flows from the subdivision. The sanitary sewer design sheet in Appendix 'C' demonstrates that the proposed sanitary sewers have sufficient capacity. The respective sanitary drainage boundaries can be seen on the Sanitary Drainage Area Plans in Appendix 'C'.

As mentioned in Section 1.3 of this report, the reconstruction of Trafalgar Road is being undertaken by the Region of Halton and will include the construction of a 750 mm diameter wastewater main (refer to Appendix 'E'). The subject lands are within the service area of the 750 mm diameter wastewater main. Through extensive coordination during the preparation of the EIR/FSS, the main's design accounts for the expected population densities proposed for the subject lands. This sewer will drain south and ultimately connect to the existing 750 mm diameter trunk sewer draining west on Dundas Street East. Refer to the Wastewater Drainage & Servicing Plan (Drawing 9.1) in Appendix 'C' for further detail.

Based on the Region's construction schedule for the reconstruction of Trafalgar Road, the main is expected to be operational in 2027/2028.

In keeping with the EIR/FSS, the proposed sanitary sewer will range in size from 200 mm to 450 mm in diameter and will connect to the proposed 750 mm diameter sanitary sewer on Trafalgar Road via Settlers Road. Copies of the Sanitary Servicing Plans are included in Appendix 'F' and should be read in conjunction with this report.

All proposed services must be in accordance with the Region of Halton's Linear Design Manual and standard drawings.

Approval of the sanitary sewer will be sought as part of the detailed engineering submissions for the subdivision.

## 4.0 STORM DRAINAGE

The following sections identify the existing and proposed stormwater infrastructure and demonstrates how the proposed development can be serviced in keeping with the recommendations outlined the EIR/FSS.

### 4.1 Existing Storm Drainage

The subject lands generally slope from north to south. There is no existing storm drainage infrastructure within the subject lands. Surface runoff is conveyed by ill-defined ditches and swales. There is an external drainage area on the west side of Trafalgar Road that traverses Trafalgar Road via twin 1390 by 970 mm culverts and is conveyed through the subject lands via the above-mentioned ditches and swales. The subject lands are located within the existing JC9 drainage boundary. The Pre-Development Drainage Plan (Drawing 7.1) from the EIR/FSS is provided in Appendix 'D' for reference.

### 4.2 Proposed Storm Drainage

The EIR/FSS has indicated the need for a Stormwater Management (SWM) Pond, referred to as SWM Pond 38, located in the eastern portion of the subcatchment, east of the subject lands. The proposed SWM Pond will discharge to the downstream tributary and Core 10 lands, and is designed to control the 100-year flows from the entire JC9 drainage boundary.

The subject lands are located entirely within the JC9 drainage boundary, as established through the EIR/FSS. Refer to the Storm Drainage & Servicing Plan (Drawing 7.8) in Appendix 'D' for further detail.

#### 4.2.1 External Drainage

As shown in the Storm Drainage Plan prepared by Urbantech in Appendix 'D', there are external lands within the JC9 drainage boundary that drain through the subject lands to SWM Pond 38. The drainage area is approximately 13.3 ha with an estimated 100-year flow of 4.566 $m^3/s$. The Region does not permit overland flow across Trafalgar Road, therefore the 100-year flows for this drainage area is captured and conveyed to the east side of Trafalgar Road via a 1200 by 1800 box section at the intersection of Trafalgar Road and Main Street.

#### 4.2.3 Minor System

A network of storm sewers (minor system) is required within the subject lands and more specifically within the municipal roads to capture and convey storm runoff from the development blocks and roads to SWM Pond 38. The Town of Oakville's design criteria requires that the minor

system be designed for the 5-year storm event; storm runoff in excess of the 5-year event is conveyed overland by the major system to the receiving facility. However, the subject lands' inherent grading constraints are such that continuous road profiles of 0.3% can only be achieved. In light of this, a "sawtoothing" design approach is proposed for the road profiles where required in conjunction with a minor system designed to capture and convey the 100-year storm event. The minor system consists of box sections ranging from 1200 by 2400 mm to 1500 by 3000 mm in size. Utilizing this approach, the road network's function is reduced to providing emergency overland flow relief, given that the minor system provides a level of protection equivalent to the 100-year storm event. Inlet (catchbasin) spacing and associated leads will be designed to capture the 100-year storm event.

The storm sewers will ultimately outlet to a headwall at the north end of the sediment forebay of SWM Pond 38. Refer to the Storm Servicing Plans in Appendix 'F' for the preliminary storm sewer layout. A preliminary inlet capture analysis has been undertaken to confirm adequate capture during the 100-year event and is provided in Appendix 'D', along with the Storm Drainage Area Plans and Storm Sewer Design Sheet.

#### 4.2.2 Major System

Since the storm sewer system and appurtenances are designed to convey the 100-year event, the road network (as mentioned above) is designed to provide emergency overland flow relief. Refer to the Grading Plans in Appendix 'F' for the proposed overland flow route.

## 5.0 STORMWATER MANAGEMENT

The stormwater management criteria for the development have been outlined in NOCSS and the EIR/FSS, as well as applicable SWM guidelines from the MECP.

### 5.1 Peak Flow Control

The proposed SWM Pond 38 located southeast of the subject lands will include an active storage component to provide quantity control (peak flow) for events up to and including the Regional storm. As per Drawing 7.8 of the EIR/FSS, the subject lands are accounted for at 100% impervious. No additional peak flow controls are required on the subject lands. Refer to Appendix 'D' for the SWM Pond 38 design drawing prepared by Urbantech.

### 5.2 Erosion Control

NOCSS has identified the need to complete an erosion threshold and erosion control analyses as part of the EIR/FSS. The erosion assessments for JC9 have been completed as part of the

underlying EIR/FSS prepared by Urbantech. SWM Pond 38 has been designed to meet downstream erosion criteria and no additional controls are required on the subject lands.

### 5.3 Quality Control

As per the NOCSS, the EIR/FSS states that water quality parameters for the subject lands are to provide Enhanced Level of water quality protection (80% TSS removal). Quality control for the subject lands is provided through the design of SWM Pond 38.

### 5.4 Infiltration/Water Balance

As identified through the EIR/FSS, LID techniques to minimize urban development impacts on the water balance are to be incorporated into the development design. As identified in the NOCSS, the soils in North Oakville have low permeability. The relatively low hydraulic conductivity of the native soils limits the use of infiltration methods; however, several other techniques can be explored to increase the potential for post-development infiltration and mitigate any potential impacts to Joshua Creek. These techniques include:

- Increased topsoil depths on residential lots of street boulevards
- Lot level LIDs
- Rain gardens within the road allowances

The techniques above will be implemented where possible within the development. Given that the development proposes extensive green space throughout, there are ample opportunities to implement LID techniques. Further information will be provided at detailed design in consultation with the landscape architect.

### 5.5 Groundwater

Based on the Hydrogeological Report, groundwater was observed at a depth of about 0.6 to 2.5 metres from the existing ground surface. Therefore, groundwater is expected at the depth of all underground parking structures and groundwater management will be required. Section 3.3 of the Hydrogeological Report provides the total expected long-term groundwater seepage plus infiltration for each development block. Groundwater management techniques will be considered at detailed design. The Geotechnical Report and Hydrogeological Report were undertaken for the subject lands by Grounded Engineering Inc. and can be found in Appendix ‘G’.

Further assessment will be completed as the design progresses to ensure infrastructure is sized appropriately (i.e. storm sewers, on-site storage) for groundwater quantity and quality.

## 6.0 MUNICIPAL ROADS

The municipal road allowance widths for the subject lands were established through coordination with the consultant team. The proposed pavement widths are based on having the deep services (water, sanitary, and storm) within the paved area of the road to facilitate unincumbered maintenance. Typical cross-sections are provided in Appendix 'F'. The cross-sections have been assessed by the Traffic Consultant to confirm the functional design is compatible with the subject lands' proposed land use.

## 7.0 GRADING

The grading of the subject lands has been designed to match boundary conditions, the existing and proposed Burnhamthorpe Road grades to the north, the proposed Trafalgar Road grading to the west, while maintaining a defined overland flow route to the stormwater management pond. As a result, the roads are generally sloped at 0.5% to 2.0% with some "sawtoothing". Grades have been set along the perimeter of the subdivision blocks and are based on the typical right-of-way cross-sections developed for the roads, provided in Appendix 'F'.

Detailed grading of the individual blocks will be completed as they progress through their separate site plan applications.

Copies of the Grading Plans and Plan-Profiles are provided in Appendix 'F' and should be read in conjunction with this report.

## 8.0 CONCLUSION

Our review of the background information as provided in this report confirms that adequate municipal services exist to support the proposed Official Plan/Rezoning Amendments and Draft Plan of Subdivision approvals being sought. The servicing and grading strategies proposed in the report align with those specified in the EIR/FSS.

This report and the information included in the report provide a framework from which more detailed designs can evolve as the project makes its way through the planning and detailed engineering approval process. We have consulted with other team consultants to ensure that the designs outlined in this report can be implemented accordingly.

**PREPARED BY TRAFALGAR ENGINEERING LTD.**




**Mary Fornasier, EIT**
Senior Designer

**P. Cifoni, P.Eng.**
Consulting Engineer

**APPENDIX ‘A’**

PART 1, PLAN 20R-18605
PIN 24930-0145 (LT)

LOT 11
PIN 24930-0146 (LT)

PART 2, PLAN 20R-18605

PART 1, PLAN 20R-22413
PIN 24930-0005 (LT)

PART 1, PLAN 20R-22413
PIN 24930-0005 (LT)

PLAN OF SURVEY

# PART OF LOT 12, CONCESSION 1 NORTH OF DUNDAS STREET

GEOGRAPHIC TOWNSHIP OF TRAFALGAR

## CITY OF OAKVILLE

REGIONAL MUNICIPALITY OF HALTON

J.D. BARNES LIMITED

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SCALE 1 : 500

10 0 10 20 30 metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 1451 mm IN WIDTH BY 917 mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:500

METRIC DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

## NOTES

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010.0).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999703.

FOR BEARING COMPARISONS, A ROTATION OF 00°48'00" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P2.

FOR BEARING COMPARISONS, A ROTATION OF 02°50'35" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P4.

## INTEGRATION DATA

OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17, NAD83 (CSRS) (2010.0).

COORDINATES TO AN URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.

| POINT ID | EASTING | NORTHING |
|---|---|---|
| ORP A | 602 046.43 | 4 817 296.75 |
| ORP B | 602 642.12 | 4 817 232.48 |

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

THE RESULTANT TIE BETWEEN ORP A AND ORP B IS 599.33 N83°50'30"E

## LOCAL BENCHMARK

CP LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF WORD POLE 5.13m WEST OF C/L OF ROAD.
ELEVATION=183.616m

DETAIL NOT TO SCALE

## TOPOGRAPHIC LEGEND

| | |
|---|---|
| BM | DENOTES BENCH MARK |
| CSP | DENOTES CORRUGATED STEEL PIPE |
| FG | DENOTES FENCE GATE |
| FP | DENOTES FENCE POST |
| HP | DENOTES HYDRO POLE |
| LS | DENOTES LIGHT STANDARD |
| MH | DENOTES MANHOLE |
| MW | DENOTES MONITORING WELL |
| PED | DENOTES TELEPHONE PEDESTAL |
| PVC | DENOTES POLYVINYL CHLORIDE PIPE |
| S | DENOTES SIGN |
| TL | DENOTES TRAFFIC SIGNAL |
| TSC | DENOTES TRAFFIC SIGNAL CONTROL |
| OHD | DENOTES OVERHEAD HYDRO CABLE |
| | DENOTES SHRUB |
| | DENOTES DECIDUOUS TREE DIA=DIAMETER OF TRUNK IN METRES |
| | DENOTES CONIFEROUS TREE DIA=DIAMETER OF TRUNK IN METRES |

## LEGEND

| | |
|---|---|
| ■ | DENOTES SURVEY MONUMENT FOUND |
| □ | DENOTES SURVEY MONUMENT SET |
| SIB | DENOTES STANDARD IRON BAR |
| IB | DENOTES IRON BAR |
| RIB | DENOTES ROUND IRON BAR |
| MEAS | DENOTES MEASURED |
| 626 | DENOTES H.D. SEWELL, O.L.S. |
| 760 | DENOTES K.A. MACNEILL, O.L.S. |
| 950 | DENOTES T.G. CUNNINGHAM O.L.S. |
| SV | DENOTES S.J. VANDERVEEN, O.L.S. |
| OU | DENOTES ORIGIN UNKNOWN |
| P1 | DENOTES PLAN 20R-11324 |
| P2 | DENOTES PLAN OF SURVEY BY T.G. CUNNINGHAM O.L.S. DATED NOVEMBER 3, 1966 (PROJECT 66-016M) |
| P3 | DENOTES PLAN 20R-22413 |
| P4 | DENOTES PLAN 20R-18605 |
| P5 | DENOTES PLAN 20R-9655 |

N=NORTH, E=EAST, S=SOUTH, W=WEST

ALL SET SSIB MONUMENTS WERE USED DUE TO LACK OF OVERBURDEN AND/OR PROXIMITY OF UNDERGROUND UTILITIES IN ACCORDANCE WITH SECTION 11 (4) OF O.REG. 525/91.

## SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, AND THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON JANUARY 30, 2025.

FEBRUARY 27, 2025
DATE

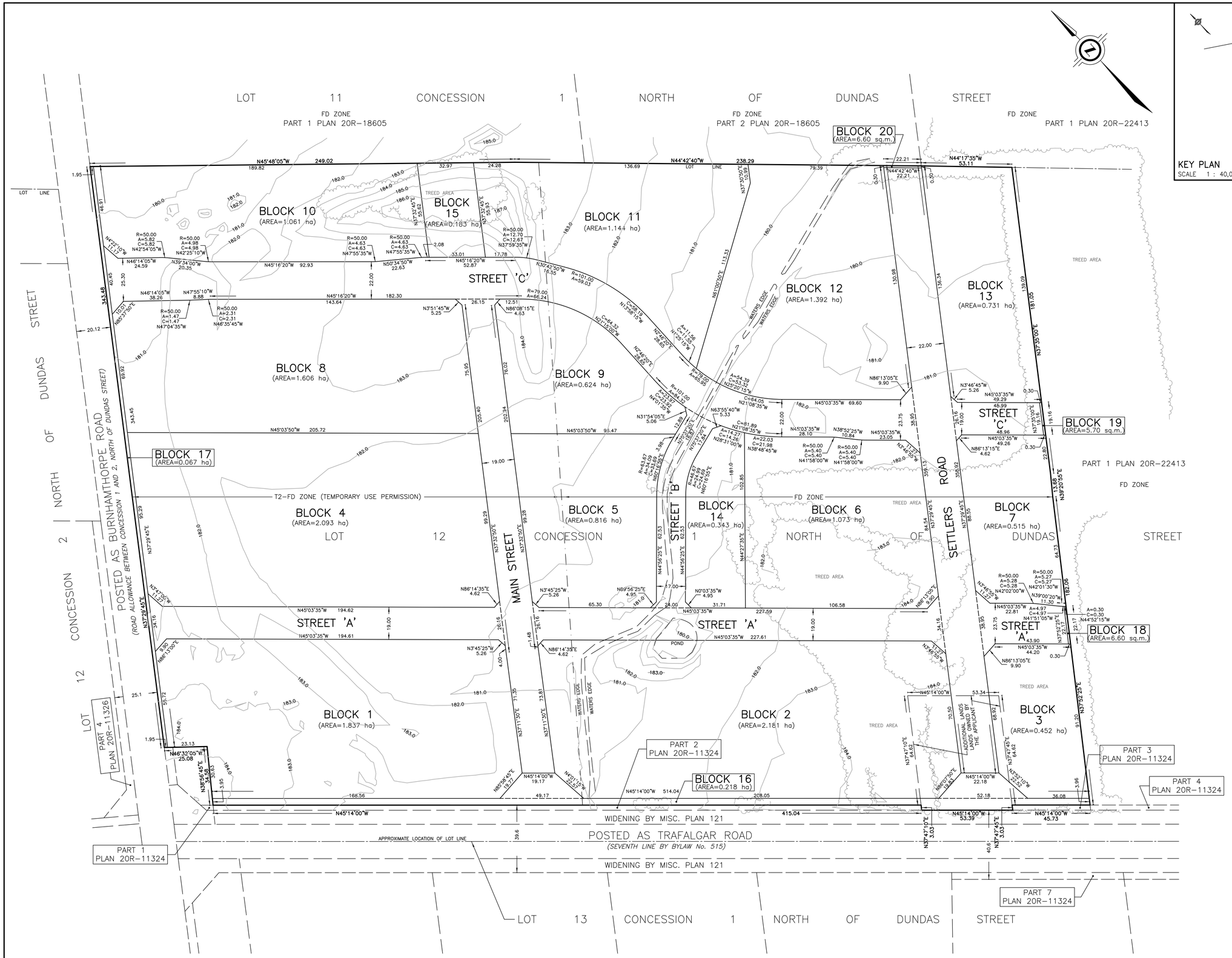
R.S. GUERRIERI
ONTARIO LAND SURVEYOR

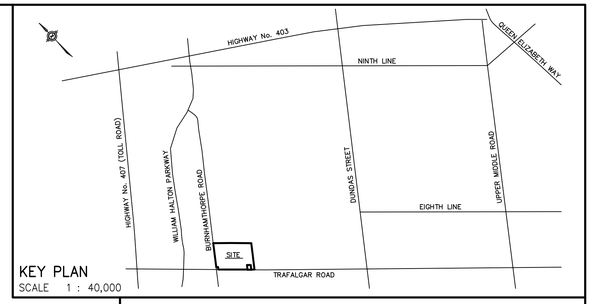
THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER V-94997

J.D. BARNES LIMITED SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
401 WHEELABRATOR WAY, SUITE A, MILTON, ON L9T 3C3
T: (905) 875-9955 F: (905) 875-9956 www.jdbarnes.com

| DRAWN BY: | CHECKED BY: | REFERENCE NO.: |
|---|---|---|
| TP | RSG | 24-30-276-00 |
| | | DATED: 03/13/2025 |

PLOT DATE: 3/13/2025 11:42 AM




KEY PLAN
SCALE 1 : 40,000

DRAFT PLAN OF SUBDIVISION OF
# PART OF LOT 12 CONCESSION 1 NORTH OF DUNDAS STREET
GEOGRAPHIC TOWNSHIP OF TRAFALGAR
# TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON

SCALE 1 : 1000
20 0 20 40 60 metres

J.D. BARNES LIMITED
© COPYRIGHT 2025

METRIC DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

## ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT

51 (17) (a) - (c) AS SHOWN ON THIS PLAN
(d) SEE 'SCHEDULE OF LAND USE' SECTION
(e) - (g) AS SHOWN ON THIS PLAN
(h) MUNICIPAL WATER SUPPLY
(i) SANDY LOAM
(j) AS SHOWN ON THIS PLAN
(k) MUNICIPAL STORM AND SANITARY SEWERS
(l) AS SHOWN ON THIS PLAN, IF ANY

## OWNER'S CERTIFICATE

WE HEREBY AUTHORIZE J.D. BARNES LIMITED, TO SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CORPORATION OF THE TOWN OF OAKVILLE FOR APPROVAL.

1816986 ONTARIO INC.

DATE

X
"I HAVE THE AUTHORITY TO BIND THE CORPORATION"

## SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DECEMBER 18, 2025
DATE

R.S. QUERUBIN
ONTARIO LAND SURVEYOR

SUBJECT PROPERTY - 340 BURNHAMTHORPE ROAD AND 3487 TRAFALGAR ROAD
CURRENT ZONING = T2-FD (TEMPORARY USE PERMISSION) AND FD (FUTURE DEVELOPMENT)
NOTE: ALL SURROUNDING PROPERTIES ARE ZONED FD (FUTURE DEVELOPMENT)
TOTAL AREA = 20.206 ha

## SCHEDULE OF PROPOSED LAND USE

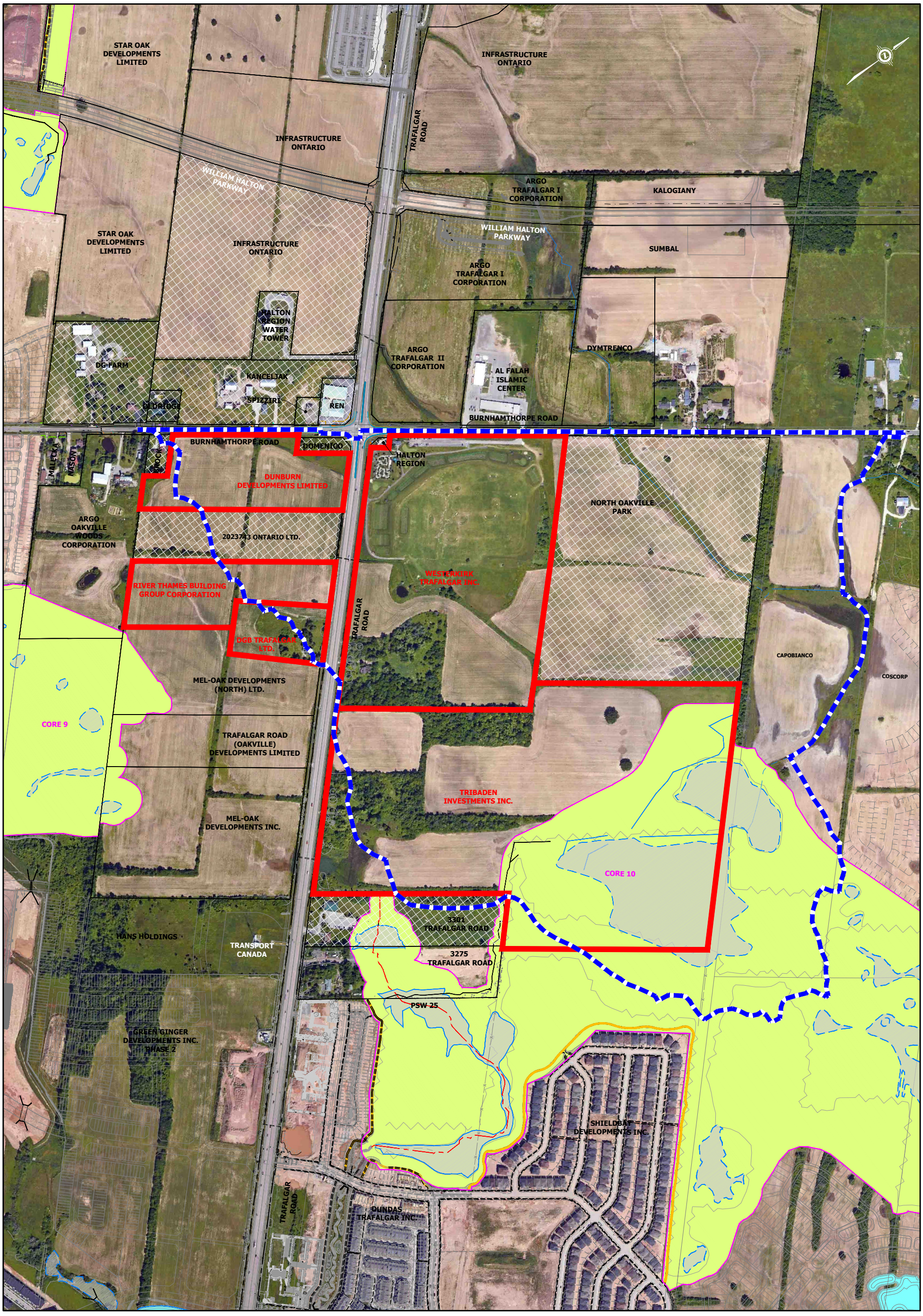
| PROPOSED LAND USE | BLOCK(S) | AREA (sq.m.) |
|---|---|---|
| HIGH DENSITY RESIDENTIAL | 1-12, INCLUSIVE | 147,940 |
| INSTITUTIONAL | 13 | 7310 |
| PARK | 14 & 15 | 5255 |
| STREET WIDENING | 16 & 17 | 2847 |
| 0.30 RESERVE | 18, 19 & 20 | 19 |
| STREETS | MAIN STREET<br>STREET 'A'<br>STREET 'B'<br>STREET 'C'<br>SETTLERS ROAD | 38,689 |
| TOTALS | | 202,060 |

J.D. BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
401 WHEELABRATOR WAY, SUITE A, MILTON, ON L9T 3C1
T: (905) 875-9955 F: (905) 875-9956 www.jdbarnes.com

| DRAWN BY: | CHECKED BY: | REFERENCE NO.: |
|---|---|---|
| DM | RSQ | 24-30-276-02 |
| | | DATED: DECEMBER 18, 2025 |

PLOT DATE: 12/18/2025 10:26 AM

FILE: G:\JOB MINV\24-30-276-02\24-30-276-02 DRAFT PLAN.dwg




*Urbantech Consulting*
*Stonybrook Consulting Inc.*
*Beacon Environmental*
*GEO Morphix Ltd.*
*R.J. Burnside &*
*Associates Limited*

**LEGEND:**

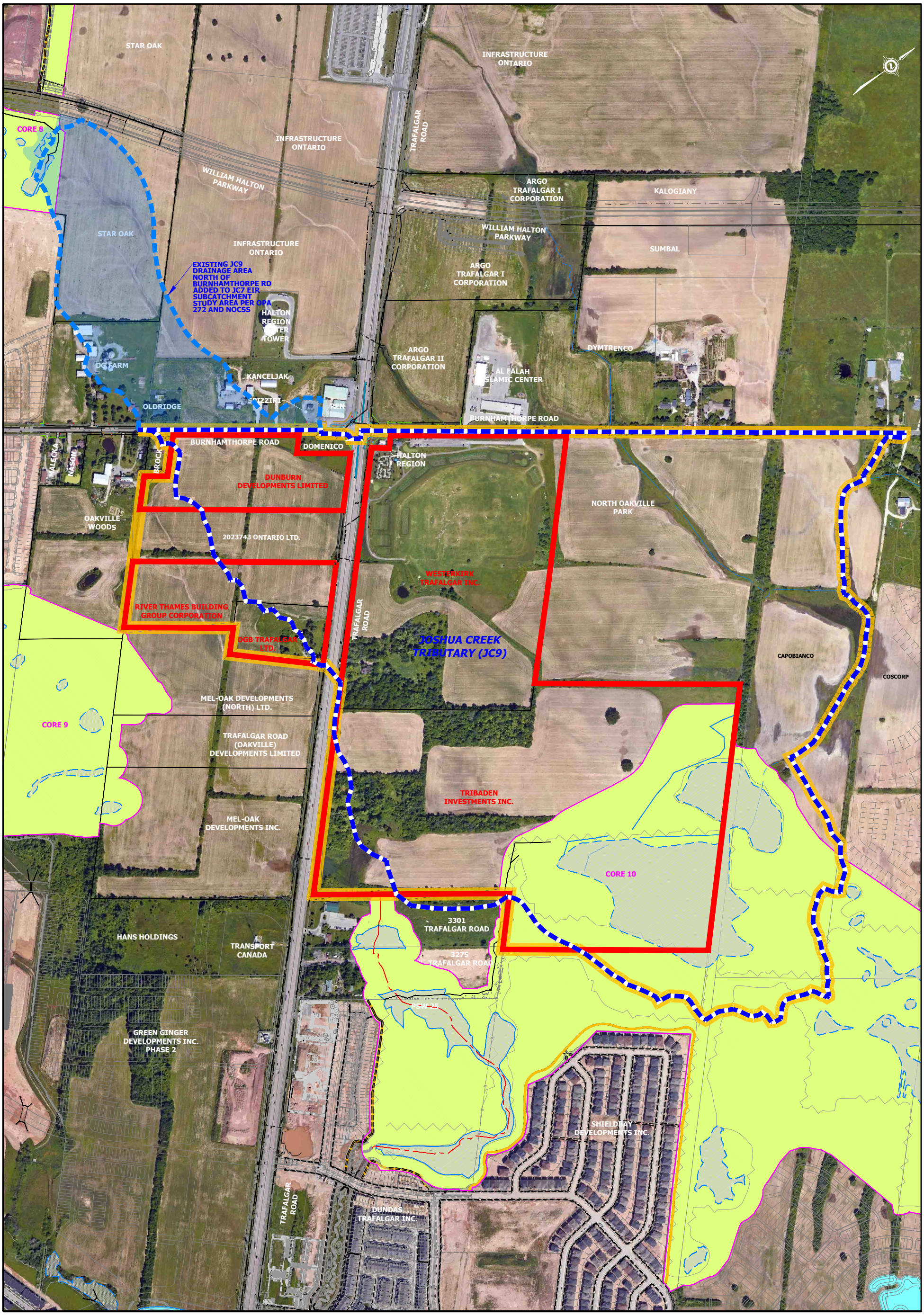
- OWNERSHIP LIMIT
- SUBJECT LANDS / EIR-FSS STUDY LIMIT
- NON PARTICIPATING LANDS
- EIR SUBCATCHMENT AREA (JC9)
- CORE BOUNDARY

*JOSHUA CREEK*
*SUBCATCHMENT JC9 EIR/FSS*

**FIGURE 1.4**

**LAND OWNERSHIP MAP**

| PROJECT No. | DATE: | SCALE: |
|---|---|---|
| 23-745 | DEC. 2025 | 1:7,000 |




*Urbantech Consulting*
*Stonybrook Consulting Inc.*
*Beacon Environmental*
*GEO Morphix Ltd.*
*R.J. Burnside &*
*Associates Limited*

**LEGEND:**

- SUBJECT LANDS
- CORE BOUNDARY
- EXISTING WATERCOURSE
- JC9 EIR SUBCATCHMENT AREA
- PORTION OF EX. JC9 DRAINAGE AREA ADDED TO JC7 EIR SUBCATCHMENT STUDY AREA
- JC9 FSS STUDY AREA

*JOSHUA CREEK*
*SUBCATCHMENT JC9 EIR/FSS*

**FIGURE 1.3**

**EIR SUBCATCHMENT AREA AND FSS STUDY AREA**

| PROJECT No. | DATE: | SCALE: |
|---|---|---|
| 23-745 | DEC. 2025 | 1:7,000 |

File: P:\Projects\23-745-JC9 EIR-FSS (N Oakville Group- Oakville )\Reports\EIR-FSS\Drawings & Figures\1_0 - INTRODUCTION\FIGURE 1.3_EIR Subcatchment Area and FSS Study Area.dwg - Revised by <VPAVLOVIC> : Fri, Oct 25 2024 - 1:08pm




1 SITE PLAN
A105.S

## SITE PLAN LEGEND

- PROPERTY LINE
- LINE OF UNDER GROUND GARAGE BELOW
- MAIN BUILDING ENTRANCE
- RETAIL ENTRANCE
- EXIT
- VEHICLE / LOADING ENTRANCE / EXIT
- FIRE HYDRANT
- SIAMESE CONNECTION
- TYPICAL PARKING SPACE
- TYPICAL B.F. PARKING SPACE
- BUILDING ENVELOPE

| Date | No. | Description |
|---|---|---|

REVISION RECORD

| | |
|---|---|
| 2026-04-06 | Issued for ZBA |

ISSUE RECORD

BDP. Quadrangle


Quadrangle Architects Limited
The Well, 8 Spadina Avenue, Suite 2100, Toronto, ON M5V 0S8
t 416 598 1240 www.bdpquadrangle.com


340 Burnhamthorpe Road East
and 3437 Trafalgar Road
Oakville, Ontario

for
1816986 Ontario Inc.

| | | | |
|---|---|---|---|
| 24064 | 1:750 | SR | SK |
| PROJECT | SCALE | DRAWN | REVIEWED |

Site Plan

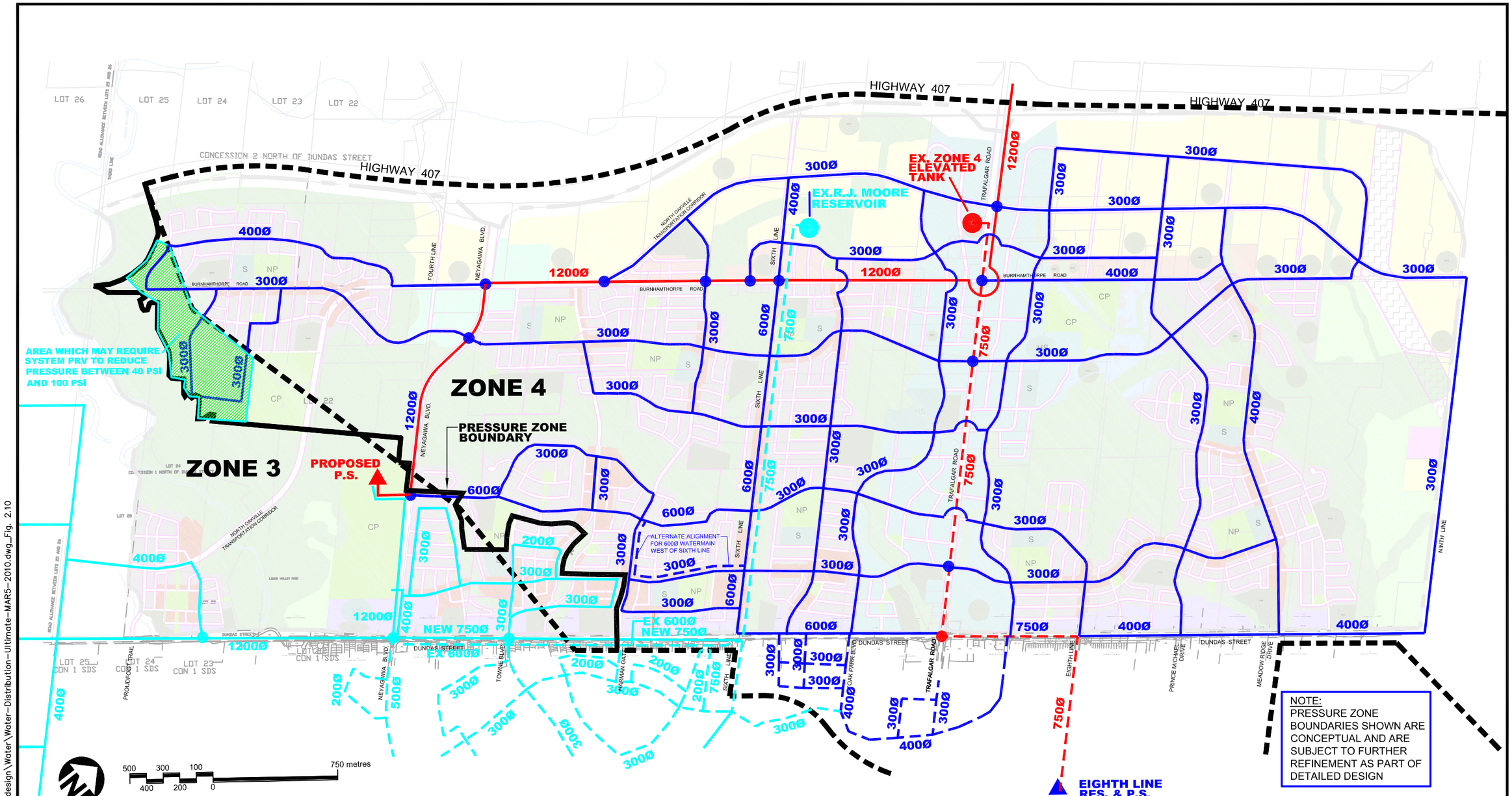
A105.S


Note: This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.


2026-03-27 12:12:22 PM

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**APPENDIX 'B'**




PROJECT

NORTH OAKVILLE COMMUNITY BUILDERS INC.

TITLE

# ULTIMATE WATER SUPPLY AND DISTRIBUTION SYSTEM PLAN

MMM GROUP
100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 www.mmm.ca

| | |
|---|---|
| Checked | Drawn |
| Date NOVEMBER 2010 | Proj. No. 10-02076 |
| Scale NTS | Exhibit No. 2.10 |

PRINTED ON: FILE NAME: H:\10-02076\design\Water\Water-Distribution-Ultimate-MAR5-2010.dwg_Fig. 2.10

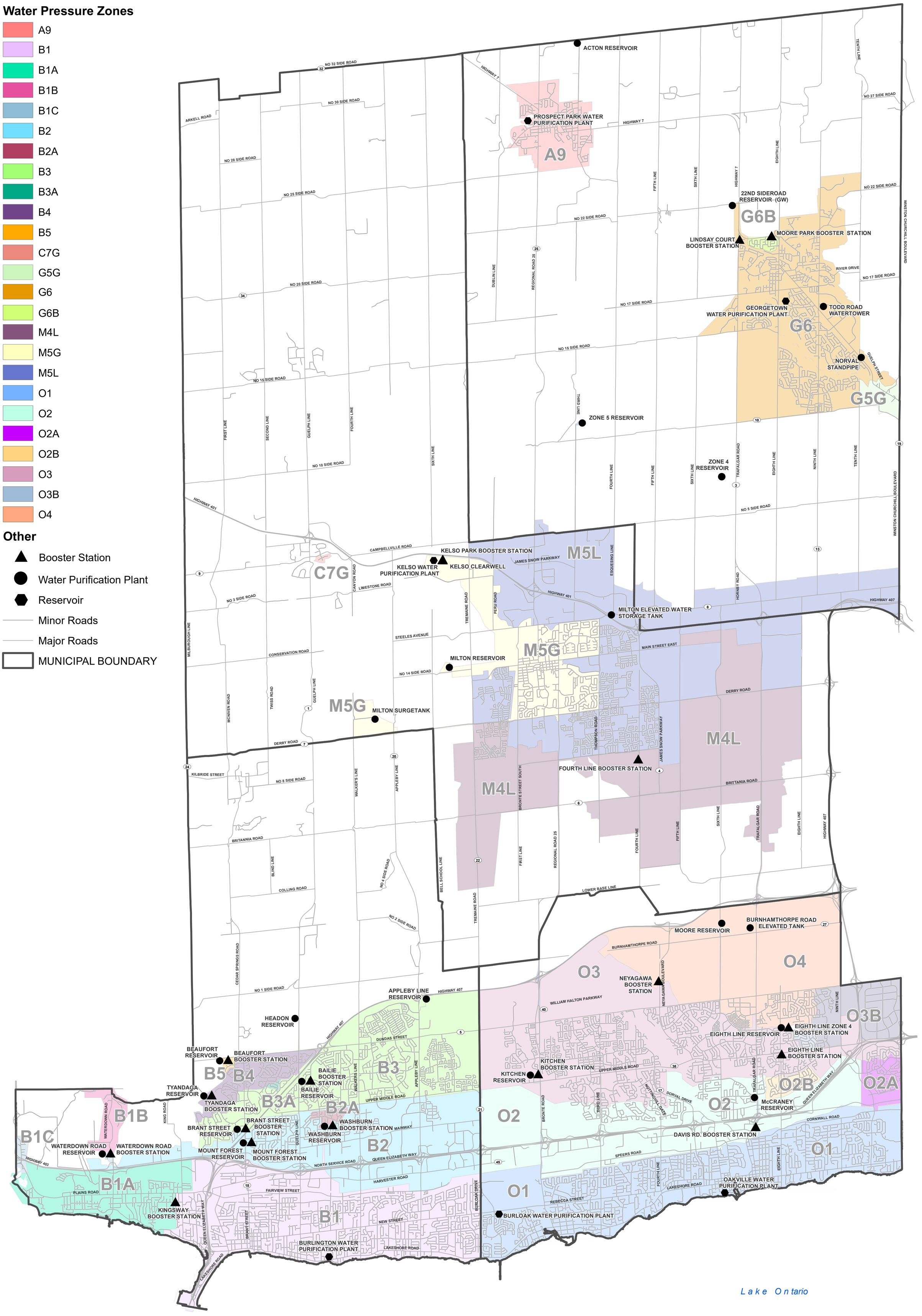
# Legend

## Water Pressure Zones

- A9
- B1
- B1A
- B1B
- B1C
- B2
- B2A
- B3
- B3A
- B4
- B5
- C7G
- G5G
- G6
- G6B
- M4L
- M5G
- M5L
- O1
- O2
- O2A
- O2B
- O3
- O3B
- O4

## Other

- Booster Station
- Water Purification Plant
- Reservoir
- Minor Roads
- Major Roads
- MUNICIPAL BOUNDARY





Halton REGION

GIS & Information Management
Public Works Department

REGIONAL MUNICIPALITY OF HALTON, ITS EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES, WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED


# *HALTON REGION*

## Existing Water Pressure Zones

**Note that the pressure zone boundaries displayed in this map are approximate and subject to change.**

0 0.75 1.5 3 4.5 6 Km

Public Work, May 2020

R:\Infrastructure Management\Infrastructure Data\Projects_Requests\Internal\Claudia\MapRequest\PressureZoneMap

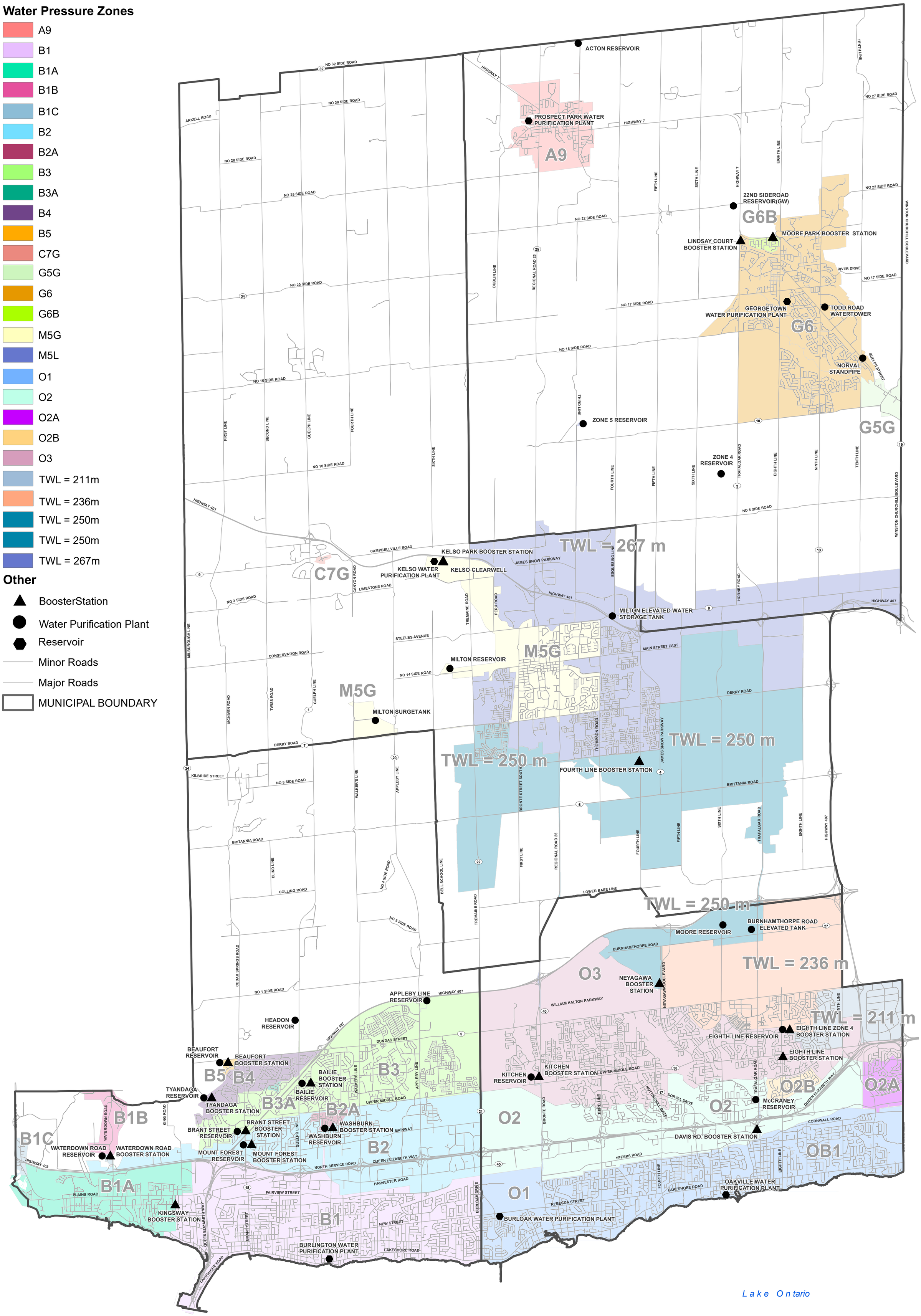
# Legend

## Water Pressure Zones

- A9
- B1
- B1A
- B1B
- B1C
- B2
- B2A
- B3
- B3A
- B4
- B5
- C7G
- G5G
- G6
- G6B
- M5G
- M5L
- O1
- O2
- O2A
- O2B
- O3
- TWL = 211m
- TWL = 236m
- TWL = 250m
- TWL = 250m
- TWL = 267m

## Other

- BoosterStation
- Water Purification Plant
- Reservoir
- Minor Roads
- Major Roads
- MUNICIPAL BOUNDARY




GIS & Information Management
Public Works Department

REGIONAL MUNICIPALITY OF HALTON, ITS EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES, WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED

# *HALTON REGION*

## Interim Water Pressure Zones

**Note that the pressure zone boundaries displayed in this map are approximate and subject to change.**

0 0.75 1.5 3 4.5 6 Km

Public Work, May 2020

R:\Infrastructure Management\Infrastructure Data\Projects_Requests\Internal\Claudia\MapRequest\PressureZoneMap

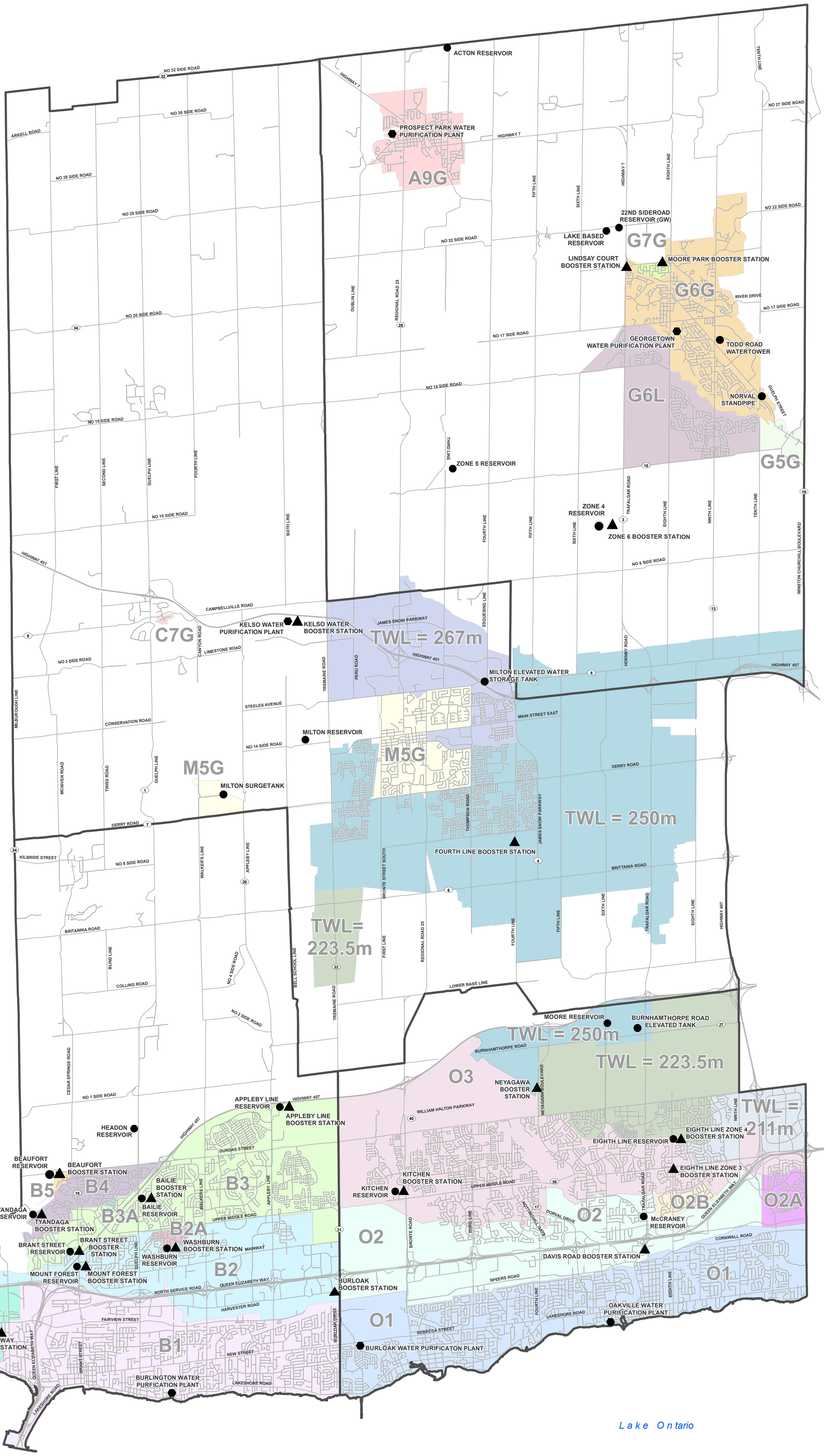
# Legend

## Water Pressure Zones

- A9
- B1
- B1A
- B1B
- B2
- B2A
- B3
- B3A
- B3B
- B4
- B4A
- B5
- B5A
- C7G
- G5G
- G6G
- G6L
- G7G
- M5G
- O1
- O2
- O2A
- O2B
- O3
- TWL = 211m
- TWL = 223.5m
- TWL = 250m
- TWL = 250m
- TWL = 267m

## Other

- Booster Station
- Water Purification Plant
- Reservoir
- Minor Roads
- Major Roads
- MUNICIPAL BOUNDARY




GIS & Information Management
Public Works Department

REGIONAL MUNICIPALITY OF HALTON, ITS EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES, WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED

# *HALTON REGION*

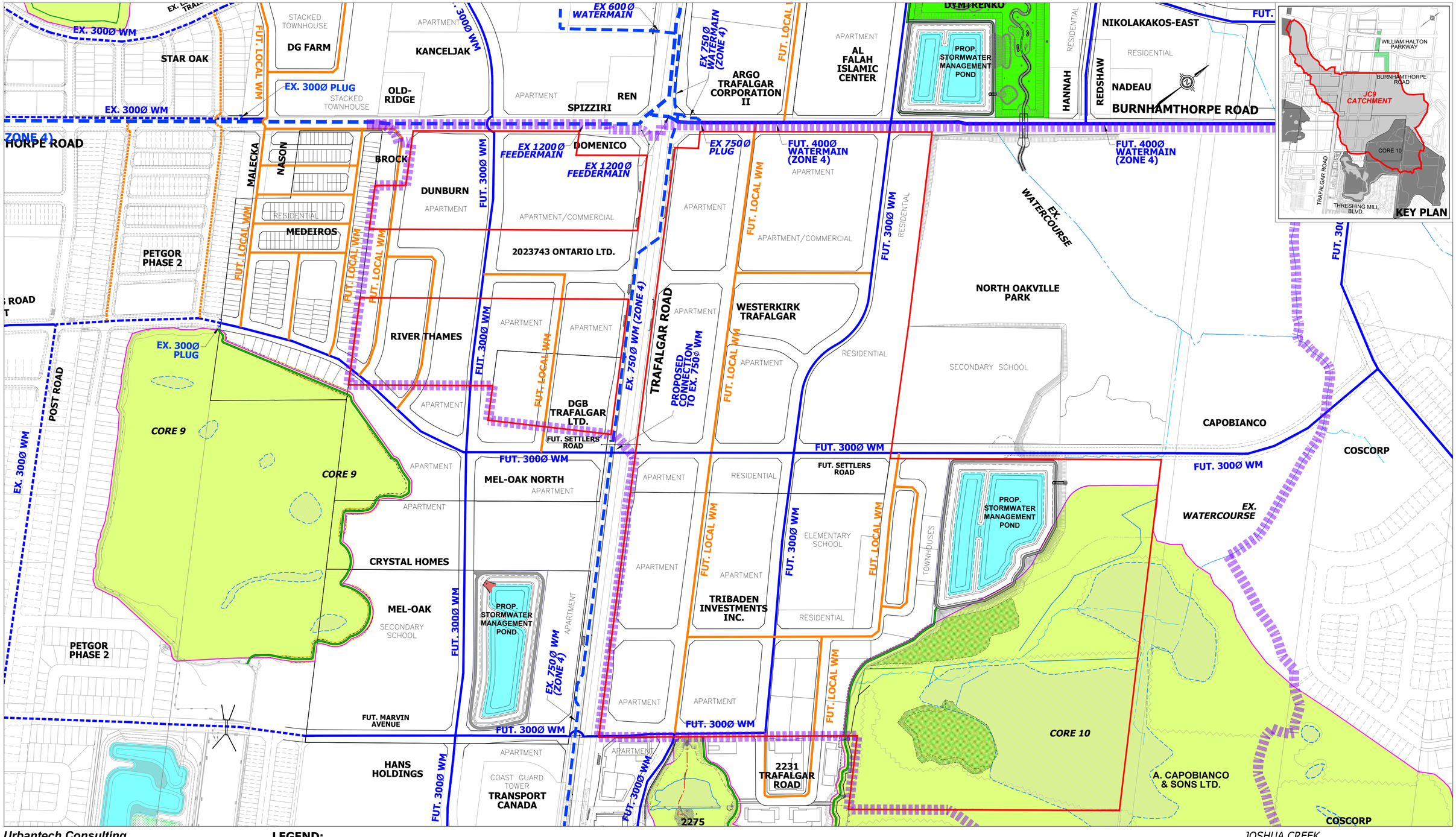
## Future Water Pressure Zones

**Note that the pressure zone boundaries displayed in this map are approximate and subject to change.**

0 0.75 1.5 3 4.5 6 Km

Public Work, May 2020

R:\Infrastructure Management\Infrastructure Data\Projects_Requests\Internal\Claudia\MapRequest\PressureZoneMap




*Urbantech Consulting*
*Stonybrook Consulting Inc.*
*Beacon Environmenta.*
*GEO Morphix Ltd.*
*R.J. Burnside & Associates Limited*

**LEGEND:**

- SUBJECT LANDS
- JC9 FSS AREA
- CORE AREA
- PROPOSED NHS
- PROPOSED SWM POND
- EXISTING TRUNK WATERMAIN
- EXISTING 300ø WATERMAIN
- EXISTING LOCAL WATERMAIN
- PROPOSED 300ø WATERMAIN
- PROPOSED LOCAL WATERMAIN

**NOTES:**

- ALL PROPOSED WATERMAIN SIZES AND ZONE BOUNDARIES SHALL BE CONFIRMED THROUGH DETAILED HYDRAULIC ANALYSIS / MODELING AND IN COORDINATION WITH THE REGION OF HALTON TO DETERMINE PROJECTED AVAILABLE FLOWS AND OPERATING PRESSURES.
- FIRE PROTECTION FOR LARGE APARTMENT BLOCKS FRONTING ARTERIAL ROADS WITH NO LOCAL WATERMAIN TO BE PROVIDED FROM ADJACENT LOCAL ROADS OR WITH APPROPRIATE INTERNAL F.D. CONNECTIONS. ALTERNATIVELY, SPACE TO BE ALOTTED IN ROADS FOR LOCAL WATERMAINS AND HYDRANTS.

*JOSHUA CREEK*
*SUBCATCHMENT JC9 EIR/FSS*

**DRAWING 9.2**

**WATER SERVICING PLAN**

| PROJECT No. | DATE: | SCALE: |
|---|---|---|
| 23-745 | DEC. 2025 | 1:2500 |

**APPENDIX 'C'**

HIGHWAY 407

HIGHWAY 407

BURNHAMTHORPE ROAD

FORCEMAIN

NORTH OAKVILLE TRANSPORATION CORRIDOR

SIXTH LINE

TRAFALGAR ROAD

BURNHAMTHORPE ROAD

HIGHWAY 403

PS

FORCEMAIN (OPTION)

NEYAGAWA BLVD.

NORTH OAKVILLE TRANSPORATION CORRIDOR

FORCEMAIN

LOCAL PS

PS

NINTH LINE

PS

DUNDAS STREET

FORCEMAIN

1200Ø

2x750Ø WWFM

1050Ø

975Ø

825Ø

600Ø

2x400Ø WWFM

PROUDFOOT TRAIL

NEYAGAWA BLVD.

TOWNE BLVD.

HARMAN GATE

SIXTH LINE

OAK PARK BLVD.

TRAFALGAR ROAD

EIGHTH LINE

PRINCE MICHAEL DRIVE

MEADOW RIDGE DRIVE

500 400 300 200 100 0 750 metres

## LEGEND

- DUNDAS STREET TRUNK SEWER
- DUNDAS STREET FORCEMAIN
- SUB-TRUNK SEWER
- SUB-TRUNK FORCEMAIN
- PS — WASTEWATER PUMPING STATION (APPROXIMATE LOCATION)
- SUB-TRUNK DRAINAGE BOUNDARY

NOTE: SUB-TRUNK SEWER AND DRAINAGE BOUNDARY LOCATIONS ARE IN GENERAL CONFORMANCE TO HALTON REGION'S PROPOSED LOCATION AND SHALL BE FURTHER REFINED IN THE DEVELOPMENT SPECIFIC FUNCTIONAL SERVICING REPORTS.

PROJECT

NORTH OAKVILLE COMMUNITY BUILDERS INC.

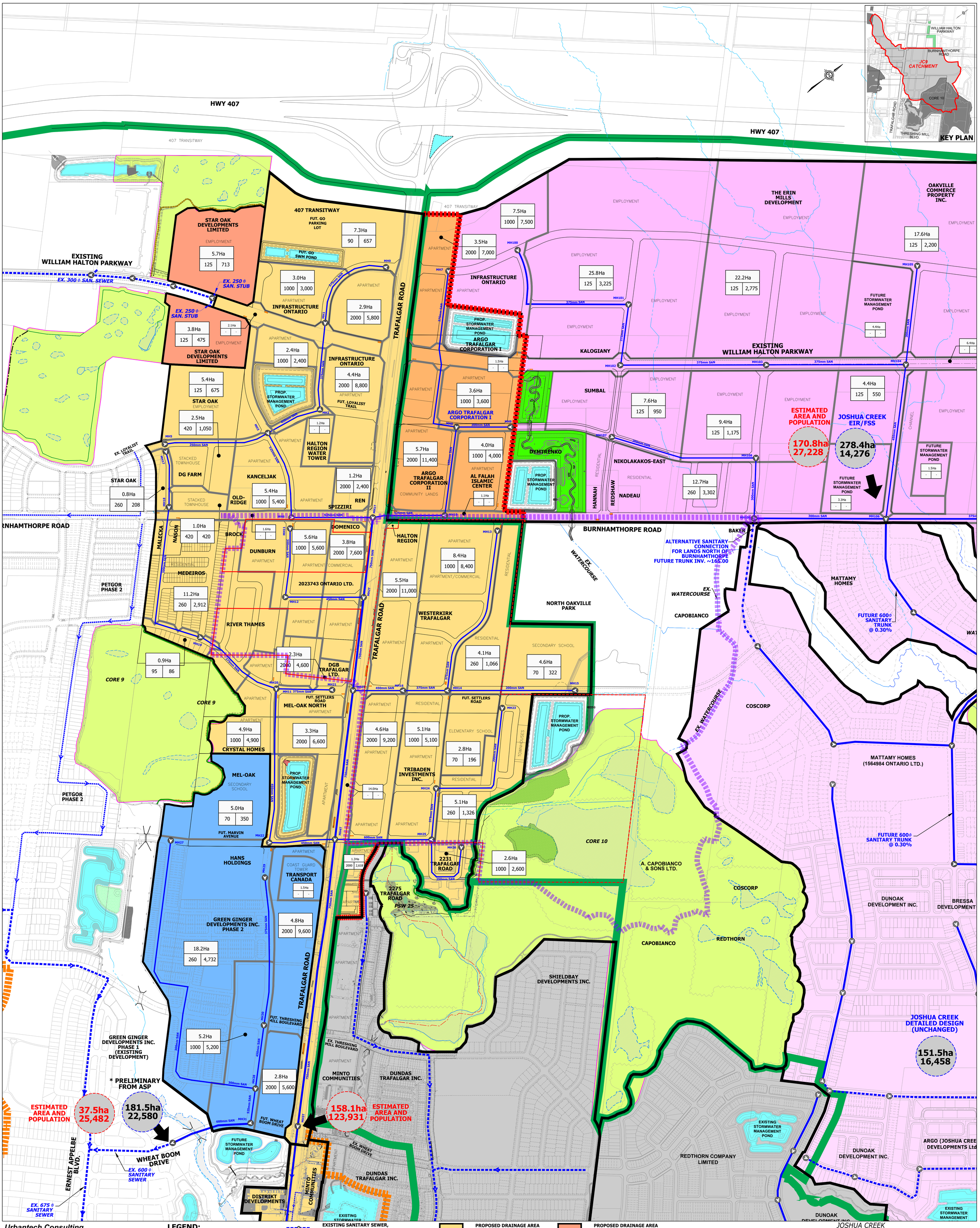
TITLE

ULTIMATE WASTEWATER DRAINAGE PLAN

MMM GROUP

| | | | |
|---|---|---|---|
| Checked | M.A.E. | Drawn | T.Y. |
| Date | AUGUST 2010 | Proj. No. | 10-02076 |
| Scale | NTS | Exhibit No. | 3.8 |

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*Urbantech Consulting*
*Stonybrook Consulting Inc.*
*Beacon Environmental*
*GEO Morphix Ltd.*
*R.J. Burnside & Associates Limited*

**LEGEND:**

- SUBJECT LANDS
- JC9 FSS AREA
- CORE AREA
- PROPOSED NHS
- PROPOSED SWM POND
- EXISTING SANITARY SEWER, MANHOLE AND FLOW DIRECTION
- PROPOSED SANITARY SEWER, MANHOLE AND FLOW DIRECTION
- ORIGINAL ASP BOUNDARY
- WASTEWATER DRAINAGE AREA BOUNDARY
- SUB-DRAINAGE AREA BOUNDARY
- WASTEWATER DRAINAGE AREA (HECTARES) / POPULATION (PERSONS) / POPULATION DENSITY (PERSONS PER HECTARE)
- PROPOSED DRAINAGE AREA TO TRAFALGAR ROAD SUB-TRUNK SEWER
- PROPOSED DRAINAGE AREA TO JOSHUA CREEK SUB-TRUNK SEWER
- PROPOSED DRAINAGE AREA TO WHEAT BOOM DRIVE SUB-TRUNK SEWER
- PROPOSED DRAINAGE AREA TO NINTH LINE SUB-TRUNK SEWER
- PROPOSED ASP DIVERSION TO TRAFALGAR ROAD SUB-TRUNK SEWER
- PROPOSED DRAINAGE AREA TO WILLIAM HALTON PKWY / SIXTH LINE SUB-TRUNK SEWER
- 278.4ha 14,276 — WASTEWATER DRAINAGE AREA (HECTARES) PER APPROVED STUDIES / POPULATION (PERSONS)
- 167.4ha 19,430 — PROPOSED WASTEWATER DRAINAGE AREA (HECTARES) / POPULATION (PERSONS)

*JOSHUA CREEK*
*SUBCATCHMENT JC9 EIR/FSS*

**DRAWING 9.1**

**WASTEWATER DRAINAGE & SERVICING PLAN**

| PROJECT No. | DATE: | SCALE: |
|---|---|---|
| 23-745 | DEC. 2025 | 1:3000 |

URBANTECH®

# PRELIMINARY SANITARY SEWER DESIGN SHEET

**Trafalgar Road Sub-Trunk**

**Region of Halton**

**PROJECT DETAILS**

Project No: #
Date: MARCH 2024
Designed by: sr
Checked by: dz

**DESIGN CRITERIA**

| | | | | | |
|---|---|---|---|---|---|
| Min Diameter = | 200 | mm | Avg. Domestic Flow = | 215.0 | l/c/d |
| Mannings 'n'= | 0.013 | | Infiltration = | 0.286 | l/s/ha |
| Min. Velocity = | 0.6 | m/s | Max. Peaking Factor = | 4.50 | |
| Max. Velocity = | 3.0 | m/s | Min. Peaking Factor= | 2.00 | |
| Factor of Safety = | 30 | % | | | |

**NOMINAL PIPE SIZE USED**

| | | | RESIDENTIAL | | | | | | | COMMERCIAL/INDUSTRIAL/INSTITUTIONAL | | | | | | FLOW CALCULATIONS | | | | | | | PIPE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | FROM MH | TO MH | AREA (ha) | ACC. AREA (ha) | UNITS (#) | DENISTY (P/ha) | DENSITY (P/unit) | POP | ACCUM. RES. POP. | AREA (ha) | ACC. AREA (ha) | EQUIV. POP. (p/ha) | FLOW RATE (l/s/ha) | EQUIV. POP. | ACCUM. EQUIV. POP. | INFILTRATION (l/s) | TOTAL ACCUM. POP. | PEAKING FACTOR | RES. FLOW (l/s) | COMM. FLOW (l/s) | ACCUM. COMM. FLOW (l/s) | TOTAL FLOW (l/s) | SLOPE (%) | PIPE DIAMETER (mm) | FULL FLOW CAPACITY (l/s) | FULL FLOW VELOCITY (m/s) | ACTUAL VELOCITY (m/s) | PERCENT FULL (%) |
| **Trafalgar Sub-Trunk** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | O | 2.60 | 2.60 | | | | | | | | | | | | 0.7 | | | | | | 0.7 | | | | | | |
| | | O | 7.30 | 7.30 | | 90 | | 657 | 657 | | | | | | | 2.1 | 657 | 3.91 | 6.4 | | | 8.5 | | | | | | |
| | | O | 3.00 | 3.00 | | 1000 | | 3000 | 3000 | | | | | | | 0.9 | 3000 | 3.44 | 25.7 | | | 26.6 | | | | | | |
| | O | 1 | 2.90 | 15.80 | | 2000 | | 5800 | 9457 | | | | | | | 4.5 | 9457 | 2.98 | 70.1 | | | 74.6 | 0.50 | 375 | 124.0 | 1.1 | 1.2 | 60% |
| | 1 | 2 | 2.40 | 18.20 | | 1000 | | 2400 | 11857 | | | | | | | 5.2 | 11857 | 2.88 | 85.0 | | | 90.2 | | 375 | | | | |
| | | 2 | 4.40 | 4.40 | | 2000 | | 8800 | 8800 | | | | | | | 1.3 | 8800 | 3.01 | 65.9 | | | 67.2 | 0.50 | | | | | |
| | 2 | 3 | 1.20 | 23.80 | | | | | 20657 | | | | | | | 6.8 | 20657 | 2.64 | 135.6 | | | 142.4 | 0.50 | 450 | 201.6 | 1.3 | 1.4 | 71% |
| | | 4 | 5.90 | 5.90 | | 125 | | 738 | 738 | | | | | | | 1.7 | 738 | 3.88 | 7.1 | | | 8.8 | | | | | | |
| | 4 | 3 | 9.20 | 15.10 | | 125 | | 1150 | 1888 | | | | | | | 4.3 | 1888 | 3.61 | 16.9 | | | 21.3 | 0.50 | 250 | 42.0 | 0.9 | 0.9 | 51% |
| | 5 | 3 | 2.50 | 2.50 | | 420 | | 1050 | 1050 | | | | | | | 0.7 | 1050 | 3.79 | 9.9 | | | 10.6 | 0.50 | 200 | 23.2 | 0.7 | 0.7 | 46% |
| | 3 | 6 | 5.40 | 46.80 | | 1000 | | 5400 | 28995 | | | | | | | 13.4 | 28995 | 2.49 | 179.8 | | | 193.2 | 0.50 | 525 | 304.1 | 1.4 | 1.5 | 64% |
| | | 6 | 1.60 | 1.60 | | | | | | | | | | | | 0.5 | | | | | | 0.5 | | | | | | |
| | 6 | 1T | 1.20 | 49.60 | | 2000 | | 2400 | 31395 | | | | | | | 14.2 | 31395 | 2.46 | 192.0 | | | 206.2 | 0.50 | 525 | 304.1 | 1.4 | 1.5 | 68% |
| | | 7 | 1.50 | 1.50 | | | | | | | | | | | | 0.4 | | | | | | 0.4 | | | | | | |
| | 7 | 8 | 3.50 | 5.00 | | 2000 | | 7000 | 7000 | | | | | | | 1.4 | 7000 | 3.11 | 54.1 | | | 55.5 | 0.50 | 375 | 124.0 | 1.1 | 1.1 | 45% |
| | 9 | 8 | 5.80 | 5.80 | | 1000 | | 5800 | 5800 | | | | | | | 1.7 | 5800 | 3.18 | 46.0 | | | 47.6 | 0.50 | 300 | 68.4 | 1.0 | 1.0 | 70% |
| | 8 | 10 | 4.10 | 14.90 | | 2000 | | 8200 | 21000 | | | | | | | 4.3 | 21000 | 2.63 | 137.5 | | | 141.8 | 0.50 | 450 | 201.6 | 1.3 | 1.4 | 70% |
| | 10 | 1T | 4.00 | 18.90 | | 1000 | | 4000 | 25000 | | | | | | | 5.4 | 25000 | 2.56 | 159.0 | | | 164.4 | 0.50 | 525 | 304.1 | 1.4 | 1.4 | 54% |
| | | 1T | 1.10 | 1.10 | | | | | | | | | | | | 0.3 | | | | | | 0.3 | | | | | | |
| | 1T | 2T | 14.00 | 83.60 | | | | | 56395 | | | | | | | 23.9 | 56395 | 2.22 | 311.0 | | | 334.9 | 0.40 | 750 | 704.1 | 1.6 | 1.5 | 48% |
| | 11 | 12 | 5.60 | 5.60 | | 1000 | | 5600 | 5600 | | | | | | | 1.6 | 5600 | 3.20 | 44.6 | | | 46.2 | 0.50 | 300 | 68.4 | 1.0 | 1.0 | 68% |
| | 12 | 2T | 3.80 | 9.40 | | 2000 | | 7600 | 13200 | | | | | | | 2.7 | 13200 | 2.83 | 93.1 | | | 95.8 | 0.50 | 450 | 201.6 | 1.3 | 1.2 | 48% |
| | 2T | 3T | | 93.00 | | | | | 69595 | | | | | | | 26.6 | 69595 | 2.13 | 369.6 | | | 396.2 | 0.40 | 750 | 704.1 | 1.6 | 1.6 | 56% |
| | | 13 | 4.80 | 4.80 | | 260 | | 1248 | 1248 | | | | | | | 1.4 | 1248 | 3.74 | 11.6 | | | 13.0 | | | | | | |
| | 13 | 14 | 7.60 | 12.40 | | 1000 | | 7600 | 8848 | | | | | | | 3.5 | 8848 | 3.01 | 66.2 | | | 69.8 | 0.50 | 375 | 124.0 | 1.1 | 1.1 | 56% |
| | 15 | 14 | 4.60 | 4.60 | | 70 | | 322 | 322 | | | | | | | 1.3 | 322 | 4.07 | 3.3 | | | 4.6 | 0.50 | 200 | 23.2 | 0.7 | 0.6 | 20% |
| | 14 | 16 | | 17.00 | | | | | 9170 | | | | | | | 4.9 | 9170 | 2.99 | 68.3 | | | 73.1 | 0.50 | 375 | 124.0 | 1.1 | 1.1 | 59% |
| | 16 | 3T | 5.50 | 22.50 | | 2000 | | 11000 | 20170 | | | | | | | 6.4 | 20170 | 2.65 | 132.9 | | | 139.4 | 0.50 | 450 | 201.6 | 1.3 | 1.3 | 69% |
| | 3T | 4T | | 115.50 | | | | | 89765 | | | | | | | 33.0 | 89765 | 2.04 | 455.5 | | | 488.5 | 0.40 | 750 | 704.1 | 1.6 | 1.7 | 69% |
| | 17 | 18 | 0.80 | 0.80 | | 260 | | 208 | 208 | | | | | | | 0.2 | 208 | 4.14 | 2.1 | | | 2.4 | 1.00 | 200 | 32.8 | 1.0 | 0.6 | 7% |
| | 18 | 19 | 1.00 | 1.80 | | 420 | | 420 | 628 | | | | | | | 0.5 | 628 | 3.92 | 6.1 | | | 6.6 | 0.50 | 200 | 23.2 | 0.7 | 0.6 | 29% |
| | | 19 | 0.90 | 0.90 | | 95 | | 86 | 86 | | | | | | | 0.3 | 86 | 4.26 | 0.9 | | | 1.2 | | | | | | |
| | 19 | 20 | 11.20 | 13.90 | | 260 | | 2912 | 3626 | | | | | | | 4.0 | 3626 | 3.37 | 30.4 | | | 34.4 | 0.50 | 375 | 124.0 | 1.1 | 1.0 | 28% |
| | 21 | 20 | 2.30 | 2.30 | | 2000 | | 4600 | 4600 | | | | | | | 0.7 | 4600 | 3.28 | 37.5 | | | 38.2 | 0.50 | 375 | 124.0 | 1.1 | 1.0 | 31% |
| | 20 | 22 | 4.90 | 21.10 | | 1000 | | 4900 | 13126 | | | | | | | 6.0 | 13126 | 2.84 | 92.7 | | | 98.7 | 0.50 | 450 | 201.6 | 1.3 | 1.2 | 49% |
| | 22 | 4T | | 21.10 | | | | | 13126 | | | | | | | 6.0 | 13126 | 2.84 | 92.7 | | | 98.7 | 0.50 | 450 | 201.6 | 1.3 | 1.2 | 49% |
| | 23 | 24 | 5.10 | 5.10 | | 260 | | 1326 | 1326 | | | | | | | 1.5 | 1326 | 3.72 | 12.3 | | | 13.7 | 0.50 | 200 | 23.2 | 0.7 | 0.8 | 59% |
| | | 24 | 2.80 | 2.80 | | 70 | | 196 | 196 | | | | | | | 0.8 | 196 | 4.15 | 2.0 | | | 2.8 | | | | | | |
| | 24 | 25 | 5.10 | 13.00 | | 1000 | | 5100 | 6622 | | | | | | | 3.7 | 6622 | 3.13 | 51.6 | | | 55.3 | 0.50 | 375 | 124.0 | 1.1 | 1.1 | 45% |
| | 26 | 25 | 2.60 | 2.60 | | 1000 | | 2600 | 2600 | | | | | | | 0.7 | 2600 | 3.49 | 22.6 | | | 23.4 | 0.50 | 250 | 42.0 | 0.9 | 0.9 | 56% |
| | 25 | 4T | 4.60 | 20.20 | | 2000 | | 9200 | 18422 | | | | | | | 5.8 | 18422 | 2.69 | 123.2 | | | 129.0 | 0.50 | 450 | 201.6 | 1.3 | 1.3 | 64% |
| | 4T | 5T | 0.90 | 157.70 | | 2000 | | 1800 | 123113 | | | | | | | 45.1 | 123113 | 2.00 | 612.7 | | | 657.8 | 0.40 | 750 | 704.1 | 1.6 | 1.8 | 93% |

**Urbantech Consulting, A Division of Leighton-Zec Ltd.**
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**www.urbantech.com**

URBANTECH®

# PRELIMINARY SANITARY SEWER DESIGN SHEET

**Trafalgar Road Sub-Trunk**

**Region of Halton**

**PROJECT DETAILS**

Project No: #
Date: MARCH 2024
Designed by: sr
Checked by: dz

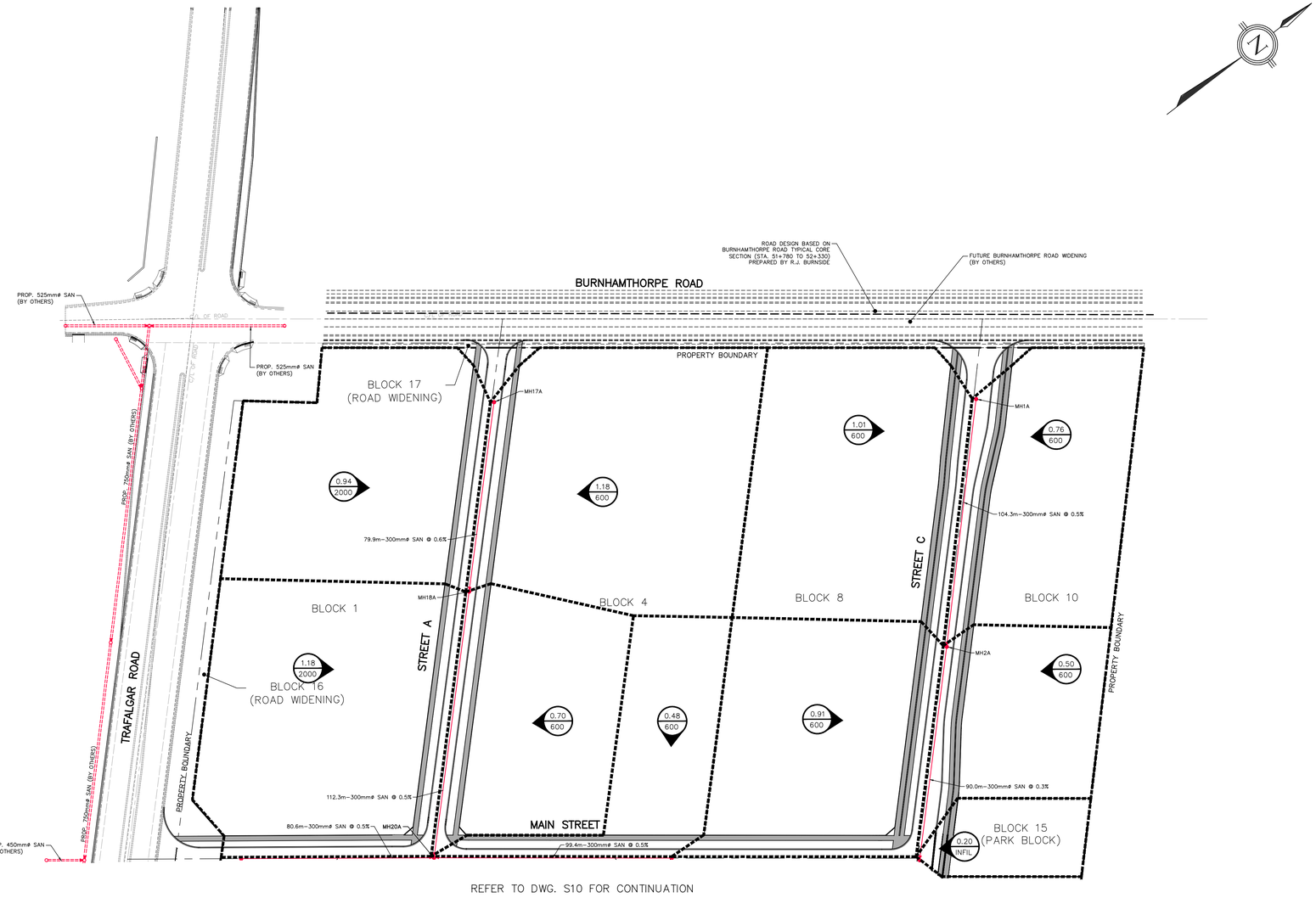
**DESIGN CRITERIA**

| | | | | | |
|---|---|---|---|---|---|
| Min Diameter = | 200 | mm | Avg. Domestic Flow = | 215.0 | l/c/d |
| Mannings 'n'= | 0.013 | | Infiltration = | 0.286 | l/s/ha |
| Min. Velocity = | 0.6 | m/s | Max. Peaking Factor = | 4.50 | |
| Max. Velocity = | 3.0 | m/s | Min. Peaking Factor= | 2.00 | |
| Factor of Safety = | 30 | % | | | |

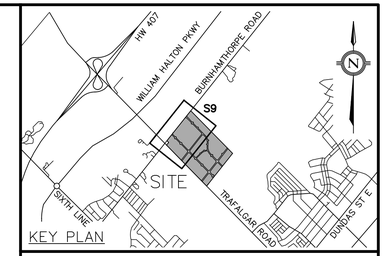
**NOMINAL PIPE SIZE USED**

| | | | RESIDENTIAL | | | | | | | COMMERCIAL/INDUSTRIAL/INSTITUTIONAL | | | | | | FLOW CALCULATIONS | | | | | | | PIPE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | FROM MH | TO MH | AREA (ha) | ACC. AREA (ha) | UNITS (#) | DENISTY (P/ha) | DENSITY (P/unit) | POP | ACCUM. RES. POP. | AREA (ha) | ACC. AREA (ha) | EQUIV. POP. (p/ha) | FLOW RATE (l/s/ha) | EQUIV. POP. | ACCUM. EQUIV. POP. | INFILTRATION (l/s) | TOTAL ACCUM. POP. | PEAKING FACTOR | RES. FLOW (l/s) | COMM. FLOW (l/s) | ACCUM. COMM. FLOW (l/s) | TOTAL FLOW (l/s) | SLOPE (%) | PIPE DIAMETER (mm) | FULL FLOW CAPACITY (l/s) | FULL FLOW VELOCITY (m/s) | ACTUAL VELOCITY (m/s) | PERCENT FULL (%) |
| **Joshua Creek Sub-Tru** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 100 | 101 | 7.50 | 7.50 | | 1000 | | 7500 | 7500 | | | | | | | 2.1 | 7500 | 3.08 | 57.4 | | | 59.6 | 0.50 | 375 | 124.0 | 1.1 | 1.1 | 48% |
| | 101 | 102 | 25.10 | 32.60 | | 125 | | 3138 | 10638 | | | | | | | 9.3 | 10638 | 2.93 | 77.5 | | | 86.8 | 0.50 | 375 | 124.0 | 1.1 | 1.2 | 70% |
| | 102 | 103 | 22.20 | 54.80 | | 125 | | 2775 | 13413 | | | | | | | 15.7 | 13413 | 2.83 | 94.4 | | | 110.0 | 0.50 | 450 | 201.6 | 1.3 | 1.3 | 55% |
| | 103 | 104 | 4.40 | 59.20 | | | | | 13413 | | | | | | | 16.9 | 13413 | 2.83 | 94.4 | | | 111.3 | 0.50 | 450 | 201.6 | 1.3 | 1.3 | 55% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 105 | 104 | 17.60 | 17.60 | | 125 | | 2200 | 2200 | | | | | | | 5.0 | 2200 | 3.55 | 19.5 | | | 24.5 | | 200 | | | | |
| | | 104 | 6.40 | 6.40 | | | | | | | | | | | | 1.8 | | | | | | 1.8 | | | | | | |
| | 104 | 106 | 4.40 | 87.60 | | 125 | | 550 | 16163 | | | | | | | 25.1 | 16163 | 2.75 | 110.4 | | | 135.5 | 0.50 | 450 | 201.6 | 1.3 | 1.3 | 67% |
| | 107 | 108 | 7.60 | 7.60 | | 125 | | 950 | 950 | | | | | | | 2.2 | 950 | 3.81 | 9.0 | | | 11.2 | 0.50 | 200 | 23.2 | 0.7 | 0.7 | 48% |
| | 108 | 109 | 9.40 | 17.00 | | 125 | | 1175 | 2125 | | | | | | | 4.9 | 2125 | 3.57 | 18.9 | | | 23.7 | 0.50 | 250 | 42.0 | 0.9 | 0.9 | 56% |
| | 109 | 106 | 12.70 | 29.70 | | 260 | | 3302 | 5427 | | | | | | | 8.5 | 5427 | 3.21 | 43.4 | | | 51.9 | 0.50 | 300 | 68.4 | 1.0 | 1.1 | 76% |
| | | 106 | 3.30 | 3.30 | | | | | | | | | | | | 0.9 | | | | | | 0.9 | | | | | | |
| | 110 | 111 | 17.40 | 17.40 | | 125 | | 2175 | 2175 | | | | | | | 5.0 | 2175 | 3.56 | 19.3 | | | 24.2 | 0.50 | 250 | 42.0 | 0.9 | 0.9 | 58% |
| | | 111 | 1.80 | 1.80 | | | | | | | | | | | | 0.5 | | | | | | 0.5 | | | | | | |
| | 111 | 112 | 20.50 | 39.70 | | 125 | | 2563 | 4738 | | | | | | | 11.4 | 4738 | 3.27 | 38.5 | | | 49.9 | 0.50 | 300 | 68.4 | 1.0 | 1.0 | 73% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 113 | 112 | 9.00 | 9.00 | | 100 | | 900 | 900 | | | | | | | 2.6 | 900 | 3.83 | 8.6 | | | 11.1 | 0.50 | 200 | 23.2 | 0.7 | 0.7 | 48% |
| | 112 | 106 | 1.50 | 50.20 | | | | | 5638 | | | | | | | 14.4 | 5638 | 3.20 | 44.8 | | | 59.2 | 0.50 | 375 | 124.0 | 1.1 | 1.1 | 48% |
| | 106 | JC | | 170.80 | | | | | 27228 | | | | | | | 48.8 | 27228 | 2.52 | 170.7 | | | 219.5 | 0.30 | 600 | 336.3 | 1.2 | 1.3 | 65% |
| | JC | ds | 151.50 | 322.30 | | | | 16458 | 43686 | | | | | | | 92.2 | 43686 | 2.32 | 252.2 | | | 344.3 | 0.45 | 600 | 411.9 | 1.5 | 1.6 | 84% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Ninth Line Sub-Trunk** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 201 | 202 | 19.40 | 19.40 | | 125 | | 2425 | 2425 | | | | | | | 5.5 | 2425 | 3.52 | 21.2 | | | 26.8 | 0.50 | 300 | 68.4 | 1.0 | 0.9 | 39% |
| | 202 | 203 | 13.10 | 32.50 | | | | | 2425 | | | | | | | 9.3 | 2425 | 3.52 | 21.2 | | | 30.5 | 0.50 | 300 | 68.4 | 1.0 | 0.9 | 45% |
| | 203 | 204 | 31.90 | 64.40 | | 125 | | 3988 | 6413 | | | | | | | 18.4 | 6413 | 3.14 | 50.2 | | | 68.6 | 0.50 | 375 | 124.0 | 1.1 | 1.1 | 55% |
| | 204 | 205 | 10.80 | 75.20 | | 125 | | 1350 | 7763 | | | | | | | 21.5 | 7763 | 3.06 | 59.2 | | | 80.7 | 0.50 | 375 | 124.0 | 1.1 | 1.2 | 65% |
| | 205 | 206 | 7.90 | 83.10 | | 70 | | 553 | 8316 | | | | | | | 23.8 | 8316 | 3.03 | 62.8 | | | 86.5 | 0.50 | 375 | 124.0 | 1.1 | 1.2 | 70% |
| | 206 | 207 | 12.70 | 95.80 | | 40 | | 508 | 8824 | | | | | | | 27.4 | 8824 | 3.01 | 66.1 | | | 93.5 | 0.50 | 375 | 124.0 | 1.1 | 1.2 | 75% |
| | 207 | 208 | | 95.80 | | | | | 8824 | | | | | | | 27.4 | 8824 | 3.01 | 66.1 | | | 93.5 | 0.50 | 375 | 124.0 | 1.1 | 1.2 | 75% |
| | 208 | ps | | 95.80 | | | | | 8824 | | | | | | | 27.4 | 8824 | 3.01 | 66.1 | | | 93.5 | 0.50 | 375 | 124.0 | 1.1 | 1.2 | 75% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Wheat Boom Drive Su** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 27 | 5.00 | 5.00 | | 70 | | 350 | 350 | | | | | | | 1.4 | 350 | 4.05 | 3.5 | | | 5.0 | | | | | | |
| | 27 | 28 | 18.20 | 23.20 | | 260 | | 4732 | 5082 | | | | | | | 6.6 | 5082 | 3.24 | 41.0 | | | 47.6 | 0.50 | 300 | 68.4 | 1.0 | 1.0 | 70% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 29 | 1.50 | 1.50 | | | | | | | | | | | | 0.4 | | | | | | 0.4 | | | | | | |
| | 29 | 30 | 4.80 | 6.30 | | 2000 | | 9600 | 9600 | | | | | | | 1.8 | 9600 | 2.97 | 71.0 | | | 72.8 | 0.50 | 375 | 124.0 | 1.1 | 1.1 | 59% |
| | 30 | 28 | 2.80 | 9.10 | | 2000 | | 5600 | 15200 | | | | | | | 2.6 | 15200 | 2.77 | 104.9 | | | 107.5 | 0.50 | 450 | 201.6 | 1.3 | 1.3 | 53% |
| | 28 | 31 | 5.20 | 37.50 | | 1000 | | 5200 | 25482 | | | | | | | 10.7 | 25482 | 2.55 | 161.5 | | | 172.3 | 0.50 | 525 | 304.1 | 1.4 | 1.4 | 57% |
| | 31 | ex | | 37.50 | | | | | 25482 | | | | | | | 10.7 | 25482 | 2.55 | 161.5 | | | 172.3 | 0.50 | 600 | 434.2 | 1.5 | 1.4 | 40% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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**www.urbantech.com**




REFER TO DWG. S10 FOR CONTINUATION




LEGEND

- X.X / XX — SANITARY DRAINAGE AREA IN HECTARES / POPULATION DENSITY
- SANITARY DRAINAGE AREA BOUNDARY
- MH1A — PROPOSED SANITARY MANHOLE
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- PROPERTY BOUNDARY

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24-30-276-00 BY J.D BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY

APPROVED BY

CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

# PROPOSED SUBDIVISION 1816986 ONTARIO INC.

LOCATION

340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

DRAWING TITLE

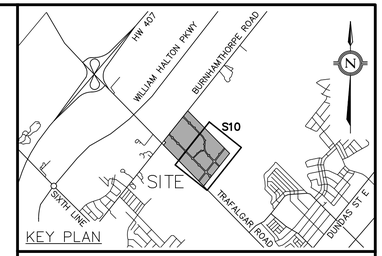
## SANITARY DRAINAGE AREA PLAN

| | | | |
|---|---|---|---|
| SCALE 1:1000 | DESIGN BY MF | PROJECT No. 1767 |
| DRAWN BY MS | CHECKED BY PC | PLAN No. S9 |
| DATE 2025/09/25 | SHEET X OF X | |

FILENAME: P:\1767 Westerkirk Trafalgar Inc\Drawings\DWG\DRAFT PLAN\1767S.dwg
PLOTDATE: Apr 10, 2026 - 12:24pm

REFER TO DWG. S9 FOR CONTINUATION




KEY PLAN

LEGEND

- X.X / XX — SANITARY DRAINAGE AREA IN HECTARES / POPULATION DENSITY
- SANITARY DRAINAGE AREA BOUNDARY
- X.X / XX — EXTERNAL SANITARY AREA IN HECTARES / POPULATION DENSITY
- MH1A — PROPOSED SANITARY MANHOLE
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- PROPERTY BOUNDARY

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24-30-276-00 BY J.D BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

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CONSULTANT

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

# PROPOSED SUBDIVISION 1816986 ONTARIO INC.

LOCATION

340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

DRAWING TITLE

# SANITARY DRAINAGE AREA PLAN

| | | | |
|---|---|---|---|
| SCALE 1:1000 | DESIGN BY MF | PROJECT No. 1767 | |
| DRAWN BY MS | CHECKED BY PC | PLAN No. S10 | |
| DATE 2025/09/25 | SHEET X OF X | | |

FILENAME P:\1767 Westerkirk Trafalgar Inc\Drawings\DWG\DRAFT PLAN\1767S.dwg
PLOTDATE Apr 10, 2026 - 12:24pm

TRAFALGAR ENGINEERING

**Prepared By:** AD
**Checked By:** MF
**Project No. :** 1767

# SANITARY SEWER DESIGN SHEET

**Regional Municipality of Halton**

**Project Name :** Westerkirk Trafalgar Inc
**Municipal Number:**
**Date:** 2025-11-06
**Sheet:** 1 of 1

| LOCATION | FROM MH | TO MH | TRIBUTARY AND FLOW DATA: Tributary Area: Residential: Area (ha) | Residential: Cum. Area (ha) | Residential: Density (ppha) | ICI: Area (ha) | ICI: Cum. Area (ha) | ICI: Density (ppha) | Total (ha) | Population Tributary: Res (pers.) | Population Tributary: ICI (pers.) | Population Tributary: Total (pers.) | Average Demand: Res (L/cap. Day) | Average Demand: ICI (L/cap. Day) | Incr. Avg. Q (L/s) | Total Avg. Q (L/s) | Peaking Factor: $K_{avg}$ | Peaking Factor: $M_{avg}$ | Peak Q, $Q_P$ (L/s) | Infiltr. (L/s) | Design Flow, $Q_D$ (L/s) | PIPE DATA: Length, L (m) | Pipe Dia., D (mm) | Slope, s (%) | Manning's Coeff., n | Full Flow Capacity, $Q_F$ (L/s) | Velocity: Full (m/s) | Velocity: Actual (m/s) | Flow Depth, d (mm) | d/D | $Q_d/Q_F$ (%) | Type | Class |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Main Street** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MH19A | MH20A | 0.48 | 0.48 | 600 | 0.12 | 0.12 | | 0.60 | 288 | 0 | 288 | 215 | 215 | 0.7 | 0.7 | 1.0 | 3.92 | 2.8 | 0.2 | 3.0 | 98.9 | 300 | 0.5 | 0.013 | 68.4 | 0.94 | **0.48** | 42.67 | 0.14 | 4% | **PVC** | **DR-35** |
| | MH21A | **MH20A** | | 0.48 | 600 | 0.16 | 0.28 | | 0.76 | | 0 | 288 | | 215 | 0.0 | 0.7 | 0.9 | 3.78 | 2.7 | 0.2 | 2.9 | 80.6 | 300 | 0.5 | 0.013 | 69.9 | 0.96 | **0.53** | 39.62 | 0.13 | 4% | **PVC** | **DR-35** |
| **Street C** | | | 1.01 | 1.01 | 600 | | 0.00 | | 1.01 | 606 | | 606 | 215 | | 1.5 | 1.5 | 1.0 | 3.93 | 5.9 | 0.3 | 6.2 | | | | | | | | | | | |
| | MH1A | MH2A | 0.76 | 1.77 | 600 | | 0.00 | | 1.77 | 456 | | 1062 | 215 | | 1.1 | 2.6 | 1.0 | 3.78 | 10.0 | 0.5 | 10.5 | 104.0 | 300 | 0.5 | 0.013 | 72.0 | 0.99 | 0.74 | 76.20 | 0.25 | 15% | **PVC** | **DR-35** |
| | | | 0.91 | 2.68 | 600 | | 0.00 | | 2.68 | 546 | | 1608 | 215 | | 1.4 | 4.0 | 1.0 | 3.66 | 14.6 | 0.8 | 15.4 | | | | | | | | | | | |
| | MH2A | MH3A | 0.50 | 3.18 | 600 | 0.20 | 0.20 | | 3.38 | 300 | 0 | 1908 | 215 | 215 | 0.7 | 4.7 | 1.0 | 3.56 | 16.9 | 1.0 | 17.9 | 91.1 | 300 | 0.3 | 0.013 | 56.2 | 0.77 | 0.70 | 115.82 | 0.38 | 32% | **PVC** | **DR-35** |
| | | | 0.22 | 3.40 | 600 | | 0.20 | | 3.60 | 132 | | 2040 | 215 | | 0.3 | 5.1 | 1.0 | 3.54 | 18.0 | 1.0 | 19.0 | | | | | | | | | | | |
| | MH3A | MH5A | 0.28 | 3.68 | 600 | | 0.20 | | 3.88 | 168 | | 2208 | 215 | | 0.4 | 5.5 | 1.0 | 3.52 | 19.3 | 1.1 | 20.4 | 40.6 | 300 | 0.4 | 0.013 | 66.2 | 0.91 | 0.80 | 115.82 | 0.38 | 31% | **PVC** | **DR-35** |
| | | | 0.20 | 3.88 | 600 | | 0.20 | | 4.08 | 120 | | 2328 | 215 | | 0.3 | 5.8 | 1.0 | 3.50 | 20.3 | 1.2 | 21.4 | | | | | | | | | | | |
| | MH5A | MH6A | 0.30 | 4.18 | 600 | | 0.20 | | 4.38 | 180 | | 2508 | 215 | | 0.4 | 6.2 | 1.0 | 3.48 | 21.7 | 1.3 | 22.9 | 34.7 | 300 | 0.3 | 0.013 | 58.8 | 0.81 | 0.76 | 131.06 | 0.43 | 39% | **PVC** | **DR-35** |
| | | | 0.25 | 4.43 | 600 | | 0.20 | | 4.63 | 150 | | 2658 | 215 | | 0.4 | 6.6 | 1.0 | 3.46 | 22.9 | 1.3 | 24.2 | | | | | | | | | | | |
| | MH6A | MH9A | 0.72 | 5.15 | 600 | | 0.20 | | 5.35 | 432 | | 3090 | 215 | | 1.1 | 7.7 | 1.0 | 3.41 | 26.2 | 1.5 | 27.7 | 56.9 | 300 | 0.3 | 0.013 | 58.8 | 0.81 | 0.80 | 146.30 | 0.48 | 47% | **PVC** | **DR-35** |
| | | | 0.19 | 5.34 | 600 | | 0.20 | | 5.54 | 114 | | 3204 | 215 | | 0.3 | 8.0 | 1.0 | 3.39 | 27.1 | 1.6 | 28.6 | | | | | | | | | | | |
| | MH9A | MH10A | 0.77 | 6.11 | 600 | | 0.20 | | 6.31 | 462 | | 3666 | 215 | | 1.1 | 9.1 | 1.0 | 3.35 | 30.5 | 1.8 | 32.3 | 27.4 | 300 | 0.5 | 0.013 | 71.3 | 0.98 | 0.96 | 143.26 | 0.47 | 45% | **PVC** | **DR-35** |
| | | | 0.37 | 6.48 | 600 | | 0.20 | | 6.68 | 222 | | 3888 | 215 | | 0.6 | 9.7 | 1.0 | 3.32 | 32.2 | 1.9 | 34.1 | | | | | | | | | | | |
| | MH10A | MH11A | 0.98 | 7.46 | 600 | | 0.20 | | 7.66 | 588 | | 4476 | 215 | | 1.5 | 11.1 | 1.0 | 3.27 | 36.4 | 2.2 | 38.6 | 29.5 | 300 | 0.5 | 0.013 | 68.4 | 0.94 | 0.98 | 161.54 | 0.53 | 56% | **PVC** | **DR-35** |
| | MH11A | **MH13A** | 0.55 | 8.01 | 600 | | 0.20 | | 8.21 | 330 | | 4806 | 215 | | 0.8 | 12.0 | 1.0 | 3.24 | 38.8 | 2.3 | 41.2 | 106.1 | 300 | 0.3 | 0.013 | 58.8 | 0.81 | 0.88 | 185.93 | 0.61 | 70% | **PVC** | **DR-35** |
| **Street A** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0.94 | 0.94 | 2000 | | 0.00 | 270 | 0.94 | 1880 | | 1880 | 215 | | 4.7 | 4.7 | 1.0 | 3.61 | 16.9 | 0.3 | 17.1 | | | | | | | | | | | |
| | MH17A | MH18A | 1.18 | 2.12 | 600 | | 0.00 | 270 | 2.12 | 708 | | 2588 | 215 | | 1.8 | 6.4 | 1.0 | 3.50 | 22.5 | 0.6 | 23.1 | 79.9 | 300 | 0.9 | 0.013 | 96.8 | 1.33 | 1.10 | 100.58 | 0.33 | 24% | **PVC** | **DR-35** |
| | | | 0.70 | 1.64 | 600 | | 0.00 | | 1.64 | 420 | | 3008 | 215 | | 1.0 | 5.7 | 1.0 | 3.44 | 19.7 | 0.5 | 20.2 | | | | | | | | | | | |
| | MH18A | MH20A | 1.18 | 2.82 | 600 | | 0.00 | | 2.82 | 708 | | 3716 | 215 | | 1.8 | 7.5 | 1.0 | 3.36 | 25.2 | 0.8 | 26.0 | 114.1 | 300 | 0.5 | 0.013 | 71.3 | 0.98 | 0.92 | 124.97 | 0.41 | 36% | **PVC** | **DR-35** |
| | | | 1.62 | 4.44 | 2000 | | 0.00 | | 4.44 | 3240 | | 6956 | 215 | | 8.1 | 15.5 | 1.0 | 3.11 | 48.3 | 1.3 | 49.6 | | | | | | | | | | | |
| | **MH20A** | MH24A | 1.06 | 5.98 | 600 | | 0.28 | | 6.26 | 636 | | 7880 | 215 | | 1.6 | 17.8 | 1.0 | 3.03 | 54.1 | 1.8 | 55.9 | 131.1 | 300 | 0.8 | 0.013 | 90.2 | 1.24 | 1.33 | 170.69 | 0.56 | 62% | **PVC** | **DR-35** |
| | MH24A | **MH22A** | 0.96 | 6.94 | 600 | | 0.28 | | 7.22 | 576 | | 8456 | 215 | | 1.4 | 19.3 | 1.0 | 3.00 | 57.9 | 2.1 | 60.0 | 128.0 | 300 | 0.9 | 0.013 | 95.7 | 1.31 | 1.40 | 173.74 | 0.57 | 63% | **PVC** | **DR-35** |
| **Settlers Road** | | | 4.50 | 4.50 | 90 | | 0.00 | | 4.50 | 405 | | 405 | 215 | | 1.0 | 1.0 | 1.0 | 4.02 | 4.1 | 1.3 | 5.3 | | | | | | | | | | | |
| | MH14A | MH13A | 0.93 | 5.43 | 90 | | 0.00 | | 5.43 | 84 | | 489 | 215 | | 0.2 | 1.2 | 1.0 | 3.98 | 4.8 | 1.6 | 6.4 | 144.2 | 200 | 0.5 | 0.013 | 24.2 | 0.75 | 0.63 | 71.12 | 0.35 | 26% | **PVC** | **DR-35** |
| | **MH13A** | MH22A | 0.74 | 14.18 | 600 | | 0.20 | | 14.38 | 444 | | 5739 | 215 | | 1.1 | 14.3 | 1.0 | 3.18 | 45.4 | 4.1 | 49.5 | 121.9 | 375 | 0.4 | 0.013 | 111.3 | 0.98 | 0.97 | 175.26 | 0.46 | 45% | **PVC** | **DR-35** |
| | | | 1.00 | 22.12 | 2000 | | 0.48 | | 22.60 | 2000 | | 16195 | 215 | | 5.0 | 38.5 | 1.0 | 2.73 | 105.3 | 6.5 | 111.8 | | | | | | | | | | | |
| | **MH22A** | MH23A | 0.59 | 22.71 | 600 | | 0.48 | | 23.19 | 354 | | 16549 | 215 | | 0.9 | 39.4 | 1.0 | 2.72 | 107.4 | 6.6 | 114.0 | 82.6 | 450 | 0.3 | 0.013 | 162.9 | 0.99 | 1.09 | 278.89 | 0.61 | 70% | **PVC** | **DR-35** |
| | MH23A | EX. MH | 0.00 | 22.71 | | | 0.48 | | 23.19 | 0 | | 16549 | 215 | | 0.0 | 39.4 | 1.0 | 2.72 | 107.4 | 6.6 | 114.0 | 56.6 | 450 | 0.4 | 0.013 | 188.1 | 1.15 | 1.21 | 256.03 | 0.56 | 61% | **PVC** | **DR-35** |
| **TRIBUTARY AREA TOTAL** | | | 23.89 | | | 0.48 | | | **0.00** | 16549 | 0 | **16549** | | | | | | | | | | Average Slope | | 0.50 | | | | | | | | |

Notes:
1) Pipe diameter is nominal
2) Capacity and velocity are based on Imperial I.D. (Nom. Dia x 25.4/25)
3) The average daily flow for residential and commercial, and the population density, are taken from the ASP Addendum

Peaking Factor $M = K_{avg} \times (1+14 / (4+P^{1/2}))$

Where P is Total population in thousands

$K_{avg} = (A_R + 0.8 \times A_{ICI}) / (A_{Total})$

Infiltration 0.286 L/ha/s

Population Density Unit Count

Full Flow Capacity (Manning's Equation), $Q_F$

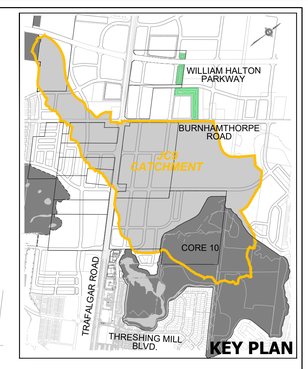
$Q_F = (1/n) \times A \times R^{2/3} \times s^{1/2}$

$= (1/n) \times 311.7 \times D^{8/3} \times s^{1/2}$

Average Daily Flow Residential 215 L/cap/d

Average Daily Flow Commercial 215 L/cap/d

**APPENDIX ‘D’**




HWY 407

EX. CULVERT

16.0ha 50%

EXISTING CARPOOL LOT

22.6ha 0%

JC1041

5.1ha 0%

JC1042

24.0ha 0%

JC1044

34.1ha 0%

JC1

CORE 8

10.4ha 30%

EX. 800ϕ CSP CULVERT IN INV. 184.40 OUT INV. 184.26

EX. HWY 407 POND OUTLET

EXISTING GO PARKING LOT

6.3ha 0%

11.7ha 0%

EX. 1150mm x 730mm AMPHIBIAN CROSSING

18.5ha 0%

JC1

7.7ha 0%

JC2

JC8a

20.9ha 0%

18.8ha 0%

WILLIAM HALTON PARKWAY

EX. 900ϕ CONC. CULVERT IN INV. 186.43 OUT INV. 185.77

EX. 900ϕ CONC. CULVERT IN INV. 185.58 OUT INV. 184.59

EX. 900ϕ CONC. STM OUTLET TO DITCH

1.0ha 90%

EX. 4.0m x 2.0m CONC. BOX CULVERT IN INV. 180.11 OUT INV. 180.10

3.7ha 90%

JC3

14.8ha 0%

WILLIAM HALTON PARKWAY

CORE 8

JC7 108.8ha 20%

EX. 900ϕ CONC. CULVERT IN INV. 185.99 OUT INV. 185.19

TEMP. SWM POND FOR WHP DRAINAGE

EL. 180.20

EX. 1050ϕ CONC. CULVERT IN INV. 185.02 OUT INV. 184.34

EX. 450ϕ POND OUTLET INV. 180.69

12.3ha 15%

16.3ha 5%

1.3ha 90%

18.1ha 0%

EX. 1500ϕ CSP CULVERT IN INV. 182.10 OUT INV. 181.90

EX. 900ϕ CSP CULVERT IN INV. 178.95 OUT INV. 179.02

JC8b

28.2ha 0%

JC5

EX. ISLAMIC CENTRE

0.5ha 90%

22.3ha 13%

EX. 450ϕ CONC. STM ROAD DRAINAGE OUTLET TO DITCH

EM1

1.1ha 90%

BURNHAMTHORPE ROAD

EX. CONC. BOX CULVERT 0.70m (H) x 2.7m (W) IN INV. 178.80 OUT INV. 178.88

12.3ha 0%

JC9b

EX. ME B1 850mm CSP CULVERT IN INV. 187.58 OUT INV. 187.35

EX. JC B2 850mm CONC. BOX CULVERT 0.83m (H) x 1.6m (W) IN INV. 184.61 OUT INV. 184.59

EX. CB OUTLET

DUNBURN DEVELOPMENTS LIMITED

EM4

10.9ha 15%

EX. 1390mm x970mm ARCH TWIN CSP CULVERT IN INV. 180.40 OUT INV. 180.30

WESTERKIRK TRAFALGAR INC.

68.4ha 0%

29.1ha 0%

JC9a

19.0ha 75%

RIVER THAMES BUILDING GROUP CORPORATION

DGB TRAFALGAR LTD.

30.35ha

4.2ha 0%

CORE 9

TRAFALGAR ROAD

JC9 121.3ha 3.0%

TRIBADEN INVESTMENTS INC.

CORE 10

EX. 1800ϕ CSP ME T5 CULVERT IN INV. 179.00 OUT INV. 178.90

27.71ha

EM4

EXISTING POND 27

EM1

**Urbantech Consulting**
**Stonybrook Consulting Inc.**
**Beacon Environmental**
**GEO Morphix Ltd.**
**R.J. Burnside & Associates Limited**

**LEGEND:**

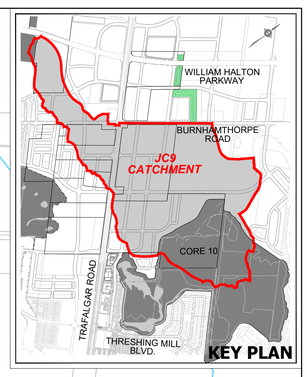
- SUBJECT LANDS
- CORE AREA
- JC7 CATCHMENT BOUNDARY
- JC9 CATCHMENT BOUNDARY
- EM4 CATCHMENT BOUNDARY
- JC8b — SUBCATCHMENT ID
- 159.00 — EXISTING CONTOURS
- EXISTING WATERCOURSE
- EXISTING CULVERT CROSSING
- EXISTING REGIONAL FLOODLINE
- 2.50ha / 0% — EXISTING STORM DRAINAGE AREA (ha) / APPROXIMATE IMPERVIOUSNESS
- EXISTING DRAINAGE BOUNDARY
- EXISTING OVERLAND FLOW DIRECTION

*JOSHUA CREEK*
*SUBCATCHMENT JC9 EIR/FSS*

**DRAWING 7.1**

**PREDEVELOPMENT DRAINAGE PLAN**

| PROJECT No. | DATE: | SCALE: |
|---|---|---|
| 23-745 | DEC. 2025 | 1:3000 |




HWY 407

HWY 407

407 TRANSITWAY

TO PROPOSED CHANNEL VIA CWS

22.8ha / 50%

407 POND

1.1ha / 0.90

MH410 T/G 187.50 OBV 185.50

TO PROPOSED CHANNEL VIA CWS

9.70ha / 0.90

MH404 T/G 187.00 OBV 184.50

210m-1200mm CWS @ 0.5%

6.8ha / 0.90

7.2ha / 0.90

MH406 T/G 186.25 OBV 183.75

EMPLOYMENT

STREET F

EX. POND 23

CORE 8 NORTH

1.7ha / 0.25

6.0ha / 0.90

EX. 1150mm x 730mm AMPHIBIAN CROSSING

GO PARKING LOT

MH408 T/G 188.25 OBV 185.50

GO SWM POND

220m-600mm CWS @ 0.5%

175m-600mm STM @ 0.5%

MH409 T/G 186.25 OBV 184.25

APARTMENT

570m-1200mm CWS @ 0.4%

STREET E

STREET D

POST-DEVELOPMENT DRAINAGE BOUNDARY TO SWM POND

6.4ha / 0.90

MH301 T/G 192.00 OBV 188.00

330m-1200mm STM @ 0.7%

MH402 T/G 186.45 OBV 183.50

1.2ha / 0.90

TRAFALGAR ROAD

2.6ha / -

WILLIAM HALTON PARKWAY

4.1ha / 0.90

MH401 T/G 189.00 OBV 186.00

STREET K

190m-600mm STM @ 0.5%

230m-1200x1800mm STM @ 0.5%

300m-900x1800mm STM @ 0.5%

MH403 T/G 187.25 OBV 184.50

MH405 T/G 184.85 OBV 182.30

SWM POND 35A (NWL 181.00)

MH407 T/G 184.25 OBV 182.00

MH411 T/G 184.00 OBV 181.85

105m-1200x1800mm BOX CWS @ 0.3%

CORE 8 SOUTH

20m-1200x2400mm STM @ 0.5%

230m-1200mm STM @ 1.0%

EX. 750mm STM SEWER

WILLIAM HALTON PARKWAY

HW OBV 183.80 INV 182.60

0.8ha / 0.25

MH302 T/G 190.00 OBV 183.90

HW OBV 183.90 INV 182.70

6.9ha / 0.90

1.7ha / 0.90 TO CWS VIA OGS

MH306 T/G 185.10 OBV 184.20

SWM POND 60 (NLW 182.70)

9.3ha / 0.90

MH307 OBV 183.80 INV 182.60

2.4ha / -

200m-1200x2400mm STM @ 0.20%

MH309 T/G 187.00 OBV 183.70

REALIGN STM EAST (DECOMMISSION EX. POND) EX. T/G 184.07 EX. OBV 182.40

6.7ha / 0.90

300m-900mm STM @ 0.3%

ABANDON EX. 4.0m x 2.0m CONC. BOX CULVERT IN INV. 180.11 OUT INV. 180.10

HW OBV 181.50 INV 180.30

2.6ha / 0.80

150m-1200x2400mm STM @ 0.3%

235m-1200mm CWS @ 0.3%

ALTERNATE 350m-1200x1800mm CWS @ 0.4%

1.1ha / 0.25

MH308 T/G 185.50 OBV 183.05

59.0m-1.2x1.8m BOX CULVERT @ 0.30% W INV. 181.50 E INV. 181.32

ALT. CROSSING LOCATION *SEE NOTES W INV. 181.50 E INV. 181.32

MH501 T/G 183.60 OBV 181.30

HW OBV 181.20 INV 180.00

2.3ha / -

LOYALIST TRAIL

MH305 T/G 189.00 OBV 184.40

275m-675mm STM @ 1.0%

200m-1200x1800mm STM @ 0.3%

100m-1200mm CWS @ 0.3%

MH311 T/G 185.60 OBV 182.50

3.4ha / 0.90

170m-900x1800mm STM @ 0.3%

20m-1200x1800mm STM @ 0.5%

HW OBV 180.60 INV 179.40

SWM POND 35 (NWL 179.40)

6.5ha / 0.90

POTENTIAL CWS CONNECTION IF APARTMENT BLOCK CANNOT DRAIN TO POND 60 BY GRAVITY (SEE NOTES)

3.8ha / 0.90

MH503 T/G 184.00 OBV 182.50

MH502 T/G 182.60 OBV 180.75

MH303 T/G 190.75 OBV 187.40

0.7ha / 0.90 TO CWS VIA OGS

MH310 T/G 184.80 OBV 183.15

MH304 T/G 186.50 OBV 185.15

MH312 T/G 184.30 OBV 182.00

315m-975mm STM @ 0.5%

600mm STM @ 0.50%

165m-1200x1800mm CWS @ 0.3%

125m-525mm STM @ 0.5%

400m-1200x1800mm CWS @ 0.4%

BURNHAMTHORPE ROAD

BURNHAMTHORPE ROAD

MH313 T/G 182.30 OBV 180.40

HW OBV 180.20 INV 179.00

MH4 T/G 189.40 OBV 187.35

3.5ha / 0.90

370m-975mm STM @ 0.3%

MH201 T/G 185.60 OBV 184.10

6.8ha / 0.90

DUNBURN DEVELOPMENTS LIMITED

0.8ha / 0.90 MAJOR

2.2ha / 0.90 MAJOR

MH204 T/G 184.75 OBV 182.90

1.4ha / 0.90

2.7ha / 0.90

5.7ha / 0.90

MH209 T/G 182.75 OBV 182.15

EX. WATERCOURSE

MH202 T/G 185.50 OBV 183.00

MH203 T/G 184.80 OBV 182.40

MH206 T/G 184.85 OBV 182.20

200m-1200mm STM @ 0.30%

MH210 T/G 183.75 OBV 181.45

825mm STM @ 1.40%

190m-750mm STM @ 0.3%

200m-900x1800mm STM @ 0.30%

WESTERKIRK TRAFALGAR INC.

POST-DEVELOPMENT DRAINAGE BOUNDARY

MH42 T/G 185.00 OBV 184.00

TO POND 29

23.8ha / 0.80

65.0m-1.2x1.8m BOX CULVERT @ 0.30% W INV. 181.20 E INV. 181.00

1.6ha / 0.90

300m-1200x1800mm STM @ 0.30%

RIVER THAMES BUILDING GROUP CORPORATION

975mm STM @ 0.50%

DGB TRAFALGAR LTD.

225m-750mm STM @ 0.3%

370m-1500x2400mm STM @ 0.30%

6.2ha / 0.90

4.1ha / 0.80

275m-1500x3000mm STM @ 0.30%

FUT. SETTLERS ROAD EXTENSION BY OTHERS

1.6ha / 0.25

1350mm STM @ 0.50%

SETTLERS ROAD

MH204 T/G 184.40 OBV 181.35

MH208 T/G 182.70 OBV 180.40

HW OBV 179.50 INV 178.00

SWM POND 38 (NWL 178.00)

1.2ha / 0.90

2.3ha / 0.90 TO CWS VIA OGS

6.6ha / 0.90

2.8ha / 0.80

5.1ha / 0.75

3.3ha / -

CORE 9

MH54 T/G 185.00 OBV 181.65

1500x2400mm STM @ 0.30%

TRAFALGAR ROAD

TRIBADEN INVESTMENTS INC.

MH211 T/G 182.50 OBV 179.50

HW OBV 178.90 INV 178.00

1.6ha / 0.90

TO POND 27

MH57 T/G 184.00 OBV 181.10

4.9ha / 0.90

200m-900x1800mm STM @ 0.40%

130m-900x 1800mm STM @ 0.40%

2.3ha / -

SWM POND 29 (NWL 179.50)

TO PSW 25

250m-1050mm STM @ 0.50%

MH210 T/G 183.00 OBV 180.30

5.8ha / 0.75

1.5ha / 0.90

340m-975m STM @ 0.3%

MH101

MH209 T/G 183.50 OBV 181.60

CORE 10

975mm STM @ 0.85%

750mm STM @ 0.50%

MARVIN AVENUE

140m-1.2x1.8m BOX CWS @ 0.25%

400m-1050mm CWS @ 1.5%

80m-675mm CWS @ 0.25% (5YR FLOW)

MH103 T/G 181.50 OBV 180.26

TO PSW 25

2.6ha / 0.85

EX. POND 27

EX. CHANNEL

EX. 975mm STM SEWER INV 174.32

POND OUTLET TO EX. CHANNEL INV. 172.50

MH102 T/G 181.25 OBV 180.40

55.5m-1.2x1.8m BOX CULVERT @ 0.25% W INV. 179.20 E INV. 179.06

HW OBV 179.80 INV 178.60

PSW 25

MH105 T/G 182.20 OBV 180.75

WILLIAM COSTSON AVENUE

*Urbantech Consulting*
*Stonybrook Consulting Inc.*
*Beacon Environmental*
*GEO Morphix Ltd.*
*R.J. Burnside & Associates Limited*

**LEGEND:**

- SUBJECT LANDS
- JC9 FSS STUDY AREA
- JC9 EIR SUBCATCHMENT AREA
- CORE AREA
- PROPOSED SWM POND
- PROPOSED CHANNEL
- PRELIMINARY CLEAN WATER SEWER ALIGNMENT AND FLOW DIRECTION (ANY STORM SEWERS DISHARGING DIRECTLY INTO CLEAN SEWERS REQUIRE OGS)
- PRELIMINARY STORM SEWER ALIGNMENT AND FLOW DIRECTION (SHOWN FOR MAIN SERVICING ROUTES ONLY)
- TRAFALGAR ROAD CROSSING (TO BE INSTALLED BY REGION)
- ALTERNATE CROSSING - SEE NOTES
- MAJOR SYSTEM / OVERLAND FLOW DIRECTION & DIRECTION OF LOCAL STORM SEWERS
- 2.50ha / 0.65 — MINOR SYSTEM STORM DRAINAGE AREA (ha) / RUNOFF COEFFICIENT
- POST-DEVELOPMENT STORM DRAINAGE BOUNDARY
- STORM DRAINAGE SUB-BOUNDARY
- MAJOR SYSTEM CAPTURE AREA (100 MINUS 5 YEAR FLOW ADDED TO MINOR SYSTEM)
- DRAINAGE TO POND 29 (EM4)
- DRAINAGE TO POND 60 (JC7)
- DRAINAGE TO POND 35A (JC7)
- DRAINAGE TO POND 35 (JC7)
- DRAINAGE TO POND 38 (JC9)
- CLEAN DRAINAGE AREAS AS NOTED (OGS OR OTHER TO BE PROVIDED)

*JOSHUA CREEK*
*SUBCATCHMENT JC9 EIR/FSS*

**DRAWING 7.8**

**STORM DRAINAGE & SERVICING PLAN**

| PROJECT No. | DATE: | SCALE: |
|---|---|---|
| 23-745 | DEC. 2025 | 1:2500 |

URBANTECH®

# STORM SEWER DESIGN SHEET

**5 Year Storm (+ Constant Flow)**

**Trafalgar Road Corridor**

**Town of Oakville**

**PROJECT DETAILS**

**Project No:** 23-745
**Date:** March 2025
**Designed by:** sr
**Checked by:** DZ

**DESIGN CRITERIA**

**Min. Diameter =** 300 mm
**Mannings 'n'=** 0.013
**Starting Tc =** 10 min
**Factor of Safety =** 20 %

**Rainfall Intensity =** $\frac{A}{(Tc+B)^{c}}$

**A =** 1170
**B =** 5.8
**c =** 0.843

Shading indicates pipes carrying 100yr flow

**NOMINAL PIPE SIZE USED**

| STREET | FROM MH | TO MH | AREA (ha) | RUNOFF COEFFICIENT "R" | 'AR' | ACCUM. 'AR' | RAINFALL INTENSITY (mm/hr) | FLOW (m3/s) | CONSTANT FLOW (m3/s) | ACCUM. CONSTANT FLOW (m3/s) | TOTAL FLOW (m3/s) | LENGTH (m) | SLOPE (%) | PIPE DIAMETER (mm) | FULL FLOW CAPACITY (m3/s) | FULL FLOW VELOCITY (m/s) | INITIAL Tc (min) | TIME OF CONCENTRATION (min) | ACC. TIME OF CONCENTRATION (min) | PERCENT FULL (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DRAINAGE TO PSW25** | | | | | | | | | | | | | | | | | | | | |
| POND 29 | 101 | 102 | | | | | 114.2 | | 0.242 | 0.242 | 0.242 | 80.0 | 0.30 | 600 | 0.336 | 1.19 | 10.00 | 1.12 | 11.12 | 72% |
| TRAFALGAR RD | 104 | 102 | 2.30 | 0.90 | 2.07 | 2.07 | 114.2 | 0.657 | 0.411 | 0.411 | 1.068 | 340.0 | 0.30 | 975 | 1.227 | 1.64 | 10.00 | 3.45 | 13.45 | 87% |
| CROSSING 1 | 102 | 103 | 0.00 | 0.00 | 0.00 | 2.07 | 96.7 | 0.556 | 0.000 | 0.653 | 1.209 | 55.5 | 0.25 | 1200x1800 (BOX) | 4.204 | 1.95 | 13.45 | 0.48 | 13.92 | 29% |
| TO PSW25 | 103 | HW1 | 1.50 | 0.90 | 1.35 | 3.42 | 94.7 | 0.900 | 0.325 | 0.978 | 1.878 | 140.0 | 0.25 | 1200x1800 (BOX) | 4.204 | 1.95 | 13.92 | 1.20 | 15.12 | 45% |
| **DRAINAGE TO POND D** | | | | | | | | | | | | | | | | | | | | |
| BURNHAMTHORPE RD | 201 | 202 | 3.50 | 0.90 | 3.15 | 3.15 | 114.2 | 0.999 | | | 0.999 | 370.0 | 0.30 | 975 | 1.227 | 1.64 | 10.00 | 3.75 | 13.75 | 81% |
| STREET 9 | 202 | 203 | 6.80 | 0.90 | 6.12 | 9.27 | 95.4 | 2.458 | | | 2.458 | 200.0 | 0.30 | 900x1800 (BOX) | 3.059 | 1.89 | 13.75 | 1.77 | 15.52 | 80% |
| TRAFALGAR RD | 204 | 203 | 1.40 | 0.90 | 1.26 | 1.26 | 114.2 | 0.400 | | | 0.400 | 190.0 | 0.30 | 750 | 0.610 | 1.38 | 10.00 | 2.29 | 12.29 | 66% |
| TRAFALGAR RD | 205 | 203 | 1.60 | 0.90 | 1.44 | 1.44 | 114.2 | 0.457 | | | 0.457 | 225.0 | 0.30 | 750 | 0.610 | 1.38 | 10.00 | 2.72 | 12.72 | 75% |
| CROSSING 2 | 203 | 206 | 0.00 | 0.00 | 0.00 | 11.97 | 88.7 | 2.950 | 1.616 | 1.616 | 4.566 | 65.0 | 0.30 | 1200x1800 (BOX) | 4.643 | 2.15 | 15.52 | 0.50 | 16.02 | 98% |
| STREET 7 | 206 | 207 | 7.10 | 0.90 | 6.39 | 18.36 | 87.0 | 4.437 | 0.000 | 1.616 | 6.053 | 225.0 | 0.30 | 1200x2400 (BOX) | 6.587 | 2.29 | 16.02 | 1.64 | 17.66 | 92% |
| STREET 1 | 207 | 208 | 4.60 | 0.90 | 4.14 | 22.50 | 81.8 | 5.115 | 0.628 | 2.244 | 7.359 | 260.0 | 0.30 | 1500x2400 (BOX) | 9.059 | 2.52 | 17.66 | 1.72 | 19.38 | 81% |
| SETTLERS RD | | 208 | 9.50 | 0.90 | 8.55 | 8.55 | | | | | | | | | | | | | | |
| SCHOOL | | 208 | 4.10 | 0.80 | 3.28 | 3.28 | | | | | | | | | | | | | | |
| TO POND D | 208 | HW2 | 1.20 | 0.90 | 1.08 | 35.41 | 77.1 | 7.584 | 0.000 | 2.244 | 9.828 | 275.0 | 0.30 | 1500x3000 (BOX) | 11.944 | 2.65 | 19.38 | 1.73 | 21.11 | 82% |
| STREET 3 | 209 | 210 | 4.90 | 0.90 | 4.41 | 4.41 | 114.2 | 1.399 | | | 1.399 | 250.0 | 0.50 | 1050 | 1.931 | 2.23 | 10.00 | 1.87 | 11.87 | 72% |
| STREET 2 | 210 | 211 | 2.80 | 0.80 | 2.24 | 6.65 | 103.9 | 1.920 | | | 1.920 | 160.0 | 0.40 | 900x1800 (BOX) | 3.532 | 2.18 | 11.87 | 1.22 | 13.09 | 54% |
| TO POND D | 211 | HW3 | 5.10 | 0.75 | 3.83 | 10.48 | 98.2 | 2.859 | | | 2.859 | 130.0 | 0.40 | 900x1800 (BOX) | 3.532 | 2.18 | 13.09 | 0.99 | 14.09 | 81% |

**Urbantech Consulting, A Division of Leighton-Zec Ltd.**
3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
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**www.urbantech.com**

URBANTECH®

# STORM SEWER DESIGN SHEET

**5 Year Storm (+ Constant Flow)**

**Trafalgar Road Corridor**

**Town of Oakville**

**PROJECT DETAILS**

**Project No:** 23-745
**Date:** March 2025
**Designed by:** sr
**Checked by:** DZ

**DESIGN CRITERIA**

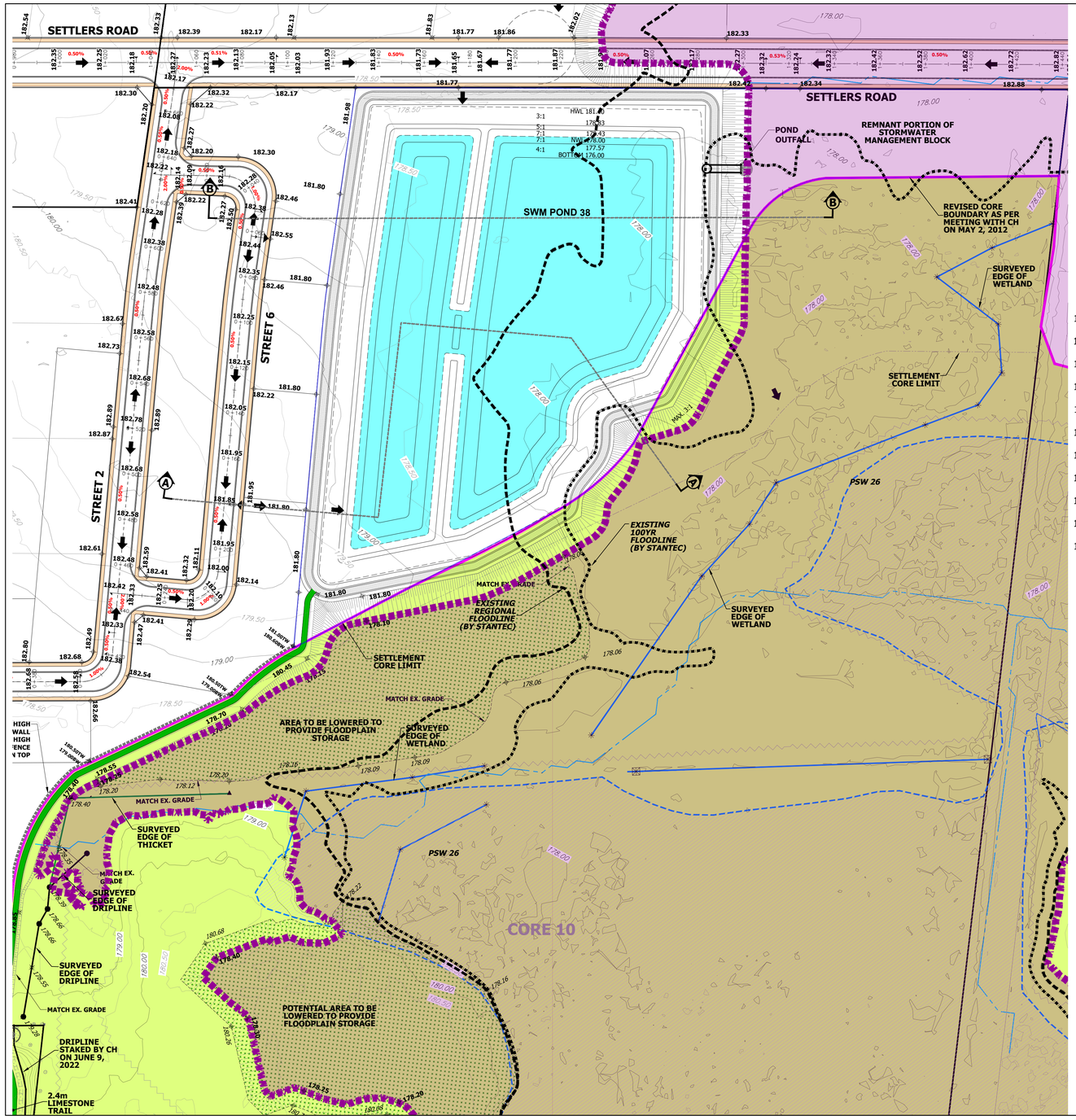
| | | | | |
|---|---|---|---|---|
| **Min. Diameter =** | **300** | **mm** | **Rainfall Intensity =** | **A / (Tc+B)^c** |
| **Mannings 'n'=** | **0.013** | | | |
| **Starting Tc =** | **10** | **min** | **A =** | **1170** |
| | | | **B =** | **5.8** |
| **Factor of Safety =** | **20** | **%** | **c =** | **0.843** |

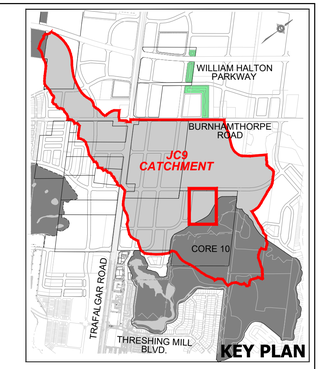
Shading indicates pipes carrying 100yr flow

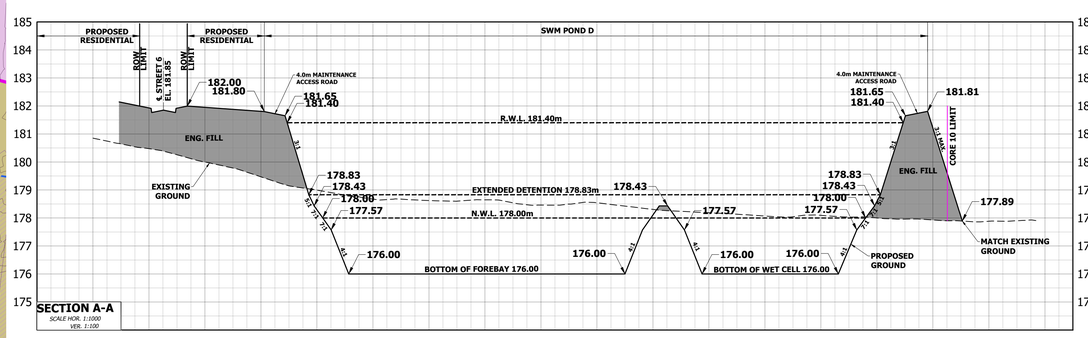
**NOMINAL PIPE SIZE USED**

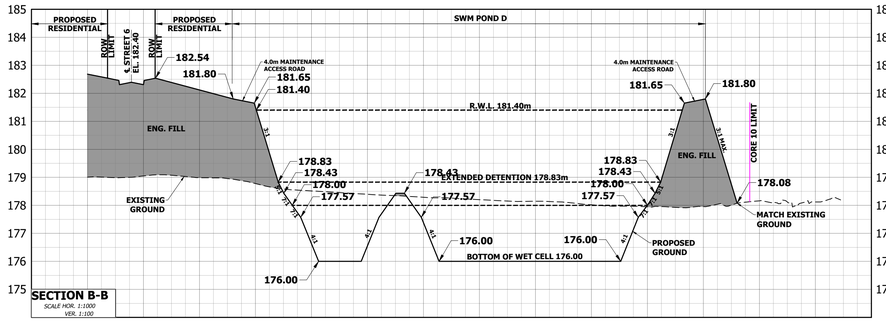
| STREET | FROM MH | TO MH | AREA (ha) | RUNOFF COEFFICIENT "R" | 'AR' | ACCUM. 'AR' | RAINFALL INTENSITY (mm/hr) | FLOW (m3/s) | CONSTANT FLOW (m3/s) | ACCUM. CONSTANT FLOW (m3/s) | TOTAL FLOW (m3/s) | LENGTH (m) | SLOPE (%) | PIPE DIAMETER (mm) | FULL FLOW CAPACITY (m3/s) | FULL FLOW VELOCITY (m/s) | INITIAL Tc (min) | TIME OF CONCENTRATION (min) | ACC. TIME OF CONCENTRATION (min) | PERCENT FULL (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DRAINAGE TO POND A** | | | | | | | | | | | | | | | | | | | | |
| N OF WHP | 301 | 302 | 6.00 | 0.90 | 5.40 | 5.40 | 114.2 | 1.713 | 1.094 | 1.094 | 2.807 | 230.0 | 1.00 | 1200 | 3.899 | 3.45 | 10.00 | 1.11 | 11.11 | 72% |
| STREET P | 303 | 305 | 2.60 | 0.80 | 2.08 | 2.08 | 114.2 | 0.660 | | | 0.660 | 275.0 | 1.00 | 675 | 0.841 | 2.35 | 10.00 | 1.95 | 11.95 | 79% |
| STREET L | 304 | 305 | 6.50 | 0.90 | 5.85 | 5.85 | 114.2 | 1.856 | 1.233 | 1.233 | 3.089 | 200.0 | 0.30 | 1200x1800 (BOX) | 4.605 | 2.13 | 10.00 | 1.56 | 11.56 | 67% |
| STREET L | 305 | 302 | 8.80 | 0.90 | 7.92 | 15.85 | 103.5 | 4.558 | 0.000 | 1.233 | 5.791 | 150.0 | 0.30 | 1200x2400 (BOX) | 6.587 | 2.29 | 11.95 | 1.09 | 13.04 | 88% |
| TO POND A | 302 | HW4 | 0.00 | 0.00 | 0.00 | 21.25 | 98.4 | 5.811 | 0.000 | 2.327 | 8.138 | 20.0 | 0.50 | 1200x2400 (BOX) | 8.504 | 2.95 | 13.04 | 0.11 | 13.16 | 96% |
| WATER TOWER | | 306 | 1.10 | 0.25 | 0.28 | 0.28 | | | | | | | | | | | | | | |
| LOYALIST TRAIL | 306 | HW5 | 7.10 | 0.90 | 6.39 | 6.67 | 114.2 | 2.115 | 0.992 | 0.992 | 3.107 | 200.0 | 0.20 | 1200x2400 (BOX) | 5.379 | 1.87 | 10.00 | 1.78 | 11.78 | 58% |
| POND A OUTLET | 307 | 308 | 0.00 | 0.00 | 0.00 | 0.00 | 114.2 | 0.000 | 1.750 | 1.750 | 1.750 | 235.0 | 0.30 | 1200 | 2.135 | 1.89 | 10.00 | 2.07 | 12.07 | 82% |
| TRAFALGAR RD | 308 | X3 | 0.00 | 0.00 | 0.00 | 0.00 | 102.9 | 0.000 | 0.000 | 1.750 | 1.750 | 100.0 | 0.30 | 1200 | 2.135 | 1.89 | 12.07 | 0.88 | 12.96 | 82% |
| TRAFALGAR RD | 309 | X3 | 1.70 | 0.90 | 1.53 | 1.53 | 114.2 | 0.485 | | | 0.485 | 230.0 | 0.50 | 675 | 0.594 | 1.66 | 10.00 | 2.31 | 12.31 | 82% |
| TRAFALGAR RD | 310 | X3 | 0.70 | 0.90 | 0.63 | 0.63 | 114.2 | 0.200 | | | 0.200 | 125.0 | 0.50 | 525 | 0.304 | 1.40 | 10.00 | 1.48 | 11.48 | 66% |
| CROSSING 3 | X3 | 311 | 0.00 | 0.00 | 0.00 | 2.16 | 98.8 | 0.593 | 0.000 | 1.750 | 2.343 | 59.0 | 0.30 | 1200x1800 (BOX) | 4.643 | 2.15 | 12.96 | 0.46 | 13.41 | 50% |
| EASEMENT | 311 | 312 | 0.00 | 0.00 | 0.00 | 2.16 | 96.8 | 0.581 | 0.000 | 1.750 | 2.331 | 150.0 | 0.30 | 1200x1800 (BOX) | 4.605 | 2.13 | 13.41 | 1.17 | 14.59 | 51% |
| BURNHAMTHORPE RD | 312 | HW6 | 0.00 | 0.00 | 0.00 | 2.16 | 92.1 | 0.553 | 0.000 | 1.750 | 2.303 | 415.0 | 0.40 | 1200x1800 (BOX) | 5.318 | 2.46 | 14.59 | 2.81 | 17.40 | 43% |
| **DRAINAGE TO POND B** | | | | | | | | | | | | | | | | | | | | |
| STREET K | 401 | 402 | 6.40 | 0.90 | 5.76 | 5.76 | 114.2 | 1.827 | 1.123 | 1.123 | 2.950 | 330.0 | 0.70 | 1200 | 3.262 | 2.88 | 10.00 | 1.91 | 11.91 | 90% |
| TRAFALGAR RD | 403 | 402 | 1.20 | 0.90 | 1.08 | 1.08 | 114.2 | 0.343 | | | 0.343 | 190.0 | 0.50 | 600 | 0.434 | 1.54 | 10.00 | 2.06 | 12.06 | 79% |
| TRAFALGAR RD | 404 | 402 | 1.10 | 0.90 | 0.99 | 0.99 | 114.2 | 0.314 | | | 0.314 | 175.0 | 0.50 | 600 | 0.434 | 1.54 | 10.00 | 1.90 | 11.90 | 72% |
| TO POND B | 402 | 405 | 6.90 | 0.90 | 6.21 | 14.04 | 103.0 | 4.017 | 0.000 | 1.123 | 5.140 | 230.0 | 0.50 | 1200x1800 (BOX) | 5.946 | 2.75 | 12.06 | 1.39 | 13.45 | 86% |
| TO POND B | 406 | 407 | 8.50 | 0.90 | 7.65 | 7.65 | 114.2 | 2.427 | | | 2.427 | 300.0 | 0.50 | 900x1800 (BOX) | 3.949 | 2.44 | 10.00 | 2.05 | 12.05 | 61% |
| **DRAINAGE TO POND C** | | | | | | | | | | | | | | | | | | | | |
| WHP | | EX.POND | 4.10 | 0.90 | 3.69 | 3.69 | | | | | | 925.0 | 0.53 | 750 | 0.810 | 1.83 | 10.00 | 8.40 | 18.40 | |
| WHP | EX.POND | 501 | | | | 3.69 | 79.7 | 0.817 | | | 0.817 | 250.0 | 0.30 | 900 | 0.992 | 1.56 | 18.40 | 2.67 | 21.08 | 82% |
| STREET B | 501 | 502 | 6.70 | 0.90 | 6.03 | 9.72 | 73.0 | 1.971 | | | 1.971 | 170.0 | 0.30 | 1350 | 2.923 | 2.04 | 21.08 | 1.39 | 22.46 | 67% |
| BURNHAMTHORPE RD | 503 | 502 | 3.80 | 0.90 | 3.42 | 3.42 | 114.2 | 1.085 | | | 1.085 | 390.0 | 0.50 | 975 | 1.585 | 2.12 | 10.00 | 3.06 | 13.06 | 68% |
| POND C | 502 | POND C | 3.40 | 0.90 | 3.06 | 16.20 | 70.0 | 3.148 | | | 3.148 | 10.0 | 0.50 | 1200x1800 (BOX) | 5.946 | 2.75 | 22.46 | 0.06 | 22.52 | 53% |

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**www.urbantech.com**




**NOTES RE POND 38:**

1. THE UPDATED REGIONAL FLOODLINE BY URBANTECH IS BASED ON THE UPDATED CH HYDROLOGIC MODEL AND GENERALLY RESULTS IN HIGHER WATER LEVELS COMPARED TO STANTEC'S APPROVED 2012 MODEL. BOTH LIMITS ARE INDICATED ON THIS PLAN FOR REFERENCE.
2. THE ALLOWABLE LIMIT OF POND 38 ENCROACHMENT WAS UP TO THE 100-YEAR WATER LEVEL (BY STANTEC) AS IDENTIFIED IN THE CORE 10 BOUNDARY DELINEATION MEMO BY STONYBROOK CONSULTING, DATED SEPTEMBER 17, 2012. THE PROPOSED POND DESIGN GENERALLY MAINTAINS THE FLOODPLAIN ENCROACHMENT CONSISTENT WITH THE STRATEGY AGREED TO WITH THE AGENCIES PER THE 2012 MEMO BASED ON THE STANTEC 100-YEAR FLOODLINE.
3. TO ACCOUNT FOR THE LOSS OF RIPARIAN STORAGE, IT IS PROPOSED TO LOWER THE ADJACENT AREA WITHIN CORE 10. HOWEVER, THE AREA CONTEMPLATED IN THE 2012 MEMO IS INSUFFICIENT TO COMPENSATE FOR THE ENTIRE LOSS, WHICH IS WHY AN ADDITIONAL COMPENSATION AREA HAS BEEN PROPOSED FARTHER SOUTH WITHIN CORE 10 FOR REVIEW.
4. THE FLOODPLAIN COMPENSATION STRATEGY DOES NOT ACCOUNT FOR THE FUTURE EXTENSION OF SETTLERS ROAD TO THE EAST OF THE TRIBADEN PROPERTY.


*Urbantech Consulting*
*Stonybrook Consulting Inc.*
*Beacon Environmenta.*
*GEO Morphix Ltd.*
*R.J. Burnside & Associates Limited*


**LEGEND:**

- SUBJECT LANDS
- CORE AREA
- 159.00 EXISTING CONTOURS
- EXISTING WATERCOURSE
- STAKED DRIPLINE
- STAKED WETLAND
- PSW
- PROPOSED NHS
- PROPOSED SWM POND
- PROPOSED REGIONAL FLOODLINE (UPDATED MODEL BY URBANTECH)
- EX. REGIONAL FLOODLINE (PREVIOUS MODEL BY STANTEC)
- EX. 100YR FLOODLINE (PREVIOUS MODEL BY STANTEC)
- × 202.45 PROPOSED GRADE
- × 202.45 EXISTING GRADE
- PROPOSED OVERLAND FLOW ROUTE
- PROPOSED BUS STOP
- PROPOSED ASPHALT MULTI-USE PATH
- PROPOSED 1.5m CONC. SIDEWALK
- 2.4m TRAIL

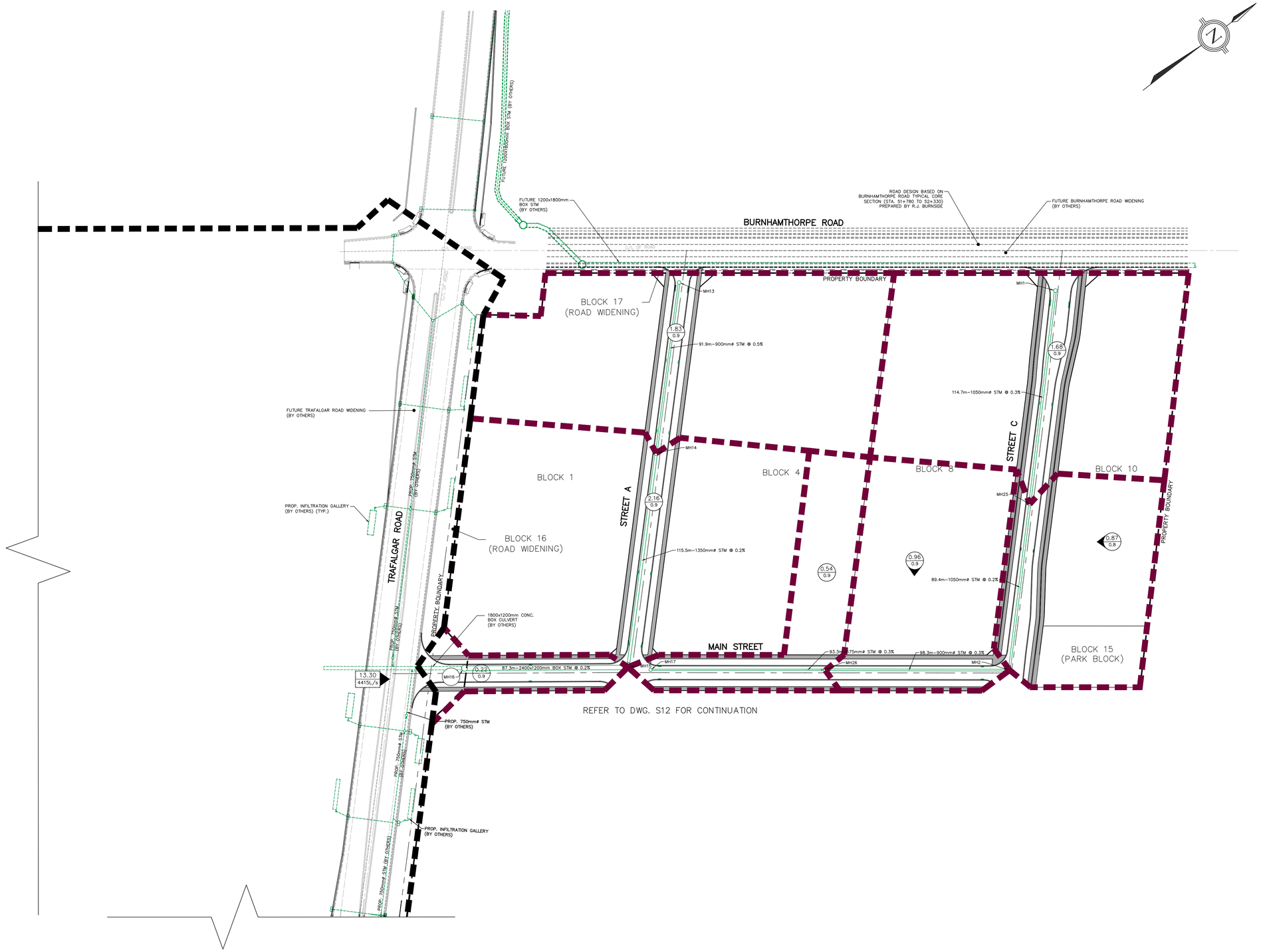
*JOSHUA CREEK*
*SUBCATCHMENT JC9 EIR/FSS*

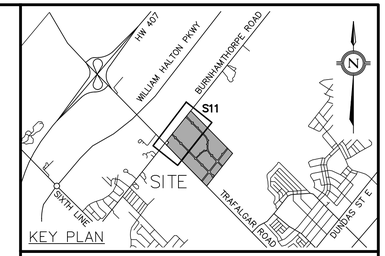
**DRAWING 7.12**

**SWM POND 38**

| PROJECT No. | DATE: | SCALE: |
|---|---|---|
| 23-745 | DEC. 2025 | 1:1000 |


File: P:\Projects\23-745-JC9 EIR-FSS (N Oakville Group- Oakville )\Reports\EIR-FSS\Drawings & Figures\7_0 - GRADING DRAINAGE AND STORMWATER MANAGEMENT\DRAWING X - SWM POND D.dwg - Revised by <VPAVLOVIC> : Tue, Mar 25 2025 - 2:33pm




LEGEND

- 0.25 / 0.8 — STORM DRAINAGE AREA IN HECTARES / STORM RUN-OFF COEFFICIENT
- STORM DRAINAGE AREA BOUNDARY
- EXTERNAL STORM DRAINAGE AREA BOUNDARY
- 13.30 / 4415L/s — EXTERNAL STORM DRAINAGE AREA IN HECTARES / STORM 100YR FLOW
- PROPOSED DOUBLE CATCHBASIN
- MH1 — PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- FUTURED STORM SEWER (BY OTHERS)
- PROPERTY BOUNDARY

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24-30-276-00 BY J.D. BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE
PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

DRAWING TITLE
STORM DRAINAGE AREA PLAN

| | | | |
|---|---|---|---|
| SCALE 1:1000 | DESIGN BY MF | PROJECT No. 1767 |
| DRAWN BY MS | CHECKED BY PC | PLAN No. S11 |
| DATE 2025/09/25 | SHEET X OF X | |

FILENAME: P:\1767 Westerkirk Trafalgar Inc\Drawings\DWG\DRAFT PLAN\1767S.dwg
PLOTDATE: Apr 10, 2026 - 12:04pm

REFER TO DWG. S11 FOR CONTINUATION

13.30
4415L/s

PROP. 750mmø STM (BY OTHERS)

PROP. INFILTRATION GALLERY (BY OTHERS) (TYP.)

PROP. 750mmø STM (BY OTHERS)

PROP. 750mmø STM (BY OTHERS)

PROP. 750mmø STM (BY OTHERS)

TRAFALGAR ROAD

FUTURE TRAFALGAR ROAD WIDENING (BY OTHERS)

PROPERTY BOUNDARY

BLOCK 2

BLOCK 16
(ROAD WIDENING)

STREET A

STREET B

STREET C

BLOCK 14
(PARK BLOCK)

BLOCK 6

BLOCK 12

SETTLERS ROAD

BLOCK 3

BLOCK 7

BLOCK 13
(SCHOOL BLOCK)

BLOCK 18
(0.3m RESERVE)

BLOCK 19
(0.3m RESERVE)

TRINISON LANDS

BLOCK 20
(0.3m RESERVE)

SCHOOL BLOCK

FUTURE
SCHOOL BLOCK

SWM POND 38

CONC. HEADWALL

MH1 MH2 MH3 MH4 MH5 MH6 MH7 MH8 MH9 MH10 MH18 MH21 MH22 MH23 MH24 MH27

45.5m–1350mmø STM @ 0.3%

33.4m–1350mmø STM @ 0.2%

52.0m–1350mmø STM @ 0.2%

34.2m–1500mmø STM @ 0.2%

24.2m–1500mmø STM @ 0.2%

106.3m–1500mmø STM @ 0.2%

203.9m–2400x1500mm BOX STM @ 0.4%

123.1m–2400x1500mm BOX STM @ 0.2%

272.4m–3000x1500mm BOX STM @ 0.2%

81.2m–675mmø STM @ 0.3%

77.7m–900mmø STM @ 0.5%

42.6m–3000x1500mm BOX STM @ 0.2%

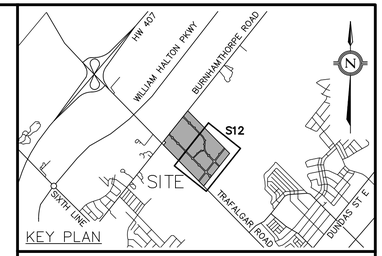
61.6m–2400x1500mm BOX STM @ 0.2%

0.25/0.8 0.50/0.9 0.39/0.9 0.85/0.9 0.13/0.9 0.49/0.9 0.08/0.9 0.39/0.7 4.04/0.9 0.73/0.9 1.46/0.9 4.10/0.8 0.25/0.9 0.64/0.9 0.12/0.9 0.78/0.9 0.10/0.9 0.87/0.8

3:1 4:1 3:1 4:1

HWL 181.40
HWL 178.43
HWL 178.00
177.57
BOTTOM 176.00

N




KEY PLAN

## LEGEND

- 0.25/0.8 — STORM AREA IN HECTARES / STORM RUN–OFF COEFFICIENT
- STORM DRAINAGE AREA BOUNDARY
- EXTERNAL STORM DRAINAGE AREA BOUNDARY
- 13.30/4415L/s — EXTERNAL STORM AREA IN HECTARES / STORM 100YR FLOW
- PROPOSED DOUBLE CATCHBASIN
- MH1 PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- FUTURED STORM SEWER (BY OTHERS)
- PROPERTY BOUNDARY

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24–30–276–00 BY J.D BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY

APPROVED BY


CONSULTANT

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com


PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

DRAWING TITLE

STORM DRAINAGE AREA PLAN

| | | | |
|---|---|---|---|
| SCALE 1:1000 | DESIGN BY MF | PROJECT No. 1767 | |
| DRAWN BY MS | CHECKED BY PC | PLAN No. S12 | |
| DATE 2025/09/25 | SHEET X OF X | | |

FILENAME: P:\1767 Westerkirk Trafalgar Inc\Drawings\DWG\DRAFT PLAN\1767S.dwg
PLOTDATE: Apr 10, 2026 - 12:24pm

TRAFALGAR ENGINEERING

**Prepared By:** MF
**Checked By:** PC
**Project No. :** 1767

# STORM SEWER DESIGN SHEET

**Town of Oakville**
**100-Year Storm**

**Project Name :** Westerkirk Neyagawa
**Municipal Number:**
**Date:** 2024-07-25
**Sheet:** 1 of 1

| | | | DRAINAGE AREA | | | | FLOW | | | SEWER DESIGN | | | | PIPE HYDRAULICS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCATION | FROM MH | TO MH | Area, A (ha) | Runoff Coeff., C | A x C (ha) | Accum. A x C (ha) | Time of Conc., $T_c$ (min) | Intensity, I (mm/h) | Expected Flow, Q (L/s) | Length, L (m) | Gradient, s (%) | Pipe Dia., D (mm) | Manning's Coeff., n | Full Flow Capacity, $Q_F$ (L/s) | Full Flow Velocity, $V_F$ (m/s) | d/D | Actual Velocity, V (m/s) | Time of Flow (min) | $Q/Q_F$ |
| **EXTERNAL AREA - REGIONAL STM** | | | 13.30 | 1.00 | 13.300 | 13.300 | 15.52 | 69.77 | **4415** | | | | | | | | | | |
| **INTERNAL SEWERS** | | | | | | | | | | | | | | | | | | | |
| **Street A** | MH13 | MH14 | 1.83 | 0.90 | 1.647 | 1.647 | 10.00 | 200.8 | **919** | 91.9 | 0.5 | 900 | 0.013 | **1388** | 2.11 | 0.59 | 2.28 | 0.67 | 0.66 |
| | MH14 | **MH15** | 2.16 | 0.90 | 1.944 | 3.591 | 10.67 | 193.7 | **1932** | 117.0 | 0.2 | 1350 | 0.013 | **2490** | 1.69 | 0.66 | 1.87 | 1.04 | 0.78 |
| **Main Street** | MH16 | **MH15** | 0.22 | 0.90 | 0.198 | 0.198 | 15.52 | 154.9 | **4500** | 87.3 | 0.3 | 1857 | 0.013 | **6661** | 2.37 | 0.61 | 2.59 | 0.56 | 0.68 |
| **Street A** | | | | | | | | | | | | | | | | | | | |
| | | | 1.72 | 0.90 | 1.548 | 1.548 | 10.00 | 200.8 | **864** | | | | | | | | | | |
| | **MH15** | **MH21** | 4.04 | 0.90 | 3.636 | 8.973 | 16.08 | 151.5 | **8191** | 259.4 | 0.2 | 2093 | 0.013 | **7589** | 2.14 | 0.88 | 2.59 | 1.67 | 1.08 |
| | MH24 | **MH21** | 0.13 | 0.90 | 0.117 | 0.117 | 10.00 | 200.8 | **65** | 54.3 | 0.4 | 375 | 0.013 | **116** | 1.01 | 0.53 | 1.06 | 0.85 | 0.56 |
| **Settlers Road** | MH22 | **MH21** | 0.64 | 0.90 | 0.576 | 0.576 | 10.00 | 200.8 | **321** | 81.2 | 0.2 | 675 | 0.013 | **392** | 1.06 | 0.68 | 1.20 | 1.13 | 0.82 |
| | MH21 | **MH3** | 0.78 | 0.90 | 0.702 | 10.368 | 17.75 | 142.1 | **8509** | 123.1 | 0.2 | 2093 | 0.013 | **12082** | 2.75 | 0.91 | 2.59 | 0.79 | 1.08 |
| **Street C** | MH1 | MH25 | 1.68 | 0.90 | 1.512 | 1.512 | 10.00 | 200.8 | **843** | 114.7 | 0.2 | 1050 | 0.013 | **1274** | 1.43 | 0.59 | 1.54 | 1.24 | 0.66 |
| | MH25 | **MH2** | 0.87 | 0.80 | 0.696 | 2.208 | 11.24 | 188.0 | **1153** | 89.5 | 0.2 | 1050 | 0.013 | **1274** | 1.43 | 0.74 | 1.63 | 0.92 | 0.91 |
| **Main Street** | | | | | | | | | | | | | | | | | | | |
| | MH17 | MH26 | 0.54 | 0.90 | 0.486 | 0.486 | 10.00 | 200.8 | **271** | 93.3 | 0.2 | 675 | 0.013 | **392** | 1.06 | 0.61 | 1.15 | 1.35 | 0.69 |
| | MH26 | **MH2** | 0.96 | 0.90 | 0.864 | 1.350 | 11.35 | 187.0 | **701** | 98.6 | 0.2 | 900 | 0.013 | **845** | 1.29 | 0.69 | 1.45 | 1.13 | 0.83 |
| **Street C** | **MH2** | MH4 | 0.50 | 0.90 | 0.450 | 4.008 | 12.49 | 176.9 | **1970** | 45.5 | 0.2 | 1350 | 0.013 | **2490** | 1.69 | 0.67 | 1.87 | 0.41 | 0.79 |
| | MH4 | MH6 | 0.39 | 0.90 | 0.351 | 4.359 | 12.89 | 173.6 | **2102** | 33.4 | 0.2 | 1350 | 0.013 | **2490** | 1.69 | 0.70 | 1.90 | 0.29 | 0.84 |
| | MH6 | MH8 | 0.85 | 0.90 | 0.765 | 5.124 | 13.18 | 171.3 | **2438** | 52.0 | 0.2 | 1350 | 0.013 | **2490** | 1.69 | 0.80 | 1.92 | 0.45 | 0.98 |
| | MH8 | **MH9** | 0.49 | 0.90 | 0.441 | 5.565 | 13.63 | 167.9 | **2595** | 34.2 | 0.2 | 1500 | 0.013 | **3298** | 1.81 | 0.66 | 2.03 | 0.28 | 0.79 |
| **Street B** | MH18 | MH20 | 0.13 | 0.90 | 0.117 | 0.117 | 10.00 | 200.8 | **65** | 78.9 | 0.8 | 300 | 0.013 | **90** | 1.24 | 0.63 | 1.35 | 0.98 | 0.72 |
| | MH20 | **MH9** | 0.08 | 0.90 | 0.072 | 0.189 | 10.98 | 190.6 | **100** | 47.1 | 0.8 | 375 | 0.013 | **164** | 1.44 | 0.56 | 1.52 | 0.52 | 0.61 |
| **Street C** | **MH9** | MH10 | 0.39 | 0.70 | 0.273 | 6.027 | 11.49 | 185.7 | **3109** | 24.2 | 0.2 | 1500 | 0.013 | **3298** | 1.81 | 0.77 | 2.06 | 0.20 | 0.94 |
| | MH10 | **MH3** | 0.73 | 0.90 | 0.657 | 6.684 | 11.69 | 183.9 | **3415** | 106.3 | 0.3 | 1500 | 0.013 | **4039** | 2.21 | 0.70 | 2.50 | 0.71 | 0.85 |
| | MH23 | **MH3** | 0.10 | 0.90 | 0.090 | 0.090 | 10.00 | 200.8 | **50** | 61.5 | 0.3 | 375 | 0.013 | **100** | 0.88 | 0.50 | 0.88 | 1.16 | 0.50 |
| **Settlers Road** | | | 0.25 | 0.90 | 0.225 | 0.225 | | | | | | | | | | | | | |
| | | | 0.87 | 0.80 | 0.696 | 0.921 | 10.00 | 200.8 | **514** | | | | | | | | | | |
| | | | 1.46 | 0.90 | 1.314 | 19.377 | 18.55 | 138.1 | **11850** | | | | | | | | | | |
| **Secondary School (10-yr)** | **MH3** | MH6 | 4.10 | 0.80 | 3.280 | 22.657 | 18.55 | 138.1 | **13109** | 272.5 | 0.3 | 2322 | 0.013 | **12082** | 2.75 | 0.87 | 3.38 | 1.34 | 1.08 |
| Headwall at SWM Pond D | MH6 | HW. | 0.00 | 0.90 | 0.000 | 22.657 | 19.89 | 131.9 | **12714** | 41.4 | 0.3 | 2322 | 0.013 | **12082** | 2.75 | 0.85 | 3.36 | 0.21 | 1.05 |
| **TOTAL AREA SITE** | | | 25.91 | | | | | | | | | | | | | | | | |
| **TOTAL TRIBUTARY AREA** | | | 39.210 | | | | | | | | | | | | | | | | |

Notes:
1) Pipe diameter is nominal
2) Capacity and velocity are based on Imperial I.D. (Nom. Dia x 25.4/25)
3) Time of Flow is based on Actual Velocity

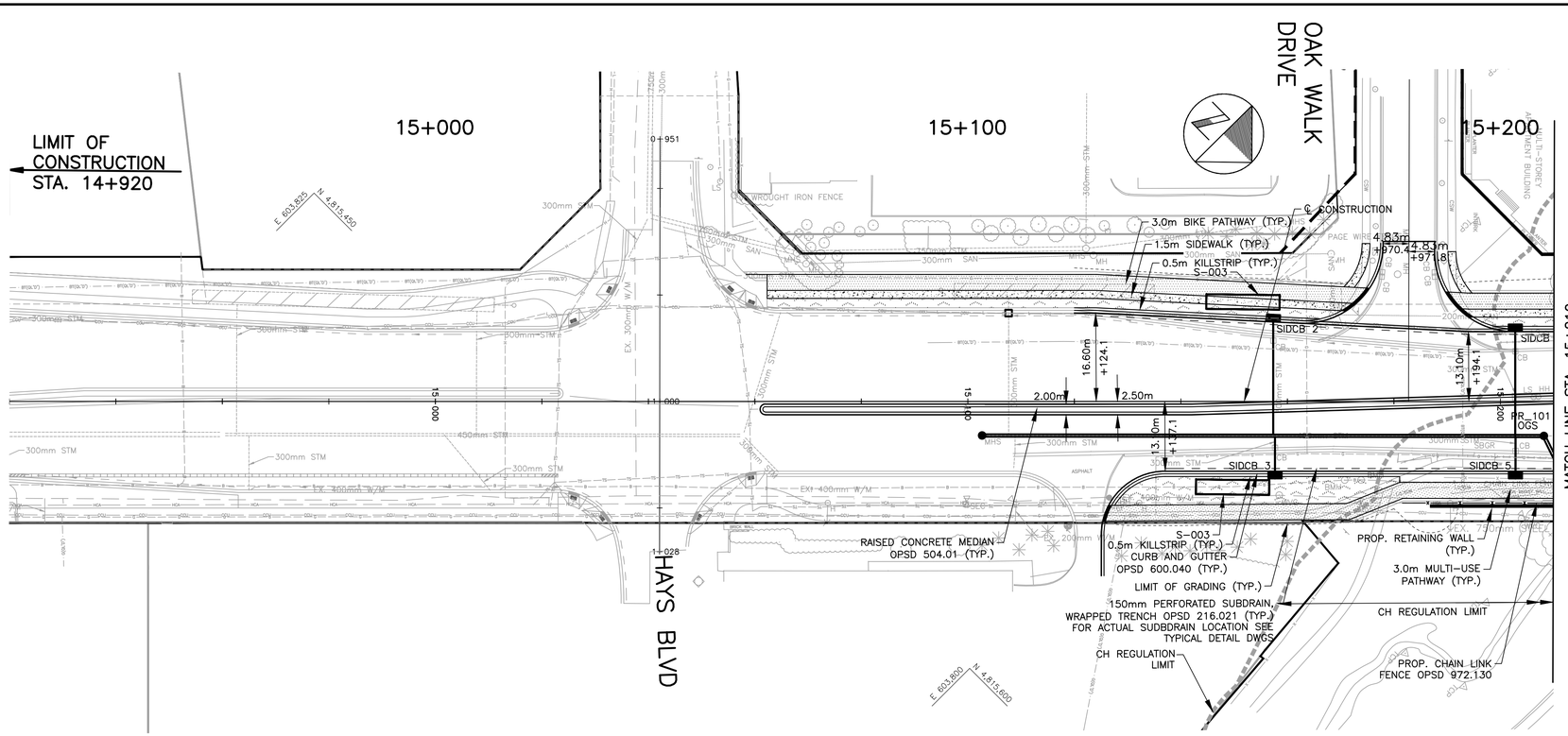
Intensity, $I = A / (T_c + B)^C$ where:
A= 2150
B= 5.7
C= 0.861
$t_c$= Time of Concentration in minutes

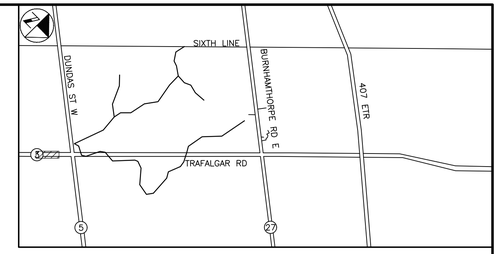
Expected Flow, $Q = 2.778 \times C \times I \times A / 1000$
Full Flow Capacity (Manning's Equation), $Q_F$
$Q_F = (1/n) \times A \times R^{2/3} \times s^{1/2}$
$= (1/n) \times 311.7 \times D^{8/3} \times s^{1/2}$

Equivalent Diameter of Box Pipe, $d_e$
S= 2438 m $d_e$ = 1857
S= 2438 m R= 1524 m $d_e$ = 2322
de = 2093
R= 1219 m
S= 3048 m
R= 1524 m

#N/A

# APPENDIX ‘E’



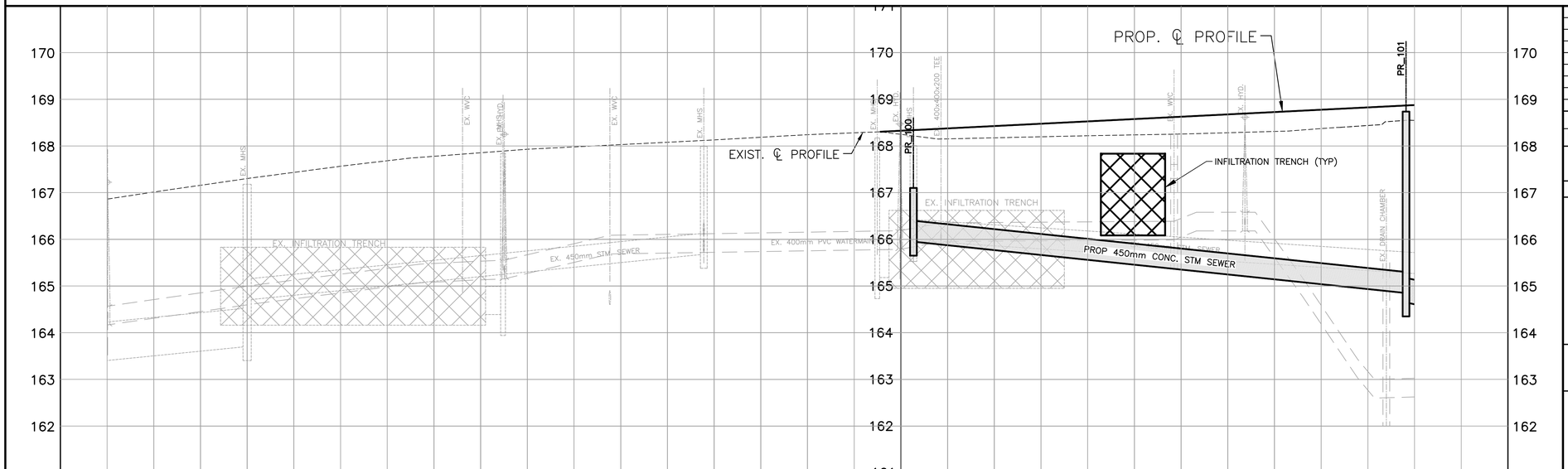




KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| SIDCB 2 | 15+157.36 | 15.663L | 705.02 | | NE166.70 | 400.010 | 168.44 | – |
| SIDCB 3 | 15+157.67 | 13.830R | 705.02 | | SW166.55 | 400.010 | 168.48 | – |
| SIDCB 4 | 15+202.80 | 13.830L | 705.02 | | NE165.70 | 400.010 | 168.64 | – |
| SIDCB 5 | 15+202.82 | 13.830R | 705.02 | | SW165.67 | 400.010 | 168.71 | – |
| PR_101 | 15+208.16 | 6.495R | 701.010 | SE164.85 | N164.65 | 401.01 | 168.74 | – |

# TRAFALGAR ROAD (REG. RD. 3)




| ℄ ELEVATIONS | 167.01 | 167.30 | 167.57 | 167.78 | 167.93 | 168.03 | 168.13 | 168.24 | 168.35 168.326 | 168.43 168.426 | 168.53 168.526 | 168.88 168.626 | 168.93 168.726 | 168.84 168.826 | ℄ ELEVATIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 525mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 14.85m @ 1.01% | | | | | | | | | | | | | | |
| | 450mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 105.49m @ 1.04% | | | | | | | | 165.95 | | | | | 164.85 164.65 | |
| CHAINAGE | 14+940 | 14+960 | 14+980 | 15+000 | 15+020 | 15+040 | 15+060 | 15+080 | 15+100 | 15+120 | 15+140 | 15+160 | 15+180 | 15+200 | CHAINAGE |

| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20 | REFERENCES
1:50 VERT. 0 0.5 1 2
REGIONAL | FIELD NOTES
SEE COVER SHEET FOR REGIONAL ACCEPTANCE | STAMP

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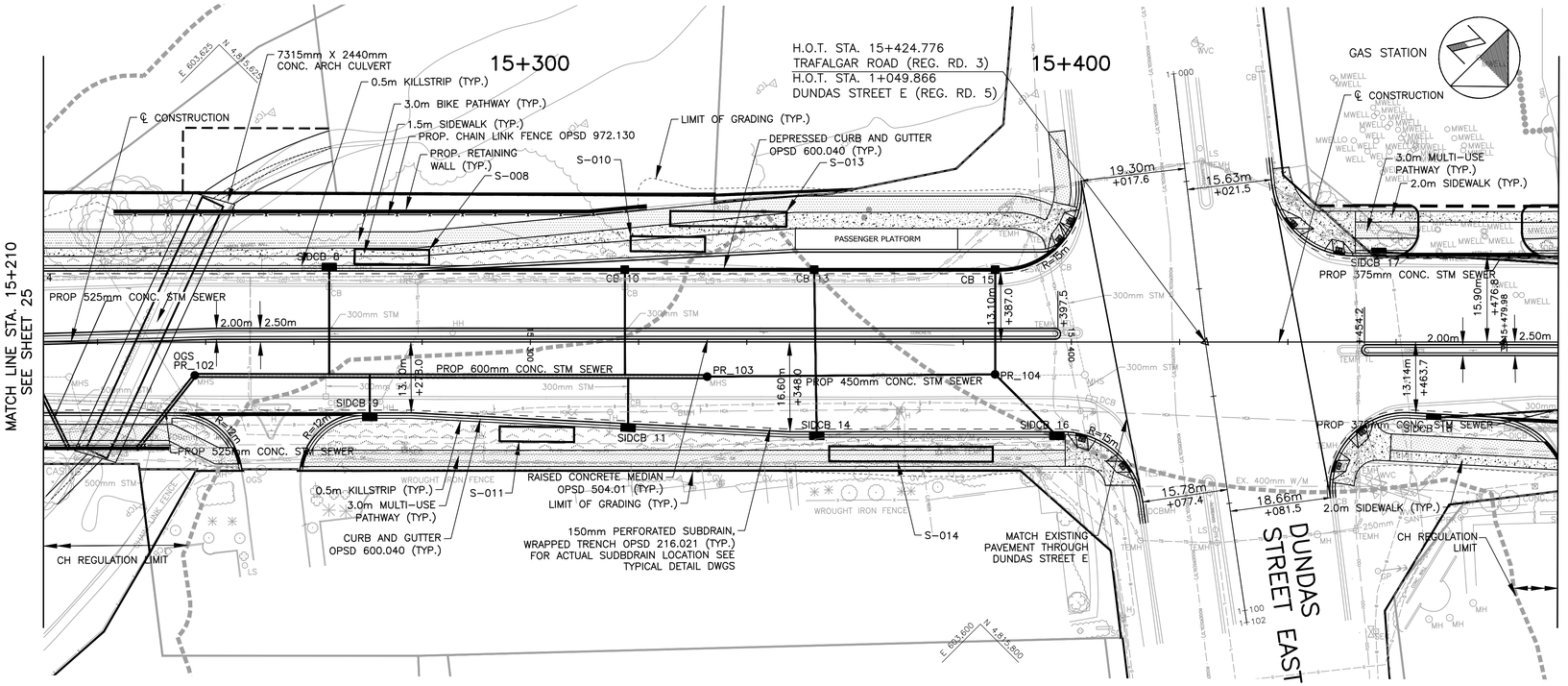
Halton REGION

ROAD RECONSTRUCTION
TRAFALGAR ROAD (REG. RD. 3)
FROM 110m SOUTH OF HAYS BLVD
TO 169m NORTH OF HAYS BLVD
STA. 14+930 TO STA. 15+210
IN THE TOWN OF OAKVILLE

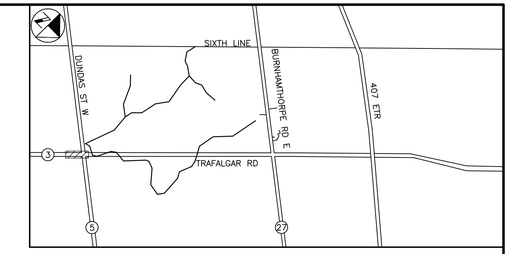
CONSULTANT FILE NO. 163269 | REGIONAL DRAWING NO.
CONTRACT NO. R-2079D-22 | DRAWING NO. SHEET 25 OF 93

R-2079D-22 25 OF 93

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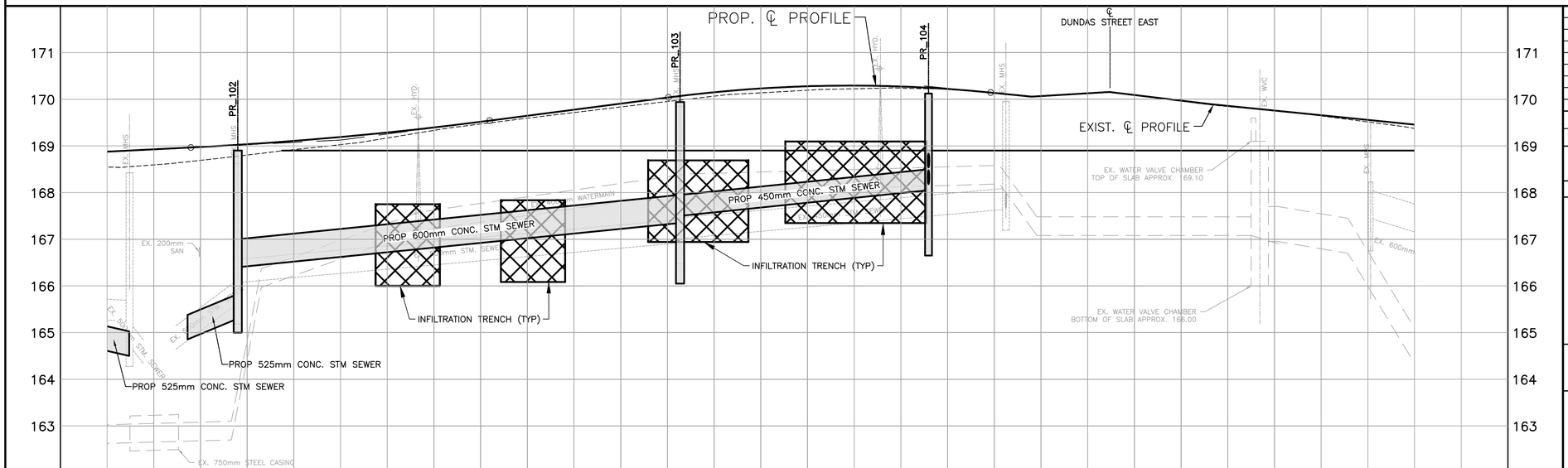

# TRAFALGAR ROAD (REG. RD. 3)




KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_102 | 15+237.99 | 6.193R | 701.011 | NW166.40 | E165.30 | 401.01 | 168.90 | – |
| SIDCB 8 | 15+262.81 | 13.830L | 705.02 | | NE167.10 | 400.010 | 169.08 | – |
| SIDCB 9 | 15+270.32 | 13.830R | 705.02 | | SW167.00 | 400.010 | 169.16 | – |
| CB 10 | 15+317.46 | 13.350L | 705.01 | | NE167.75 | 400.082 | 169.59 | – |
| SIDCB 11 | 15+318.07 | 15.834R | 705.02 | | SW167.60 | 400.010 | 169.74 | – |
| PR_103 | 15+332.71 | 6.411R | 701.011 | NW167.50 | SE167.35 | 401.01 | 169.94 | – |
| CB 13 | 15+352.46 | 13.350L | 705.01 | | NE168.10 | 400.082 | 169.96 | – |
| SIDCB 14 | 15+352.94 | 17.330R | 705.02 | | SW167.85 | 400.010 | 170.07 | – |
| CB 15 | 15+385.91 | 13.350L | 705.01 | | NE168.38 | 400.010 | 169.97 | – |
| PR_104 | 15+385.91 | 6.003R | 701.010 | SW168.18 N168.54 | SE168.05 | 401.01 | 170.12 | – |
| SIDCB 16 | 15+397.32 | 17.330R | 705.02 | | S168.38 | 400.010 | 169.98 | – |
| SIDCB 17 | 15+456.84 | 16.614L | 705.02 | | NW166.30 | 400.010 | 169.60 | – |
| SIDCB 18 | 15+466.96 | 14.038R | 705.02 | | NW166.60 | 400.010 | 169.55 | – |




| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20 | REFERENCES
1:50 VERT. 0 0.5 1 2
REGIONAL | FIELD NOTES
SEE COVER SHEET FOR REGIONAL ACCEPTANCE | STAMP

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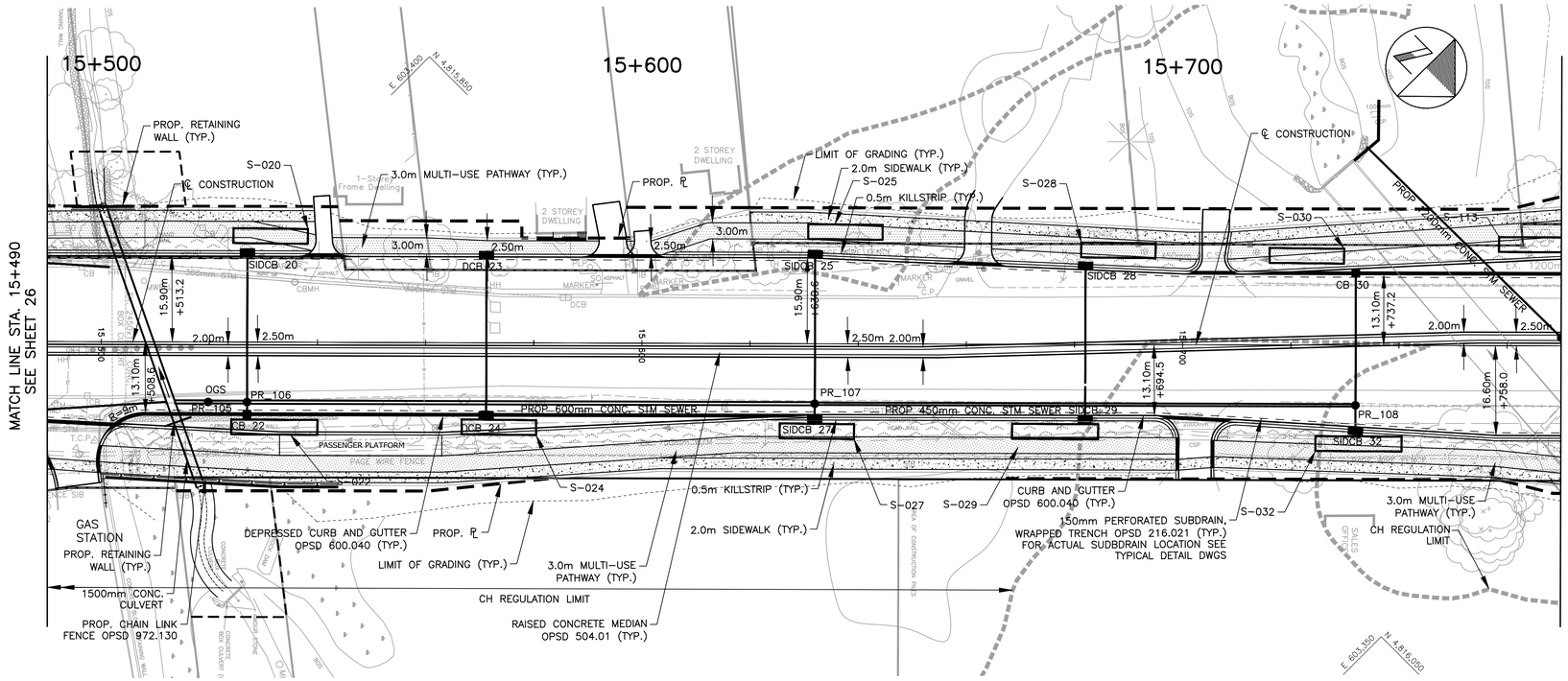
Halton REGION

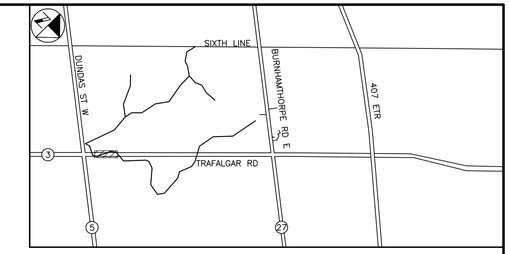
ROAD RECONSTRUCTION
**TRAFALGAR ROAD (REG. RD. 3)**
FROM 169m NORTH OF HAYS BLVD
TO 66m NORTH OF DUNDAS ST
STA. 15+210 TO STA. 15+490
IN THE TOWN OF OAKVILLE

CONSULTANT FILE NO. 163269 | REGIONAL DRAWING NO.
CONTRACT NO. R-2079D-22 | DRAWING NO. SHEET 26 OF 93

R-2079D-22 26 OF 93

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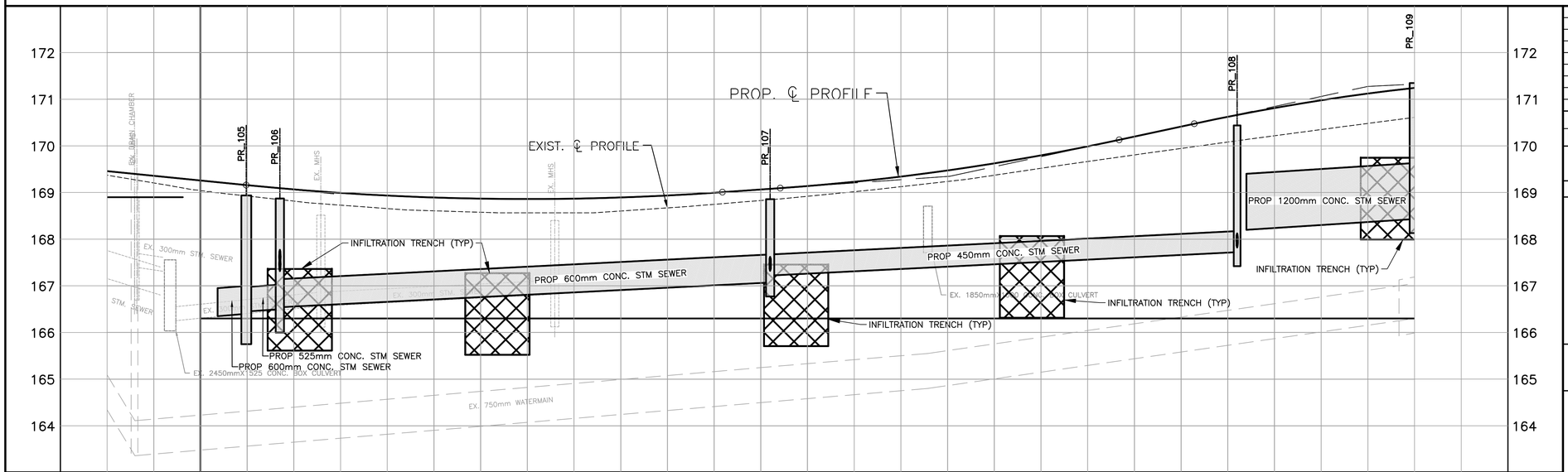




KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_105 | 15+519.81 | 11.100R | 701.012 | NW166.45 | SE166.40 | 401.01 | 168.94 | – |
| CB 22 | 15+527.00 | 13.350R | 705.01 | | SW167.50 | 400.010 | 168.81 | – |
| PR_106 | 15+527.00 | 11.100R | 701.011 | NW166.54<br>NE167.47<br>SW167.32 | SE166.50 | 401.01 | 168.87 | – |
| SIDCB 20 | 15+527.00 | 16.580L | 705.02 | | NE167.59 | 400.082 | 168.89 | – |
| DCB 24 | 15+571.22 | 13.400R | 705.02 | | SW–1.58 | 400.010 | 168.58 | – |
| DCB 23 | 15+571.22 | 16.200L | 705.02 | | NE–1.58 | 400.082 | 168.73 | – |
| PR_107 | 15+632.00 | 11.100R | 701.011 | NW167.22<br>NE167.32<br>SW167.32 | SE167.07 | 401.01 | 168.86 | – |
| SIDCB 25 | 15+632.00 | 16.559L | 705.02 | | NE167.57 | 400.082 | 168.89 | – |
| SIDCB 27 | 15+632.00 | 13.830R | 705.02 | | SW167.35 | 400.082 | 168.95 | – |
| SIDCB 28 | 15+682.00 | 14.548L | 705.02 | | NE–1.58 | 400.082 | 169.51 | – |
| SIDCB 29 | 15+682.00 | 13.830R | 705.02 | | SW–1.58 | 400.082 | 169.53 | – |
| CB 30 | 15+732.00 | 13.350L | 705.01 | | NE168.07 | 400.010 | 170.38 | – |
| PR_108 | 15+732.00 | 11.100R | 701.010 | SW167.82<br>NE167.82 | SE167.72 | 401.01 | 170.44 | – |
| SIDCB 32 | 15+732.00 | 15.815R | 705.02 | | SW167.87 | 400.082 | 170.49 | – |
| PR_109 | 15+770.00 | 1.532L | 701.012 | NW168.76<br>N168.58 | S168.43 | 401.01 | 171.35 | – |

# TRAFALGAR ROAD (REG. RD. 3)




| ℄ ELEVATIONS | 169.31 169.358 | 168.96 169.158 | 168.79 168.992 | 168.80 168.893 | 168.86 168.860 | 168.89 168.894 | 168.28 168.995 | 169.33 169.138 | 169.33 169.341 | 169.87 169.625 | 169.88 169.988 | 169.94 170.414 | 170.92 170.812 | 170.48 171.121 | ℄ ELEVATIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 600mm DIA. STM 65–D CONC., CLASS B BEDDING 6.13m @ 0.82% | | 525mm DIA. STM CL. 65–D CONC., CLASS B BEDDING 7.19m @ 0.70% | | | | | | | | | | | 900mm DIA. STM CL. 65–D CONC., CLASS B BEDDING 13.08m @ 0.89% | |
| | 166.35 | 166.40 | 166.45 | 166.50 | 166.54 | 600mm DIA. STM CL. 65–D CONC., CLASS B BEDDING 105.00m @ 0.50% | | 167.07 | 167.22 | 450mm DIA. STM CL. 65–D CONC., CLASS B BEDDING 100.00m @ 0.50% | | 167.72 | 168.20 | 1200mm DIA. STM CL. 65–D CONC., CLASS B BEDDING 50.30m @ 0.46% | 168.43 |
| CHAINAGE | 15+500 | 15+520 | 15+540 | 15+560 | 15+580 | 15+600 | 15+620 | 15+640 | 15+660 | 15+680 | 15+700 | 15+720 | 15+740 | 15+760 | CHAINAGE |

| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20
1:50 VERT. 0 0.5 1 2
REGIONAL | REFERENCES | FIELD NOTES | STAMP

SEE COVER SHEET FOR REGIONAL ACCEPTANCE

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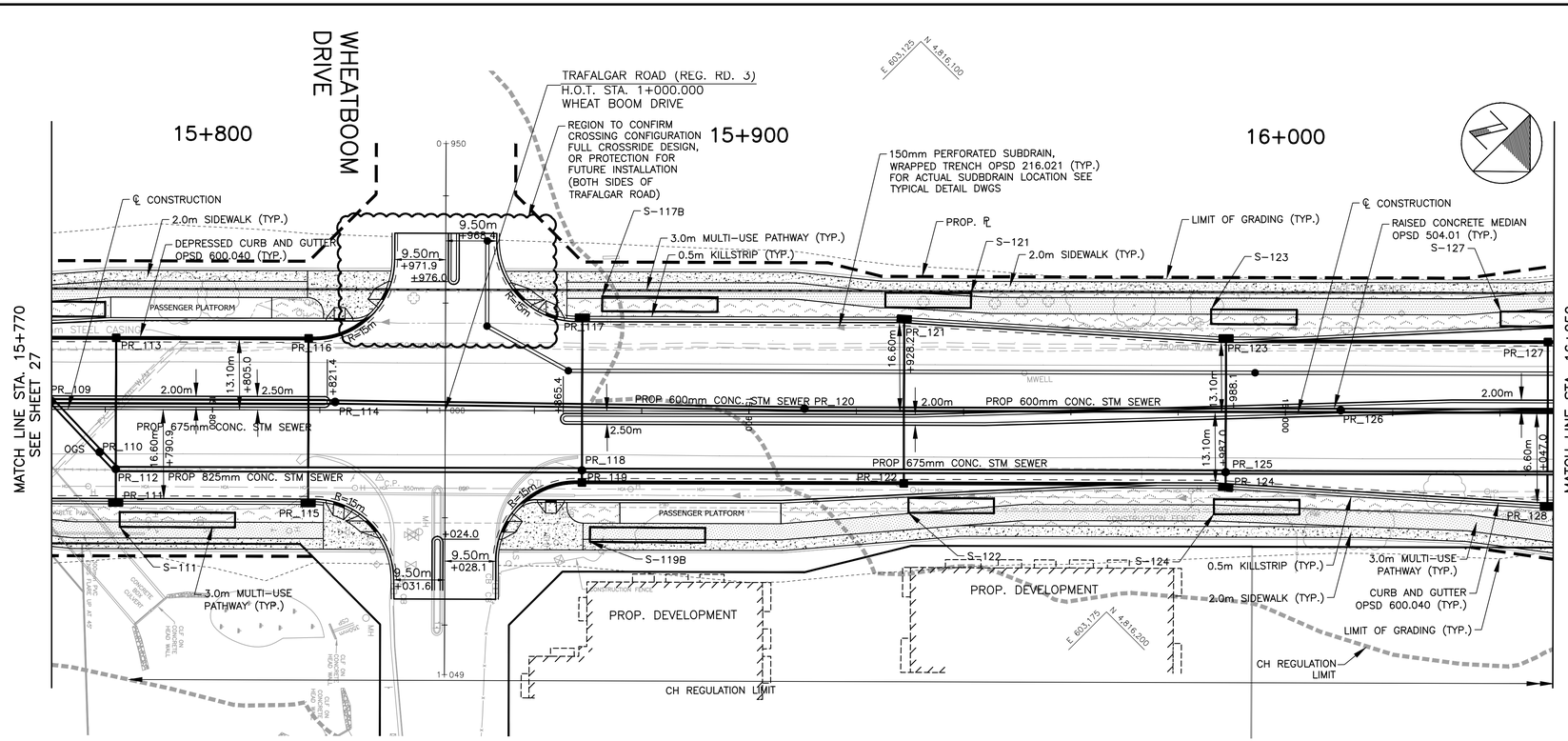
Halton REGION

ROAD RECONSTRUCTION
TRAFALGAR ROAD (REG. RD. 3)
FROM 66m NORTH OF DUNDAS ST TO 73m SOUTH OF WHEATBOOM DR
STA. 15+490 TO STA. 15+770
IN THE TOWN OF OAKVILLE

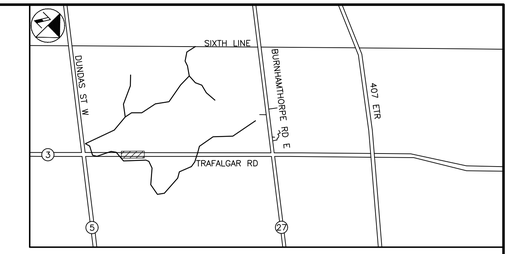
CONSULTANT FILE NO. 163269 | REGIONAL DRAWING NO.
CONTRACT NO. R–2079D–22 | DRAWING NO. SHEET 27 OF 93

R–2079D–22 27 OF 93

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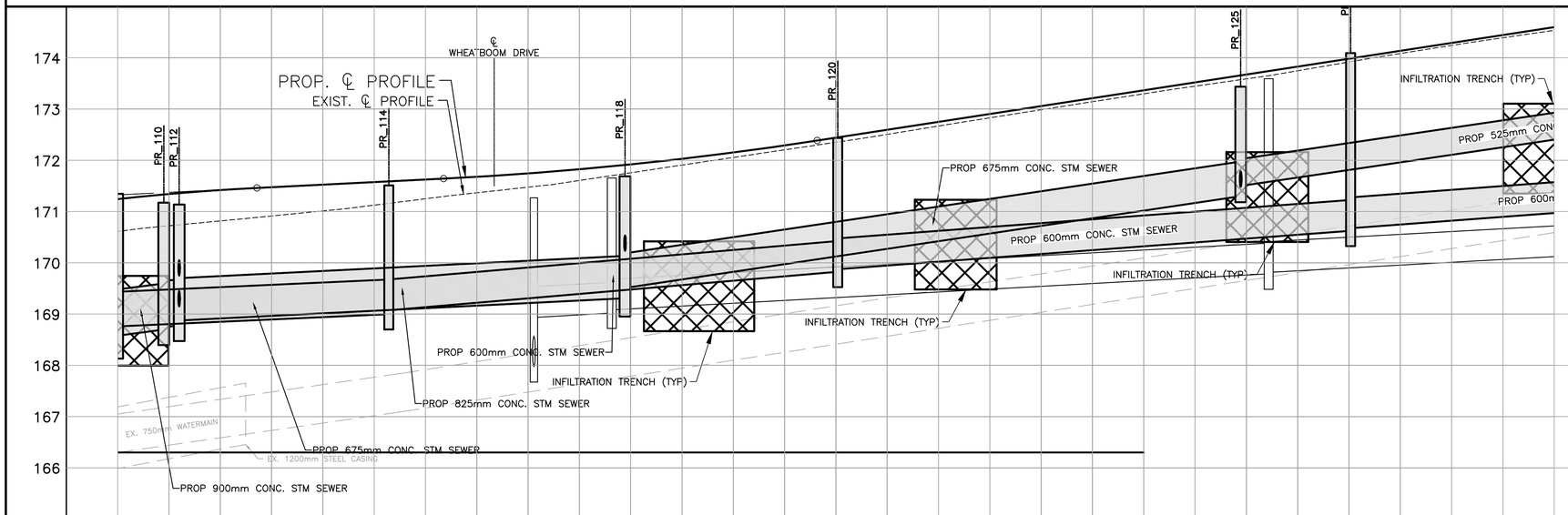

# TRAFALGAR ROAD (REG. RD. 3)




KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_110 | 15+779.00 | 7.958R | 701.012 | N168.75 | S168.70 | 401.01 | 171.17 | – |
| PR_113 | 15+782.00 | 13.350L | 705.01 | | NE169.40 | 400.010 | 171.08 | – |
| PR_111 | 15+782.00 | 17.330R | 705.02 | | SW169.81 | 400.010 | 171.16 | – |
| PR_112 | 15+782.00 | 11.100R | 701.012 | NW168.88 NE169.75 SW169.15 | S168.77 | 401.01 | 171.14 | – |
| PR_116 | 15+817.88 | 13.350L | 705.01 | | NE169.62 | 400.010 | 171.28 | – |
| PR_115 | 15+817.88 | 17.330R | 705.02 | | SW169.60 | 400.010 | 171.36 | – |
| PR_114 | 15+822.85 | 1.500L | 701.011 | NW169.08 | SE169.00 | 401.01 | 171.51 | – |
| PR_118 | 15+868.89 | 11.100R | 701.012 | NW169.51 NE170.23 SW170.23 | SE169.31 | 401.01 | 171.69 | – |
| PR_119 | 15+868.89 | 13.350R | 705.01 | | SW170.26 | 400.010 | 171.63 | – |
| PR_117 | 15+868.89 | 17.330L | 705.02 | | NE170.52 | 400.010 | 171.64 | – |
| PR_120 | 15+910.35 | 0.501L | 701.011 | NW169.88 | SE169.82 | 401.01 | 172.44 | – |
| PR_122 | 15+928.89 | 13.350R | 705.01 | | SW170.86 | 400.010 | 172.45 | – |
| PR_121 | 15+928.89 | 17.279L | 705.02 | | NE170.80 | 400.010 | 172.53 | – |
| PR_125 | 15+988.89 | 11.100R | 701.012 | NW171.50 NE171.48 SW171.48 | SE171.30 | 401.01 | 173.43 | – |
| PR_124 | 15+988.89 | 13.942R | 705.02 | | SW171.51 | 400.010 | 173.52 | – |
| PR_123 | 15+988.89 | 13.830L | 705.02 | | NE171.73 | 400.010 | 173.52 | – |
| PR_126 | 16+010.32 | 0.501L | 701.011 | NW170.68 | SE170.62 | 401.01 | 174.09 | – |
| PR_127 | 16+048.89 | 13.350L | 705.01 | | NE172.95 | 400.010 | 174.30 | – |
| PR_128 | 16+048.89 | 17.330R | 705.02 | | SW172.80 | 400.010 | 174.38 | – |







| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20 | REFERENCES
1:50 VERT. 0 0.5 1 2
REGIONAL | FIELD NOTES
SEE COVER SHEET FOR REGIONAL ACCEPTANCE | STAMP

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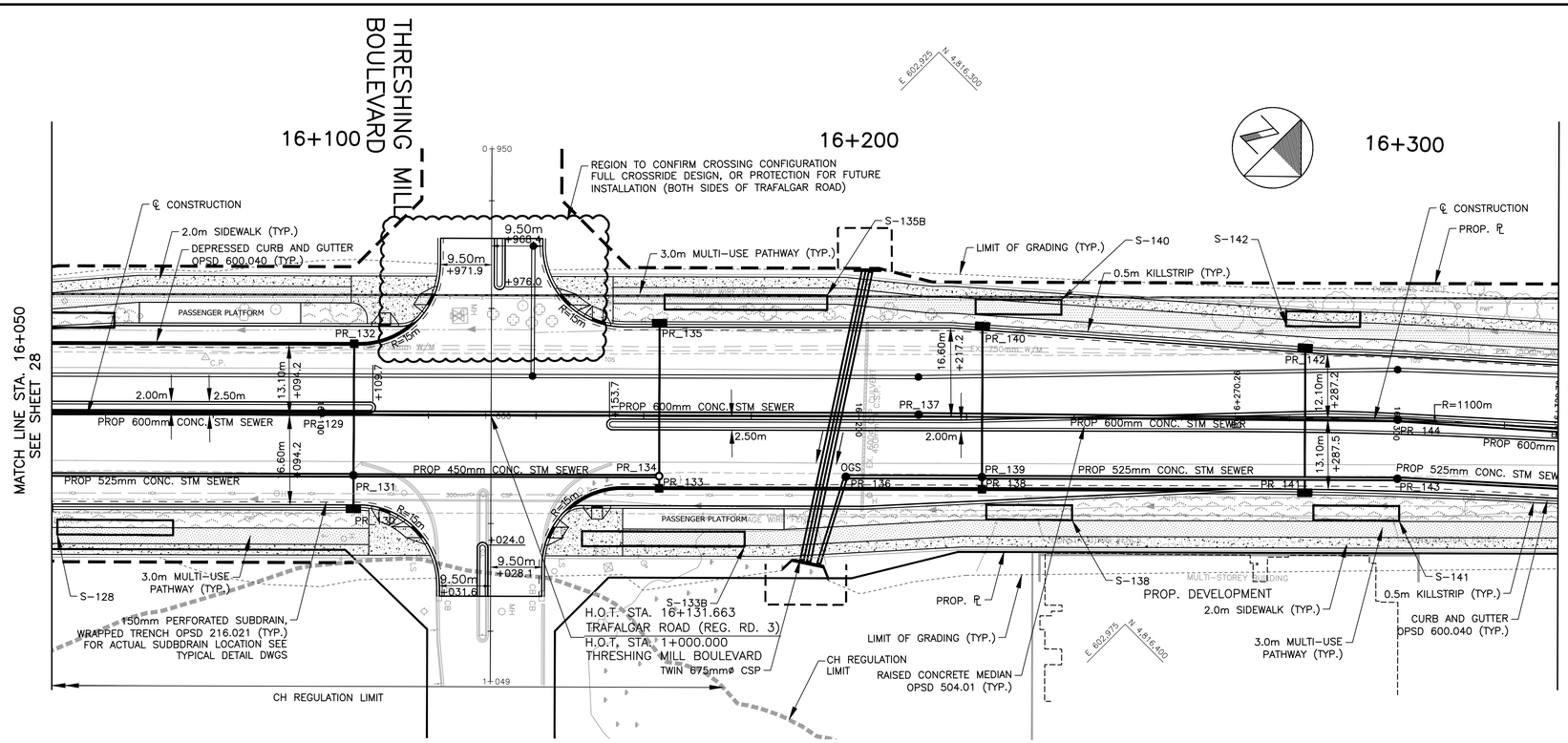
Halton REGION

ROAD RECONSTRUCTION
**TRAFALGAR ROAD (REG. RD. 3)**
FROM 73m SOUTH OF WHEATBOOM DR TO 82m SOUTH OF THRESHING MILL BLVD
STA. 15+770 TO STA. 16+050
IN THE TOWN OF OAKVILLE

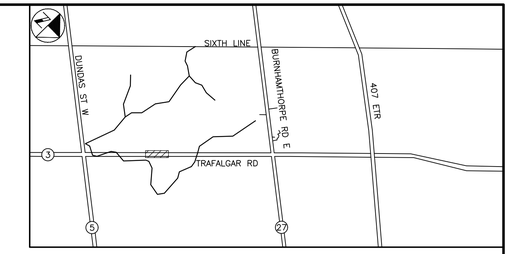
CONSULTANT FILE NO. 163269 | REGIONAL DRAWING NO.
CONTRACT NO. R-2079D-22 | DRAWING NO. SHEET 28 OF 93

R-2079D-22 28 OF 93

Drawing: C:\USERS\JCWIT\APPDATA\LOCAL\TEMP\ACPUBLISH_27424\163269-PLAN&PROFILE-PHASE 2.DWG
Layout Tab: 28 TRAFALGAR-PP4
Date: 11/09/2021 Time: 01:37:13 AM



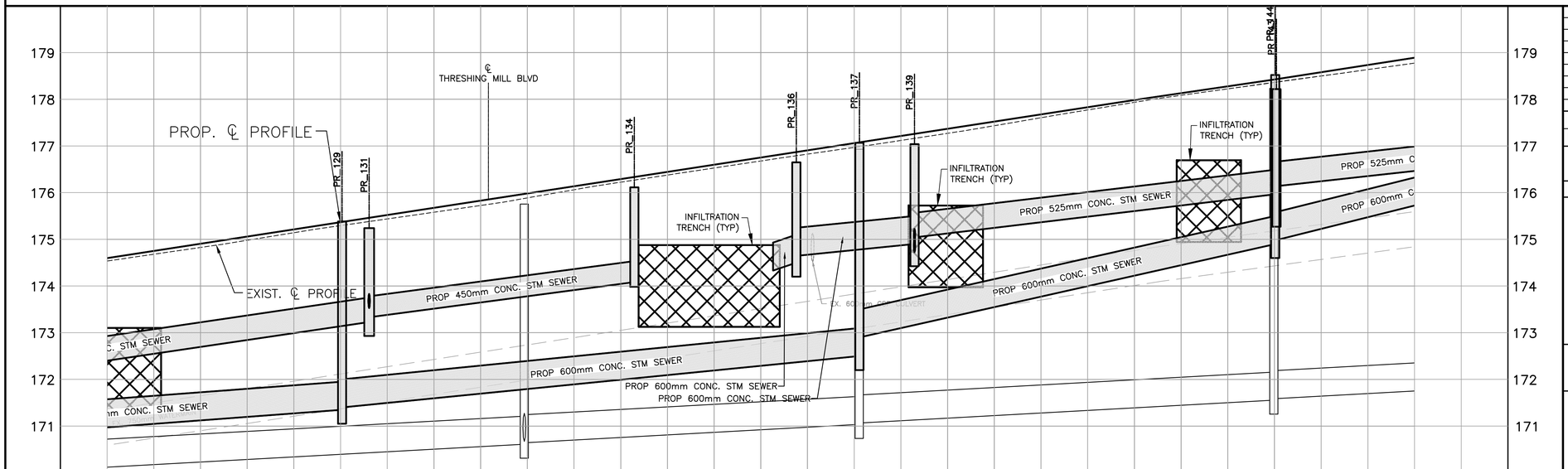

# TRAFALGAR ROAD (REG. RD. 3)

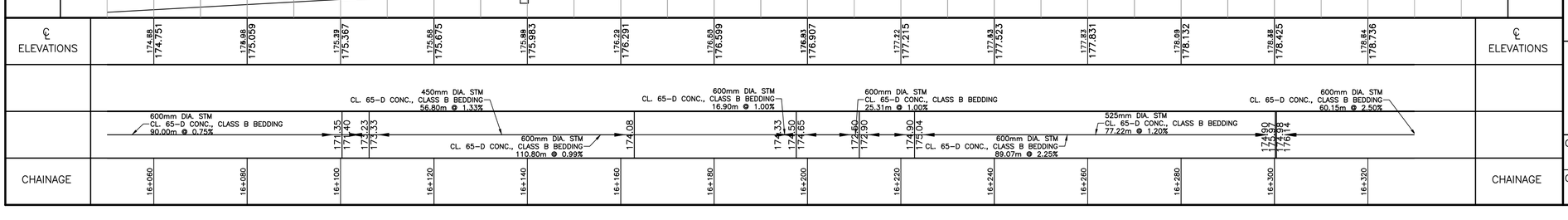



KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_129 | 16+100.32 | 0.500L | 701.011 | NW171.40 | SE171.35 | 401.01 | 175.38 | – |
| PR_130 | 16+106.11 | 17.330R | 705.02 | | SW173.60 | 400.010 | 175.23 | – |
| PR_131 | 16+106.12 | 11.100R | 701.012 | NW173.33<br>NE173.53<br>SW173.53 | SE173.23 | 401.01 | 175.24 | – |
| PR_132 | 16+106.17 | 13.350L | 705.01 | | NE173.80 | 400.010 | 175.18 | – |
| Structure-43 | 16+162.92 | 11.100R | ??? | SW174.23 | | ??? | 174.63 | – |
| PR_133 | 16+162.92 | 13.350R | 705.01 | | SW174.43 | 400.010 | 176.05 | – |
| PR_134 | 16+162.92 | 11.100R | 701.011 | | SE174.08 | 401.01 | 176.11 | – |
| PR_135 | 16+162.92 | 17.330L | 705.02 | | NE174.37 | 400.010 | 176.13 | – |
| PR_136 | 16+197.61 | 11.100R | 701.011 | NW174.65 | NE174.50 | 401.01 | 176.65 | – |
| PR_137 | 16+211.11 | 0.480L | 701.011 | NW172.90 | SE172.50 | 401.01 | 177.07 | – |
| PR_138 | 16+222.92 | 13.350R | 705.01 | | SW174.95 | 400.010 | 176.98 | – |
| PR_139 | 16+222.92 | 11.100R | 701.011 | NW175.04<br>NE174.92<br>SW174.72 | SE174.90 | 401.01 | 177.04 | – |
| PR_140 | 16+222.92 | 16.951L | 705.02 | | NE175.00 | 400.010 | 177.07 | – |
| PR_142 | 16+282.77 | 13.169L | 705.02 | | NE173.77 | 400.010 | 178.06 | – |
| PR_141 | 16+283.08 | 13.756R | 705.02 | | SW176.43 | 400.010 | 178.04 | – |
| PR_144 | 16+300.16 | 0.200L | 701.011 | NW174.98 | SE174.90 | 401.01 | 178.52 | – |
| PR_143 | 16+300.43 | 10.789R | 701.011 | NW176.14 | SE175.97 | 401.01 | 178.22 | – |




| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20
1:50 VERT. 0 0.5 1 2
REGIONAL | REFERENCES
FIELD NOTES
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STAMP

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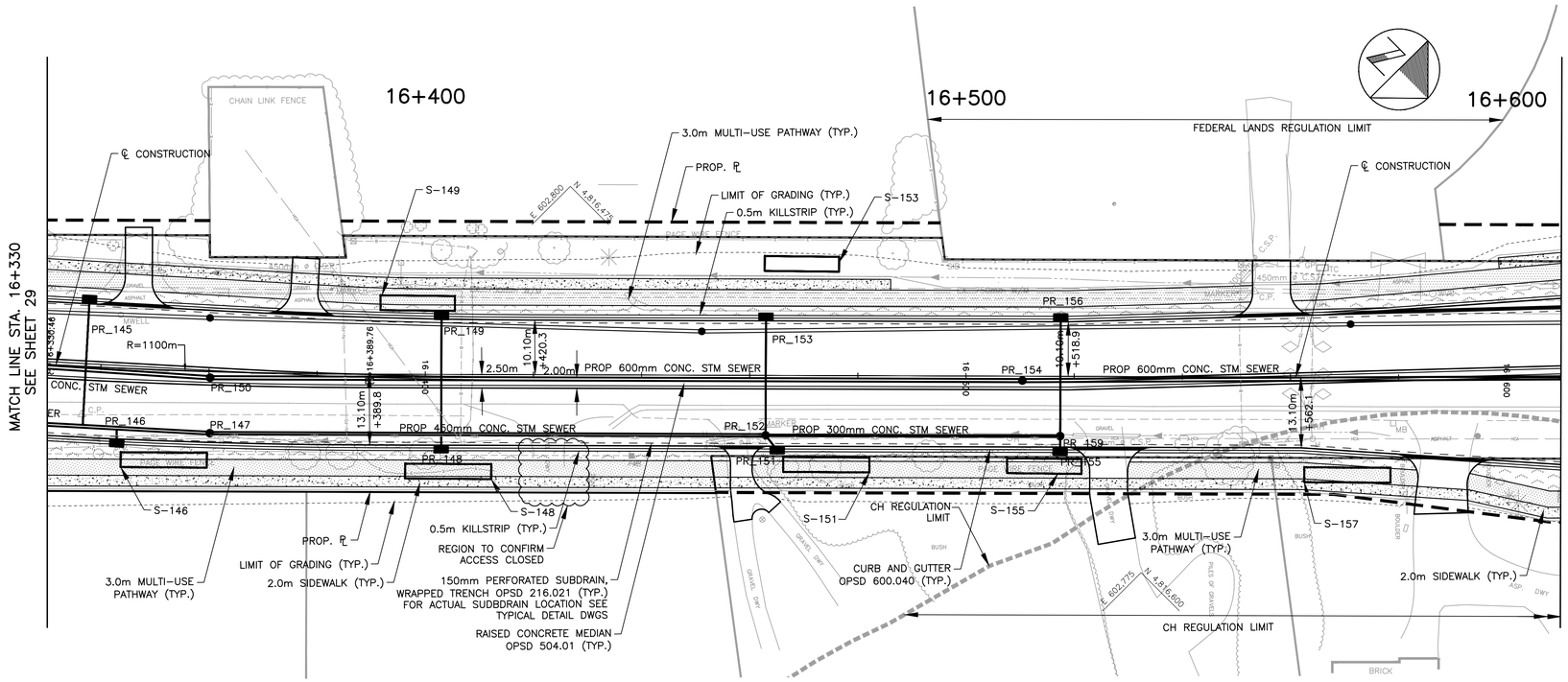
Halton REGION

ROAD RECONSTRUCTION
**TRAFALGAR ROAD (REG. RD. 3)**
FROM 82m SOUTH OF THRESHING MILL BLVD
TO 198m NORTH OF THRESHING MILL BLVD
STA. 16+050 TO STA. 16+330
IN THE TOWN OF OAKVILLE

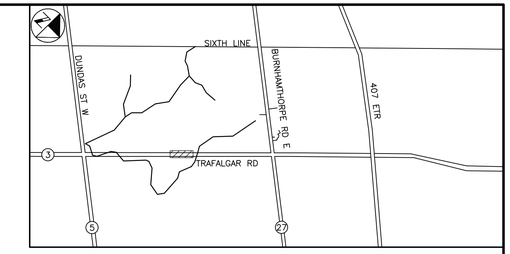
CONSULTANT FILE NO. 163269 | REGIONAL DRAWING NO.
CONTRACT NO. R-2079D-22 | DRAWING NO. SHEET 29 OF 93

R-2079D-22 29 OF 93

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Layout Tab: 29 TRAFALGAR-PP2
Date: 11/09/2021 Time: 01:39:09 AM



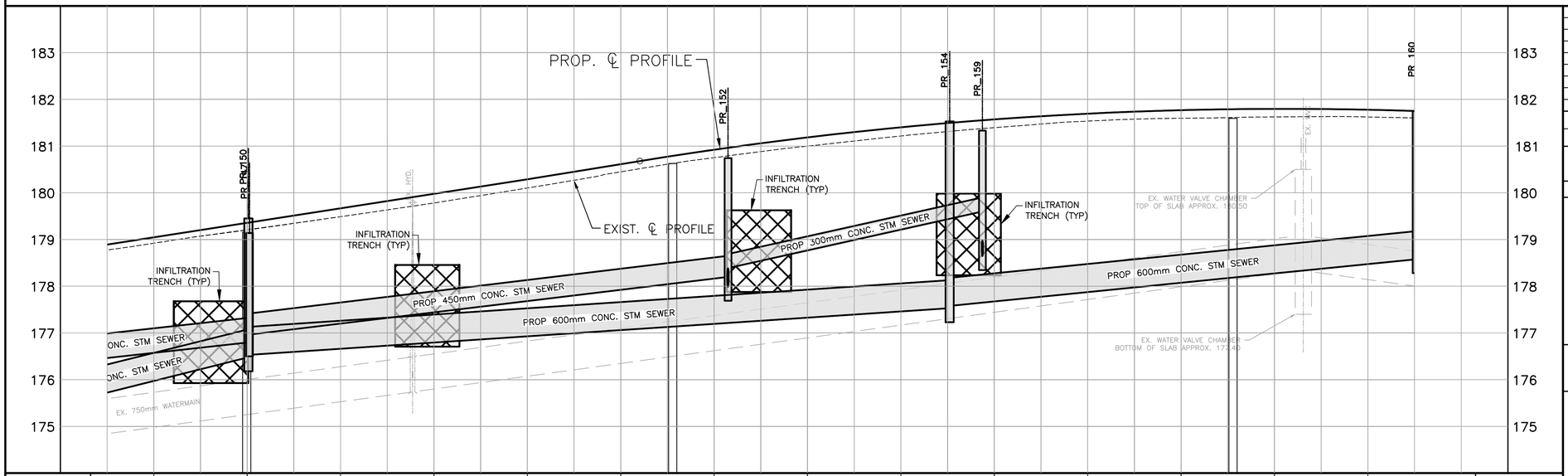

# TRAFALGAR ROAD (REG. RD. 3)

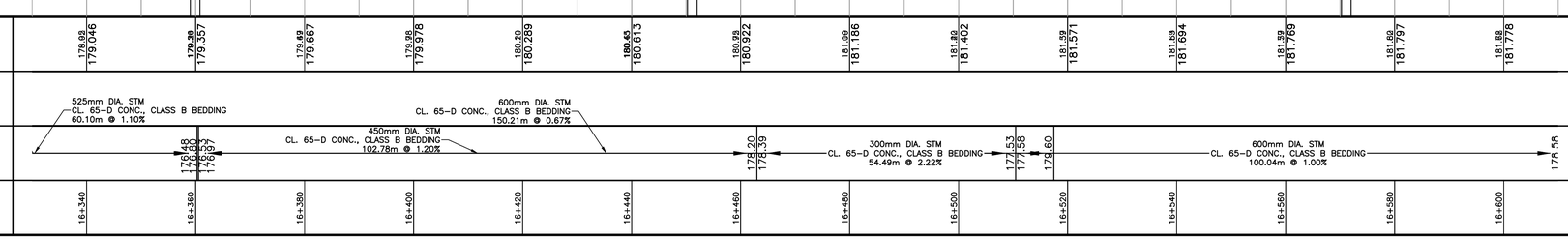



KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_145 | 16+337.25 | 12.496L | 705.02 | | NE177.00 | 400.010 | 178.83 | – |
| PR_146 | 16+343.55 | 13.888R | 705.02 | | SW176.33 | 400.010 | 178.97 | – |
| PR_150 | 16+360.27 | 1.141R | 701.011 | NW176.53 | SE176.48 | 401.01 | 179.45 | – |
| PR_147 | 16+360.51 | 11.387R | 701.010 | NW176.97 | SE176.80 | 401.01 | 179.14 | – |
| PR_148 | 16+402.98 | 13.824R | 705.02 | | SW177.26 | 400.010 | 179.89 | – |
| PR_149 | 16+402.98 | 10.836L | 705.02 | | NE177.31 | 400.010 | 179.94 | – |
| PR_152 | 16+462.98 | 11.085R | 701.010 | NW178.39<br>N177.99<br>SW178.08 | SE178.20 | 401.01 | 180.74 | – |
| PR_153 | 16+462.98 | 10.845L | 705.02 | | NE178.27 | 400.010 | 180.89 | – |
| PR_151 | 16+465.13 | 13.821R | 705.02 | | S178.21 | 400.010 | 180.81 | – |
| PR_154 | 16+510.44 | 0.814R | 701.011 | NW177.58 | SE177.53 | 401.01 | 181.53 | – |
| PR_155 | 16+517.46 | 13.924R | 705.02 | | SW178.84 | 400.010 | 181.34 | – |
| PR_159 | 16+517.46 | 11.078R | 701.010 | SW178.68<br>NE178.65 | SE179.60 | 401.01 | 181.33 | – |
| PR_156 | 16+517.50 | 10.875L | 705.02 | | NE178.90 | 400.010 | 181.48 | – |




| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20
1:50 VERT. 0 0.5 1 2
REFERENCES
REGIONAL
FIELD NOTES
SEE COVER SHEET FOR REGIONAL ACCEPTANCE
STAMP

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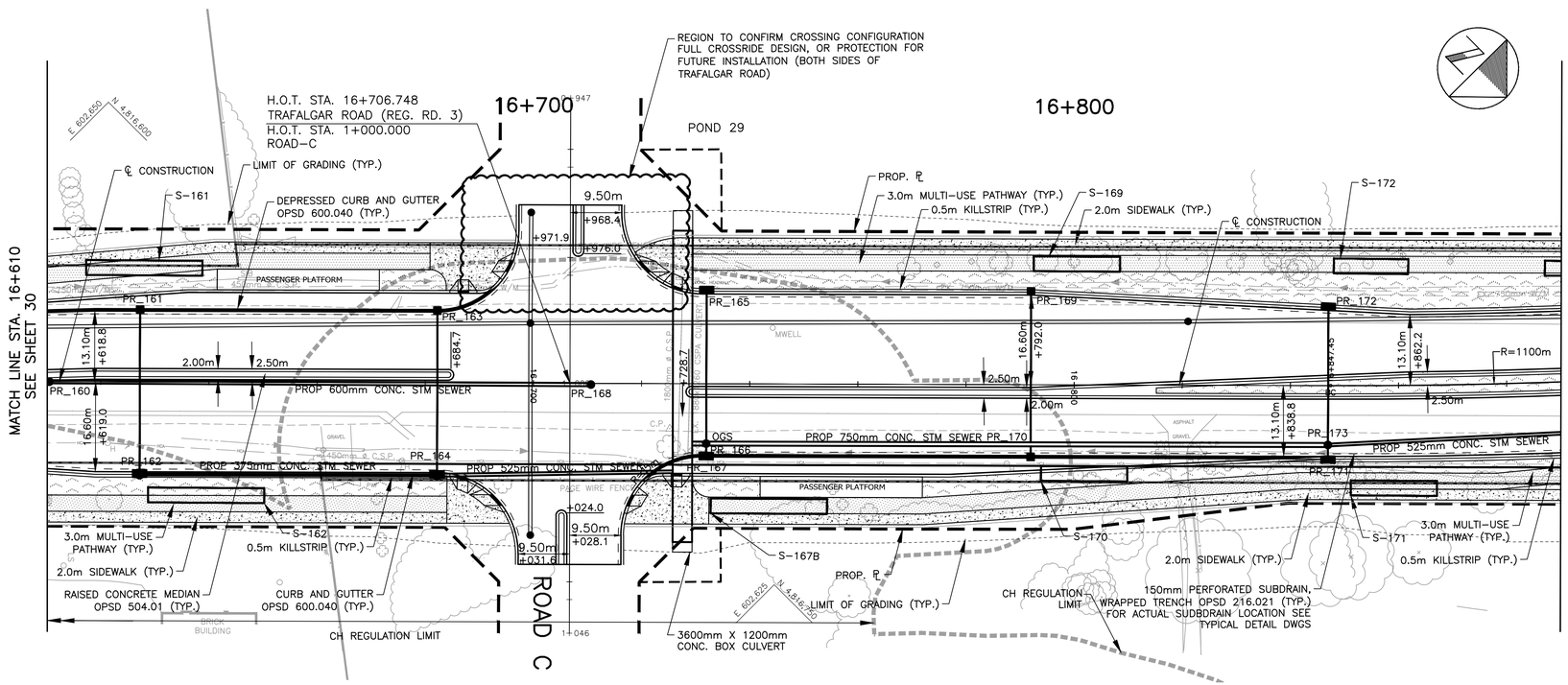
Halton REGION

ROAD RECONSTRUCTION
**TRAFALGAR ROAD (REG. RD. 3)**
FROM 198m NORTH OF THRESHING MILL BLVD TO 97m SOUTH OF ROAD A
STA. 16+050 TO STA. 16+330
IN THE TOWN OF OAKVILLE

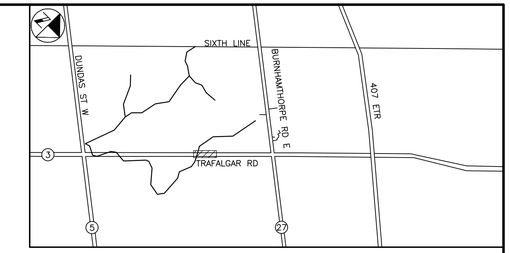
CONSULTANT FILE NO. 163269
REGIONAL DRAWING NO.
CONTRACT NO. R-2079D-22
DRAWING NO. SHEET 30 OF 93

R-2079D-22 30 OF 93

Drawing: C:\USERS\DCWIT\APPDATA\LOCAL\TEMP\ACPUBLISH_27424\163269-PLAN&PROFILE-PHASE 2.DWG
Layout Tab: 30 TRAFALGAR-PP6
Date: 11/09/2021 Time: 01:41:07 AM



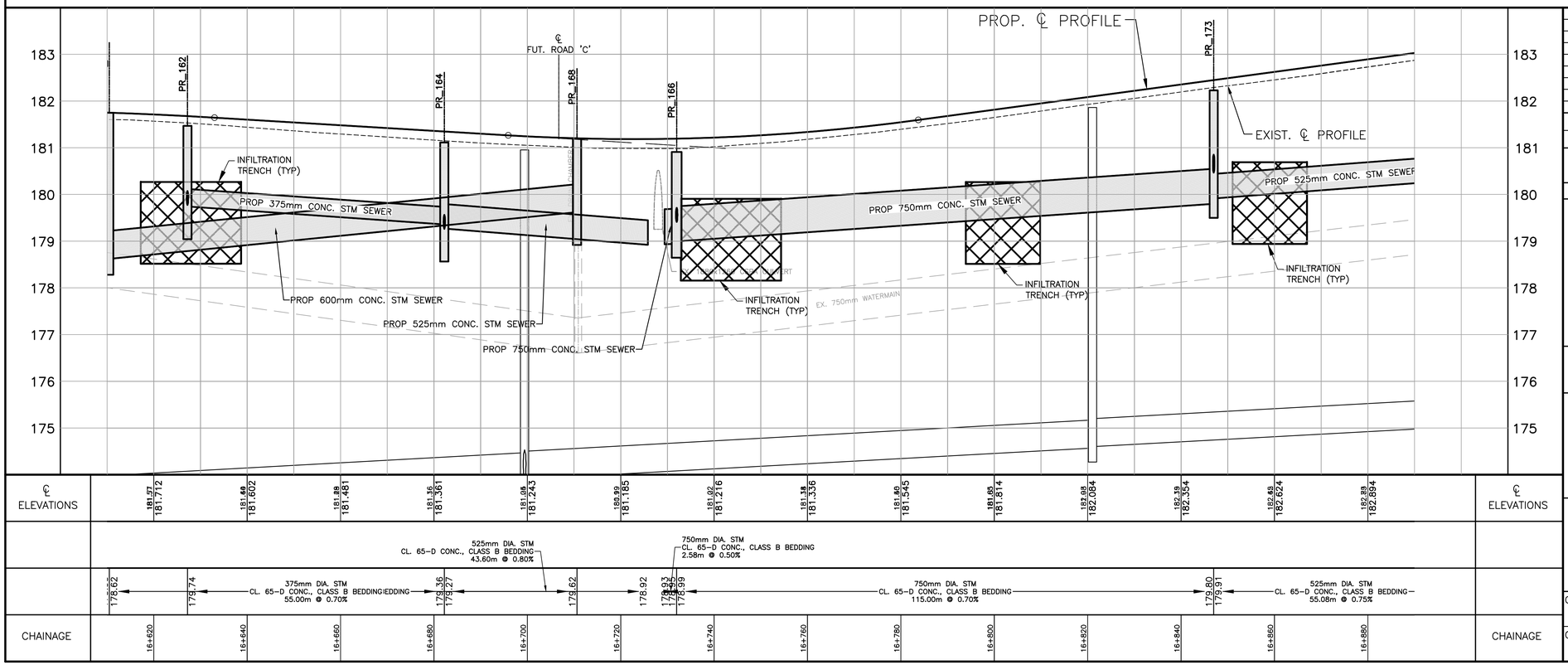

# TRAFALGAR ROAD (REG. RD. 3)




KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_160 | 16+610.48 | 0.000 | 701.011 | NW178.62 | SE178.58 | 401.01 | 181.75 | – |
| PR_161 | 16+627.21 | 13.387L | 705.01 | | NE179.79 | 400.010 | 181.39 | – |
| PR_162 | 16+627.22 | 17.093R | 701.011 | SW179.77 | NW179.74 | 400.010 | 181.47 | – |
| PR_163 | 16+682.21 | 13.395L | 705.01 | | NE179.42 | 400.010 | 181.03 | – |
| PR_164 | 16+682.22 | 17.085R | 701.011 | SE179.36 SW179.26 | NW179.27 | 400.010 | 181.11 | – |
| PR_168 | 16+710.64 | 0.227R | 701.011 | | SE179.62 | 401.01 | 181.19 | – |
| PR_167 | 16+731.98 | 13.382R | 705.02 | | SW179.44 | 400.082 | 180.84 | – |
| PR_166 | 16+731.98 | 11.070R | 701.012 | NW178.99 SW179.41 NE179.41 | SE178.95 | 401.01 | 180.91 | – |
| PR_165 | 16+731.98 | 17.326L | 705.02 | | NE179.69 | 400.082 | 180.93 | – |
| PR_170 | 16+791.98 | 13.333R | 705.01 | | SW179.83 | 400.010 | 181.42 | – |
| PR_169 | 16+791.98 | 17.269L | 705.01 | | NE179.79 | 400.010 | 181.50 | – |
| PR_173 | 16+846.98 | 10.986R | 701.011 | NW179.91 NE180.55 SW180.47 | SE179.80 | 401.01 | 182.23 | – |
| PR_172 | 16+846.98 | 14.590L | 705.02 | | NE180.72 | 400.082 | 182.30 | – |
| PR_171 | 16+846.98 | 13.711R | 705.02 | | SW180.58 | 400.082 | 182.31 | – |




| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20 | REFERENCES
1:50 VERT. 0 0.5 1 2
REGIONAL | FIELD NOTES
SEE COVER SHEET FOR REGIONAL ACCEPTANCE | STAMP

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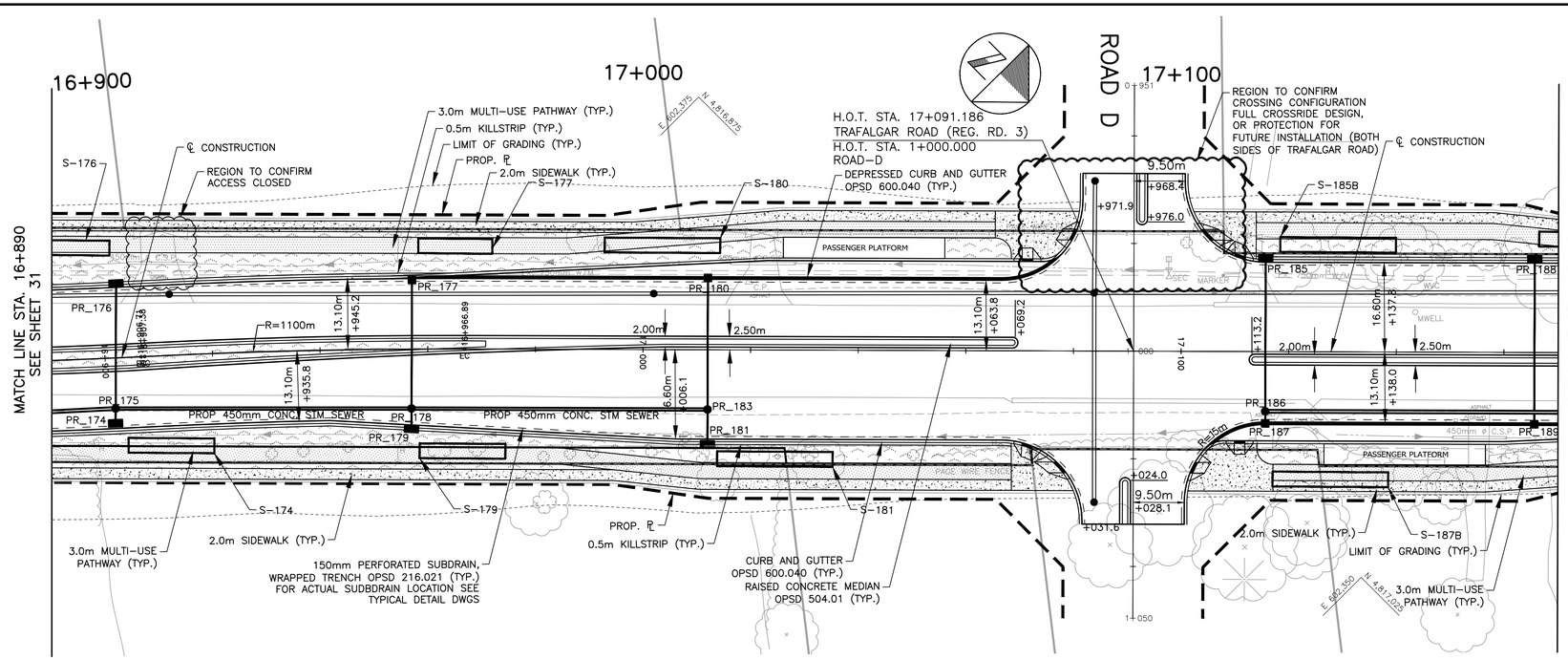
Halton REGION

ROAD RECONSTRUCTION
**TRAFALGAR ROAD (REG. RD. 3)**
FROM 97m SOUTH OF ROAD A TO 184m NORTH OF ROAD A
STA. 16+610 TO STA. 16+890
IN THE TOWN OF OAKVILLE

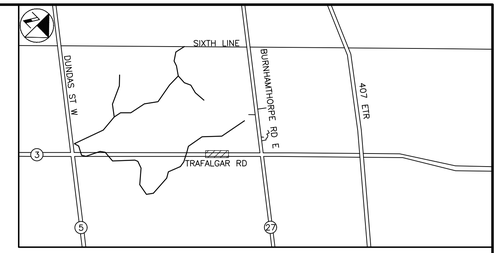
CONSULTANT FILE NO. 163269 | REGIONAL DRAWING NO.
CONTRACT NO. R–2079D–22 | DRAWING NO. SHEET 31 OF 93

R–2079D–22 31 OF 93

Drawing: C:\USERS\DCWTLAP\DATA\LOCAL\TEMP\ACPUBLISH_27424\163269–PLAN&PROFILE–PHASE 2.DWG
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Date: 11/09/2021 Time: 01:43:05 AM



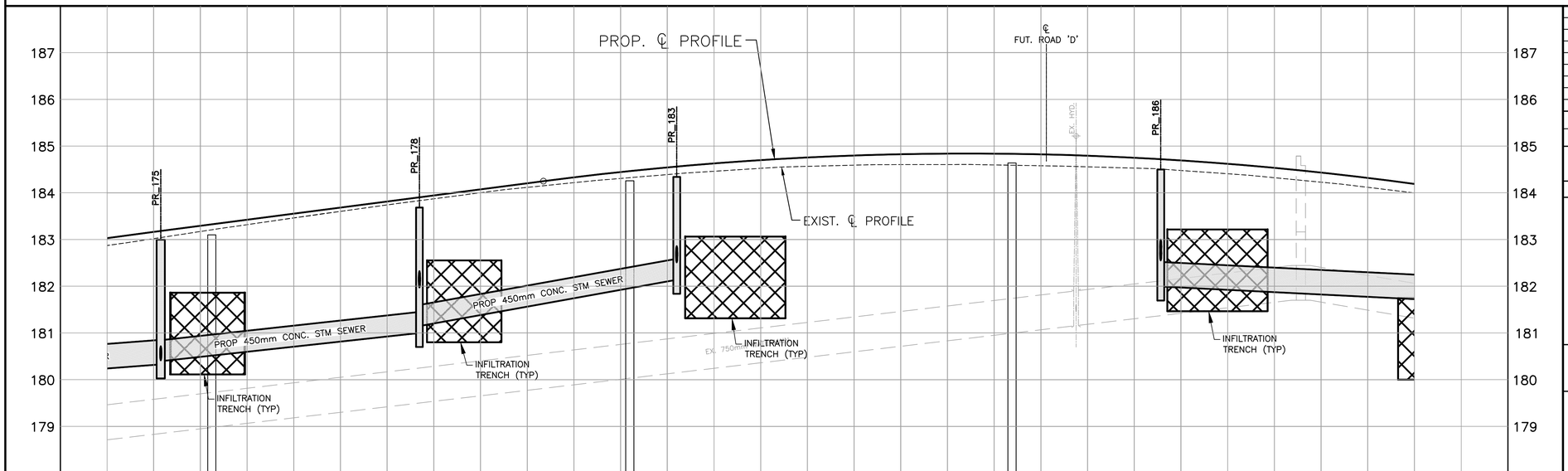

# TRAFALGAR ROAD (REG. RD. 3)




KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_174 | 16+901.41 | 12.121R | 705.02 | | SW181.35 | 400.082 | 182.94 | – |
| PR_175 | 16+901.54 | 9.384R | 701.01 | SW180.41 NW180.40 | SE180.33 | 401.01 | 183.00 | – |
| PR_176 | 16+902.69 | 13.804L | 705.02 | | NE181.34 | 400.082 | 183.07 | – |
| PR_179 | 16+956.91 | 14.832R | 705.02 | | SW182.05 | 400.082 | 183.75 | – |
| PR_178 | 16+956.94 | 11.055R | 701.010 | NW181.15 SW181.97 NE182.02 | SE181.00 | 401.01 | 183.68 | – |
| PR_177 | 16+957.15 | 12.834L | 705.01 | | NE182.07 | 400.010 | 183.65 | – |
| PR_180 | 17+012.03 | 13.350L | 705.01 | | NE182.63 | 400.010 | 184.28 | – |
| PR_183 | 17+012.04 | 11.111R | 701.010 | SW182.51 NE182.56 | SE182.14 | 401.01 | 184.34 | – |
| PR_181 | 17+012.04 | 17.600R | 705.02 | | SW182.59 | 400.082 | 184.36 | – |
| PR_187 | 17+115.68 | 13.350R | 705.01 | | SW182.72 | 400.010 | 184.44 | – |
| PR_186 | 17+115.68 | 11.100R | 701.010 | SW182.55 NE182.70 | NW182.00 | 401.01 | 184.50 | – |
| PR_185 | 17+115.68 | 17.330L | 705.02 | | NE182.67 | 400.082 | 184.68 | – |
| PR_189 | 17+165.68 | 13.350R | 705.01 | | SW182.28 | 400.010 | 183.96 | – |
| PR_188 | 17+165.68 | 17.330L | 705.02 | | NE182.23 | 400.082 | 184.21 | – |




| ℄ ELEVATIONS | 183.68 183.164 | 183.42 183.424 | 183.69 183.684 | 183.97 183.944 | 184.20 184.204 | 184.44 184.444 | 184.46 184.629 | 184.38 184.756 | 184.80 184.826 | 184.88 184.838 | 184.98 184.794 | 184.68 184.693 | 184.33 184.534 | 184.32 184.318 | ℄ ELEVATIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | |
| | 180.33 180.40 | 450mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 55.00m @ 1.10% | | 181.00 181.15 | 450mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 55.01m @ 1.80% | | 182.14 | | | | | 182.00 | | | |
| CHAINAGE | 16+900 | 16+920 | 16+940 | 16+960 | 16+980 | 17+000 | 17+020 | 17+040 | 17+060 | 17+080 | 17+100 | 17+120 | 17+140 | 17+160 | CHAINAGE |

| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20
1:50 VERT. 0 0.5 1 2
REGIONAL | REFERENCES | FIELD NOTES | STAMP

SEE COVER SHEET FOR REGIONAL ACCEPTANCE

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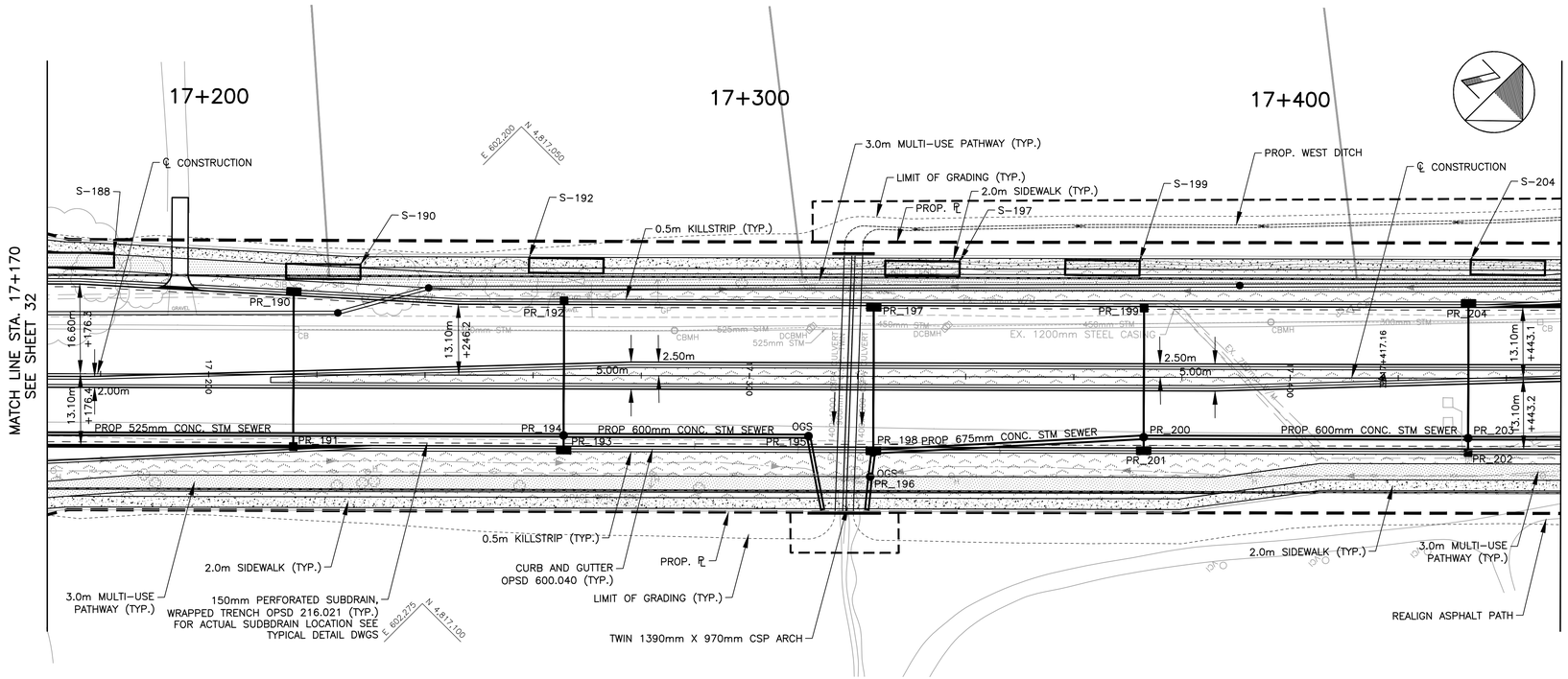
Halton REGION

ROAD RECONSTRUCTION
**TRAFALGAR ROAD (REG. RD. 3)**
FROM 184m NORTH OF ROAD A TO 80m NORTH OF ROAD B
STA. 16+890 TO STA. 17+170
IN THE TOWN OF OAKVILLE

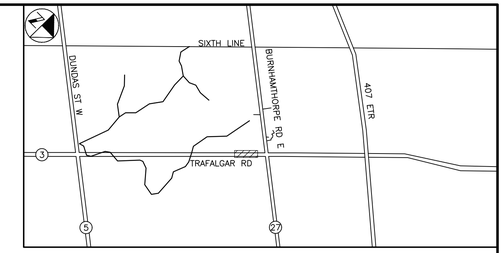
CONSULTANT FILE NO. 163269 | REGIONAL DRAWING NO.
CONTRACT NO. R-2079D-22 | DRAWING NO. SHEET 32 OF 93

R-2079D-22 32 OF 93

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Date: 11/09/2021 Time: 01:44:58 AM



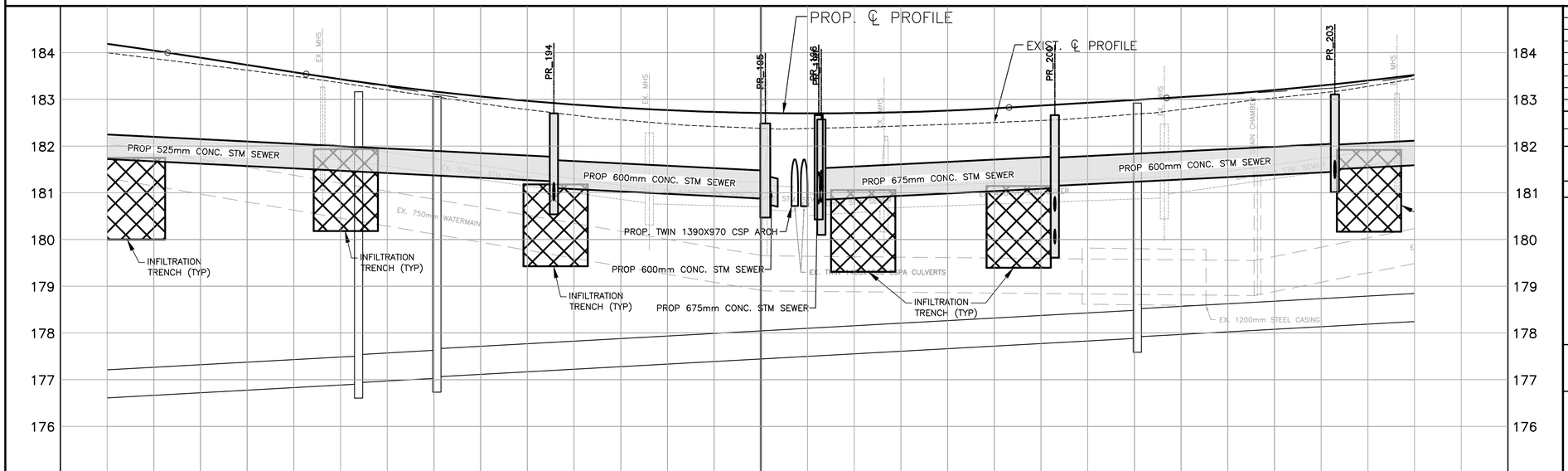

# TRAFALGAR ROAD (REG. RD. 3)




KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_191 | 17+215.68 | 13.350R | 705.01 | | SW181.63 | 400.010 | 183.21 | – |
| PR_190 | 17+215.68 | 15.352L | 705.02 | | NE181.63 | 400.082 | 183.43 | – |
| PR_194 | 17+265.68 | 11.100R | 701.011 | SE181.24 NE180.91 SW180.84 | NW181.10 | 401.01 | 182.70 | – |
| PR_192 | 17+265.68 | 13.792L | 705.01 | | NE180.94 | 400.010 | 182.79 | – |
| PR_193 | 17+265.68 | 13.830R | 705.02 | | SW180.94 | 400.082 | 182.79 | – |
| PR_195 | 17+310.96 | 11.100R | 701.012 | SE180.87 | NE180.77 | 401.01 | 182.49 | – |
| PR_196 | 17+322.39 | 18.578R | 701.011 | SW180.77 | NE180.73 | 401.01 | 182.66 | – |
| PR_197 | 17+322.96 | 12.790L | 705.02 | | NE181.32 | 400.082 | 182.44 | – |
| PR_198 | 17+322.96 | 13.932R | 701.011 | SW181.06 NW180.85 | NE180.80 | 400.010 | 182.57 | – |
| PR_199 | 17+372.96 | 12.790L | 705.01 | | NE180.85 | 400.010 | 182.63 | – |
| PR_200 | 17+372.96 | 11.100R | 701.011 | NW181.15 SW180.61 NE179.91 | SE181.10 | 401.01 | 182.66 | – |
| PR_201 | 17+372.96 | 13.600R | 705.02 | | SW179.94 | 400.010 | 182.75 | – |
| PR_203 | 17+432.94 | 11.100R | 701.011 | NW181.50 SW181.31 NE181.39 | SE181.45 | 401.01 | 183.10 | – |
| PR_202 | 17+432.94 | 13.792R | 705.01 | | SW181.41 | 400.010 | 183.19 | – |
| PR_204 | 17+432.98 | 13.830L | 705.02 | | NE181.41 | 400.082 | 183.19 | – |




| ℄ ELEVATIONS | 184.69 184.045 | 183.88 183.736 | 183.45 183.430 | 183.08 183.170 | 182.98 182.966 | 182.86 182.820 | 182.73 182.731 | 182.58 182.699 | 182.73 182.724 | 182.50 182.807 | 182.61 182.926 | 183.08 183.047 | 183.08 183.199 | 183.88 183.402 | ℄ ELEVATIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 600mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 13.82m @ 0.50% | | | | | | | | 675mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 6.10m @ 0.50% | | | | | | |
| | 525mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 150.00m @ 0.50% | | | | 181.24 181.10 | 600mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 45.28m @ 0.50% | | 180.87 180.77 180.70 | 180.70 180.73 180.85 | 675mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 50.08m @ 0.50% | | 181.10 181.15 | 600mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 60.00m @ 0.50% | | 181.45 181.50 | |
| CHAINAGE | 17+180 | 17+200 | 17+220 | 17+240 | 17+260 | 17+280 | 17+300 | 17+320 | 17+340 | 17+360 | 17+380 | 17+400 | 17+420 | 17+440 | CHAINAGE |

| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20
1:50 VERT. 0 0.5 1 2
REFERENCES
REGIONAL
FIELD NOTES
SEE COVER SHEET FOR REGIONAL ACCEPTANCE
STAMP

arva R.V. Anderson Associates Limited
engineering • environment • infrastructure

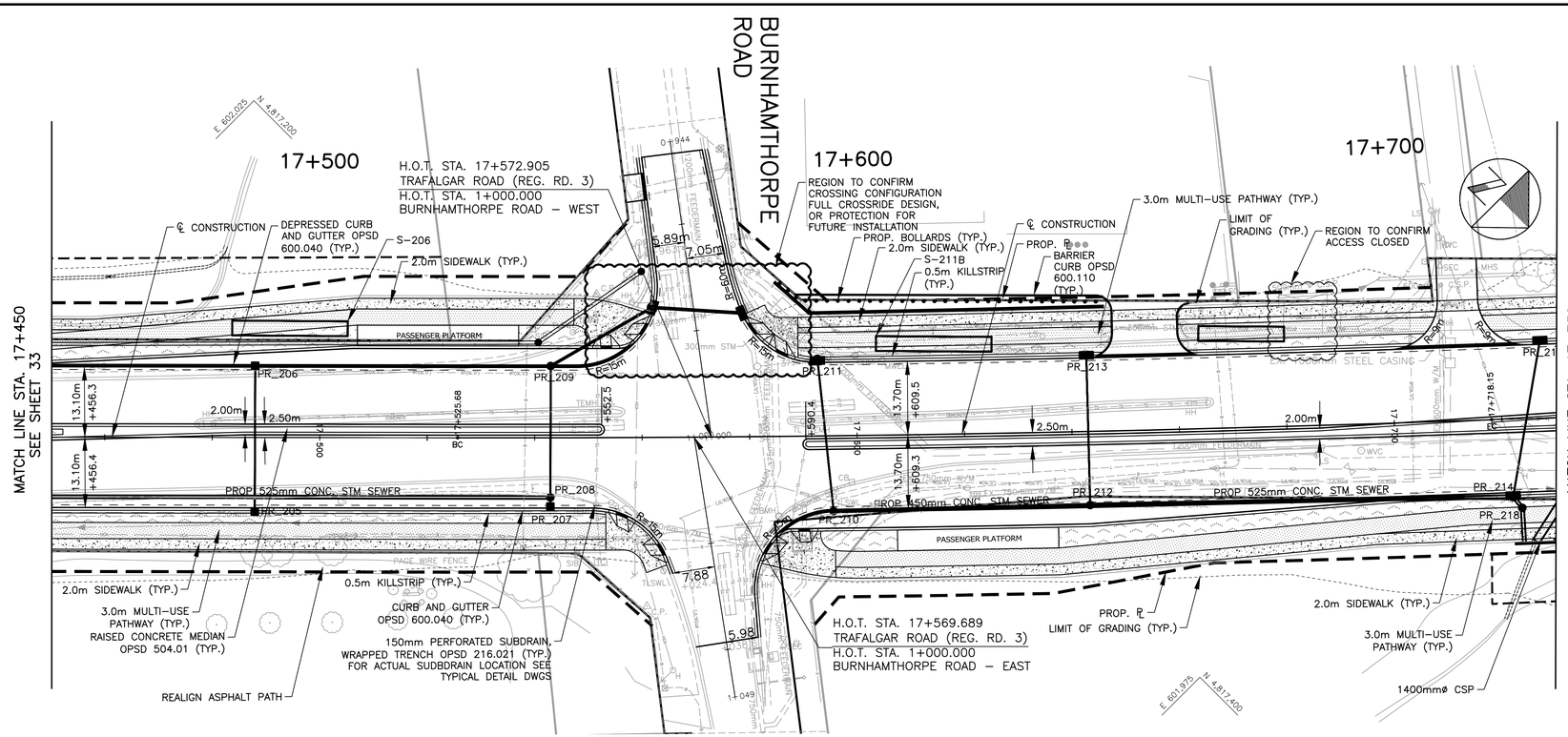
Halton REGION

ROAD RECONSTRUCTION
**TRAFALGAR ROAD (REG. RD. 3)**
FROM 80m NORTH OF ROAD B
TO 122m SOUTH OF BURNHAMTHORPE ROAD
STA. 17+170 TO STA. 17+450
IN THE TOWN OF OAKVILLE

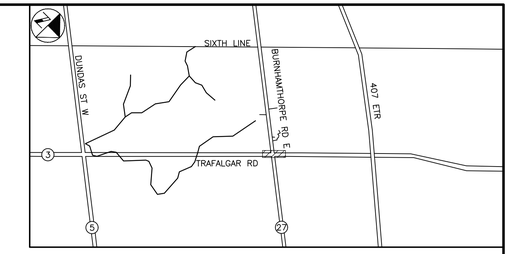
CONSULTANT FILE NO. 163269 | REGIONAL DRAWING NO.
CONTRACT NO. R-2079D-22 | DRAWING NO. SHEET 33 OF 93

R-2079D-22 33 OF 93

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Layout Tab: 33 TRAFALGAR-PP3
Date: 11/09/2021 Time: 01:46:48 AM



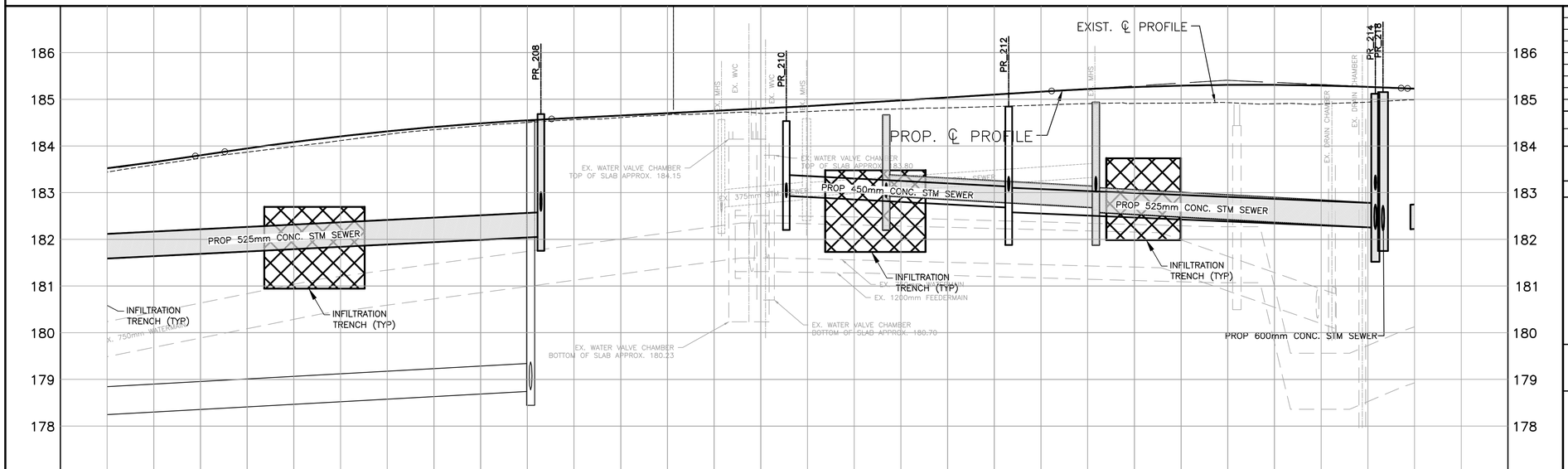

# TRAFALGAR ROAD (REG. RD. 3)




KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_205 | 17+487.94 | 13.820R | 705.01 | | SW182.23 | 400.010 | 183.92 | – |
| PR_206 | 17+487.98 | 13.350L | 705.01 | | NE182.20 | 400.010 | 183.77 | – |
| PR_207 | 17+542.89 | 12.788R | 705.01 | | SW182.73 | 400.010 | 184.31 | – |
| PR_208 | 17+542.90 | 11.100R | 701.010 | SW182.61 NE182.71 | SE182.06 | 401.01 | 184.68 | – |
| PR_209 | 17+543.02 | 13.370L | 701.010 | W182.85 | NE182.71 | 400.010 | 184.28 | – |
| Structure–53 | 17+561.95 | 24.198L | 701.011 | NW182.71 | E183.15 | 400.010 | 184.61 | – |
| Structure–52 | 17+578.77 | 23.018L | 705.02 | | SE182.91 | 400.010 | 184.44 | – |
| PR_211 | 17+592.79 | 14.200L | 701.011 | | NE183.02 | 400.010 | 184.67 | – |
| PR_210 | 17+595.46 | 14.002R | 701.010 | SW182.90 | NW182.93 | 400.010 | 184.53 | – |
| PR_213 | 17+642.97 | 14.200L | 705.02 | | NE183.32 | 400.082 | 184.97 | – |
| PR_212 | 17+643.09 | 13.700R | 701.010 | SW183.04 SE182.68 | NW182.58 | 400.010 | 184.84 | – |
| PR_214 | 17+721.61 | 14.430R | 701.011 | SW183.07 SE182.25 | N182.22 | 400.010 | 185.12 | – |
| PR_218 | 17+723.24 | 16.616R | 701.012 | S182.20 | NE182.05 | 401.01 | 185.15 | – |
| PR_217 | 17+727.64 | 14.442L | 705.02 | | NE183.36 | 400.082 | 185.09 | – |




| ℄ ELEVATIONS | 183.69 183.655 | 183.85 183.948 | 184.22 184.206 | 184.35 184.407 | 184.58 184.550 | 184.61 184.652 | 184.70 184.752 | 184.88 184.852 | 184.88 184.976 | 185.09 185.100 | 185.22 185.219 | 185.29 185.292 | 185.30 185.308 | 185.24 185.267 | ℄ ELEVATIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | 600mm DIA. STM CL. 65–D CONC., CLASS B BEDDING 6.57m @ 0.52% | |
| | 525mm DIA. STM CL. 65–D CONC., CLASS B BEDDING 110.00m @ 0.50% | | | | 182.06 | | | | 182.93 | 450mm DIA. STM CL. 65–D CONC., CLASS B BEDDING 47.76m @ 0.52% | | 182.68 182.58 | 525mm DIA. STM CL. 65–D CONC., CLASS B BEDDING 78.73m @ 0.42% | 182.25 182.20 182.05 | |
| CHAINAGE | 17+460 | 17+480 | 17+500 | 17+520 | 17+540 | 17+560 | 17+580 | 17+600 | 17+620 | 17+640 | 17+660 | 17+680 | 17+700 | 17+720 | CHAINAGE |

| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20
1:50 VERT. 0 0.5 1 2
REGIONAL | REFERENCES
FIELD NOTES
STAMP

SEE COVER SHEET FOR REGIONAL ACCEPTANCE

arva R.V. Anderson Associates Limited
engineering • environment • infrastructure

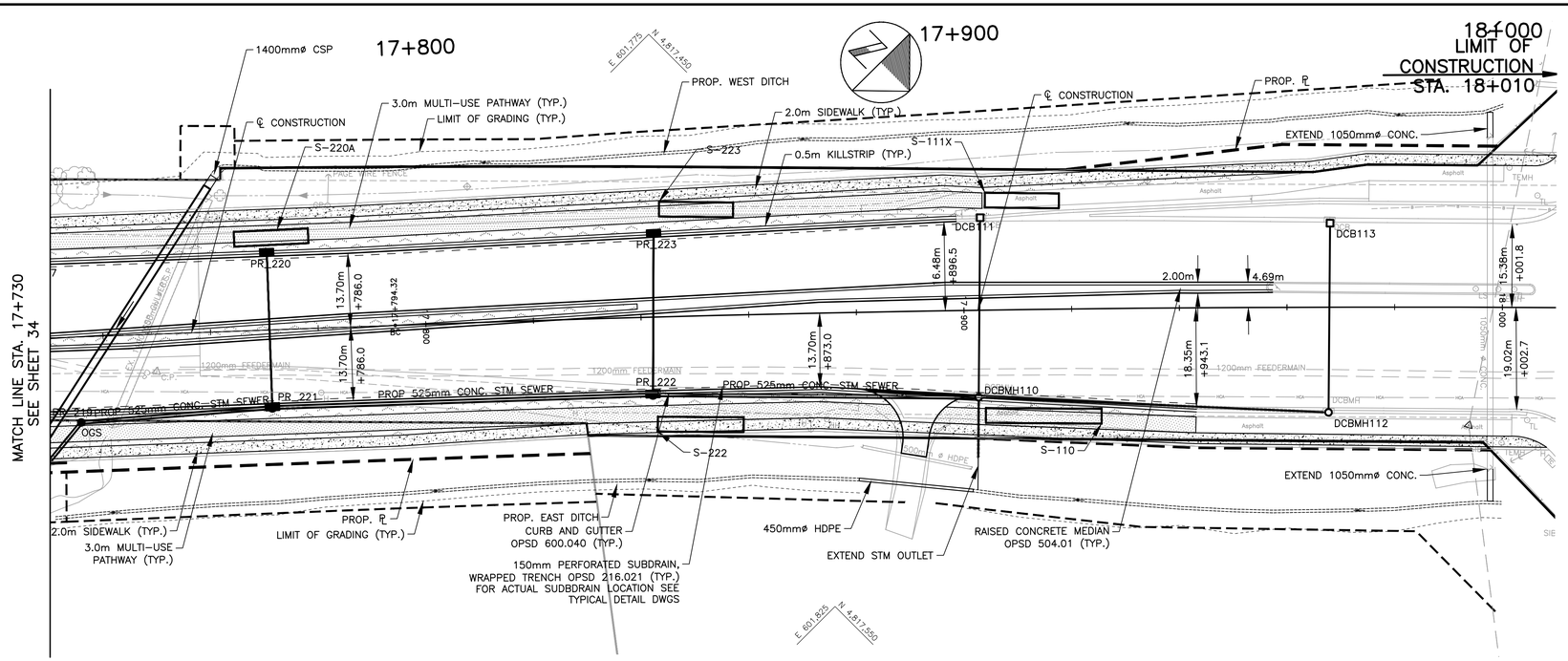
Halton REGION

ROAD RECONSTRUCTION
**TRAFALGAR ROAD (REG. RD. 3)**
FROM 122m SOUTH OF BURNHAMTHORPE ROAD TO 158m NORTH OF BURNHAMTHORPE ROAD
STA. 17+450 TO STA. 17+730
IN THE TOWN OF OAKVILLE

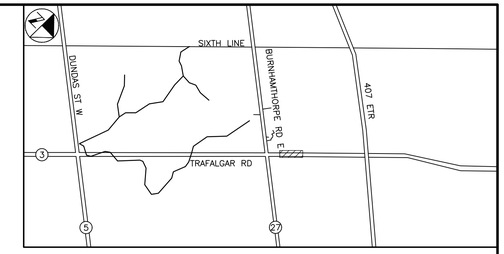
| CONSULTANT FILE NO. | REGIONAL DRAWING NO. |
|---|---|
| 163269 | |
| CONTRACT NO. | DRAWING NO. |
| R–2079D–22 | SHEET 34 OF 93 |

R–2079D–22 34 OF 93

Drawing: C:\USERS\DCWT\APPDATA\LOCAL\TEMP\ACPUBLISH_27424\163269–PLAN&PROFILE–PHASE 2.DWG
Layout Tab: 34 TRAFALGAR–PP10
Date: 11/09/2021 Time: 01:48:48 AM



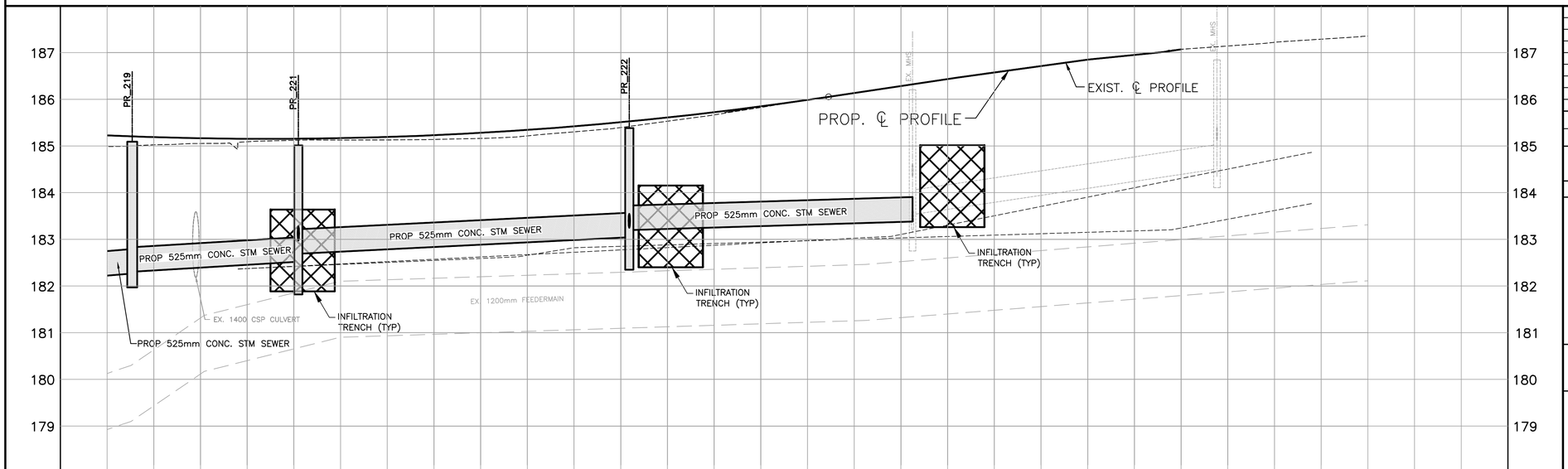

# TRAFALGAR ROAD (REG. RD. 3)




KEY PLAN
N.T.S.

## STORM SEWER DATA

| MH/ CB# | STATION | ℄ CONSTR OFFSET | MH STD DWG | INV. INLET | INV. OUTLET | FRAME & COVER STD. | TOP OF FRAME ELEV | REMARKS |
|---|---|---|---|---|---|---|---|---|
| PR_219 | 17+735.39 | 15.902R | 701.012 | NW182.31 | E182.27 | 401.01 | 185.09 | – |
| PR_220 | 17+770.96 | 14.430L | 705.02 | | NE183.08 | 400.082 | 185.01 | – |
| PR_221 | 17+770.96 | 14.430R | 701.011 | SW182.98<br>NW182.69 | SE182.52 | 400.010 | 185.01 | – |
| PR_222 | 17+841.83 | 14.430R | 701.011 | SW183.25<br>NW183.20 | SE183.05 | 400.010 | 185.38 | – |
| PR_223 | 17+842.75 | 15.555L | 705.02 | | NE183.36 | 400.082 | 185.37 | – |




| ℄ ELEVATIONS | 185.09 185.189 | 185.09 185.153 | 185.13 185.167 | 185.34 185.231 | 185.38 185.344 | 185.50 185.508 | 185.87 185.722 | 186.08 185.985 | 186.28 186.284 | 186.59 186.575 | 186.85 186.850 | 187.07 187.070 | 187.22 | 187.35 | ℄ ELEVATIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

525mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 9.47m @ 0.55%

182.77 182.31 525mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 35.60m @ 0.60% 182.52 182.69 525mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 71.52m @ 0.50% 183.05 183.20 525mm DIA. STM CL. 65-D CONC., CLASS B BEDDING 60.49m @ 0.30% 183.38

| CHAINAGE | 17+740 | 17+760 | 17+780 | 17+800 | 17+820 | 17+840 | 17+860 | 17+880 | 17+900 | 17+920 | 17+940 | 17+960 | 17+980 | 18+000 | CHAINAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| NO | DATE | BY | REVISIONS | MANU | CAD |
|---|---|---|---|---|---|
| 2 | XX/XX/20 | | ISSUED FOR 60% REVIEW | | X |
| 1 | 24/04/20 | | ISSUED FOR 30% REVIEW | | X |

DESIGN | CH'KD | DATE
DRAWN | CH'KD
SCALE 1:500 HORIZ. 0 5 10 20 | REFERENCES
1:50 VERT. 0 0.5 1 2
REGIONAL | FIELD NOTES
SEE COVER SHEET FOR REGIONAL ACCEPTANCE | STAMP

arva R.V. Anderson Associates Limited
engineering • environment • infrastructure

Halton REGION

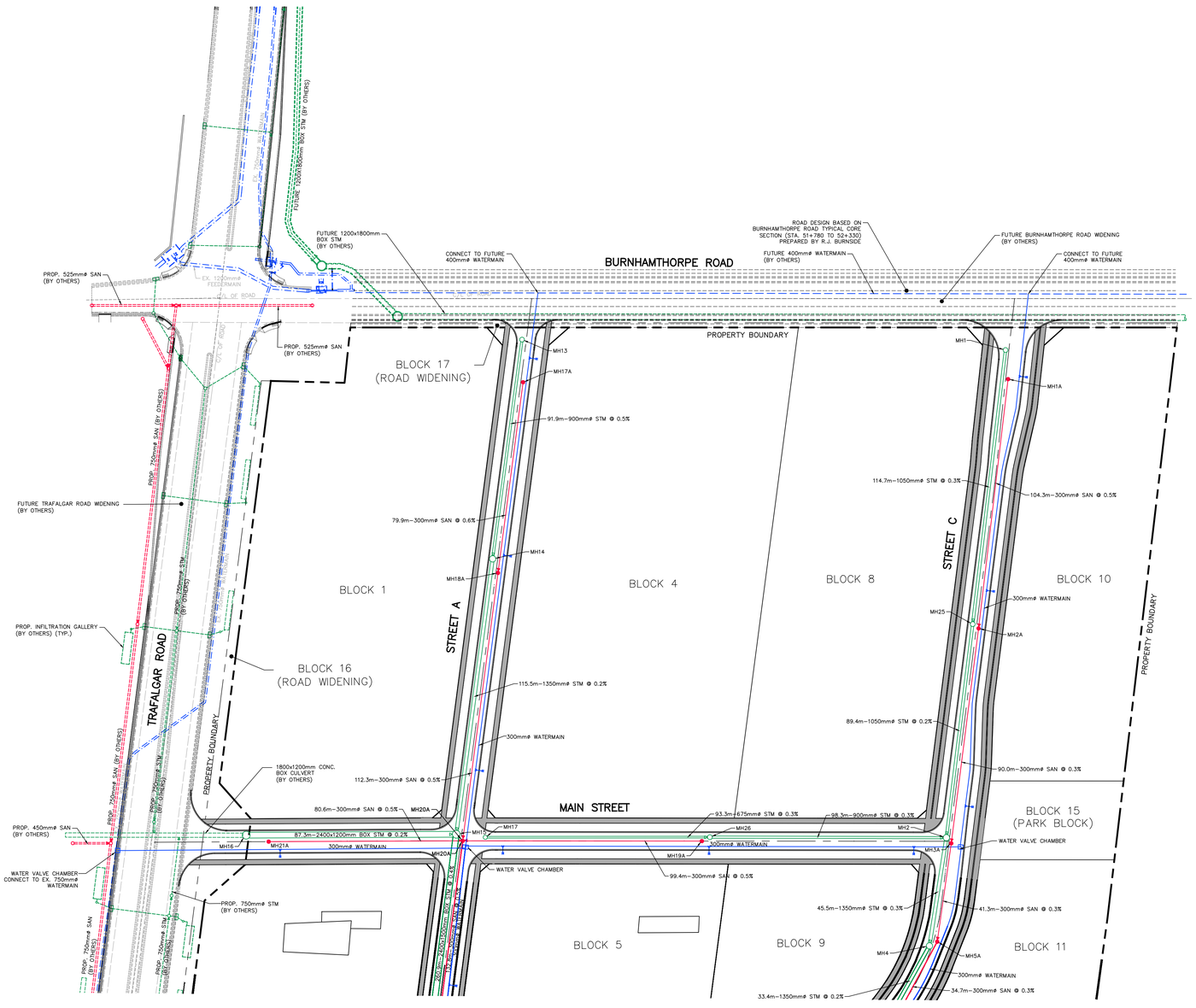
ROAD RECONSTRUCTION
**TRAFALGAR ROAD (REG. RD. 3)**
FROM 158m NORTH OF BURNHAMTHORPE ROAD
TO 20m SOUTH OF WILLIAM HALTON PARKWAY
STA. 17+730 TO STA. 18+000
IN THE TOWN OF OAKVILLE

CONSULTANT FILE NO. 163269 | REGIONAL DRAWING NO.
CONTRACT NO. R-2079D-22 | DRAWING NO. SHEET 35 OF 93

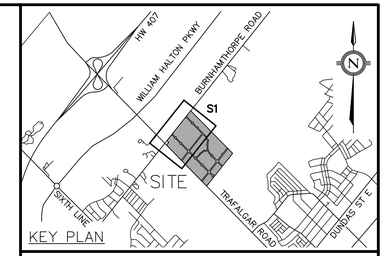
R-2079D-22 35 OF 93

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Layout Tab: 35 TRAFALGAR-PP11
Date: 11/09/2021 Time: 01:50:44 AM

# APPENDIX ‘F’




SEE DWG.S2 FOR CONTINUATION




## LEGEND

- MH1 — PROPOSED STORM MANHOLE
- MH1A — PROPOSED WASTEWATER MANHOLE
- PROPOSED FIRE HYDRANT AND VALVE
- PROPOSED STORM SEWER
- FUTURE STORM SEWER (BY OTHERS)
- PROPOSED WASTEWATER SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPOSED WATER VALVE CHAMBER
- PROPERTY LINE

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24-30-276-00 BY J.D BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

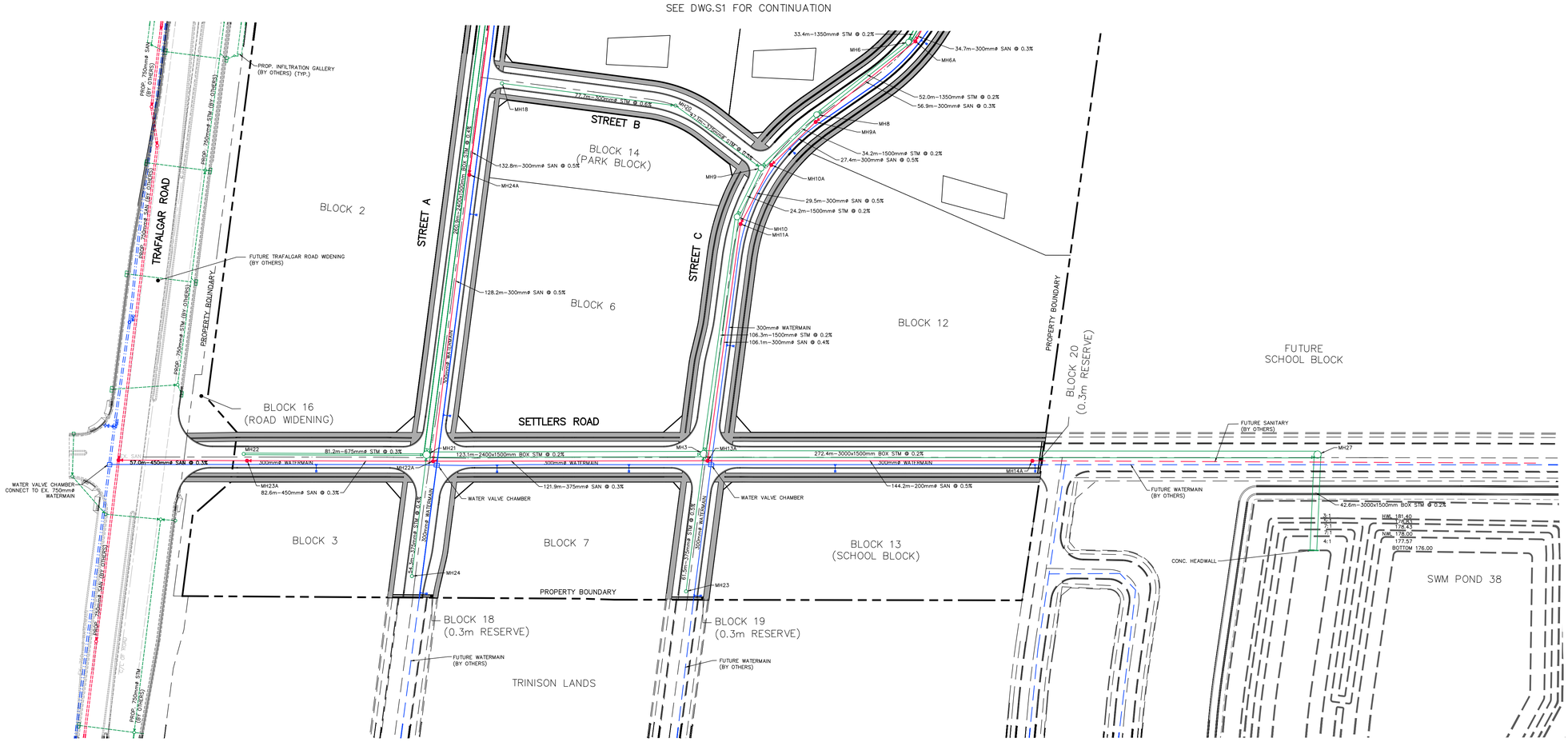
PROJECT TITLE
PROPOSED SUBDIVISION
1816986 ONTARIO INC.

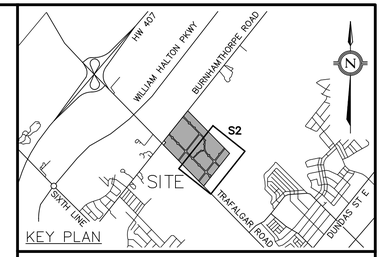
LOCATION
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

DRAWING TITLE
COMBINED SERVICING PLAN

| | | | |
|---|---|---|---|
| SCALE 1:1000 | DESIGN BY MF | PROJECT No. 1767 |
| DRAWN BY MS | CHECKED BY PC | PLAN No. S1 |
| DATE 2025/09/25 | SHEET X OF X | |

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PLOTDATE: Apr 10, 2026 - 2:21pm




## LEGEND

- MH1 — PROPOSED STORM MANHOLE
- MH1A — PROPOSED WASTEWATER MANHOLE
- PROPOSED FIRE HYDRANT AND VALVE
- PROPOSED STORM SEWER
- FUTURE STORM SEWER (BY OTHERS)
- PROPOSED WASTEWATER SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPOSED WATER VALVE CHAMBER
- PROPERTY LINE

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24–30–276–00 BY J.D BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

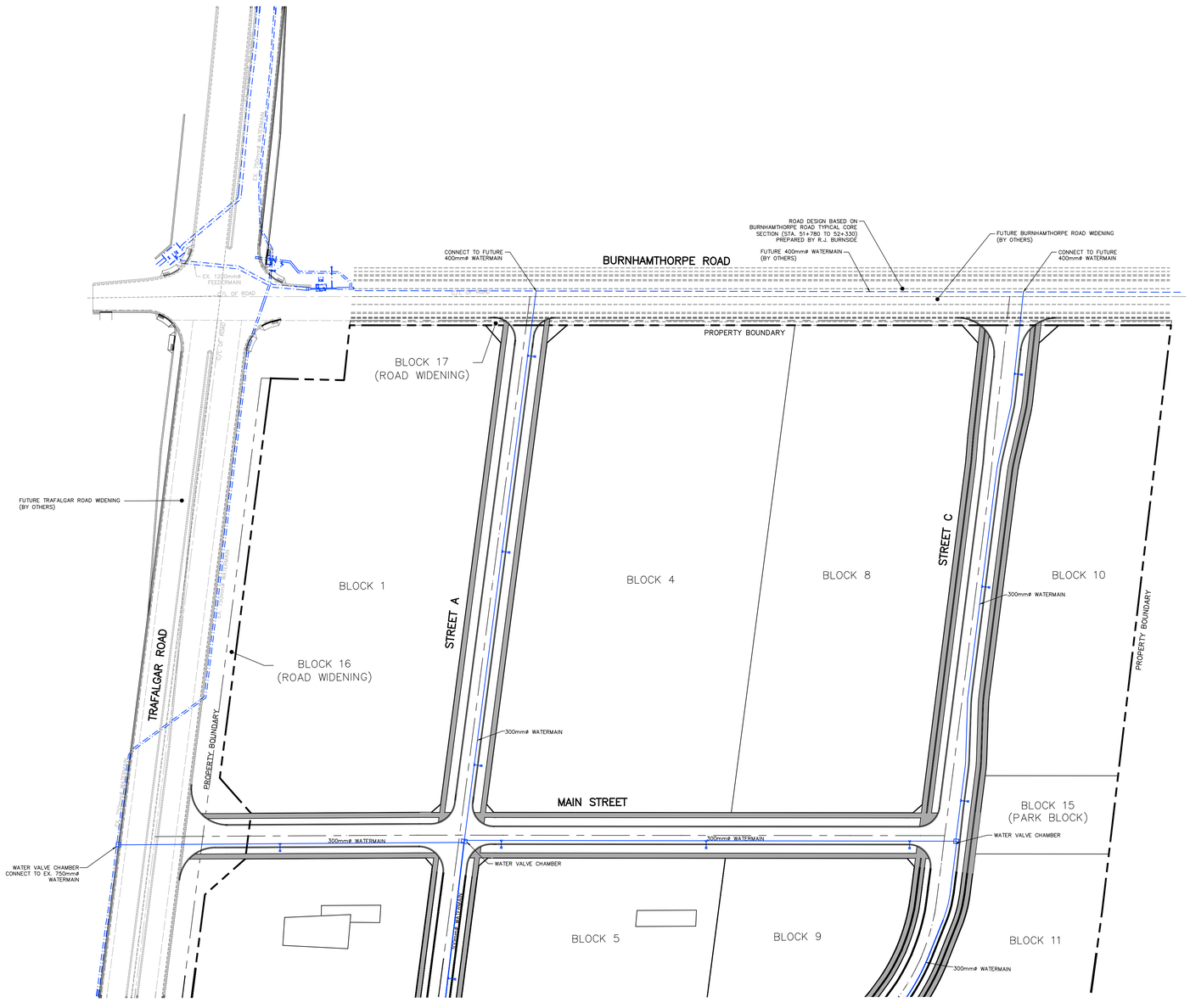
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

DRAWING TITLE

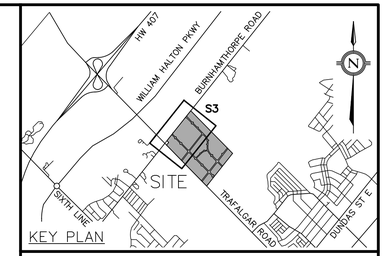
COMBINED SERVICING PLAN

| | | | |
|---|---|---|---|
| SCALE 1:1000 | DESIGN BY MF | PROJECT No. 1767 | |
| DRAWN BY MS | CHECKED BY PC | PLAN No. S2 | |
| DATE 2025/09/25 | SHEET X OF X | | |

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PLOTDATE: Apr 10, 2026 - 2:22pm




SEE DWG.S4 FOR CONTINUATION




KEY PLAN

LEGEND

- PROPOSED FIRE HYDRANT AND VALVE
- EXISTING WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPOSED WATERMAIN
- PROPOSED WATER VALVE CHAMBER
- PROPERTY LINE

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24-30-276-00 BY J.D BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

# PROPOSED SUBDIVISION 1816986 ONTARIO INC.

LOCATION

340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

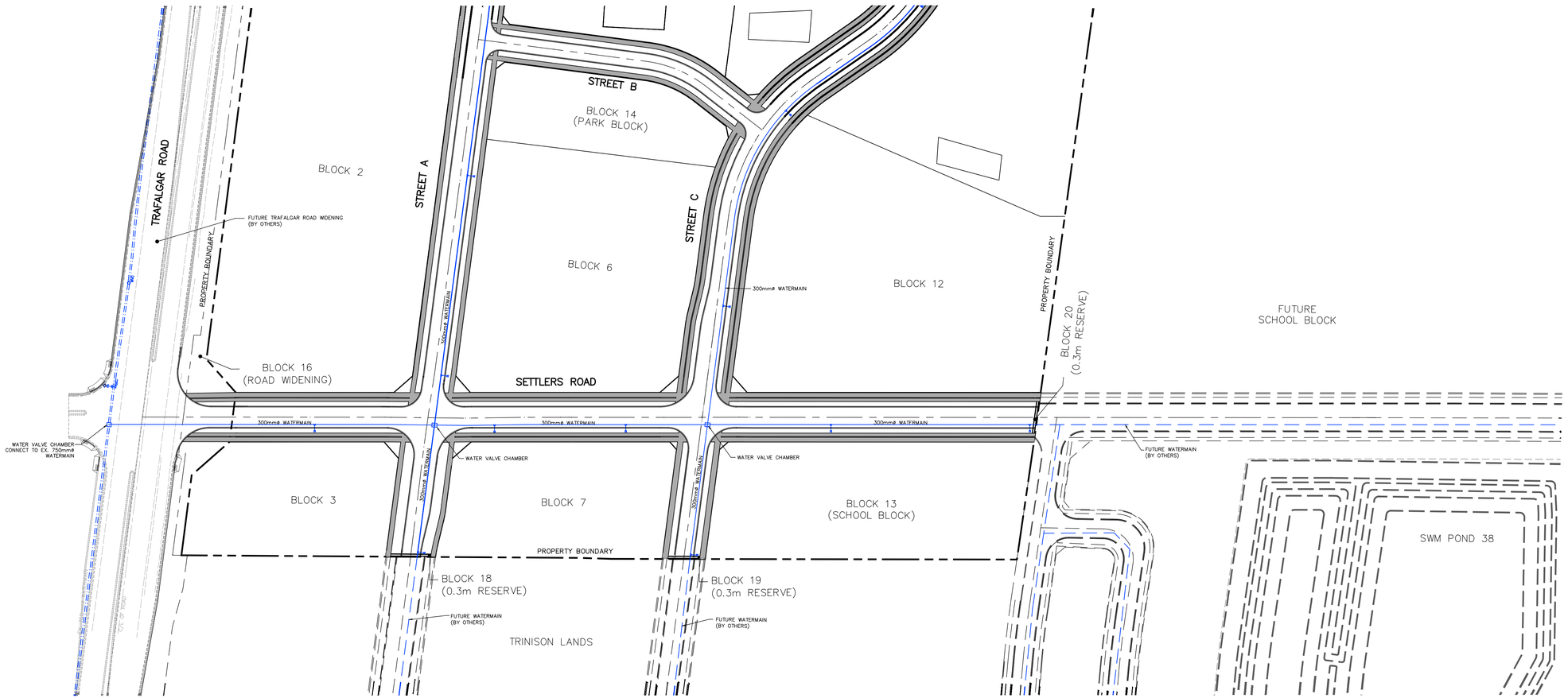
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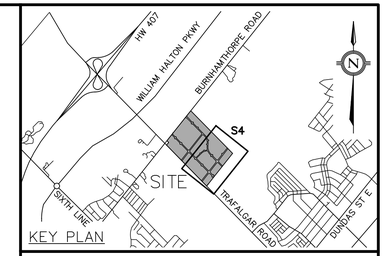
# WATER SERVICING PLAN

| | | | |
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| DATE 2025/09/25 | SHEET X OF X | | |

FILENAME: P:\1767 Westerkirk Trafalgar Inc\Drawings\DWG\DRAFT PLAN\1767S.dwg
PLOTDATE: Apr 10, 2026 - 12:10pm

SEE DWG.S3 FOR CONTINUATION




LEGEND

- PROPOSED FIRE HYDRANT AND VALVE
- EXISTING WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPOSED WATERMAIN
- PROPOSED WATER VALVE CHAMBER
- PROPERTY LINE

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24-30-276-00 BY J.D BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY


CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com


PROJECT TITLE
PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

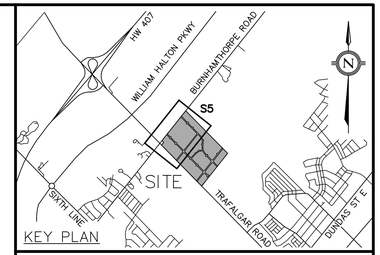
DRAWING TITLE
WATER SERVICING PLAN

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| DATE 2025/09/25 | SHEET X OF X | |

FILENAME: P:\1767 Westerkirk Trafalgar Inc\Drawings\DWG\DRAFT PLAN\1767S.dwg
PLOTDATE: Apr 10, 2026 - 12:29pm




SEE DWG.S6 FOR CONTINUATION




LEGEND

- MH1 — PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- FUTURE STORM SEWER (BY OTHERS)
- PROPERTY LINE

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

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LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT

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PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

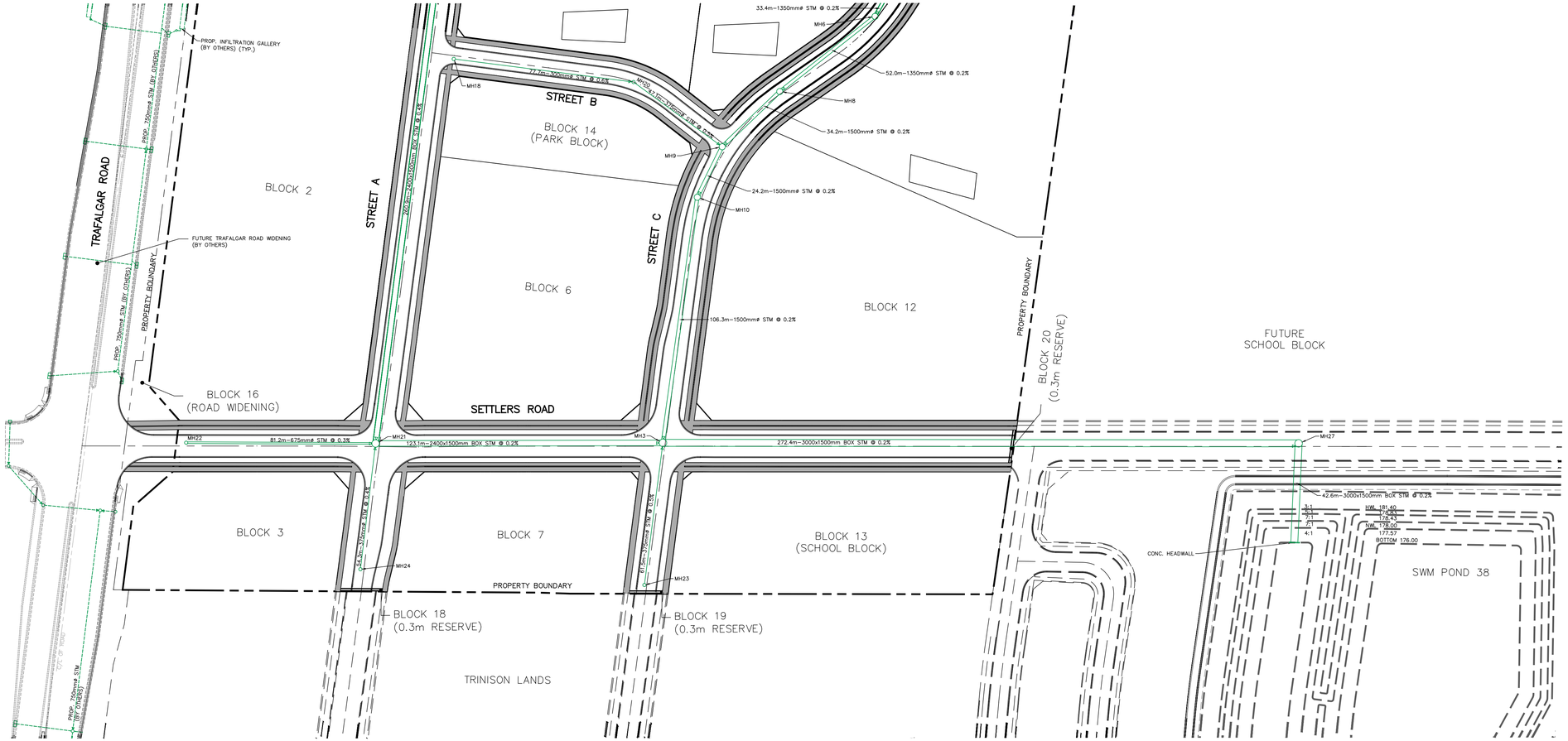
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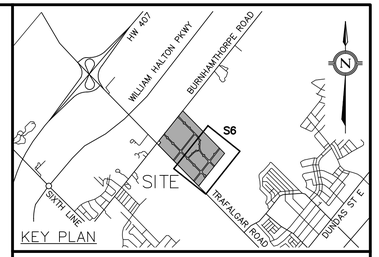
STORM SERVICING PLAN

| | | | |
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| DATE 2025/09/25 | SHEET X OF X | |

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PLOTDATE: Apr 10, 2026 - 12:09pm

SEE DWG.S5 FOR CONTINUATION




LEGEND

- MH1 — PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- FUTURE STORM SEWER (BY OTHERS)
- PROPERTY LINE

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

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DESIGNED BY

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CONSULTANT

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www.trafalgareng.com

PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

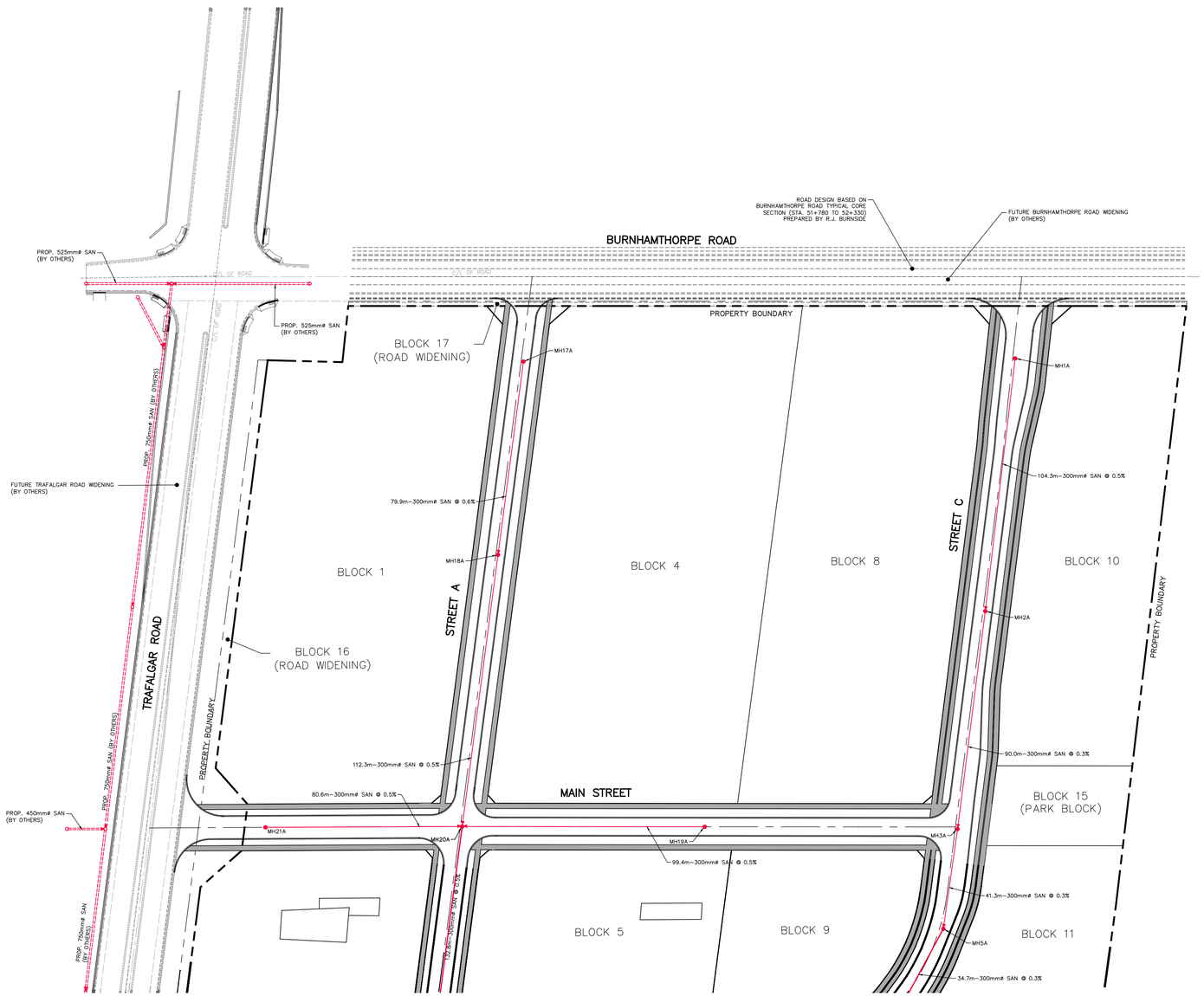
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

DRAWING TITLE

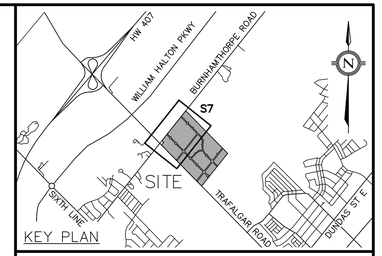
STORM SERVICING PLAN

| | | | |
|---|---|---|---|
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PLOTDATE: Apr 10, 2026 - 12:29pm




SEE DWG.S8 FOR CONTINUATION




KEY PLAN

## LEGEND

- MH1A — PROPOSED WASTEWATER MANHOLE
- PROPOSED WASTEWATER SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- PROPERTY LINE

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

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LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT
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#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

# PROPOSED SUBDIVISION 1816986 ONTARIO INC.

LOCATION

340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

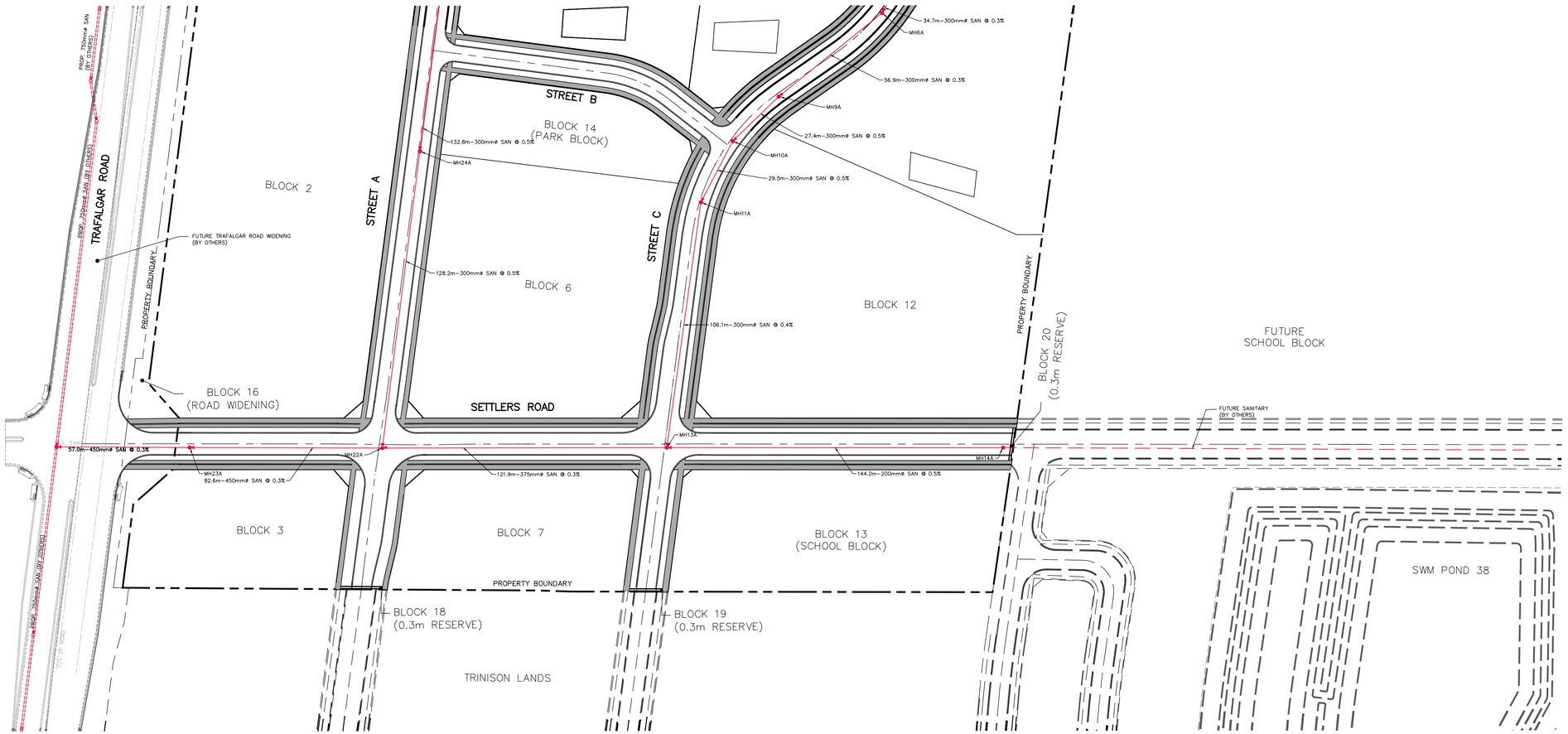
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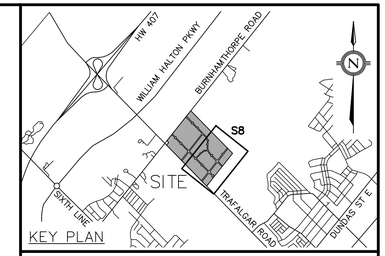
## SANITARY SERVICING PLAN

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| DRAWN BY MS | CHECKED BY PC | PLAN No. S7 | |
| DATE 2025/09/25 | SHEET X OF X | | |

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PLOTDATE: Apr 10, 2026 - 12:20pm

SEE DWG.S7 FOR CONTINUATION




KEY PLAN

LEGEND

- MH1A — PROPOSED WASTEWATER MANHOLE
- PROPOSED WASTEWATER SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- PROPERTY LINE

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

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## NOTE

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LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

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www.trafalgareng.com


PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

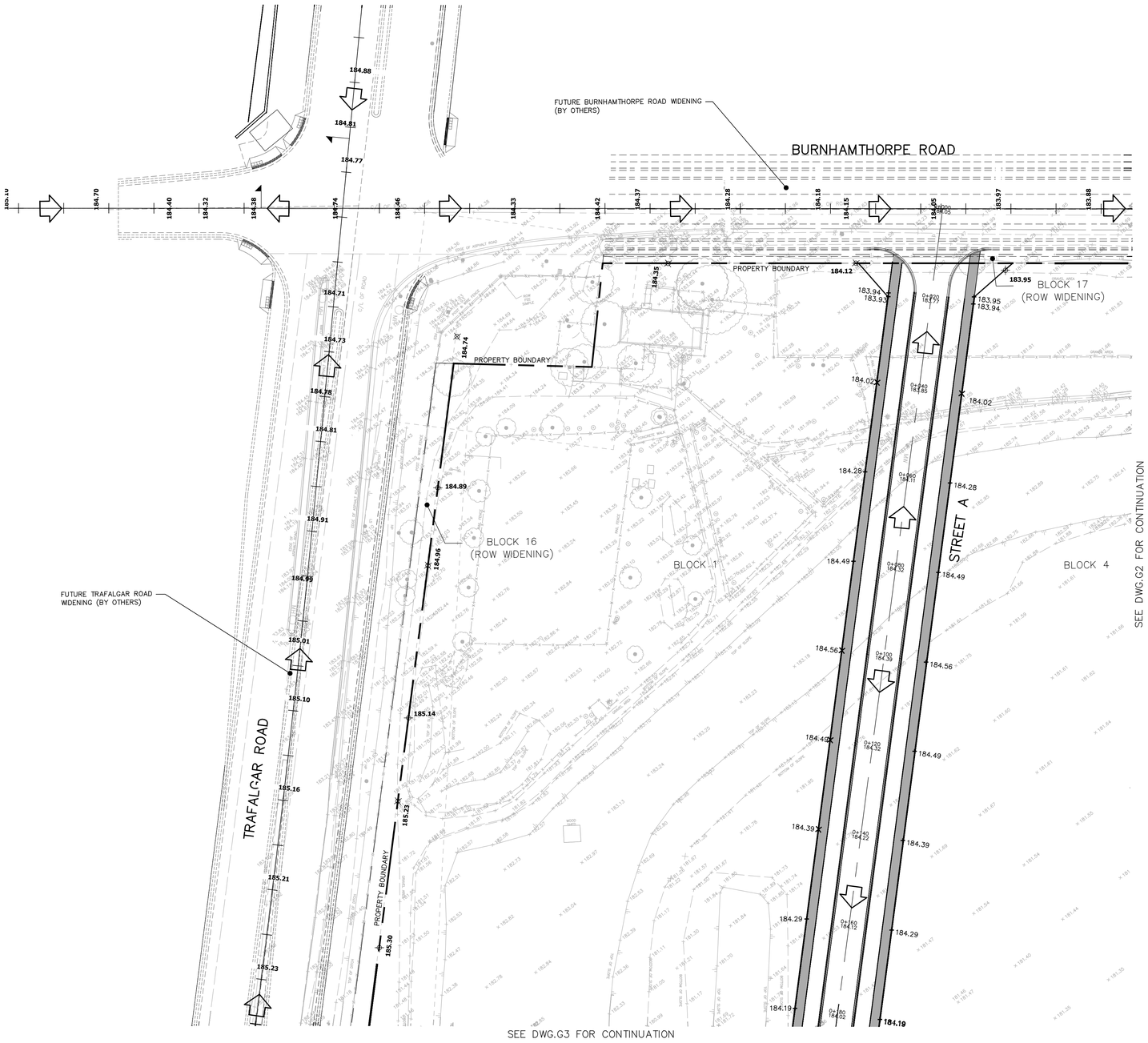
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

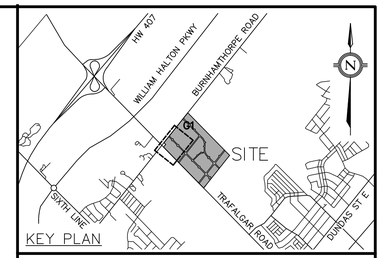
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SANITARY SERVICING PLAN

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| DRAWN BY MS | CHECKED BY PC | PLAN No. S8 |
| DATE 2025/09/25 | SHEET X OF X | |

FILENAME: P:\1767 Westerkirk Trafalgar Inc\Drawings\DWG\DRAFT PLAN\1767S.dwg
PLOTDATE: Apr 10, 2026 - 12:29pm




LEGEND

- 000.00 — EXISTING ELEVATION
- 0+000 00.00 — PROPOSED CENTRELINE ALIGNMENT STATION AND ELEVATION
- SUBJECT LANDS
- MAJOR OVERLAND FLOW ROUTE
- 185.30 — PROPOSED ELEVATION PER URBANTECH EIR/FSS GRADING

0 5 10 20 30 40 50m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767G.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

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LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

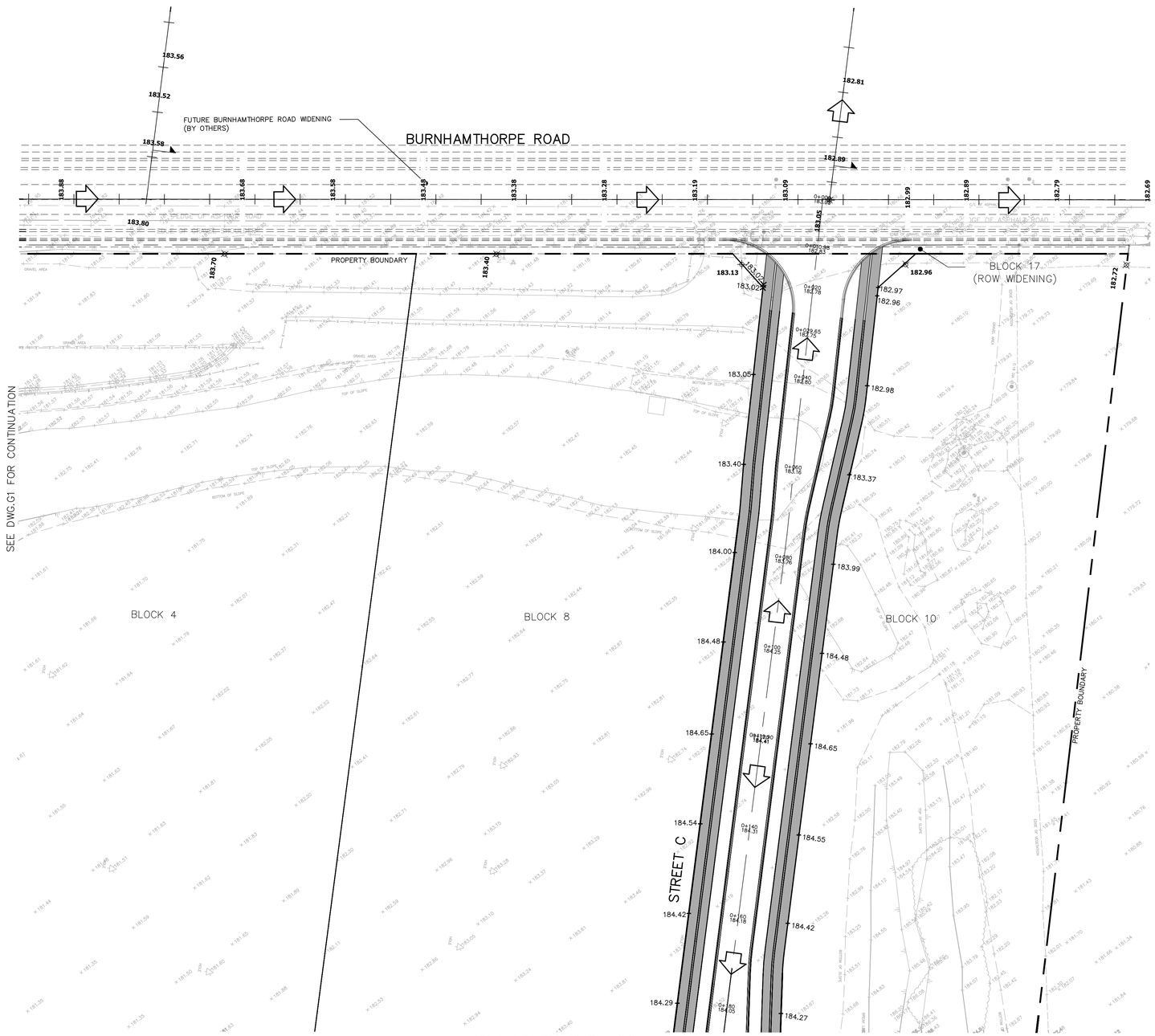
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

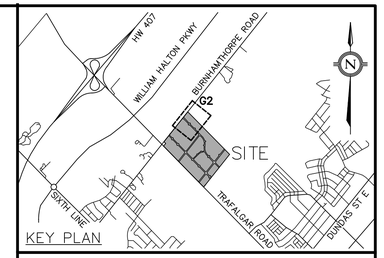
DRAWING TITLE

# GRADING PLAN

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| DATE 2025/09/25 | SHEET OF | | |

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PLOTDATE: Apr 10, 2026 - 2:29pm




## LEGEND

- 000.00 — EXISTING ELEVATION
- 0+000 00.00 — PROPOSED CENTRELINE ALIGNMENT STATION AND ELEVATION
- SUBJECT LANDS
- MAJOR OVERLAND FLOW ROUTE
- 185.30 — PROPOSED ELEVATION PER URBANTECH EIR/FSS GRADING

0 5 10 20 30 40 50m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767G.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

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LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT
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#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE
PROPOSED SUBDIVISION
1816986 ONTARIO INC.

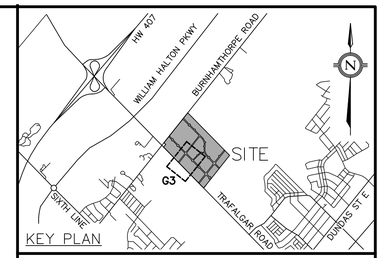
LOCATION
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

DRAWING TITLE
GRADING PLAN

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PLOTDATE: April 10, 2026 - 2:29pm




LEGEND

- 000.00 — EXISTING ELEVATION
- 0+000 00.00 — PROPOSED CENTRELINE ALIGNMENT STATION AND ELEVATION
- SUBJECT LANDS
- MAJOR OVERLAND FLOW ROUTE
- 185.30 — PROPOSED ELEVATION PER URBANTECH EIR/FSS GRADING

0 5 10 20 30 40 50m

| NO. | DATE | BY/DRAWN | REVISIONS |
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| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767G.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

BENCHMARK

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LOCATION

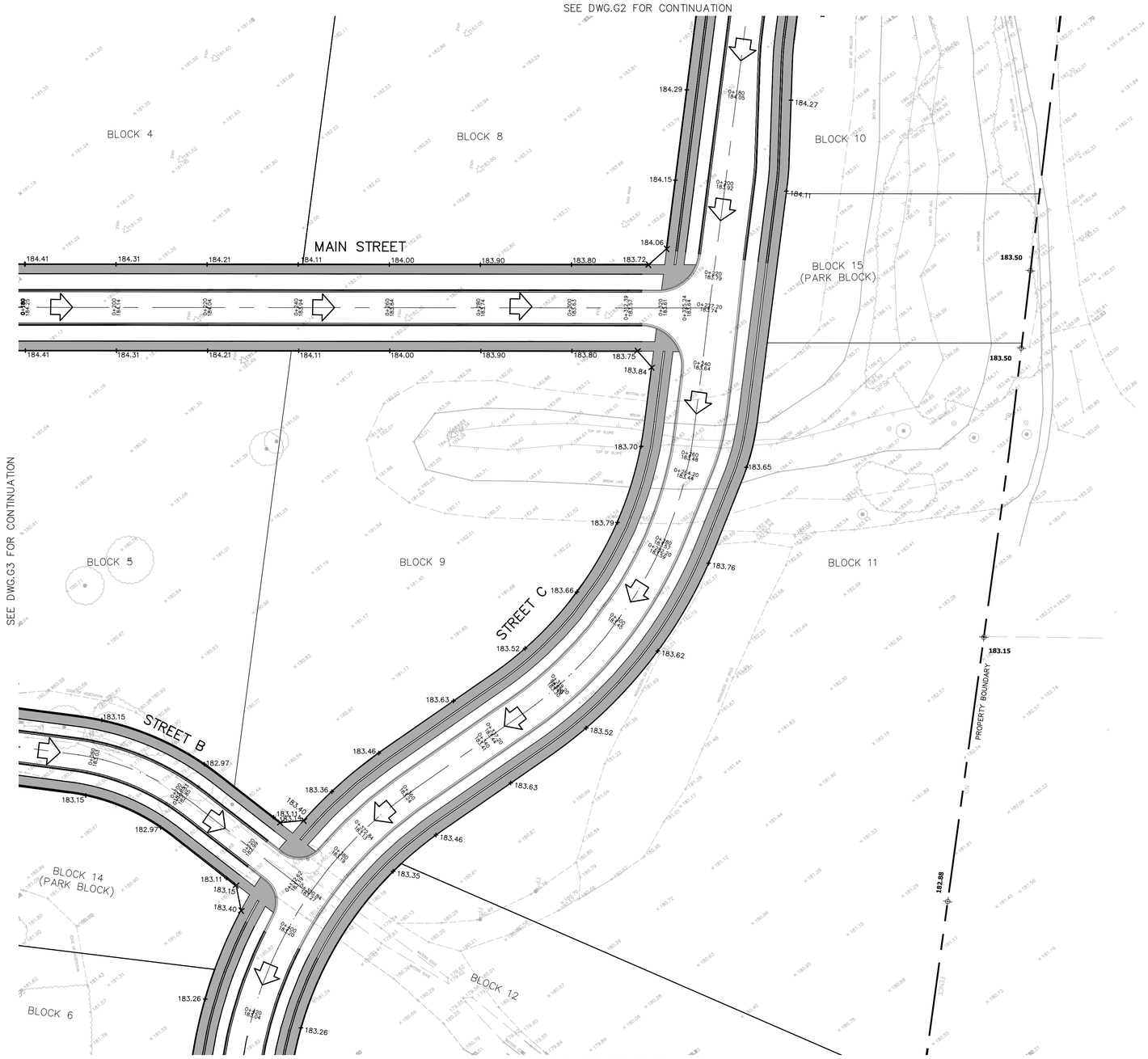
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

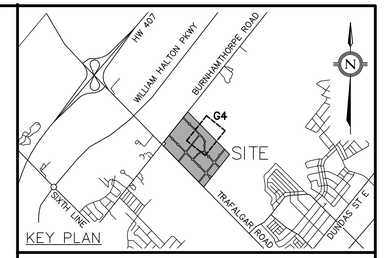
DRAWING TITLE

GRADING PLAN

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| DATE 2025/09/25 | SHEET OF | | |

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PLOTDATE: Apr 10, 2026 - 2:20pm




LEGEND

- 000.00 — EXISTING ELEVATION
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0 5 10 20 30 40 50m

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CAD FILE: 1767G.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

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## NOTE

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LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT
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#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

# PROPOSED SUBDIVISION 1816986 ONTARIO INC.

LOCATION

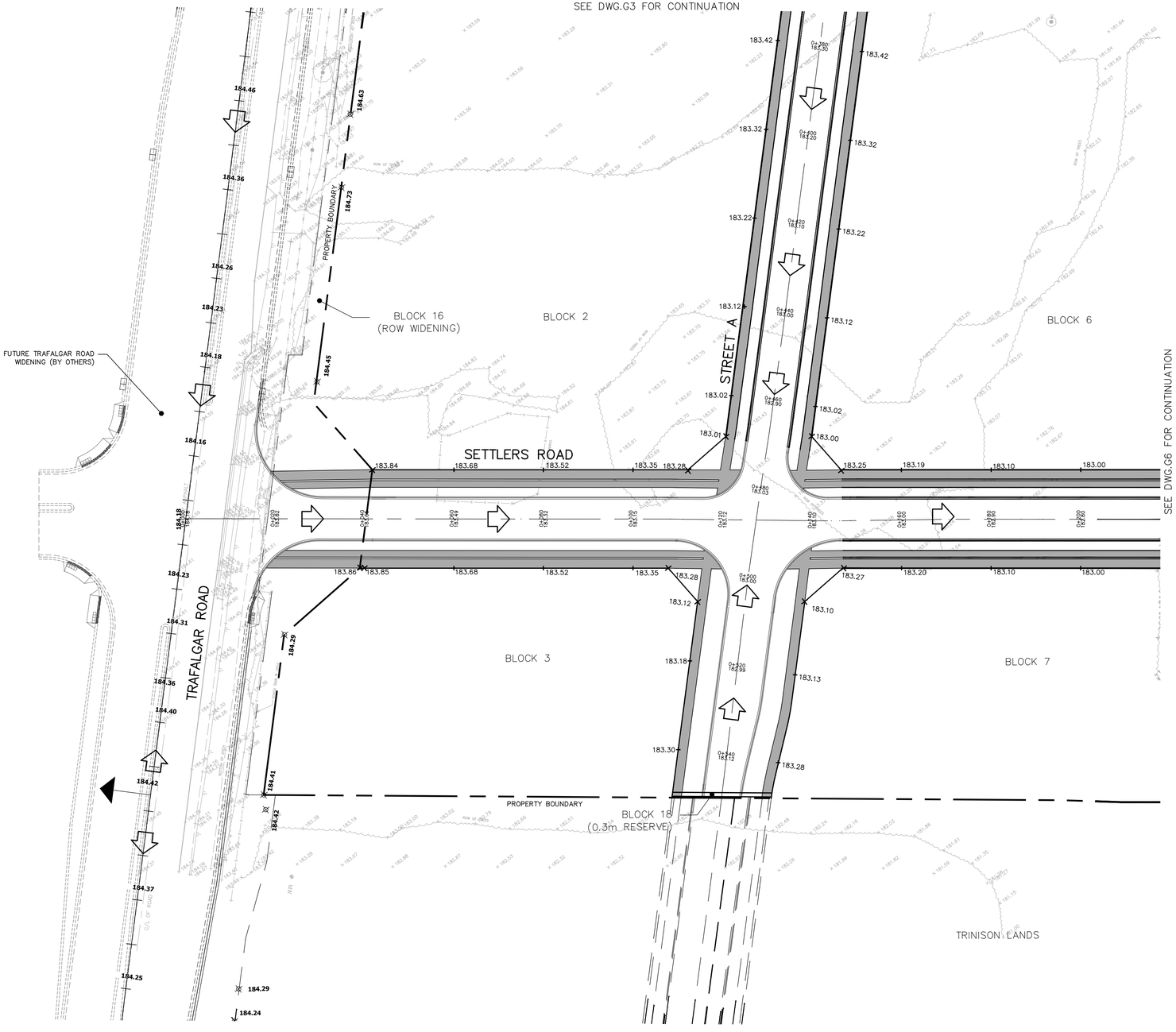
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

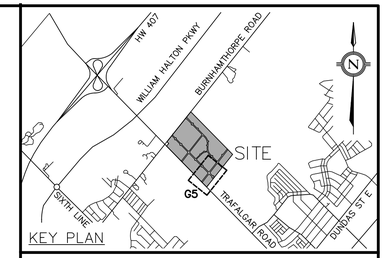
DRAWING TITLE

## GRADING PLAN

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| DRAWN BY MS | CHECKED BY PC | PLAN No. G4 | |
| DATE 2025/09/25 | SHEET OF | | |

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PLOTDATE: Apr 10, 2026 - 2:29pm




LEGEND

- 000.00 — EXISTING ELEVATION
- 0+000 00.00 — PROPOSED CENTRELINE ALIGNMENT STATION AND ELEVATION
- SUBJECT LANDS
- MAJOR OVERLAND FLOW ROUTE
- 185.30 — PROPOSED ELEVATION PER URBANTECH EIR/FSS GRADING

0 5 10 20 30 40 50m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767G.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24-30-276-00 BY J.D BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

340 BURNHAMTHORPE ROAD
EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

DRAWING TITLE

GRADING PLAN

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|---|---|---|---|
| SCALE 1:500 | DESIGN BY MF | PROJECT No. 1767 |
| DRAWN BY MS | CHECKED BY PC | PLAN No. G5 |
| DATE 2025/09/25 | SHEET OF | |

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PLOTDATE: Apr 10, 2026 - 2:20pm

SEE DWG.G4 FOR CONTINUATION

SEE DWG.G5 FOR CONTINUATION

STREET C

BLOCK 6

BLOCK 12

FUTURE
SCHOOL BLOCK

PROPERTY BOUNDARY

SETTLERS ROAD

BLOCK 7

BLOCK 13
(SCHOOL BLOCK)

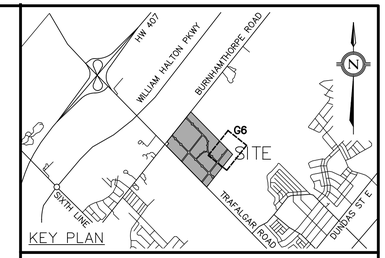
BLOCK 20
(0.3m RESERVE)

BLOCK 19
(0.3m RESERVE)

PROPERTY BOUNDARY

TRINISON LANDS

SWM POND 38




KEY PLAN

## LEGEND

| | |
|---|---|
| 000.00 | EXISTING ELEVATION |
| 0+000 00.00 | PROPOSED CENTRELINE ALIGNMENT STATION AND ELEVATION |
| | SUBJECT LANDS |
| | MAJOR OVERLAND FLOW ROUTE |
| 185.30 | PROPOSED ELEVATION PER URBANTECH EIR/FSS GRADING |

0 5 10 20 30 40 50m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767G.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

## BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

## NOTE

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LICENSED PROFESSIONAL ENGINEER
P. CIFONI
April 6 2026
PROVINCE OF ONTARIO

DESIGNED BY

APPROVED BY


CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

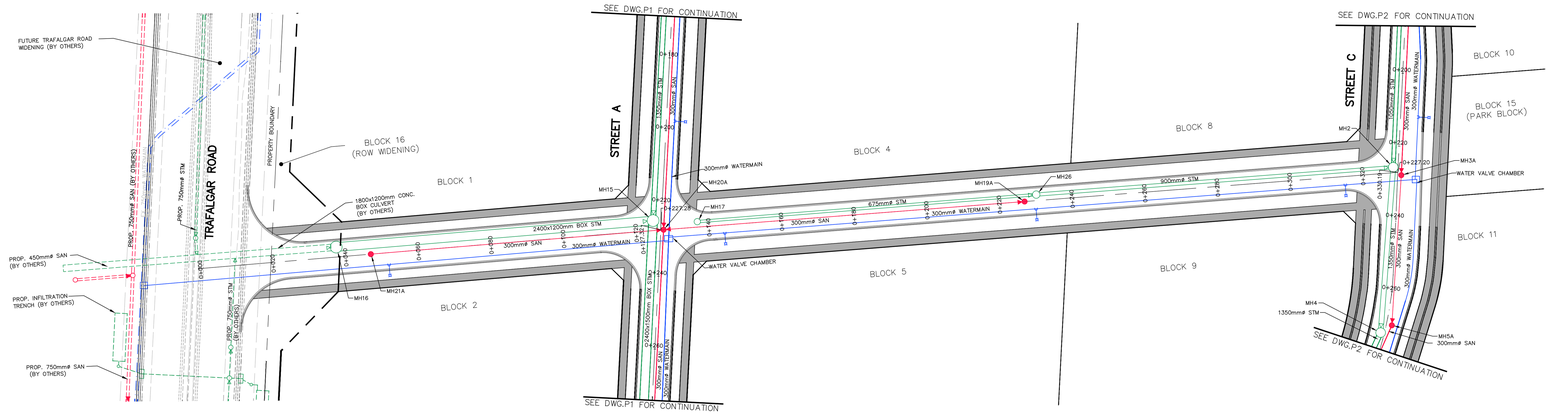

PROJECT TITLE
PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

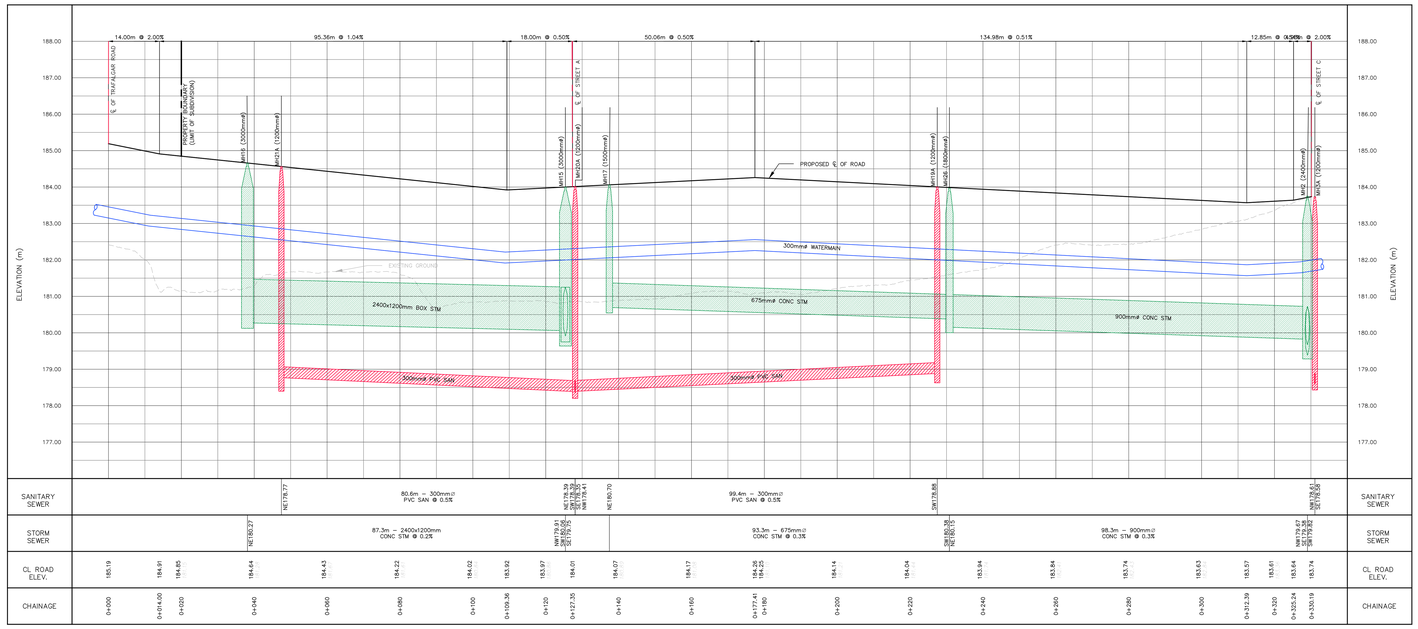
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GRADING PLAN

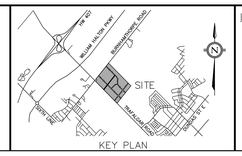
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PLOTDATE Apr 10, 2026 - 2:20pm




MAIN STREET




KEY PLAN

LEGEND

- MH1 — PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- FUTURE STORM SEWER (BY OTHERS)
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- MH1A — PROPOSED SANITARY MANHOLE
- PROPOSED WATER VALVE CHAMBER
- PROPOSED HYDRANT & VALVE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPERTY BOUNDARY

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.60m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

NOTE

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P. CIFONI — 100172855 — PROVINCE OF ONTARIO

DESIGNED BY

APPROVED BY

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

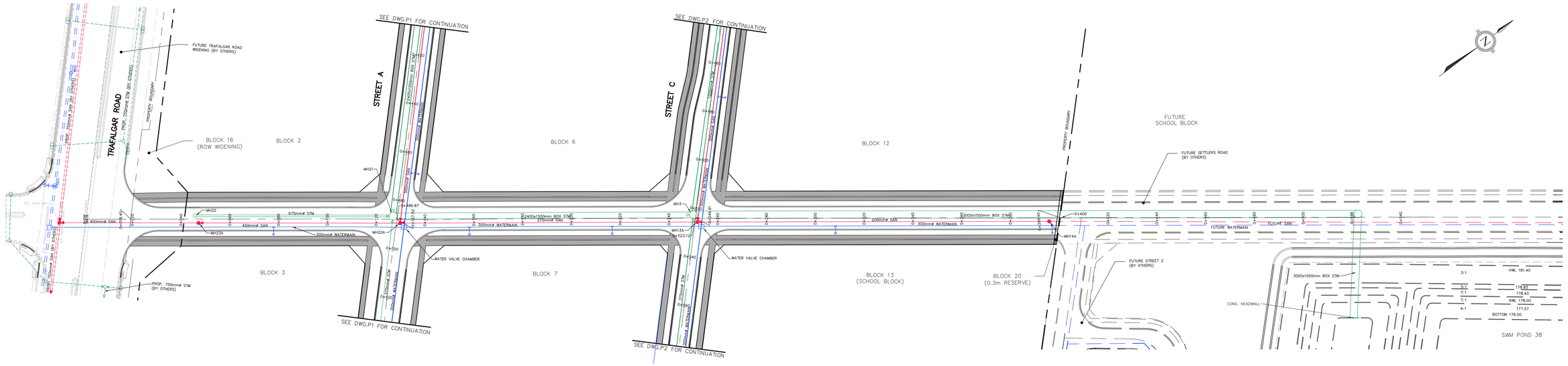
PROJECT TITLE
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

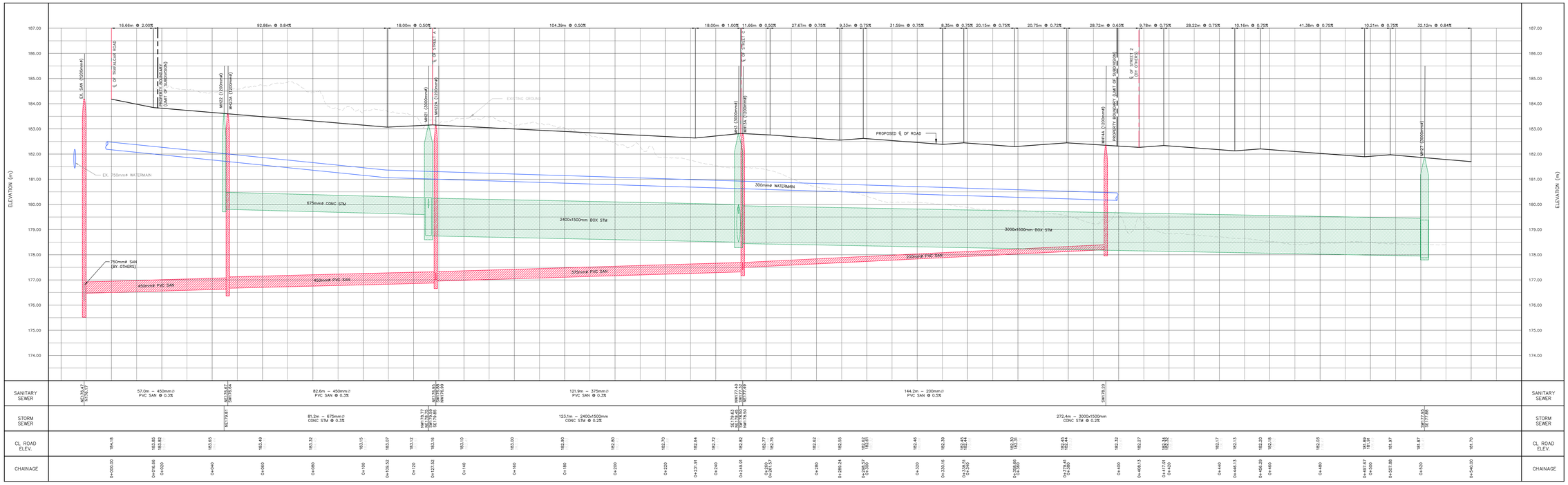
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PLAN – PROFILE
MAIN STREET
STA. 0+000 TO 0+330.19

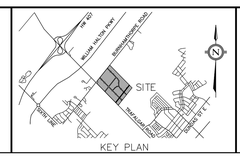
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| DRAWN BY | MS | CHECKED BY | PC |
| DATE | 2025/11/20 | SHEET | 0 OF 0 |
| PROJECT No. | 1767 | PLAN No. | P3 |




SETTLERS ROAD




LEGEND

- MH1 — PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- FUTURE STORM SEWER (BY OTHERS)
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- MH1A — PROPOSED SANITARY MANHOLE
- PROPOSED WATER VALVE CHAMBER
- PROPOSED HYDRANT & VALVE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPERTY BOUNDARY

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

NOTE

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DESIGNED BY

APPROVED BY

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

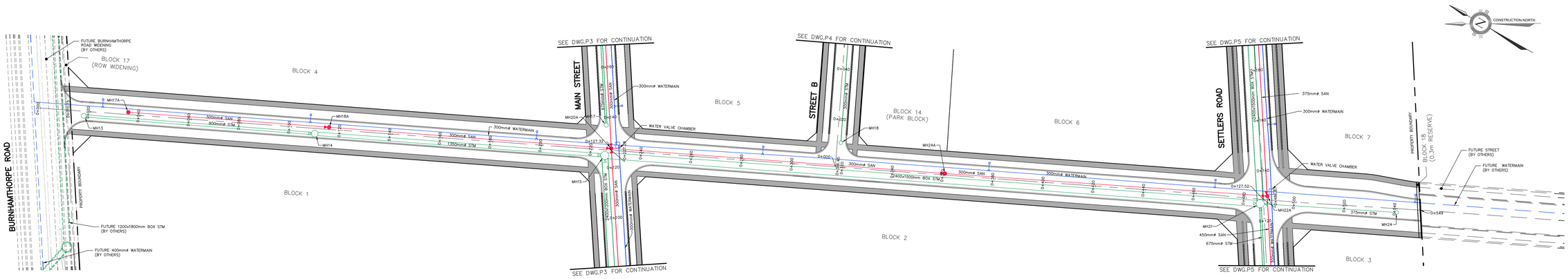
PROJECT TITLE
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

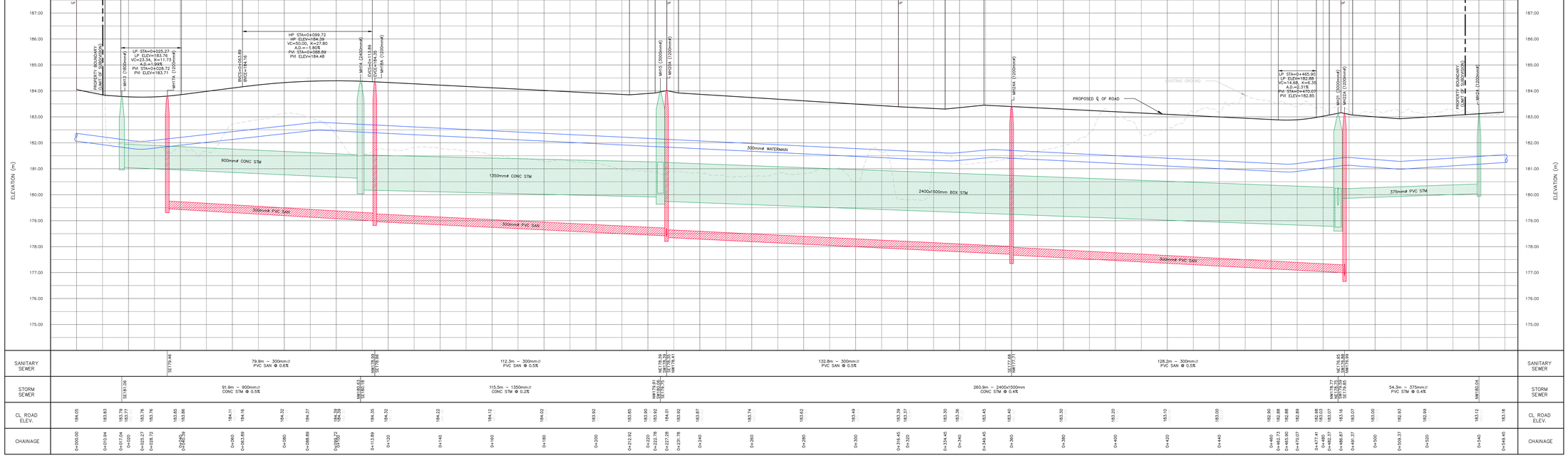
DRAWING TITLE
PLAN – PROFILE
SETTLERS ROAD
STA. 0+000 TO 0+540.00

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| SCALE | 1:500V/1:50H | DESIGN BY | MF |
| DRAWN BY | MG | CHECKED BY | PC |
| DATE | 2025/11/20 | SHEET | 0 OF 0 |
| PROJECT No. | 1767 | PLAN No. | P5 |

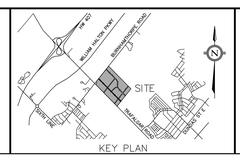
BAR SCALE: 0 25 50




STREET A




KEY PLAN




LEGEND

- MH1 — PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- FUTURE STORM SEWER (BY OTHERS)
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- MH1A — PROPOSED SANITARY MANHOLE
- PROPOSED WATER VALVE CHAMBER
- PROPOSED HYDRANT & VALVE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPERTY BOUNDARY

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

NOTE

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DESIGNED BY

APPROVED BY

TRAFALGAR ENGINEERING
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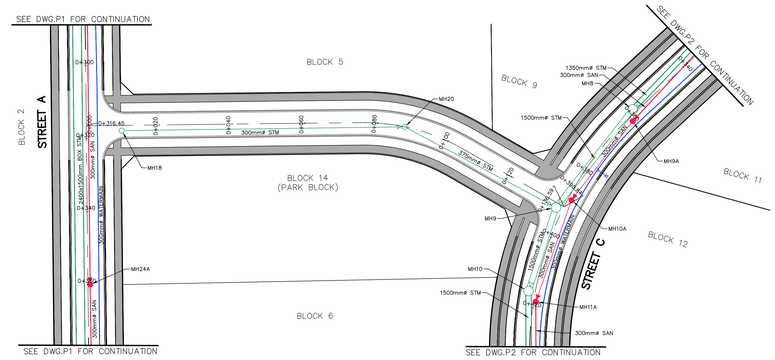
PROJECT TITLE
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

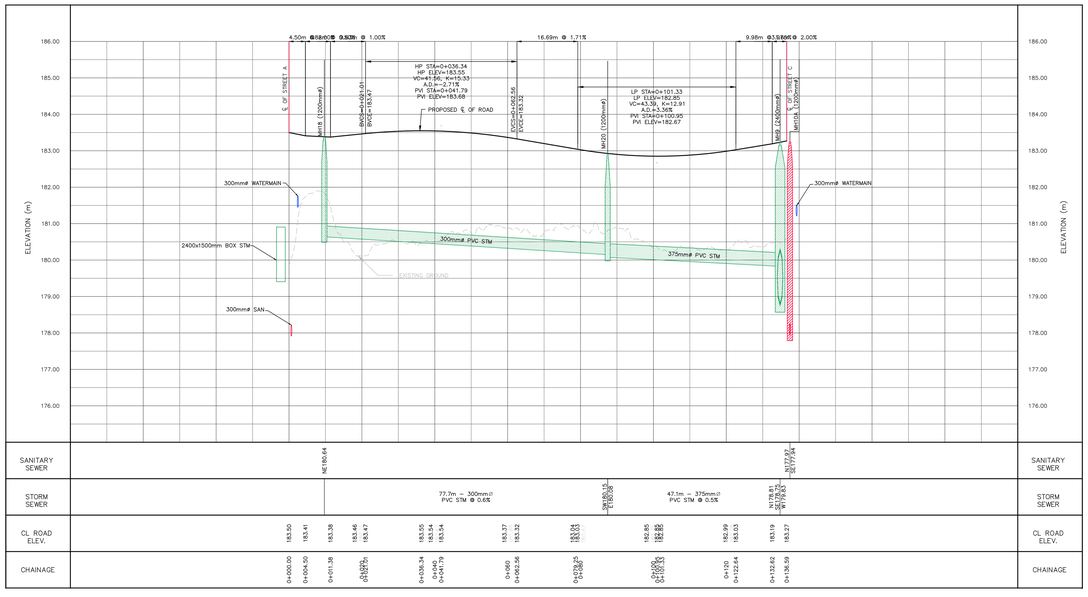
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PLAN – PROFILE
STREET A
STA. 0+000 TO 0+549.00

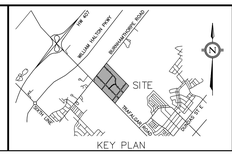
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| DRAWN BY | MG | CHECKED BY | PC |
| DATE | 2025/11/20 | SHEET | 0 OF 0 |
| PROJECT No. | 1767 | PLAN No. | P1 |




STREET B




KEY PLAN

LEGEND

- MH1 — PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- MH1A — PROPOSED SANITARY MANHOLE
- PROPOSED WATER VALVE CHAMBER
- PROPOSED HYDRANT & VALVE
- PROPOSED WATERMAIN
- PROPERTY BOUNDARY

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1. | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.60m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

NOTE

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P. CIFONI — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

DESIGNED BY

APPROVED BY

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

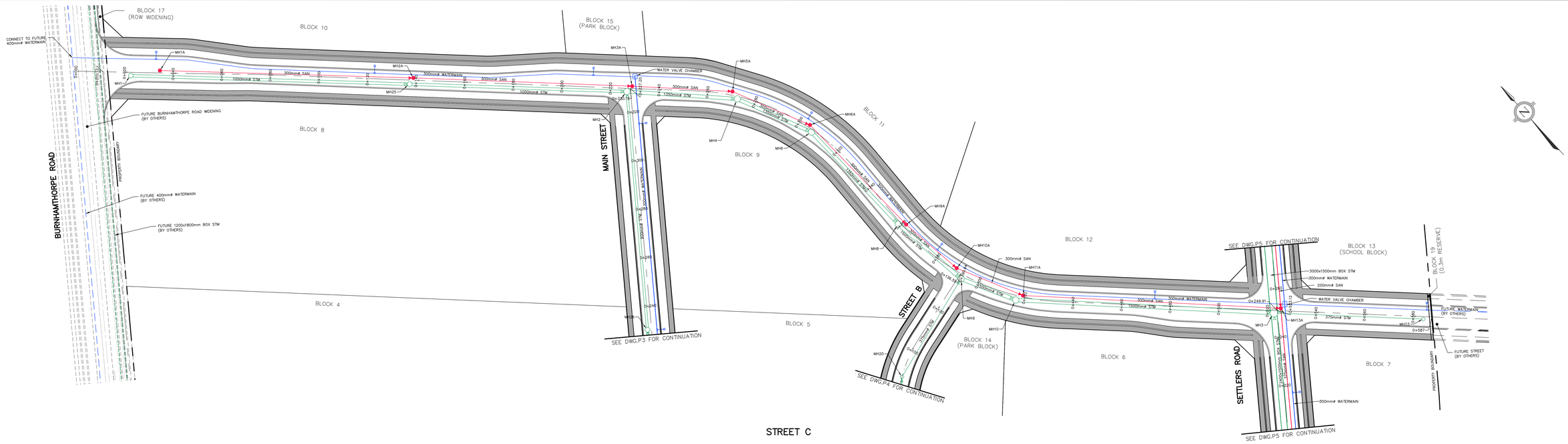
PROJECT TITLE
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD

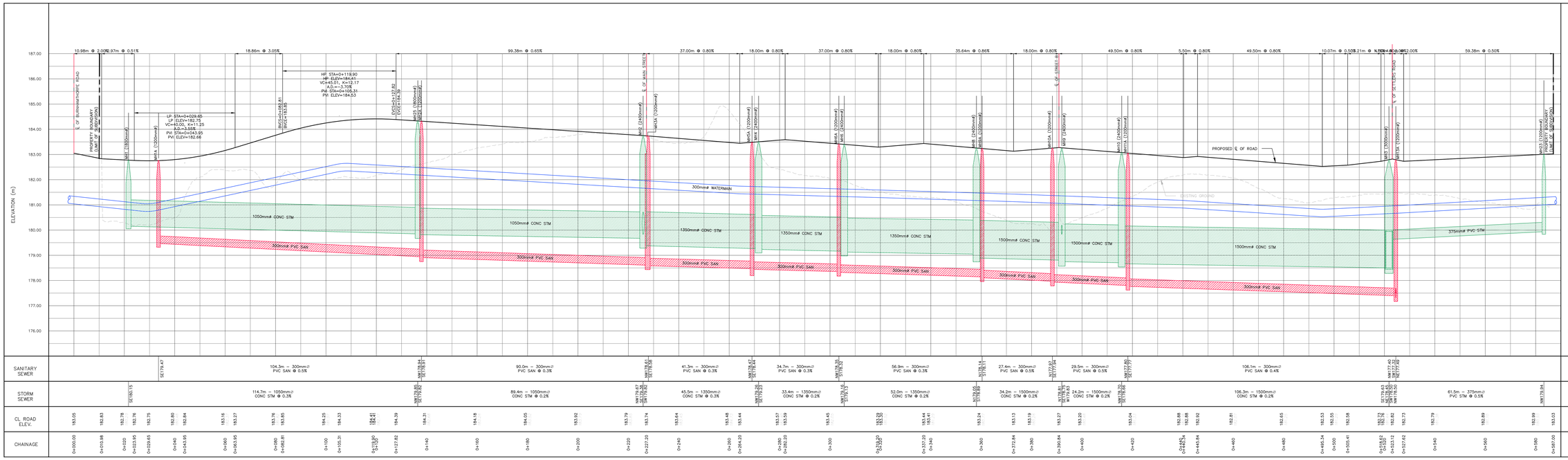
PROPOSED SUBDIVISION
1816986 ONTARIO INC.

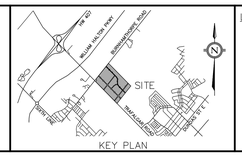
DRAWING TITLE
PLAN – PROFILE
STREET B
STA. 0+000 TO 0+136.59

BAR SCALE 0 25 50

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| DRAWN BY | MS | CHECKED BY | PC |
| DATE | 2025/11/20 | SHEET | 0 OF 0 |
| PROJECT No. | 1767 | PLAN No. | P4 |




LEGEND

- MH1 — PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- FUTURE STORM SEWER (BY OTHERS)
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- MH1A — PROPOSED SANITARY MANHOLE
- PROPOSED WATER VALVE CHAMBER
- PROPOSED HYDRANT & VALVE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPERTY BOUNDARY

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.15m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

NOTE

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PROFESSIONAL ENGINEER — P. CHYONI — PROVINCE OF ONTARIO

DESIGNED BY

APPROVED BY

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD

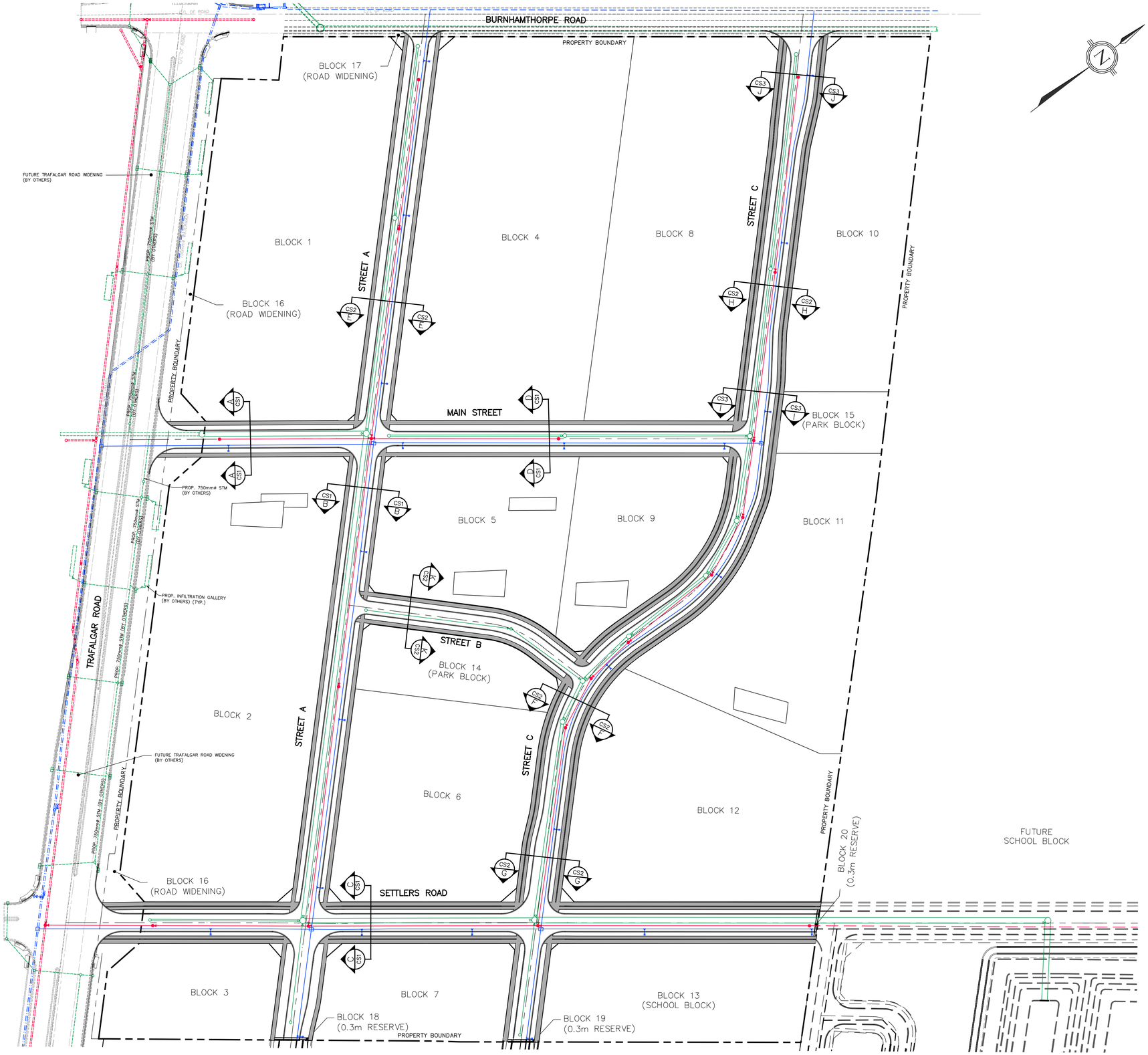
PROPOSED SUBDIVISION
1816986 ONTARIO INC.

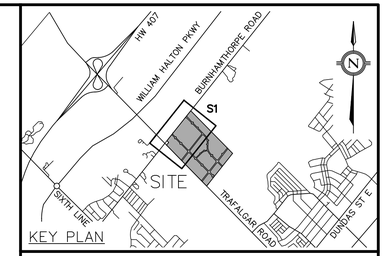
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PLAN – PROFILE
STREET C
STA. 0+000 TO 0+587.00

BAR SCALE 0 25 50

| SCALE | 1:500V/1:50H | DESIGN BY | MF | PROJECT No. | 1767 |
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| DATE | 2025/11/20 | SHEET | 0 OF 0 | | |

PATHNAME: P:\1767 Brokerlink Trafalgar Inv\Drawings\DWG\DRAFT PLAN\1767P.dwg
LOGGED: Apr 09, 2026 - 12:39pm




LEGEND

- PROPOSED STORM MANHOLE
- PROPOSED WASTEWATER MANHOLE
- PROPOSED FIRE HYDRANT AND VALVE
- PROPOSED STORM SEWER
- FUTURE STORM SEWER (BY OTHERS)
- PROPOSED WASTEWATER SEWER
- FUTURE SANITARY SEWER (BY OTHERS)
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPOSED WATER VALVE CHAMBER
- PROPERTY LINE

0 10 20 40 60 80 100m

| NO. | DATE | BY/DRAWN | REVISIONS |
|---|---|---|---|
| 1 | 26/04/06 | PC/MF | ISSUED FOR OPA/ZBA/DRAFT PLAN OF SUBDIVISION |

CAD FILE: 1767S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Apr 10, 2026

BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

NOTE

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LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

340 BURNHAMTHORPE ROAD
EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

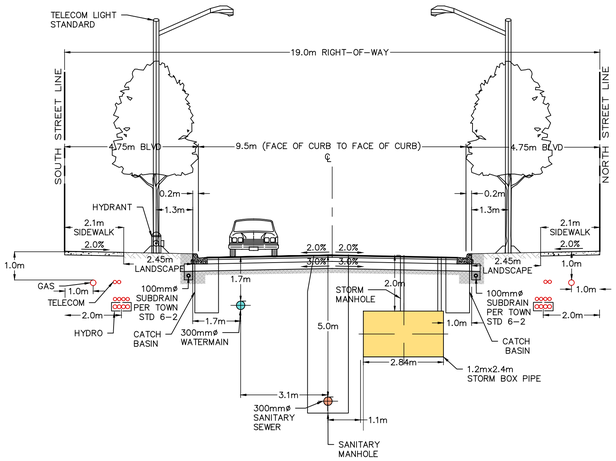
DRAWING TITLE

CROSS-SECTION
KEY PLAN

| | | | |
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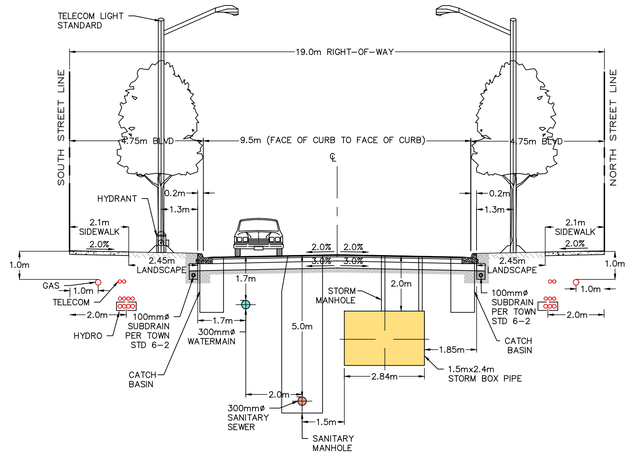
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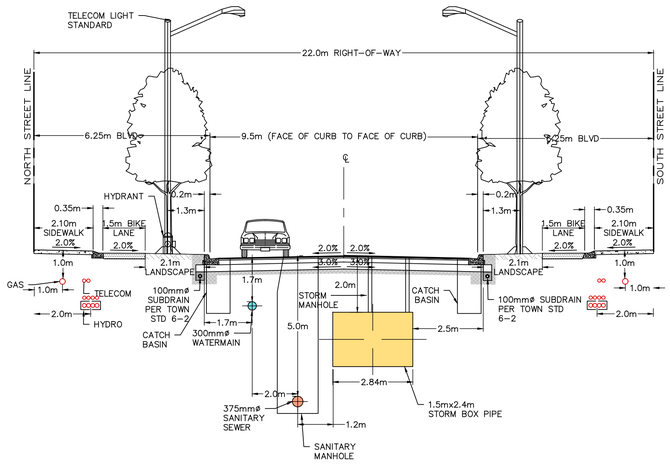

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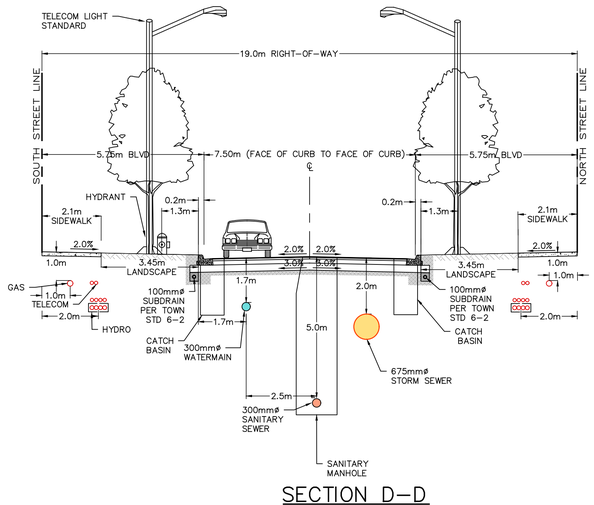

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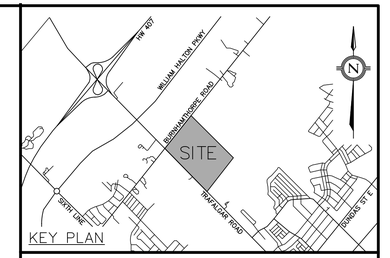

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BENCHMARK

ELEVATIONS

NOTE

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LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY

APPROVED BY

CONSULTANT

TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

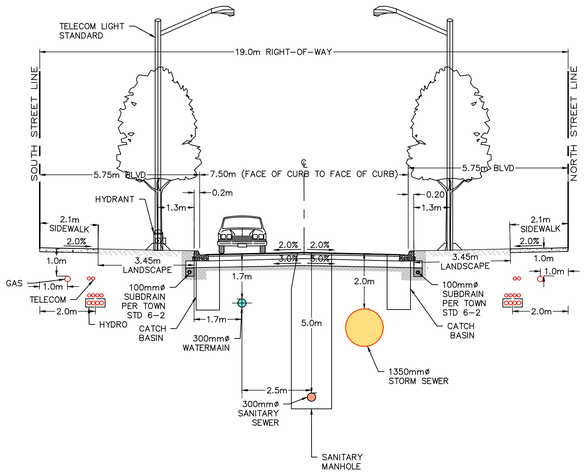
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD

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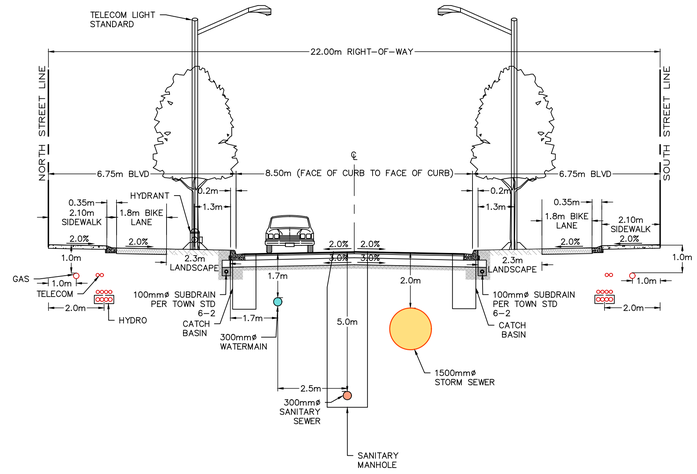
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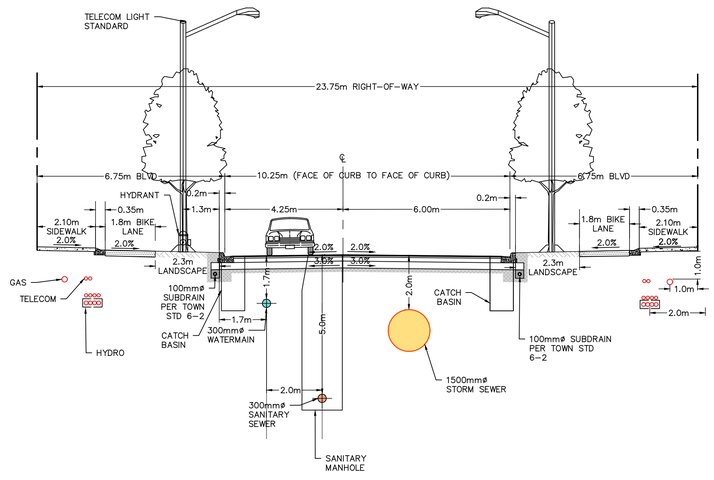

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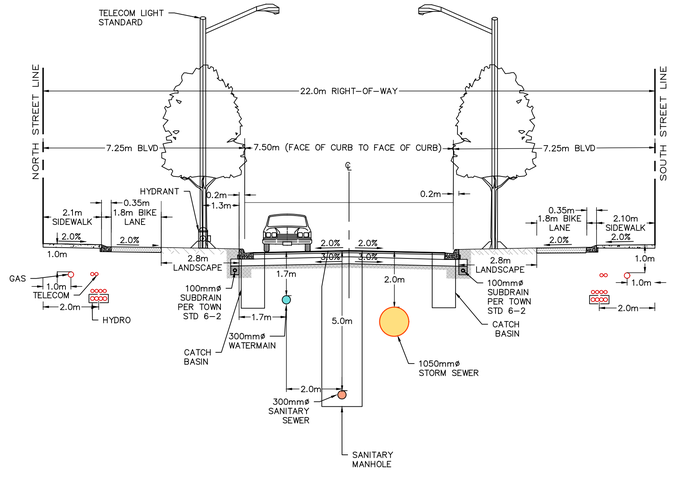

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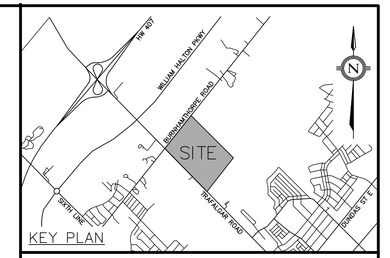

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### BENCHMARK

CONTROL POINT LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD, HAVING AN ELEVATION OF 183.616m

### NOTE

SURVEY INFORMATION CONTAINED IN THIS DRAWING ARE FROM PLAN 24-30-276-00 BY J.D BARNES LIMITED, ONTARIO LAND SURVEYORS. THE SURVEY WAS COMPLETED ON JANUARY 30TH, 2025.

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

# PROPOSED SUBDIVISION
# 1816986 ONTARIO INC.

LOCATION

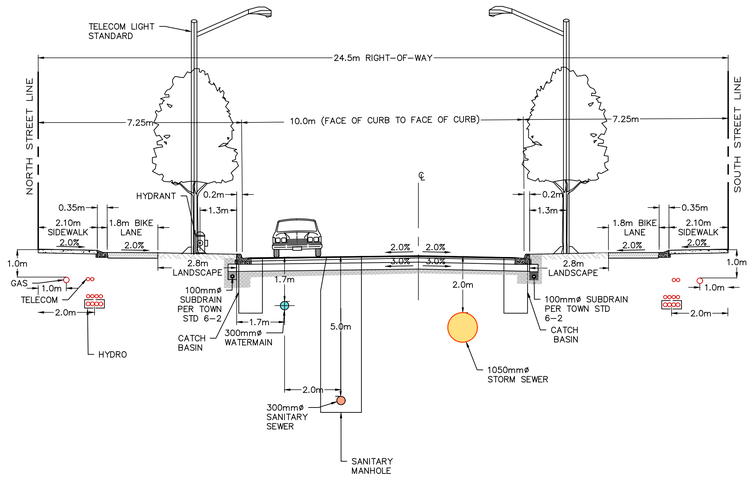
340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD
OAKVILLE, ONTARIO

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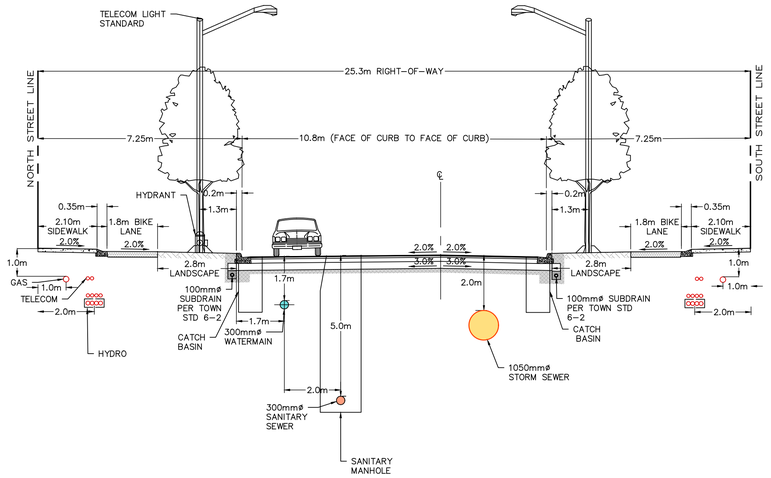
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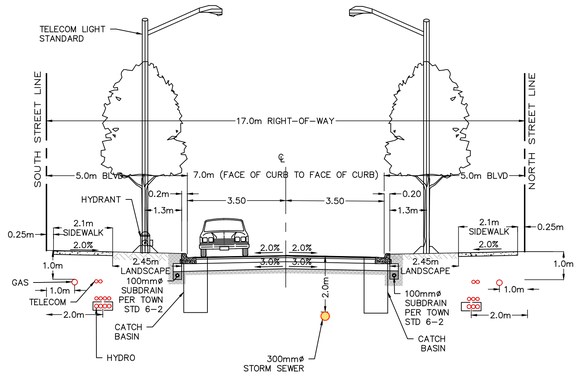

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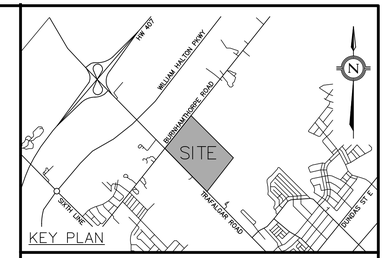

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BENCHMARK

ELEVATIONS

NOTE

NOTE

LICENSED PROFESSIONAL ENGINEER P. CIFONI April 6, 2026 PROVINCE OF ONTARIO

DESIGNED BY

APPROVED BY

CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE

PROPOSED SUBDIVISION
1816986 ONTARIO INC.

LOCATION

340 BURNHAMTHORPE ROAD EAST & 3437 TRAFALGAR ROAD

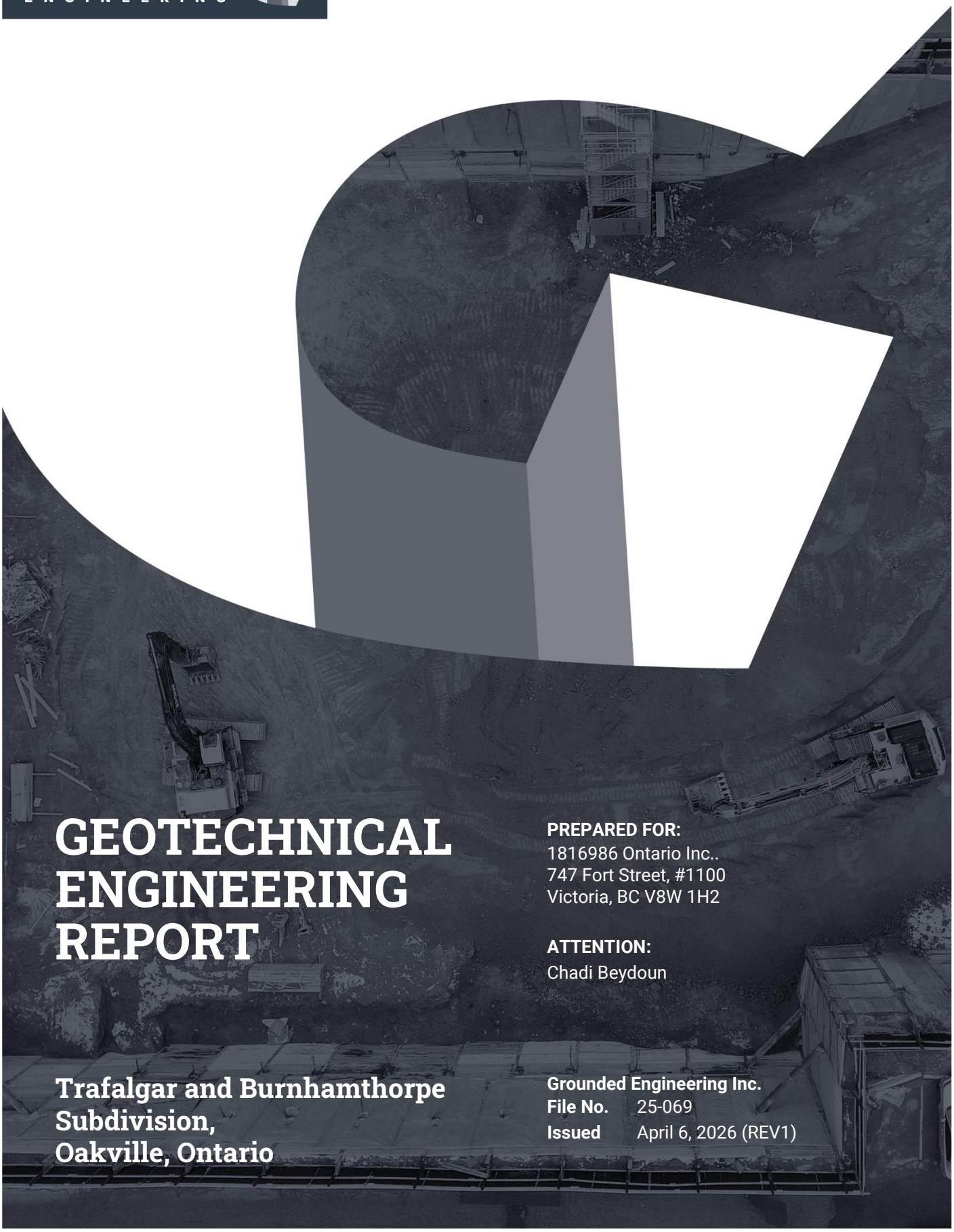
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**APPENDIX ‘G’**



# GEOTECHNICAL ENGINEERING REPORT

**PREPARED FOR:**
1816986 Ontario Inc..
747 Fort Street, #1100
Victoria, BC V8W 1H2

**ATTENTION:**
Chadi Beydoun

## Trafalgar and Burnhamthorpe Subdivision, Oakville, Ontario

**Grounded Engineering Inc.**
**File No.** 25-069
**Issued** April 6, 2026 (REV1)

49 Mobile Drive, Toronto ON M4A 1H5 | (647) 264-7909 | groundedeng.ca | Grounded Engineering

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Appendix A – Borehole Logs; Abbreviations and Terminology
Appendix B – Geotechnical Laboratory Results
Appendix C – Chemical Analysis, Corrosivity Parameters
Appendix D – Typical Details
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# Executive Summary

This executive summary is intended to provide a general overview of the following geotechnical report. It cannot be relied upon on its own, as the entire geotechnical engineering report must be reviewed for the geotechnical engineering recommendations relevant for the proposed development. This executive summary is subject to limitations included in Section 6 of this report.

The proposed development includes constructing a new mixed-use subdivision separated into various building blocks (1 to 15), comprised of mid-rise to high-rise residential and/or commercial buildings ranging in height from 4 to 30-storeys, with podium heights ranging from 1 to 8-storeys. Each block will have underground parking levels ranging from 4 to 10 m depth (P1 to P3) as well as some on-grade structures. The proposed development also includes two public parks (Blocks 14 and 15) and is designed to provide appropriate connections to a planned school site (Block 13).

Grounded's subsurface investigation of the site to date includes twelve (12) boreholes and seven (7) monitoring wells. The level of investigation conducted at the site for geotechnical engineering is considered preliminary. For detailed design of any block or individual buildings, additional subsurface investigation and updated geotechnical engineering recommendations will be required.

The subsurface conditions generally consist of surficial materials (topsoil, pavements, etc.) and existing earth fills overlying native, undisturbed Halton Till and/or sands and silts, which are underlain by shale bedrock (Queenston Formation). The groundwater table varies across the site but is generally observed at depths of 0.6 to 2.5± m below existing site grades.

Site grading, including cutting and/or filling, will be necessary to achieve the desired site grades prior to construction. Given the extent of grade raises required, it is recommended that all up-fill for grade raises be placed as engineered fill and allow time to self-settle upon completion.

Given the variability in building sizes and depths proposed at the site, and the preliminary nature of this investigation and geotechnical engineering assessment, a variety of preliminary foundation options are provided in this report. Consideration is given for conventional spread footings bearing on native soils, weathered bedrock, and on engineered fill, as well as consideration for end-bearing caissons in bedrock, and helical piles.

The seismic site designation is $\mathbf{X_D}$, with further testing (MASW testing) recommended for detailed structural design. Excavations can be completed as open cut or with shoring, depending on the space available for sloped excavation sides of any particular block or building. Groundwater during construction can be managed using sump and pumps. Below grade structures may be designed as either drained structures, or alternatively watertight, however hydrostatic uplift pressures would need to be considered in that case.

# 1 Introduction

1816986 Ontario Inc.. has retained Grounded Engineering Inc. to provide preliminary geotechnical engineering design advice for the proposed development at Trafalgar and Burnhamthorpe Subdivision located on the known municipally as 340 Burnhamthorpe Road East and 3437 Trafalgar Road, in Oakville, Ontario. The level of study presented in this report is consistent with the requirements for a Zoning Bylaw Amendment and Plan of Subdivision. Additional boreholes, in-situ testing, and a detailed geotechnical engineering report will be required for detailed design and building permit purposes.

This report has been revised (Revision 1), as follows:

- Updated architectural drawings were provided to Grounded, which are reflected in this report.
- Updated client information. The report is now addressed to 1816986 Ontario Inc.
- The executive summary has been revised.

The subject site, which is comprised of 2 properties, has a total area of approximately 19.9 hectares (49.2 acres), with approximately 537 metres of frontage along Burnhamthorpe Road East and 374 metres along Trafalgar Road.

The majority of the Site is currently underutilized farmland. There is a two-storey abandoned farmhouse in the southwest portion of the Site, which is a listed property in the Oakville Heritage Property Register. The Vic Hadfield Golf & Learning Centre, which is a small golf facility, is located at the northwest corner of the Site.

The proposed development is a mixed-use community over 12 development blocks (Blocks 1 to 12) including 0.5 hectares of public parks (Blocks 14 and 15), urban square, walking trails, a new public street network. The various building blocks are comprised of mid-rise to high-rise residential and/or commercial buildings ranging in height from 4 to 30-storeys with podium heights ranging from 1 to 8-storeys. Below Blocks 1, 3, 4 and 5 there will be three (P3) levels of underground parking with a lowest P3 FFE set at a depth of 10 m. Below Blocks 2, 6, 8 and 9 there will be two (P2) levels of underground parking with a lowest P2 FFE set at a depth of 7 m. Below blocks 7 and 10 to 12 there will be a single (P1) level of underground parking with a lowest P1 FFE set at a depth of 4 m. The proposed development is designed to provide appropriate connections to a planned school site (Block 13).

Grounded has been provided with the following documents to assist in our geotechnical scope of work:

- Site survey, prepared by JD Barnes (Feb. 11, 2025).
- Architectural Drawings, “Draft Trafalgar & Burnhamthorpe”; Project No. 24064, dated 2026-04-06, prepared by BDP. Quadrangle.
- Functional Servicing Report, OPA/ZBA Draft Plan of Subdivision; Project No. 1767, dated April 6, 2026, prepared by Trafalgar Engineering.

- Draft Plan of Subdivision, dated February 9, 2026, prepared by JD. Barnes.

Grounded's subsurface investigation of the site to date includes twelve (12) boreholes (Boreholes 101 to 112) which were advanced from June 2nd to 9th, 2025.

Based on the borehole findings, preliminary geotechnical engineering advice for the proposed development is provided for foundations, seismic site designation, earth pressure design, slab on grade design, basement drainage, and pavement design. Construction considerations including excavation, groundwater control, and geostructural engineering design advice are also provided.

This geotechnical engineering report is considered preliminary and should be used for planning purposes only. Additional site-specific boreholes, monitoring wells, in situ and laboratory testing, and a detailed geotechnical engineering report are required for detailed design.

# 2 Ground Conditions

The borehole results are detailed on the attached borehole logs. Our assessment of the relevant stratigraphic units is intended to highlight the strata as they relate to geotechnical engineering. The ground conditions reported here will vary between and beyond the borehole locations.

The stratigraphic boundary lines shown on the borehole logs are assessed from non-continuous samples supplemented by drilling observations. These stratigraphic boundary lines represent transitions between soil types and should be regarded as approximate and gradual. They are not exact points of stratigraphic change.

Elevations are measured relative to geodetic datum (Site Survey by J.D. Barnes). The horizontal coordinates are provided relative to the Universal Transverse Mercator (UTM) geographic coordinate system.

The boreholes were surveyed for horizontal coordinates and geodetic elevations with the Sokkia GCX3 system, connected to the Global Navigation Satellite System and the Can-Net Virtual Reference Station Network.

## 2.1 Stratigraphy

The following stratigraphic summary is based on the results of the boreholes and the geotechnical laboratory testing. A subsurface profile showing stratigraphy and engineering units is appended.

### 2.1.1 Surficial and Earth Fill

Surficial fill (pavements, aggregate, topsoil, etc.) thicknesses were observed in individual borehole locations through the top of the open borehole. Thicknesses may vary between and beyond each borehole location.

Borehole 101 encountered a 100 mm thick aggregate layer at the existing ground surface. Borehole 112 encountered 50 mm of asphalt at the existing ground surface. A layer of topsoil, approximately 25 to 300 mm thick, was encountered at the existing ground surface of Boreholes 102 to 104, and 106 to 111, and underlying the above-noted surficial materials in Boreholes 101 and 112.

#### *2.1.1.1 Earth Fill*

Underlying the surficial materials, Boreholes 101 to 107 and 109 observed a layer of earth fill that extends to depths of about 0.8 to 3.0 metres below grade (Elev. 182.7 to 178.8 metres). The earth fill varies in composition but generally consists of sandy silt to clayey silt with trace gravel and trace rootlets. The earth fill is typically dark brown to brown, and moist.

Standard Penetration Test (SPT) results (N-Values) measured in the existing earth fill range from 3 to 46 blows per 300 mm of penetration (“bpf”). Due to inconsistent placement and the inherent heterogeneity of earth fill materials, the relative density of the earth fill is variable.

#### *2.1.1.2 Reworked Soils*

Underlying the surficial materials in Boreholes 108 and 110 to 112 and underlying the earth fill in Boreholes 101, 105 and 109, the boreholes observed a layer of reworked soils that extends to depths of 0.8 to 2.3 metres below grade (Elev. 183.2 to 178.1 metres). The reworked soils appear to be similar to the underlying Halton Till, and are likely disturbed or re-worked due to farm-tilling and/or previous site grading activities.The reworked soils generally consist of sandy silt with some clay, trace gravel, trace rootlets and trace rock fragments. The reworked sandy silt is typically brown to reddish brown, and moist.

SPT N-Values measured in the reworked soils range from 9 to 60 bpf, indicating a highly variable relative density. Higher N-values are likely indicative of the presence of cobbles and/or rock fragments within the soil matrix, as well as the variability due to regrading or reworking.

For the purposes of providing geotechnical engineering recommendations, the reworked soils are grouped together with the earth fill unit based on their engineering properties and their suitability for foundations and pavements.

### 2.1.2 Halton Till

Underlying the fill materials in Boreholes 101 to 104, 106 to 110 and 112 and underlying the sands and silts described below in Borehole 105, the boreholes encountered an undisturbed native glacial till deposit with a matrix of cohesionless and cohesive sandy silt to clayey silt, and cohesionless silty sand, more commonly known in this region as “**Halton Till**”. This unit was encountered at depths of 0.8 to 7.6 metres below grade (Elev. 183.2 to 175.7 m) and extends down to depths of 3.2 to 9.4 m below grade (Elev. 177.9 to 172.9 m). Boreholes 103, 104, 105, 107 and 112 were terminated within this stratum at their target investigation depths. The Halton till is generally brown to grey, and moist. This unit contains a varying amount of clay (trace to clayey), trace to some gravel, trace shale fragments, inferred cobbles and trace rock fragments.

SPT N-values measured in this unit range from 17 to greater than 50 bpf (compact to very dense in the cohesionless till, and hard in the cohesive till).

### 2.1.3 Sands and Silts

Underlying the fill materials in Boreholes 105 and 111 and below the Halton till in Boreholes 106 and 109, an undisturbed native cohesionless sand to silt unit was encountered at depths of 0.8 to 4.6 metres below grade (Elev. 180.9 to 177.7 m), and extends down to a depth of about 7.6 m below grade (Elev. 174.8 to 173.9 m). This unit is generally brown to grey, and moist to wet, and contains varying amounts of clay (trace to clayey), trace rock fragments, trace shale fragments and trace gravel. SPT N-values measured in the sands and silts unit range from 20 to greater than 50 bpf, indicating a compact to very dense relative density.

### 2.1.4 Inferred Bedrock

Inferred bedrock was encountered in Boreholes 101, 102, 106, and 108 to 111 underlying either the Halton till or sands and silts at depths of 3.0 to 9.4 m below grade (Elev. 176.6 to 172.5 m). Rock coring was not included in our scope. The bedrock was inferred from observations of auger and split spoon resistance and limited sample recovery in the split spoons to depths of 4.6 to 9.5 metres below grade (Elev. 175.0 to 170.9 m), at which depth Boreholes 101, 102, 106, 108 to 111 were terminated. The bedrock beneath the site is known to consist of reddish brown shale of the Queenston Formation, which typically has a weathered zone at and near the surface of the bedrock which eventually transitions to unweathered (sound) bedrock. Sound bedrock elevations were not determined in the boreholes, as this was not part of this scope of work. It is recommended that rock coring to determine the elevation of sound bedrock is conducted as part of a future scope of work.

## 2.2 Groundwater

The depth to (unstabilized) groundwater and caved soils was measured in each of the boreholes immediately following the completion of drilling, prior to installing the monitoring wells and/or backfilling the boreholes.

Monitoring wells (7 total) were installed at six (6) select borehole locations (including a nested well in BH 108), and stabilized groundwater levels were measured in each of the installed monitoring wells. The monitoring well installation information and the groundwater measurements and observations are shown on the Borehole Logs and are summarized in Table 1 appended.

Groundwater levels fluctuate with time depending on the amount of precipitation and surface runoff, and may be influenced by known or unknown dewatering activities at nearby sites.

The groundwater elevation changes across the site, generally following the existing grades which fluctuate across the site. For engineering purposes, the groundwater table ranges from a depth of 0.6± to 2.5± metres below the existing site grades.

The groundwater table is in all the native soil units and the weathered zone of the underlying (inferred) bedrock. The Halton till has a relatively low permeability and will yield minor seepage in the long term. The sands and silts unit has a relatively high permeability and will yield free-flowing water when penetrated below the groundwater table. It can be expected that fractures in the weathered and sound bedrock will also produce groundwater seepage. There is also infiltrated stormwater perched in the earth fill which is flowing down towards the groundwater table.

Grounded has prepared a hydrogeological report for this site (File No. 25-069) under separate cover.

## 2.3 Corrosivity and Sulphate Attack

Three (3) soil samples were submitted for corrosivity testing parameters (pH, Resistivity, Electrical Conductivity, Redox Potential, Sulphate, Sulphide and Chloride). The Certificate of Analyses and interpretation sheet is appended.

The soil samples were analysed for soluble sulphate concentration and compared to the Canadian Standard CAN3/CSA A23.1-M94 Table 3, *Additional Requirements for Concrete Subjected to Sulphate Attack*. Corrosivity parameters are also used for assessing soil corrosivity applicable to cast iron alloys, according to the 10-point soil evaluation procedure described in the American Water Work Association (AWWA) C-105-18 standard[1].

The analytical results only provide an indication of the potential for corrosion. The results of this analysis are in reference to only the soil samples collected from specific locations, and soil chemistry may vary between and beyond the locations of the analysed samples. In summary:

- All of the samples have negligible sulphate concentrations.
- All of the samples scored less than 10 points in the AWWA C-105 evaluation. Corrosion protective measures are therefore not necessary for cast iron alloys.

## 2.4 Frost Heave Susceptibility of Soils

A soil's susceptibility to frost heave is related to the percentage of silt and very fine sand in the soil, as frost heave impacts fine-grained soils with low cohesion and high capillarity. The site soils are classified for susceptibility to frost heave according to their grain size distributions on this basis. Geotechnical laboratory results for this site are appended. Per the Second Edition of the

[1] ANSI/AWWA C105/A21.5-18, Appendix A

Pavement Design and Rehabilitation Manual by the Ministry of Transportation in Ontario, the following table summarizes the relationship between grain size and frost heave susceptibility:

| Grain Size Percentage between 5 and 75 µm | Susceptibility to Frost Heaving |
|---|---|
| **0 to 40%** | Low |
| **40 to 55%** | Moderate |
| **55 to 100%** | High |

Per the grain size data measured in the site soils, frost heave susceptibility is summarized accordingly:

| Stratum | Grain Size Percentage between 5 and 75 µm | Susceptibility to Frost Heaving |
|---|---|---|
| **Earth Fill** | Est. 25 to 50% | Low to Moderate |
| **Halton Till** | Approx. 34 to 61% | Low to High (Avg. Moderate) |
| **Silt** | Approx. 45% | Moderate |
| **Sand** | Est. 10% | Low |

# 3 Preliminary Geotechnical Engineering Recommendations

Based on the factual data summarized above, preliminary geotechnical engineering recommendations are provided. They must be supplemented and confirmed by additional boreholes, wells, and detailed geotechnical engineering reports (likely for each block) at the detailed design stage.

This report assumes that the design features relevant to the geotechnical analyses will be in accordance with applicable codes, standards, and guidelines of practice. If there are any changes to the site development features, or there is any additional information relevant to the interpretations made of the subsurface information with respect to the geotechnical analyses or other recommendations, then Grounded should be retained to review the implications of these changes with respect to the contents of this report.

## 3.1 Site Grading

Site grading, including cutting and/or filling, will be necessary to achieve the desired site grades prior to construction. Based on the provided site grading plan (Trafalgar Core Grading, 2025-08-27), it is expected that up-fill will be necessary to raise grades by up to about 4.0± m (existing versus proposed final grade) in the areas of the proposed roadways.

Between the roadways are various blocks which will consist primarily of building structures with 1 to 3 levels of underground parking. It is understood that the roadways will be built up first as part of the site grading activities.

Prior to the arrival of any imported soil materials, they must be tested per the requirements of O.Reg 406/19 and approved by the Environmental QP for the site.

### 3.1.1 Compacted Fill / Engineered Fill

For pavement areas, grade raises may comprise compacted fill or engineered fill. Compacted fill is suitable for raising grades to support new pavements, landscaping, and services. Engineered fill is required wherever the fill material must provide structural support for foundations. Given the extent of grade raises required for the pavements, it is recommended that all up-fill for grade raises be placed as engineered fill.

**When building up the pavement subgrades, the engineered fill must be constructed to reach the desired grade with a consistent slope of 2:1 (horizontal to vertical) or shallower to ensure proper stability and support**. This slope ratio helps in maintaining structural integrity by effectively distributing loads and preventing erosion or slippage of the underlying materials. A 2:1 slope also facilitates better drainage, reducing the risk of water accumulation that can compromise the subgrade's durability. Adhering to this gradient during construction is essential for ultimately achieving long-term performance and safety of the pavement structure post-construction.

An engineered fill earthworks specification is appended. Compacted fill is generally similar to engineered fill, with the following exceptions:

1. **Inspection and Testing:** Compacted fill does not need full-time inspection and testing, although it does need periodic geotechnical engineering testing and inspections for quality control. The frequency of periodic inspections can vary from once a day to once every 3 days and is to be confirmed after the construction schedule is available for review. Engineered fill requires full-time inspection and testing.
2. **Acceptable Subgrade:** Compacted fill can be made on an existing earth fill subgrade if it is proof rolled under the inspection of a qualified geotechnical technician and approved by a geotechnical engineer prior to fill placement. Engineered fill requires an approved subgrade of undisturbed (dewatered) native soils, which implies that the existing earth fill must be subexcavated down to the top of native soil across the site.
3. **Dewatering**: Engineered fill construction requires an undisturbed native subgrade for construction. If the top of native soil elevation is below the groundwater table, positive dewatering may be required to lower the groundwater table to 1.2 m below the top of native, to preserve the native soils in their undisturbed state. Compacted fill does not require that the existing fill materials be excavated (so long as they are proof rolled and approved as described below), which can reduce the need for dewatering during construction. Note that compacted fill may still require occasional sub-excavation below the groundwater table, to remediate any obvious loose/weak areas exposed during proof rolling.
4. **Slab on Grade Design:** Compacted fill typically has a lower modulus of subgrade reaction than engineered fill (see section below). Slabs made on compacted fill may need to be thicker or have more reinforcement.

Both compacted fill and engineered fill shall comprise earth fill that is inorganic, clean, and geotechnically suitable soil sourced from the site or imported.

Compacted fill may be made on inspector-approved existing clean non-organic earth fill, or native soil. Engineered fill must be made to bear on inspector-approved undisturbed (dewatered) native soil only.

### 3.1.2 Subgrade Approval

Prior to placement of the engineered/compacted fill, the cut subgrade shall be proof-rolled and inspected by a qualified geotechnical personnel for obvious exposed loose or disturbed areas, or for areas containing excessive deleterious materials or moisture. These areas shall be recompacted in place and retested, or else replaced with Granular B placed as engineered fill (in lifts 150 mm thick or less and compacted to a minimum of 98 percent SPMDD). A static drum roller should be used to proof-roll the soils at this site, as vibration will cause unwanted disturbance, dilation, and strength reduction in the underlying native soils. Slabs on grade should not be placed on frozen subgrade in order to prevent settlement of the slab as the subgrade thaws. Areas of frozen subgrade should be removed during subgrade preparation.

### 3.1.3 Construction

All fill must be placed on approved subgrade, in loose lifts of 150 mm and compacted to a minimum of 98% SPMDD at a moisture content within 2% of optimum. Engineered fill must be placed under the full-time supervision of a qualified geotechnical technician, who shall perform frequent in situ density measurements to ensure the uniformity and adequacy of the compaction effort. Upon completion, engineered fill must be certified by a Geotechnical Engineer.

In areas that are not sensitive to settlement (e.g. landscaping areas), it may be acceptable to place compacted fill in loose lifts of 200 mm and compact to a minimum of 95% SPMDD at a moisture content within 2% of optimum. We can review and comment on these areas as needed.

Soil that is used as engineered or compacted fill must have a moisture content within 2% of optimum and be free of deleterious materials, cobbles/boulders greater than 150 mm in diameter, topsoil, and other organics. Representative soil samples must be collected from the proposed fill material and tested using the Standard Proctor Maximum Dry Density (SPMDD) method to determine the optimum moisture content and maximum dry density prior to placement and compaction as common or engineered fill.

The existing topsoil is not geotechnically suitable and must be removed from settlement sensitive areas (structures, pavements, etc.). Topsoil may be re-used in landscaped areas that are not sensitive to settlement (e.g. berms or landscaping), or wasted off-site. Moisture content measurements made on earth fill soil samples from the boreholes range from 9 to 23% (on average, 15.2%). They occasionally contain trace organics. We estimate that potentially half of the existing fill may be suitable for immediate re-use as compacted or engineered fill, if it is sorted or blended to remove any excess organics, moisture, or other deleterious materials.

Moisture content measurements made on Halton Till soil samples from the boreholes within 2 m of existing grade range from 7 to 13% (on average, 10.6%). We estimate that most of the undisturbed native soil at the site is likely suitable for immediate re-use on site.

As inferred by the boreholes, embedded cobbles and boulders should be anticipated in all existing fill and native soils.

Compacted or engineered fill may not be readily compacted in small volumes, such as trenches or in areas adjacent to foundations or catch basins. For areas of limited extent, compactable aggregate-source backfills like Granular B (OPSS.MUNI 1010) are recommended for post-construction grade integrity. All new fill shall be compacted to a minimum of 98% SPMDD.

Where engineered fill pads tie into existing grades, the engineered fill should extend for a distance of at least 2 m beyond the proposed structure footprints in every direction as measured at the founding level, and should extend downwards from this point at no steeper than 2 to 1 (horizontal to vertical) slope to the adjacent ground level.

### 3.1.4 Frost Susceptibility

Frost susceptible soils within 1.2 m of finished grades in unheated areas (e.g. pavements) could potentially cause pavements to heave or crack next to structures with no frost cover (e.g. curbs, catchbasins, pavements). The degree of heaving is unknown. If frost susceptibility is to be considered in design (to be determined by the Owner based on their own pavement performance criteria), all soil placed within 1.2 m of finished grades should be classified as having a low susceptibility to frost heaving, as defined in Section 2.4 above. The most effective ways of dealing with potential frost heave are to construct a good subsurface drainage system (e.g. for pavements), and to stay above the groundwater table.

### 3.1.5 Post-Construction Settlement

Engineered/compacted fill can be expected to experience self-weight post-construction settlement on the order of about 1% of the depth of the compacted/engineered fill. If the engineered fill is composed of sand or aggregate materials, then self-weight post-construction settlements of the engineered fill will be around 0.5% or less. The time period over which this settlement occurs depends on the composition of the engineered fill as follows (after initial placement):

- Sand or gravel soil – several days
- Silt soil – several weeks
- Clay or clayey soil (common earth fill) – several months

If compacted fill is constructed over an approved existing earth fill subgrade, the fill subgrade will also be prone to settlement due to the increase in effective vertical stress. Organics in the existing earth fill may also be subject to secondary consolidation (creep). For grade raises of over 0.5 m

immediately above existing fill, Grounded should be consulted to assess the potential for post-construction settlement, and provide recommendations for mitigation measures.

## 3.2 Preliminary Foundation Design Parameters

The proposed development includes constructing a new mixed-use subdivision separated into various building blocks (1 to 15) and comprised mid-rise to high-rise residential and/or commercial buildings ranging in height from 4 to 30-storeys with podium heights ranging from 1 to 8-storeys. Below Blocks 1, 3, 4 and 5 there will be three (P3) levels of underground parking with a lowest P3 FFE set at a depth of 10 m. Below Blocks 2, 6, 8 and 9 there will be two (P2) levels of underground parking with a lowest P2 FFE set at a depth of 7 m. Below blocks 7 and 10 to 12 there will be a single (P1) level of underground parking with a lowest P1 FFE set at a depth of 4 m. The proposed development also includes two public parks (Blocks 14 and 15) and is designed to provide appropriate connections to a planned school site (Block 13).

The topsoil and earth fill soils (in their current state) are considered unsuitable for the support of the proposed building foundations.

Given the variable depth to / elevation of bedrock at the site, and in consideration that the lowest FFE of the underground structures within each block is not presently known, and will be variable from block to block, the foundation design recommendations provided in this report are considered preliminary.

The following foundation options have been considered in our preliminary analysis.

- Conventional spread footings bearing on native soil.
- Conventional spread footings bearing on engineered fill.
- Caissons on end-bearing on sound bedrock
- Helical piles

Alternative foundation options such as micropiles, or the use of ground improvement in conjunction with conventional spread footings or a raft foundation under the towers with tie down anchors may also be considered as feasible foundation options to support the proposed building structures. These options (as well as the caisson option) will likely only be necessary or feasible if/where the base of a given underground structure is situated within compacted or engineered fill (i.e. above the elevation of the top of native soils), so that the building loads are transferred down to competent native bearing strata, where needed. If these options are considered/required at the detailed design level, Grounded can provide recommendations in an updated geotechnical report.

Regardless, additional boreholes, including in-situ pressuremeter testing, and/or rock coring, as well as additional monitoring wells, and an updated geotechnical report will be required for detailed design.

### 3.2.1 General Foundation Recommendations

Grounded should be retained by the Owner to review the structural engineering drawings prior to issue or construction, to ensure that the recommendations in this report have been appropriately implemented.

Footings stepped from one elevation to another should be offset at a slope not steeper than 7 vertical to 10 horizontal. This requirement exists to avoid undermining adjacent footings at the higher elevation.

When exposed to ambient environmental temperatures in the Greater Toronto Area, the design earth cover for frost protection of foundations and grade beams is 1.2 metres.

The founding subgrade must be cleaned of all unacceptable materials and approved by Grounded prior to pouring concrete for the footings. Such unacceptable materials may include disturbed or caved soils, ponded water, or similar as indicated by Grounded during founding subgrade inspection. During the winter, adequate temporary frost protection for the footing bases and concrete must be provided if construction proceeds during freezing weather conditions.

### 3.2.2 Spread Footings Bearing on Native Soils / Weathered Bedrock

Conventional foundations made for the proposed buildings may bear on undisturbed native dense to very dense cohesionless soils or weathered bedrock. The depth and elevation of competent bearing strata varies across the site. Conventional spread footings made to bear on these soils may be designed using the following maximum factored geotechnical resistances at ULS, and maximum geotechnical reactions at SLS for an estimated maximum total settlement of 25 mm at the following elevations as determined at each borehole location within the proposed areas of development. For present purposes, a maximum 3 x 3 m spread footing was used for our preliminary analyses.

| Borehole No. | Approximate Foundation Bearing Elevation (m) for a Maximum 3 x 3 m Conventional Spread Footing | |
|---|---|---|
| | Bearing in Dense to Very Dense Glacial Till or Sands and Silts (750 kPa SLS / 1,500 kPa ULS) | Bearing on Weathered Bedrock (3,000 kPa SLS / 4,000 kPa ULS) |
| 101 | 178.5 ± | 172.5 ± |
| 102 | 179.5 ± | 173.0 ± |
| 103 | 181.0 ± | 173.5 ± |
| 104 | 181.0 ± | *n/a** |
| 105 | 179.0 ± | *n/a** |
| 106 | 179.0 ± | 174.5 ± |
| 107 | 178.5 ± | *n/a** |

| Borehole No. | Approximate Foundation Bearing Elevation (m) for a Maximum 3 x 3 m Conventional Spread Footing | |
|---|---|---|
| | Bearing in Dense to Very Dense Glacial Till or Sands and Silts (750 kPa SLS / 1,500 kPa ULS) | Bearing on Weathered Bedrock (3,000 kPa SLS / 4,000 kPa ULS) |
| 108 | 178.5 ± | 176.0 ± |
| 109 | 180.0 ± | 174.5 ± |
| 110 | 178.0 ± | 176.5 ± |
| 111 | 179.0 ± | 174.0 ± |
| 112 | 182.0 ± | *n/a** |

**Bedrock was not encountered/inferred at these borehole locations*

The capacities provided above are based on individual spread footing foundations that are 1 to 3 m wide, spaced one footing width apart, and embedded a minimum of 0.6 m below FFE. These minimum requirements apply in conjunction with the above recommended geotechnical resistance regardless of loading considerations. The geotechnical reaction at SLS refers to an estimated settlement which for practical purposes is linear and non-recoverable. Differential settlement is related to column spacing, column loads, and footing sizes.

### 3.2.3 Spread Footings Bearing on Engineered Fill

It may be feasible to support smaller structures on spread footing foundations resting on engineered fill. An engineered fill specification is appended and discussed in Section 3.1.

So long as the engineered fill is placed and compacted as indicated per the specification, spread footings resting on engineered fill (comprising common earth fill) may be designed for a net geotechnical reaction of 150 kPa at SLS (for an estimated total settlement of 25 mm) and a factored geotechnical resistance of 225 kPa at ULS.

For footings supported on engineered fill, the minimum width for conventional strip footings must be 600 mm, and the minimum width of individual spread footings must be 1000 mm. These minimum requirements apply in conjunction with the above recommended geotechnical resistance regardless of loading considerations. The geotechnical reaction at SLS refers to a settlement which for practical purposes is linear and non-recoverable. Differential settlement is related to column spacing, column loads, and footing sizes.

The timing of foundation construction must consider the post-construction settlement of the engineered fill (see Section 3.1).

### 3.2.4 Preliminary Caissons Bearing on Sound Bedrock

End-bearing caissons, extending into unweathered (sound) bedrock may be used to support building structures at the site. This foundation method may be beneficial when large structural loads are required to be supported and competent bearing soil is not immediately beneath the lowest FFE. This may be the case if/when the lowest FFE of any given building is within earth fill soils (placed or existing), and the depth to competent bearing strata is not conducive for conventional foundation construction.

Coring of the bedrock was not part of the current scope of work. A summary of bedrock elevations observed/reported in site-specific boreholes is provided in a table in Section 2.1.4. If caissons extending into sound bedrock are to be considered, additional boreholes including rock coring will be required for detailed design. For present, preliminary design purposes, it can be assumed that caissons must be socketed a minimum of 3 m into bedrock (i.e. from the top of weathered bedrock) in order to bear on sound bedrock.

Preliminary caissons end-bearing in sound bedrock may be designed using a maximum factored geotechnical resistance at ULS of 10 MPa. The geotechnical reaction at SLS is 8 MPa, for 20 mm of estimated settlement at pile tip elevation, for individual caissons no larger than 2 m diameter and not subject to group effects.

In addition to the displacement of the rock, there will be compression of the concrete caisson shaft under loading which will increase the apparent settlement at the structure level. Caisson shaft compression must be assessed by the structural engineer.

Caissons end bearing on bedrock should be separated from each other by at least 2 times the largest caisson diameter (measured on centres) to avoid inducing additional settlement from group effect. Caissons placed closer than this will induce group effects, and a reduced bearing capacity will apply, which is dependent on caisson sizing, bearing stratum, founding elevation, and separation distance. If this situation is unavoidable from a structural engineering perspective, we can review the structural drawings and estimate the expected settlement of the caisson group, on request.

Augered boreholes for caissons will need to be protected against loss of ground, upheave, and basal disturbance due to the ingress of groundwater. Augered boreholes for caissons may require temporary liners, polymer mud drilling techniques, tremie pour concrete, pre-advancing casing, or other means and methods as deemed necessary by the contractor to prevent groundwater inflow or loss of soil into the drill holes, disturbance to placed concrete, or similar issues. Concrete for caissons must be placed by tremie method where there is more than 300 mm of water or fluid at the base of the hole.

The following construction methodology must be utilized for all structural caisson installations:

- All caisson excavations are to be inspected on a full-time basis by Grounded per the Ontario Building Code (2024).

- Caissons designed to bear on sound rock are to be initially advanced to the top of weathered bedrock as identified in Section 2.1.4, and as confirmed by Grounded through observation of the drilling and auger cuttings at each location.
- Once the top of weathered bedrock elevation is established for a given caisson by Grounded, the caisson must then be advanced a minimum of 1 m into sound bedrock as identified in the nearest borehole (see table in Section 2.1.4.), to be sure that the caisson is seated in the sound bedrock.
- Auger, cleanout bucket, or one-eyed bucket cleaning of the hole base is to then take place in each caisson hole, and visually inspected by Grounded to ensure that base cleaning has been carried out as thoroughly as practically possible.
- Place 30 MPa (min.) concrete to a minimum depth of 600 mm in the base of the hole (volume to be determined based on caisson diameter) to be stirred with the auger without advancing the auger any further for about 5 minutes.
- The auger spun concrete is then removed and wasted, leaving no more than 100 mm depth of concrete at the base of the caisson.
- Tremie placement of concrete is required wherever the drill holes have more than 300 mm of water in the base or are full of drilling fluid.
- Complete construction of the caisson to cut off elevation.

Any recommendations must also satisfy the structural engineering requirements regardless of any interpretation provided herein.

### 3.2.5 Helical Piles

Helical piles may be designed to carry new structural load. Helical piles may be beneficial where the lowest FFE of a given building structure is situated within fill (existing, engineered, etc.) and the structural loads must be carried deeper in order to provide the necessary resistance. It may be possible to support low to mid-rise sized buildings on helical piles at this site.

Contractors specializing in helical pile design and installation can provide detailed information on installation methodology, detailed design, product quality, and certification. Local specialist contractors that provide these design-build services can be provided on request.

At this site, helical piles can be installed to bear into the dense to very dense native strata at the site in order to obtain adequate resistance to support the new loads. Following helical pile installation, a pile cap or grade beam is constructed to transfer the building loads onto the underlying competent soils through the helical piles.

There are several helical pile products available. Helical pile detailed design will ultimately depend upon the loading considerations and the ground conditions. The project geotechnical information should be provided to a specialist design/build contractor to assess the feasibility of this foundation system and to determine probable helical pile refusal/installation depths, and capacities.

The actual installation depth of each helical pile is determined on site during installation based on depth and torque measurements made during installation, and the load support requirements. The load carrying capacity of each helical pile is confirmed by the helical pile contractor based on the torque measurements and a full-scale performance test of a prototype pile. Occasionally, field torque measurements indicate that helical piles must be advanced deeper than originally designed. Provision must be made in helical pile contracts to allocate and quantify risks associated with any extra time and materials utilized to achieve the required field torque readings.

The presence of debris/obstructions within fill materials or larger sized cobbles or boulders in native soil (although not specifically encountered in the boreholes) could impede helical pile installation. Refer to the borehole logs for detailed subsurface information. Provision must be made in helical pile contracts to allocate risks associated with the time spent and equipment utilized to remove or work around such obstructions when encountered.

Within the design frost depth, uplift due to frost (also known as 'adfreezing') on the shaft of helical piles must also be considered in the design. Based on the Canadian Foundation Engineering Manual (5th Ed.), design adfreeze bonds vary from 65 kPa (fine grained soils frozen to wood/concrete) to 100 kPa (fine grained soils frozen to steel), to 150 kPa (gravel frozen to steel). These loads act in the upward direction on the portion of shaft that is above the design frost depth. Alternatively, bond breakers can be designed and applied to the shaft of the helical pile.

## 3.3 Seismic Site Designation

The Ontario Building Code (2024) stipulates the methodology for earthquake load and effects analysis and design, as set out in Subsection 4.1.8. The determination of the type of analysis is predicated on the importance of the structure, the spectral response acceleration, and the site classification.

The site designation, X, is determined using the average shear wave velocity, $V_{s30}$, calculated from in situ measurements of shear wave velocity, in accordance with ground profiles provided in Table 4.1.8.4.-A. For all other ground profiles, the site designation is $X_V$, where V is the value of $V_{s30}$. At sites where $V_{s30}$ is not available, the site designation is $X_S$, where S is the Site Class as determined from rational analysis of average undrained shear strength ($s_u$) or energy-corrected average standard penetration resistance (SPT N-values) in accordance with Table 4.1.8.4.-B.

The structural commentaries to the NBC 2020, on which the OBC 2024 are based, have been recently released. Based on the structural commentaries, site designation must be evaluated in the top 30 m of site stratigraphy.

At this site, the boreholes generally observe compact to very dense cohesionless soils. These soils are classified as "Stiff Soil". Based on this information, the site designation for seismic analysis is **$X_D$**, per Table 4.1.8.4.-B of the Ontario Building Code (2024).

We have determined the site designation based on rational analysis of energy-corrected average standard penetration resistance (SPT N-values) with assumed N-values for the stratigraphy beyond the investigation depth. The National Building Code 2020 (and the OBC 2024) provides the option of calculating the seismic hazard (i.e. spectral acceleration) directly from average $Vs_{30}$ measurement. Consideration should be given to conducting site-specific shear wave testing (Multichannel Analysis of Surface Waves (MASW) testing or downhole shear wave testing) as part of a future scope of work, to determine the average shear wave velocity in the 30 meters of stratigraphy ($Vs_{30}$). Shear wave testing may result in an improved seismic site designation.

## 3.4 Earth Pressure Design Parameters

At this site, the design parameters for structures subject to unbalanced earth pressures such as basement walls and retaining walls are shown in the table below.

| Stratigraphic Unit | $\gamma$ | $\varphi$ | $K_a$ | $K_o$ | $K_p$ |
|---|---|---|---|---|---|
| Compact Granular Fill<br>Granular 'B' (OPSS.MUNI 1010) | 21 | 32 | 0.31 | 0.47 | 3.25 |
| Existing Earth Fill | 19 | 29 | 0.35 | 0.52 | 2.88 |
| Halton Till (Cohesionless) | 21 | 37 | 0.25 | 0.40 | 4.02 |
| Halton Till (Cohesive) | 21 | 32 | 0.31 | 0.47 | 3.25 |
| Silts and Sands | 21 | 37 | 0.25 | 0.40 | 4.02 |
| Weathered Bedrock | 26 | 28 | n/a | | |

$\gamma$ = soil bulk unit weight (kN/m$^3$)
$\varphi$ = internal friction angle (degrees)
$K_a$ = active earth pressure coefficient (Rankine, dimensionless)
$K_o$ = at-rest earth pressure coefficient (Jaky, dimensionless)
$K_p$ = passive earth pressure coefficient (Rankine, dimensionless)

These earth pressure parameters assume that grade is horizontal behind the retaining structure. If retained grade is inclined, these parameters do not apply and must be re-evaluated.

The following equation can be used to calculate the unbalanced earth pressure imposed on walls:

$$P = K[\gamma(h - h_w) + \gamma' h_w + q] + \gamma_w h_w$$

$P$ = horizontal pressure (kPa) at depth h
$h$ = the depth at which P is calculated (m)
$K$ = earth pressure coefficient
$h_w$ = height of groundwater (m) above depth h
$\gamma$ = soil bulk unit weight (kN/m$^3$)
$\gamma'$ = submerged soil unit weight ($\gamma$ - 9.8 kN/m$^3$)
$q$ = total surcharge load (kPa)

If the wall backfill is drained such that hydrostatic pressures on the wall are effectively eliminated, this equation simplifies to:

$$P = K[\gamma h + q]$$

The possible effects of frost on retaining earth structures must be considered. In frost-susceptible soils, pressures induced by freezing pore water are basically irresistible. Insulation typically addresses this issue. Alternatively, non-frost-susceptible backfill may be specified.

Foundation resistance to sliding is proportional to the friction between the subgrade and the base of the footing. The factored geotechnical resistance to friction ($\mathbf{R_f}$) at ULS provided in the following equation:

$$R_f = \Phi N \tan \varphi$$

| | | |
|---|---|---|
| $R_f$ | = | frictional resistance (kN) |
| $\Phi$ | = | reduction factor per CFEM 5th Ed. (0.8 for cohesionless soils or rock; 0.6 for cohesive soils) |
| N | = | normal load at base of footing (kN) |
| $\varphi$ | = | internal friction angle (see table above) |

## 3.5 Slab on Grade Design Parameters

For watertight underground structures, the lowest slab on grade must be designed to be watertight and to withstand uplift and hydrostatic pressures, with no permanent drainage. This is generally achieved via raft slabs or pressurized structural slabs spanning between columns and walls.

For underground structures situated above the groundwater table (i.e. the base of the subfloor drainage layer is above the water table), and for on-grade structures, a conventional (drained) slab on grade approach can be implemented. The following recommendations apply only to a conventionally drained slab on grade.

Conventional slabs on grade constructed at the site may rest on native undisturbed sands and silts or the Halton till, existing fill, or on engineered fill. The undisturbed native soils or engineered fill will provide adequate subgrade for the support of a conventional slab on grade. In its present state the earth fill/disturbed soils are not competent for the support of a slab on grade. If slabs on grade are to rest on existing fill / disturbed soils, the subgrade should be compacted in place, proof-rolled, and inspected under the supervision of Grounded for obvious exposed loose/soft or disturbed areas, or for areas containing excessive deleterious materials or moisture. Unacceptable material (as determined by Grounded) must be sub-excavated and replaced with Granular B (OPSS.MUNI 1010) compacted to a minimum of 98% SPMDD. The modulus of subgrade reaction appropriate for design of a slab on grade resting on the above noted subgrade types is summarized in the following table.

| Subgrade Type | Modulus of Subgrade Reaction (kPa/m) |
|---|---|
| Native cohesionless soils, undisturbed | 30,000 |
| Engineered Fill | 22,000 |
| Compacted Earth Fill (Existing Fill or Placed Fill) | 10,000 |

For conventional drained structures, a permanent drainage system including subfloor drains is required (see section below). In this case, the slabs on grade must be provided with a drainage layer and capillary moisture break, which is achieved by forming the slabs on a minimum 200 mm thick layer of 19 mm clear stone (OPSS.MUNI 1004) vibrated to a dense state.

Wherever a slab-on-grade is made on native sands and silts, the drainage layer must be separated from the underlying soils using a non-woven geotextile (with an apparent opening size of less than 0.250 mm and a tear resistance of more than 200 N) with a minimum 600 mm overlap. The stone drainage layer is then placed over the geotextile. Without this filtering layer, fines from the underlying subgrade will enter the drainage layer potentially resulting in loss of ground, loss of slab support, and clogging of the subfloor drainage system.

The subgrade should be cut neat and inspected by Grounded prior to placement of the capillary moisture break and construction of the slab. Disturbed or otherwise unacceptable material (as determined by Grounded) must be sub-excavated and replaced with Granular B (OPSS.MUNI 1010) compacted to a minimum of 98% SPMDD. The slabs on grade should not be placed on frozen subgrade, to prevent excessive settlement of the slab as the subgrade thaws. Areas of frozen subgrade should be removed during subgrade preparation.

## 3.6 Long-Term Groundwater and Seepage Control

To limit seepage to the extent practicable, exterior grades adjacent to foundation walls should be sloped at a minimum 2 percent gradient away from the wall for 1.2 m minimum.

The requirement for a permanent basement drainage system depends on whether a fully watertight approach is adopted for any particular underground structure constructed at the site. Grounded's Hydrogeological Report (File No. 25-069) provides further discussion on this.

A watertight basement implies that the basement structure is designed to withstand hydrostatic pressures, with no permanent drainage system. The full height of the basement walls should be watertight (no drainage) and designed to withstand hydrostatic pressure (horizontal and uplift) using a static groundwater table ranging from a depth of 0.6± to 2.5± metres below the existing site grades. A connection to the Town's sewer for emergency repair services is recommended.

For conventional slab-on-grade structures with no basement, perimeter drainage is not needed where the finished floor is higher than exterior grade. To prevent impaired door function during winter months, subgrade adjacent to doors should be either drained or protected against potential frost heave. These details are provided by the building science engineer. If drained, perimeter drains should be connected directly to a sump, or positively discharged to grade if possible.

Regardless of any requirements for watertight basements/underground structures from a development application perspective, a drained basement approach is considered feasible from an engineering perspective.

For a conventional drained basement approach, perimeter and subfloor drainage systems are required for the underground structure. Subfloor drainage collects and removes the seepage that infiltrates under the floor. Perimeter drainage collects and removes seepage that infiltrates at the foundation walls. Perimeter drainage must be collected and conveyed directly to the building sumps, and not discharged into the subfloor drainage system, the granular layer, or beneath the floor slab.

Subfloor drainage pipes are to be spaced at a maximum 9 m (measured on-centres).

In an open cut excavation, basement wall drainage is installed directly against the basement wall from the open cut side. Perimeter foundation drains made in this application comprise perforated pipe (minimum 100 mm diameter) surrounded by a granular filter of OPSS.MUNI HL-8 Coarse Aggregate providing a minimum 300 mm of cover over the drainpipe.

Typical basement drainage details are appended.

The perimeter and subfloor drainage systems are critical structural elements since they eliminate hydrostatic pressure from acting on the basement walls and floor slab. The sumps that ensure the performance of these systems must have a duplexed pump arrangement providing 100% redundancy, and they must be on emergency power. The sumps should be sized by the mechanical engineer to adequately accommodate the estimated volume of water seepage.

The drainage system should be connected directly to the municipal storm system if possible, or else discharge at grade.

The permanent dewatering requirements are provided in Grounded's Hydrogeological Report (File No. 25-069) under separate cover.

## 3.7 Site Servicing

All services must have at least 1.2 metres of earth cover or equivalent insulation for frost protection.

Where site services extend beyond the building footprint, the following recommendations apply.

### 3.7.1 Bedding

The soil subgrade encountered within the proposed site servicing trenches will consist of either earth fill or native soil. The trench base must be inspected for obvious loose, wet, or disturbed material. Any unsuitable material must be subexcavated and replaced with imported fill compacted to 98% SPMDD. If suitable earth fill is encountered, the subgrade must be compacted in place to a minimum 98% SPMDD.

Based on the preliminary site servicing report outlined in the FSR (dated April 6, 2026), service trenches will be made above and below the groundwater table across the site.

For trenches that extend below the groundwater table, the groundwater table must be lowered to 1.2 m below the lowest excavation elevation prior to excavation. At this site, the stabilized groundwater table is shallow and within the fill materials. Native soils are low permeability and will generally preclude the free flow of groundwater. Test pits may be advanced to observe seepage at trench invert elevation, to inform dewatering requirements.

Bedding material below the groundwater table must consist of well graded granular fill such as Granular A (OPSS.MUNI 1010). The bedding material must be compacted to a minimum 98% SPMDD. Clear stone is specifically prohibited below the groundwater table.

Where trenches are above the groundwater table, bedding material may consist of 19 mm clear stone (OPSS.MUNI 1004) or similar, vibrated to a dense state. Where the bedding material consists of clear stone, the bedding must be separated from the subgrade with a non-woven geotextile.

### 3.7.2 Backfill

Excavated earth fill and native soils on site will constitute adequate backfill material if the soil meets the following backfill specifications:

- Any deleterious material in the earth fill is removed prior to reuse as backfill.
- Backfill materials are not frozen.
- The moisture content is within 2% of optimum, or moisture conditioned to within 2% of optimum.
- The backfill must be compacted to a minimum 98% SPMDD.

### 3.7.3 Trench Plugs

Trench plugs are installed when the invert of the trench is below the groundwater table, to prevent the groundwater from preferentially flowing through the granular bedding and backfill material, creating a local drawdown of the groundwater table. Where local drawdown is not tolerated or contaminant transport is a risk, trench plugs can be installed in the granular bedding and backfill material.

Trench plugs may be constructed as clay plugs or cut off collars around the pipe. Clay plugs should be installed no further than 50 m apart along the full length of the trench. Clay plugs must be a minimum of 1 m thick along the length of the trench and will completely replace any bedding or backfill material around the pipe. Soil used for clay plugs must have greater than 50% fines content, 15% of the particles finer than 2 microns, and a hydraulic conductivity of less than $10^{-8}$ m/s. The clay plug must be compacted to minimum 95% SPMDD. A representative sample of the clay plug material must be submitted prior to construction and during construction for hydraulic conductivity and particle size testing to confirm the material is adequate and in compliance with the above material specifications.

If cutoff collars are used instead of clay plugs, the cutoff collar must not be placed within 1 m of a pipe joint to ensure adequate compaction of the backfill. The soils around the cutoff collar must be compacted to 95% SPMDD. Cutoff collars are designed by the civil engineer.

The region and/or municipality may have its own minimum design requirements for trench plugs. If this is the case, the relevant specifications should be reviewed and incorporated by the civil engineer, and the more stringent of the two specifications should be used.

# 4 Pavement Engineering Recommendations

## 4.1 Pavements Above Underground Parking Structures

Some of the pavements will be placed on top of the underground parking structures. In these cases, standard pavement design does not apply since the parking structure incorporates waterproofing and drainage elements, and the pavement should be specified by the architect. All drainage and pavement design considerations for these areas must be designed separately and in conjunction with the civil and mechanical engineering design of the underground parking structure. The design presented below is only for areas in which the pavements will rest on a soil subgrade.

## 4.2 Asphalt Pavements on Soil Subgrade

The following design pertains to asphaltic concrete pavements ('pavement') where the pavement will rest on a soil subgrade as described above.

The following Ontario Provincial Standards Specifications (OPSS.MUNI) apply to the pavement construction and material requirements:

- OPSS.MUNI 310 - Hot Mix Asphalt
- OPSS.MUNI 501 - Compacting
- OPSS.MUNI 1010 - Aggregates – Base, Subbase, Select Subgrade, and Backfill Material
- OPSS.MUNI 1101 - Performance Graded Asphalt Cement
- OPSS.MUNI 1150 - Hot Mix Asphalt

The pavement construction and material should also follow the relevant city specifications, as applicable.

The Municipality may eventually assume the roads. The municipality has its own minimum pavement design requirements which will have to be followed for the making of any of the pavement surfaces that will eventually become a municipal responsibility. If this is the case, the relevant specifications should be reviewed in detail, and the more stringent of the two specifications should be used.

### 4.2.1 Pavement Subgrade Preparation

The subgrade must be adequately prepared prior to pavement construction. A discussion on site grading and subgrade preparation is provided in Section 3.1. As discussed in that section, the internal roadways for this development are to be constructed first, which will require the placement of engineered to raise grades for the pavements. If just the roadways are to be built up (and not the building pad areas, or not the entire site at once), the engineered fill must be tapered at a maximum slope of 2H:1V, as discussed in Section 3.1.

Topsoil and existing wet or organic-rich earth fill soils are considered unsuitable for the pavement subgrade. These materials must be stripped down to acceptable subgrade prior to pavement construction.

Existing earth fill (free of organic-rich or wet soils) and native subgrade will provide adequate subgrade for the support of the pavement. The subgrade must be proof-rolled and inspected under the supervision of Grounded for obvious loose or disturbed soils or where there is deleterious materials or moisture. These areas can either be recompacted in place and retested, or replaced with Granular B (OPSS.MUNI 1010) in 150 mm thick lifts, compacted to a minimum of 98% SPMDD.

The existing subgrade may not be readily compacted in small volumes, such as trenches or in areas adjacent to foundations or catch basins. For areas of limited extent, compactable aggregate-source backfills like Granular B (OPSS.MUNI 1010) are recommended for post-construction grade integrity. All new fill shall be compacted to a minimum of 98% SPMDD.

The subgrade for all pavement structures shall be frost tapered at a 3H to 1V slope (or flatter) to match with existing pavement structures, to reduce differential settlements due to frost heave.

### 4.2.2 Asphalt Pavement Design – Parking Lots and Driveways

Minimum and performance asphaltic concrete pavement designs are outlined in the tables below.

The following **basic pavement design** will last for 8 to 10 years before significant maintenance is required, depending on the traffic volume.

| **Basic Pavement Structure** | **Compaction Requirement** | **Car Parking Minimum Component Thickness** | **Bus/Truck Traffic Minimum Component Thickness** |
|---|---|---|---|
| **Asphalt Top Lift**<br>HL-3 (OPSS.MUNI 1150), and<br>PG 58-28 (OPSS.MUNI 1101) | OPSS.MUNI 310 | 65 mm | 40 mm |
| **Asphalt Base Course**<br>HL-8 (OPSS.MUNI 1150), and<br>PG 58-28 (OPSS.MUNI 1101) | OPSS.MUNI 310 | N/A | 50 mm |

| **Basic Pavement Structure** | **Compaction Requirement** | **Car Parking Minimum Component Thickness** | **Bus/Truck Traffic Minimum Component Thickness** |
|---|---|---|---|
| **Granular Base Course**<br>19 mm diameter crusher run limestone or Granular A (OPSS.MUNI 1010) | 100% Standard Proctor Maximum Dry Density (ASTM-D698) | 150 mm | 150 mm |
| **Granular Subbase Course**<br>50 mm diameter crusher run limestone or Granular B Type II (OPSS.MUNI 1010) | 98% Standard Proctor Maximum Dry Density (ASTM-D698) | 300 mm | 400 mm |
| **Total Thickness** | | **515 mm** | **640 mm** |

The following **performance pavement design** will last approximately twice as long before significant maintenance is required. The performance pavement design considers that the top layer of asphalt will be damaged over time, and therefore, will contribute less to the structural strength of the asphalt.

| **Performance Pavement Structure** | **Compaction Requirement** | **Car Parking Minimum Component Thickness** | **Bus/Truck Traffic Minimum Component Thickness** |
|---|---|---|---|
| **Asphalt Top Lift**<br>HL-3 (OPSS.MUNI 1150), and PG 58-28 (OPSS.MUNI 1101) | OPSS.MUNI 310 | 40 mm | 40 mm |
| **Asphalt Base Course**<br>HL-8 (OPSS.MUNI 1150), and PG 58-28 (OPSS.MUNI 1101) | OPSS.MUNI 310 | 50 mm | 80 mm |
| **Granular Base Course**<br>19 mm diameter crusher run limestone or Granular A (OPSS.MUNI 1010) | 100% Standard Proctor Maximum Dry Density (ASTM-D698) | 150 mm | 150 mm |
| **Granular Subbase Course**<br>50 mm diameter crusher run limestone or Granular B Type II (OPSS.MUNI 1010) | 98% Standard Proctor Maximum Dry Density (ASTM-D698) | 400 mm | 500 mm |
| **Total Thickness** | | **640 mm** | **770 mm** |

The existing subgrade soils have a relatively low to moderate susceptibility to frost heave, and pavement on these materials must be designed accordingly. To reduce frost heave, soil subgrade that is susceptible to frost (as defined in Section 2.4) should be replaced to a depth of 70 percent of the frost penetration depth (i.e. 0.85± m below proposed top of pavement) with non-frost susceptible soils or with granular materials. The most effective ways of dealing with potential frost heave are to construct a good subsurface drainage system, and to stay above the groundwater table.

Pavements for roadways should be constructed to reach the desired grade with a consistent slope of 2:1 (horizontal to vertical) to ensure proper stability and support. This slope ratio helps in maintaining structural integrity by effectively distributing loads and preventing erosion or slippage of the underlying materials. A 2:1 slope also facilitates better drainage, reducing the risk

of water accumulation that can compromise the pavement's durability. Adhering to this gradient during construction is essential for achieving long-term performance and safety of the pavement structure.

### 4.2.3 Asphalt Pavement Design – Internal Roadways

The Town of Oakville's Development Engineering Procedures and Guidelines (Section 7.7.2 – Private Residential Roadways) provides the minimum road pavement design for internal private roadways. The following table summarizes the Town's minimum requirements as well as Grounded's recommended pavement component thicknesses.

| **Basic Pavement Structure** | **Compaction Requirement** | **Private Residential Roadways Minimum Component Thickness** | |
|---|---|---|---|
| | | **Town of Oakville Minimum Requirements** | **Grounded's Recommended Minimum Requirements** |
| **Asphalt Top Lift**<br>HL-3 (OPSS.MUNI 1150), and PG 58-28 (OPSS.MUNI 1101) | OPSS.MUNI 310 | 40 mm | 40 mm |
| **Asphalt Base Course**<br>HL-8 (OPSS.MUNI 1150), and PG 58-28 (OPSS.MUNI 1101) | OPSS.MUNI 310 | 50 mm | 50 mm |
| **Granular Base Course**<br>19 mm diameter crusher run limestone or Granular A (OPSS.MUNI 1010) | 100% Standard Proctor Maximum Dry Density (ASTM-D698) | 150 mm | 150 mm |
| **Granular Subbase Course**<br>50 mm diameter crusher run limestone or Granular B Type II (OPSS.MUNI 1010) | 98% Standard Proctor Maximum Dry Density (ASTM-D698) | 300 mm | 400 mm |
| **Total Thickness** | | **540 mm** | **640 mm** |

The existing subgrade soils have a relatively low to moderate susceptibility to frost heave, and pavement on these materials must be designed accordingly. To reduce frost heave, soil subgrade that is susceptible to frost (as defined in Section 2.4) should be replaced to a depth of 70 percent of the frost penetration depth (i.e. 0.85± m below proposed top of pavement) with non-frost susceptible soils or with granular materials. The most effective ways of dealing with potential frost heave are to construct a good subsurface drainage system, and to stay above the groundwater table.

Pavements for roadways should be constructed to reach the desired grade with a consistent slope of 2:1 (horizontal to vertical) to ensure proper stability and support. This slope ratio helps in maintaining structural integrity by effectively distributing loads and preventing erosion or slippage of the underlying materials. A 2:1 slope also facilitates better drainage, reducing the risk of water accumulation that can compromise the pavement's durability. Adhering to this gradient during construction is essential for achieving long-term performance and safety of the pavement structure.

### 4.2.4 Pavement Drainage

Adequate drainage of the pavement subgrade is required. Prior to paving, the subgrade should be free of any depressions and sloped at a minimum grade of 2% to provide positive drainage. Perforated plastic subdrains (100 mm diameter) should be designed to collect subgrade water and positively outlet it at the catch basins. Typical pavement drainage details are appended.

Controlling surface water is important in keeping pavements in good maintenance. Grading adjacent pavement areas must be designed so that water is not allowed to pond adjacent to the outside edges of the pavement or curb.

# 5 Considerations for Construction

## 5.1 Excavations

Excavations must be carried out in accordance with the *Occupational Health and Safety Act – Regulation 213/91 – Construction Projects (Part III - Excavations, Section 222 through 242)*. These regulations designate four (4) broad classifications of soils to stipulate appropriate measures for excavation safety. For practical purposes:

- The earth fill is a Type 3 soil
- The Halton Till is considered a Type 2 soil
- The wet sands and silts are Type 4 soils, or can be considered Type 3 soils if dewatered or above the groundwater table

In accordance with the regulation's requirements, the soil must be suitably sloped and/or braced where workers must enter a trench or excavation deeper than 1.2 m. Safe excavation slopes (of no more than 3 m in height) by soil type are stipulated as follows, per Section 234:

| Soil Type | Base of Slope | Steepest Slope Inclination |
|---|---|---|
| 1 | within 1.2 metres of bottom of trench | 1 horizontal to 1 vertical |
| 2 | within 1.2 metres of bottom of trench | 1 horizontal to 1 vertical |
| 3 | from bottom of trench | 1 horizontal to 1 vertical |
| 4 | from bottom of trench | 3 horizontal to 1 vertical |

Minimum support system requirements for steeper excavations are stipulated in Sections 235 through 239 and 241 of the Act and Regulations and include provisions for timbering, shoring and moveable trench boxes. Any excavation slopes greater than 3 m in height should be checked by Grounded for global stability issues.

Larger obstructions (e.g. buried concrete debris, other obstructions) not directly observed in the boreholes are likely present in the earth fill. Similarly, larger inclusions (e.g. cobbles and boulders) may be encountered in the native soils. The size and distribution of these obstructions cannot

be predicted with boreholes, as the split spoon sampler is not large enough to capture particles of this size. Provision must be made in excavation contracts to allocate risks associated with the time spent and equipment utilized to remove or penetrate such obstructions when encountered.

Excess soil is governed by Ontario Regulation 406/19: On-Site and Excess Soil Management (ESM). The Project Leader (typically the owner) may be required to file a notice in the excess soil registry and a Qualified Person (within the meaning of O.Reg. 153/04) may be required to prepare the associated planning documents and/or develop and implement a tracking system in accordance with the Soil Rules, to track each load of excess soil during its transportation and deposit before removing excess soil from the project area.

## 5.2 Short-Term Groundwater Control

Considerations pertaining to groundwater discharge quantities and quality are discussed in Grounded's hydrogeological report for the site (File No. 25-069), under separate cover.

The groundwater table is relatively shallow and varies across the site, ranging from 0.6 to 2.5 ±m below existing site grade. Depending on final site grading, basement excavations for new dwellings may extend below the groundwater table. Seepage may be allowed to drain into the excavations and then pumped out. In open excavations, it is anticipated that seepage volumes will be limited to the extent that temporary pumping will sufficiently control any groundwater seepage. Excavation delays will occur as seepage (however limited) is controlled. These delays should be anticipated in the construction schedule.

## 5.3 Site Work

To better protect wet undisturbed subgrade, excavations exposing wet soils must be cut neat, inspected, and then immediately protected with a skim coat of concrete (i.e. a mud mat). Wet sands are susceptible to degradation and disturbance due to even mild site work, frost, weather, or a combination thereof.

The effects of work on site can greatly impact soil integrity. Care must be taken to prevent this damage. Site work carried out during periods of inclement weather may result in the subgrade becoming disturbed, unless a granular working mat is placed to preserve the subgrade soils in their undisturbed condition. Subgrade preparation activities should not be conducted in wet weather and the project must be scheduled accordingly.

If site work causes disturbance to the subgrade, removal of the disturbed soils and the use of granular fill material for site restoration or underfloor fill will be required at additional cost to the project.

It is construction activity itself that often imparts the most severe loading conditions on the subgrade. Special provisions such as end dumping and forward spreading of earth and aggregate

fills, restricted construction lanes, and half-loads during placement of the granular base and other work may be required, especially if construction is carried out during unfavourable weather.

Adequate temporary frost protection for the founding subgrade must be provided if construction proceeds in freezing weather conditions. The subgrade at this site is susceptible to frost damage. The slab on grade should not be placed on frozen subgrade, to prevent excess settlement of the slab as the subgrade thaws. Areas of frozen subgrade should be removed during subgrade preparation. Depending on the project context, consideration should be given to frost effects (heaving, softening, etc.) on exposed subgrade surfaces.

## 5.4 Engineering Review

By issuing this preliminary report, Grounded Engineering has assumed the role of Geotechnical Engineer of Record for this site. Grounded should be retained by the Owner to review the structural and civil engineering drawings prior to issue or construction, to ensure that the recommendations in this report have been appropriately implemented.

All foundation installations must be reviewed in the field by Grounded, the Geotechnical Engineer of Record, as they are constructed. The on-site review of foundation installations and the condition of the founding subgrade as the foundations are constructed is as much a part of the geotechnical engineering design function as the design itself; it is also required by Section 4.2.2.3. of the 2024 Ontario Building Code. If Grounded is not retained to carry out foundation engineering field review during construction, then Grounded accepts no responsibility for the performance or non-performance of the foundations, even if they are constructed in general conformance with the engineering design advice contained in this report.

Strict procedures must be maintained during construction to maintain the integrity of the subgrade to the extent possible. The design advice in this report is based on an assessment of the subgrade support capabilities as indicated by the boreholes. These conditions may vary across the site depending on the final design grades and therefore, the preparation of the subgrade should be monitored by Grounded at the time of construction to confirm material quality, and thickness.

A visual pre-construction survey of adjacent lands and buildings is recommended to be completed prior to the start of any construction. This documents the baseline condition and can prevent unwarranted damage claims. Any shoring system, regardless of the execution and design, has the potential for movement. Small changes in stress or soil volume can cause cracking in adjacent buildings.

Fill placement is typically measured relative to Standard Proctor Maximum Dry Density (SPMDD). A third-party testing agency can be retained to provide in situ density measurements on site to confirm that the specified density is achieved during fill or asphalt placement. Grounded can provide oversight and review services for this testing as needed.

# 6 Limitations and Restrictions

This preliminary geotechnical engineering report is intended for planning purposes only. At detailed design, additional boreholes, possibly including in-situ pressuremeter testing and/or rock coring, groundwater monitoring wells, and updated detailed geotechnical engineering advice are required. Shear wave velocity (MASW) testing is recommended for detailed seismic site designation for each block. Once completed, the future detailed geotechnical engineering reports by Grounded Engineering would then supersede this preliminary report. Note that preliminary findings can vary significantly from the findings of a detailed comprehensive study.

## 6.1 Investigation Procedures

The geotechnical engineering analysis and advice provided are based on the factual borehole information observed and recorded by Grounded. The investigation methodology and engineering analysis methods used to carry out this scope of work are consistent with Grounded's standard of practice as well as other reasonable and prudent geotechnical consultants, working under similar conditions and constraints (time, financial, and physical).

Borehole drilling services were provided to Grounded by a specialist professional contractor. The drilling was observed and recorded by Grounded's field supervisor on a full-time basis. Drilling was conducted using conventional drilling rigs equipped with hollow stem augers drilling equipment. As drilling proceeded, groundwater observations were made in the boreholes. Based on examination of recovered borehole samples, our field supervisor made a record of borehole and drilling observations. The field samples were secured in air-tight clean jars and bags and taken to the Grounded soil laboratory where they were each logged and reviewed by the geotechnical engineering team and the senior reviewer.

The Split-Barrel Method technique (ASTM D1586) was used to obtain the soils samples. The sampling was conducted at conventional intervals and not continuously. As such, stratigraphic interpolation between samples is required and stratigraphic boundary lines do not represent exact depths of geological change. They should be taken as gradual transition zones between soil or rock types.

A carefully conducted, fully comprehensive investigation and sampling scope of work carried out under the most stringent level of oversight may still fail to detect certain ground conditions. As such, users of this report must be aware of the risks inherent in using engineered field investigations to observe and record subsurface conditions. As a necessary requirement of working with discrete test locations, Grounded has assumed that the conditions between test locations are the same as the test locations themselves, for the purposes of providing geotechnical engineering advice.

It is not possible to design a field investigation with enough test locations that would provide complete subsurface information, nor is it possible to provide geotechnical engineering advice that completely identifies or quantifies every element that could affect construction, scheduling,

or tendering. Contractors undertaking work based on this report (in whole or in part) must make their own determination of how they may be affected by the subsurface conditions, based on their own analysis of the factual information provided and based on their own means and methods. Contractors using this report must be aware of the risks implicit in using factual information at discrete test locations to infer subsurface conditions across the site and are directed to conduct their own investigations as needed.

## 6.2 Site and Scope Changes

Natural occurrences, the passage of time, local construction, and other human activity all have the potential to directly or indirectly alter the subsurface conditions at or near the project site. Contractual obligations related to groundwater or stormwater control, disturbed soils, frost protection, etc. must be considered with attention and care as they relate to potential site alteration.

This report provides preliminary geotechnical engineering advice intended for use by the owner and their retained design team for planning only. These preliminary interpretations, design parameters, advice, and discussion on construction considerations are not complete. A detailed site-specific geotechnical investigation must be conducted by Grounded during detailed design to confirm and update the preliminary recommendations provided here.

## 6.3 Report Use

The authorized users of this report are 1816986 Ontario Inc.. and their design team, for whom this report has been prepared. Grounded Engineering Inc. maintains the copyright and ownership of this document. Reproduction of this report in any format or medium requires explicit prior authorization from Grounded Engineering Inc.

The local municipal/regional governing bodies may also make use of and rely upon this report, subject to the limitations as stated.

# 7 Closure

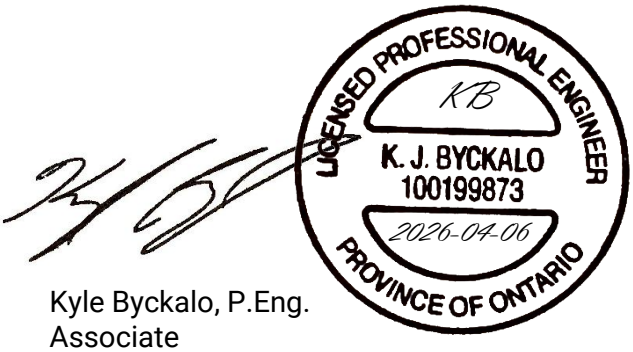
If the design team has any questions regarding the discussion and advice provided, please do not hesitate to have them contact our office. We trust that this report meets your requirements at present.

For and on behalf of our team,

GROUNDED ENGINEERING




Sam Bastan, P.Eng.
Intermediate Project Engineer

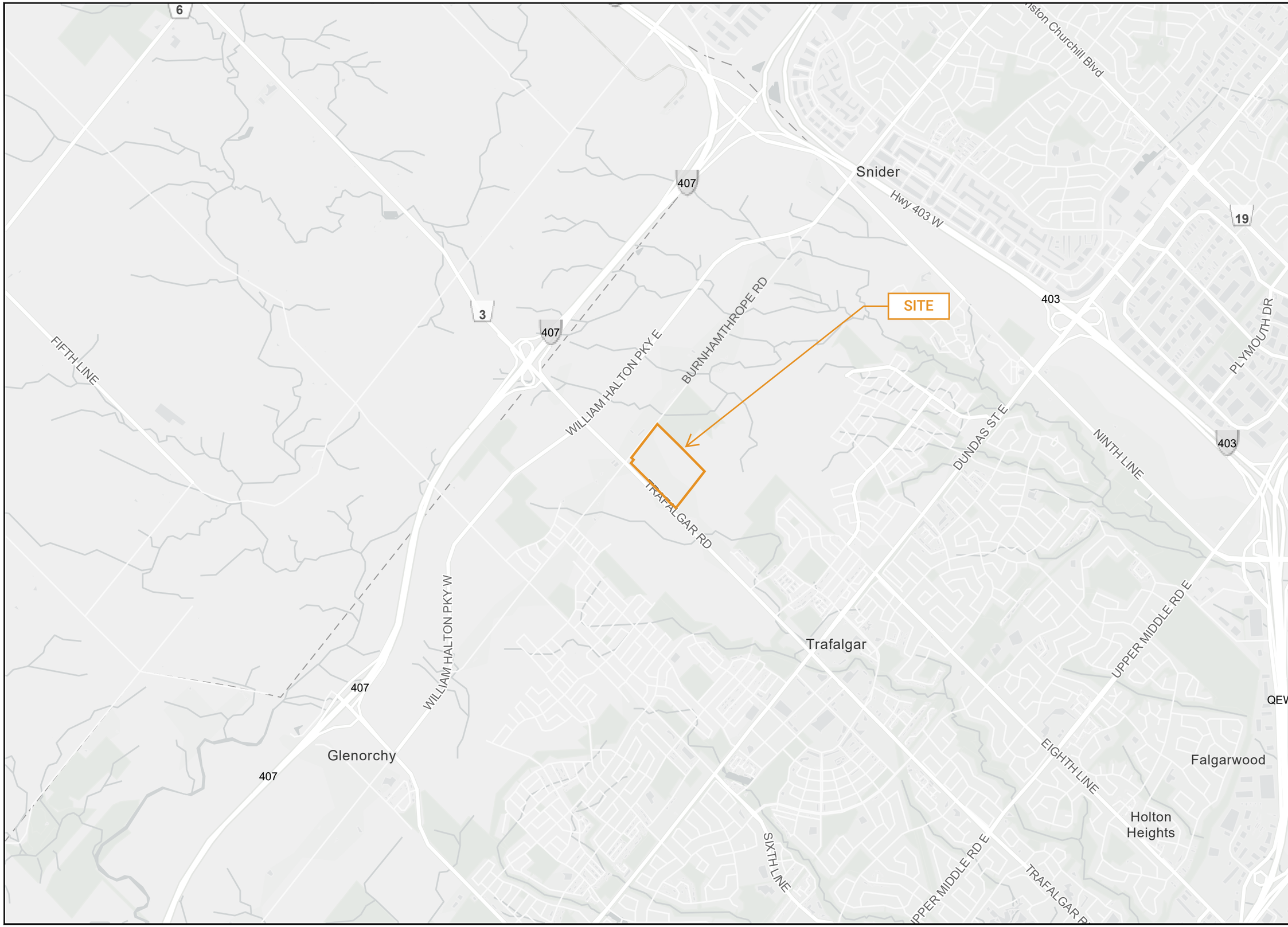



Kyle Byckalo, P.Eng.
Associate

Jason Crowder, Ph.D., P.Eng.
Principal

# FIGURES






GROUNDED ENGINEERING

49 MOBILE DRIVE., NORTH YORK, ON M4A 1H5
www.groundedeng.ca

**LEGEND**

APPROXIMATE PROPERTY BOUNDARY

Note

Reference

ArcGIS Online 2025

Project

**TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO**

Figure Title

**KEY PLAN**

North

TRUE
PROJECT

Date

APRIL 2026

Scale

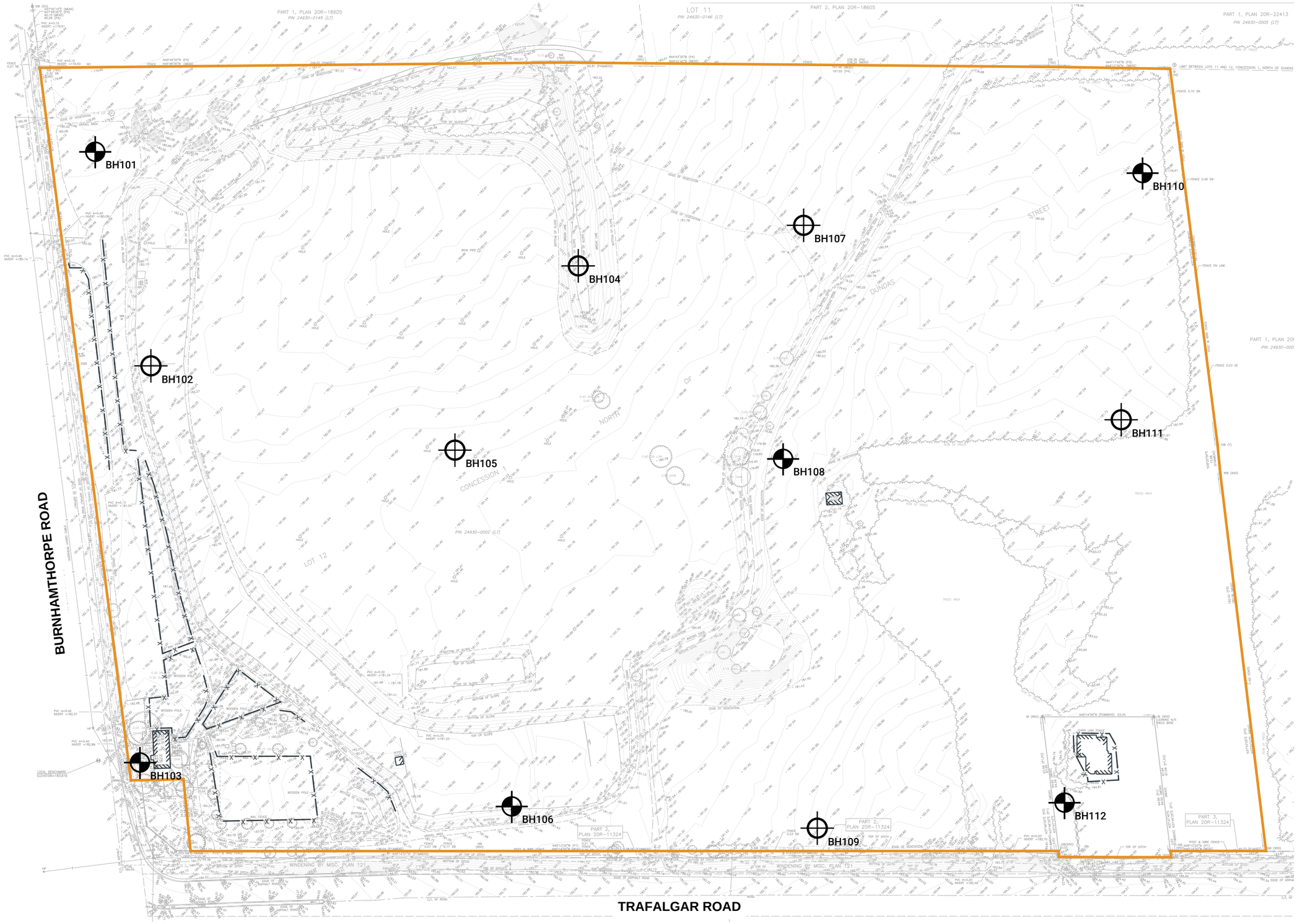
0m 500m 1000m

Job No

25-069

Figure No

**FIGURE 1**




GROUNDED ENGINEERING

49 MOBILE DRIVE., NORTH YORK, ON M4A 1H5
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**LEGEND**

- APPROX PROPERTY BOUNDARY
- EXISTING BUILDING STRUCTURE
- FENCE LINE
- MONITORING WELL/BOREHOLE BY GROUNDED

Note

Reference

Survey Drawing 24-30-276-00.
Dated February 11, 2025.
Prepared by J.D. Barnes Limited.
Received on May 7, 2025.

Project

**TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO**

Figure Title

**BOREHOLE LOCATION PLAN - EXISTING SITE CONDITIONS**

North

TRUE
PROJECT

Date

APRIL 2026

Scale

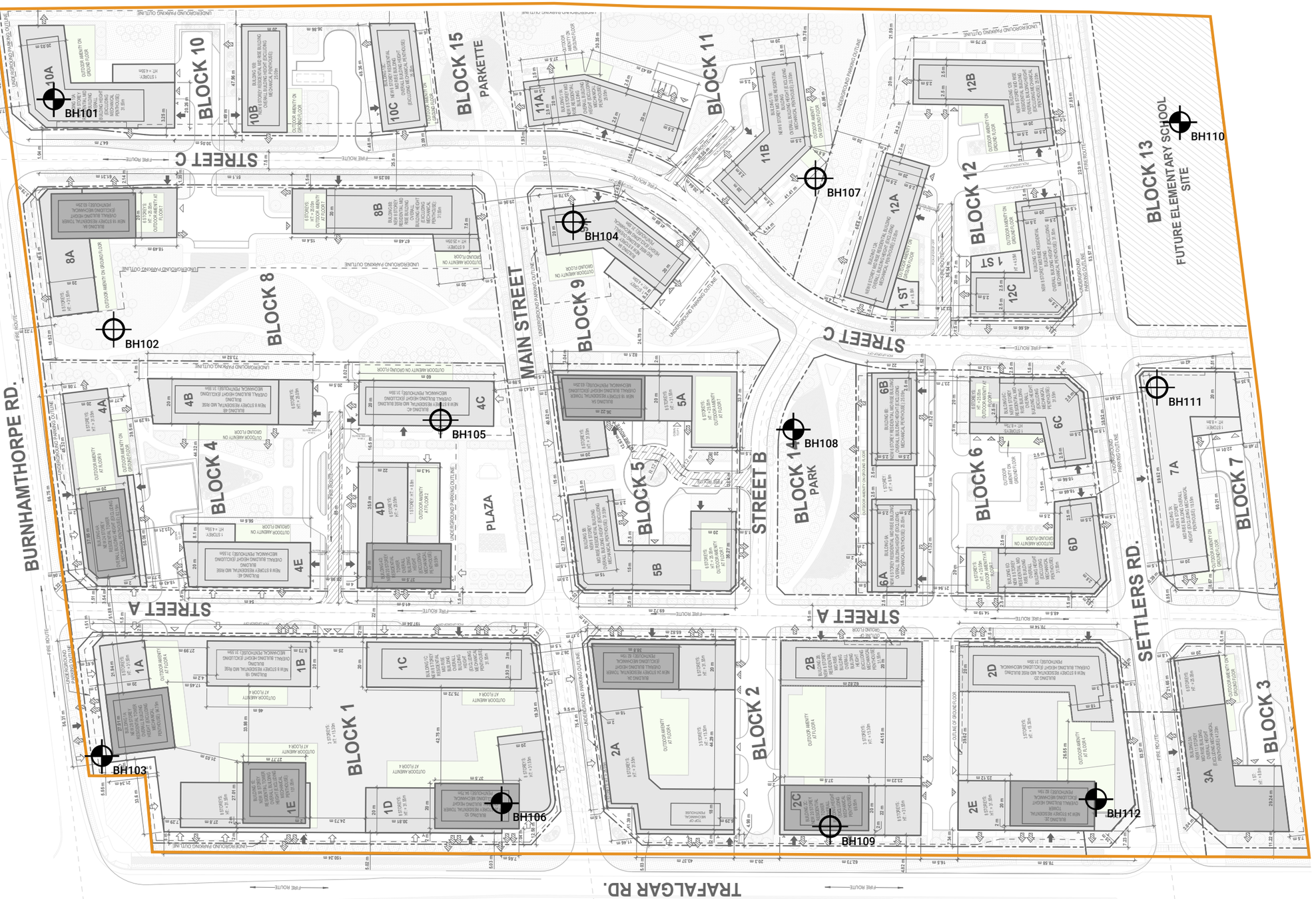
0m 25m 50m

Job No

25-069

Figure No

**FIGURE 2**




GROUNDED ENGINEERING

49 MOBILE DRIVE., NORTH YORK, ON M4A 1H5
www.groundedeng.ca

**LEGEND**

- APPROX PROPERTY BOUNDARY
- MONITORING WELL/BOREHOLE BY GROUNDED

Note

Reference

Site Plan A-105S.
Dated 2026-04-06
Prepared by BDP. Quadrangle.

Project

**TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO**

Figure Title

**BOREHOLE LOCATION PLAN - PROPOSED SITE CONDITIONS**

North

TRUE
PROJECT

Date

APRIL 2026

Scale

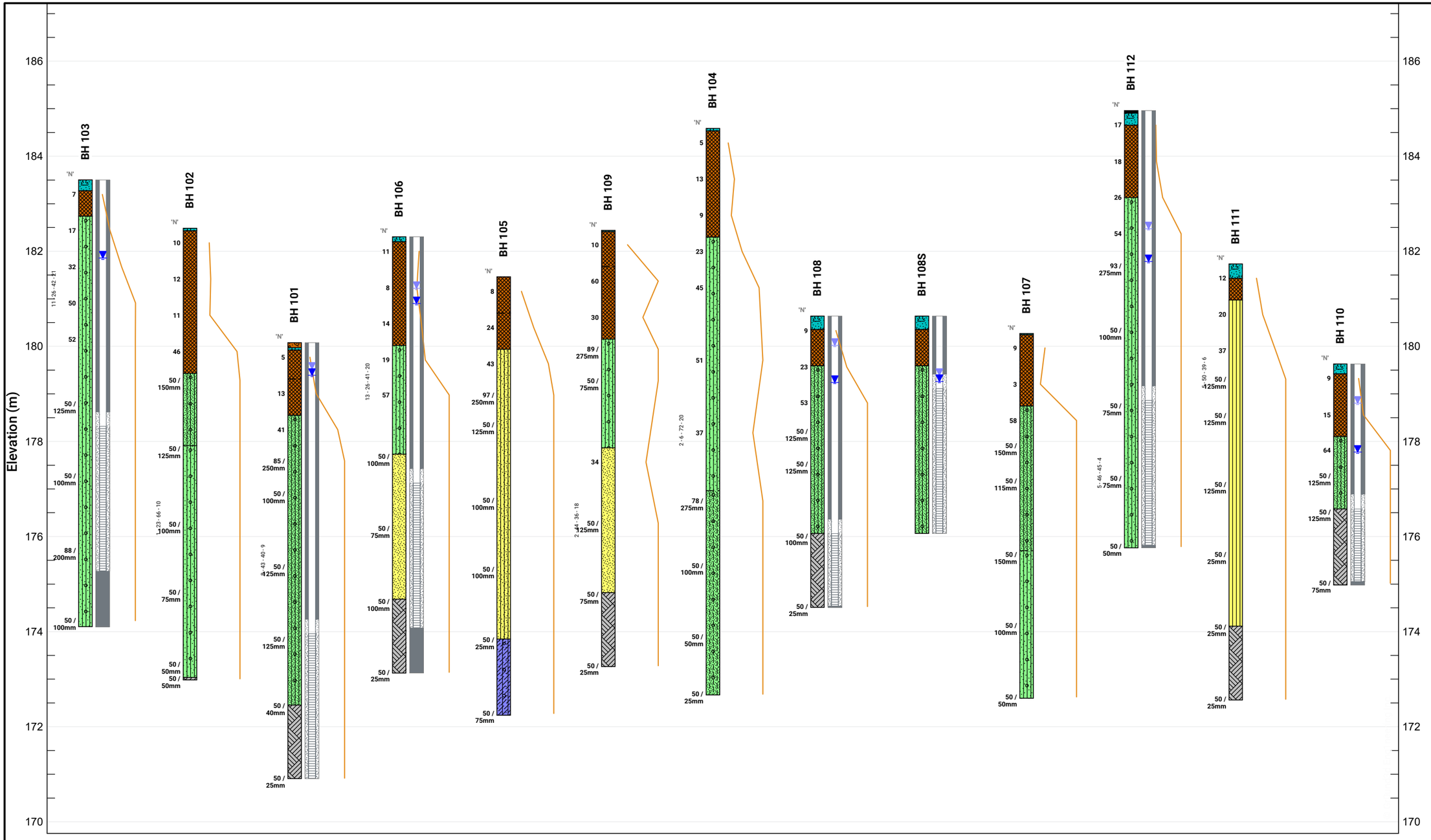
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Job No

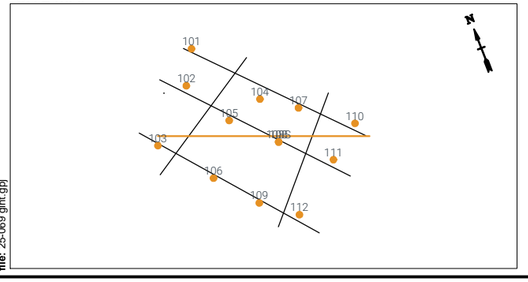
25-069

Figure No

**FIGURE 3**




SITE MAP




file: 25-069 gint.gpj

***Boreholes Equally Spaced***

**BOREHOLE STRATIGRAPHY LEGEND**

- Aggregate
- Topsoil
- Fill
- Sand and Silt Till
- Bedrock (inferred)
- Sandy Silt Till
- Silty Sand Till
- Sand and Silt
- Clayey Silt Till
- Sand
- Silt and Sand Till
- Silt
- Asphalt

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LEGEND

- FILL
- GRAVELS (gravel to gravelly sand)
- SILT TO SAND (not till)
- COHESIONLESS TILLS
- COHESIVE SOILS (clayey silt to clay, incl. tills)
- DISTURBED/REWORKED/ORGANIC

**BH 101** BOREHOLES BY GROUNDED

*T-BH7* BOREHOLES BY OTHERS

- water level, unstabilized
- water level, stabilized (latest)
- water level, stabilized (highest)

Project

**TRAFALGAR AND BURNHAMTHORPE SUBDIVISION OAKVILLE**

Figure Title

**SUBSURFACE PROFILE**

Date

APRIL 2026

Scale

AS INDICATED

Job No

25-069

Figure No

**FIGURE 4**

# TABLES



**TABLE 1:**
**GROUNDWATER LEVEL MONITORING SUMMARY**
**340 BURNHAMTHORPE RD. E., 3437 TRAFALGAR RD., Oakville**

| Well ID | Ground Surface Elev. (masl) | Well Screen Interval | | Soil Strata | Grounded Engineering | | | | | | | | | | Minimum Elev. (Lowest) | | Maximum Elev. (Highest) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | June 12, 2025 | | July 18, 2025 | | August 8, 2025 | | September 5, 2025 | | October 3, 2025 | | | | | |
| | | (mbgs) | (masl) | | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) |
| **BH101** | 180.1 | 6.1 - 9.2 | 174.0 - 170.9 | SN+SL-TL | 0.58 | 179.52 | 0.71 | 179.39 | 0.97 | 179.13 | 0.67 | 179.43 | 0.57 | 179.53 | 0.97 | 179.13 | 0.57 | 179.53 |
| **BH103** | 183.5 | 5.2 - 8.2 | 178.3 - 175.3 | SN-SL-TL | 1.86 | 181.64 | 1.67 | 181.83 | 1.82 | 181.68 | 1.89 | 181.61 | 1.89 | 181.61 | 1.89 | 181.61 | 1.67 | 181.83 |
| **BH106** | 182.3 | 5.2 - 8.2 | 177.1 - 174.1 | SN | 1.11 | 181.19 | 1.43 | 180.87 | 1.76 | 180.54 | 1.90 | 180.40 | 2.09 | 180.22 | 2.09 | 180.22 | 1.11 | 181.19 |
| **BH108S** | 180.6 | 3.0 - 4.6 | 177.6 - 176.1 | SN+SL-TL | NA | - | 1.40 | 179.20 | 2.00 | 178.60 | 2.50 | 178.11 | 2.43 | 178.17 | 2.50 | 178.11 | 1.40 | 179.20 |
| **BH108** | 180.6 | 4.6 - 6.1 | 176.1 - 174.5 | BEDROCK | 0.64 | 179.96 | 1.42 | 179.18 | 2.03 | 178.57 | 2.49 | 178.12 | 2.63 | 177.98 | 2.63 | 177.98 | 0.64 | 179.96 |
| **BH110** | 179.6 | 3.0 - 4.6 | 176.6 - 175.1 | BEDROCK | 0.85 | 178.75 | 1.88 | 177.72 | 2.52 | 177.08 | 3.07 | 176.53 | 3.30 | 176.31 | 3.30 | 176.31 | 0.85 | 178.75 |
| **BH112** | 185.0 | 6.1 - 9.1 | 178.9 - 175.8 | SN-SL-TL | 2.51 | 182.49 | 3.20 | 181.80 | 3.63 | 181.37 | 4.07 | 180.93 | 4.43 | 180.57 | 4.43 | 180.57 | 2.51 | 182.49 |

**mbgs** = metres below existing ground surface
**masl** = metres above sea level
* = unstabilized groundwater level
NA = not available, unable to access monitoring well

# APPENDIX A



# BOREHOLE LOG TERMINOLOGY

GROUNDED ENGINEERING

## SAMPLING/TESTING METHODS

SS: split spoon sample

AS: auger sample

GS: grab sample

FV: shear vane

DP: direct push

PMT: pressuremeter test

ST: shelby tube

CORE: soil coring

RUN: rock coring

## SYMBOLS & ABBREVIATIONS

MC: moisture content

LL: liquid limit

PL: plastic limit

PI: plasticity index

γ: soil unit weight (bulk)

$G_s$: specific gravity

$S_u$: undrained shear strength

▽ unstabilized water level

▼ 1st water level measurement

▼ 2nd water level measurement most recent

▼ water level measurement

## ENVIRONMENTAL SAMPLES

M&I: metals and inorganic parameters

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

VOC: volatile organic compound

PHC: petroleum hydrocarbon

BTEX: benzene, toluene, ethylbenzene and xylene

PPM: parts per million

## FIELD MOISTURE (based on tactile inspection)

**DRY:** no observable pore water

**MOIST:** inferred pore water, not observable (i.e. grey, cool, etc.)

**WET:** visible pore water

## COHESIONLESS

| Relative Density | N-Value |
|---|---|
| Very Loose | <4 |
| Loose | 4 - 10 |
| Compact | 10 - 30 |
| Dense | 30 - 50 |
| Very Dense | >50 |

## COHESIVE

| Consistency | N-Value | Su (kPa) |
|---|---|---|
| Very Soft | <2 | <12 |
| Soft | 2 - 4 | 12 - 25 |
| Firm | 4 - 8 | 25 - 50 |
| Stiff | 8 - 15 | 50 - 100 |
| Very Stiff | 15 - 30 | 100 - 200 |
| Hard | >30 | >200 |

## COMPOSITION

| Term | % by weight |
|---|---|
| ***trace*** silt | <10 |
| ***some*** silt | 10 - 20 |
| silt***y*** | 20 - 35 |
| sand ***and*** silt | >35 |

## ASTM STANDARDS

**ASTM D1586 Standard Penetration Test (SPT)**
Driving a 51 mm O.D. split-barrel sampler ("split spoon") into soil with a 63.5 kg weight free falling 760 mm. The blows required to drive the split spoon 300 mm ("bpf") after an initial penetration of 150 mm is referred to as the N-Value.

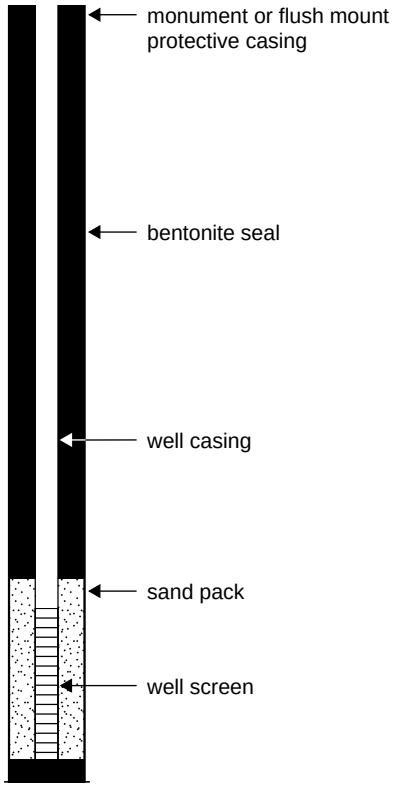
**ASTM D3441 Cone Penetration Test (CPT)**
Pushing an internal still rod with a outer hollow rod ("sleeve") tipped with a cone with an apex angle of 60° and a cross-sectional area of 1000 $mm^2$ into soil. The resistance is measured in the sleeve and at the tip to determine the skin friction and the tip resistance.

**ASTM D2573 Field Vane Test (FVT)**
Pushing a four blade vane into soil and rotating it from the surface to determine the torque required to shear a cylindrical surface with the vane. The torque is converted to the shear strength of the soil using a limit equilibrium analysis.

**ASTM D1587 Shelby Tubes (ST)**
Pushing a thin-walled metal tube into the in-situ soil at the bottom of a borehole, removing the tube and sealing the ends to prevent soil movement or changes in moisture content for the purposes of extracting a relatively undisturbed sample.

**ASTM D4719 Pressuremeter Test (PMT)**
Place an inflatable cylindrical probe into a pre-drilled hole and expanding it while measuring the change in volume and pressure in the probe. It is inflated under either equal pressure increments or equal volume increments. This provides the stress-strain response of the soil.

## WELL LEGEND



GROUNDED ENGINEERING

**Date Started** : Jun 2, 2025
**Position** : E: 602245, N: 4817567 (UTM 17T)
**Elev. Datum** : Geodetic

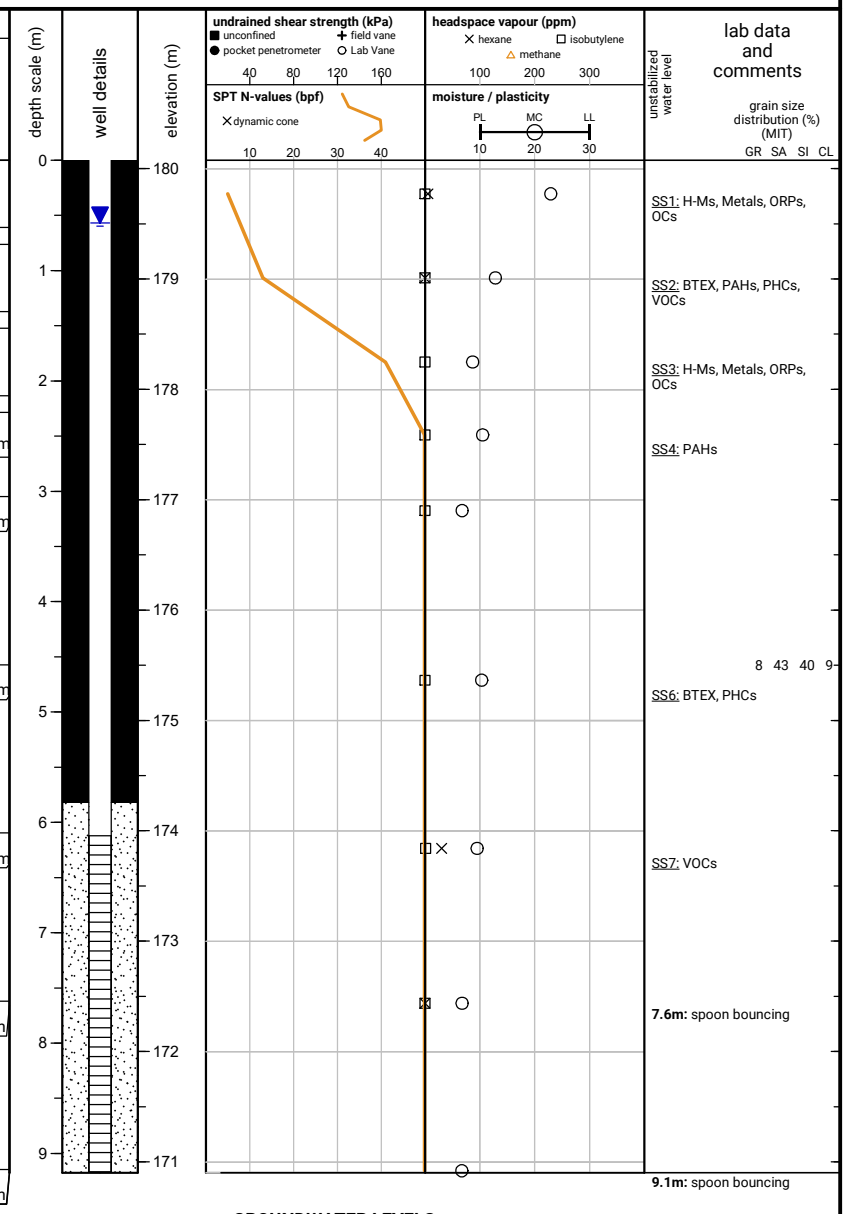
# BOREHOLE LOG 101

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev / depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **180.1** | **GROUND SURFACE** | | | | |
| 179.9 / 0.2 | 100mm **AGGREGATE**<br>50mm **TOPSOIL** | | 1 | SS | 5 |
| 179.3 / 0.8 | **FILL**, clayey silt, some sand, trace gravel, trace rootlets, firm, dark brown, moist | | 2 | SS | 13 |
| 178.6 / 1.5 | **SANDY SILT**, some clay, trace gravel, trace rootlets, compact, reddish brown, moist (REWORKED) | | 3 | SS | 41 |
| | **SAND AND SILT**, trace clay, trace gravel, trace rock fragments, dense, reddish brown, moist<br>(HALTON TILL)<br>...at 2.3 m, some clay, very dense | | 4 | SS | 85 / 250mm |
| | ...at 3.0 m, trace clay, grey | | 5 | SS | 50 / 100mm |
| | ...at 4.6 m, wet | | 6 | SS | 50 / 125mm |
| | ...at 6.1 m, trace rock fragments, reddish brown, moist | | 7 | SS | 50 / 125mm |
| 172.5 / 7.6 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 8 | SS | 50 / 40mm |
| 170.9 / 9.2 | **END OF BOREHOLE** | | 9 | SS | 50 / 25mm |

solid stem augers OD=150 mm




**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 0.6 | 179.5 |
| Jul 18, 2025 | 0.7 | 179.4 |
| Aug 8, 2025 | 1.0 | 179.1 |
| Sep 5, 2025 | 0.7 | 179.4 |
| Oct 3, 2025 | 0.6 | 179.5 |

Water level and cave not measured upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**Date Started** : Jun 2, 2025
**Position** : E: 602194, N: 4817474 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 102

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| 182.5 | **GROUND SURFACE** | | | | |
| | 50mm **TOPSOIL** | | 1 | SS | 10 |
| | **FILL**, sandy silt, some clay, trace gravel, trace rootlets, organic odour, compact, dark brown, moist | | | | |
| | ...at 0.8 m, clayey silt, sandy, stiff, reddish brown, moist | | 2 | SS | 12 |
| | ...at 1.5 m, silty sand, trace clay, trace gravel, trace shale fragments, compact | | 3 | SS | 11 |
| | ...at 2.3 m, sand and gravel, trace silt, dense, brown, wet | | 4 | SS | 46 |
| 179.5 / 3.0 | **SAND AND SILT**, trace clay, trace gravel, very dense, brown, moist (HALTON TILL) | | 5 | SS | 50 / 150mm |
| 177.9 / 4.6 | **SANDY SILT**, some clay, trace gravel, very dense, grey, moist (HALTON TILL) | | 6 | SS | 50 / 125mm |
| | | | 7 | SS | 50 / 100mm |
| | | | 8 | SS | 50 / 75mm |
| | ...at 9.1 m, some shale fragments, wet | | 9 | SS | 50 / 50mm |
| 173.1 / 173.0 / 9.5 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 10 | SS | 50 / 50mm |

solid stem augers OD=150 mm

**END OF BOREHOLE**

Water level and cave not measured upon completion of drilling.

depth scale (m) 0 1 2 3 4 5 6 7 8 9

well details

elevation (m) 182 181 180 179 178 177 176 175 174 173

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene △ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS1: OCs
SS2: H-Ms, Metals, ORPs
SS3: PAHs, VOCs
SS4: BTEX, PHCs
SS5: H-Ms, Metals, PAHs, OCs
SS6: BTEX, PHCs, VOCs

1 23 66 10

**9.1m:** switch to hollow stem augers
**9.4m:** auger grinding, spoon bouncing

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**GROUNDED ENGINEERING**

**Date Started** : Jun 9, 2025
**Position** : E: 602058, N: 4817345 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 103

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| 183.5 | **GROUND SURFACE** | | | | |
| 183.3 | 225mm **TOPSOIL** | | | | |
| 0.2 | **FILL**, sandy silt, trace gravel, trace clay, trace rootlets, loose, dark brown, moist | | 1 | SS | 7 |
| 182.7 | | | | | |
| 0.8 | **SANDY SILT**, clayey, some shale fragments, trace gravel, trace rock fragments, compact, brown, moist (HALTON TILL) | | 2 | SS | 17 |
| | ...at 1.5 m, dense | | 3 | SS | 32 |
| | ...at 2.3 m, some gravel, very dense | | 4A | SS | 50 |
| | ...at 2.5 m, some clay | | 4B | | |
| | | | 5 | SS | 52 |
| | ...at 4.6 m, sand, some silt, grey | | 6 | SS | 50 / 125mm |
| | ...at 6.1 m, silty | | 7 | SS | 50 / 100mm |
| | | | 8 | SS | 88 / 200mm |
| 174.1 | | | 9 | SS | 50 / 100mm |
| 9.4 | | | | | |

depth scale (m) | well details | elevation (m)

**undrained shear strength (kPa)** — unconfined, field vane, pocket penetrometer, Lab Vane; 40 80 120 160

**SPT N-values (bpf)** — dynamic cone; 10 20 30 40

**headspace vapour (ppm)** — hexane, isobutylene, methane; 100 200 300

**moisture / plasticity** — PL MC LL; 10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT) GR SA SI CL

SS1: H-Ms, Metals, ORPs, OCs

SS2: BTEX, PAHs, PHCs

SS3: VOCs

11 26 42 21

4B: H-Ms, Metals, ORPs

SS5: PAHs, OCs

SS7: BTEX, PHCs

SS8: VOCs
**7.9m:** auger grinding

**8.8m:** auger grinding

**END OF BOREHOLE**

Unstabilized water level measured at 7.0 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 1.9 | 181.6 |
| Jun 17, 2025 | 2.0 | 181.5 |
| Jul 18, 2025 | 1.7 | 181.8 |
| Aug 8, 2025 | 1.8 | 181.7 |
| Sep 5, 2025 | 1.9 | 181.6 |
| Oct 3, 2025 | 1.9 | 181.6 |

file: 25-069 gint.gpj



**Tech** : EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 3, 2025
**Position** : E: 602375, N: 4817364 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 104

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev / depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **184.6** | **GROUND SURFACE** | | | | |
| | 50mm **TOPSOIL** | | 1 | SS | 5 |
| | **FILL**, sandy silt, trace clay, trace gravel, trace rootlets, organic odour, loose to compact, brown, moist | | | | |
| | ...at 0.8 m, trace rock fragments | | 2 | SS | 13 |
| | ...at 1.5 m, trace shale fragments | | 3 | SS | 9 |
| 182.3 / 2.3 | **SANDY SILT**, some clay, trace gravel, compact, brown, moist (HALTON TILL) | | 4 | SS | 23 |
| | ...at 3.0 m, dense<br>...at 3.2 m, very dense | | 5A<br>5B | SS | 45 |
| | ...at 4.6 m, brown with orange | | 6 | SS | 51 |
| | ...at 6.3 m, clayey silt, trace sand, hard, grey | | 7A<br>7B | SS | 37 |
| 177.0 / 7.6 | **SILTY SAND**, trace gravel, trace clay, trace rock fragments, very dense, grey, moist (HALTON TILL) | | 8 | SS | 78 / 275mm |
| | | | 9 | SS | 50 / 100mm |
| | | | 10 | SS | 50 / 50mm |
| 172.7 / 11.9 | ...at 11.9 m, clayey, some shale fragments, wet | | 11 | SS | 50 / 25mm |

hollow stem augers OD=215 mm

depth scale (m): 0 1 2 3 4 5 6 7 8 9 10 11

well details

elevation (m): 184 183 182 181 180 179 178 177 176 175 174 173

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene △ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level ▽

**lab data and comments**

grain size distribution (%) (MIT)
GR SA SI CL

SS1: OCs

SS2: BTEX, PHCs, VOCs

SS3: H-Ms, Metals, ORPs, PAHs

2 6 72 20

**10.7m:** no recovery, auger grinding

**11.9m:** spoon bouncing, auger refusal

**END OF BOREHOLE**

Unstabilized water level measured at 5.5 m below ground surface; caved to 8.5 m below ground surface upon completion of drilling.

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 4, 2025
**Position** : E: 602272, N: 4817338 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 105

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

solid stem augers OD=150 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **181.5** | **GROUND SURFACE** | | | | |
| | **FILL**, sandy silt, some clay, trace gravel, trace rootlets, organic odour, loose, brown, moist | | 1 | SS | 8 |
| 180.7 / 0.8 | **SANDY SILT**, some clay, trace gravel, trace rock fragments, compact, brown, moist (REWORKED) | | 2 | SS | 24 |
| 180.0 / 1.5 | **SAND AND SILT**, trace clay, trace gravel, trace rock fragments, very dense, brown, moist | | 3 | SS | 43 |
| | | | 4 | SS | 97 / 250mm |
| | ...at 3.0 m, wet | | 5 | SS | 50 / 125mm |
| | ...at 4.6 m, sandy silt, clayey, grey<br>...at 4.6 m, some clay, trace shale fragments, reddish brown | | 6A<br>6B | SS | 50 / 100mm |
| | | | 7 | SS | 50 / 100mm |
| 173.9 / 7.6 | **CLAYEY SILT**, some sand, trace gravel, trace shale fragments, hard (HALTON TILL) | | 8 | SS | 50 / 25mm |
| 172.3 / 9.2 | ...at 9.1 m, some shale fragments | | 9 | SS | 50 / 75mm |

depth scale (m): 0 1 2 3 4 5 6 7 8 9

well details

elevation (m): 181 180 179 178 177 176 175 174 173

undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane; 40 80 120 160

SPT N-values (bpf): dynamic cone; 10 20 30 40

headspace vapour (ppm): hexane, isobutylene, methane; 100 200 300

moisture / plasticity: PL MC LL; 10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT): GR SA SI CL

SS2: OCs

SS3: H-Ms, Metals, ORPs

**END OF BOREHOLE**

Unstabilized water level measured at 6.4 m below ground surface; caved to 7.0 m below ground surface upon completion of drilling.

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

# BOREHOLE LOG 106

**Date Started** : Jun 4, 2025
**Position** : E: 602172, N: 4817202 (UTM 17T)
**Elev. Datum** : Geodetic

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **182.3** | **GROUND SURFACE** | | | | |
| | 100mm **TOPSOIL** | | 1 | SS | 11 |
| | **FILL**, sandy silt, trace gravel, trace rootlets, organic odour, compact to loose, dark brown, moist | | | | |
| | ...at 0.8 m, silty sand | | 2 | SS | 8 |
| | ...at 1.5 m, sandy silt, some clay, dark grey | | 3 | SS | 14 |
| 180.0 / 2.3 | **SANDY SILT**, some clay, some gravel, trace rock fragments, trace rootlets, compact, brown, moist (HALTON TILL) | | 4 | SS | 19 |
| | ...at 3.0 m, very dense | | 5 | SS | 57 |
| 177.7 / 4.6 | **SAND**, some silt, very dense, grey, moist | | 6 | SS | 50 / 100mm |
| | ...at 6.1 m, silty, some clay, trace shale fragments | | 7 | SS | 50 / 75mm |
| 174.7 / 7.6 | **INFERRED BEDROCK**, shale fragments, wet (WEATHERED) | | 8 | SS | 50 / 100mm |
| 173.1 / 9.2 | | | 9 | SS | 50 / 25mm |

depth scale (m): 0 1 2 3 4 5 6 7 8 9

well details

elevation (m): 182 181 180 179 178 177 176 175 174

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene △ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS1: OCs

SS2: H-Ms, Metals, ORPs

SS3: BTEX, PAHs, PHCs, VOCs

13 26 41 20

**4.9m:** auger grinding

**6.1m:** spoon bouncing

**END OF BOREHOLE**

Unstabilized water level measured at 6.1 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 1.1 | 181.2 |
| Jul 9, 2025 | 1.2 | 181.1 |
| Jul 18, 2025 | 1.4 | 180.9 |
| Aug 8, 2025 | 1.8 | 180.5 |
| Sep 5, 2025 | 1.9 | 180.4 |
| Oct 3, 2025 | 2.1 | 180.2 |

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 3, 2025
**Position** : E: 602468, N: 4817301 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 107

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **180.3** | **GROUND SURFACE** | | | | |
| | 25mm **TOPSOIL** | | 1 | SS | 9 |
| | **FILL**, clayey silt, some sand, trace gravel, trace rootlets, firm, dark brown, moist | | | | |
| | ...at 0.8 m, sandy, soft, wet | | 2 | SS | 3 |
| 178.8 / 1.5 | **SAND AND SILT**, trace gravel, trace clay, very dense, brown, moist (HALTON TILL) | | 3 | SS | 58 |
| | | | 4 | SS | 50 / 150mm |
| | | | 5 | SS | 50 / 115mm |
| 175.7 / 4.6 | **SANDY SILT**, some clay, some gravel, trace shale fragments, very dense, reddish brown, moist (HALTON TILL) | | 6 | SS | 50 / 150mm |
| | ...at 6.1 m, some shale fragments, wet | | 7 | SS | 50 / 100mm |
| 172.6 / 7.7 | **END OF BOREHOLE** | | 8 | SS | 50 / 50mm |

solid stem augers OD=150 mm

depth scale (m): 0, 1, 2, 3, 4, 5, 6, 7

well details

elevation (m): 180, 179, 178, 177, 176, 175, 174, 173

undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane; 40, 80, 120, 160

SPT N-values (bpf): dynamic cone; 10, 20, 30, 40

headspace vapour (ppm): hexane, isobutylene, methane; 100, 200, 300

moisture / plasticity: PL, MC, LL; 10, 20, 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT): GR SA SI CL

SS2: OCs

SS3: H-Ms, Metals, ORPs

**5.5m:** auger grinding **to 6.1m**

**7.0m:** auger grinding **to 7.6m**

Water level and cave not measured upon completion of drilling.

**file:** 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**Date Started** : Jun 6, 2025
**Position** : E: 602381, N: 4817231 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 108

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **180.6** | **GROUND SURFACE** | | | | |
| 180.3 / 0.3 | 275mm **TOPSOIL** | | 1 | SS | 9 |
| | **SANDY SILT**, some clay, trace gravel, trace rootlets, loose, greyish brown, moist (REWORKED) | | 2A | SS | 23 |
| 179.6 / 1.0 | ...at 0.8 m, trace rock fragments, compact | | 2B | | |
| | **SAND AND SILT**, trace gravel, trace clay, trace rock fragments, compact, brown, moist (HALTON TILL) | | 3 | SS | 53 |
| | ...at 1.5 m, very dense | | 4 | SS | 50 / 125mm |
| | ...at 3.0 m, grey | | 5 | SS | 50 / 125mm |
| 176.0 / 4.6 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 6 | SS | 50 / 100mm |
| 174.5 / 6.1 | ...at 6.1 m, wet | | 7 | SS | 50 / 25mm |

depth scale (m) 0 1 2 3 4 5 6

well details

elevation (m) 180 179 178 177 176 175

undrained shear strength (kPa) ■ unconfined ● pocket penetrometer + field vane ○ Lab Vane — 40 80 120 160

SPT N-values (bpf) × dynamic cone — 10 20 30 40

headspace vapour (ppm) × hexane □ isobutylene △ methane — 100 200 300

moisture / plasticity — PL MC LL — 10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT) GR SA SI CL

2B: H-Ms, Metals, ORPs

SS3: OCs

▽ **5.5m:** auger grinding

**END OF BOREHOLE**

Unstabilized water level measured at 5.5 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 0.6 | 180.0 |
| Jul 18, 2025 | 1.4 | 179.2 |
| Aug 8, 2025 | 2.0 | 178.6 |
| Sep 5, 2025 | 2.5 | 178.1 |
| Oct 3, 2025 | 2.6 | 178.0 |

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**Date Started** : Jun 27, 2025
**Position** : E: 602381, N: 4817231 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 108S

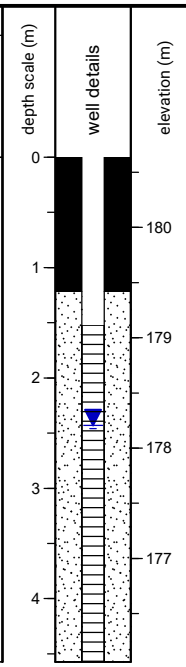
**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

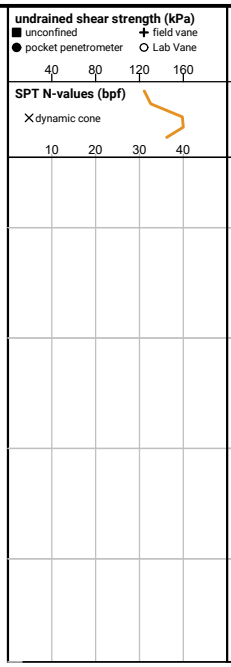
drill method : CME TRACK

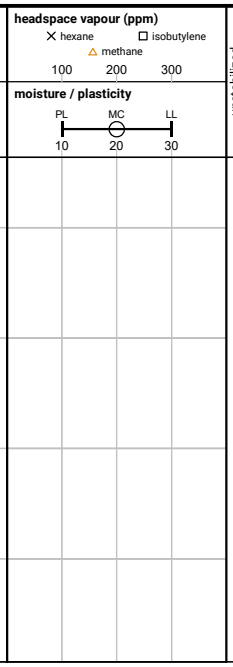
| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **180.6** | **GROUND SURFACE** | | | | |
| 180.3 / 0.3 | Straight drilled<br>Refer to borehole 108 for stratigraphy | | | | |
| 179.6 / 1.0 | | | | | |
| 176.0 / 4.6 | **END OF BOREHOLE** | | | | |

hollow stem augers OD=215 mm

Dry and open upon completion of drilling.




unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jul 9, 2025 | 1.3 | 179.3 |
| Jul 18, 2025 | 1.4 | 179.2 |
| Aug 8, 2025 | 2.0 | 178.6 |
| Sep 5, 2025 | 2.5 | 178.1 |
| Oct 3, 2025 | 2.4 | 178.2 |

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 9, 2025
**Position** : E: 602268, N: 4817089 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 109

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

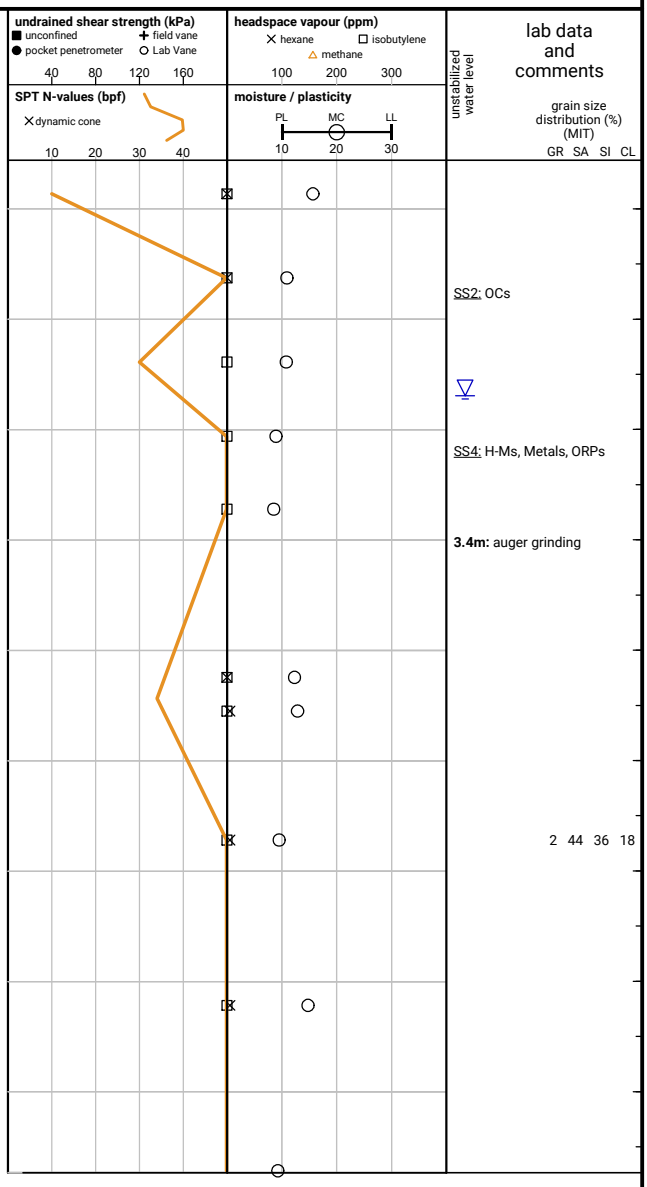
drill method : CME TRACK

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **182.4** | **GROUND SURFACE** | | | | |
| | 25mm **TOPSOIL** | | 1 | SS | 10 |
| 181.6 / 0.8 | **FILL**, sandy silt, some clay, trace gravel, trace rootlets, compact, brown, moist | | | | |
| | **SANDY SILT**, some clay, trace gravel, trace rock fragments, cobbles (inferred), dense, brown, moist (REWORKED) | | 2 | SS | 60 |
| | | | 3 | SS | 30 |
| 180.1 / 2.3 | **SANDY SILT**, trace clay, trace gravel, trace rock fragments, cobbles (inferred), dense, brown, moist (HALTON TILL) | | 4 | SS | 89 / 275mm |
| | ...at 3.0 m, some clay, very dense | | 5 | SS | 50 / 75mm |
| 177.8 / 4.6 | **SAND**, some silt, trace gravel, dense, grey, wet | | 6A / 6B | SS | 34 |
| | ...at 4.8 m, some gravel, cobbles (inferred) | | | | |
| | ...at 6.1 m, sand and silt, some shale fragments, some clay, trace gravel, very dense | | 7 | SS | 50 / 125mm |
| 174.8 / 7.6 | **INFERRED BEDROCK**, shale fragments, wet (WEATHERED) | | 8 | SS | 50 / 75mm |
| 173.2 / 9.2 | ...at 9.1 m, moist | | 9 | SS | 50 / 25mm |

solid stem augers OD=150 mm

**END OF BOREHOLE**

Unstabilized water level measured at 2.1 m below ground surface; caved to 4.3 m below ground surface upon completion of drilling.




**file:** 25-069 gint.gpj



**Tech** : EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 5, 2025
**Position** : E: 602602, N: 4817203 (UTM 17T)
**Elev. Datum** : Geodetic

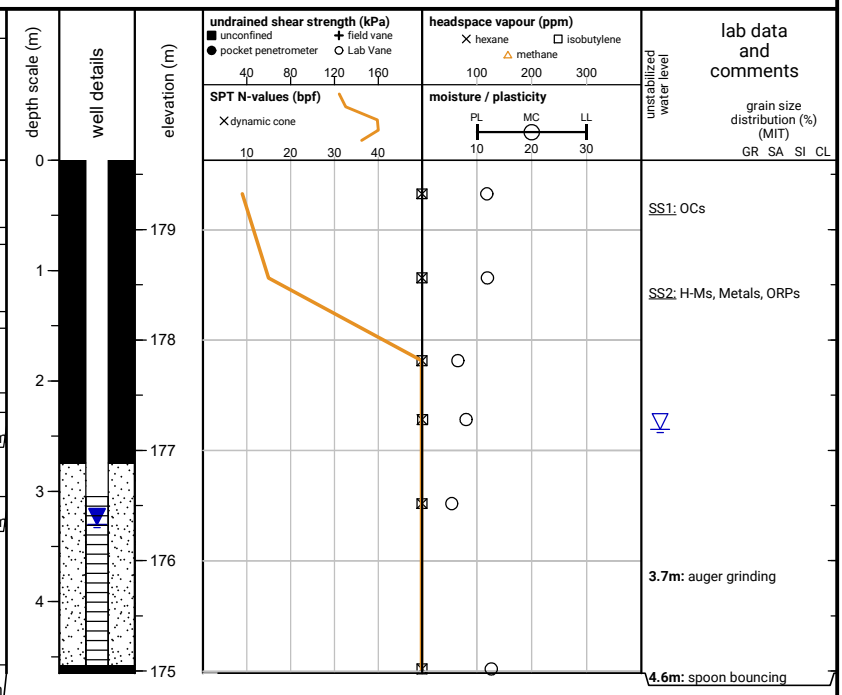
# BOREHOLE LOG 110

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **179.6** | **GROUND SURFACE** | | | | |
| 179.4 | 200mm **TOPSOIL** | | | | |
| 0.2 | **SANDY SILT**, some clay, trace gravel, trace rootlets, loose to compact, brown, moist (REWORKED) | | 1 | SS | 9 |
| | | | 2 | SS | 15 |
| 178.1 | | | | | |
| 1.5 | **SILT AND SAND**, trace gravel, trace clay, very dense, brown with orange, moist (HALTON TILL) | | 3 | SS | 64 |
| | ...at 2.3 m, trace rock fragments, cobbles (inferred) | | 4 | SS | 50 / 125mm |
| 176.6 | | | | | |
| 3.0 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 5 | SS | 50 / 125mm |
| 175.0 | | | | | |
| 4.6 | ...at 4.6 m, wet | | 6 | SS | 50 / 75mm |




**END OF BOREHOLE**

Unstabilized water level measured at 2.4 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 0.9 | 178.7 |
| Jul 18, 2025 | 1.9 | 177.7 |
| Aug 8, 2025 | 2.6 | 177.0 |
| Sep 5, 2025 | 3.1 | 176.5 |
| Oct 3, 2025 | 3.3 | 176.3 |

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 5, 2025
**Position** : E: 602508, N: 4817128 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 111

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev depth (m) | description | graphic log | samples: number | samples: type | samples: SPT N-value |
|---|---|---|---|---|---|
| **181.7** | **GROUND SURFACE** | | | | |
| 181.4 / 0.3 | 300mm **TOPSOIL** | | 1 | SS | 12 |
| 180.9 / 0.8 | **SANDY SILT**, some clay, trace gravel, trace rootlets, compact, brown, moist (REWORKED) | | | | |
| | **SILT**, some sand, trace clay, trace gravel, compact, greyish brown, moist | | 2 | SS | 20 |
| | ...at 1.5 m, trace rock fragments, dense | | 3A | SS | 37 |
| | ...at 1.8 m, sandy silt, brown, grey | | 3B | | |
| | ...at 2.3 m, sand and silt, very dense, moist | | 4 | SS | 50 / 125mm |
| | ...at 3.0 m, grey | | 5 | SS | 50 / 125mm |
| | | | 6 | SS | 50 / 125mm |
| | ...at 6.1 m, clayey with shale fragments, reddish brown, wet | | 7 | SS | 50 / 25mm |
| 174.1 / 7.6 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 8 | SS | 50 / 25mm |
| 172.5 / 9.2 | **END OF BOREHOLE** | | 9 | SS | 50 / 25mm |

solid stem augers OD=150 mm

depth scale (m): 0 1 2 3 4 5 6 7 8 9

well details

elevation (m): 181 180 179 178 177 176 175 174 173

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene △ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS2: OCs

5 50 39 6

SS4: H-Ms, Metals, ORPs

**5.8m:** auger grinding

Unstabilized water level measured at 2.4 m below ground surface; caved to 4.9 m below ground surface upon completion of drilling.

**file:** 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**GROUNDED ENGINEERING**

**Date Started** : Jun 6, 2025
**Position** : E: 602362, N: 4817017 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 112

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **185.0** | **GROUND SURFACE** | | | | |
| 184.7 / 0.3 | 50mm **ASPHALT**<br>250mm **TOPSOIL** | | 1 | SS | 17 |
| | **SANDY SILT**, some clay, trace gravel, trace rootlets until 0.9m, compact, brown, moist (REWORKED) | | 2 | SS | 18 |
| 183.2 / 1.8 | **SANDY SILT**, some clay, trace gravel, very dense, brown, moist (HALTON TILL)<br>...at 2.3 m, trace rock fragments, cobbles (inferred) | | 3 | SS | 26 |
| | | | 4 | SS | 54 |
| | ...at 3.0 m, silt and sand | | 5 | SS | 93 / 275mm |
| | ...at 4.6 m, sand and silt, brown with orange, wet | | 6 | SS | 50 / 100mm |
| | ...at 6.1 m, grey | | 7 | SS | 50 / 75mm |
| | | | 8 | SS | 50 / 75mm |
| 175.8 / 9.2 | ...at 9.1 m, clayey with shale fragments | | 9 | SS | 50 / 50mm |

depth scale (m): 0 1 2 3 4 5 6 7 8 9

well details

elevation (m): 184 183 182 181 180 179 178 177 176

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene
△ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS2: H-Ms, Metals, ORPs, PAHs

SS3: BTEX, PHCs

SS4: PAHs

**3.0m:** auger grinding, added water

SS5: BTEX, H-Ms, Metals, ORPs, PHCs

**5.2m:** auger grinding

5 46 45 4

**END OF BOREHOLE**

Water level and cave not measured upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 2.5 | 182.5 |
| Jun 17, 2025 | 3.3 | 181.7 |
| Jul 18, 2025 | 3.2 | 181.8 |
| Aug 8, 2025 | 3.6 | 181.4 |
| Sep 5, 2025 | 4.1 | 180.9 |
| Oct 3, 2025 | 4.4 | 180.6 |

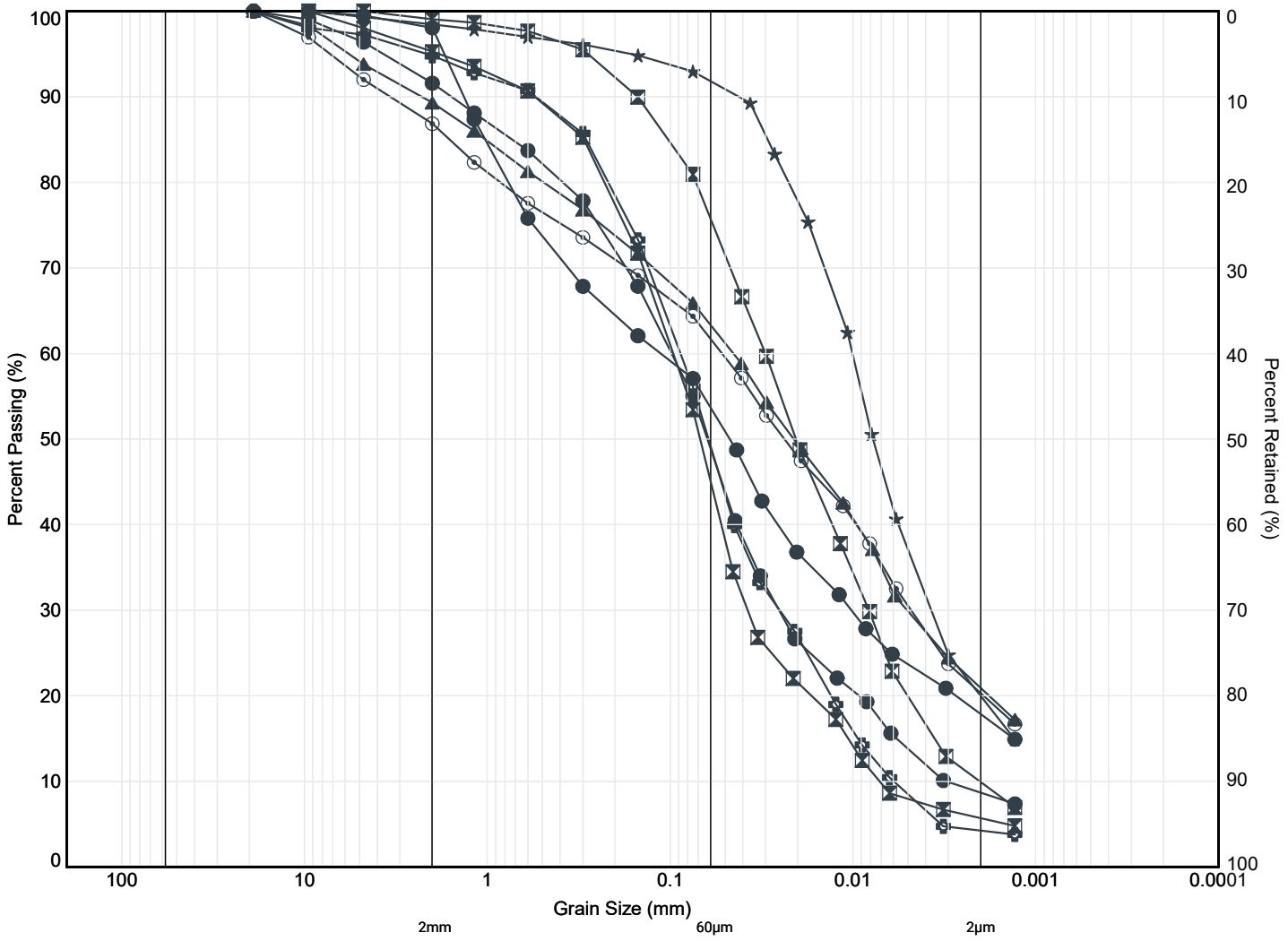
file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

# APPENDIX B






| MIT SYSTEM | COBBLES | GRAVEL | | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|---|---|---|
| | | COARSE | MEDIUM | FINE | COARSE | MEDIUM | FINE | | |

MIT SYSTEM

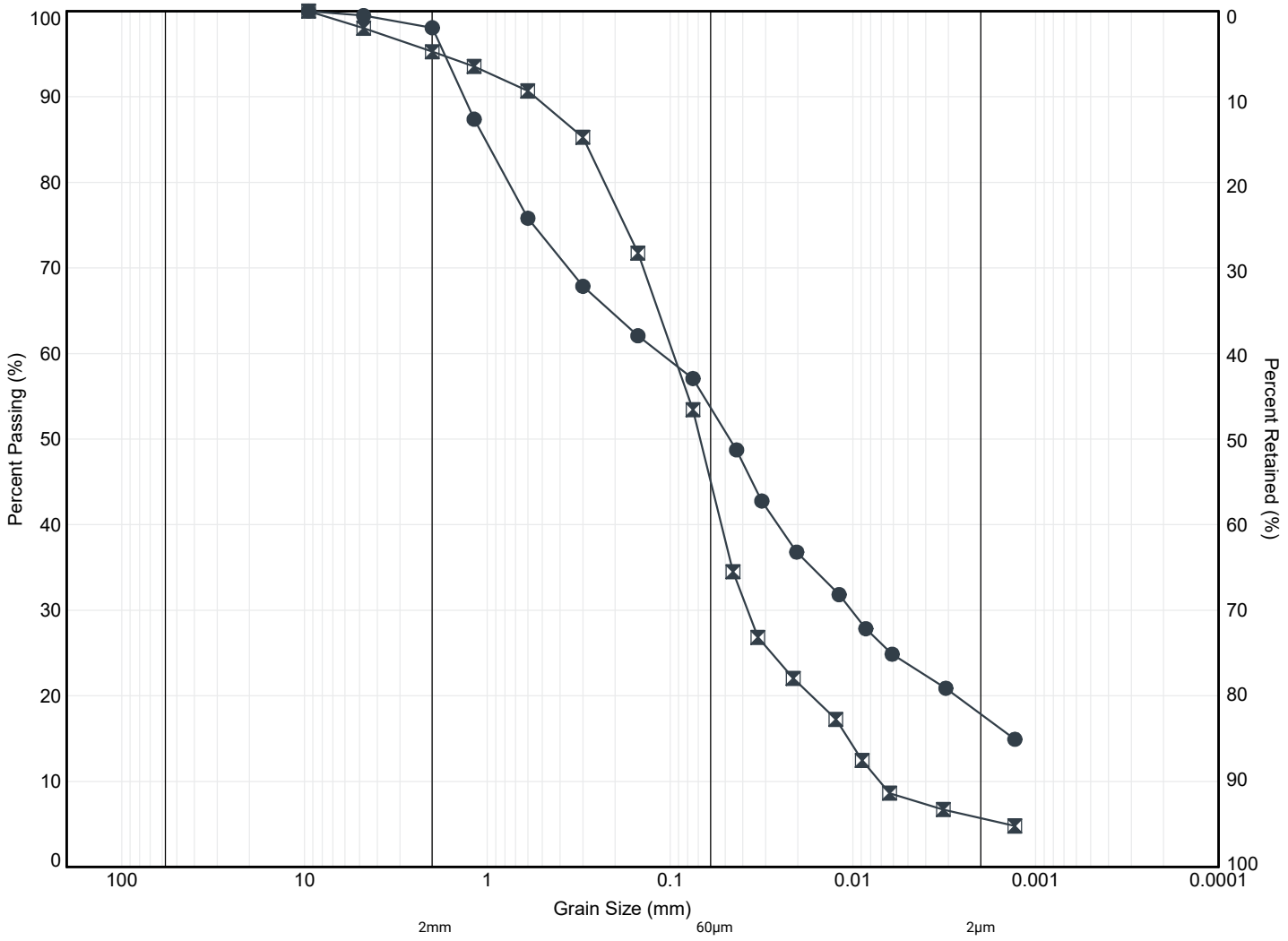
| | Location | Sample | Depth (m) | Elev. (m) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|---|
| ● | **BH 101** | SS6 | 4.7 | 175.4 | 8 | 43 | 40 | 9 |
| ⊠ | **BH 102** | SS7 | 6.2 | 176.3 | 1 | 23 | 66 | 10 |
| ▲ | **BH 103** | 4A | 2.4 | 181.1 | 11 | 26 | 42 | 21 |
| ★ | **BH 104** | 7B | 6.5 | 178.1 | 2 | 6 | 72 | 20 |
| ⊙ | **BH 106** | SS5 | 3.3 | 179.0 | 13 | 26 | 41 | 20 |
| ✿ | **BH 112** | SS8 | 7.7 | 177.2 | 5 | 46 | 45 | 4 |

GROUNDED ENGINEERING

Title: **GRAIN SIZE DISTRIBUTION HALTON TILL**

File No.: **25-069**

file: 25-069 gint.gpj




| MIT SYSTEM | COBBLES | GRAVEL | | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|---|---|---|
| | | COARSE | MEDIUM | FINE | COARSE | MEDIUM | FINE | | |

MIT SYSTEM

| | Location | Sample | Depth (m) | Elev. (m) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|---|
| ● | **BH 109** | SS7 | 6.2 | 176.3 | 2 | 44 | 36 | 18 |
| ⊠ | **BH 111** | SS4 | 2.4 | 179.3 | 5 | 50 | 39 | 6 |

GROUNDED ENGINEERING

Title: **GRAIN SIZE DISTRIBUTION SANDS AND SILTS**

File No.: **25-069**

file: 25-069 gint.gpj

# APPENDIX C



# CORROSIVITY (SGS)

| | |
|---|---|
| **Report No.** | **CA40092-JUN25** |
| **Customer** | **Grounded Engineering Inc.** |
| **Attention** | **Kristen Shaver** |
| **Reference** | **25-069, Kristen Shaver** |
| **Works#** | |
| **Title** | **Final Report** |

| **Sample ID** | | Analysis Start Date | Analysis Start Time | Analysis Completed Date | Analysis Completed Time | BH101 SS3 | BH106 SS3 | BH111 SS5 |
|---|---|---|---|---|---|---|---|---|
| **Sample Date / Time** | | | | | | 02-Jun-25 18:00 | 04-Jun-25 12:30 | 05-Jun-25 15:00 |
| **Analysis** | **Units** | | | | | | | |
| Sample Date & Time | | | | | | June 2, 2025 | June 4, 2025 | June 5, 2025 |
| Corrosivity Index | none | 12-Jun-25 | 13:54 | 12-Jun-25 | 13:54 | 4 | 4 | 4 |
| pH | pH Units | 10-Jun-25 | 08:24 | 11-Jun-25 | 08:46 | 8.75 | 8.52 | 8.74 |
| Soil Redox Potential | mV | 10-Jun-25 | 15:30 | 11-Jun-25 | 08:47 | 308.0 | 303.0 | 298.0 |
| Sulphide (Na2CO3) | % | 11-Jun-25 | 13:18 | 11-Jun-25 | 13:51 | 0.01 | < 0.01 | 0.01 |
| Moisture Index | N/A | 10-Jun-25 | 15:30 | 11-Jun-25 | 08:47 | 1 | 1.0 | 1 |
| Chloride | µg/g | 12-Jun-25 | 11:06 | 13-Jun-25 | 14:02 | 17 | 48.0 | 2.2 |
| Sulphate | µg/g | 12-Jun-25 | 11:06 | 13-Jun-25 | 14:02 | 23 | 79 | 24 |
| Conductivity | uS/cm | 10-Jun-25 | 08:24 | 11-Jun-25 | 08:46 | 139 | 237 | 108 |
| Resistivity (calculated) | ohms.cm | 45818 | 45821.4 | 45819 | 45821.3653 | 7190 | 4220 | 9260 |

## INTERPRETATION

| **AWWA C-105 Standard** | **Points** | **Points** | **Points** |
|---|---|---|---|
| **% Moisture** | **2** | **2** | **2** |
| **pH** | | | |
| Is pH bet 6.5-7.5 ? | NO | NO | NO |
| Is Redox Potential < 100 mv? | NO | NO | NO |
| Are Sulphides present ? | YES | NO | YES |
| If above three conditions are met, pH is assigned 3 points | | | |
| **pH - Score** | **3** | **3** | **3** |
| **Redox Potential** | **0** | **0** | **0** |
| **Resistivity** | **0** | **0** | **0** |
| **Acid Volatile Sulphides** | **0** | **0** | **0** |
| **TOTAL SCORE (AWWA C-105)** | **5** | **5** | **5** |

| **Sample** | **BH101 SS3** | **BH106 SS3** | **BH111 SS5** |
|---|---|---|---|
| **Corrosion Protection Recommended?** | **No** | **No** | **No** |
| **Sulphate** % | 0.002% | 0.005% | 0.000% |
| **CLASS OF EXPOSURE** | **Negligible** | **Negligible** | **Negligible** |





# FINAL REPORT

## CA40092-JUN25 R1

**25-069, 340 Bumhamthorpe Rd. E. Oakville**

Prepared for

Grounded Engineering Inc.

# FINAL REPORT



## First Page

CLIENT DETAILS

| | |
|---|---|
| Client | Grounded Engineering Inc. |
| Address | 49 Mobile Drive<br>Toronto, Ontario<br>M4A 1H5. Canada |
| Contact | Kristen Shaver |
| Telephone | |
| Facsimile | |
| Email | kshaver@groundedeng.ca |
| Project | 25-069, 340 Bumhamthorpe Rd. E. Oakville |
| Order Number | |
| Samples | Soil (3) |

LABORATORY DETAILS

| | |
|---|---|
| Project Specialist | Maarit Wolfe, Hon.B.Sc |
| Laboratory | SGS Canada Inc. |
| Address | 185 Concession St., Lakefield ON, K0L 2H0 |
| Telephone | 705-652-2000 |
| Facsimile | 705-652-6365 |
| Email | Maarit.Wolfe@sgs.com |
| SGS Reference | CA40092-JUN25 |
| Received | 06/09/2025 |
| Approved | 06/13/2025 |
| Report Number | CA40092-JUN25 R1 |
| Date Reported | 06/13/2025 |

COMMENTS

Temperature of Sample upon Receipt: 4 degrees C
Cooling Agent Present: yes
Custody Seal Present: yes

Chain of Custody Number: 042794

Corrosivity Index is based on the American Water Works Corrosivity Scale according to AWWA C-105. An index greater than 10 indicates the soil matrix may be corrosive to cast iron alloys.

SIGNATORIES

Maarit Wolfe, Hon.B.Sc



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Annexes..... 8

# FINAL REPORT

CA40092-JUN25 R1

**Client:** Grounded Engineering Inc.
**Project:** 25-069, 340 Bumhamthorpe Rd. E. Oakville
**Project Manager:** Kristen Shaver
**Samplers:** Elizabeth Beard

MATRIX: SOIL

| | | | |
|---|---|---|---|
| **Sample Number** | 5 | 6 | 7 |
| **Sample Name** | BH101 SS3 | BH106 SS3 | BH111 SS5 |
| **Sample Matrix** | Soil | Soil | Soil |
| **Sample Date** | 02/06/2025 | 04/06/2025 | 05/06/2025 |

| Parameter | Units | RL | | Result | Result | Result |
|---|---|---|---|---|---|---|
| **Corrosivity Index** | | | | | | |
| Corrosivity Index | none | 1 | | 4 | 4 | 4 |
| pH | pH Units | 0.05 | | 8.75 | 8.52 | 8.74 |
| Soil Redox Potential | mV | no | | 308 | 303 | 298 |
| Sulphide (Na2CO3) | % | 0.01 | | 0.01 | < 0.01 | 0.01 |
| Resistivity (calculated) | ohms.cm | -9999 | | 7190 | 4220 | 9260 |
| **General Chemistry** | | | | | | |
| Conductivity | uS/cm | 2 | | 139 | 237 | 108 |
| **Metals and Inorganics** | | | | | | |
| Sulphate | µg/g | 0.4 | | 23 | 79 | 24 |
| **Other (ORP)** | | | | | | |
| Chloride | µg/g | 0.4 | | 17 | 48 | 2.2 |

## HOLDING TIME SUMMARY

| Sample Name | QC Batch Reference | Sample Number | Sampled | Received | Extracted/ Prepared | Analysed | Holding Time | Approved |
|---|---|---|---|---|---|---|---|---|
| **Method: Calculation \|** | | | | | | | | |
| BH101 SS3 | | 5 | 06/02/2025 | 06/09/2025 | 06/12/2025 | 06/12/2025 | | 06/12/2025 |
| BH106 SS3 | | 6 | 06/04/2025 | 06/09/2025 | 06/12/2025 | 06/12/2025 | | 06/12/2025 |
| BH111 SS5 | EWL0242-JUN25 | 7 | 06/05/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 † | 06/09/2025 | 06/11/2025 |
| **Anions by IC** | | | | | | | | |
| **Method: EPA300/MA300-Ions1.3 \| Internal ref.: ME-CA-[ENV]IC-LAK-AN-001** | | | | | | | | |
| BH101 SS3 | DIO0285-JUN25 | 5 | 06/02/2025 | 06/09/2025 | 06/12/2025 | 06/12/2025 | 07/02/2025 | 06/13/2025 |
| BH106 SS3 | DIO0285-JUN25 | 6 | 06/04/2025 | 06/09/2025 | 06/12/2025 | 06/12/2025 | 07/02/2025 | 06/13/2025 |
| BH111 SS5 | DIO0285-JUN25 | 7 | 06/05/2025 | 06/09/2025 | 06/12/2025 | 06/12/2025 | 07/05/2025 | 06/13/2025 |
| **Carbon/Sulphur** | | | | | | | | |
| **Method: ASTM E1915-07A \| Internal ref.: ME-CA-[ENV]ARD-LAK-AN-020** | | | | | | | | |
| BH101 SS3 | ECS0032-JUN25 | 5 | 06/02/2025 | 06/09/2025 | 06/11/2025 | 06/11/2025 | 06/16/2025 | 06/11/2025 |
| BH106 SS3 | ECS0032-JUN25 | 6 | 06/04/2025 | 06/09/2025 | 06/11/2025 | 06/11/2025 | 06/18/2025 | 06/11/2025 |
| BH111 SS5 | ECS0032-JUN25 | 7 | 06/05/2025 | 06/09/2025 | 06/11/2025 | 06/11/2025 | 06/19/2025 | 06/11/2025 |
| **Conductivity** | | | | | | | | |
| **Method: SM 2510 \| Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006** | | | | | | | | |
| BH101 SS3 | EWL0222-JUN25 | 5 | 06/02/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 | 07/02/2025 | 06/11/2025 |
| BH106 SS3 | EWL0222-JUN25 | 6 | 06/04/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 | 07/04/2025 | 06/11/2025 |
| BH111 SS5 | EWL0222-JUN25 | 7 | 06/05/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 | 07/05/2025 | 06/11/2025 |
| **Inorganics-General** | | | | | | | | |
| **Method: N/A - Calculation \| Internal ref.: ME-CA-[ENV]EWL-LAK-AN-30** | | | | | | | | |
| BH101 SS3 | EWL0242-JUN25 | 5 | 06/02/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 | | 06/11/2025 |
| BH106 SS3 | EWL0242-JUN25 | 6 | 06/04/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 | | 06/11/2025 |
| BH111 SS5 | EWL0242-JUN25 | 7 | 06/05/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 | | 06/11/2025 |
| **pH** | | | | | | | | |
| **Method: SM 4500 \| Internal ref.: ME-CA-[ENV]EWL-LAK-AN-001** | | | | | | | | |
| BH101 SS3 | EWL0222-JUN25 | 5 | 06/02/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 † | 06/09/2025 | 06/11/2025 |
| BH106 SS3 | EWL0222-JUN25 | 6 | 06/04/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 | 06/11/2025 | 06/11/2025 |
| BH111 SS5 | EWL0222-JUN25 | 7 | 06/05/2025 | 06/09/2025 | 06/10/2025 | 06/10/2025 | 06/12/2025 | 06/11/2025 |

## QC SUMMARY

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Chloride | DIO0285-JUN25 | µg/g | 0.4 | <0.4 | 12 | 35 | 96 | 80 | 120 | 101 | 75 | 125 |
| Sulphate | DIO0285-JUN25 | µg/g | 0.4 | <0.4 | 35 | 35 | 99 | 80 | 120 | 104 | 75 | 125 |

### Carbon/Sulphur

Method: ASTM E1915-07A | Internal ref.: ME-CA-[ENV]ARD-LAK-AN-020

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Sulphide (Na2CO3) | ECS0032-JUN25 | % | 0.01 | < 0.01 | | | | | | | | |

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Conductivity | EWL0222-JUN25 | uS/cm | 2 | < 2 | 0 | 20 | 98 | 90 | 110 | NA | | |

## QC SUMMARY

### pH

Method: SM 4500 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-001

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| pH | EWL0222-JUN25 | pH Units | 0.05 | NA | 0 | | 100 | | | NA | | |

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

**Multielement Scan Qualifier**: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier**: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier**: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

## LEGEND

### FOOTNOTES

| | |
|---|---|
| **NSS** | Insufficient sample for analysis. |
| **RL** | Reporting Limit. |
| ↑ | Reporting limit raised. |
| ↓ | Reporting limit lowered. |
| **NA** | The sample was not analysed for this analyte |
| **ND** | Non Detect |

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.
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This report supersedes all previous versions.

-- End of Analytical Report --

# Request for Laboratory Services and CHAIN OF CUSTODY

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 042794 Page 1 of 1

**Laboratory Information Section - Lab use only**

Received By: Scott Ken
Received Date: 06/09/2025 (mm/dd/yy)
Received Time: 07:30 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☒ No ☐
Custody Seal Intact: Yes ☒ No ☐
Cooling Agent Present: Yes ☒ No ☐ Type: ice
Temperature Upon Receipt (°C) 4 ICE 3
LAB LIMS #: CA40922Jn25

| REPORT INFORMATION | INVOICE INFORMATION |
|---|---|
| Company: Grounded Engineering | ☒ (same as Report Information) |
| Contact: Kristen Shaver | Company: |
| Address: 49 Mobile Dr., Toronto ON, M4A 1H5 | Contact: |
| Phone: | Address: |
| Fax: | Phone: |
| Email: Kshaver@groundedeng.ca | Email: |

Quotation #: P.O. #:
Project #: 25-069 Site Location/ID: 340 Burnhamthorpe Rd. E. Oakville

**TURNAROUND TIME (TAT) REQUIRED**

☐ Client Regular TAT ☒ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

**RUSH TAT (Additional Charges May Apply):** ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
**PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION**

Specify Due Date:

*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

**REGULATIONS**

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____ Appx. _____
Soil Volume ☐ <350m3 ☐ >350m3

**Other Regulations:**
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☒ Other: Corrosivity suite
☐ MISA
☐ ODWS Not Reportable *See note

**Sewer By-Law:**
☐ Sanitary
☐ Storm
Municipality:

RECORD OF SITE CONDITION (RSC) ☒ YES ☐ NO

**ANALYSIS REQUESTED**

| | SAMPLE IDENTIFICATION | DATE SAMPLED | TIME SAMPLED | # OF BOTTLES | MATRIX | Field Filtered (Y/N) | M&I: Metals & Inorganics (incl CrVI, CN,Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na-water) | M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI | M&I: ICP Metals only (Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn | SVOC: PAHs only | SVOC: SVOCs (all incl PAHs, ABNs, CPs | PCB: PCBs Total ☐ Aroclor ☐ | PHC: F1-F4 + BTEX | PHC: F1-F4 only (no BTEX | VOC: VOCs (all incl BTEX | VOC: BTEX only | Pest: Pesticides (Organochlorine or specify other | Other: Corrosivity | Other: OCPs | Other | Other | Other | Sewer Use: Specify pkg: | Water Characterization Pkg: General ☐ Extended ☐ | SPLP: Specify tests ☐Metals ☐VOC ☐1,4-Dioxane ☐OCP ☐ABN | TCLP: Specify tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit. | COMMENTS: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BH101 SS3 | 06/02/25 | 18:00 | 1 | Soil | | | | | | | | | | | | | X | | | | | | | | |
| 2 | BH106 SS3 | 06/04/25 | 12:30 | 1 | ↓ | | | | | | | | | | | | | X | | | | | | | | |
| 3 | BH111 SS5 | 06/05/25 | 15:00 | 1 | ↓ | | | | | | | | | | | | | X | | | | | | | | |
| EB 4 | ~~BH108 SS3~~ | ~~06/06/25~~ | ~~17:30~~ | ~~1~~ | | | | | | | | | | | | | | ~~X~~ | | | | | | | | |
| 5 | ~~BH112~~ | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |

Observations/Comments/Special Instructions

**Sampled By (NAME):** Elizabeth Beard **Signature:** [signature] Date: 06/06/25 (mm/dd/yy)
**Relinquished by (NAME):** **Signature:** Date: ____/____/____ (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

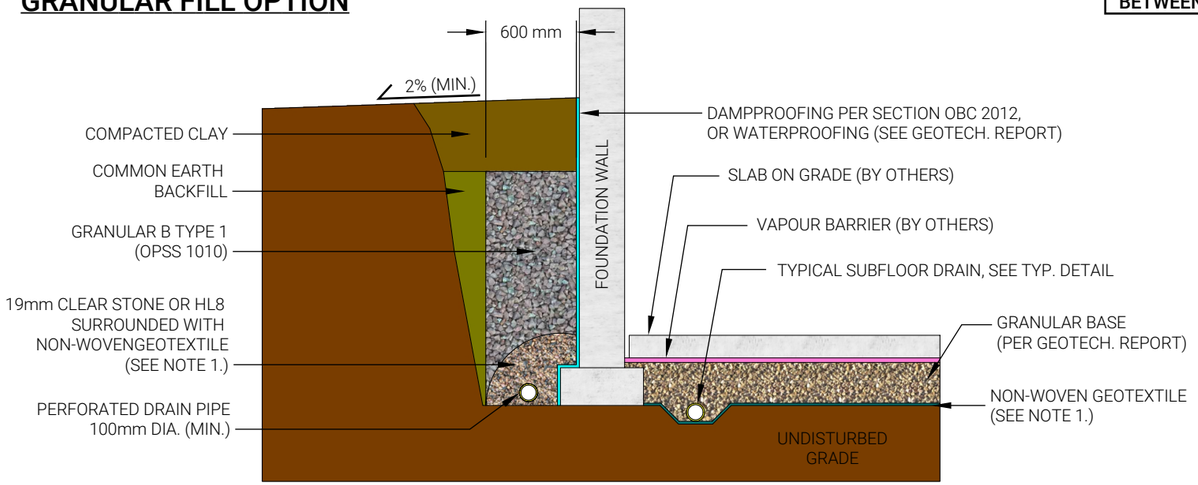


**Note:** Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

# APPENDIX D

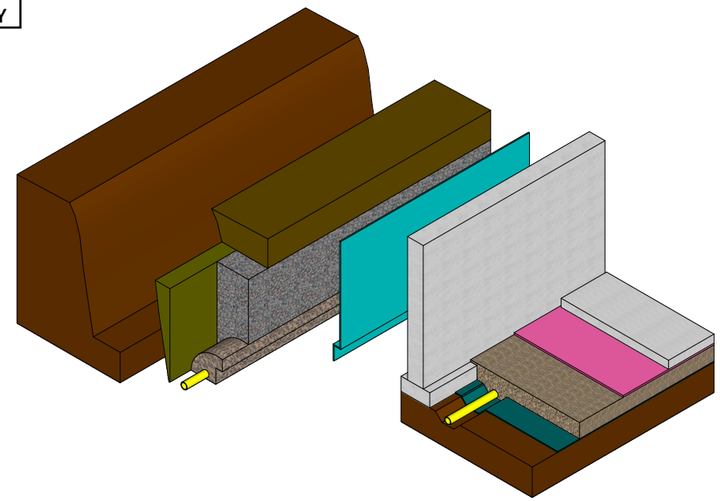


## GRANULAR FILL OPTION



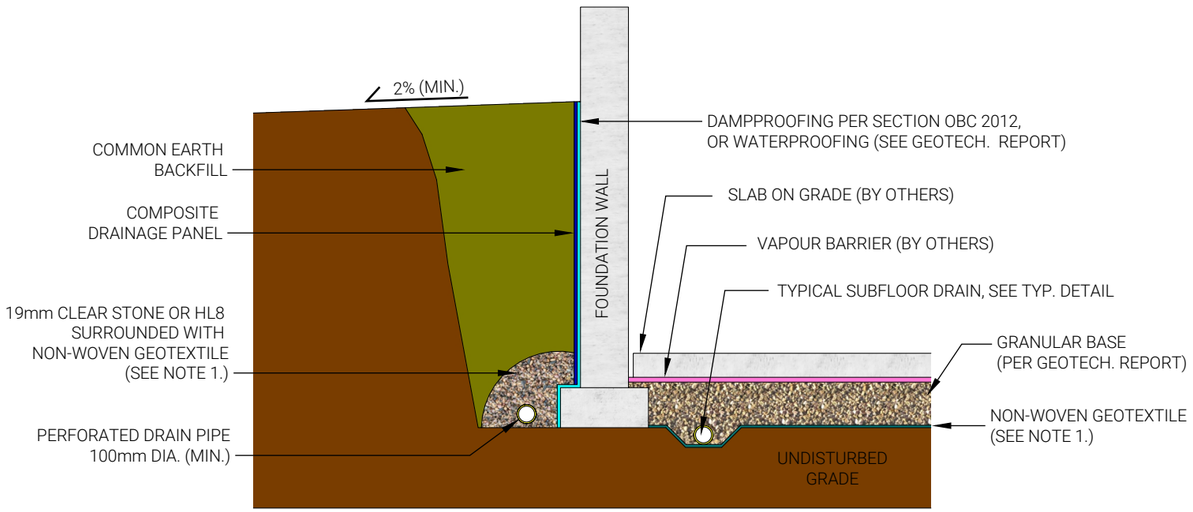

**SECTIONAL VIEW**

**OBJECTS ARE COLOR-CODED BETWEEN TWO VIEWS FOR CLARITY**

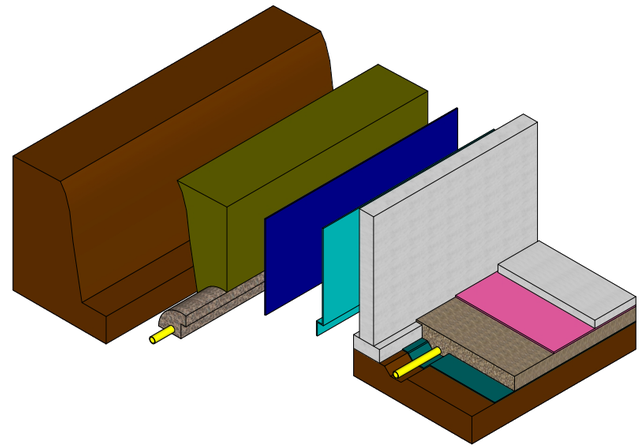


**ISOMETRIC VIEW**

## GEO-COMPOSITE DRAINAGE PANEL OPTION




**SECTIONAL VIEW**



**ISOMETRIC VIEW**

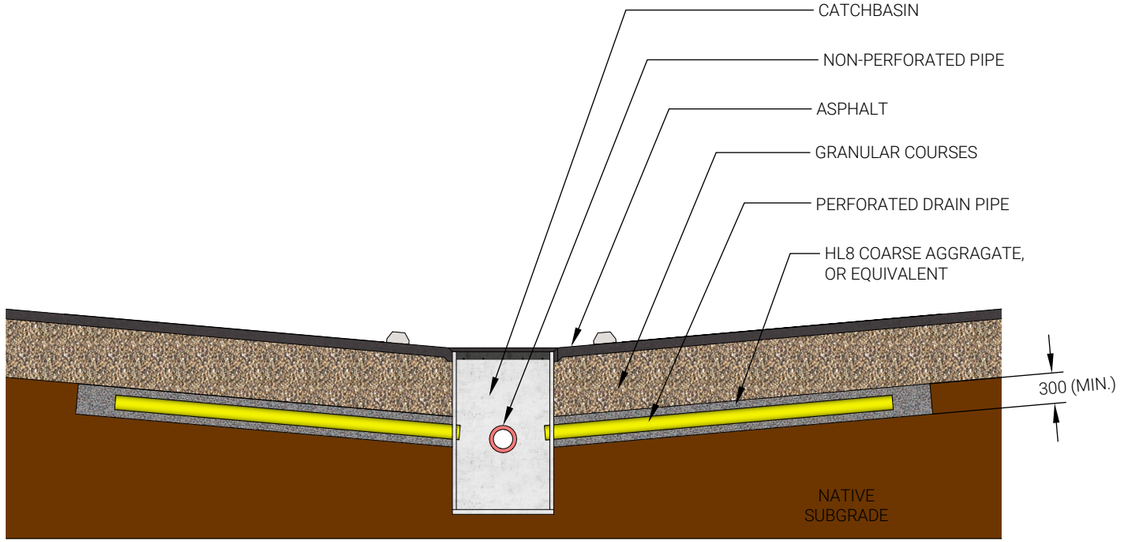
**NOTES**
1. A NON-WOVEN GEOTEXTILE WITH AN APPARENT OPENING SIZE OF < 0.250mm AND A TEAR RESISTANCE OF > 200 N.

GROUNDED ENGINEERING

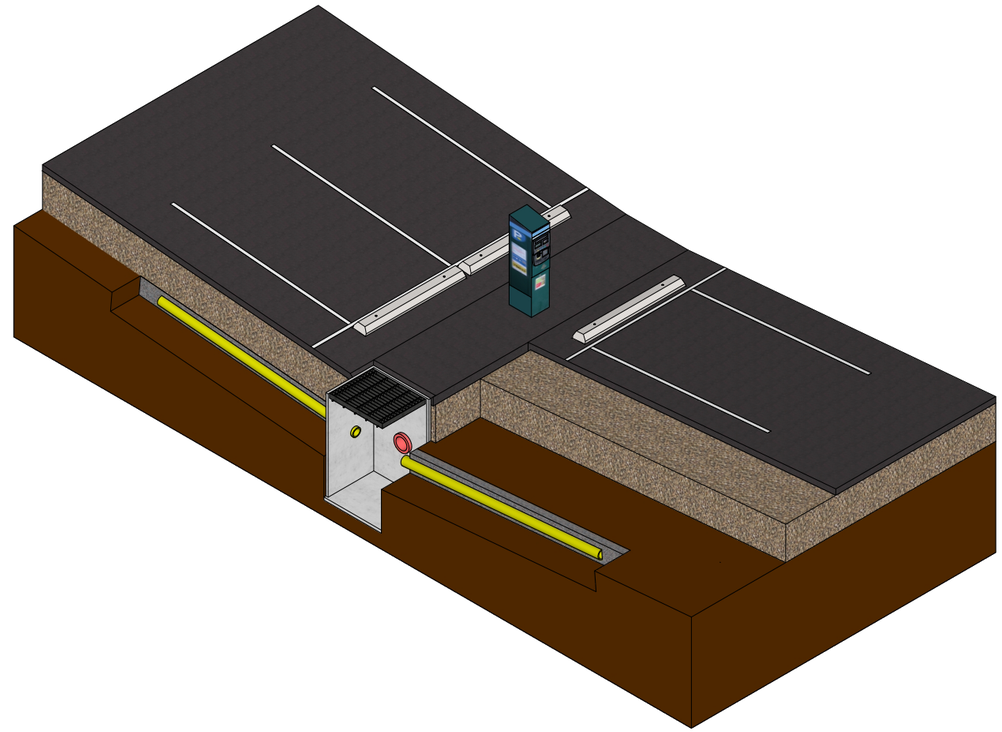
Title

# BASEMENT DRAINAGE TYPICAL DETAIL

**OBJECTS ARE COLOR-CODED BETWEEN TWO VIEWS FOR CLARITY**




**SECTIONAL VIEW**

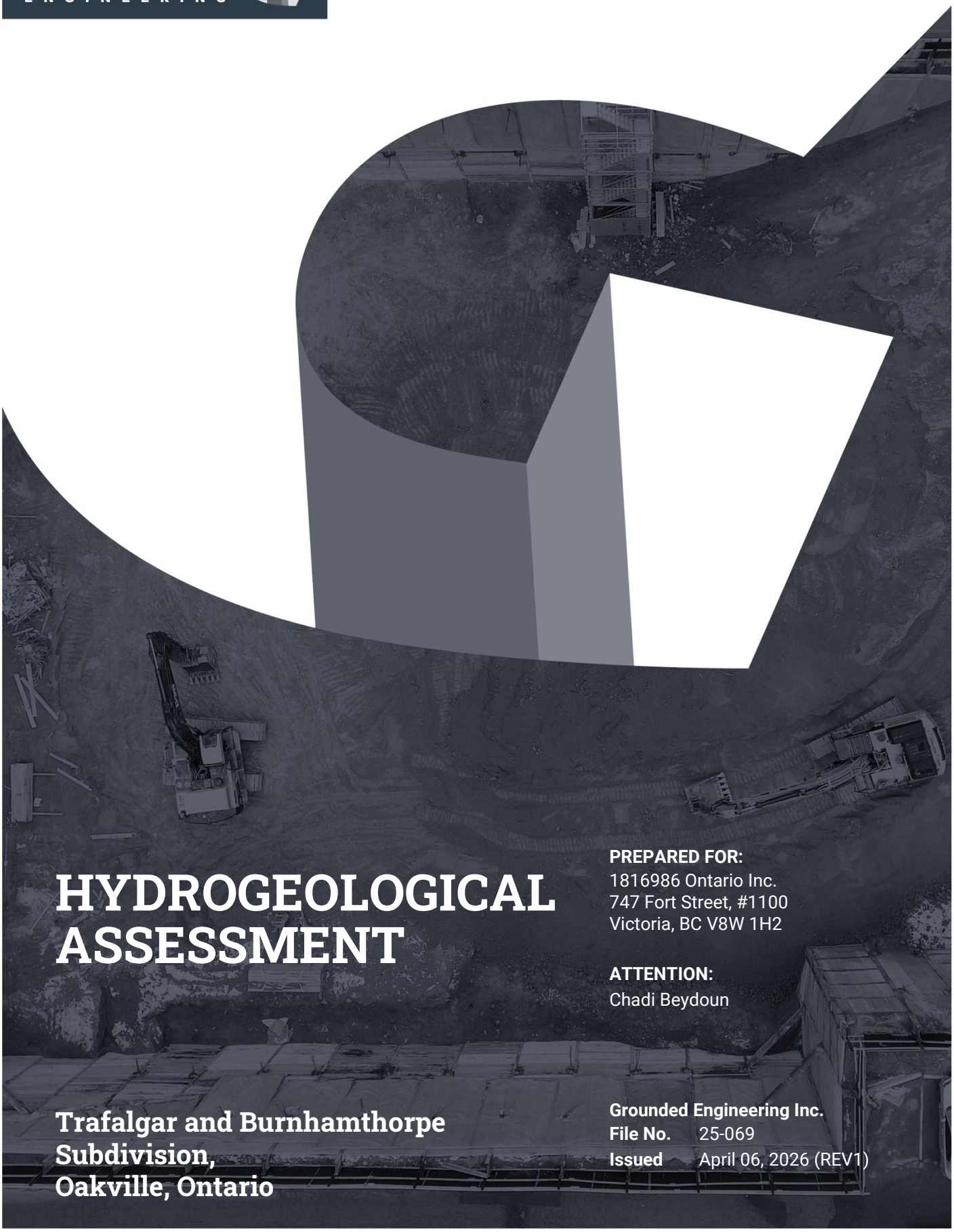


**ISOMETRIC**

GROUNDED ENGINEERING

Title

# LONGITUDINAL SUBDRAIN CONNECTION TO CATCHBASIN



# HYDROGEOLOGICAL ASSESSMENT

**PREPARED FOR:**
1816986 Ontario Inc.
747 Fort Street, #1100
Victoria, BC V8W 1H2

**ATTENTION:**
Chadi Beydoun

## Trafalgar and Burnhamthorpe Subdivision, Oakville, Ontario

**Grounded Engineering Inc.**
**File No.** 25-069
**Issued** April 06, 2026 (REV1)

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Appendix B – Source Water Protection Plan/ Watershed Mapping
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Appendix D – Climate Data
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Appendix I – Aquifer Response Tests
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# Executive Summary

This executive summary is intended to provide a general overview of the following hydrogeological assessment report. It cannot be relied upon on its own, as the entire hydrogeological report must be reviewed for the presented data, results, and engineering recommendations relevant to the proposed development. This executive summary is subject to limitations included in Section 6 of this report

The proposed development includes constructing a new mixed-use subdivision separated into various building blocks (1 to 15), comprised of mid-rise to high-rise residential and/or commercial buildings ranging in height from 4 to 30-storeys, with podium heights ranging from 1 to 8-storeys. Each block will have underground parking levels ranging from 4 to 10 m depth (P1 to P3) as well as some on-grade structures. The proposed development also includes two public parks (Blocks 14 and 15) and is designed to provide appropriate connections to a planned school site (Block 13).

The subsurface conditions generally consist of surficial materials (topsoil, pavements, etc.) and existing earth fills overlying native, undisturbed Halton Till and/or sands and silts, which are underlain by shale bedrock (Queenston Formation). The groundwater table varies across the site but is generally observed at depths of 0.6 to 2.5± m below existing site grades.

The design hydraulic conductivity of the overburden soils ranges from about 1.0 $x10^{-5}$ m/s to 1.3 $x10^{-6}$ m/s, while the hydraulic conductivity of the underlying bedrock is taken as 3.0 x $10^{-6}$ m/s.

A groundwater sample taken from a monitoring well at the site **met** the criteria for The Region of Halton's Sanitary and Combined Sewer limits but **exceeded** the criteria for the Town of Oakville Storm Sewer limits. As such treatment of groundwater discharged to the Town of Oakville Storm Sewers will be required.

Overburden soils must be positively dewatered to a minimum of 1.2 m below proposed founding elevations prior to excavation to preserve the integrity of the native soils. Positive dewatering of the bedrock is not required, and seepage from the bedrock can be managed with sumps and pumps (in addition to the dewatering system for the overburden soils).

Estimated short term dewatering volumes (groundwater and rainfall) using a factor of safety (F.O.S.) of 3.0 range from about 341,000 to 2,064,000 L/day for Blocks 1 to 12. The total preliminary long term dewatering volumes (groundwater and infiltration) using an F.O.S. of 3.0 ranges from 265,000 to 1,526,000 L/day for Blocks 1 to 12. The zone of influence (ZOI) due to dewatering ranges from 8 to 83 m in the short term and 2 to 71 m in the long term, resulting in the maximum settlement of adjacent structures within the ZOI of <1 to 7 mm due to dewatering activities. The impact on adjacent structures due to dewatering Grounded considers within acceptable limits.

| Regulatory Requirements | |
|---|---|
| Environmental Activity and Sector Registry (EASR) Posting | Required |
| Short Term Permit to Take Water (PTTW) | Not Required* |
| Long Term Permit to Take Water (PTTW) | Required** |
| Short Term Discharge Agreement Region of Halton/Oakville | Required |
| Long Term Discharge Agreement Region of Halton/Oakville | Required |

**Per amendments to O.Reg. 63/16 effective July 1st, 2025, a short term PTTW will no longer be required for construction dewatering above 400,000 L/day. An EASR will still be required.*

***Per amendments to Ontario Regulation 387/04 effective July 1st, 2025, low-risk foundation drainage systems used primarily for residential purposes that take less than 379,000 litres of groundwater per day are exempted from requiring environmental permissions, exempt from requiring a PTTW, and exempt from needing to self-register online.* ***Therefore, a Long Term PTTW is not required for Blocks 3, 9, 10, 11 and 12.***

Additional boreholes and monitoring wells are required for general site coverage and for a more refined dewatering analysis of particular blocks of development at the detailed design stage. The above estimated volumes are considered preliminary, based on limited design information and assumed soil and groundwater conditions in areas where boreholes and monitoring wells are not currently present.

# 1 Introduction

## 1.1 Background

1816986 Ontario Inc. retained Grounded Engineering Inc., to complete a preliminary Hydrogeological Assessment for the property located on the lands known municipally as 340 Burnhamthorpe Road East and 3437 Trafalgar Road, or "Trafalgar and Burnhamthrope Subdivision" (the Property). The Site is located in North Oakville, near the Town's border with Milton, at the intersection of Burnhamthorpe Road East and Trafalgar Road, on the south-east corner. The Subject Site, which is comprised of 2 properties, has a total area of approximately 20.2 hectares (49.9 acres), with approximately 537 metres of frontage along Burnhamthorpe Road East and 374 metres along Trafalgar Road. The site location is presented in Figure 1.

The Proposed Development will redevelop the mostly-vacant Site into a mixed-use, transit-supportive development. The Proposed Development includes 34 mixed-use and residential buildings across 12 development blocks; A new street network, inclusive of public and private streets (Streets A, B, C, Main Street, Settlers Road, and private access lanes); Access to the Site from Trafalgar Road and Burnhamthorpe Road West; 0.5 hectares of parks and open space; and, Public realm improvements throughout the Proposed Development.

The Proposed Development will deliver a total gross floor area (GFA) of 607,135 $m^2$ of new development, comprised of 592,660 $m^2$ of residential and 14,475 $m^2$ of non-residential usage. Within the majority of each of the blocks, the development will generally consist of mixed-use and/or commercial mid-rise to high-rise buildings with 1-3 levels of underground parking.

The hydrogeological assessment was undertaken to evaluate hydrogeological conditions of the proposed development on the Property and to develop a plan to manage risk of potential impacts associated with activities related to the proposed land use during both construction, and in the permanent condition.

Grounded has been provided with the following reports and drawings to assist in our scope of work:

- Site survey, prepared by JD Barnes (Feb. 11, 2025).
- Architectural Drawings, "Draft Trafalgar & Burnhamthorpe"; Project No. 24064, dated 2026-04-06, prepared by BDP. Quadrangle.
- Functional Servicing Report, OPA/ZBA Draft Plan of Subdivision; Project No. 1767, dated April 6, 2026, prepared by Trafalgar Engineering.
- Draft Plan of Subdivision, dated February 9, 2026, prepared by JD. Barnes.

## 1.2 Scope of Work

A summary of the scope of work is provided below:

- Background Information Review: Review of available background geologic and hydrogeological information for the Property and surrounding areas. This included a review of the Ministry of the Environment, Conservation and Parks (MECP) well records, watershed information by the Conservation Halton and results of previous studies and subsurface investigations.
- Private Well Survey: A well survey was conducted for properties within 500 m of the Property.
- Groundwater Level Monitoring: Groundwater level monitoring was conducted to assess the groundwater flow conditions.
- Hydraulic Conductivity Testing: In-situ hydraulic conductivity tests were conducted in select monitoring wells to assess hydraulic conductivity of the strata. The underlying soils were assessed to determine potential dewatering requirements.

# 2 Site Information

## 2.1 Site Location and Description

The Property is rectangular in shape, with a total area of ±202,000 $m^2$ and is located approximately east of intersection at Trafalgar and Burnhamthrope Roads. The majority of the Site is currently underutilized farmland. There is a two-storey abandoned farmhouse on the southwest of the Site, which is a listed property in the Oakville Heritage Property Register, and the Vic Hadfield Golf & Learning Centre, a small golf facility located on the northwest corner of the Site. The existing site conditions are presented in Figure 2.

The Property and the immediate neighboring areas are not serviced with municipal piped water or sewage services.

## 2.2 Topography & Drainage

The Ministry of Natural Resources (MNR) and Ministry of Energy and Mines (MEM) database were searched to obtain topographic and geological maps of Ontario for review. The maps are provided as Appendix C. The information obtained is summarized below:

| Records | Information |
|---|---|
| Topographic Maps | The elevation of the site ranges from 180.0 m to 185.0 m. |

| Records | Information |
|---|---|
| Hydrology | There is a small unnamed off-line pond located in the south-central portion of the site. Joshuas Creek is located approximately 125± m north of the site. Groundwater is expected to flow east. |
| Run Off | Stormwater on the property is expected to drain towards ditches within the developed portions of site. The on-site drainage ditch running roughly north south flows into the municipal catch basins located along Trafalgar Road. Stormwater in the vegetated area of site is assumed to be infiltrated into the ground. |

## 2.3 Regional Physiography

From a regional perspective the Property is situated within the physiographic feature known as the South Slope physiographic region of Southern Ontario.

The South Slope is an approximately 2,500 km$^2$ area that encompasses the southern slope of the Oak Ridges Moraine. The area is narrow, only 10 to 11 km wide and extends from the Niagara Escarpment to the Trent River. The area is drumlinized with scattered drumlins and is characterised by a variety of soils developed on tills that are sandier in the east and more clayey in the west. Streams and rivers are common and have cut deep gullies into the till and occasionally the bedrock. The orientation of streams is influenced by the orientation of the surrounding drumlins. There are also regions along the south slope where drumlins are less prominent, becoming either faintly drumlinized to gently rolling with knolls, hollows, and occasionally flutings such as east of Maple, near Scarborough within York, Etobicoke, and Mississauga. The area near the Trafalgar Moraine shows knob-and-kettle relief. In the Sheridan the flutings are worn into the shale. Some other notable areas are in Hope Township where large hills 60 to 90 m high, the tops of which have been moulded into drumlins. The bedrock in the area is limestone of the Verulam and Lindsay Formations, or the shale of the Georgian Bay or Queenston Formations. Soils within the South Slope have been characterised as the Bondhead, Darlington, and Woburn loams, the King clay loam, Chinguacousy clay loam and the Oneida clay loam.

The Property is located within the Conservation Halton watershed. Based on the Source Water Protection mapping, which is presented in Appendix B, this site is **not** located within a source water protection area.

## 2.4 Regional Geology and Soils

Based on the published information, the regional geology is described below.

| Records | Information |
|---|---|
| Geological Maps | **Overburden:** The overburden is between 10 to 30 m in thickness within this region and comprises of glacial, glaciofluvial and glaciolacustrine deposits of the Pleistocene age and the fluvial and beach deposits of Recent age. Two tills |

| Records | Information |
|---|---|
| | occurred with the Halton Authority. They are Wentworth and Halton Tills. The Halton Till is found as a ground moraine over most of the area below the escarpment.<br><br>**Bedrock**: The site is located on the Queenston Rock Formation which comprises of Shale, Limestone, Dolostone and Siltstone. The Queenston Formation is one of the oldest bedrock units within the Authority that formed during the Upper Ordovician age.<br><br>**Depth to Bedrock:** The depth to bedrock on the site varies from 3.0 to 9.4 m. |

It should be noted that the subsurface soil and rock conditions described above represent generalized conditions only and should not be considered site specific. The information is presented in Appendix C.

## 2.5 Regional Hydrogeology

The regional hydrogeologic conditions were assessed through reviewing of the water well records, geologic mapping, published information from Conservation Halton, and the results of previous investigations completed within the vicinity of the site and for the Property. Based on the information, the hydrostratigraphic units below were defined in the vicinity of the Property.

Glacial Till (Aquifer):

The till material in the region is comprised of silt and clay. It has a low permeability and conducts limited quantities of groundwater. The till is observed to extend to depths of approximately 13 m below ground surface around the property.

Queenston Formation Bedrock (Aquifer):

The Queenston Formation Bedrock generally consists of shale and minor limestone. The bedrock is typically located at depths of approximately 18 m below ground surface in the vicinity of the property. Wells installed into the bedrock typically have limited groundwater yielded.

## 2.6 Regional Climate

The following general climate data for the Property was obtained from Halton Region Source Protection Area Assessment Report for Joshua's Creek Subwatershed, dated October 2017 (Appendix D).

| | |
|---|---|
| **Mean annual precipitation (mm/yr.)** | 863 mm |
| **Mean annual evapotranspiration** | 545 mm |
| **Mean annual water surplus** | 318 mm |

The precipitation data was based on Halton Region Source Protection Area Assessment Report. It is noted that the above are average values, which are representative in a regional context. There

will be seasonal and annual variations in these values. However, the average values will govern long-term groundwater recharge and discharge rates. Therefore, average values are appropriate for assessment of hydrogeologic conditions at the site.

## 2.7 Groundwater Resources

Private well records from the MECP well record database were reviewed for wells located within 500 m radius of the Property. A total of 45 well records were retrieved from the well record database. The MECP well records are presented in Appendix E. Well record locations are presented in plan on Figure 4. A summary of data obtained is presented in the following table.

| **Total Number of Wells** | **35** |
|---|---|
| Wells completed in Overburden | 13 (37%) |
| Bedrock | 11 (31%) |
| Unknown | 11 (31%) |
| **Depth Ranges** | |
| 50 ft. or less | 31 (41%) |
| 51 ft. to 100 ft. | 15 (20%) |
| 101 to 200 ft. | 9 (12%) |
| >200ft | 1 (1.3%) |
| Unknown | 19 (25%) |
| **Water Use** | |
| Monitoring/Test Holes | 34 (45%) |
| Commercial/Industrial | Unknown |
| Water Supply (domestic/public/livestock) | 21 (28%) |

MECP well records for wells completed in the vicinity of the Property show that the primary aquifer used for potable water is within either coarse grained deposits or fine grained soils. Groundwater supply is generally poor quality and quantity due to the low permeability of the overburden and bedrock. Over 50% of wells were installed within 60 mbgs (up to 200 ft.). Bedrock was

encountered at the location of thirty-eight (38) wells which extended to a maxim depth of ±60 m (±200 ft.) below grade.

## 2.8 Private Well Survey

A house-to-house water well survey within 500 m of the Property was completed on May 26, 2025 to characterize the groundwater resource conditions. Based on the private well survey, it was concluded that one (1) out of fourteen (14) sites within a 500 m radius of the Property was on private well water. The other 13 sites were municipally serviced. The Property is located in an undeveloped area of the City of Oakville, and all properties are not municipally serviced. The locations of the wells surveyed are presented in Figure 4.

## 2.9 Subsurface Investigation

A subsurface investigation was conducted by Grounded at the Property from June 2nd to 9th . The field investigation is as below. Borehole logs are presented in Appendix F. The borehole and monitoring well locations are shown on Figure 2. A cross section is shown in Figure 5.

| | |
|---|---|
| **Boreholes** | BH101 to BH112 |
| **Monitoring Wells** | BH101, 103, 106, 108D, 108S, 110, 112 |
| **Well Depth (mbgs)** | Well depths range from 4.6 m to 9.2 m |

The stratigraphy beneath the investigated areas of the Property generally consists of the following:

| Geological Units | Description |
|---|---|
| Pavement Structure/Topsoil | Borehole 101 encountered a 100 mm thick aggregate layer at the existing ground surface. Borehole 112 encountered 50 mm of asphalt at the existing ground surface. A layer of topsoil, approximately 25 to 300 mm thick, was encountered at the existing ground surface of Boreholes 102 to 104, and 106 to 111, and underlying the above-noted surficial materials in Boreholes 101 and 112. |
| Earth Fill | Underlying the surficial materials, Boreholes 101 to 107 and 109 observed a layer of earth fill that extends to depths of about 0.8 to 3.0 metres below grade (Elev. 182.7 to 178.8 metres). The earth fill varies in composition but generally consists of sandy silt to clayey silt with trace gravel and trace rootlets. The earth fill is typically dark brown to brown, and moist. |
| Reworked Native Soils | Underlying the surficial materials in Boreholes 108 and 110 to 112 and underlying the earth fill in Boreholes 101, 105 and 109, the boreholes observed a layer of reworked native soils that extends to depths of 0.8 to 2.3 metres below grade (Elev. 183.2 to 178.1 metres). The reworked native soils are likely in place due to farm-tilling and/or previous site grading activities, and generally consist of sandy silt with some clay, trace gravel, trace rootlets and trace rock fragments. The reworked native sandy silt is typically brown to reddish brown, and moist. |

| Geological Units | Description |
|---|---|
| Halton Till | Underlying the fill materials in Boreholes 101 to 104, 106 to 110 and 112 and underlying the sands and silts described below in Borehole 105, the boreholes encountered an undisturbed native glacial till deposit with a matrix of cohesionless and cohesive sandy silt to clayey silt, and cohesionless silty sand, more commonly known in this region as "Halton Till". This unit was encountered at depths of 0.8 to 7.6 metres below grade (Elev. 183.2 to 175.7 m) and extends down to depths of 3.2 to 9.4 m below grade (Elev. 177.9 to 172.9 m). Boreholes 103, 104, 105, 107 and 112 were terminated within this stratum at their target investigation depths. The Halton till is generally brown to grey, and moist. This unit contains a varying amount of clay (trace to clayey), trace to some gravel, trace shale fragments, inferred cobbles and trace rock fragments. |
| Sands and Silts | Underlying the fill materials in Boreholes 105 and 111 and below the Halton till in Boreholes 106 and 109, an undisturbed native cohesionless sand to silt unit was encountered at depths of 0.8 to 4.6 metres below grade (Elev. 180.9 to 177.7 m) and extending to a depth of about 7.6 m below grade (Elev. 174.8 to 173.9 m). This unit is generally brown to grey and moist to wet, and contains varying amounts of clay (trace to clayey), trace rock fragments, trace shale fragments and trace gravel. |
| Inferred Bedrock | Inferred bedrock was encountered in Boreholes 101, 102, 106, and 108 to 111 underlying either the Halton till or sands and silts at depths of 3.0 to 9.4 m below grade (Elev. 176.6 to 172.5 m). Rock coring was not included in our scope. The bedrock was inferred from observations of auger and split spoon resistance and limited sample recovery in the split spoons to depths of 4.6 to 9.5 metres below grade (Elev. 175.0 to 170.9 m), at which depth Boreholes 101, 102, 106, 108 to 111 were terminated. The bedrock beneath the site is known to consist of reddish brown shale of the Queenston Formation, which typically has a weathered zone at and near the surface of the bedrock which eventually transitions to unweathered (sound) bedrock. Sound bedrock elevations were not determined in the boreholes, as this was not part of this scope of work. |

## 2.10 Groundwater Level Monitoring

A total of seven (7) monitoring wells were installed on the Property. The appended Table 1 summarizes the details of the monitoring well construction as well as the measured groundwater elevations in the installed wells.

The groundwater level measurements included seasonal fluctuation monitoring from June to October, 2025. The groundwater levels on this site range from 0.6 to 2.5 m depth (Elev. 182.5 m to 178.8 m), the groundwater flows from the southwest to northeast.

Groundwater levels fluctuate with time depending on the amount of precipitation and surface runoff and may be influenced by known or unknown dewatering activities at nearby sites.

## 2.11 Groundwater Quality

A groundwater sample was obtained from the monitoring wells on-site and submitted for laboratory analysis on June 17, 2025. Monitoring well construction details are provided Table 1. The sample was analyzed with respect to the Halton Sewer Use Bylaw- Sanitary and Combined

Sewer Discharge and Town of Oakville Sewer Use Bylaw – Storm Sewer Discharge. The results of the groundwater testing are presented in Appendix G and summarized below.

| Town of Oakville | Exceedance |
|---|---|
| Table 2 Storm Sewer Discharge Criteria | Manganese (Limit 0.15 mg/L, Result 2.48 mg/L) |

The groundwater sample met the Limits for Sanitary and Combined Sewer Discharge for all parameters analyzed.

A true copy of the analysis report, Certificate of Analysis, and a chain of custody record for the sample are enclosed.

Treatment of the groundwater should be completed such that the Oakville Storm Sewer Discharge By-Law criteria are met if groundwater is to be discharged to storm sewers.

## 2.12 Hydraulic Conductivity

### 2.12.1 In Situ Permeability Test (Single Well Response Test)

In situ single well response tests (SWRT) were conducted in select monitoring wells to assess the hydraulic conductivity of the underlying soil. Data from the SWRT were analyzed using the Bouwer and Rice method (1976). The table below summarizes the results of the hydraulic conductivity testing. The analyses are presented in Appendix I.

The hydraulic properties of the strata applicable to the site are as follows:

| Well ID | Well Screen Elevation (masl) | Screened Geological Unit | Hydraulic Conductivity (m/s) |
|---|---|---|---|
| BH103 | 174.0 – 170.9 | Halton Till/Inferred Bedrock | $1.00 \times 10^{-6}$ |
| BH106 | 177.1 – 174.1 | Sands and Silts / Inferred Bedrock | $5.80 \times 10^{-6}$ |
| B108 | 176.1 – 174.5 | Inferred Bedrock | $3.05 \times 10^{-6}$ |
| BH112 | 178.9 – 175.8 | Halton Till | $1.31 \times 10^{-6}$ |

### 2.12.2 Grain Size Analysis

Grain size analyses were conducted on representative soil samples through sieve and hydrometer analysis. The analyses are summarized below and presented in Appendix H.

The hydraulic conductivities of various soil types can also be estimated from grain size analyses. An assessment of the grain sizes was conducted using the excel-based tool, HydrogeoSieve XL

(*HydrogeoSieve XL ver.2.2, J.F. Devlin, University of Kansas, 2015*). HydrogeoSieve XL compares the results of the grain size analyses against fifteen (15) different analytical methods.

Given our experience in the area as well as published literature, some of the geometric means provided for the soil were biased low by one or more methods. In these instances, the values determined by these methods were excluded from the mean. The table below illustrates the hydraulic conductivity values estimated from the mean of the analytical methods where the soil met the applicable analysis criteria.

| Sample ID | Soil Description | Applicable Analysis Methods | Hydraulic Conductivity (m/s) |
|---|---|---|---|
| BH101-SS6 | Sand and silt till | Alyamani and Sen, Krumbien and Monk, Sauerbrei | $2.1 \times 10^{-7}$ |
| BH102-SS7 | Sandy Silt Till | Alyamani and Sen, Barr, Sauerbrei | $2.7 \times 10^{-8}$ |
| BH103-SS4A | Sandy Silt Till | Alyamani and Sen, Barr, Sauerbrei | $7.4 \times 10^{-9}$ |
| BH104-SS7B | Sandy Silt Till | Alyamani and Sen, Barr, Sauerbrei | $3.9 \times 10^{-9}$ |
| BH106-SS5 | Sandy Silt Till | Alyamani and Sen, Barr, Sauerbrei | $8.7 \times 10^{-9}$ |
| BH109-SS8 | Inferred Bedrock | Alyamani and Sen, Barr, Sauerbrei | $1.9 \times 10^{-8}$ |
| BH111-SS4 | Sand and silt till | Alyamani and Sen, Barr, Sauerbrei | $4.0 \times 10^{-7}$ |
| BH112-SS8 | Sandy Silt Till | Alyamani and Sen, Barr, Sauerbrei | $1.9 \times 10^{-7}$ |

Based on the in-situ testing and grain size analysis, the Property consists of moderate to low permeability soils and is not considered to be significant in terms of groundwater recharge.

### 2.12.3 Literature

According to Freeze and Cherry (1979), the typical hydraulic conductivity of the strata investigated at the site are:

| Stratum/Formation | Hydraulic Conductivity (m/s) |
|---|---|
| Earth Fill | $10^{-2}$ to $10^{-6}$ |
| Sands | $10^{-2}$ to $10^{-7}$ |
| Silts | $10^{-5}$ to $10^{-9}$ |
| Glacial Tills | $10^{-6}$ to $10^{-12}$ |
| Bedrock (Shale) | $10^{-6}$ to $10^{-13}$ |

## 2.13 Surface Water Features

A site inspection was conducted to assess the presence of surface water features on or bounding the Property. The inspection includes the following:

- Inspection of surface and groundwater interactions and associated features
- Inspection of areas of actual and potential groundwater discharge
- Inspection of swales and drainage courses
- Evidence of phreatophytic vegetation, which may indicate seasonally high groundwater levels and/or groundwater discharge and seepage

The site inspection was conducted on May 26th, 2025. The Property is mostly flat with a couple hills and some low-lying areas and shallow ditches which would allow ponding of water. There is a man-made off-line pond in the center of the site. Surface water looks likely to flow west overland into ditches and towards catch basins on municipal roads.

# 3 Discussion and Analysis

## 3.1 Proposed Development Plan

The proposed development plan is presented in Figure 3.

The proposed development includes constructing a new mixed-use subdivision separated into various building blocks (1 to 15) and comprises mid-rise to high-rise residential and/or commercial buildings ranging in height from 4 to 32-storeys with podium heights ranging from 1 to 8-storeys. Below Blocks 1, 2, 6 and 14 there will be three (P3) levels of underground parking with a lowest P3 FFE set at a depth of 10 m. Below Blocks 3, 5, 7 and 8 there will be two (P2) levels of underground parking with a lowest P2 FFE set at a depth of 7 m. Below blocks 4 and 10 to 12 there will be a single (P1) level of underground parking with a lowest P1 FFE set at a depth of 4 m. The proposed development also includes two separate parks and a future school (Blocks 9, 13 and 15, respectively).

The following summarizes the proposed land development coverage statistics:

| Land Coverage Type | Areas |
|---|---|
| Building Envelope | 7.24 ha |
| Hard Surface Paving | 10.16 ha |
| Landscape areas for infiltration | 2.81 ha |
| **Total Area** | **20.21 ha** |

## 3.2 Summary of Hydrogeologic Conditions

For design purposes, the stabilized groundwater table varies from block to block and ranges from 0.6 to 2.5 m depth (Elev. 182.5 to 178.8± m). The groundwater table is present in all the native soil units and earth fill. The lowest (P1 to P3) FFE ranges from 4 to 10 m depth. Bulk and

foundation excavations for the underground parking level(s) will extend below the design groundwater table. In summary:

- Bulk excavation for the underground parking level(s) will extend below the elevation of the design groundwater table.
- Foundation excavations will extend below the design groundwater table.
- Foundation excavations will penetrate lower wet sands, which will yield free-flowing water.
- A dewatering zone of influence has been estimated (see Section 3.5)

The proposed shoring at the site is assumed to consist of conventional soldier piling and lagging for present purposes.

Prior to excavation, positive dewatering to lower the groundwater table will be required to facilitate construction as well as to maintain the integrity of the subgrade for foundation and slab-on-grade support. The water level must be kept at least 1.2 m below the lowest excavation elevation during construction. Failure to dewater prior to excavation will result in unrecoverable disturbance of the subgrade, which will render advice provided for undisturbed subgrade conditions inapplicable.

Due to the low permeability and strength of bedrock, dewatering of the bedrock is not anticipated.

Dewatering will take some time to accomplish prior to the start of excavation. Stored water within the excavation will need to be considered prior to excavation/dewatering.

A professional dewatering contractor must be consulted to review the subsurface conditions and to design a site-specific dewatering system. It is the dewatering contractor's responsibility to assess the factual data and to provide recommendations on dewatering system requirements.

The above hydrogeologic features and functions were considered in assessing the potential impact of the proposed development. This information was used to provide mitigating measures to ensure that hydrogeologic function is not adversely affected during the proposed development.

## 3.3 Groundwater Control Requirements

It is necessary to positively dewater the Property to a minimum of 1.2 m below proposed founding elevation prior to excavation to preserve the integrity of the native soils. Excavation for foundations under the lowest parking level of each block will extend approximately 1.0 to 10.3 m below the groundwater table within the Halton Till or sands and silts. The dewatering target varies from block to block but is generally 1.2 m below the base of excavation for each block.

Preliminary groundwater seepage estimates were conducted for both short term and long-term dewatering scenarios. The modeling was conducted using an equivalent well radius

approximation (Powers et al, 2007). The calculation for groundwater seepage indicates the short term (construction) and long term (permanent) dewatering requirements as provided below.

The Equivalent Well Radius results are summarized below and presented in Appendix J.

**Estimated Short Term (Construction) Groundwater Quantities – Safety Factor of 3.0 Used**

| Block No. | Groundwater Seepage | | Design Rainfall Event (29 mm) | | Total Daily Water Takings | |
|---|---|---|---|---|---|---|
| | L/day | L/min | L/day | L/min | L/day | L/min |
| 1 | 1,083,000 | 752 | 534,000 | 371 | 1,617,000 | 1,123 |
| 2 | 960,000 | 667 | 623,000 | 433 | 1,583,000 | 1,099 |
| 3 | 243,000 | 169 | 121,000 | 84 | 364,000 | 253 |
| 4 | 1,521,000 | 1,056 | 543,000 | 377 | 2,064,000 | 1,433 |
| 5 | 495,000 | 344 | 241,000 | 167 | 736,000 | 511 |
| 6 | 960,000 | 667 | 299,000 | 208 | 1,259,000 | 874 |
| 7 | 792,000 | 550 | 141,000 | 98 | 933,000 | 648 |
| 8 | 477,000 | 331 | 223,000 | 155 | 700,000 | 486 |
| 9 | 255,000 | 177 | 86,000 | 59 | 341,000 | 237 |
| 10 | 363,000 | 252 | 281,000 | 195 | 644,000 | 447 |
| 11 | 375,000 | 260 | 323,000 | 224 | 698,000 | 485 |
| 12 | 312,000 | 217 | 311,000 | 216 | 623,000 | 433 |

As required by Ontario Regulation 63/16, a plan for discharge must consider the conveyance of storm water from a 100-year storm. The additional volume that will be generated in the occurrence of a 100-year storm event (101.4 mm) for each block is as follows:

- Block 1: 1,846,000 L
- Block 2: 2,178,000 L
- Block 3: 421,000 L
- Block 4: 1,897,000 L
- Block 5: 840,000 L
- Block 6: 1,043,000 L
- Block 7: 492,000 L
- Block 8: 779,000 L
- Block 9: 301,000 L

- Block 10: 981,000 L
- Block 11: 1,129,000 L
- Block 12: 1,087,000 L

The groundwater control system is required to be designed by a dewatering contractor. The groundwater must be dewatered prior to excavation to maintain a stable working base in the excavation.

Mitigation measures based on dewatering and infiltration requirements as per the MECP are discussed in Section 3.6.

**Estimated Long Term (Permanent) Groundwater Quantites – Safety Factor of 3.0 Used**

| Block No. | Groundwater Seepage | | Infiltration Design Rainfall Event (29 mm) | | Total Daily Water Takings | |
|---|---|---|---|---|---|---|
| | L/day | L/min | L/day | L/min | L/day | L/min |
| 1 | 1,083,000 | 752 | 18,000 | 13 | 1,101,000 | 765 |
| 2 | 960,000 | 666 | 21,000 | 15 | 981,000 | 681 |
| 3 | 243,000 | 169 | 5,000 | 4 | 248,000 | 172 |
| 4 | 1,521,000 | 1,056 | 5,000 | 4 | 1,526,000 | 1,060 |
| 5 | 495,000 | 344 | 9,000 | 6 | 504,000 | 350 |
| 6 | 960,000 | 667 | 2,000 | 1 | 962,000 | 668 |
| 7 | 792,000 | 550 | 5,000 | 4 | 797,000 | 554 |
| 8 | 477,000 | 331 | 18,000 | 13 | 495,000 | 344 |
| 9 | 255,000 | 177 | 10,000 | 7 | 265,000 | 184 |
| 10 | 363,000 | 252 | 6,000 | 4 | 369,000 | 256 |
| 11 | 375,000 | 260 | 8,000 | 6 | 383,000 | 266 |
| 12 | 312,000 | 217 | 16,000 | 11 | 328,000 | 228 |

| Regulatory Requirements | |
|---|---|
| Environmental Activity and Sector Registry (EASR) Posting | Required |
| Short Term Permit to Take Water (PTTW) | Not Required* |
| Long Term Permit to Take Water (PTTW) | Required** |
| Short Term Discharge Agreement Region of Halton/Oakville | Required |
| Long Term Discharge Agreement Region of Halton/Oakville | Required |

**Per amendments to O.Reg. 63/16 effective July 1st, 2025, a short term PTTW will not be required for construction dewatering above 400,000 L/day. An EASR will be required.*

***Per amendments to Ontario Regulation 387/04 effective July 1st, 2025, low-risk foundation drainage systems used primarily for residential purposes that take less than 379,000 litres of groundwater per day are exempted from requiring environmental permissions, exempt from requiring a PTTW, and exempt from needing to self-register online.* ***Therefor, a Long Term PTTW is not required for Blocks 3, 9, 10, 11 and 12.***

Additional boreholes and monitoring wells are required for general site coverage and for a more refined dewatering analysis for any particular block once design details are finalized. The above estimated volumes are considered preliminary, based on limited design information and assumed soil and groundwater conditions in areas where boreholes and monitoring wells are not currently present. Site grading may also have an impact on the groundwater elevation once site works have been completed.

## 3.4 Assessment of Potential Impact

The proposed development includes constructing a new mixed-use subdivision separated into various building blocks (1 to 15) and comprised mid-rise to high-rise residential and/or commercial buildings ranging in height from 4 to 32-storeys with podium heights ranging from 1 to 8-storeys. Below Blocks 1, 2, 6 and 14 there will be three (P3) levels of underground parking with a lowest P3 FFE set at a depth of 10 m. Below Blocks 3, 5, 7 and 8 there will be two (P2) levels of underground parking with a lowest P2 FFE set at a depth of 7 m. Below blocks 4 and 10 to 12 there will be a single (P1) level of underground parking with a lowest P1 FFE set at a depth of 4 m. The proposed development also includes two separate parks and a future school (Blocks 9, 13 and 15).

The site grade is to be raised, by up to 4± m in some areas, better align with the surrounding grades of Trafalgar Road and Burnhamthorpe Road. The Property will be serviced with municipal piped water, storm and sanitary sewers. The proposed nature of the development does not pose any significant concern with respect to potential impact on groundwater quality in the area.

### 3.4.1 Short Term Discharge (Construction Dewatering)

The flow of water from the dewatering system must be treated to meet the Town of Oakville Storm Sewer Discharge Requirements prior to discharge to the municipal sewer system. No additional treatment is required should the groundwater be discharged to the Region of Halton's

Sanitary Sewer System. Sampling of the discharge water from the dewatering system is required during initial discharge and on-going basis as required by the Region during active dewatering activities. Visual monitoring of the dewatering discharge should be conducted daily. Adjustment to the dewatering system should be made if an increase in turbidity or sediment is noted.

### 3.4.2 Long Term Discharge (Post Construction)

The flow of water from the drained foundation system must be treated to meet the Town of Oakville Storm Sewer Discharge Requirements prior to discharge to the municipal sewer system. No additional treatment is required should the groundwater be discharged to the Region of Halton's Sanitary Sewer System.

### 3.4.3 Zone of Influence

Localized dewatering of an aquifer produces a cone-shaped depression in the groundwater table that extends some distance away from the dewatering point. The lateral distance which the cone of depression extends (i.e., the distance to where drawdown is effectively zero) is known as the Zone of Influence (ZOI).

The ZOI was calculated using the Sichardt equation below.

$$R_0 = 3000(\Delta H)\sqrt{K}$$

| | | |
|---|---|---|
| $\Delta H$ | = | dewatering thickness (m) |
| $K$ | = | hydraulic conductivity (m/s) |
| $R_0$ | = | radius of influence (m) |

The ZOI with respect to groundwater seepage at the site is summarized as follows.

| Zone of Influence (ZOI) | | |
|---|---|---|
| **Block No.** | **Short Term (Construction), m** | **Long Term (Permanent), m** |
| 1 | 75 | 63 |
| 2 | 56 | 43 |
| 3 | 26 | 26 |
| 4 | 83 | 71 |
| 5 | 38 | 32 |
| 6 | 54 | 42 |
| 7 | 29 | 17 |
| 8 | 16 | 10 |
| 9 | 14 | 8 |
| 10 | 17 | 12 |
| 11 | 8 | 2 |
| 12 | 15 | 10 |

### 3.4.4 Land Stability

The impacts to land stability on adjacent structures due to the proposed short- and long-term dewatering at the site are summarized as follows:

| Land Stability (Blocks 1 to 14) | | |
|---|---|---|
| | **Short Term (Construction)** | **Long Term (Permanent)** |
| **Dewatering Thickness (m)** | 1 to 11.5 | 0 to 8.6 |
| **Increase in Effective Stress (kPa)** | 22 to 113 | 5 to 96 |
| **Maximum Theoretical Settlement due to Dewatering (mm)** | 1 to 7 | <1 to 6 |
| **Public Realm Theoretical Settlement due to Dewatering (mm)** | 1 to 7 | <1 to 6 |

The maximum induced settlement (estimated) occurs directly adjacent to the proposed excavation and decreases in a nonlinear fashion with distance away from the excavation.

On this basis, the impact of the proposed dewatering on the existing adjacent structures is considered by Grounded to be within acceptable limits.

## 3.5 Mitigation Measures to Maintain Hydrogeologic Functions

### 3.5.1 Maintenance of Groundwater Recharge

The existing groundwater recharge at the Property occurs in a broad diffuse manner over the entire site. Mitigation measures are available to maintain recharge rates. There are no wetlands in the immediate vicinity of the Property. Joshua's Creek, the nearest water body, is located approximately 125 m to the east. There will be no direct surface runoff from the Property to the water body.

To maintain groundwater recharge for the Property, low-impact development (LID) methods could be implemented. There is a surplus of water available following development to maintain groundwater recharge and function. Based on the property conditions, the following typical LID measures may be suitable for the proposed development:

- Collection of clean run-offs from the building rooftops and redirection to grass areas and overland flow.
- Planters and green roofs
- Re-use of grey water at the site
- Provision of an extra thickness of topsoil at the Property (approximately 0.3 m) on open areas to promote water storage in surficial soil and infiltration.

The storm water management measures must specifically address the maintenance of groundwater recharge of the proposed development and mitigate any potential impacts to Joshua's Creek 125± m to the east of the site.

### 3.5.2 Maintenance of Groundwater Transmission Pathways

The native soils at the Property consist of low to moderate permeability soils which should be considered in terms of groundwater recharge if penetrated below the groundwater table. The underlying clayey silt encountered in Borehole 105 is of low permeability and will not result in significant groundwater recharge if penetrated.

The overall continuity of the groundwater flow at the Property should be maintained, where practical. Generally, the groundwater transmission pathways can be maintained through the following means:

- Bedding materials beneath underground services may serve as a subdrain to collect and convey groundwater. To prevent drainage of groundwater along bedding materials, clay trench plugs should be provided at all manhole locations to cut off the granular bedding.
- The excavation of any underground services or utilities across permeable layers may interrupt the groundwater flow. It is recommended that trench backfilling be carried out with materials that are similar to the materials that have been excavated.

Groundwater flow may occur into the open shallow excavations if more permeable deposits (such as sand or gravel) are encountered; however, based on the results of the subsurface investigation, active groundwater control (such as from wells or well points) is anticipated during construction, therefore groundwater seepage into the excavation will be controlled. Localized groundwater flow into shallow excavations can be controlled by utilizing localized sumps and pumps at the base of the excavations. In addition to this, it is recommended that any excavations should be staged or constructed in such a manner to avoid the collection of overland drainage.

# 4 Conclusions and Recommendations

- It is assumed that excavations will be made for the underground parking level(s) prior to grade raises at this site. The site grade is to be raised in some areas by up to 4± m to achieve the desired site grading.
- The site is characterized by surficial deposits of topsoil cover underlain by fill material/reworked native consisted of sandy silt to clayey silt and then native material comprising of the Halton Till and/or sands and silts, overlying bedrock. The earth fill and the native sands and silts are highly permeable and provide fast recharge capability and groundwater movement. The Halton Till is moderate to low permeability and provides for low recharge capability and groundwater movement.

- Groundwater was observed within a depth of about 0.6 - 2.5 m (Elev. 182.5 to 178.8 m) from existing ground surface in all monitoring wells. The design groundwater table within the native soils was observed to slope from approximately Elev. 182.5 m in the west to Elev. 178.8± m in the east. Seasonal fluctuations of groundwater are expected at the site.
- Based on the low to moderate permeability of the soils at the surface, groundwater transmission is expected to be slow to moderate. No area of groundwater discharge such as seepages and springs were noted at the Property during the site inspection. LID measures are feasible given the expected increase in site grades and potential for importing material with higher permeability.
- MECP well records for wells completed in the vicinity of the Property show that over 50% of wells were installed within 60 mbgs (up to 200 ft.). Bedrock was encountered at the location of one (1) well which extended to a maxim depth of 84 m (276 ft.) below grade.
- The total short-term discharge volume (storm water and groundwater combined) for the Property ranges from 341,000 L/day for Block 7 to 2,064,000 L/day for Block 2. All blocks will require an EASR application.
- The total long-term discharge volume (storm water and groundwater combined) for the Property ranges from 248,000 L/day for Block 14 to 1,526,000 L/day for Block 2. A long term PTTW will be required for Blocks 1, 2, 3, 5, 6, 8 and 12 .
- Additional boreholes and monitoring wells are required for general site coverage and for a more refined dewatering analysis once design details, including final FFEs, have been established. The dewatering volumes are considered preliminary, based on limited design information and assumed soil and groundwater conditions in areas where boreholes and monitoring wells are not currently present. Site grading may also haver an impact on the groundwater elevation once site works have been completed.

## 4.1 Signatures

The Hydrogeological Assessment was conducted by Sam Bastan, P.Eng. under the supervision of Freesia Waxman, P.Eng., QP $_{ESA}$.

We trust that this report meets your requirements at present.

For and on behalf of our team,

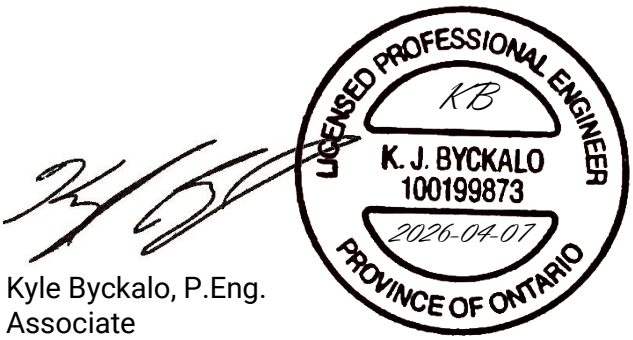
GROUNDED ENGINEERING




Sam Bastan, P.Eng.
Intermediate Project Engineer




Freesia Waxman, P.Eng., QP $_{ESA}$
Associate




Kyle Byckalo, P.Eng.
Associate

# 5 References

1. Armstrong, D.K. and Dodge, J.E.P. 2007. *Paleozoic Geology Map of Southern Ontario*. Ontario Geological Survey, Miscellaneous Release--Data 219.
2. Chapman, L.J. and Putnam, D.F. 2007. Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 228.
3. Region of Halton Source Protection Area Assessment Report HaltonARclean_221104.docx.pdf
4. Region of Halton Conservation Authority Mapping, 2024. Regulation Mapping. https://camaps.maps.arcgis.com/apps/webappviewer/index.html?id=cc14d108b062400eba13a44da02bf3d3 Accessed December 2, 2025.
5. Gao, C., Shirota, J., Kelly, R.I., Brunton, F.R., van Haaften, S., 2006. *Bedrock Topography and Overburden Thickness Mapping, Southern Ontario*. Ontario Geological Survey. Miscellaneous Release-Data 207.
6. Government of Canada, 2024. Canadian Climate Normal 1992-2020 Data.
7. J.D. Barnes Ltd., 2025. Survey Drawing, Dated Feb. 11, 2025.
8. Ministry of the Environment, Conservation and Parks, 2023. Source Protection Information Atlas. https://www.lioapplications.lrc.gov.on.ca/SourceWaterProtection/index.html?viewer=SourceWaterProtection.SWPViewer&locale=en-CA Accessed June 4, 2024.
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10. Ontario Geological Survey, 2010. *Surficial geology of Southern Ontario*. Miscellaneous Release – Data 128-REV.
11. Singer et. al., 2003. The Hydrogeology of Southern Ontario, Second Edition.

# 6 Limitations and Restrictions

The assessment should not be considered a comprehensive investigation that eliminates all risks of encountering environmental problems. The information presented in this report is based on information collected during the completion of the Hydrogeological Assessment by Grounded Engineering Inc. It was based on the conditions on the Hydrogeological Assessment at the time of the site inspection supplemented by a review of historical information to assess the environmental conditions regarding the Property.

There is no warranty expressed or implied by this report regarding the hydrogeologic conditions of the Property. Professional judgement was exercised in gathering and analysing information collected by our staff, as well as that submitted by others. The conclusions presented are the product of professional care and competence and cannot be construed as an absolute guarantee.

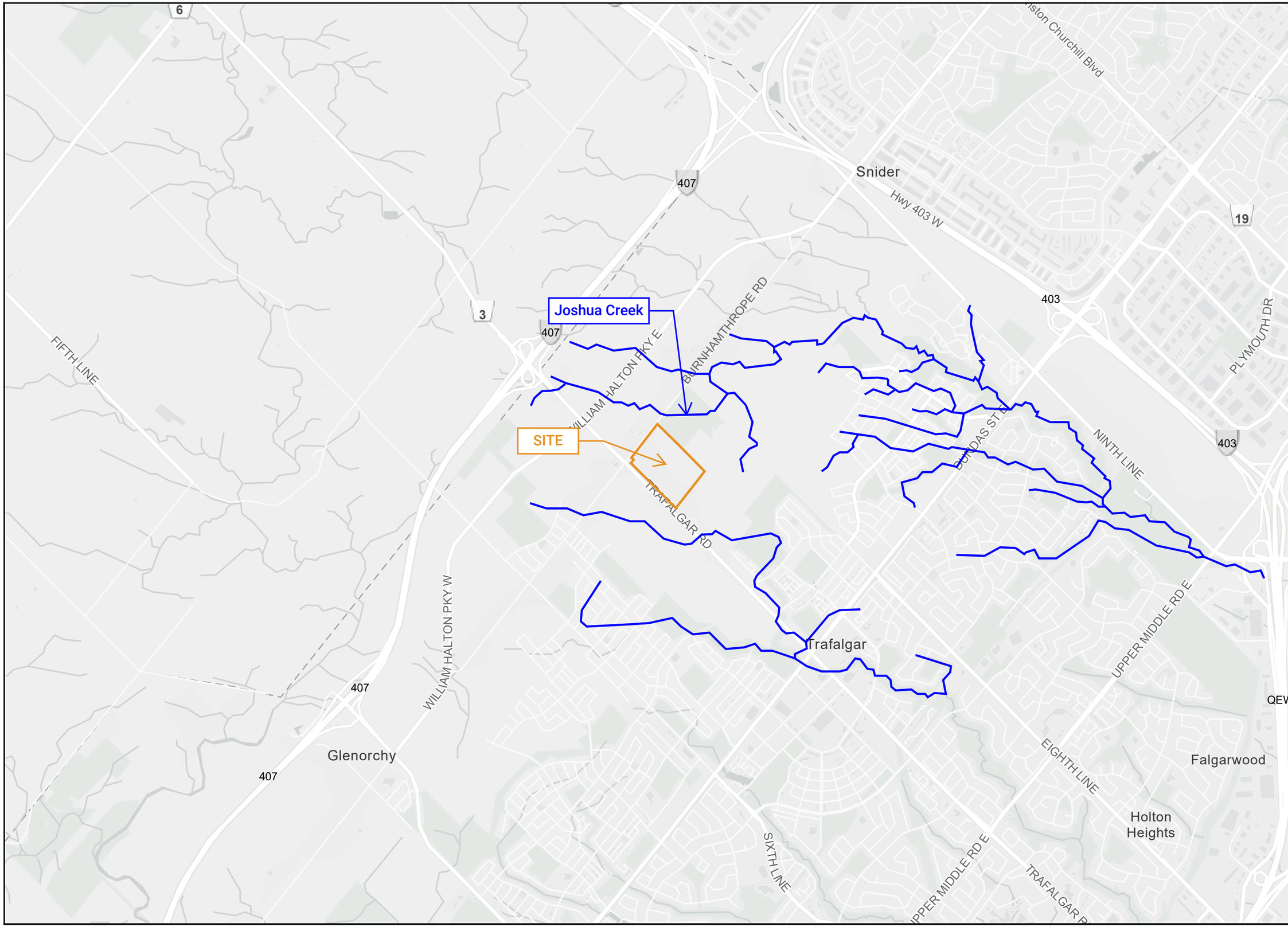
If new information regarding the hydrogeological condition of the Property is identified during future work, or outstanding responses from regulatory agencies indicate outstanding issues on file with respect to the Property, Grounded Engineering Inc. should be notified so that we may re-evaluate the findings of this assessment and provide amendments.

# 7 Report Use

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# FIGURES






GROUNDED ENGINEERING

49 MOBILE DRIVE., NORTH YORK, ON M4A 1H5
www.groundedeng.ca

**LEGEND**

- APPROXIMATE PROPERTY BOUNDARY
- WATER BODIES AROUND THE STUDY SITE

Note

Reference

ArcGIS Online 2025

Project

**TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO**

Figure Title

**KEY PLAN**

North

TRUE PROJECT

Date

APRIL 2026

Scale

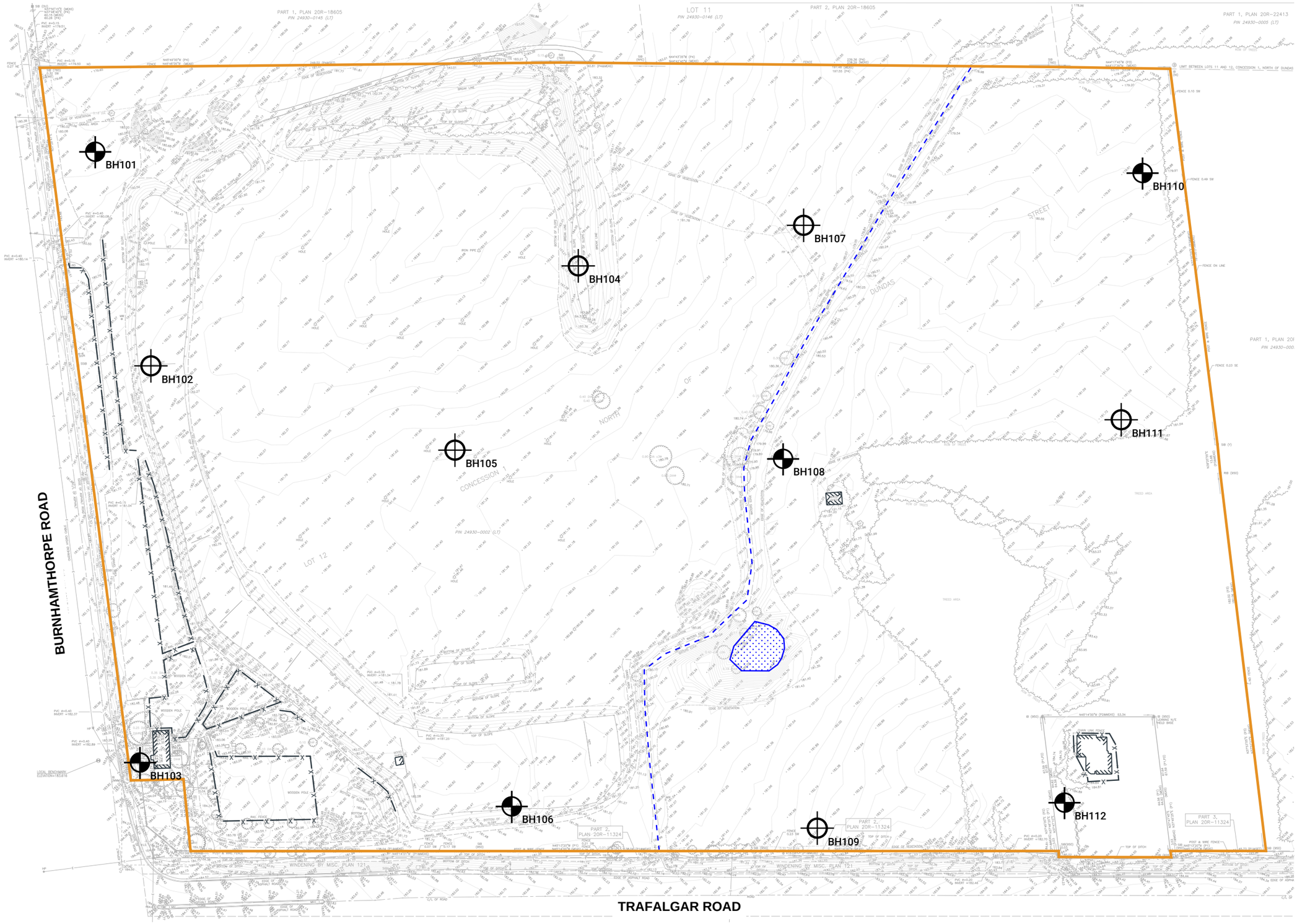
0m 500m 1000m

Job No

25-069

Figure No

**FIGURE 1**




GROUNDED ENGINEERING
49 MOBILE DRIVE., NORTH YORK, ON M4A 1H5
www.groundedeng.ca

**LEGEND**

- APPROX PROPERTY BOUNDARY
- EXISTING BUILDING STRUCTURE
- FENCE LINE
- MONITORING WELL/BOREHOLE BY GROUNDED
- DRAINAGE DITCH
- POND

Note

Reference

Survey Drawing 24-30-276-00.
Dated February 11, 2025.
Prepared by J.D. Barnes Limited.
Received on May 7, 2025.

Project

**TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO**

Figure Title

**BOREHOLE LOCATION PLAN - EXISTING SITE CONDITIONS**

North

TRUE
PROJECT

Date

APRIL 2026

Scale

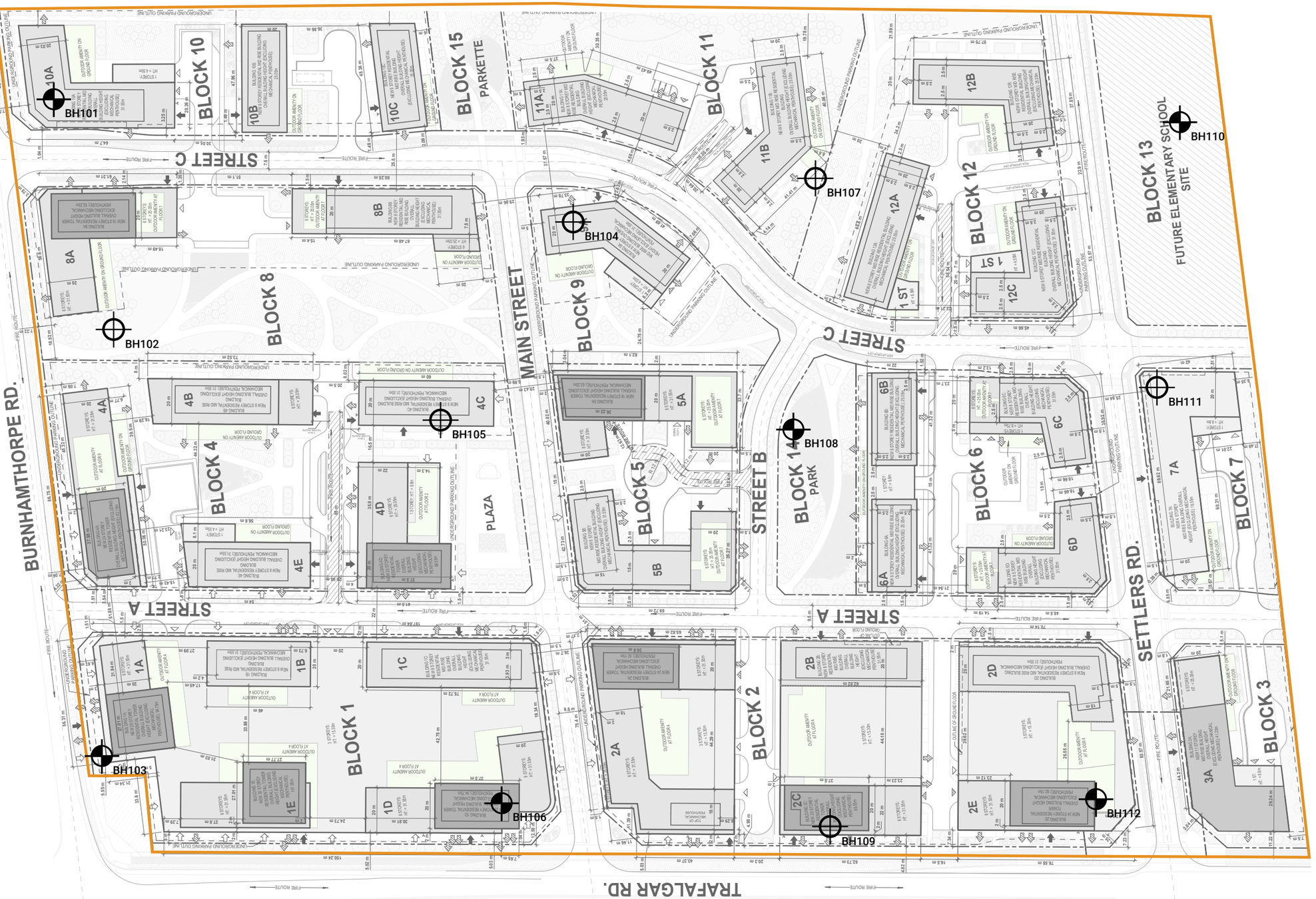
0m 25m 50m

Job No

25-069

Figure No

**FIGURE 2**




GROUNDED ENGINEERING

49 MOBILE DRIVE., NORTH YORK, ON M4A 1H5
www.groundedeng.ca

**LEGEND**

- APPROX PROPERTY BOUNDARY
- MONITORING WELL/BOREHOLE BY GROUNDED

Note

Reference

Site Plan A-105S.
Dated 2026-04-06
Prepared by BDP. Quadrangle.

Project

**TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO**

Figure Title

**BOREHOLE LOCATION PLAN - PROPOSED SITE CONDITIONS**

North

TRUE
PROJECT

Date

APRIL 2026

Scale

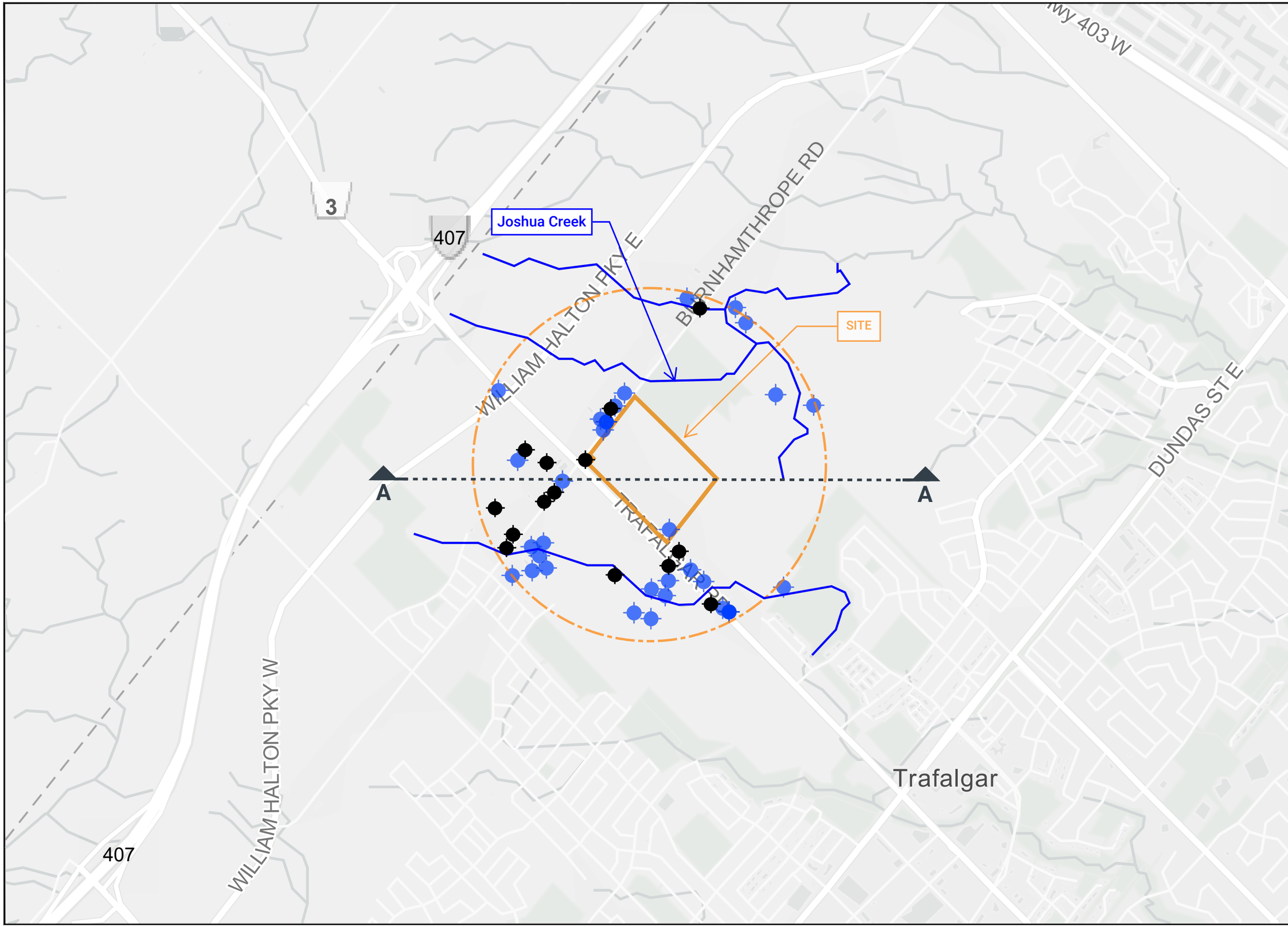
0m 25m 50m

Job No

25-069

Figure No

**FIGURE 3**




GROUNDED ENGINEERING

49 MOBILE DRIVE., NORTH YORK, ON M4A 1H5
www.groundedeng.ca

**LEGEND**

- APPROXIMATE PROPERTY BOUNDARY
- 500m STUDY AREA
- MECP WELLS
- WATER BODIES AROUND THE STUDY STITE
- PRIVATE WELL SURVEY LOCATIONS

Note

Reference

ArcGIS Online 2025

Project

**TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO**

Figure Title

**MECP WELL LOCATION PLAN**

North

TRUE
PROJECT

Date

APRIL 2026

Scale

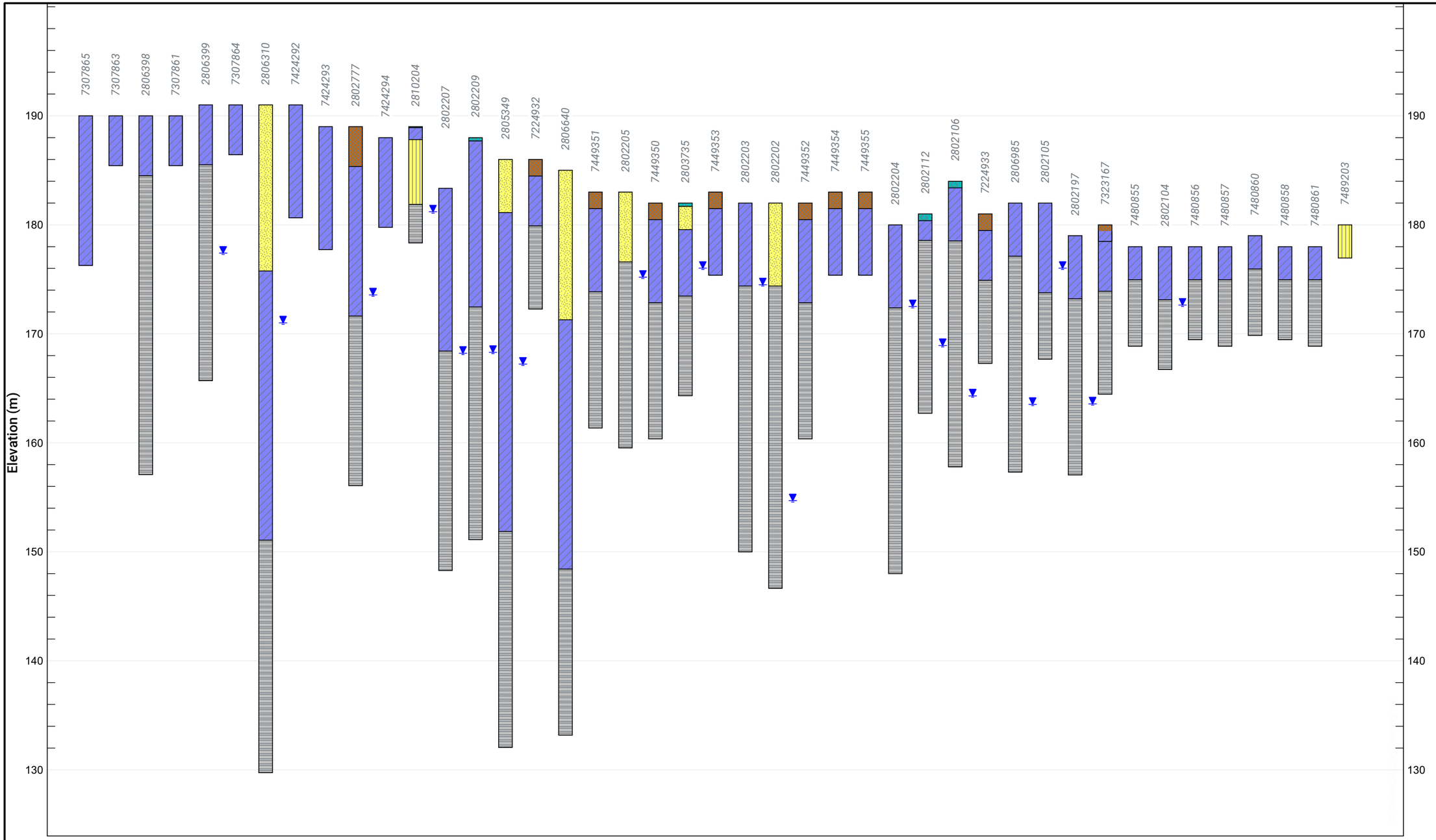
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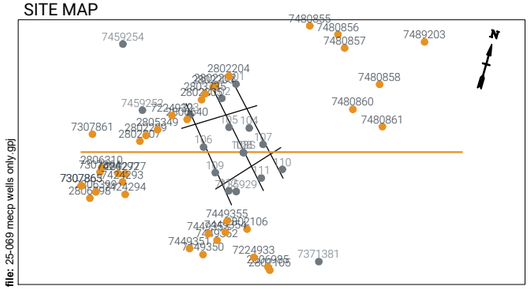
25-069

Figure No

**FIGURE 4**




SITE MAP




file: 25-069 mecp wells only.gpj

***Boreholes Equally Spaced***

**BOREHOLE STRATIGRAPHY LEGEND**

- Clay
- Fill
- Bedrock (cored)
- Silt
- Topsoil
- Sand

The factual borehole information shown is from other consultants only. A full list of references is provided in the body of our report.


GROUNDED ENGINEERING

49 Mobile Drive, Toronto ON, M4A 1H5
www.groundedeng.ca


LEGEND

- FILL
- GRAVELS (gravel to gravelly sand)
- SILT TO SAND (not till)
- COHESIONLESS TILLS
- COHESIVE SOILS (clayey silt to clay, incl. tills)
- DISTURBED/REWORKED/ORGANIC

**BH 101** BOREHOLES BY GROUNDED

*T-BH7* BOREHOLES BY OTHERS

- water level, unstabilized
- water level, stabilized (latest)
- water level, stabilized (highest)

Project

**TRAFALGAR AND BURNHAMTHORPE SUBDIVISION OAKVILLE**

Figure Title

**SUBSURFACE PROFILE**

**MECP SECTION A-A**

Date

APRIL 2026

Scale

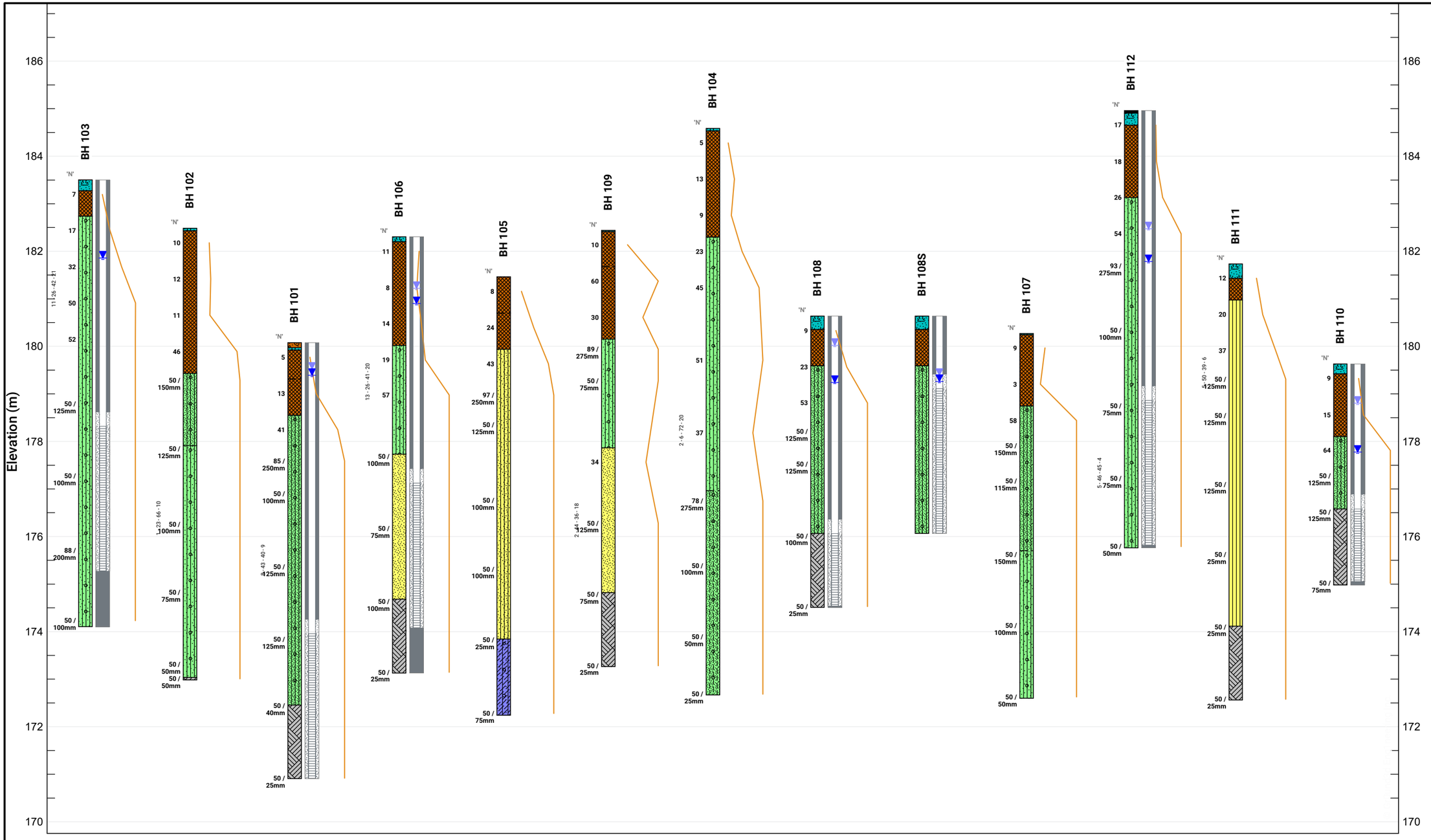
AS INDICATED

Job No

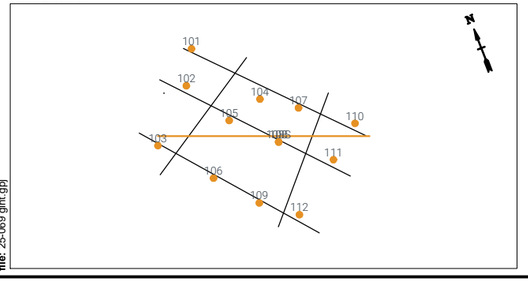
25-069

Figure No

**FIGURE 5**




SITE MAP




file: 25-069 gint.gpj

***Boreholes Equally Spaced***

**BOREHOLE STRATIGRAPHY LEGEND**

- Aggregate
- Topsoil
- Fill
- Sand and Silt Till
- Bedrock (inferred)
- Sandy Silt Till
- Silty Sand Till
- Sand and Silt
- Clayey Silt Till
- Sand
- Silt and Sand Till
- Silt
- Asphalt


GROUNDED ENGINEERING

49 Mobile Drive, Toronto, Ont., M4A 1H5
www.groundedeng.ca


LEGEND

- FILL
- GRAVELS (gravel to gravelly sand)
- SILT TO SAND (not till)
- COHESIONLESS TILLS
- COHESIVE SOILS (clayey silt to clay, incl. tills)
- DISTURBED/REWORKED/ORGANIC

**BH 101** BOREHOLES BY GROUNDED

*T-BH7* BOREHOLES BY OTHERS

- water level, unstabilized
- water level, stabilized (latest)
- water level, stabilized (highest)

Project

**TRAFALGAR AND BURNHAMTHORPE SUBDIVISION OAKVILLE**

Figure Title

**SUBSURFACE PROFILE**

**B-B'**

Date

APRIL 2026

Scale

AS INDICATED

Job No

25-069

Figure No

**FIGURE 6**

# TABLES



**TABLE 1:**
**GROUNDWATER LEVEL MONITORING SUMMARY**
**340 BURNHAMTHORPE RD. E., 3437 TRAFALGAR RD., Oakville**

| Well ID | Ground Surface Elev. (masl) | Well Screen Interval | | Soil Strata | Grounded Engineering | | | | | | | | | | Minimum Elev. (Lowest) | | Maximum Elev. (Highest) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | June 12, 2025 | | July 18, 2025 | | August 8, 2025 | | September 5, 2025 | | October 3, 2025 | | | | | |
| | | (mbgs) | (masl) | | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) | (mbgs) | (masl) |
| **BH101** | 180.1 | 6.1 - 9.2 | 174.0 - 170.9 | SN+SL-TL | 0.58 | 179.52 | 0.71 | 179.39 | 0.97 | 179.13 | 0.67 | 179.43 | 0.57 | 179.53 | 0.97 | 179.13 | 0.57 | 179.53 |
| **BH103** | 183.5 | 5.2 - 8.2 | 178.3 - 175.3 | SN-SL-TL | 1.86 | 181.64 | 1.67 | 181.83 | 1.82 | 181.68 | 1.89 | 181.61 | 1.89 | 181.61 | 1.89 | 181.61 | 1.67 | 181.83 |
| **BH106** | 182.3 | 5.2 - 8.2 | 177.1 - 174.1 | SN | 1.11 | 181.19 | 1.43 | 180.87 | 1.76 | 180.54 | 1.90 | 180.40 | 2.09 | 180.22 | 2.09 | 180.22 | 1.11 | 181.19 |
| **BH108S** | 180.6 | 3.0 - 4.6 | 177.6 - 176.1 | SN+SL-TL | NA | - | 1.40 | 179.20 | 2.00 | 178.60 | 2.50 | 178.11 | 2.43 | 178.17 | 2.50 | 178.11 | 1.40 | 179.20 |
| **BH108** | 180.6 | 4.6 - 6.1 | 176.1 - 174.5 | BEDROCK | 0.64 | 179.96 | 1.42 | 179.18 | 2.03 | 178.57 | 2.49 | 178.12 | 2.63 | 177.98 | 2.63 | 177.98 | 0.64 | 179.96 |
| **BH110** | 179.6 | 3.0 - 4.6 | 176.6 - 175.1 | BEDROCK | 0.85 | 178.75 | 1.88 | 177.72 | 2.52 | 177.08 | 3.07 | 176.53 | 3.30 | 176.31 | 3.30 | 176.31 | 0.85 | 178.75 |
| **BH112** | 185.0 | 6.1 - 9.1 | 178.9 - 175.8 | SN-SL-TL | 2.51 | 182.49 | 3.20 | 181.80 | 3.63 | 181.37 | 4.07 | 180.93 | 4.43 | 180.57 | 4.43 | 180.57 | 2.51 | 182.49 |

**mbgs** = metres below existing ground surface
**masl** = metres above sea level
* = unstabilized groundwater level
NA = not available, unable to access monitoring well

# APPENDIX A






1 SITE PLAN
A105.S

## SITE PLAN LEGEND

- PROPERTY LINE
- LINE OF UNDER GROUND GARAGE BELOW
- MAIN BUILDING ENTRANCE
- RETAIL ENTRANCE
- EXIT
- VEHICLE / LOADING ENTRANCE / EXIT
- FIRE HYDRANT
- SIAMESE CONNECTION
- TYPICAL PARKING SPACE
- TYPICAL B.F. PARKING SPACE
- BUILDING ENVELOPE

| Date | No. | Description |
|---|---|---|

REVISION RECORD

| | |
|---|---|
| 2026-04-06 | Issued for ZBA |

ISSUE RECORD

BDP. Quadrangle


Quadrangle Architects Limited
The Well, 8 Spadina Avenue, Suite 2100, Toronto, ON M5V 0S8
t 416 598 1240 www.bdpquadrangle.com


340 Burnhamthorpe Road East
and 3437 Trafalgar Road
Oakville, Ontario

for
1816986 Ontario Inc.

| | | | |
|---|---|---|---|
| 24064 | 1:750 | SR | SK |
| PROJECT | SCALE | DRAWN | REVIEWED |

Site Plan

A105.S


Note: This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.


2026-03-27 12:12:22 PM

C:\Users\HMMSX\Documents\BDP\Q_AR_24064_Trafalgar & Burnhamthorpe_Master Plan_R2025_hmmshYTX21.rvt

PART 1, PLAN 20R-18605
PIN 24930-0145 (LT)

LOT 11
PIN 24930-0146 (LT)

PART 2, PLAN 20R-18605

PART 1, PLAN 20R-22413
PIN 24930-0005 (LT)

# PLAN OF SURVEY
# PART OF LOT 12, CONCESSION 1 NORTH OF DUNDAS STREET

GEOGRAPHIC TOWNSHIP OF TRAFALGAR

## CITY OF OAKVILLE

REGIONAL MUNICIPALITY OF HALTON

J.D. BARNES LIMITED

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SCALE 1 : 500

10 0 10 20 30 metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 1451 mm IN WIDTH BY 917 mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:500

METRIC DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

## NOTES

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010.0).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999703.

FOR BEARING COMPARISONS, A ROTATION OF 00°48'00" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P2.

FOR BEARING COMPARISONS, A ROTATION OF 00°50'35" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P4.

## INTEGRATION DATA

OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17, NAD83 (CSRS) (2010.0).

COORDINATES TO AN URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.

| POINT ID | EASTING | NORTHING |
|---|---|---|
| ORP A | 602 046.43 | 4 817 296.75 |
| ORP B | 602 642.12 | 4 817 232.48 |

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

THE RESULTANT TIE BETWEEN ORP A AND ORP B IS 599.33 N83°50'30"E

## LOCAL BENCHMARK

CP LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF WORD POLE S.13m WEST OF C/L OF ROAD.
ELEVATION=183.616m

## TOPOGRAPHIC LEGEND

| | |
|---|---|
| BM | DENOTES BENCH MARK |
| CSP | DENOTES CORRUGATED STEEL PIPE |
| FG | DENOTES FENCE GATE |
| FP | DENOTES FENCE POST |
| HP | DENOTES HYDRO POLE |
| LS | DENOTES LIGHT STANDARD |
| MH | DENOTES MANHOLE |
| MW | DENOTES MONITORING WELL |
| PED | DENOTES TELEPHONE PEDESTAL |
| PVC | DENOTES POLYVINYL CHLORIDE PIPE |
| S | DENOTES SIGN |
| TL | DENOTES TRAFFIC SIGNAL |
| TSC | DENOTES TRAFFIC SIGNAL CONTROL |
| E | DENOTES OVERHEAD HYDRO CABLE |
| | DENOTES SHRUB |
| | DENOTES DECIDUOUS TREE DIA=DIAMETER OF TRUNK IN METRES |
| | DENOTES CONIFEROUS TREE DIA=DIAMETER OF TRUNK IN METRES |

## LEGEND

| | |
|---|---|
| | DENOTES SURVEY MONUMENT FOUND |
| | DENOTES SURVEY MONUMENT SET |
| SIB | DENOTES STANDARD IRON BAR |
| IB | DENOTES IRON BAR |
| RIB | DENOTES ROUND IRON BAR |
| MEAS | DENOTES MEASURED |
| IGS | DENOTES H.D. SEMELL. O.L.S. |
| 760 | DENOTES K.H. McCONELL. O.L.S. |
| 950 | DENOTES J.D. BARNES LIMITED. O.L.S |
| | DENOTES YATES AND PURCELL. O.L.S |
| OU | DENOTES ORIGIN UNKNOWN |
| P1 | DENOTES PLAN 20R-11324 |
| P2 | DENOTES PLAN OF SURVEY BY F.G. CUNNINGHAM O.L.S. DATED NOVEMBER 3, 1966 (PROJECT 66-016W) |
| P3 | DENOTES PLAN 20R-22413 |
| P4 | DENOTES PLAN 20R-18605 |
| P5 | DENOTES PLAN 20R-9655 |

N=NORTH, E=EAST, S=SOUTH, W=WEST

ALL SET SSIB MONUMENTS WERE USED DUE TO LACK OF OVERBURDEN AND/OR PROXIMITY OF UNDERGROUND UTILITIES IN ACCORDANCE WITH SECTION 11 (4) OF O.REG. 525/97.

## SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, AND THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON JANUARY 30, 2025.

FEBRUARY 11, 2025
DATE

R.S. GUDELSKY
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER V-94997

J.D. BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
481 WHEELABRATOR WAY, SUITE 1, MILTON, ONTARIO L9T 3C1
T: (905) 875-9955 F: (905) 875-9956 www.jdbarnes.com

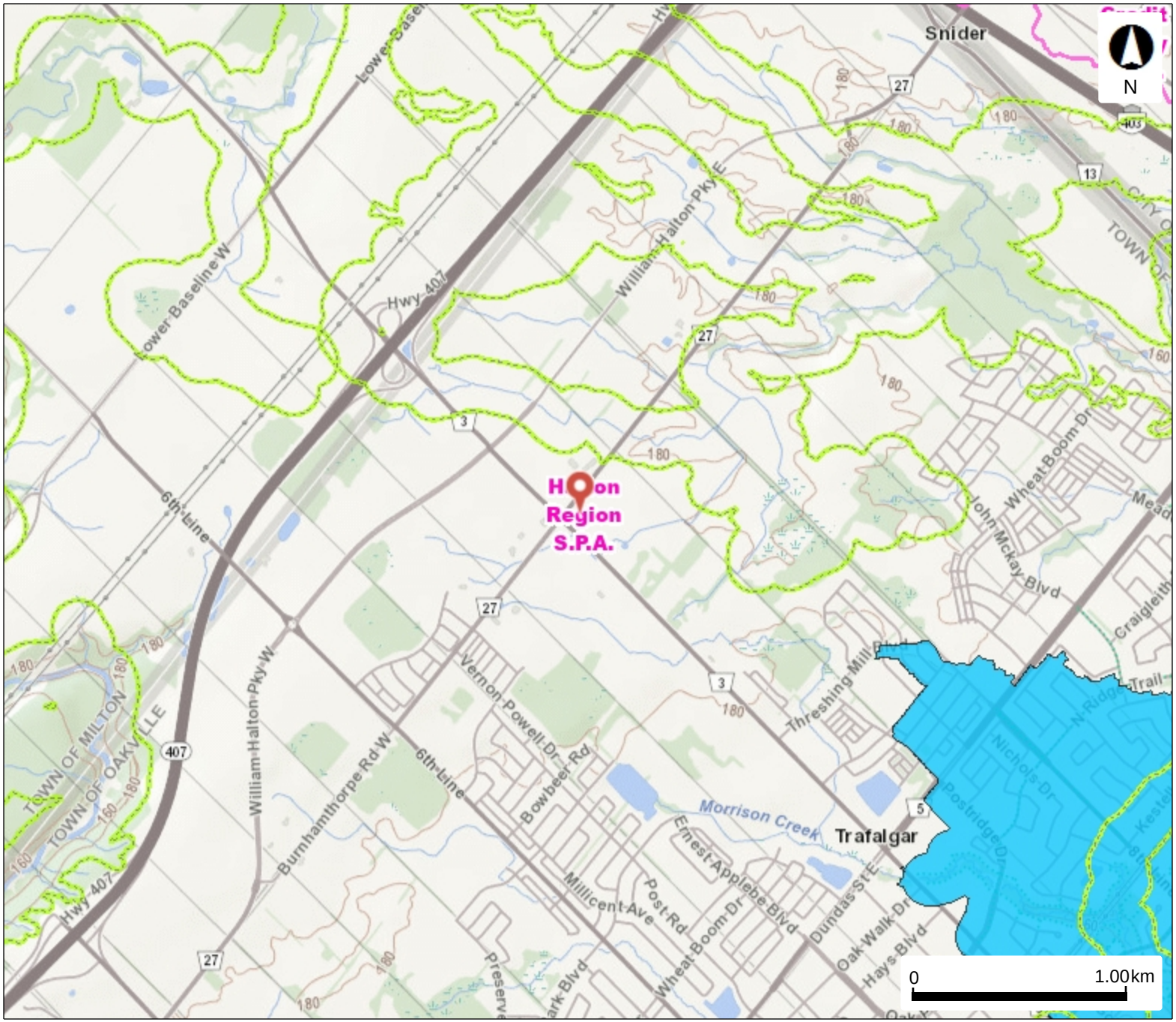
DRAWN BY: TP | CHECKED BY: RSG | REFERENCE NO.: 24-30-276-00 | DATED: 02/11/2025

PLOT DATE: 2/11/2025 10:46 AM

# APPENDIX B



# Source Water Protection Plan




## Legend

- Issue Contributing Areas
- WHPA-E
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Intake Protection Zone 1
- Event Based Areas
- Intake Protection Zone 2
- Source Protection Areas

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

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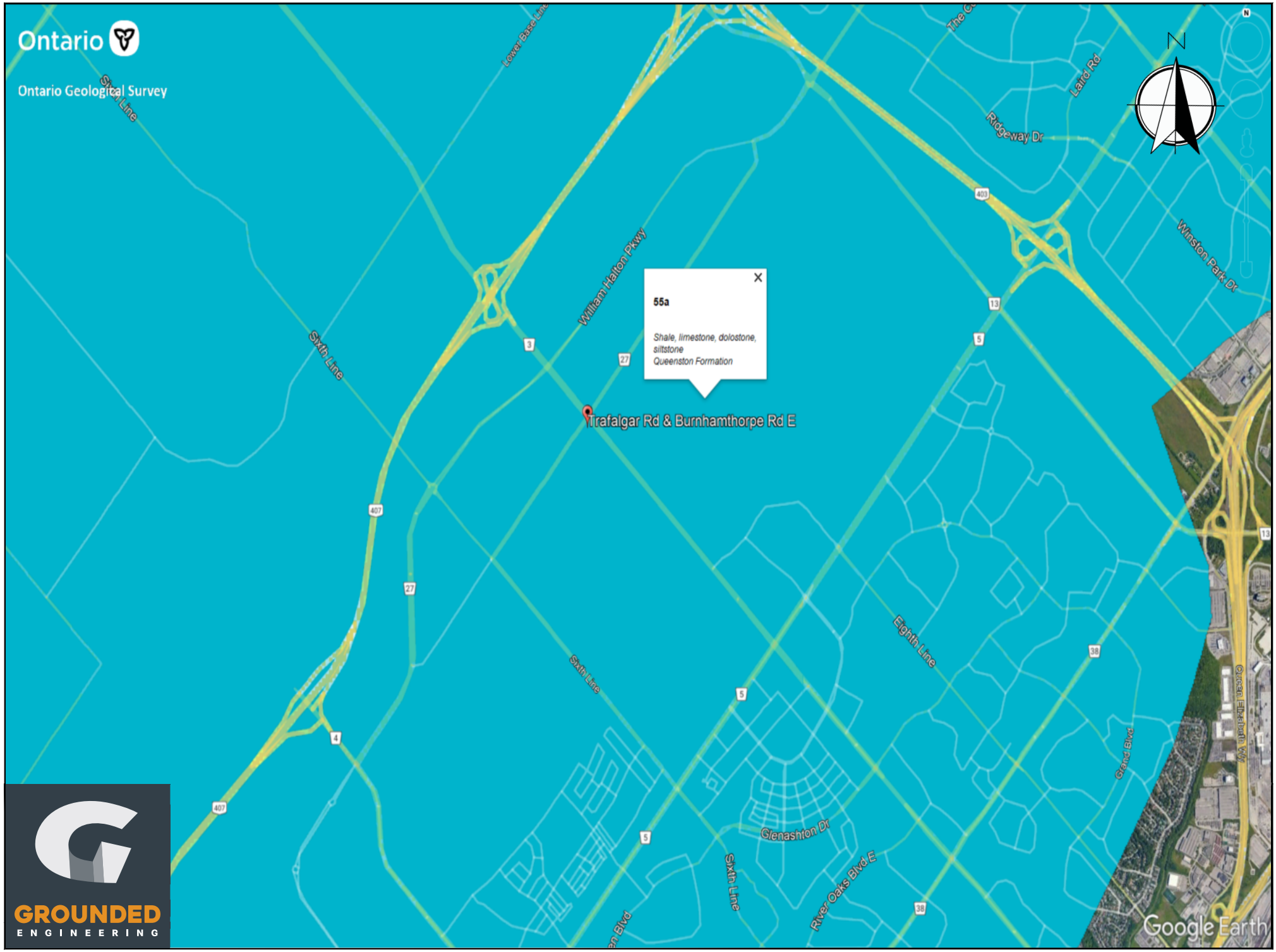
May Not be Reproduced without Permission.
THIS IS NOT A PLAN OF SURVEY.

Map Created: 9/22/2025
Map Center: 43.50192 N, -79.73662 W

# APPENDIX C




Ontario
8b Fine-textured glaciolacustrine deposits
Ontario Geological Survey
Lower Base Line
407
William Halton Pkwy
William Halton Pkwy
3
5d Till
Clay to silt-textured till (derived from glaciolacustrine deposits or shale)
Trafalgar Rd & Burnhamthorpe Rd E
William Halton Pkwy
407
Sixth Line
27
Sixth Line
5
3
North Ridge Trail
Eighth Line
N
GROUNDED
ENGINEERING


Ontario
Ontario Geological Survey
55a
Shale, limestone, dolostone, siltstone
Queenston Formation
Trafalgar Rd & Burnhamthorpe Rd E
William Halton Pkwy
Sixth Line
Eighth Line
Ridgeway Dr
Laird Rd
Winston Park Dr
Glenashton Dr
River Oaks Blvd E
Grand Blvd
Queen Elizabeth Way
403
407
27
3
4
5
13
38
N
Google Earth
GROUNDED
ENGINEERING

# APPENDIX D



| LOCATION_NAME | PROVINCE_OR_TERRITORY | PERIOD_OF_RECORD | ELEMENT_GROUP | NORMALS_ELEMENT | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year | Code |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Daily Average (°C) | -5 | -4.4 | 0.6 | 7 | 13.7 | 19.2 | 22.1 | 21.1 | 16.9 | 10 | 4.1 | -1.6 | 8.6 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | StdDev Mean Monthly Temperature (°C) | 3 | 3 | 2.2 | 1.6 | 2 | 1.3 | 1.8 | 1.3 | 1.7 | 1.3 | 2 | 2.1 | 1.3 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Daily Maximum (°C) | -1.2 | -0.3 | 5 | 12 | 19.2 | 24.5 | 27.4 | 26.3 | 22.3 | 14.6 | 7.9 | 1.9 | 13.3 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Daily Minimum (°C) | -8.9 | -8.5 | -3.8 | 1.9 | 8.2 | 13.9 | 16.6 | 15.8 | 11.6 | 5.3 | 0.2 | -5 | 3.9 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Maximum Daily Mean (°C) | 13.4 | 10.9 | 18.2 | 22.4 | 27.6 | 29.5 | 31.8 | 31.5 | 28.5 | 24.5 | 16.1 | 14.1 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Maximum Daily Mean (°C) Date (yyyy/mm/dd) | 2008-01-08 | 2017-02-23 | 2012-03-22 | 2002-04-17 | 2006-05-30 | 2012-06-20 | 2011-07-21 | 2006-08-01 | 2016-09-07 | 2002-10-01 | 2020-11-10 | 2001-12-05 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Minimum Daily Mean (°C) | -24.7 | -22.3 | -18.8 | -4.7 | 0.9 | 8.4 | 13.6 | 13.2 | 4.5 | -1 | -9.6 | -18.6 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Minimum Daily Mean (°C) Date (yyyy/mm/dd) | 1994-01-15 | 2015-02-15 | 2003-03-03 | 2003-04-06 | 2020-05-08 | 1992-06-20 | 1992-07-31 | 1992-08-13 | 1993-09-30 | 2020-10-30 | 2018-11-22 | 2017-12-31 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Extreme Maximum (°C) | 17.6 | 17.7 | 26 | 29.6 | 34.1 | 36.2 | 37.9 | 37.9 | 35 | 31.8 | 24.3 | 18.3 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Extreme Maximum (°C) Date (yyyy/mm/dd) | 2005-01-13 | 2017-02-23 | 2012-03-22 | 2002-04-16 | 2006-05-29 | 1994-06-18 | 2011-07-21 | 2001-08-08 | 2016-09-07 | 2019-10-01 | 2020-11-10 | 2001-12-05 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Minimum Daily Maximum (°C) | -21 | -19.1 | -12.8 | -3 | 4.8 | 10 | 15.4 | 16.2 | 9.9 | 2.3 | -5.9 | -14.5 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Minimum Daily Maximum (°C) Date (yyyy/mm/dd) | 1994-01-15 | 2015-02-15 | 2003-03-03 | 2003-04-04 | 2020-05-08 | 1992-06-20 | 1992-07-31 | 1992-08-13 | 2000-09-28 | 2020-10-30 | 2018-11-22 | 2017-12-31 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Maximum Daily Minimum (°C) | 11.3 | 6.5 | 11.9 | 16.3 | 22.2 | 24.4 | 26 | 26.3 | 23.4 | 19.4 | 12.3 | 9.8 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Maximum Daily Minimum (°C) Date (yyyy/mm/dd) | 2008-01-08 | 2009-02-11 | 2012-03-23 | 2002-04-17 | 2006-05-30 | 2012-06-20 | 2011-07-21 | 2006-08-01 | 2001-09-09 | 2002-10-01 | 2002-11-10 | 2001-12-05 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Extreme Minimum (°C) | -31 | -25.5 | -24.7 | -9.2 | -4.7 | 3 | 7.9 | 8 | -1.2 | -5.4 | -13.9 | -24.3 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Temperature | Extreme Minimum (°C) Date (yyyy/mm/dd) | 1994-01-16 | 2015-02-15 | 2003-03-03 | 1995-04-05 | 2020-05-09 | 1998-06-05 | 1992-07-22 | 1992-08-20 | 1993-09-30 | 2020-10-31 | 2019-11-13 | 2004-12-20 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Maximum Daily Mean (°C) | 13.4 | 10.9 | 18.2 | 24 | 27.6 | 29.5 | 31.8 | 31.5 | 30 | 24.5 | 16.7 | 15 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Maximum Daily Mean (°C) Date (yyyy/mm/dd) | 2008-01-08 | 2017-02-23 | 2012-03-22 | 1990-04-26 | 2006-05-30 | 2012-06-20 | 2011-07-21 | 2006-08-01 | 1953-09-02 | 2002-10-01 | 1974-11-01 | 1966-12-08 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Minimum Daily Mean (°C) | -24.7 | -23.4 | -18.8 | -11.1 | 0.9 | 5.3 | 11.4 | 9.5 | 2.5 | -3.6 | -11.7 | -20.9 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Minimum Daily Mean (°C) Date (yyyy/mm/dd) | 1994-01-15 | 1943-02-15 | 2003-03-03 | 1972-04-07 | 2020-05-08 | 1945-06-01 | 1968-07-03 | 1965-08-30 | 1965-09-27 | 1969-10-22 | 1949-11-26 | 1942-12-20 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Extreme Maximum (°C) | 17.6 | 17.7 | 26 | 31.1 | 34.4 | 36.7 | 37.9 | 38.3 | 36.7 | 31.8 | 25 | 20 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Extreme Maximum (°C) Date (yyyy/mm/dd) | 2005-01-13 | 2017-02-23 | 2012-03-22 | 1990-04-25 | 1962-05-16 | 1952-06-25 | 2011-07-21 | 1948-08-25 | 1953-09-02 | 2019-10-01 | 1950-11-01 | 1982-12-03 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Minimum Daily Maximum (°C) | -21 | -19.2 | -15 | -5 | 4.4 | 9.4 | 15.4 | 15.6 | 6.7 | 0 | -7.3 | -17.8 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Minimum Daily Maximum (°C) Date (yyyy/mm/dd) | 1994-01-15 | 1979-02-17 | 1938-03-03 | 1972-04-07 | 1976-05-07 | 1945-06-01 | 1992-07-31 | 1964-08-13 | 1950-09-24 | 1969-10-22 | 1987-11-21 | 1955-12-20 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Maximum Daily Minimum (°C) | 11.3 | 6.5 | 12.6 | 17.5 | 22.2 | 24.4 | 26 | 26.3 | 23.4 | 19.4 | 13.9 | 12.8 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Maximum Daily Minimum (°C) Date (yyyy/mm/dd) | 2008-01-08 | 2009-02-11 | 1989-03-28 | 1990-04-26 | 2006-05-30 | 1959-06-29 | 2011-07-21 | 2006-08-01 | 2001-09-09 | 2002-10-01 | 1956-11-01 | 1966-12-08 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Extreme Minimum (°C) | -31.3 | -31.1 | -28.9 | -17.2 | -5.6 | 0.6 | 3.9 | 1.1 | -3.9 | -8.3 | -18.3 | -31.1 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Temperature | Extreme Minimum (°C) Date (yyyy/mm/dd) | 1981-01-04 | 1943-02-15 | 1950-03-04 | 1972-04-07 | 1966-05-07 | 1949-06-08 | 1968-07-30 | 1965-08-30 | 1965-09-27 | 1969-10-23 | 1949-11-26 | 1942-12-20 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Rainfall (mm) | 33.8 | 23.9 | 34 | 70.7 | 77.5 | 80.7 | 74 | 68.5 | 69.4 | 67 | 62.7 | 35.3 | 697.4 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Snowfall (cm) | 31.5 | 27.7 | 17.2 | 4.5 | 0.1 | 0 | 0 | 0 | 0 | 0.2 | 9.3 | 24.1 | 114.5 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Precipitation (mm) | 61.6 | 50.2 | 50.5 | 76.7 | 77.6 | 80.7 | 74 | 68.5 | 69.4 | 67.2 | 71.8 | 58.6 | 806.8 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Average Snow Depth (cm) | 6 | 7 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Median Snow Depth (cm) | 5 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Snow Depth at Month-end (cm) | 8 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Extreme Daily Rainfall (mm) | 59 | 25.8 | 40.8 | 55.8 | 59.4 | 53.8 | 126 | 41.4 | 66.4 | 64.8 | 52.4 | 30.2 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Extreme Daily Rainfall (mm) Date (yyyy/mm/dd) | 2020-01-11 | 2009-02-11 | 1991-03-27 | 1992-04-11 | 2000-05-12 | 2000-06-13 | 2013-07-08 | 1991-08-03 | 1996-09-07 | 1995-10-05 | 1999-11-02 | 1998-12-06 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Extreme Daily Snowfall (cm) | 26.4 | 30.4 | 15.2 | 10.4 | 2.8 | 0 | 0 | 0 | 0 | 2 | 19.4 | 17.4 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Extreme Daily Snowfall (cm) Date (yyyy/mm/dd) | 2019-01-28 | 2008-02-06 | 1998-03-21 | 1994-04-06 | 2020-05-11 | 1991-06-01 | 1991-07-01 | 1991-08-01 | 1991-09-01 | 2018-10-27 | 2020-11-22 | 2014-12-11 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Extreme Daily Precipitation (mm) | 59 | 40.4 | 40.8 | 55.8 | 59.4 | 53.8 | 126 | 41.4 | 66.4 | 64.8 | 52.4 | 30.2 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Extreme Daily Precipitation (mm) Date (yyyy/mm/d | 2020-01-11 | 2001-02-08 | 1991-03-27 | 1992-04-11 | 2000-05-12 | 2000-06-13 | 2013-07-08 | 1991-08-03 | 1996-09-07 | 1995-10-05 | 1999-11-02 | 1998-12-06 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Extreme Snow Depth (cm) | 67 | 48 | 30 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 36 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Precipitation | Extreme Snow Depth (cm) Date (yyyy/mm/dd) | 1999-01-15 | 2008-02-13 | 2008-03-09 | 1994-04-07 | 1991-05-01 | 1991-06-01 | 1991-07-01 | 1991-08-01 | 1991-09-01 | 1991-10-01 | 2002-11-18 | 2008-12-24 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Precipitation | Extreme Daily Rainfall (mm) | 59 | 31.8 | 41.7 | 55.8 | 92.7 | 53.8 | 126 | 80.8 | 108 | 121.4 | 86.1 | 40.9 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Precipitation | Extreme Daily Rainfall (mm) Date (yyyy/mm/dd) | 2020-01-11 | 1975-02-24 | 1942-03-16 | 1992-04-11 | 1944-05-31 | 2000-06-13 | 2013-07-08 | 1970-08-30 | 1948-09-18 | 1954-10-15 | 1962-11-10 | 1962-12-06 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Precipitation | Extreme Daily Snowfall (cm) | 36.8 | 39.9 | 32.3 | 26.7 | 2.8 | 0 | 0 | 0 | 0 | 7.4 | 33.5 | 28.2 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Precipitation | Extreme Daily Snowfall (cm) Date (yyyy/mm/dd) | 1966-01-23 | 1965-02-25 | 1964-03-10 | 1939-04-10 | 2020-05-11 | 1938-06-01 | 1938-07-01 | 1938-08-01 | 1938-09-01 | 1962-10-25 | 1940-11-30 | 1944-12-11 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Precipitation | Extreme Daily Precipitation (mm) | 59 | 55.9 | 41.7 | 55.8 | 92.7 | 53.8 | 126 | 80.8 | 108 | 121.4 | 86.1 | 40.9 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Precipitation | Extreme Daily Precipitation (mm) Date (yyyy/mm/d | 2020-01-11 | 1965-02-25 | 1942-03-16 | 1992-04-11 | 1944-05-31 | 2000-06-13 | 2013-07-08 | 1970-08-30 | 1948-09-18 | 1954-10-15 | 1962-11-10 | 1962-12-06 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Precipitation | Extreme Snow Depth (cm) | 67 | 48 | 30 | 13 | 0 | 0 | 0 | 0 | 0 | 13 | 18 | 36 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Precipitation | Extreme Snow Depth (cm) Date (yyyy/mm/dd) | 1999-01-15 | 2008-02-13 | 2008-03-09 | 1975-04-04 | 1955-05-01 | 1955-06-01 | 1955-07-01 | 1955-08-01 | 1955-09-01 | 1969-10-22 | 2002-11-18 | 2008-12-24 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days With ... | Freezing Rain or Freezing Drizzle | 2 | 1.1 | 0.77 | 0.47 | 0 | 0 | 0 | 0 | 0 | 0 | 0.23 | 0.9 | 5.5 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days With ... | Thunderstorms | 0.13 | 0.3 | 0.5 | 2.2 | 3.5 | 5.1 | 5.5 | 4.7 | 2.6 | 1.3 | 0.4 | 0.2 | 26.3 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days With ... | Hail | 0 | 0 | 0.03 | 0.13 | 0.13 | 0.07 | 0 | 0.07 | 0 | 0.07 | 0.03 | 0 | 0.53 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days With ... | Fog, Ice Fog, or Freezing Fog | 2 | 1.3 | 1.4 | 1 | 1.6 | 0.7 | 0.43 | 0.23 | 0.73 | 1.3 | 1.9 | 1.5 | 14.2 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days With ... | Smoke or Haze | 2.5 | 2.2 | 2.8 | 2.1 | 3.5 | 4.5 | 4.4 | 4.2 | 2.9 | 2.4 | 3.1 | 2.5 | 37.2 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature <= -30 °C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature <= -20 °C | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature <= -10 °C | 2.6 | 1.1 | 0.24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.15 | 4 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature <= 0 °C | 16.9 | 13.7 | 6.3 | 0.44 | 0 | 0 | 0 | 0 | 0 | 0 | 1.5 | 10.7 | 49.5 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature > 0 °C | 14.1 | 14.6 | 24.7 | 29.6 | 31 | 30 | 31 | 31 | 30 | 31 | 28.5 | 20.4 | 315.8 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature > 10 °C | 1.2 | 0.77 | 6.2 | 18.9 | 30 | 30 | 31 | 31 | 29.9 | 25.2 | 9.2 | 1.6 | 214.7 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature > 20 °C | 0 | 0 | 0.6 | 2.8 | 12.3 | 24.6 | 30.5 | 30 | 19.7 | 4.4 | 0.24 | 0 | 125.1 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature > 30 °C | 0 | 0 | 0 | 0 | 0.75 | 3.4 | 7.7 | 4 | 1.3 | 0.08 | 0 | 0 | 17.2 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature > 35 °C | 0 | 0 | 0 | 0 | 0 | 0.07 | 0.54 | 0.19 | 0 | 0 | 0 | 0 | 0.8 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Maximum T | Days with Maximum Temperature > 40 °C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature > 20 °C | 0 | 0 | 0 | 0 | 0.08 | 1.4 | 5.5 | 2.4 | 0.4 | 0 | 0 | 0 | 9.7 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature > 10 °C | 0.04 | 0 | 0.16 | 0.8 | 9.9 | 24.8 | 30.4 | 29.8 | 18.8 | 4 | 0.24 | 0 | 119 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature > 0 °C | 3.5 | 1.9 | 7.6 | 20.7 | 30.4 | 30 | 31 | 31 | 29.8 | 28 | 15.4 | 5.5 | 234.7 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature <= 2 °C | 30 | 27.9 | 27.2 | 15.6 | 2.4 | 0 | 0 | 0 | 0.36 | 7.5 | 20.6 | 29.1 | 160.6 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature <= 0 °C | 27.5 | 26.4 | 23.4 | 9.3 | 0.63 | 0 | 0 | 0 | 0.16 | 3 | 14.6 | 25.5 | 130.6 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature < -2 °C | 24.8 | 23.3 | 18.5 | 4.4 | 0.17 | 0 | 0 | 0 | 0 | 0.64 | 8.7 | 20.5 | 101 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature < -10 °C | 13.4 | 10.8 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 5.7 | 34.2 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature < -20 °C | 1.9 | 0.54 | 0.08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.15 | 2.7 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature < -30 °C | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Minimum T | Days with Minimum Temperature < -40 °C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Rainfall | Days with Rainfall >= 0.2 mm | 6.2 | 4.6 | 7.2 | 11.7 | 12.7 | 10.8 | 10.3 | 9.8 | 10.2 | 12.8 | 10.4 | 7.5 | 114.1 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Rainfall | Days with Rainfall >= 5 mm | 2.2 | 1.8 | 2.2 | 4.7 | 4.8 | 5.2 | 3.9 | 3.9 | 4.5 | 4.1 | 3.7 | 2.6 | 43.5 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Rainfall | Days with Rainfall >= 10 mm | 0.96 | 0.96 | 1 | 2.5 | 2.5 | 3 | 2.5 | 2.3 | 2.3 | 2.2 | 2 | 1.1 | 23.3 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Rainfall | Days with Rainfall >= 25 mm | 0.16 | 0.08 | 0.08 | 0.32 | 0.44 | 0.52 | 0.76 | 0.73 | 0.52 | 0.32 | 0.6 | 0.08 | 4.6 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Rainfall | Days with Rainfall >= 50 mm | 0.04 | 0 | 0 | 0.04 | 0.04 | 0.07 | 0.08 | 0 | 0.04 | 0.04 | 0.04 | 0 | 0.39 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Rainfall | Days with Rainfall >= 100 mm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snowfall | Days with Snowfall >= 0.2 cm | 12.7 | 9.7 | 6.8 | 2.2 | 0.12 | 0 | 0 | 0 | 0 | 0.24 | 3.6 | 9.2 | 44.7 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snowfall | Days with Snowfall >= 5 cm | 1.8 | 1.9 | 1.1 | 0.28 | 0 | 0 | 0 | 0 | 0 | 0 | 0.56 | 1.6 | 7.2 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snowfall | Days with Snowfall >= 10 cm | 0.56 | 0.5 | 0.36 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.52 | 2.2 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snowfall | Days with Snowfall >= 25 cm | 0.04 | 0.08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.12 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snowfall | Days with Snowfall >= 40 cm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Precipitatio | Days with Precipitation >= 0.2 mm | 16.2 | 12 | 12.3 | 12.5 | 12.7 | 10.8 | 10.3 | 9.8 | 10.2 | 12.8 | 12.6 | 14.9 | 147.3 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Precipitatio | Days with Precipitation >= 1 mm | 10.2 | 8.1 | 8.3 | 9.5 | 9.1 | 9 | 8 | 7.4 | 7.8 | 9.2 | 8.9 | 10 | 105.5 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Precipitatio | Days with Precipitation >= 5 mm | 3.9 | 3.4 | 3.2 | 5 | 4.8 | 5.2 | 3.9 | 3.9 | 4.5 | 4.1 | 4.3 | 4 | 50.3 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Precipitatio | Days with Precipitation >= 10 mm | 1.7 | 1.5 | 1.4 | 2.8 | 2.5 | 3 | 2.5 | 2.3 | 2.3 | 2.2 | 2.4 | 1.6 | 26.1 | B |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Precipitatio | Days with Precipitation >= 25 mm | 0.16 | 0.15 | 0.08 | 0.32 | 0.44 | 0.52 | 0.76 | 0.73 | 0.52 | 0.32 | 0.64 | 0.12 | 4.8 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Precipitatio | Days with Precipitation >= 50 mm | 0.04 | 0 | 0 | 0.04 | 0.04 | 0.07 | 0.08 | 0 | 0.04 | 0.04 | 0.04 | 0 | 0.39 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Precipitatio | Days with Precipitation >= 100 mm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snow Depth | Days with Snow Depth >= 1 cm | 21 | 20.4 | 11.4 | 1.3 | 0 | 0 | 0 | 0 | 0 | 0 | 2.3 | 12.2 | 68.6 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snow Depth | Days with Snow Depth >= 5 cm | 13.4 | 10.5 | 6.5 | 0.61 | 0 | 0 | 0 | 0 | 0 | 0 | 0.91 | 5.5 | 37.4 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snow Depth | Days with Snow Depth >= 10 cm | 7.1 | 6 | 4 | 0.22 | 0 | 0 | 0 | 0 | 0 | 0 | 0.32 | 3.2 | 20.8 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snow Depth | Days with Snow Depth >= 20 cm | 2 | 1.6 | 0.78 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.82 | 5.3 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snow Depth | Days with Snow Depth >= 30 cm | 0.78 | 0.79 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.23 | 1.8 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snow Depth | Days with Snow Depth >= 50 cm | 0.13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.13 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Days with Snow Depth | Days with Snow Depth >= 100 cm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Wind Speed (km/h) | 17.9 | 17.8 | 17.5 | 17.3 | 14.8 | 14 | 13.9 | 13.1 | 13.4 | 15 | 16 | 17 | 15.7 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Most Frequent Wind Direction | W | W | N | N | N | W | N | N | W | W | W | W | A | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Days with Winds >= 52 km/h | 2.3 | 2.4 | 2.4 | 3.2 | 1.4 | 1.2 | 0.5 | 0.78 | 0.67 | 2.2 | 2.5 | 2.6 | 22.3 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Days with Winds >= 63 km/h | 0.65 | 0.64 | 0.74 | 0.92 | 0.35 | 0.3 | 0.15 | 0.17 | 0.1 | 0.57 | 0.82 | 0.32 | 5.7 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Days with Gusts >= 90 km/h | 0.19 | 0.32 | 0.29 | 0.2 | 0 | 0.13 | 0.1 | 0 | 0.11 | 0.22 | 0.32 | 0.14 | 2 | D |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Extreme Wind Speed (km/h) | 80 | 70 | 72 | 82 | 70 | 59 | 56 | 59 | 61 | 76 | 72 | 76 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Extreme Wind Speed (km/h) Date (yyyy/mm/dd hh: | 2017-01-11 2:00 | 2002-02-01 15:00 | 2009-03-11 10:00 | 2011-04-28 10:00 | 2002-05-10 12:00 | 2011-06-01 15:00 | 1996-07-19 13:00 | 1992-08-10 19:00 | 2005-09-29 11:00 | 2003-10-15 12:00 | 1992-11-12 23:00 | 2008-12-28 9:00 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Direction of Extreme Wind Speed | W | W | W | W | W | W | NW | NW | NW | W | W | W | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Direction of Extreme Wind Speed Date (yyyy/mm/d | 2017-01-11 2:00 | 2002-02-01 15:00 | 2009-03-11 10:00 | 2011-04-28 10:00 | 2002-05-10 12:00 | 2011-06-01 15:00 | 1996-07-19 13:00 | 1992-08-10 19:00 | 2005-09-29 11:00 | 2003-10-15 12:00 | 1992-11-12 23:00 | 2008-12-28 9:00 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Extreme Gust Speed (km/h) | 109 | 96 | 96 | 115 | 89 | 98 | 104 | 115 | 106 | 102 | 106 | 109 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Extreme Gust Speed (km/h) Date (yyyy/mm/dd) | 1996-01-27 | 1997-02-27 | 1996-03-19 | 2009-04-25 | 1996-05-19 | 1991-06-15 | 2013-07-19 | 2009-08-11 | 2010-09-22 | 2002-10-07 | 1995-11-11 | 1996-12-01 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Direction of Extreme Gust Speed | SW | W | NE | W | SW | SW | NW | NE | NW | W | W | S | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind | Direction of Extreme Gust Speed Date (yyyy/mm/d | 1996-01-27 | 1997-02-27 | 1996-03-19 | 2009-04-25 | 1996-05-19 | 1991-06-15 | 2013-07-19 | 2009-08-11 | 2010-09-22 | 2002-10-07 | 1995-11-11 | 1996-12-01 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind | Extreme Wind Speed (km/h) | 80 | 77 | 97 | 82 | 71 | 63 | 61 | 71 | 77 | 92 | 80 | 76 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind | Extreme Wind Speed (km/h) Date (yyyy/mm/dd hh: | 2017-01-11 2:00 | 1958-02-17 8:00 | 1959-03-15 18:00 | 2011-04-28 10:00 | 1964-05-09 15:00 | 1980-06-20 10:00 | 1964-07-13 2:00 | 1958-08-31 13:00 | 1954-09-22 0:00 | 1954-10-16 0:00 | 1955-11-16 19:00 | 2008-12-28 9:00 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind | Direction of Extreme Wind Speed | W | N | SW | W | W | NW | E | W | W | W | W | W | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind | Direction of Extreme Wind Speed Date (yyyy/mm/d | 2017-01-11 2:00 | 1958-02-17 8:00 | 1959-03-15 18:00 | 2011-04-28 10:00 | 1964-05-09 15:00 | 1980-06-20 10:00 | 1964-07-13 2:00 | 1958-08-31 13:00 | 1954-09-22 0:00 | 1954-10-16 0:00 | 1955-11-16 19:00 | 2008-12-28 9:00 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind | Extreme Gust Speed (km/h) | 115 | 105 | 124 | 115 | 109 | 107 | 135 | 115 | 106 | 104 | 122 | 109 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind | Extreme Gust Speed (km/h) Date (yyyy/mm/dd) | 1978-01-26 | 1956-02-25 | 1964-03-05 | 2009-04-25 | 1983-05-02 | 1990-06-03 | 1956-07-01 | 2009-08-11 | 2010-09-22 | 1989-10-14 | 1955-11-17 | 1996-12-01 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind | Direction of Extreme Gust Speed | E | W | SW | W | W | W | NW | NE | NW | NW | SW | S | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind | Direction of Extreme Gust Speed Date (yyyy/mm/d | 1978-01-26 | 1956-02-25 | 1964-03-05 | 2009-04-25 | 1983-05-02 | 1990-06-03 | 1956-07-01 | 2009-08-11 | 2010-09-22 | 1989-10-14 | 1955-11-17 | 1996-12-01 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Above 24 °C | 0 | 0 | 0 | 0 | 0.5 | 5.9 | 18.2 | 7.9 | 1.7 | 0 | 0 | 0 | 34.1 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Above 18 °C | 0 | 0 | 0 | 0.7 | 16 | 65.4 | 129.5 | 101.1 | 32.4 | 2.5 | 0 | 0 | 347.6 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Above 15 °C | 0 | 0 | 0.5 | 3.5 | 39.5 | 132.4 | 218.9 | 187.2 | 79.9 | 10.4 | 0.1 | 0 | 672.4 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Above 10 °C | 0.2 | 0 | 4.4 | 22.5 | 125.5 | 275.2 | 373.7 | 341.9 | 203.8 | 52.2 | 6 | 0.3 | 1405.7 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Above 5 °C | 3 | 1.7 | 22.2 | 89.5 | 265 | 425.1 | 528.7 | 496.9 | 351.3 | 159 | 39.5 | 5.2 | 2387.2 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Above 0 °C | 22.1 | 17.9 | 79.3 | 214.9 | 419.3 | 575.1 | 683.7 | 651.9 | 501.3 | 308.1 | 131.4 | 38.7 | 3643.7 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Below 0 °C | 175.2 | 134 | 59.6 | 3.1 | 0 | 0 | 0 | 0 | 0 | 0.1 | 13.4 | 87.3 | 472.6 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Below 5 °C | 311.1 | 259.2 | 157.5 | 27.6 | 0.7 | 0 | 0 | 0 | 0 | 5.9 | 71.5 | 208.8 | 1042.4 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Below 10 °C | 463.3 | 398.9 | 294.7 | 110.6 | 16.2 | 0.1 | 0 | 0 | 2.5 | 54.2 | 188 | 358.8 | 1887.3 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Below 15 °C | 618.1 | 540.2 | 445.8 | 241.6 | 85.2 | 7.3 | 0.2 | 0.3 | 28.6 | 167.4 | 332.1 | 513.6 | 2980.4 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Degree Days | Degree Days Below 18 °C | 711.1 | 625 | 538.3 | 328.8 | 154.7 | 30.3 | 3.8 | 7.2 | 71.1 | 252.4 | 422 | 606.6 | 3751.3 | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Quintiles | Quintile 1 (Lower Bound) | 24.4 | 20.2 | 18 | 29.2 | 14.4 | 20.4 | 20.4 | 11.6 | 25.2 | 17.6 | 10.2 | 17 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Quintiles | Quintile 1 (Upper Bound) | 37.5 | 25.5 | 30 | 47.8 | 47.8 | 45 | 34 | 39.5 | 44.2 | 40.2 | 33 | 36.2 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Quintiles | Quintile 2 (Upper Bound) | 47.6 | 38.4 | 40.7 | 63.5 | 67.4 | 59.4 | 57.6 | 52.6 | 52.5 | 54.2 | 58 | 52 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Quintiles | Quintile 3 (Upper Bound) | 63.2 | 47.3 | 52.8 | 88.6 | 79.6 | 72.7 | 85.3 | 67.4 | 69.8 | 66.3 | 70.8 | 62.5 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Quintiles | Quintile 4 (Upper Bound) | 72.2 | 75.3 | 63.7 | 102.7 | 93.3 | 109 | 100.8 | 91.9 | 86.3 | 95.6 | 91.9 | 72.4 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Quintiles | Quintile 5 (Upper Bound) | 133.3 | 107.6 | 98.4 | 133.8 | 152.8 | 191.6 | 193.2 | 154.4 | 166.2 | 136.2 | 141.2 | 99.8 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Humidex | Days with Humidex >= 30 | 0 | 0 | 0 | 0.17 | 3.5 | 10 | 18.3 | 16.2 | 7.2 | 0.55 | 0 | 0 | 55.9 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Humidex | Days with Humidex >= 35 | 0 | 0 | 0 | 0 | 0.9 | 4 | 8 | 6.2 | 2.1 | 0.14 | 0 | 0 | 21.3 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Humidex | Days with Humidex >= 40 | 0 | 0 | 0 | 0 | 0.07 | 0.93 | 2.1 | 1.3 | 0.14 | 0 | 0 | 0 | 4.6 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Humidex | Extreme Humidex | 19 | 19.1 | 29.6 | 34.9 | 42.6 | 45.6 | 50.3 | 46.6 | 43 | 39.1 | 27.4 | 21.1 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Humidex | Extreme Humidex Date (yyyy/mm/dd) | 2005-01-13 | 2018-02-20 | 2012-03-22 | 2002-04-16 | 2006-05-30 | 2018-06-30 | 1995-07-14 | 2006-08-01 | 2018-09-05 | 2007-10-08 | 2020-11-10 | 1998-12-06 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Humidex | Extreme Humidex | 19 | 19.1 | 29.6 | 37.9 | 42.6 | 45.6 | 50.3 | 46.6 | 48 | 39.1 | 28.6 | 23.9 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Humidex | Extreme Humidex Date (yyyy/mm/dd) | 2005-01-13 | 2018-02-20 | 2012-03-22 | 1990-04-25 | 2006-05-30 | 2018-06-30 | 1995-07-14 | 2006-08-01 | 1953-09-01 | 2007-10-08 | 1961-11-03 | 1982-12-03 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind Chill | Days with Wind Chill < -20 | 8.8 | 7 | 1.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.17 | 2.8 | 20.6 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind Chill | Days with Wind Chill < -30 | 1.8 | 0.76 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.14 | 2.8 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind Chill | Days with Wind Chill < -40 | 0.03 | 0.03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind Chill | Days with Wind Chill < -50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind Chill | Extreme Wind Chill | -40.2 | -40.6 | -36.2 | -18.5 | -8.9 | 0 | 0 | 0 | -5.2 | -8.9 | -22.9 | -37.2 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Wind Chill | Extreme Wind Chill Date (yyyy/mm/dd) | 1994-01-15 | 2015-02-15 | 2003-03-03 | 1995-04-05 | 2020-05-09 | 1991-06-01 | 1991-07-01 | 1991-08-01 | 1993-09-30 | 2020-10-30 | 2005-11-25 | 2004-12-20 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind Chill | Extreme Wind Chill | -44.7 | -40.6 | -36.2 | -25.4 | -9.5 | 0 | 0 | 0 | -8 | -13.5 | -25.4 | -38.5 | | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Wind Chill | Extreme Wind Chill Date (yyyy/mm/dd) | 1981-01-04 | 2015-02-15 | 2003-03-03 | 1972-04-07 | 1963-05-01 | 1953-06-01 | 1953-07-01 | 1953-08-01 | 1965-09-27 | 1969-10-23 | 1958-11-30 | 1980-12-25 | | |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Humidity | Average Vapour Pressure (kPa) | 0.4 | 0.4 | 0.5 | 0.6 | 1 | 1.5 | 1.8 | 1.8 | 1.4 | 1 | 0.7 | 0.5 | 1 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Humidity | Average Relative Humidity - 0600LST (%) | 79.2 | 77.4 | 75.2 | 73 | 75.7 | 77.6 | 79.3 | 83.7 | 85.5 | 83.6 | 81.4 | 80.7 | 79.3 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Humidity | Average Relative Humidity - 1500LST (%) | 69.7 | 65.7 | 58.5 | 53.4 | 53.6 | 54.4 | 52.9 | 55.2 | 57.3 | 61.6 | 66.7 | 70.5 | 60 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Pressure | Average Station Pressure (kPa) | 99.6 | 99.6 | 99.6 | 99.4 | 99.4 | 99.3 | 99.4 | 99.5 | 99.7 | 99.6 | 99.6 | 99.6 | 99.5 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Pressure | Average Sea Level Pressure (kPa) | 101.7 | 101.7 | 101.7 | 101.5 | 101.5 | 101.4 | 101.4 | 101.6 | 101.7 | 101.7 | 101.8 | 101.7 | 101.6 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Visibility | Visibility < 1 km (hours with) | 10 | 9.2 | 5.5 | 2.8 | 3.5 | 2.1 | 0.6 | 0.4 | 1.4 | 4.3 | 6.7 | 7 | 53.4 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Visibility | Visibility 1 to 9 km (hours with) | 126.9 | 97.1 | 76.3 | 60.5 | 50.6 | 53.5 | 39.7 | 43.4 | 43.8 | 55.1 | 82.5 | 103.8 | 833.2 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Visibility | Visibility > 9 km (hours with) | 606.9 | 571.7 | 662 | 656.3 | 689.5 | 664 | 702.9 | 699.5 | 674.3 | 684.1 | 630.3 | 632.9 | 7874.4 | A |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Cloud Amount | Cloud Amount 0 to 2 tenths (hours with) | 129.8 | 154.2 | 206.3 | 184.4 | 221.7 | 212 | 229.5 | 261.4 | 257.1 | 200.2 | 141.7 | 131.8 | 2330 | D |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Cloud Amount | Cloud Amount 3 to 7 tenths (hours with) | 94.6 | 104.6 | 117.6 | 121.6 | 152.7 | 179.7 | 214.4 | 200.2 | 166.8 | 139 | 108.3 | 99.8 | 1699.2 | D |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Cloud Amount | Cloud Amount 8 to 10 tenths (hours with | 519.7 | 421.2 | 420.1 | 414.1 | 369.7 | 328.3 | 300.1 | 282.4 | 296.1 | 404.8 | 470 | 512.4 | 4738.8 | D |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Frost-Free | Average Date of Last Spring Frost | | | | | | | | | | | | | 27-Apr | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Frost-Free | Average Date of First Fall Frost | | | | | | | | | | | | | 20-Oct | C |
| TORONTO PEARSON (AIRPORT) | ON | Normal | Frost-Free | Average Length of Frost-Free Period | | | | | | | | | | | | | 174 Days | C |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of last temperature in spring <= 0°C, on | | | | | | | | | | | | | 19-May | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of last temperature in spring <= 0°C, on | | | | | | | | | | | | | 13-May | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of last temperature in spring <= 0°C, on | | | | | | | | | | | | | 10-May | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of last temperature in spring <= 0°C, on | | | | | | | | | | | | | 04-May | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of last temperature in spring <= 0°C, on | | | | | | | | | | | | | 29-Apr | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of last temperature in spring <= 0°C, on | | | | | | | | | | | | | 28-Apr | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of last temperature in spring <= 0°C, on | | | | | | | | | | | | | 17-Apr | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of first temperature in fall <= 0°C, on or | | | | | | | | | | | | | 22-Sep | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of first temperature in fall <= 0°C, on or | | | | | | | | | | | | | 29-Sep | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of first temperature in fall <= 0°C, on or | | | | | | | | | | | | | 04-Oct | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of first temperature in fall <= 0°C, on or | | | | | | | | | | | | | 09-Oct | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of first temperature in fall <= 0°C, on or | | | | | | | | | | | | | 17-Oct | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of first temperature in fall <= 0°C, on or | | | | | | | | | | | | | 20-Oct | |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of first temperature in fall <= 0°C, on or | | | | | | | | | | | | | 30-Oct | |

| | | | | | |
|---|---|---|---|---|---|
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of frost-free period equal to or less than | 134 |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of frost-free period equal to or less than | 143 |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of frost-free period equal to or less than | 149 |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of frost-free period equal to or less than | 156 |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of frost-free period equal to or less than | 166 |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of frost-free period equal to or less than | 170 |
| TORONTO PEARSON (AIRPORT) | ON | Long-Term | Frost-Free | Probability of frost-free period equal to or less than | 187 |

# APPENDIX E



# Water Well Records

December 2, 2025
3:27:42 PM

| TOWNSHIP CON L | UTM | DATE CN | CASING DIA | WATER | PUMP TEST | WELL USE | SCREEN | WELL | FORMATION |
|---|---|---|---|---|---|---|---|---|---|
| MILTON TOWN (TRAFALG | 17 601967 4817316 W | 2014-06 7472 | 2.04 | | | MO | 0015 10 | 7224932 (Z189606) A165987 | BRWN FILL GRVL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY SHLE GRVL PCKD 0025 |
| MILTON TOWN (TRAFALG | 17 601559 4817716 W | 2014-06 7230 | | | | | | 7229890 (C26700) A163756 P | |
| MILTON TOWN (TRAFALG 02 012 | 17 601497 4818080 W | 2005-04 4868 | 29.9 | | | DO | | 2810248 (Z28842) A | |
| MILTON TOWN (TRAFALG DS N 02 012 | 17 601652 4817972 W | 2011-11 7407 | 48 36 | FR | 0///: | ST | | 7173101 (Z136877) A | |
| MILTON TOWN (TRAFALG DS N 02 012 | 17 601684 4818075 W | 2023-08 7472 | 2 | | ///: | MO | 0030 5 | 7459250 (QF8KSN87) A358112 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY TILL PCKD 0035 |
| MILTON TOWN (TRAFALG DS N 02 012 | 17 601562 4817794 W | 2023-08 7472 | 2 | | ///: | MO | 0030 5 | 7459251 (DH6KDO6F) A358110 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY TILL PCKD 0035 |
| MILTON TOWN (TRAFALG DS N 02 012 | 17 601581 4818034 W | 2017-08 7407 | 42 | | | DO | | 7294968 (Z247286) A | |
| MILTON TOWN (TRAFALG DS N 02 013 | 17 601616 4817606 W | 2023-08 7472 | 2 | | ///: | MO | 0010 10 | 7459254 (M3CYQXZW) A358158 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY TILL PCKD 0020 |
| MILTON TOWN (TRAFALG DS N 02 013 | 17 601810 4817300 W | 2023-08 7472 | 2 | | ///: | MO | 0025 10 | 7459252 (WEWYS3ZR) A388064 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY TILL PCKD 0035 |
| OAKVILLE TOWN | 17 602141 4816841 W | 2016-11 7215 | | | | | | 7276686 (C35133) A218531 P | |
| OAKVILLE TOWN | 17 602898 4816533 W | 2018-09 7472 | 2 | | | MO | 0020 10 | 7323167 (Z290871) A258727 | BRWN LOAM LOOS 0001 BRWN FILL GRVL LOOS 0005 GREY CLAY GRVL PCKD 0015 RED SHLE WTHD 0030 |
| OAKVILLE TOWN | 17 602875 4816427 W | 2014-06 7472 | 2.04 | | | MO | 0011 10 | 7224934 (Z189608) A165983 | BRWN FILL GRVL LOOS 0005 GREY CLAY SILT PCKD 0015 BRWN SHLE GRVL PCKD 0021 |
| OAKVILLE TOWN | 17 602904 4816576 W | 2023-03 7644 | | | | | | 7448477 (Z402063) A365238 P | |
| OAKVILLE TOWN | 17 602585 4816717 W | 2014-06 7472 | 2.04 | | | MO | 0020 10 | 7224933 (Z189607) A165985 | BRWN FILL GRVL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY SHLE GRVL PCKD 0030 |

| TOWNSHIP CON L | UTM | DATE CN | CASING DIA | WATER | PUMP TEST | WELL USE | SCREEN | WELL | FORMATION |
|---|---|---|---|---|---|---|---|---|---|
| OAKVILLE TOWN | 17 603080 4816959 W | 2013-10 7360 | | | | | | 7218875 (C23027) A150486 P | |
| OAKVILLE TOWN | 17 601611 4816830 W | 2018-01 6607 | 2.00 | | | MO | 0010 5 | 7307863 (Z266881) A241347 | BRWN CLAY SILT TILL 0015 |
| OAKVILLE TOWN | 17 601685 4816926 W | 2018-01 6607 | 2.00 | | | MO | 0010 5 | 7307864 (Z266882) A241279 | BRWN CLAY SILT TILL 0015 |
| OAKVILLE TOWN | 17 601610 4816830 W | 2018-01 6607 | 2.00 | | | MO | 0025 5 | 7307865 (Z266883) A241281 | BRWN CLAY SILT TILL 0015 GREY CLAY SILT TILL 0030 |
| OAKVILLE TOWN | 17 601729 4817326 W | 2022-03 7464 | | | | | | 7422287 (Z358916) A345376 P | |
| OAKVILLE TOWN | 17 601720 4817313 W | 2022-03 7464 | | | | | | 7422288 (Z358915) A345377 P | |
| OAKVILLE TOWN | 17 601786 4816845 W | 2022-06 7757 | | | | | | 7424715 (Z390846) A334553 P | |
| OAKVILLE TOWN | 17 601592 4817107 W | 2018-01 6607 | 2.00 | | | MO | 0010 5 | 7307861 (Z266879) A241263 | BRWN CLAY SILT TILL 0015 |
| OAKVILLE TOWN | 17 602426 4816936 W | 2023-06 7230 | | | | | | 7455379 (C62859) A375141 P | |
| OAKVILLE TOWN 02 011 | 17 601519 4818094 W | 2005-03 3030 | 36 | 0012 0026 0038 | 14/18/4/1: | DO | | 2810204 (Z23393) A023150 | BRWN LOAM 0001 BRWN CLAY 0012 GREY SILT STNS HARD 0026 GREY SILT SAND LYRD 0038 RED SHLE 0040 |
| OAKVILLE TOWN 02 012 | 17 602094 4817483 W | 2006-10 3349 | | | | | | 2810672 (Z71495) A | |
| OAKVILLE TOWN DS N 01 009 | 17 603137 4818051 W | 2024-08 7472 | 2 | | ///: | MO | 0005 5 | 7489203 (9T8X9AN8) A412681 | GREY SILT TILL PCKD 0010 |
| OAKVILLE TOWN DS N 01 010 | 17 602872 4817607 W | 2024-06 7472 | 2 | | ///: | MO | 0010 10 | 7480860 (LCUVOCR6) A405387 | BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0020 |
| OAKVILLE TOWN DS N 01 010 | 17 603184 4817581 W | 2024-06 7472 | 2 | | ///: | MO | 0008 10 | 7480859 (NU9ZCUKI) A405391 | BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0018 |
| OAKVILLE TOWN DS N 01 010 | 17 602971 4817772 W | 2024-06 7472 | 2 | | ///: | MO | 0008 10 | 7480858 (XIMSFBFW) A405396 | BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0018 |

| TOWNSHIP CON L | UTM | DATE CN | CASING DIA | WATER | PUMP TEST | WELL USE | SCREEN | WELL | FORMATION |
|---|---|---|---|---|---|---|---|---|---|
| OAKVILLE TOWN DS N 01 010 | 17 602742 4817905 W | 2024-06 7472 | 2 | | ///: | MO | 0010 10 | 7480857 (8WS7DDBB) A405392 | BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0020 |
| OAKVILLE TOWN DS N 01 010 | 17 602689 4817964 W | 2024-06 7472 | 2 | | ///: | MO | 0008 10 | 7480856 (XX3N33ZH) A405395 | BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0018 |
| OAKVILLE TOWN DS N 01 010 | 17 603046 4817562 W | 2024-06 7472 | 2 | | ///: | MO | 0010 10 | 7480861 (QIL56QNC) A405381 | BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0020 |
| OAKVILLE TOWN DS N 01 010 | 17 602534 4817967 W | 2024-06 7472 | 2 | | ///: | MO | 0010 10 | 7480855 (SJPK6VF5) A405335 | BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0020 |
| OAKVILLE TOWN DS N 01 010 | 17 602619 4818048 W | 1963-06 1308 | 30 | FR 0018 | 10/20/2/1:0 | DO | | 2802104 () | BRWN CLAY 0005 RED CLAY BLDR 0011 RED SHLE 0021 |
| OAKVILLE TOWN DS N 01 012 | 17 602401 4817024 W | 2009-11 7140 | | | 9///: | NU | | 7135929 (Z01648) A | 0024 GRVL 0025 0026 |
| OAKVILLE TOWN DS N 01 012 | 17 602919 4816789 W | 2020-09 7437 | 2 | | ///: | TH | 0010 10 | 7371381 (Z294108) A280907 | BRWN LOAM 0001 GREY TILL 0005 RED TILL 0008 RED SHLE 0020 |
| OAKVILLE TOWN DS N 01 012 | 17 602559 4816814 W | 2009-10 7219 | 6 | | 18///: | NU | | 7132311 (Z098405) A085721 A | |
| OAKVILLE TOWN DS N 01 012 | 17 602684 4816675 W | 1962-06 1308 | 30 | FR 0020 | 8/18/5/1:0 | DO | | 2802105 () | BRWN CLAY 0008 RED CLAY BLDR 0019 RED SHLE 0020 |
| OAKVILLE TOWN DS N 01 012 | 17 602510 4816850 W | 1965-10 1612 | 6 6 | FR 0065 | 9/14/2/1:30 | DO | | 2802106 () | LOAM 0002 BRWN CLAY 0016 RED SHLE 0068 |
| OAKVILLE TOWN DS N 01 012 | 17 602859 4816560 W | 2020-12 7360 | 2 | | ///: | MO | 0020 10 | 7375761 (8NMEM4NC) A306604 | LOAM 0001 BRWN FILL 0006 GREY TILL HARD 0017 RED SHLE 0030 |
| OAKVILLE TOWN DS N 01 012 | 17 602837 4816527 W | 2020-12 7360 | 2 | | ///: | MO | 0020 10 | 7375762 (75FQPEBV) A306605 | LOAM 0001 BRWN FILL 0006 GREY TILL HARD 0017 RED SHLE 0030 |
| OAKVILLE TOWN DS N 01 012 | 17 602871 4816503 W | 2020-12 7360 | 2 | | ///: | MO | 0020 10 | 7375763 (IWVBAESP) A306606 | LOAM 0001 BRWN FILL 0006 GREY TILL HARD 0017 RED SHLE 0030 |
| OAKVILLE TOWN DS N 01 012 | 17 602917 4816536 W | 2020-12 7360 | 2 | | ///: | MO | 0020 10 | 7375764 (2MC4MXPY) A306631 | LOAM 0001 BRWN FILL 0006 GREY TILL HARD 0017 RED SHLE 0030 |
| OAKVILLE TOWN DS N 01 012 | 17 602811 4816674 W | 7654 | | | | | | 7381974 (C43270) _NO_TAG P | |
| OAKVILLE TOWN DS N 01 012 | 17 602891 4816446 W | 2021-10 7230 | | | | | | 7413066 (C53921) A320636 P | |

| TOWNSHIP CON L | UTM | DATE CN | CASING DIA | WATER | PUMP TEST | WELL USE | SCREEN | WELL | FORMATION |
|---|---|---|---|---|---|---|---|---|---|
| OAKVILLE TOWN DS N 01 012 | 17 602670 4816688 W | 1988-07 4005 | 6 | UK 0048 UK 0061 | 9/53/6/1:0 | DO | | 2806985 (31051) | BRWN CLAY LOOS 0016 RED SHLE HARD 0065 |
| OAKVILLE TOWN DS N 01 012 | 17 602049 4817318 W | 1987-04 4005 | | | | DO | | 2806640 (10163) A | BRWN CLAY FGVL LOOS 0009 GREY CLAY FGVL LOOS 0017 RED CLAY SNDY FGVL 0019 BRWN SAND FGVL LOOS 0021 GREY SAND PCKD 0024 GREY CLAY CGVL LOOS 0030 RED SHLE HARD 0050 |
| OAKVILLE TOWN DS N 01 013 | 17 601815 4816953 W | 1968-04 1307 | 30 | FR 0051 | ///: | DO | | 2802777 () | BRWN LOAM 0012 GREY CLAY 0045 RED SHLE 0051 |
| OAKVILLE TOWN DS N 01 013 | 17 602565 4816547 W | 1953-10 4623 | 5 5 | FR 0040 | 8//4/: | PS | | 2802112 () | LOAM 0002 CLAY BLDR 0008 RED SHLE 0050 |
| OAKVILLE TOWN DS N 01 013 | 17 602635 4816638 W | 2024-06 7725 | | | | | | 7486138 (Z429629) A391595 P | |
| OAKVILLE TOWN DS N 01 013 | 17 602247 4816669 W | 2023-04 7472 | 2 | | ///: | MO | 0031 10 | 7449351 (NTHBMHHU) A375936 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0025 GREY SHLE HARD 0041 |
| OAKVILLE TOWN DS N 01 013 | 17 602324 4816658 W | 2023-04 7472 | 2 | | ///: | MO | 0031 10 | 7449350 (R6LLZBMQ) A376050 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0025 GREY SHLE HARD 0041 |
| OAKVILLE TOWN DS N 01 013 | 17 602397 4816862 W | 2023-04 7472 | 2 | | ///: | MO | 0010 10 | 7449355 (M2NSNJ4I) A376060 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0020 |
| OAKVILLE TOWN DS N 01 013 | 17 602405 4816802 W | 2023-04 7472 | 2 | | ///: | MO | 0010 10 | 7449354 (OUN7QOK6) A375940 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0020 |
| OAKVILLE TOWN DS N 01 013 | 17 602321 4816772 W | 2023-04 7472 | 2 | | ///: | MO | 0010 10 | 7449353 (MWFICUTR) A376049 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0020 |
| OAKVILLE TOWN DS N 01 013 | 17 602374 4816750 W | 2023-04 7472 | 2 | | ///: | MO | 0031 10 | 7449352 (LKNJQBS6) A375964 | BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0025 GREY SHLE HARD 0041 |
| OAKVILLE TOWN DS N 01 013 | 17 602350 4816508 W | 2024-06 7725 | | | | | | 7486136 (Z429631) A391599 P | |
| OAKVILLE TOWN DS N 01 013 | 17 601779 4816945 W | 2022-06 7472 | 2 | | ///: | MO | 0012 10 | 7424292 (6Q6GBWGL) A348376 | BRWN CLAY PCKD 0012 GREY CLAY SILT PCKD 0022 |
| OAKVILLE TOWN DS N 01 013 | 17 602345 4816622 W | 2024-06 7725 | | | | | | 7486135 (Z429630) A391599 P | |
| OAKVILLE TOWN DS N 01 014 | 17 601813 4816909 W | 2022-06 7472 | 2 | | ///: | MO | 0015 10 | 7424293 (WQ3GBA4V) A353058 | BRWN CLAY PCKD 0012 GREY CLAY SILT PCKD 0025 |

| TOWNSHIP CON L | UTM | DATE CN | CASING DIA | WATER | PUMP TEST | WELL USE | SCREEN | WELL | FORMATION |
|---|---|---|---|---|---|---|---|---|---|
| OAKVILLE TOWN DS N 01 014 | 17 601671 4816780 W | 1985-09 4207 | 6 6 | | ///: | NU | | 2806398 () A | BRWN CLAY 0018 RED SHLE 0090 |
| OAKVILLE TOWN DS N 01 014 | 17 601692 4816820 W | 1985-09 4207 | 6 6 | SA 0045 | 20/65/1/: | NU | | 2806399 () A | BRWN CLAY 0018 RED SHLE 0065 |
| OAKVILLE TOWN DS N 01 014 | 17 601844 4816850 W | 2022-06 7472 | 2 | | ///: | MO | 0005 10 | 7424294 (WK8OO5NI) A353056 | BRWN CLAY PCKD 0012 GREY CLAY SILT PCKD 0015 |
| OAKVILLE TOWN DS N 02 010 | 17 602479 4817999 W | 1963-11 1308 | 30 | SA 0022 SA 0051 | 18/52/1/1:0 | ST DO | | 2802197 () | RED CLAY MSND BLDR 0019 RED SHLE 0053 |
| OAKVILLE TOWN DS N 02 012 | 17 602134 4817519 W | 1955-05 1642 | 6 | FR 0025 | 5/24/1/: | | | 2802203 () A | MSND CLAY 0025 RED SHLE 0080 |
| OAKVILLE TOWN DS N 02 012 | 17 602144 4817529 W | 1955-05 1642 | 6 | SA 0090 | 8//1/: | NU | | 2802202 () A | MSND CLAY 0025 RED SHLE 0091 |
| OAKVILLE TOWN DS N 02 012 | 17 602198 4817597 W | 1955-05 1642 | 6 6 | FR 0025 | 5/24/1/: | PS | | 2802204 () | CLAY MSND 0025 RED SHLE 0080 |
| OAKVILLE TOWN DS N 02 012 | 17 602094 4817438 W | 1962-08 4602 | 6 6 | MN 0026 | 6/56/1/2:0 | PS | | 2802205 () | MSND CLAY 0021 RED SHLE 0056 |
| OAKVILLE TOWN DS N 02 012 | 17 602103 4817473 W | 1971-04 3637 | 30 | FR 0020 FR 0028 | 7/30//4:0 | DO | | 2803735 () | BRWN LOAM 0001 BRWN MSND CLAY 0007 BRWN CLAY 0020 RED SHLE 0030 |
| OAKVILLE TOWN DS N 02 013 | 17 601842 4817140 W | 1956-11 1642 | 6 6 | FR 0062 | 6/60/1/0:15 | ST DO | | 2802207 () | PRDG 0012 BLUE CLAY 0049 RED SHLE 0066 |
| OAKVILLE TOWN DS N 02 013 | 17 601915 4817223 W | 1979-01 4005 | 6 | FR 0062 | 8/43/1/1:0 | DO | | 2805349 () | BRWN CLAY SNDY LOOS 0008 BRWN SAND BLDR GRVL 0016 GREY CLAY LOOS 0022 BRWN CLAY BLDR SNDY 0030 BRWN CLAY SNDY LOOS 0036 RED SHLE HARD 0065 |
| OAKVILLE TOWN DS N 02 013 | 17 601865 4817178 W | 1967-02 1612 | 7 7 | FR 0065 | 26/70/1/2:0 | DO | | 2802209 () | LOAM 0001 BRWN CLAY 0050 RED SHLE 0070 |
| OAKVILLE TOWN DS N 02 014 | 17 601687 4816952 W | 1985-07 4005 | 6 | FR 0066 | 12/69/1/1:0 | DO | | 2806310 () | BRWN CLAY SNDY LOOS 0008 GREY CLAY LOOS 0025 GREY CLAY GRVL LOOS 0048 GREY SAND LOOS 0050 RED SHLE HARD 0070 |

Notes:
UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: .Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code
PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL ( AUDIT # ) Well Tag . A: Abandonment; P: Partial Data Entry Only

## 1. Core Material and Descriptive te

| Code | Description | Code | Description | Code | Description | Code | Description | Code | Description |
|---|---|---|---|---|---|---|---|---|---|
| BLDR | BOULDERS | FCRD | FRACTURED | IRFM | IRON FORMATION | PORS | POROUS | SOFT | SOFT |
| BSLT | BASALT | FGRD | FINE-GRAINED | LIMY | LIMY | PRDG | PREVIOUSLY DUG | SPST | SOAPSTONE |
| CGRD | COARSE-GRAINED | FGVL | FINE GRAVEL | LMSN | LIMESTONE | PRDR | PREV. DRILLED | STKY | STICKY |
| CGVL | COARSE GRAVEL | FILL | FILL | LOAM | TOPSOIL | QRTZ | QUARTZITE | STNS | STONES |
| CHRT | CHERT | FLDS | FELDSPAR | LOOS | LOOSE | QSND | QUICKSAND | STNY | STONEY |
| CLAY | CLAY | FLNT | FLINT | LTCL | LIGHT-COLOURED | QTZ | QUARTZ | THIK | THICK |
| CLN | CLEAN | FOSS | FOSILIFEROUS | LYRD | LAYERED | ROCK | ROCK | THIN | THIN |
| CLYY | CLAYEY | FSND | FINE SAND | MARL | MARL | SAND | SAND | TILL | TILL |
| CMTD | CEMENTED | GNIS | GNEISS | MGRD | MEDIUM-GRAINED | SHLE | SHALE | UNKN | UNKNOWN TYPE |
| CONG | CONGLOMERATE | GRNT | GRANITE | MGVL | MEDIUM GRAVEL | SHLY | SHALY | VERY | VERY |
| CRYS | CRYSTALLINE | GRSN | GREENSTONE | MRBL | MARBLE | SHRP | SHARP | WBRG | WATER-BEARING |
| CSND | COARSE SAND | GRVL | GRAVEL | MSND | MEDIUM SAND | SHST | SCHIST | WDFR | WOOD FRAGMENTS |
| DKCL | DARK-COLOURED | GRWK | GREYWACKE | MUCK | MUCK | SILT | SILT | WTHD | WEATHERED |
| DLMT | DOLOMITE | GVLY | GRAVELLY | OBDN | OVERBURDEN | SLTE | SLATE | | |
| DNSE | DENSE | GYPS | GYPSUM | PCKD | PACKED | SLTY | SILTY | | |
| DRTY | DIRTY | HARD | HARD | PEAT | PEAT | SNDS | SANDSTONE | | |
| DRY | DRY | HPAN | HARDPAN | PGVL | PEA GRAVEL | SNDY | SANDYOAPSTONE | | |

## 2. Core Color

| Code | Description |
|---|---|
| WHIT | WHITE |
| GREY | GREY |
| BLUE | BLUE |
| GREN | GREEN |
| YLLW | YELLOW |
| BRWN | BROWN |
| RED | RED |
| BLCK | BLACK |
| BLGY | BLUE-GREY |

## 3. Well Use

| Code | Description | Code | Description |
|---|---|---|---|
| DO | Domestic | OT | Other |
| ST | Livestock | TH | Test Hole |
| IR | Irrigation | DE | Dewatering |
| IN | Industrial | MO | Monitoring |
| CO | Commercial | MT | Monitoring TestHole |
| MN | Municipal | | |
| PS | Public | | |
| AC | Cooling And A/C | | |
| NU | Not Used | | |

## 4. Water Detail

| Code | Description | Code | Description |
|---|---|---|---|
| FR | Fresh | GS | Gas |
| SA | Salty | IR | Iron |
| SU | Sulphur | | |
| MN | Mineral | | |
| UK | Unknown | | |

# APPENDIX F



# BOREHOLE LOG TERMINOLOGY

GROUNDED ENGINEERING

## SAMPLING/TESTING METHODS

SS: split spoon sample

AS: auger sample

GS: grab sample

FV: shear vane

DP: direct push

PMT: pressuremeter test

ST: shelby tube

CORE: soil coring

RUN: rock coring

## SYMBOLS & ABBREVIATIONS

MC: moisture content

LL: liquid limit

PL: plastic limit

PI: plasticity index

γ: soil unit weight (bulk)

$G_s$: specific gravity

$S_u$: undrained shear strength

▽ unstabilized water level

▼ 1st water level measurement

▼ 2nd water level measurement most recent

▼ water level measurement

## ENVIRONMENTAL SAMPLES

M&I: metals and inorganic parameters

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

VOC: volatile organic compound

PHC: petroleum hydrocarbon

BTEX: benzene, toluene, ethylbenzene and xylene

PPM: parts per million

## FIELD MOISTURE (based on tactile inspection)

**DRY:** no observable pore water

**MOIST:** inferred pore water, not observable (i.e. grey, cool, etc.)

**WET:** visible pore water

## COHESIONLESS

| Relative Density | N-Value |
|---|---|
| Very Loose | <4 |
| Loose | 4 - 10 |
| Compact | 10 - 30 |
| Dense | 30 - 50 |
| Very Dense | >50 |

## COHESIVE

| Consistency | N-Value | Su (kPa) |
|---|---|---|
| Very Soft | <2 | <12 |
| Soft | 2 - 4 | 12 - 25 |
| Firm | 4 - 8 | 25 - 50 |
| Stiff | 8 - 15 | 50 - 100 |
| Very Stiff | 15 - 30 | 100 - 200 |
| Hard | >30 | >200 |

## COMPOSITION

| Term | % by weight |
|---|---|
| ***trace*** silt | <10 |
| ***some*** silt | 10 - 20 |
| silt***y*** | 20 - 35 |
| sand ***and*** silt | >35 |

## ASTM STANDARDS

**ASTM D1586 Standard Penetration Test (SPT)**
Driving a 51 mm O.D. split-barrel sampler ("split spoon") into soil with a 63.5 kg weight free falling 760 mm. The blows required to drive the split spoon 300 mm ("bpf") after an initial penetration of 150 mm is referred to as the N-Value.

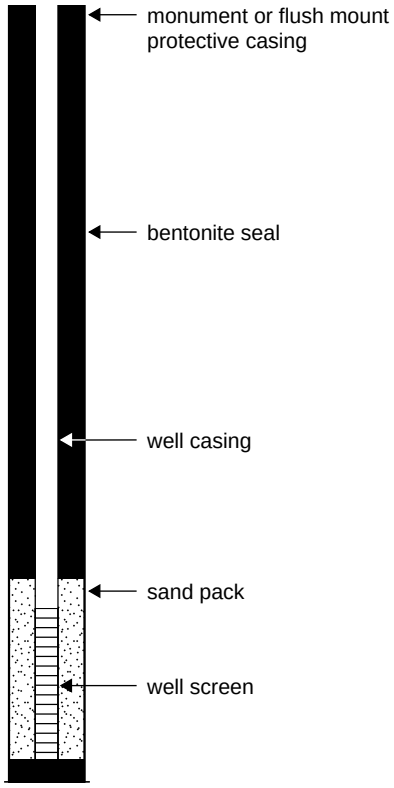
**ASTM D3441 Cone Penetration Test (CPT)**
Pushing an internal still rod with a outer hollow rod ("sleeve") tipped with a cone with an apex angle of 60° and a cross-sectional area of 1000 $mm^2$ into soil. The resistance is measured in the sleeve and at the tip to determine the skin friction and the tip resistance.

**ASTM D2573 Field Vane Test (FVT)**
Pushing a four blade vane into soil and rotating it from the surface to determine the torque required to shear a cylindrical surface with the vane. The torque is converted to the shear strength of the soil using a limit equilibrium analysis.

**ASTM D1587 Shelby Tubes (ST)**
Pushing a thin-walled metal tube into the in-situ soil at the bottom of a borehole, removing the tube and sealing the ends to prevent soil movement or changes in moisture content for the purposes of extracting a relatively undisturbed sample.

**ASTM D4719 Pressuremeter Test (PMT)**
Place an inflatable cylindrical probe into a pre-drilled hole and expanding it while measuring the change in volume and pressure in the probe. It is inflated under either equal pressure increments or equal volume increments. This provides the stress-strain response of the soil.

## WELL LEGEND



GROUNDED ENGINEERING

**Date Started** : Jun 2, 2025
**Position** : E: 602245, N: 4817567 (UTM 17T)
**Elev. Datum** : Geodetic

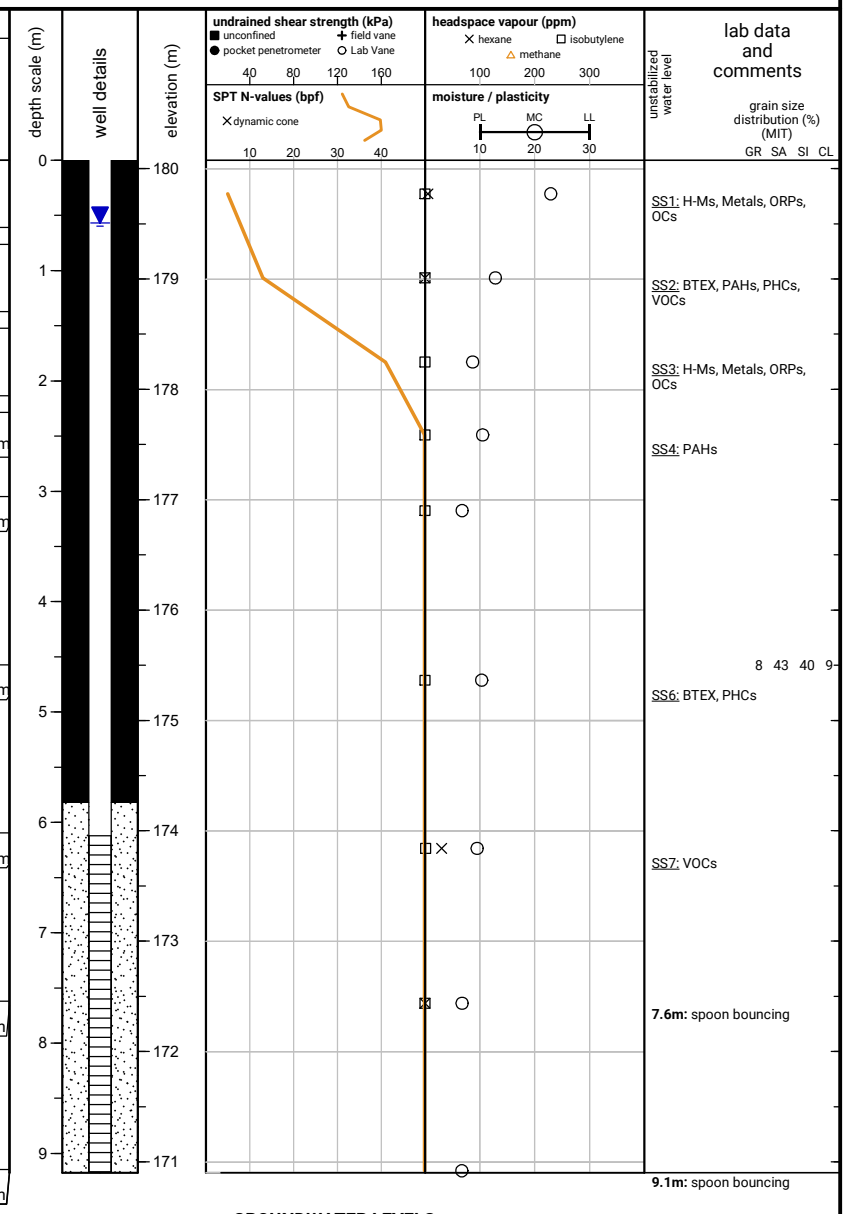
# BOREHOLE LOG 101

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev / depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **180.1** | **GROUND SURFACE** | | | | |
| 179.9 / 0.2 | 100mm **AGGREGATE**<br>50mm **TOPSOIL** | | 1 | SS | 5 |
| 179.3 / 0.8 | **FILL**, clayey silt, some sand, trace gravel, trace rootlets, firm, dark brown, moist | | 2 | SS | 13 |
| 178.6 / 1.5 | **SANDY SILT**, some clay, trace gravel, trace rootlets, compact, reddish brown, moist (REWORKED) | | 3 | SS | 41 |
| | **SAND AND SILT**, trace clay, trace gravel, trace rock fragments, dense, reddish brown, moist<br>(HALTON TILL)<br>...at 2.3 m, some clay, very dense | | 4 | SS | 85 / 250mm |
| | ...at 3.0 m, trace clay, grey | | 5 | SS | 50 / 100mm |
| | ...at 4.6 m, wet | | 6 | SS | 50 / 125mm |
| | ...at 6.1 m, trace rock fragments, reddish brown, moist | | 7 | SS | 50 / 125mm |
| 172.5 / 7.6 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 8 | SS | 50 / 40mm |
| 170.9 / 9.2 | **END OF BOREHOLE** | | 9 | SS | 50 / 25mm |

solid stem augers OD=150 mm




**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 0.6 | 179.5 |
| Jul 18, 2025 | 0.7 | 179.4 |
| Aug 8, 2025 | 1.0 | 179.1 |
| Sep 5, 2025 | 0.7 | 179.4 |
| Oct 3, 2025 | 0.6 | 179.5 |

Water level and cave not measured upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**Date Started** : Jun 2, 2025
**Position** : E: 602194, N: 4817474 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 102

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| 182.5 | **GROUND SURFACE** | | | | |
| | 50mm **TOPSOIL** | | 1 | SS | 10 |
| | **FILL**, sandy silt, some clay, trace gravel, trace rootlets, organic odour, compact, dark brown, moist | | | | |
| | ...at 0.8 m, clayey silt, sandy, stiff, reddish brown, moist | | 2 | SS | 12 |
| | ...at 1.5 m, silty sand, trace clay, trace gravel, trace shale fragments, compact | | 3 | SS | 11 |
| | ...at 2.3 m, sand and gravel, trace silt, dense, brown, wet | | 4 | SS | 46 |
| 179.5 / 3.0 | **SAND AND SILT**, trace clay, trace gravel, very dense, brown, moist (HALTON TILL) | | 5 | SS | 50 / 150mm |
| 177.9 / 4.6 | **SANDY SILT**, some clay, trace gravel, very dense, grey, moist (HALTON TILL) | | 6 | SS | 50 / 125mm |
| | | | 7 | SS | 50 / 100mm |
| | | | 8 | SS | 50 / 75mm |
| | ...at 9.1 m, some shale fragments, wet | | 9 | SS | 50 / 50mm |
| 173.1 / 173.0 / 9.5 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 10 | SS | 50 / 50mm |

solid stem augers OD=150 mm

**END OF BOREHOLE**

Water level and cave not measured upon completion of drilling.

depth scale (m) 0 1 2 3 4 5 6 7 8 9

well details

elevation (m) 182 181 180 179 178 177 176 175 174 173

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene △ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS1: OCs
SS2: H-Ms, Metals, ORPs
SS3: PAHs, VOCs
SS4: BTEX, PHCs
SS5: H-Ms, Metals, PAHs, OCs
SS6: BTEX, PHCs, VOCs

1 23 66 10

**9.1m:** switch to hollow stem augers
**9.4m:** auger grinding, spoon bouncing

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**GROUNDED ENGINEERING**

**Date Started** : Jun 9, 2025
**Position** : E: 602058, N: 4817345 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 103

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| 183.5 | **GROUND SURFACE** | | | | |
| 183.3 | 225mm **TOPSOIL** | | | | |
| 0.2 | **FILL**, sandy silt, trace gravel, trace clay, trace rootlets, loose, dark brown, moist | | 1 | SS | 7 |
| 182.7 | | | | | |
| 0.8 | **SANDY SILT**, clayey, some shale fragments, trace gravel, trace rock fragments, compact, brown, moist (HALTON TILL) | | 2 | SS | 17 |
| | ...at 1.5 m, dense | | 3 | SS | 32 |
| | ...at 2.3 m, some gravel, very dense | | 4A | SS | 50 |
| | ...at 2.5 m, some clay | | 4B | | |
| | | | 5 | SS | 52 |
| | ...at 4.6 m, sand, some silt, grey | | 6 | SS | 50 / 125mm |
| | ...at 6.1 m, silty | | 7 | SS | 50 / 100mm |
| | | | 8 | SS | 88 / 200mm |
| 174.1 | | | 9 | SS | 50 / 100mm |
| 9.4 | | | | | |

depth scale (m) | well details | elevation (m)

**undrained shear strength (kPa)** — unconfined, field vane, pocket penetrometer, Lab Vane; 40 80 120 160

**SPT N-values (bpf)** — dynamic cone; 10 20 30 40

**headspace vapour (ppm)** — hexane, isobutylene, methane; 100 200 300

**moisture / plasticity** — PL MC LL; 10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT) GR SA SI CL

SS1: H-Ms, Metals, ORPs, OCs

SS2: BTEX, PAHs, PHCs

SS3: VOCs

11 26 42 21

4B: H-Ms, Metals, ORPs

SS5: PAHs, OCs

SS7: BTEX, PHCs

SS8: VOCs
**7.9m:** auger grinding

**8.8m:** auger grinding

**END OF BOREHOLE**

Unstabilized water level measured at 7.0 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 1.9 | 181.6 |
| Jun 17, 2025 | 2.0 | 181.5 |
| Jul 18, 2025 | 1.7 | 181.8 |
| Aug 8, 2025 | 1.8 | 181.7 |
| Sep 5, 2025 | 1.9 | 181.6 |
| Oct 3, 2025 | 1.9 | 181.6 |

file: 25-069 gint.gpj



**Tech** : EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 3, 2025
**Position** : E: 602375, N: 4817364 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 104

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev / depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **184.6** | **GROUND SURFACE** | | | | |
| | 50mm **TOPSOIL** | | 1 | SS | 5 |
| | **FILL**, sandy silt, trace clay, trace gravel, trace rootlets, organic odour, loose to compact, brown, moist | | | | |
| | ...at 0.8 m, trace rock fragments | | 2 | SS | 13 |
| | ...at 1.5 m, trace shale fragments | | 3 | SS | 9 |
| 182.3 / 2.3 | **SANDY SILT**, some clay, trace gravel, compact, brown, moist (HALTON TILL) | | 4 | SS | 23 |
| | ...at 3.0 m, dense<br>...at 3.2 m, very dense | | 5A<br>5B | SS | 45 |
| | ...at 4.6 m, brown with orange | | 6 | SS | 51 |
| | ...at 6.3 m, clayey silt, trace sand, hard, grey | | 7A<br>7B | SS | 37 |
| 177.0 / 7.6 | **SILTY SAND**, trace gravel, trace clay, trace rock fragments, very dense, grey, moist (HALTON TILL) | | 8 | SS | 78 / 275mm |
| | | | 9 | SS | 50 / 100mm |
| | | | 10 | SS | 50 / 50mm |
| 172.7 / 11.9 | ...at 11.9 m, clayey, some shale fragments, wet | | 11 | SS | 50 / 25mm |

hollow stem augers OD=215 mm

depth scale (m): 0 1 2 3 4 5 6 7 8 9 10 11

well details

elevation (m): 184 183 182 181 180 179 178 177 176 175 174 173

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene △ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level ▽

**lab data and comments**

grain size distribution (%) (MIT)
GR SA SI CL

SS1: OCs

SS2: BTEX, PHCs, VOCs

SS3: H-Ms, Metals, ORPs, PAHs

2 6 72 20

**10.7m:** no recovery, auger grinding

**11.9m:** spoon bouncing, auger refusal

**END OF BOREHOLE**

Unstabilized water level measured at 5.5 m below ground surface; caved to 8.5 m below ground surface upon completion of drilling.

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 4, 2025
**Position** : E: 602272, N: 4817338 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 105

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

solid stem augers OD=150 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **181.5** | **GROUND SURFACE** | | | | |
| | **FILL**, sandy silt, some clay, trace gravel, trace rootlets, organic odour, loose, brown, moist | | 1 | SS | 8 |
| 180.7 / 0.8 | **SANDY SILT**, some clay, trace gravel, trace rock fragments, compact, brown, moist (REWORKED) | | 2 | SS | 24 |
| 180.0 / 1.5 | **SAND AND SILT**, trace clay, trace gravel, trace rock fragments, very dense, brown, moist | | 3 | SS | 43 |
| | | | 4 | SS | 97 / 250mm |
| | ...at 3.0 m, wet | | 5 | SS | 50 / 125mm |
| | ...at 4.6 m, sandy silt, clayey, grey<br>...at 4.6 m, some clay, trace shale fragments, reddish brown | | 6A<br>6B | SS | 50 / 100mm |
| | | | 7 | SS | 50 / 100mm |
| 173.9 / 7.6 | **CLAYEY SILT**, some sand, trace gravel, trace shale fragments, hard (HALTON TILL) | | 8 | SS | 50 / 25mm |
| 172.3 / 9.2 | ...at 9.1 m, some shale fragments | | 9 | SS | 50 / 75mm |

depth scale (m): 0 1 2 3 4 5 6 7 8 9

well details

elevation (m): 181 180 179 178 177 176 175 174 173

undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane; 40 80 120 160

SPT N-values (bpf): dynamic cone; 10 20 30 40

headspace vapour (ppm): hexane, isobutylene, methane; 100 200 300

moisture / plasticity: PL MC LL; 10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT): GR SA SI CL

SS2: OCs

SS3: H-Ms, Metals, ORPs

**END OF BOREHOLE**

Unstabilized water level measured at 6.4 m below ground surface; caved to 7.0 m below ground surface upon completion of drilling.

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

# BOREHOLE LOG 106

**Date Started** : Jun 4, 2025
**Position** : E: 602172, N: 4817202 (UTM 17T)
**Elev. Datum** : Geodetic

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **182.3** | **GROUND SURFACE** | | | | |
| | 100mm **TOPSOIL** | | 1 | SS | 11 |
| | **FILL**, sandy silt, trace gravel, trace rootlets, organic odour, compact to loose, dark brown, moist | | | | |
| | ...at 0.8 m, silty sand | | 2 | SS | 8 |
| | ...at 1.5 m, sandy silt, some clay, dark grey | | 3 | SS | 14 |
| 180.0 / 2.3 | **SANDY SILT**, some clay, some gravel, trace rock fragments, trace rootlets, compact, brown, moist (HALTON TILL) | | 4 | SS | 19 |
| | ...at 3.0 m, very dense | | 5 | SS | 57 |
| 177.7 / 4.6 | **SAND**, some silt, very dense, grey, moist | | 6 | SS | 50 / 100mm |
| | ...at 6.1 m, silty, some clay, trace shale fragments | | 7 | SS | 50 / 75mm |
| 174.7 / 7.6 | **INFERRED BEDROCK**, shale fragments, wet (WEATHERED) | | 8 | SS | 50 / 100mm |
| 173.1 / 9.2 | | | 9 | SS | 50 / 25mm |

depth scale (m): 0 1 2 3 4 5 6 7 8 9

well details

elevation (m): 182 181 180 179 178 177 176 175 174

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene △ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS1: OCs

SS2: H-Ms, Metals, ORPs

SS3: BTEX, PAHs, PHCs, VOCs

13 26 41 20

**4.9m:** auger grinding

**6.1m:** spoon bouncing

**END OF BOREHOLE**

Unstabilized water level measured at 6.1 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 1.1 | 181.2 |
| Jul 9, 2025 | 1.2 | 181.1 |
| Jul 18, 2025 | 1.4 | 180.9 |
| Aug 8, 2025 | 1.8 | 180.5 |
| Sep 5, 2025 | 1.9 | 180.4 |
| Oct 3, 2025 | 2.1 | 180.2 |

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 3, 2025
**Position** : E: 602468, N: 4817301 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 107

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **180.3** | **GROUND SURFACE** | | | | |
| | 25mm **TOPSOIL** | | 1 | SS | 9 |
| | **FILL**, clayey silt, some sand, trace gravel, trace rootlets, firm, dark brown, moist | | | | |
| | ...at 0.8 m, sandy, soft, wet | | 2 | SS | 3 |
| 178.8 / 1.5 | **SAND AND SILT**, trace gravel, trace clay, very dense, brown, moist (HALTON TILL) | | 3 | SS | 58 |
| | | | 4 | SS | 50 / 150mm |
| | | | 5 | SS | 50 / 115mm |
| 175.7 / 4.6 | **SANDY SILT**, some clay, some gravel, trace shale fragments, very dense, reddish brown, moist (HALTON TILL) | | 6 | SS | 50 / 150mm |
| | ...at 6.1 m, some shale fragments, wet | | 7 | SS | 50 / 100mm |
| 172.6 / 7.7 | **END OF BOREHOLE** | | 8 | SS | 50 / 50mm |

solid stem augers OD=150 mm

depth scale (m): 0, 1, 2, 3, 4, 5, 6, 7

well details

elevation (m): 180, 179, 178, 177, 176, 175, 174, 173

undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane; 40, 80, 120, 160

SPT N-values (bpf): dynamic cone; 10, 20, 30, 40

headspace vapour (ppm): hexane, isobutylene, methane; 100, 200, 300

moisture / plasticity: PL, MC, LL; 10, 20, 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT): GR SA SI CL

SS2: OCs

SS3: H-Ms, Metals, ORPs

**5.5m:** auger grinding **to 6.1m**

**7.0m:** auger grinding **to 7.6m**

Water level and cave not measured upon completion of drilling.

**file:** 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**Date Started** : Jun 6, 2025
**Position** : E: 602381, N: 4817231 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 108

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **180.6** | **GROUND SURFACE** | | | | |
| 180.3 / 0.3 | 275mm **TOPSOIL** | | 1 | SS | 9 |
| | **SANDY SILT**, some clay, trace gravel, trace rootlets, loose, greyish brown, moist (REWORKED) | | 2A | SS | 23 |
| 179.6 / 1.0 | ...at 0.8 m, trace rock fragments, compact | | 2B | | |
| | **SAND AND SILT**, trace gravel, trace clay, trace rock fragments, compact, brown, moist (HALTON TILL) | | 3 | SS | 53 |
| | ...at 1.5 m, very dense | | 4 | SS | 50 / 125mm |
| | ...at 3.0 m, grey | | 5 | SS | 50 / 125mm |
| 176.0 / 4.6 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 6 | SS | 50 / 100mm |
| 174.5 / 6.1 | ...at 6.1 m, wet | | 7 | SS | 50 / 25mm |

depth scale (m) 0 1 2 3 4 5 6

well details

elevation (m) 180 179 178 177 176 175

undrained shear strength (kPa) ■ unconfined ● pocket penetrometer + field vane ○ Lab Vane — 40 80 120 160

SPT N-values (bpf) × dynamic cone — 10 20 30 40

headspace vapour (ppm) × hexane □ isobutylene △ methane — 100 200 300

moisture / plasticity — PL MC LL — 10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT) GR SA SI CL

2B: H-Ms, Metals, ORPs

SS3: OCs

▽ **5.5m:** auger grinding

**END OF BOREHOLE**

Unstabilized water level measured at 5.5 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 0.6 | 180.0 |
| Jul 18, 2025 | 1.4 | 179.2 |
| Aug 8, 2025 | 2.0 | 178.6 |
| Sep 5, 2025 | 2.5 | 178.1 |
| Oct 3, 2025 | 2.6 | 178.0 |

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**Date Started** : Jun 27, 2025
**Position** : E: 602381, N: 4817231 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 108S

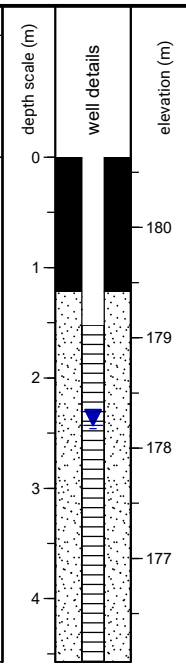
**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

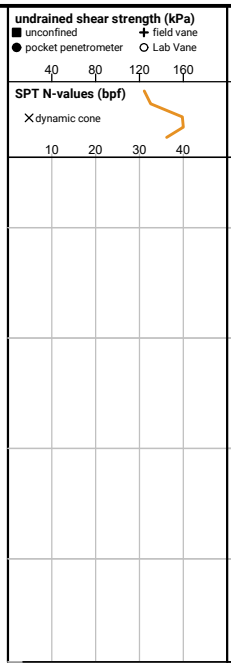
drill method : CME TRACK

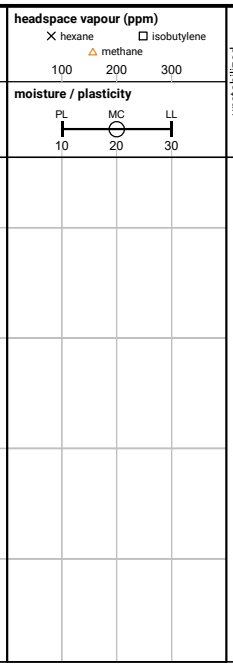
| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **180.6** | **GROUND SURFACE** | | | | |
| 180.3 / 0.3 | Straight drilled<br>Refer to borehole 108 for stratigraphy | | | | |
| 179.6 / 1.0 | | | | | |
| 176.0 / 4.6 | **END OF BOREHOLE** | | | | |

hollow stem augers OD=215 mm

Dry and open upon completion of drilling.




unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jul 9, 2025 | 1.3 | 179.3 |
| Jul 18, 2025 | 1.4 | 179.2 |
| Aug 8, 2025 | 2.0 | 178.6 |
| Sep 5, 2025 | 2.5 | 178.1 |
| Oct 3, 2025 | 2.4 | 178.2 |

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 9, 2025
**Position** : E: 602268, N: 4817089 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 109

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

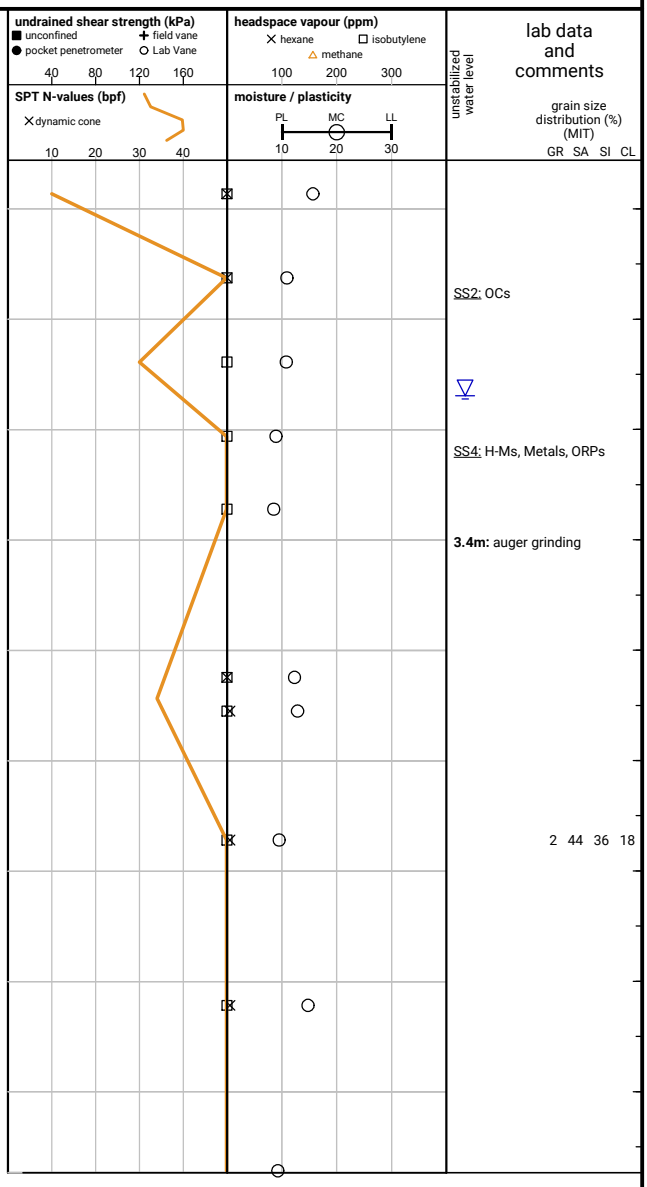
drill method : CME TRACK

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **182.4** | **GROUND SURFACE** | | | | |
| | 25mm **TOPSOIL** | | 1 | SS | 10 |
| 181.6 / 0.8 | **FILL**, sandy silt, some clay, trace gravel, trace rootlets, compact, brown, moist | | | | |
| | **SANDY SILT**, some clay, trace gravel, trace rock fragments, cobbles (inferred), dense, brown, moist (REWORKED) | | 2 | SS | 60 |
| | | | 3 | SS | 30 |
| 180.1 / 2.3 | **SANDY SILT**, trace clay, trace gravel, trace rock fragments, cobbles (inferred), dense, brown, moist (HALTON TILL) | | 4 | SS | 89 / 275mm |
| | ...at 3.0 m, some clay, very dense | | 5 | SS | 50 / 75mm |
| 177.8 / 4.6 | **SAND**, some silt, trace gravel, dense, grey, wet | | 6A / 6B | SS | 34 |
| | ...at 4.8 m, some gravel, cobbles (inferred) | | | | |
| | ...at 6.1 m, sand and silt, some shale fragments, some clay, trace gravel, very dense | | 7 | SS | 50 / 125mm |
| 174.8 / 7.6 | **INFERRED BEDROCK**, shale fragments, wet (WEATHERED) | | 8 | SS | 50 / 75mm |
| 173.2 / 9.2 | ...at 9.1 m, moist | | 9 | SS | 50 / 25mm |

solid stem augers OD=150 mm

**END OF BOREHOLE**

Unstabilized water level measured at 2.1 m below ground surface; caved to 4.3 m below ground surface upon completion of drilling.




**file:** 25-069 gint.gpj



**Tech** : EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 5, 2025
**Position** : E: 602602, N: 4817203 (UTM 17T)
**Elev. Datum** : Geodetic

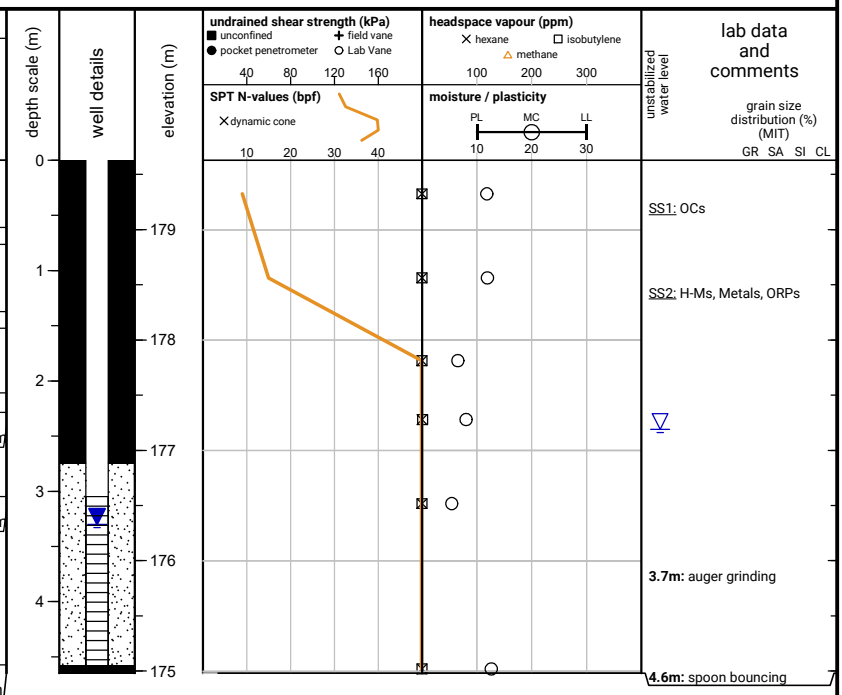
# BOREHOLE LOG 110

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **179.6** | **GROUND SURFACE** | | | | |
| 179.4 | 200mm **TOPSOIL** | | | | |
| 0.2 | **SANDY SILT**, some clay, trace gravel, trace rootlets, loose to compact, brown, moist (REWORKED) | | 1 | SS | 9 |
| | | | 2 | SS | 15 |
| 178.1 | | | | | |
| 1.5 | **SILT AND SAND**, trace gravel, trace clay, very dense, brown with orange, moist (HALTON TILL) | | 3 | SS | 64 |
| | ...at 2.3 m, trace rock fragments, cobbles (inferred) | | 4 | SS | 50 / 125mm |
| 176.6 | | | | | |
| 3.0 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 5 | SS | 50 / 125mm |
| 175.0 | | | | | |
| 4.6 | ...at 4.6 m, wet | | 6 | SS | 50 / 75mm |




**END OF BOREHOLE**

Unstabilized water level measured at 2.4 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 0.9 | 178.7 |
| Jul 18, 2025 | 1.9 | 177.7 |
| Aug 8, 2025 | 2.6 | 177.0 |
| Sep 5, 2025 | 3.1 | 176.5 |
| Oct 3, 2025 | 3.3 | 176.3 |

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

**Date Started** : Jun 5, 2025
**Position** : E: 602508, N: 4817128 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 111

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

| elev depth (m) | description | graphic log | samples: number | samples: type | samples: SPT N-value |
|---|---|---|---|---|---|
| **181.7** | **GROUND SURFACE** | | | | |
| 181.4 / 0.3 | 300mm **TOPSOIL** | | 1 | SS | 12 |
| 180.9 / 0.8 | **SANDY SILT**, some clay, trace gravel, trace rootlets, compact, brown, moist (REWORKED) | | | | |
| | **SILT**, some sand, trace clay, trace gravel, compact, greyish brown, moist | | 2 | SS | 20 |
| | ...at 1.5 m, trace rock fragments, dense | | 3A | SS | 37 |
| | ...at 1.8 m, sandy silt, brown, grey | | 3B | | |
| | ...at 2.3 m, sand and silt, very dense, moist | | 4 | SS | 50 / 125mm |
| | ...at 3.0 m, grey | | 5 | SS | 50 / 125mm |
| | | | 6 | SS | 50 / 125mm |
| | ...at 6.1 m, clayey with shale fragments, reddish brown, wet | | 7 | SS | 50 / 25mm |
| 174.1 / 7.6 | **INFERRED BEDROCK**, shale fragments (WEATHERED) | | 8 | SS | 50 / 25mm |
| 172.5 / 9.2 | **END OF BOREHOLE** | | 9 | SS | 50 / 25mm |

solid stem augers OD=150 mm

depth scale (m): 0 1 2 3 4 5 6 7 8 9

well details

elevation (m): 181 180 179 178 177 176 175 174 173

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene △ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS2: OCs

5 50 39 6

SS4: H-Ms, Metals, ORPs

**5.8m:** auger grinding

Unstabilized water level measured at 2.4 m below ground surface; caved to 4.9 m below ground surface upon completion of drilling.

**file:** 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

**GROUNDED ENGINEERING**

**Date Started** : Jun 6, 2025
**Position** : E: 602362, N: 4817017 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 112

**File No.** : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **185.0** | **GROUND SURFACE** | | | | |
| 184.7 / 0.3 | 50mm **ASPHALT**<br>250mm **TOPSOIL** | | 1 | SS | 17 |
| | **SANDY SILT**, some clay, trace gravel, trace rootlets until 0.9m, compact, brown, moist (REWORKED) | | 2 | SS | 18 |
| 183.2 / 1.8 | **SANDY SILT**, some clay, trace gravel, very dense, brown, moist (HALTON TILL)<br>...at 2.3 m, trace rock fragments, cobbles (inferred) | | 3 | SS | 26 |
| | | | 4 | SS | 54 |
| | ...at 3.0 m, silt and sand | | 5 | SS | 93 / 275mm |
| | ...at 4.6 m, sand and silt, brown with orange, wet | | 6 | SS | 50 / 100mm |
| | ...at 6.1 m, grey | | 7 | SS | 50 / 75mm |
| | | | 8 | SS | 50 / 75mm |
| 175.8 / 9.2 | ...at 9.1 m, clayey with shale fragments | | 9 | SS | 50 / 50mm |

depth scale (m): 0 1 2 3 4 5 6 7 8 9

well details

elevation (m): 184 183 182 181 180 179 178 177 176

**undrained shear strength (kPa)**
■ unconfined + field vane
● pocket penetrometer ○ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene
△ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS2: H-Ms, Metals, ORPs, PAHs

SS3: BTEX, PHCs

SS4: PAHs

**3.0m:** auger grinding, added water

SS5: BTEX, H-Ms, Metals, ORPs, PHCs

**5.2m:** auger grinding

5 46 45 4

**END OF BOREHOLE**

Water level and cave not measured upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Jun 12, 2025 | 2.5 | 182.5 |
| Jun 17, 2025 | 3.3 | 181.7 |
| Jul 18, 2025 | 3.2 | 181.8 |
| Aug 8, 2025 | 3.6 | 181.4 |
| Sep 5, 2025 | 4.1 | 180.9 |
| Oct 3, 2025 | 4.4 | 180.6 |

file: 25-069 gint.gpj



**Tech** : KS/EB | **PM** : KrS | **Rev** : KB

# APPENDIX G



# FINAL REPORT

## CA40176-JUN25 R1

## 25-069-150, Burnhamthorpe Rd & Trafalgar

Prepared for

Grounded Engineering Inc.

# FINAL REPORT



## First Page

CLIENT DETAILS

| | |
|---|---|
| Client | Grounded Engineering Inc. |
| Address | 49 Mobile Drive<br>Toronto, Ontario<br>M4A 1H5. Canada |
| Contact | Sam Bastan |
| Telephone | |
| Facsimile | |
| Email | sbastan@groundedeng.ca |
| Project | 25-069-150, Burnhamthorpe Rd & Trafalgar |
| Order Number | |
| Samples | Ground Water (1) |

LABORATORY DETAILS

| | |
|---|---|
| Project Specialist | Maarit Wolfe, Hon.B.Sc |
| Laboratory | SGS Canada Inc. |
| Address | 185 Concession St., Lakefield ON, K0L 2H0 |
| Telephone | 705-652-2000 |
| Facsimile | 705-652-6365 |
| Email | Maarit.Wolfe@sgs.com |
| SGS Reference | CA40176-JUN25 |
| Received | 06/17/2025 |
| Approved | 06/19/2025 |
| Report Number | CA40176-JUN25 R1 |
| Date Reported | 07/22/2025 |

COMMENTS

RL - SGS Reporting Limit

Temperature of Sample upon Receipt: 8 degrees C
Cooling Agent Present: yes
Custody Seal Present: yes

Chain of Custody Number: 042898

Tag 9 - Dibenzo(a,i)pyrene RL increased due to a drop in instrument sensitivity. PAH total remains unchanged

SIGNATORIES

Maarit Wolfe, Hon.B.Sc





Member of the SGS Group (SGS SA)

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Legend..... 21

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**Client:** Grounded Engineering Inc.
**Project:** 25-069-150, Burnhamthorpe Rd & Trafalgar
**Project Manager:** Sam Bastan
**Samplers:** LB

MATRIX: WATER

**Sample Number** 9
**Sample Name** SW-UF-BH106
**Sample Matrix** Ground Water
**Sample Date** 17/06/2025

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

| Parameter | Units | RL | L1 | L2 | Result |
|---|---|---|---|---|---|
| **General Chemistry** | | | | | |
| Carbonaceous Biochemical Oxygen Demand | mg/L | 2 | | | < 4 ↑ |
| Biochemical Oxygen Demand (BOD5) | mg/L | 2 | 300 | 15 | < 4 ↑ |
| Total Suspended Solids | mg/L | 2 | 350 | 15 | 4 |
| Total Kjeldahl Nitrogen | as N mg/L | 0.5 | 100 | | 1.8 |
| **Metals and Inorganics** | | | | | |
| Cyanide (total) | mg/L | 0.01 | 2 | 0.02 | < 0.01 |
| Fluoride | mg/L | 0.06 | 10 | | 0.32 |
| Sulphate | mg/L | 1 | 1500 | | 440 |
| Aluminum (total) | mg/L | 0.001 | 50 | | 0.030 |
| Antimony (total) | mg/L | 0.0009 | 5 | | < 0.0009 |
| Arsenic (total) | mg/L | 0.0002 | 1 | 0.02 | 0.0033 |
| Beryllium (total) | mg/L | 0.000007 | 5 | | < 0.000007 |
| Cadmium (total) | mg/L | 0.000003 | 1 | 0.008 | 0.000023 |
| Chromium (total) | mg/L | 0.00008 | 3 | 0.08 | 0.00024 |
| Cobalt (total) | mg/L | 0.000004 | 5 | | 0.000738 |
| Copper (total) | mg/L | 0.001 | 3 | 0.04 | 0.002 |
| Iron (total) | mg/L | 0.007 | 50 | | 0.351 |
| Lead (total) | mg/L | 0.00009 | 3 | 0.12 | < 0.00009 |
| Manganese (total) | mg/L | 0.00001 | 5 | 0.05 | 0.146 |
| Molybdenum (total) | mg/L | 0.0004 | 5 | | 0.0095 |

**Client:** Grounded Engineering Inc.
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MATRIX: WATER

**Sample Number** 9
**Sample Name** SW-UF-BH106
**Sample Matrix** Ground Water
**Sample Date** 17/06/2025

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

| Parameter | Units | RL | L1 | L2 | Result |
|---|---|---|---|---|---|
| **Metals and Inorganics (continued)** | | | | | |
| Nickel (total) | mg/L | 0.0001 | 3 | 0.08 | 0.0009 |
| Phosphorus (total) | mg/L | 0.003 | 10 | 0.4 | 0.005 |
| Selenium (total) | mg/L | 0.00004 | 5 | 0.02 | 0.00013 |
| Silver (total) | mg/L | 0.00005 | 5 | 0.12 | < 0.00005 |
| Tin (total) | mg/L | 0.00006 | 5 | | 0.00324 |
| Titanium (total) | mg/L | 0.0001 | 5 | | 0.0007 |
| Zinc (total) | mg/L | 0.002 | 3 | 0.04 | 0.003 |
| **Microbiology** | | | | | |
| Ecoli | mpn/100mL | 0 | | 200 | 0 |
| **Nonylphenol and Ethoxylates** | | | | | |
| Nonylphenol | mg/L | 0.001 | | 0.001 | < 0.001 |
| Nonylphenol Ethoxylates | mg/L | 0.01 | | 0.01 | < 0.01 |
| **Oil and Grease** | | | | | |
| Oil & Grease (total) | mg/L | 2 | | | < 2 |
| Oil & Grease (animal/vegetable) | mg/L | 4 | 150 | | < 4 |
| Oil & Grease (mineral/synthetic) | mg/L | 4 | 15 | | < 4 |

**Client:** Grounded Engineering Inc.
**Project:** 25-069-150, Burnhamthorpe Rd & Trafalgar
**Project Manager:** Sam Bastan
**Samplers:** LB

MATRIX: WATER

**Sample Number** 9
**Sample Name** SW-UF-BH106
**Sample Matrix** Ground Water
**Sample Date** 17/06/2025

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

| Parameter | Units | RL | L1 | L2 | Result |
|---|---|---|---|---|---|
| **Organochlorine Pests (OCs)** | | | | | |
| Hexachlorobenzene | mg/L | 0.00001 | | 0.00004 | < 0.00001 |
| **Other (ORP)** | | | | | |
| pH | No unit | 0.05 | 10 | 8.5 | 7.70 |
| Chromium VI | mg/L | 0.0002 | | 0.04 | < 0.0002 |
| Mercury (total) | mg/L | 0.00001 | 0.05 | 0.0004 | < 0.00001 |
| **PAHs** | | | | | |
| Benzo(b+j)fluoranthene | mg/L | 0.0001 | | | < 0.0001 |
| **PCBs** | | | | | |
| Polychlorinated Biphenyls (PCBs) - Total | mg/L | 0.0001 | | 0.0004 | < 0.0001 |
| **Pesticides** | | | | | |
| Aldrin + Dieldrin | mg/L | 0.00002 | | 0.00008 | < 0.00002 |
| Chlordane (total) | mg/L | 0.00002 | | 0.04 | < 0.001↑ |
| DDT+Metabolites | mg/L | 0.00004 | | | < 0.00004 |
| op-DDT | mg/L | 0.00002 | | | < 0.00002 |
| pp-DDD | mg/L | 0.00002 | | | < 0.00002 |
| pp-DDE | mg/L | 0.00001 | | | < 0.00001 |
| pp-DDT | mg/L | 0.00002 | | | < 0.00002 |
| o,p-DDD | mg/L | 0.00002 | | | < 0.00002 |
| o,p-DDE | mg/L | 0.00001 | | | < 0.00001 |
| Mirex | mg/L | 0.001 | | 0.04 | < 0.001 |
| Hexachlorocyclohexane | mg/L | 0.001 | | 0.04 | < 0.001 |

**Client:** Grounded Engineering Inc.
**Project:** 25-069-150, Burnhamthorpe Rd & Trafalgar
**Project Manager:** Sam Bastan
**Samplers:** LB

MATRIX: WATER

**Sample Number** 9
**Sample Name** SW-UF-BH106
**Sample Matrix** Ground Water
**Sample Date** 17/06/2025

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

| Parameter | Units | RL | L1 | L2 | Result |
|---|---|---|---|---|---|
| **Phenols** | | | | | |
| 4AAP-Phenolics | mg/L | 0.001 | 1 | 0.008 | < 0.001 |
| **SVOCs** | | | | | |
| PAHs (Total) | mg/L | | | 0.002 | < 0.001 |
| Perylene | mg/L | 0.0005 | | | < 0.0005 |
| di-n-Butyl Phthalate | mg/L | 0.002 | | 0.015 | < 0.002 |
| Bis(2-ethylhexyl)phthalate | mg/L | 0.002 | | 0.0088 | < 0.002 |
| 3,3-Dichlorobenzidine | mg/L | 0.0005 | | 0.0008 | < 0.0005 |
| Pentachlorophenol | mg/L | 0.0005 | | 0.002 | < 0.0005 |
| **SVOCs - PAHs** | | | | | |
| Naphthalene | mg/L | 0.0005 | 0.14 | | < 0.0005 |
| 7Hdibenzo(c,g)carbazole | mg/L | 0.0001 | | | < 0.0001 |
| Anthracene | mg/L | 0.0001 | | | < 0.0001 |
| Benzo(a)anthracene | mg/L | 0.0001 | | | < 0.0001 |
| Benzo(a)pyrene | mg/L | 0.0001 | | | < 0.0001 |
| Benzo(e)pyrene | mg/L | 0.0001 | | | < 0.0001 |
| Benzo(ghi)perylene | mg/L | 0.0002 | | | < 0.0002 |
| Benzo(k)fluoranthene | mg/L | 0.0001 | | | < 0.0001 |
| Chrysene | mg/L | 0.0001 | | | < 0.0001 |
| Dibenzo(a,h)anthracene | mg/L | 0.0001 | | | < 0.0001 |
| Dibenzo(a,i)pyrene | mg/L | 0.0001 | | | < 0.0002↑ |
| Dibenzo(a,j)acridine | mg/L | 0.0001 | | | < 0.0001 |

**Client:** Grounded Engineering Inc.
**Project:** 25-069-150, Burnhamthorpe Rd & Trafalgar
**Project Manager:** Sam Bastan
**Samplers:** LB

MATRIX: WATER

**Sample Number** 9
**Sample Name** SW-UF-BH106
**Sample Matrix** Ground Water
**Sample Date** 17/06/2025

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

| Parameter | Units | RL | L1 | L2 | Result |
|---|---|---|---|---|---|
| **SVOCs - PAHs (continued)** | | | | | |
| Fluoranthene | mg/L | 0.0001 | | | < 0.0001 |
| Indeno(1,2,3-cd)pyrene | mg/L | 0.0002 | | | < 0.0002 |
| Phenanthrene | mg/L | 0.0001 | | | < 0.0001 |
| Pyrene | mg/L | 0.0001 | | | < 0.0001 |
| **VOCs** | | | | | |
| Chloroform | mg/L | 0.0005 | 0.04 | 0.002 | 0.0011 |
| 1,2-Dichlorobenzene | mg/L | 0.0005 | | 0.0056 | < 0.0005 |
| 1,4-Dichlorobenzene | mg/L | 0.0005 | 0.08 | 0.0068 | < 0.0005 |
| cis-1,2-Dichloroethylene | mg/L | 0.0005 | | 0.0056 | < 0.0005 |
| trans-1,3-Dichloropropene | mg/L | 0.0005 | | 0.0056 | < 0.0005 |
| Methylene Chloride | mg/L | 0.0005 | 2 | 0.0052 | < 0.0005 |
| Tetrachloroethylene (perchloroethylene) | mg/L | 0.0005 | 1 | 0.0044 | < 0.0005 |
| Trichloroethylene | mg/L | 0.0005 | 0.4 | 0.0076 | < 0.0005 |
| 1,1,2,2-Tetrachloroethane | mg/L | 0.0005 | | 0.017 | < 0.0005 |

**Client:** Grounded Engineering Inc.
**Project:** 25-069-150, Burnhamthorpe Rd & Trafalgar
**Project Manager:** Sam Bastan
**Samplers:** LB

MATRIX: WATER

**Sample Number** 9
**Sample Name** SW-UF-BH106
**Sample Matrix** Ground Water
**Sample Date** 17/06/2025

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

| Parameter | Units | RL | L1 | L2 | Result |
|---|---|---|---|---|---|
| **VOCs - BTEX** | | | | | |
| Benzene | mg/L | 0.0005 | 0.01 | 0.002 | < 0.0005 |
| Ethylbenzene | mg/L | 0.0005 | 0.16 | 0.002 | < 0.0005 |
| Toluene | mg/L | 0.0005 | 0.016 | 0.002 | < 0.0005 |
| m-p-xylene | mg/L | 0.0005 | | | < 0.0005 |
| o-xylene | mg/L | 0.0005 | | | < 0.0005 |
| Xylene (total) | mg/L | 0.0005 | | | < 0.0005 |

## EXCEEDANCE SUMMARY

| Parameter | Method | Units | Result | SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03 L1 | SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031 L2 |
|---|---|---|---|---|---|
| **SW-UF-BH106** | | | | | |
| Manganese | SM 3030/EPA 200.8 | mg/L | 0.146 | | 0.05 |

## QC SUMMARY

### Anions by discrete analyzer

Method: US EPA 375.4 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Sulphate | DIO8038-JUN25 | mg/L | 1 | <2 | 1 | 20 | 100 | 80 | 120 | 84 | 75 | 125 |

### Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Biochemical Oxygen Demand (BOD5) | BOD0038-JUN25 | mg/L | 2 | < 2 | 6 | 30 | 104 | 70 | 130 | 74 | 70 | 130 |
| Carbonaceous Biochemical Oxygen Demand | BOD0039-JUN25 | (CBOD5) mg/L | 2 | < 2 | 11 | 30 | 86 | 70 | 130 | NV | 70 | 130 |

## QC SUMMARY

### Cyanide by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-005

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Cyanide (total) | SKA0197-JUN25 | mg/L | 0.01 | <0.01 | ND | 10 | 99 | 90 | 110 | 94 | 75 | 125 |

### Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Fluoride | EWL0489-JUN25 | mg/L | 0.06 | <0.06 | ND | 10 | 100 | 90 | 110 | 106 | 75 | 125 |

### Hexavalent Chromium by SFA

Method: EPA218.6/EPA3060A I Internal ref.: ME-CA-IENVISKA-LAK-AN-012

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Chromium VI | SKA0195-JUN25 | mg/L | 0.0002 | <0.0002 | ND | 20 | 99 | 80 | 120 | 94 | 75 | 125 |

## QC SUMMARY

### Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Mercury (total) | EHG0027-JUN25 | mg/L | 0.00001 | < 0.00001 | ND | 20 | 102 | 80 | 120 | 116 | 70 | 130 |

## QC SUMMARY

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Silver (total) | EMS0157-JUN25 | mg/L | 0.00005 | <0.00005 | ND | 20 | 100 | 90 | 110 | 72 | 70 | 130 |
| Aluminum (total) | EMS0157-JUN25 | mg/L | 0.001 | <0.001 | 4 | 20 | 91 | 90 | 110 | 111 | 70 | 130 |
| Arsenic (total) | EMS0157-JUN25 | mg/L | 0.0002 | <0.0002 | 14 | 20 | 97 | 90 | 110 | 106 | 70 | 130 |
| Beryllium (total) | EMS0157-JUN25 | mg/L | 0.000007 | <0.000007 | 19 | 20 | 98 | 90 | 110 | 107 | 70 | 130 |
| Cadmium (total) | EMS0157-JUN25 | mg/L | 0.000003 | <0.000003 | 11 | 20 | 97 | 90 | 110 | 102 | 70 | 130 |
| Cobalt (total) | EMS0157-JUN25 | mg/L | 0.000004 | <0.000004 | 0 | 20 | 99 | 90 | 110 | 97 | 70 | 130 |
| Chromium (total) | EMS0157-JUN25 | mg/L | 0.00008 | <0.00008 | ND | 20 | 98 | 90 | 110 | 113 | 70 | 130 |
| Copper (total) | EMS0157-JUN25 | mg/L | 0.001 | <0.001 | 3 | 20 | 98 | 90 | 110 | 98 | 70 | 130 |
| Iron (total) | EMS0157-JUN25 | mg/L | 0.007 | <0.007 | 0 | 20 | 99 | 90 | 110 | 125 | 70 | 130 |
| Manganese (total) | EMS0157-JUN25 | mg/L | 0.00001 | <0.00001 | 1 | 20 | 99 | 90 | 110 | 97 | 70 | 130 |
| Molybdenum (total) | EMS0157-JUN25 | mg/L | 0.0004 | <0.0004 | ND | 20 | 96 | 90 | 110 | 98 | 70 | 130 |
| Nickel (total) | EMS0157-JUN25 | mg/L | 0.0001 | <0.0001 | 2 | 20 | 98 | 90 | 110 | 99 | 70 | 130 |
| Lead (total) | EMS0157-JUN25 | mg/L | 0.00009 | <0.00009 | 1 | 20 | 99 | 90 | 110 | 99 | 70 | 130 |
| Phosphorus (total) | EMS0157-JUN25 | mg/L | 0.003 | <0.003 | ND | 20 | 94 | 90 | 110 | NV | 70 | 130 |
| Antimony (total) | EMS0157-JUN25 | mg/L | 0.0009 | <0.0009 | ND | 20 | 110 | 90 | 110 | 95 | 70 | 130 |
| Selenium (total) | EMS0157-JUN25 | mg/L | 0.00004 | <0.00004 | 19 | 20 | 96 | 90 | 110 | 107 | 70 | 130 |
| Tin (total) | EMS0157-JUN25 | mg/L | 0.00006 | <0.00006 | ND | 20 | 97 | 90 | 110 | NV | 70 | 130 |
| Titanium (total) | EMS0157-JUN25 | mg/L | 0.0001 | <0.0001 | 12 | 20 | 95 | 90 | 110 | NV | 70 | 130 |
| Zinc (total) | EMS0157-JUN25 | mg/L | 0.002 | <0.002 | 2 | 20 | 101 | 90 | 110 | 101 | 70 | 130 |

## QC SUMMARY

### Microbiology

**Method: SM 9223B | Internal ref.: ME-CA-IENVIMIC-LAK-AN-021**

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Ecoli | BAC9297-JUN25 | mpn/100mL | - | ACCEPTED | ACCEPTED | | | | | | | |

### Nonylphenol and Ethoxylates

**Method: ASTM D7065-06 | Internal ref.: ME-CA-IENVIGC-LAK-AN-015**

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Nonylphenol | GCM0316-JUN25 | mg/L | 0.001 | <0.001 | | | 92 | 55 | 120 | | | |

### Oil & Grease

**Method: MOE E3401 | Internal ref.: ME-CA-IENVIGC-LAK-AN-019**

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Oil & Grease (total) | GCM0290-JUN25 | mg/L | 2 | <2 | NSS | 20 | 104 | 75 | 125 | | | |

## QC SUMMARY

### Oil & Grease-AV/MS

**Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019**

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Oil & Grease (animal/vegetable) | GCM0290-JUN25 | mg/L | 4 | < 4 | NSS | 20 | NA | 70 | 130 | | | |
| Oil & Grease (mineral/synthetic) | GCM0290-JUN25 | mg/L | 4 | < 4 | NSS | 20 | NA | 70 | 130 | | | |

### Pesticides

**Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-018**

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Hexachlorobenzene | GCM0284-JUN25 | mg/L | 0.00001 | < 0.00001 | ND | 30 | 90 | 50 | 140 | 93 | 50 | 140 |
| Hexachlorocyclohexane | GCM0284-JUN25 | mg/L | 0.001 | < 0.001 | ND | 30 | 95 | 50 | 140 | 100 | 50 | 140 |
| Mirex | GCM0284-JUN25 | mg/L | 0.001 | < 0.001 | ND | 30 | 92 | 50 | 140 | 96 | 50 | 140 |
| o,p-DDD | GCM0284-JUN25 | mg/L | 0.00002 | < 0.00002 | ND | 30 | 95 | 50 | 140 | 100 | 50 | 140 |
| o,p-DDE | GCM0284-JUN25 | mg/L | 0.00001 | < 0.00001 | ND | 30 | 89 | 50 | 140 | 95 | 50 | 140 |
| op-DDT | GCM0284-JUN25 | mg/L | 0.00002 | < 0.00002 | ND | 30 | 110 | 50 | 140 | 118 | 50 | 140 |
| pp-DDD | GCM0284-JUN25 | mg/L | 0.00002 | < 0.00002 | ND | 30 | 86 | 50 | 140 | 94 | 50 | 140 |
| pp-DDE | GCM0284-JUN25 | mg/L | 0.00001 | < 0.00001 | ND | 30 | 94 | 50 | 140 | 99 | 50 | 140 |
| pp-DDT | GCM0284-JUN25 | mg/L | 0.00002 | < 0.00002 | ND | 30 | 121 | 50 | 140 | 138 | 50 | 140 |

## QC SUMMARY

### pH

Method: SM 4500 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-006

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| pH | EWL0448-JUN25 | No unit | 0.05 | NA | 0 | | 100 | | | NA | | |

### Phenols by SFA

Method: SM 5530B-D I Internal ref.: ME-CA-[ENVISFA-LAK-AN-006

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| 4AAP-Phenolics | SKA0215-JUN25 | mg/L | 0.001 | <0.001 | ND | 10 | 102 | 80 | 120 | 94 | 75 | 125 |

### Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A I Internal ref.: ME-CA-[ENVIGC-LAK-AN-001

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Polychlorinated Biphenyls (PCBs) - Total | GCM0300-JUN25 | mg/L | 0.0001 | <0.0001 | NSS | 30 | 83 | 60 | 140 | NSS | 60 | 140 |

## QC SUMMARY

### Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| 7Hdibenzo(c,g)carbazole | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 96 | 50 | 140 | NSS | 50 | 140 |
| Anthracene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 89 | 50 | 140 | NSS | 50 | 140 |
| Benzo(a)anthracene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 93 | 50 | 140 | NSS | 50 | 140 |
| Benzo(a)pyrene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 88 | 50 | 140 | NSS | 50 | 140 |
| Benzo(b+j)fluoranthene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 94 | 50 | 140 | NSS | 50 | 140 |
| Benzo(e)pyrene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 97 | 50 | 140 | NSS | 50 | 140 |
| Benzo(ghi)perylene | GCM0329-JUN25 | mg/L | 0.0002 | < 0.0002 | NSS | 30 | 94 | 50 | 140 | NSS | 50 | 140 |
| Benzo(k)fluoranthene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 97 | 50 | 140 | NSS | 50 | 140 |
| Bis(2-ethylhexyl)phthalate | GCM0329-JUN25 | mg/L | 0.002 | < 0.002 | NSS | 30 | 97 | 50 | 140 | NSS | 50 | 140 |
| Chrysene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 93 | 50 | 140 | NSS | 50 | 140 |
| di-n-Butyl Phthalate | GCM0329-JUN25 | mg/L | 0.002 | < 0.002 | NSS | 30 | 97 | 50 | 140 | NSS | 50 | 140 |
| Dibenzo(a,h)anthracene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 93 | 50 | 140 | NSS | 50 | 140 |
| Dibenzo(a,i)pyrene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 95 | 50 | 140 | NSS | 50 | 140 |
| Dibenzo(a,j)acridine | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 94 | 50 | 140 | NSS | 50 | 140 |
| Fluoranthene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 92 | 50 | 140 | NSS | 50 | 140 |
| Indeno(1,2,3-cd)pyrene | GCM0329-JUN25 | mg/L | 0.0002 | < 0.0002 | NSS | 30 | 96 | 50 | 140 | NSS | 50 | 140 |
| Naphthalene | GCM0329-JUN25 | mg/L | 0.0005 | < 0.0005 | NSS | 30 | 83 | 50 | 140 | NSS | 50 | 140 |
| Pentachlorophenol | GCM0329-JUN25 | mg/L | 0.0005 | < 0.0005 | NSS | 30 | 97 | 50 | 140 | NSS | 50 | 140 |
| Perylene | GCM0329-JUN25 | mg/L | 0.0005 | < 0.0005 | NSS | 30 | 105 | 50 | 140 | NSS | 50 | 140 |
| Phenanthrene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 91 | 50 | 140 | NSS | 50 | 140 |

## QC SUMMARY

### Semi-Volatile Organics (continued)

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Pyrene | GCM0329-JUN25 | mg/L | 0.0001 | < 0.0001 | NSS | 30 | 93 | 50 | 140 | NSS | 50 | 140 |
| 3,3-Dichlorobenzidine | GCM0331-JUN25 | mg/L | 0.0005 | < 0.0005 | NSS | 30 | 80 | 30 | 130 | NSS | 30 | 130 |

### Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Total Suspended Solids | EWL0455-JUN25 | mg/L | 2 | < 2 | 5 | 10 | 95 | 90 | 110 | NA | | |

### Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| Total Kjeldahl Nitrogen | SKA0186-JUN25 | as N mg/L | 0.5 | <0.5 | ND | 10 | 96 | 90 | 110 | 87 | 75 | 125 |

## QC SUMMARY

### Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENV]GC-LAK-AN-004

| Parameter | QC batch Reference | Units | RL | Method Blank | Duplicate | | LCS/Spike Blank | | | Matrix Spike / Ref. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | RPD | AC (%) | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | | Low | High | | Low | High |
| 1,1,2,2-Tetrachloroethane | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 96 | 60 | 130 | 106 | 50 | 140 |
| 1,2-Dichlorobenzene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 93 | 60 | 130 | 98 | 50 | 140 |
| 1,4-Dichlorobenzene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 90 | 60 | 130 | 96 | 50 | 140 |
| Benzene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 93 | 60 | 130 | 103 | 50 | 140 |
| Chloroform | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 94 | 60 | 130 | 103 | 50 | 140 |
| cis-1,2-Dichloroethylene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 95 | 60 | 130 | 94 | 50 | 140 |
| Ethylbenzene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 96 | 60 | 130 | 100 | 50 | 140 |
| m-p-xylene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 96 | 60 | 130 | 101 | 50 | 140 |
| Methylene Chloride | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 106 | 60 | 130 | 88 | 50 | 140 |
| o-xylene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 95 | 60 | 130 | 101 | 50 | 140 |
| Tetrachloroethylene (perchloroethylene) | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 94 | 60 | 130 | 99 | 50 | 140 |
| Toluene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 95 | 60 | 130 | 100 | 50 | 140 |
| trans-1,3-Dichloropropene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 98 | 60 | 130 | 102 | 50 | 140 |
| Trichloroethylene | GCM0308-JUN25 | mg/L | 0.0005 | <0.0005 | ND | 30 | 83 | 60 | 130 | 97 | 50 | 140 |

## QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

**Multielement Scan Qualifier**: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier**: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier**: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

## LEGEND

### FOOTNOTES

| | |
|---|---|
| **NSS** | Insufficient sample for analysis. |
| **RL** | Reporting Limit. |
| ↑ | Reporting limit raised. |
| ↓ | Reporting limit lowered. |
| **NA** | The sample was not analysed for this analyte |
| **ND** | Non Detect |

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.
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This report supersedes all previous versions.

-- End of Analytical Report --

# Request for Laboratory Services and CHAIN OF CUSTODY

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 042898 Page 1 of 1

**Laboratory Information Section - Lab use only**

Received By: S H Lan
Received Date: 06/17/2025 (mm/dd/yy)
Received Time: 17:15 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☐ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: ICE
Temperature Upon Receipt (°C): 8.6
CA-410176-Jun25
LAB LIMS #:

| REPORT INFORMATION | INVOICE INFORMATION |
|---|---|
| Company: Grounded Eng | ☑ (same as Report Information) |
| Contact: Sam Bastan | Company: |
| Address: 49 Mobile Dr | Contact: |
| Phone: 647-361-5439 | Address: |
| Fax: | Phone: |
| Email: Sbastan@groundedeng.ca | Email: |

Quotation #:
Project #: 25-069-150
P.O. #:
Site Location/ID: Burnhamthorpe Rd & Trafalgar

**TURNAROUND TIME (TAT) REQUIRED**

☐ Client Regular TAT ☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

**RUSH TAT (Additional Charges May Apply):** ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
**PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION**

Specify Due Date:
***NOTE:** DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

**REGULATIONS**

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table Appx.
Soil Volume ☐ <350m3 ☐ >350m3

**Other Regulations:**
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
☐ ODWS Not Reportable *See note

**Sewer By-Law:**
☑ Sanitary
☑ Storm
Municipality: Halton / Oakville

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

**ANALYSIS REQUESTED**

| | SAMPLE IDENTIFICATION | DATE SAMPLED | TIME SAMPLED | # OF BOTTLES | MATRIX | Field Filtered (Y/N) | M & I: Metals & Inorganics (incl CrVI, CN, Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na-water) | M & I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI | M & I: ICP Metals only (Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn | SVOC: PAHs only | SVOC: SVOCs (all incl PAHs, ABNs, CPs | PCB: PCBs ☐ Total ☐ Aroclor | PHC: F1-F4 + BTEX | PHC: F1-F4 only (no BTEX | VOC: VOCs (all incl BTEX | VOC: BTEX only | Pest: Pesticides (Organochlorine or specify other | Other (please specify): Sewer Use: Halton/Oakville Specify pkg: Sanitary & Storm Combined | Water Characterization Pkg: General ☐ Extended ☐ | SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN | TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit. | COMMENTS: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SW-4F-BH106 | 06/17/25 | 13:00 | 22 | GW | N | | | | | | | | | | | | X | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | |

Observations/Comments/Special Instructions

**Sampled By (NAME):** LB **Signature:**
**Relinquished by (NAME):** LB **Signature:**
Date: 06/17/25 (mm/dd/yy)
Date: 06/17/25 (mm/dd/yy)

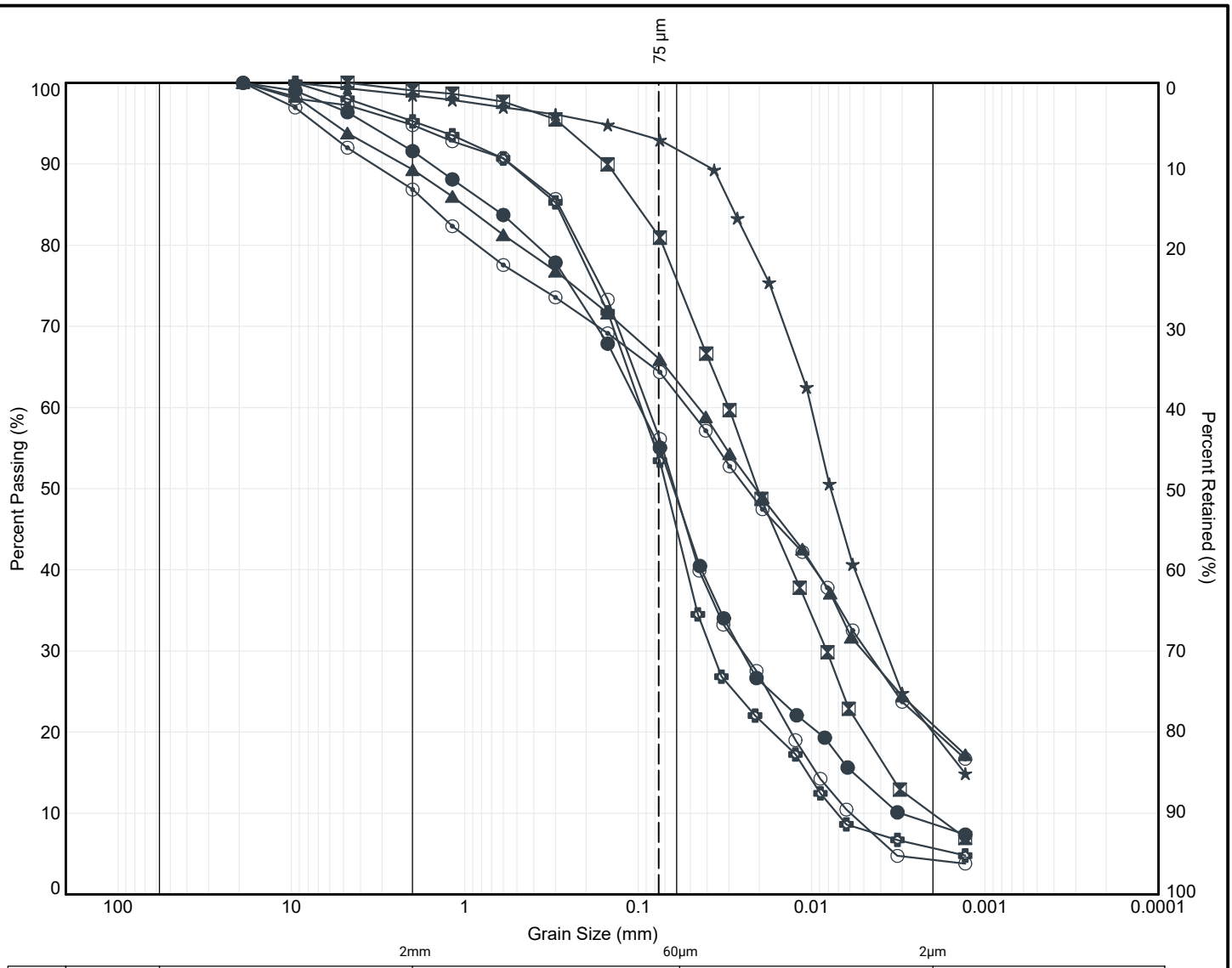
Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.8
Date of Issue: 06 SEP 2024

**Note:** Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection, handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

# APPENDIX H






| MIT SYSTEM | COBBLES | GRAVEL | | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|---|---|---|
| | | COARSE | MEDIUM | FINE | COARSE | MEDIUM | FINE | | |

MIT SYSTEM

| | Location | Sample | Depth (m) | Elev. (m) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|---|
| ● | **BH 101** | SS6 | 4.7 | 175.4 | 8 | 43 | 40 | 9 |
| ⊠ | **BH 102** | SS7 | 6.2 | 176.3 | 1 | 23 | 66 | 10 |
| ▲ | **BH 103** | 4A | 2.4 | 181.1 | 11 | 26 | 42 | 21 |
| ★ | **BH 104** | 7B | 6.5 | 178.1 | 2 | 6 | 72 | 20 |
| ⊙ | **BH 106** | SS5 | 3.3 | 179.0 | 13 | 26 | 41 | 20 |
| ✿ | **BH 111** | SS4 | 2.4 | 179.3 | 5 | 50 | 39 | 6 |
| ○ | **BH 112** | SS8 | 7.7 | 177.2 | 5 | 46 | 45 | 4 |

GROUNDED ENGINEERING

Title: **GRAIN SIZE DISTRIBUTION**

File No.: **25-069**

file: 25-069 gint.gpj

*K* from Grain Size Analysis Report

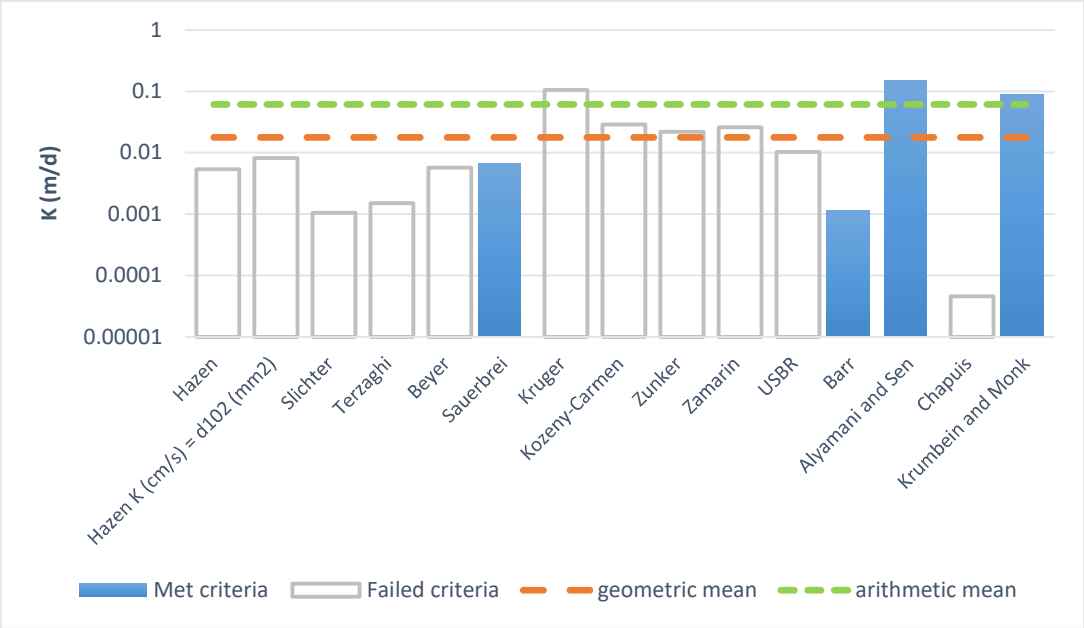
Date: 09-Jul-25

Sample Name: BH101-SS6

Mass Sample (g): 199.2

T (oC) 26

## Poorly sorted sand with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 6.2E-06 | 6.2E-08 | 0.01 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 9.5E-06 | 9.5E-08 | 0.01 | |
| Slichter | 1.2E-06 | 1.2E-08 | 0.00 | |
| Terzaghi | 1.7E-06 | 1.7E-08 | 0.00 | |
| Beyer | 6.6E-06 | 6.6E-08 | 0.01 | |
| Sauerbrei | 7.7E-06 | 7.7E-08 | 0.01 | |
| Kruger | 1.2E-04 | 1.2E-06 | 0.11 | |
| Kozeny-Carmen | 3.3E-05 | 3.3E-07 | 0.03 | |
| Zunker | 2.5E-05 | 2.5E-07 | 0.02 | |
| Zamarin | 3.0E-05 | 3.0E-07 | 0.03 | |
| USBR | 1.2E-05 | 1.2E-07 | 0.01 | |
| Barr | 1.3E-06 | 1.3E-08 | 0.00 | |
| Alyamani and Sen | 1.7E-04 | 1.7E-06 | 0.15 | |
| Chapuis | 5.3E-08 | 5.3E-10 | 0.00 | |
| Krumbein and Monk | 1.0E-04 | 1.0E-06 | 0.09 | |
| geometric mean | 2.1E-05 | 2.1E-07 | 0.02 | |
| arithmetic mean | 7.1E-05 | 7.1E-07 | 0.06 | |

*K* from Grain Size Analysis Report

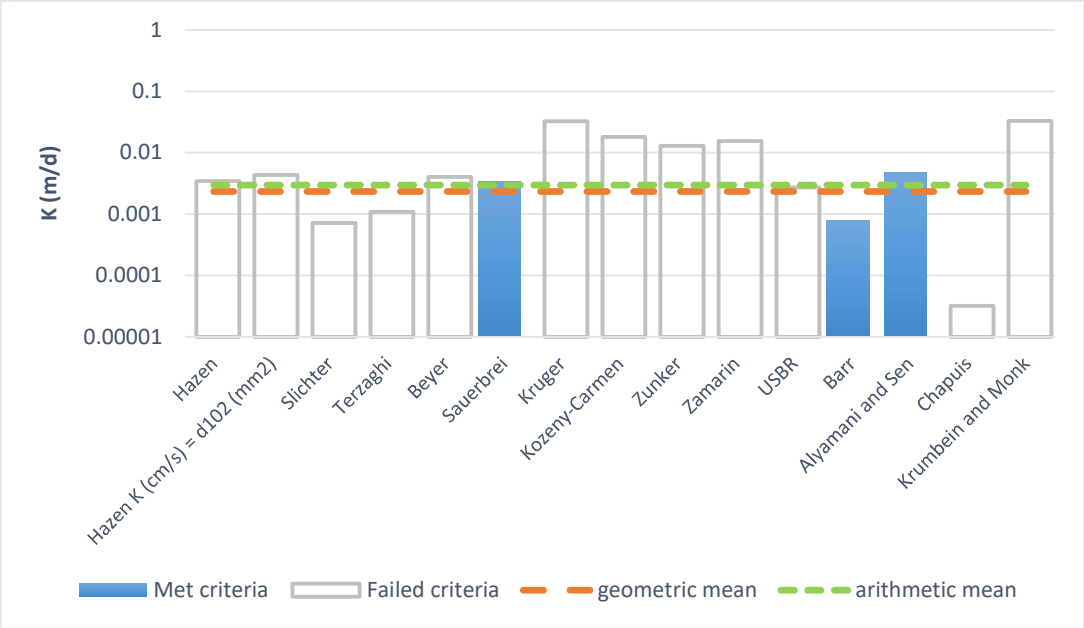
Date: 09-Jul-25

Sample Name: BH102-SS7

Mass Sample (g): 115.94

T (oC) 26

## Poorly sorted sandy silt with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 4.0E-06 | 4.0E-08 | 0.00 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 5.0E-06 | 5.0E-08 | 0.00 | |
| Slichter | 8.3E-07 | 8.3E-09 | 0.00 | |
| Terzaghi | 1.3E-06 | 1.3E-08 | 0.00 | |
| Beyer | 4.7E-06 | 4.7E-08 | 0.00 | |
| Sauerbrei | 3.9E-06 | 3.9E-08 | 0.00 | |
| Kruger | 3.8E-05 | 3.8E-07 | 0.03 | |
| Kozeny-Carmen | 2.1E-05 | 2.1E-07 | 0.02 | |
| Zunker | 1.5E-05 | 1.5E-07 | 0.01 | |
| Zamarin | 1.8E-05 | 1.8E-07 | 0.02 | |
| USBR | 3.1E-06 | 3.1E-08 | 0.00 | |
| Barr | 9.2E-07 | 9.2E-09 | 0.00 | |
| Alyamani and Sen | 5.5E-06 | 5.5E-08 | 0.00 | |
| Chapuis | 3.7E-08 | 3.7E-10 | 0.00 | |
| Krumbein and Monk | 3.8E-05 | 3.8E-07 | 0.03 | |
| geometric mean | 2.7E-06 | 2.7E-08 | 0.00 | |
| arithmetic mean | 3.5E-06 | 3.5E-08 | 0.00 | |

*K* from Grain Size Analysis Report

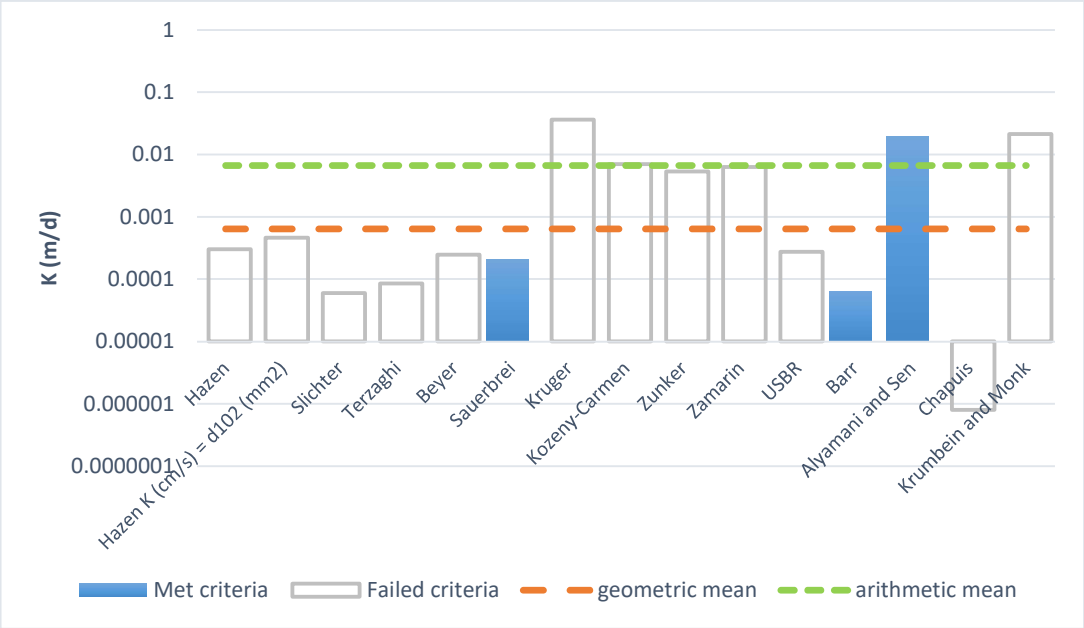
Date: 09-Jul-25

Sample Name: BH103-SS4A

Mass Sample (g): 137.43

T (oC) 26

## Poorly sorted sandy gravelly silt with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 3.5E-07 | 3.5E-09 | 0.00 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 5.4E-07 | 5.4E-09 | 0.00 | |
| Slichter | 6.9E-08 | 6.9E-10 | 0.00 | |
| Terzaghi | 9.8E-08 | 9.8E-10 | 0.00 | |
| Beyer | 2.9E-07 | 2.9E-09 | 0.00 | |
| Sauerbrei | 2.4E-07 | 2.4E-09 | 0.00 | |
| Kruger | 4.2E-05 | 4.2E-07 | 0.04 | |
| Kozeny-Carmen | 8.2E-06 | 8.2E-08 | 0.01 | |
| Zunker | 6.2E-06 | 6.2E-08 | 0.01 | |
| Zamarin | 7.3E-06 | 7.3E-08 | 0.01 | |
| USBR | 3.2E-07 | 3.2E-09 | 0.00 | |
| Barr | 7.4E-08 | 7.4E-10 | 0.00 | |
| Alyamani and Sen | 2.3E-05 | 2.3E-07 | 0.02 | |
| Chapuis | 9.2E-10 | 9.2E-12 | 0.00 | |
| Krumbein and Monk | 2.5E-05 | 2.5E-07 | 0.02 | |
| geometric mean | 7.4E-07 | 7.4E-09 | 0.00 | |
| arithmetic mean | 7.8E-06 | 7.8E-08 | 0.01 | |

*K* from Grain Size Analysis Report

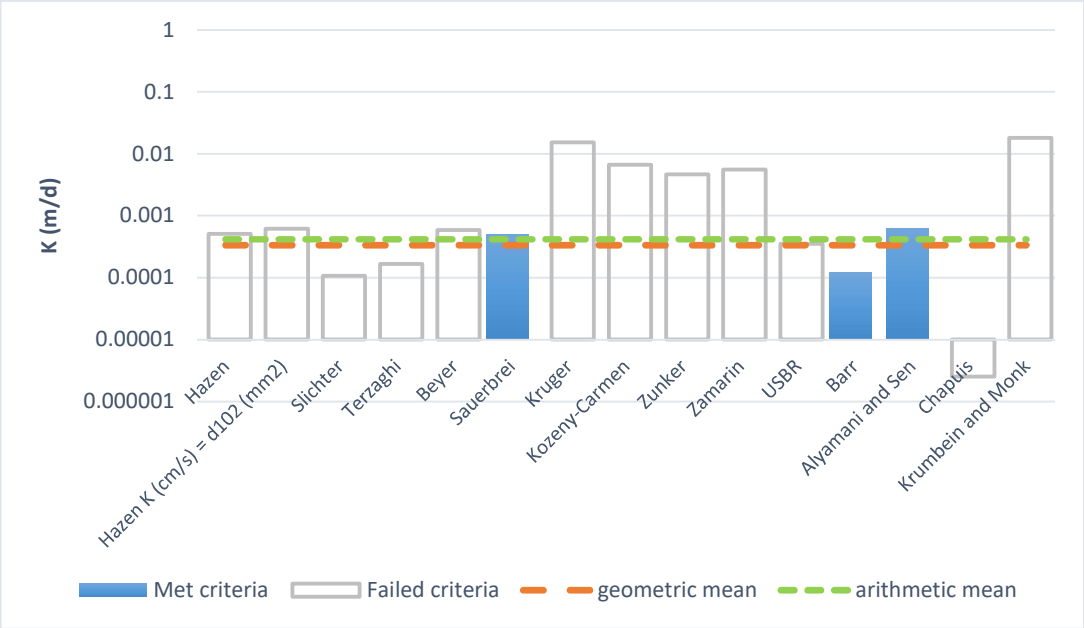
Date: 09-Jul-25

Sample Name: BH104-SS7B

Mass Sample (g): 117.17

T (oC) 26

## Poorly sorted clay with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 5.9E-07 | 5.9E-09 | 0.00 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 7.2E-07 | 7.2E-09 | 0.00 | |
| Slichter | 1.2E-07 | 1.2E-09 | 0.00 | |
| Terzaghi | 1.9E-07 | 1.9E-09 | 0.00 | |
| Beyer | 6.8E-07 | 6.8E-09 | 0.00 | |
| Sauerbrei | 5.8E-07 | 5.8E-09 | 0.00 | |
| Kruger | 1.8E-05 | 1.8E-07 | 0.02 | |
| Kozeny-Carmen | 7.7E-06 | 7.7E-08 | 0.01 | |
| Zunker | 5.4E-06 | 5.4E-08 | 0.00 | |
| Zamarin | 6.5E-06 | 6.5E-08 | 0.01 | |
| USBR | 4.1E-07 | 4.1E-09 | 0.00 | |
| Barr | 1.4E-07 | 1.4E-09 | 0.00 | |
| Alyamani and Sen | 7.3E-07 | 7.3E-09 | 0.00 | |
| Chapuis | 2.9E-09 | 2.9E-11 | 0.00 | |
| Krumbein and Monk | 2.1E-05 | 2.1E-07 | 0.02 | |
| geometric mean | 3.9E-07 | 3.9E-09 | 0.00 | |
| arithmetic mean | 4.8E-07 | 4.8E-09 | 0.00 | |

*K* from Grain Size Analysis Report

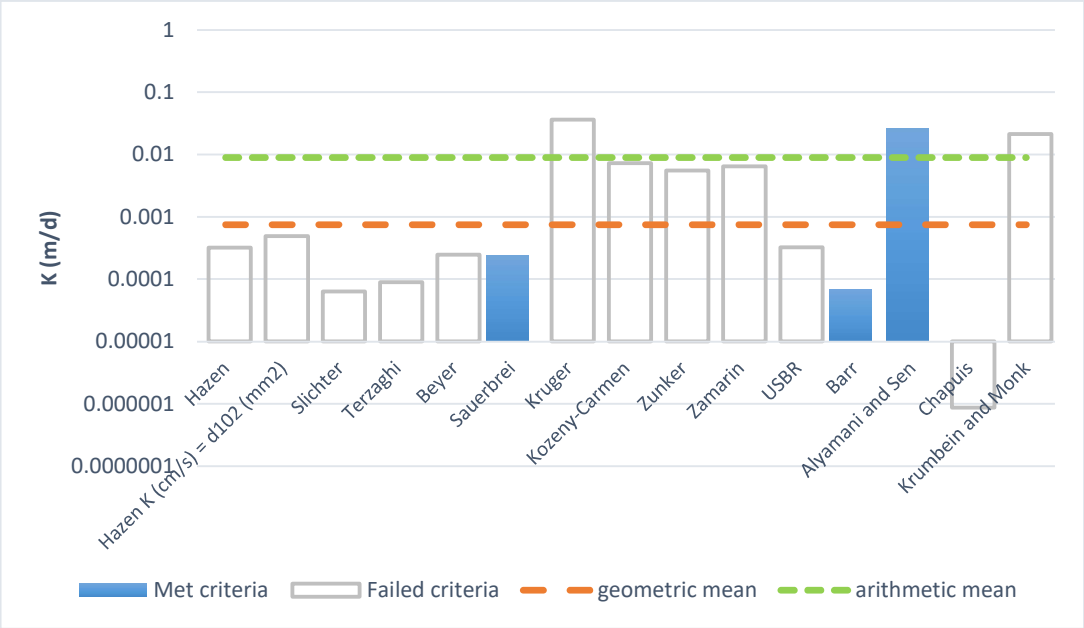
Date: 09-Jul-25

Sample Name: BH106-SS5

Mass Sample (g): 138.51

T (oC) 26

## Poorly sorted sandy gravelly silt with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 3.7E-07 | 3.7E-09 | 0.00 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 5.7E-07 | 5.7E-09 | 0.00 | |
| Slichter | 7.3E-08 | 7.3E-10 | 0.00 | |
| Terzaghi | 1.0E-07 | 1.0E-09 | 0.00 | |
| Beyer | 2.8E-07 | 2.8E-09 | 0.00 | |
| Sauerbrei | 2.8E-07 | 2.8E-09 | 0.00 | |
| Kruger | 4.2E-05 | 4.2E-07 | 0.04 | |
| Kozeny-Carmen | 8.4E-06 | 8.4E-08 | 0.01 | |
| Zunker | 6.4E-06 | 6.4E-08 | 0.01 | |
| Zamarin | 7.5E-06 | 7.5E-08 | 0.01 | |
| USBR | 3.7E-07 | 3.7E-09 | 0.00 | |
| Barr | 7.8E-08 | 7.8E-10 | 0.00 | |
| Alyamani and Sen | 3.1E-05 | 3.1E-07 | 0.03 | |
| Chapuis | 1.0E-09 | 1.0E-11 | 0.00 | |
| Krumbein and Monk | 2.5E-05 | 2.5E-07 | 0.02 | |
| geometric mean | 8.7E-07 | 8.7E-09 | 0.00 | |
| arithmetic mean | 1.0E-05 | 1.0E-07 | 0.01 | |

*K* from Grain Size Analysis Report

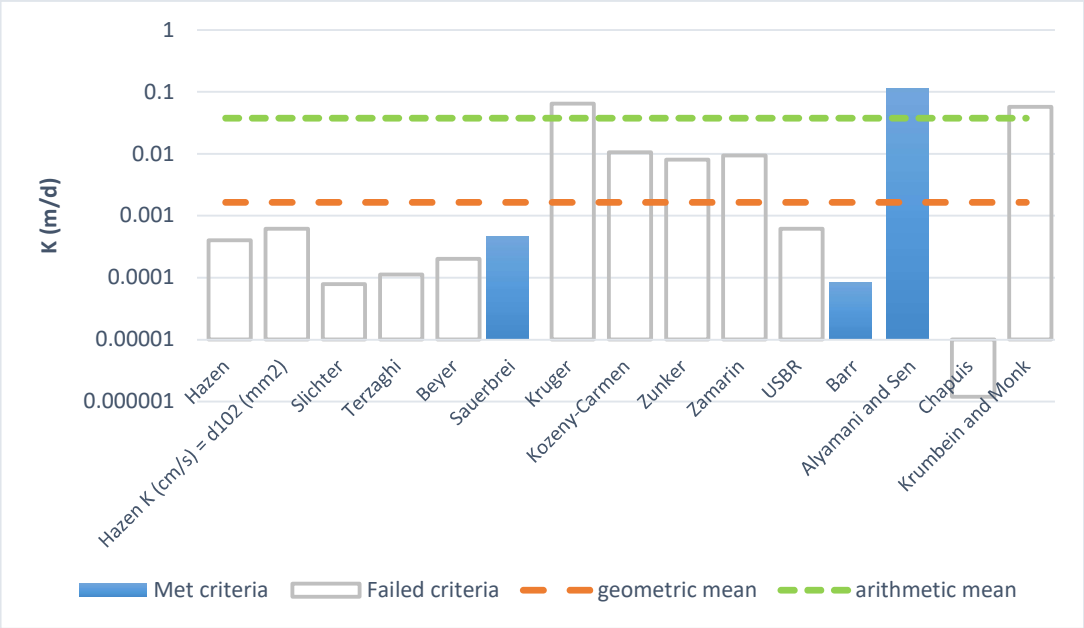
Date: 09-Jul-25

Sample Name: BH109-SS8

Mass Sample (g): 192.32

T (oC) 26

## Poorly sorted sandy silt with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 4.7E-07 | 4.7E-09 | 0.00 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 7.1E-07 | 7.1E-09 | 0.00 | |
| Slichter | 9.1E-08 | 9.1E-10 | 0.00 | |
| Terzaghi | 1.3E-07 | 1.3E-09 | 0.00 | |
| Beyer | 2.3E-07 | 2.3E-09 | 0.00 | |
| Sauerbrei | 5.4E-07 | 5.4E-09 | 0.00 | |
| Kruger | 7.5E-05 | 7.5E-07 | 0.06 | |
| Kozeny-Carmen | 1.2E-05 | 1.2E-07 | 0.01 | |
| Zunker | 9.3E-06 | 9.3E-08 | 0.01 | |
| Zamarin | 1.1E-05 | 1.1E-07 | 0.01 | |
| USBR | 7.1E-07 | 7.1E-09 | 0.00 | |
| Barr | 9.8E-08 | 9.8E-10 | 0.00 | |
| Alyamani and Sen | 1.3E-04 | 1.3E-06 | 0.11 | |
| Chapuis | 1.4E-09 | 1.4E-11 | 0.00 | |
| Krumbein and Monk | 6.6E-05 | 6.6E-07 | 0.06 | |
| geometric mean | 1.9E-06 | 1.9E-08 | 0.00 | |
| arithmetic mean | 4.4E-05 | 4.4E-07 | 0.04 | |

*K* from Grain Size Analysis Report

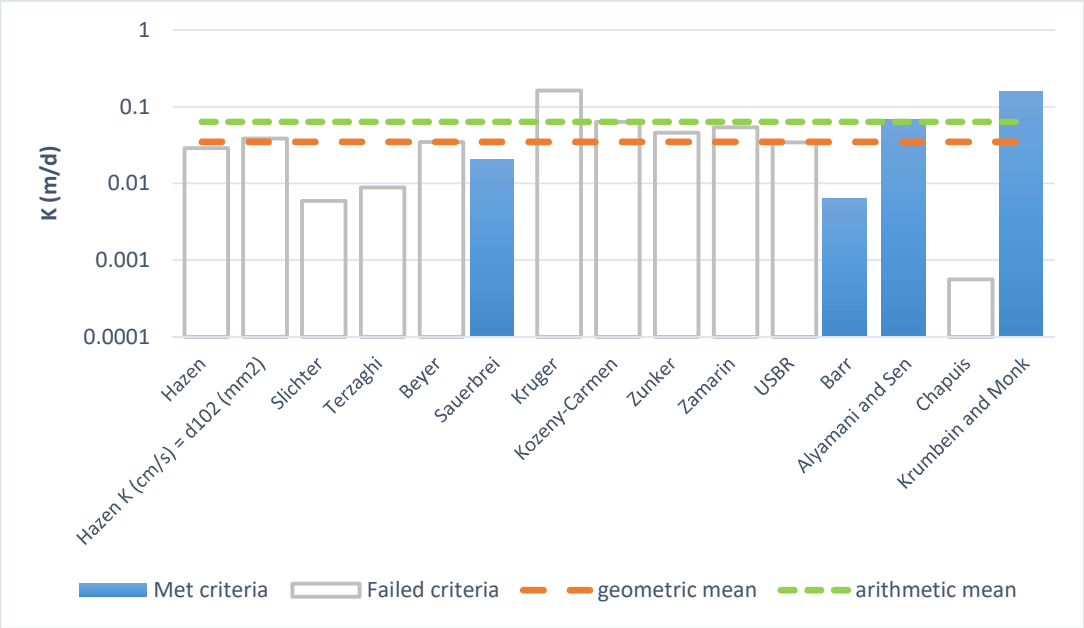
Date: 09-Jul-25

Sample Name: BH111-SS4

Mass Sample (g): 135.78

T (oC) 26

## Poorly sorted sand low in fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 3.3E-05 | 3.3E-07 | 0.03 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 4.4E-05 | 4.4E-07 | 0.04 | |
| Slichter | 6.9E-06 | 6.9E-08 | 0.01 | |
| Terzaghi | 1.0E-05 | 1.0E-07 | 0.01 | |
| Beyer | 4.0E-05 | 4.0E-07 | 0.03 | |
| Sauerbrei | 2.4E-05 | 2.4E-07 | 0.02 | |
| Kruger | 1.9E-04 | 1.9E-06 | 0.16 | |
| Kozeny-Carmen | 7.3E-05 | 7.3E-07 | 0.06 | |
| Zunker | 5.3E-05 | 5.3E-07 | 0.05 | |
| Zamarin | 6.2E-05 | 6.2E-07 | 0.05 | |
| USBR | 4.0E-05 | 4.0E-07 | 0.03 | |
| Barr | 7.5E-06 | 7.5E-08 | 0.01 | |
| Alyamani and Sen | 8.1E-05 | 8.1E-07 | 0.07 | |
| Chapuis | 6.5E-07 | 6.5E-09 | 0.00 | |
| Krumbein and Monk | 1.8E-04 | 1.8E-06 | 0.16 | |
| geometric mean | 4.0E-05 | 4.0E-07 | 0.03 | |
| arithmetic mean | 7.4E-05 | 7.4E-07 | 0.06 | |

*K* from Grain Size Analysis Report

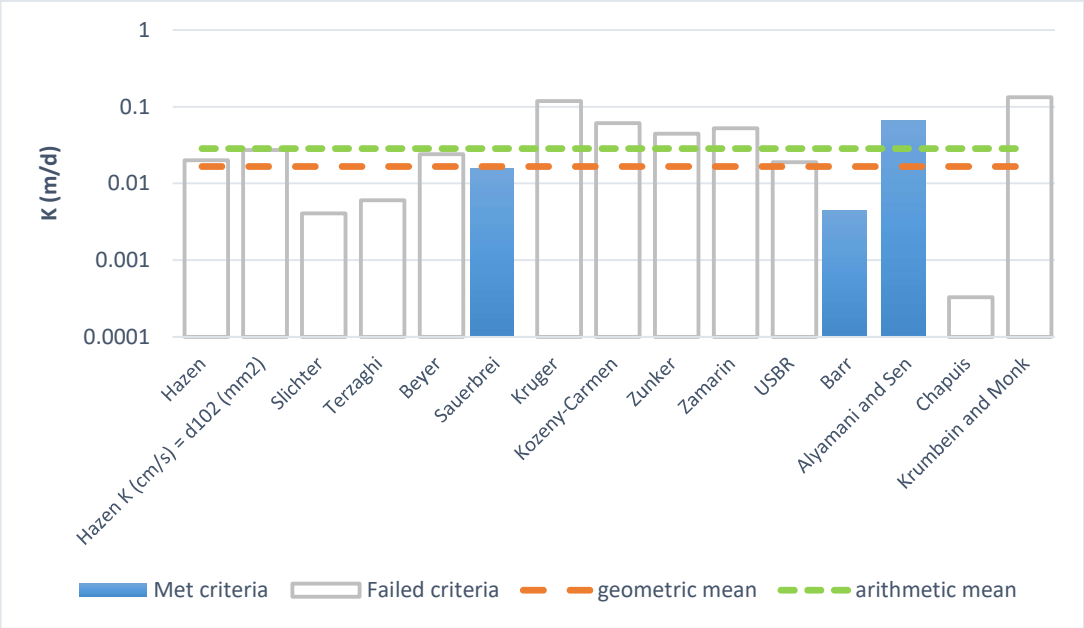
Date: 09-Jul-25

Sample Name: BH112-SS8

Mass Sample (g): 227.82

T (oC) 26

## Poorly sorted sandy silt low in fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 2.3E-05 | 2.3E-07 | 0.02 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 3.2E-05 | 3.2E-07 | 0.03 | |
| Slichter | 4.7E-06 | 4.7E-08 | 0.00 | |
| Terzaghi | 7.0E-06 | 7.0E-08 | 0.01 | |
| Beyer | 2.8E-05 | 2.8E-07 | 0.02 | |
| Sauerbrei | 1.8E-05 | 1.8E-07 | 0.02 | |
| Kruger | 1.4E-04 | 1.4E-06 | 0.12 | |
| Kozeny-Carmen | 7.1E-05 | 7.1E-07 | 0.06 | |
| Zunker | 5.1E-05 | 5.1E-07 | 0.04 | |
| Zamarin | 6.1E-05 | 6.1E-07 | 0.05 | |
| USBR | 2.2E-05 | 2.2E-07 | 0.02 | |
| Barr | 5.1E-06 | 5.1E-08 | 0.00 | |
| Alyamani and Sen | 7.6E-05 | 7.6E-07 | 0.07 | |
| Chapuis | 3.8E-07 | 3.8E-09 | 0.00 | |
| Krumbein and Monk | 1.5E-04 | 1.5E-06 | 0.13 | |
| geometric mean | 1.9E-05 | 1.9E-07 | 0.02 | |
| arithmetic mean | 3.3E-05 | 3.3E-07 | 0.03 | |

# APPENDIX I



GROUNDED ENGINEERING

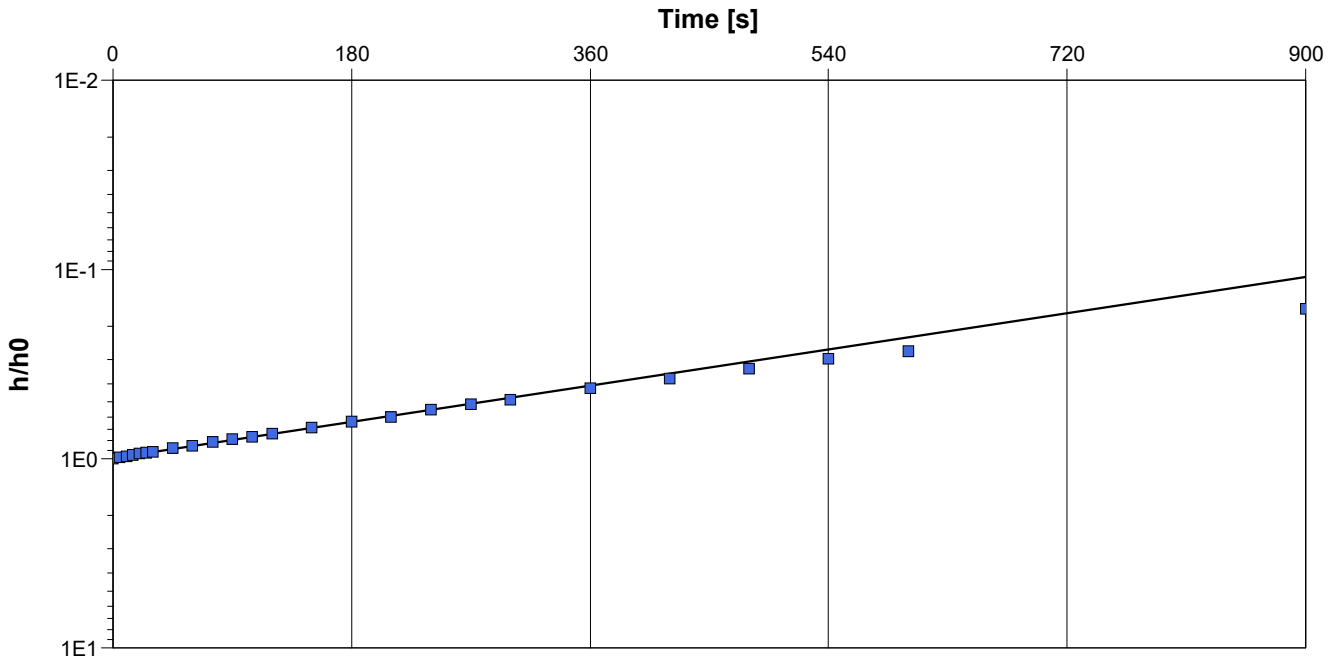
**Slug Test Analysis Report**

Project: Trafalgar and Burnhamthorpe Subdivision, Oakville

Number: 25-069

Client: Westerkirk Trafalgar Inc.

| | | |
|---|---|---|
| Location: Oakville | Slug Test: BH103 | Test Well: BH103 |
| Test Conducted by: LB | | Test Date: 2025-06-17 |
| Analysis Performed by: RR | BH103 | Analysis Date: 2025-07-14 |
| Aquifer Thickness: 9.00 m | | |




Calculation using Bouwer & Rice

| Observation Well | Hydraulic Conductivity [m/s] | |
|---|---|---|
| BH103 | $1.00 \times 10^{-6}$ | |

GROUNDED ENGINEERING

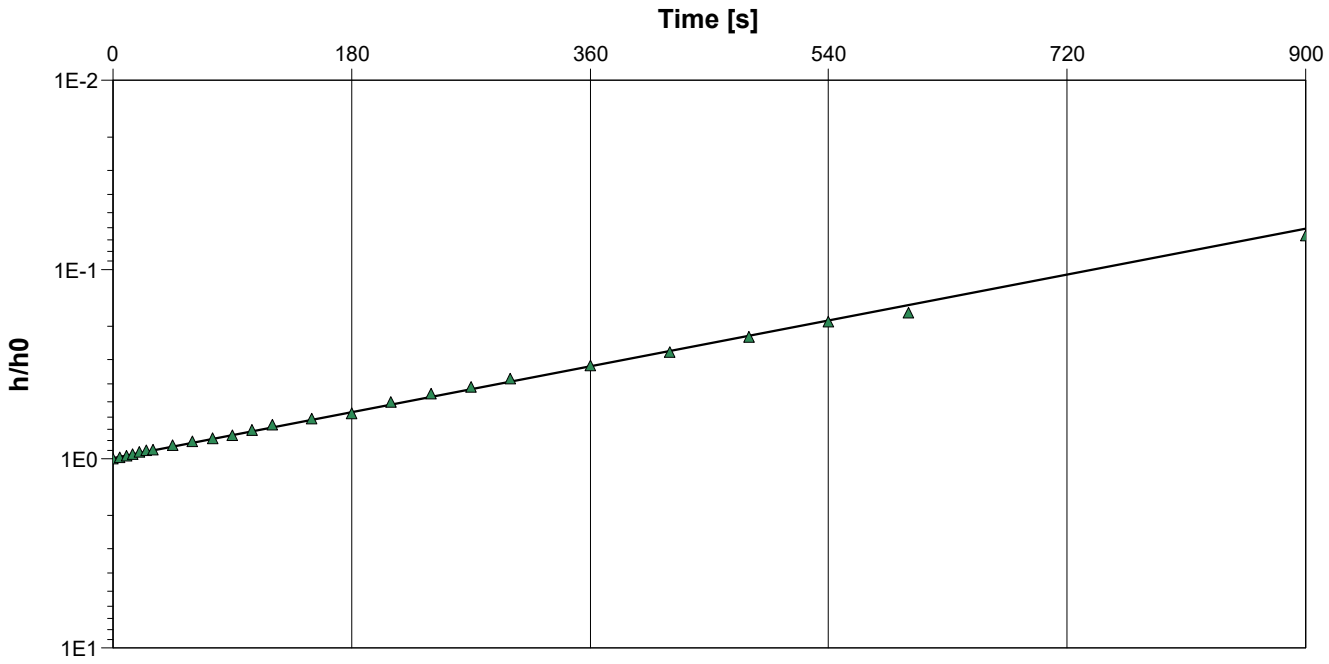
**Slug Test Analysis Report**

Project: Trafalgar and Burnhamthorpe Subdivision, Oakville

Number: 25-069

Client: Westerkirk Trafalgar Inc.

| | | |
|---|---|---|
| Location: Oakville | Slug Test: BH112 | Test Well: BH112 |
| Test Conducted by: LB | | Test Date: 2025-06-17 |
| Analysis Performed by: RR | BH112 | Analysis Date: 2025-07-14 |
| Aquifer Thickness: 9.50 m | | |

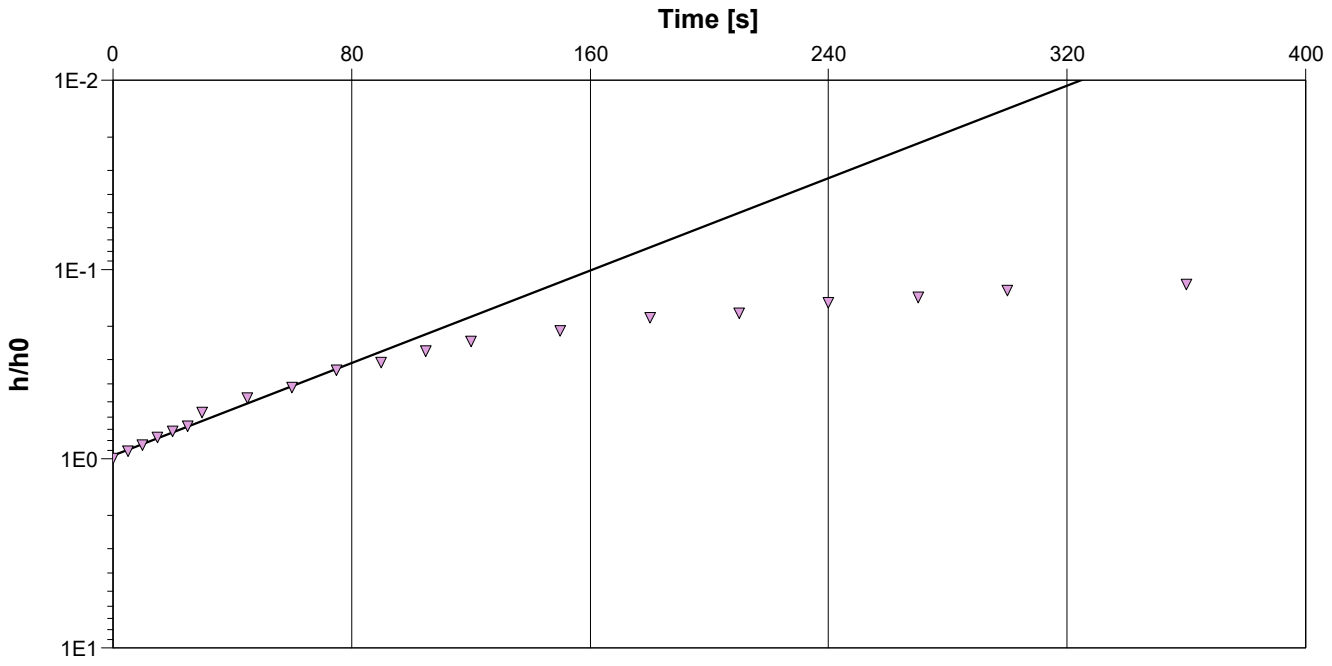



Calculation using Bouwer & Rice

| Observation Well | Hydraulic Conductivity [m/s] | |
|---|---|---|
| BH112 | $1.31 \times 10^{-6}$ | |

| | |
|---|---|
| GROUNDED ENGINEERING | **Slug Test Analysis Report** |
| | Project: Trafalgar and Burnhamthorpe Subdivision, Oakville |
| | Number: 25-069 |
| | Client: Westerkirk Trafalgar Inc. |

| | | |
|---|---|---|
| Location: Oakville | Slug Test: BH106 | Test Well: BH106 |
| Test Conducted by: EB | | Test Date: 2025-07-18 |
| Analysis Performed by: RR | BH106A | Analysis Date: 2025-08-06 |
| Aquifer Thickness: 9.00 m | | |

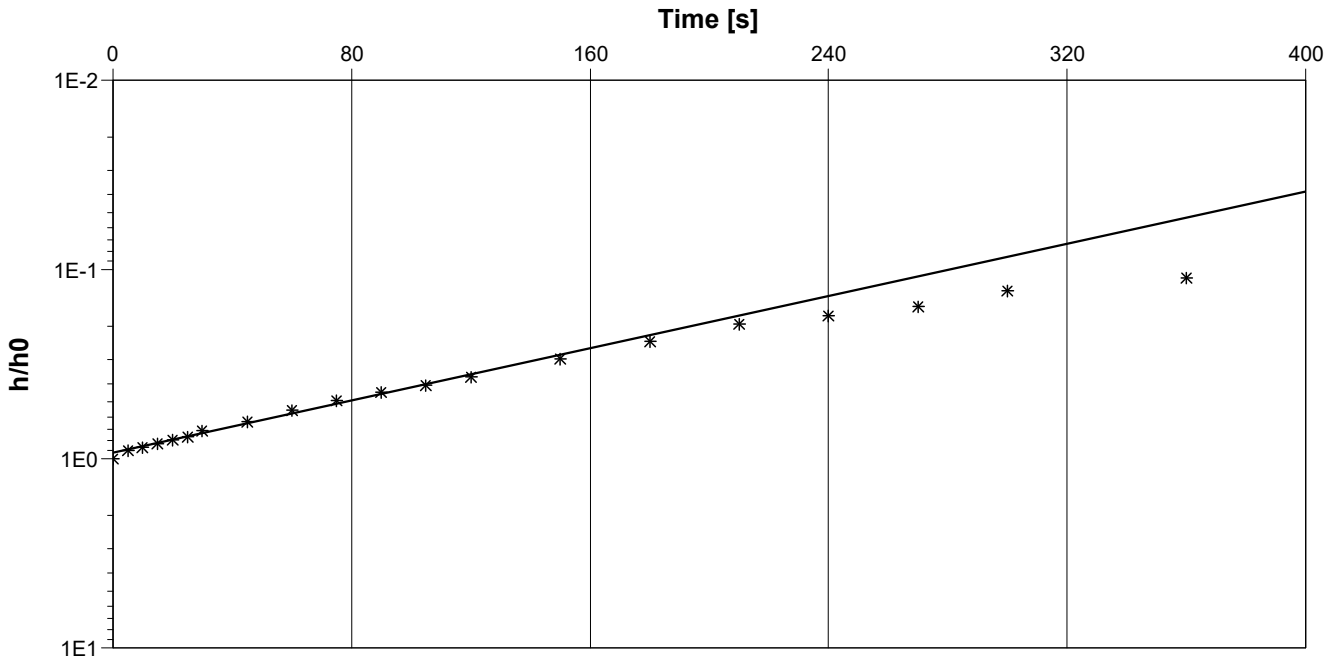



Calculation using Bouwer & Rice

| Observation Well | Hydraulic Conductivity [m/s] | |
|---|---|---|
| BH106 | $5.80 \times 10^{-6}$ | |

| | |
|---|---|
| GROUNDED ENGINEERING | **Slug Test Analysis Report** |
| | Project: Trafalgar and Burnhamthorpe Subdivision, Oakville |
| | Number: 25-069 |
| | Client: Westerkirk Trafalgar Inc. |

| | | |
|---|---|---|
| Location: Oakville | Slug Test: BH108 | Test Well: BH108 |
| Test Conducted by: EB | | Test Date: 2025-07-18 |
| Analysis Performed by: RR | BH108 | Analysis Date: 2025-08-06 |
| Aquifer Thickness: 9.00 m | | |




Calculation using Bouwer & Rice

| Observation Well | Hydraulic Conductivity [m/s] | |
|---|---|---|
| BH108 | $3.05 \times 10^{-6}$ | |

# APPENDIX J



# Equivalent Well Radius - PILE & LAGGING BLOCK 01

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 183 | masl |
| Highest Water Level | 181.7 | masl |
| Base of Excavation | 172.5 | masl |
| Drawdown Target | 171.3 | masl |
| Aquifer Bottom | 170 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 5.80E-06 | m/s |
| H = | 11.7 | m |
| $h_w$ = | 1.3 | m |
| dH = | 10.4 | m |
| $R_{0=}$ | 75.1 | m |
| $r_s$+ $R_{0=}$ | 168 | m |
| a = | 91 | m |
| b = | 202 | m |
| $r_{s=}$ | 93 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 1,083,000 | 752.1 |
| Rainfall | 534,000 | 370.8 |
| Total | 1,617,000 | 1,122.9 |

**100 year storm event (L/day): 1,864,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 1,083,000 | 752.1 |
| Infiltration | 18,000 | 12.5 |
| Total | 1,101,000 | 764.6 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 02

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 183.5 | masl |
| Highest Water Level | 182.5 | masl |
| Base of Excavation | 176 | masl |
| Drawdown Target | 174.8 | masl |
| Aquifer Bottom | 173 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 5.80E-06 | m/s |
| H = | 9.5 | m |
| $h_w$ = | 1.8 | m |
| dH = | 7.7 | m |
| $R_{0=}$ | 55.6 | m |
| $r_s$+ $R_{0=}$ | 160 | m |
| a = | 91 | m |
| b = | 236 | m |
| $r_{s=}$ | 104 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 960,000 | 666.7 |
| Rainfall | 623,000 | 432.6 |
| Total | 1,583,000 | 1,099.3 |

**100 year storm event (L/day): 2,178,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 960,000 | 666.7 |
| Infiltration | 21,000 | 14.6 |
| Total | 981,000 | 681.3 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 03

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 185 | masl |
| Highest Water Level | 182.5 | masl |
| Base of Excavation | 174.5 | masl |
| Drawdown Target | 174.8 | masl |
| Aquifer Bottom | 171.5 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 1.30E-06 | m/s |
| H = | 11.0 | m |
| $h_w$ = | 3.3 | m |
| dH = | 7.7 | m |
| $R_0$ = | 26.3 | m |
| $r_s$+ $R_0$= | 69 | m |
| a = | 50 | m |
| b = | 83 | m |
| $r_s$ = | 42 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 243,000 | 168.8 |
| Rainfall | 121,000 | 84.0 |
| Total | 364,000 | 252.8 |

**100 year storm event (L/day): 421,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 243,000 | 168.8 |
| Infiltration | 5,000 | 3.5 |
| Total | 248,000 | 172.2 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 04

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 182 | masl |
| Highest Water Level | 181.8 | masl |
| Base of Excavation | 171.5 | masl |
| Drawdown Target | 170.3 | masl |
| Aquifer Bottom | 167 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 5.80E-06 | m/s |
| H = | 14.8 | m |
| $h_w$ = | 3.3 | m |
| dH = | 11.5 | m |
| $R_{0=}$ | 83.1 | m |
| $r_s$+ $R_{0=}$ | 174 | m |
| a = | 100 | m |
| b = | 187 | m |
| $r_{s=}$ | 91 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 1,521,000 | 1,056.3 |
| Rainfall | 543,000 | 377.1 |
| Total | 2,064,000 | 1,433.3 |

**100 year storm event (L/day): 1,897,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 1,521,000 | 1,056.3 |
| Infiltration | 5,000 | 3.5 |
| Total | 1,526,000 | 1,059.7 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 05

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 180.7 | masl |
| Highest Water Level | 180 | masl |
| Base of Excavation | 170.2 | masl |
| Drawdown Target | 169 | masl |
| Aquifer Bottom | 164 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 1.31E-06 | m/s |
| H = | 16.0 | m |
| $h_w$ = | 5.0 | m |
| dH = | 11.0 | m |
| $R_0$ = | 37.8 | m |
| $r_s$+ $R_0$= | 96 | m |
| a = | 82 | m |
| b = | 101 | m |
| $r_s$ = | 58 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 495,000 | 343.8 |
| Rainfall | 241,000 | 167.4 |
| Total | 736,000 | 511.1 |

**100 year storm event (L/day): 840,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 495,000 | 343.8 |
| Infiltration | 9,000 | 6.3 |
| Total | 504,000 | 350.0 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 06

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 181.2 | masl |
| Highest Water Level | 180 | masl |
| Base of Excavation | 173.7 | masl |
| Drawdown Target | 172.5 | masl |
| Aquifer Bottom | 168 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 5.80E-06 | m/s |
| H = | 12.0 | m |
| $h_w$ = | 4.5 | m |
| dH = | 7.5 | m |
| $R_{0=}$ | 54.2 | m |
| $r_s$+ $R_{0=}$ | 119 | m |
| a = | 97 | m |
| b = | 106 | m |
| $r_{s=}$ | 65 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 960,000 | 666.7 |
| Rainfall | 299,000 | 207.6 |
| Total | 1,259,000 | 874.3 |

**100 year storm event (L/day): 1,043,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 960,000 | 666.7 |
| Infiltration | 2,000 | 1.4 |
| Total | 962,000 | 668.1 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 07

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 181.7 | masl |
| Highest Water Level | 180 | masl |
| Base of Excavation | 177.2 | masl |
| Drawdown Target | 176 | masl |
| Aquifer Bottom | 168 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 5.80E-06 | m/s |
| H = | 12.0 | m |
| $h_w$ = | 8.0 | m |
| dH = | 4.0 | m |
| $R_{0=}$ | 28.9 | m |
| $r_s$+ $R_{0=}$ | 76 | m |
| a = | 49 | m |
| b = | 99 | m |
| $r_{s=}$ | 47 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 792,000 | 550.0 |
| Rainfall | 141,000 | 97.9 |
| Total | 933,000 | 647.9 |

**100 year storm event (L/day): 492,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 792,000 | 550.0 |
| Infiltration | 5,000 | 3.5 |
| Total | 797,000 | 553.5 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 08

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 183.5 | masl |
| Highest Water Level | 179.5 | masl |
| Base of Excavation | 176 | masl |
| Drawdown Target | 174.8 | masl |
| Aquifer Bottom | 168 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 1.30E-06 | m/s |
| H = | 11.5 | m |
| $h_w$ = | 6.8 | m |
| dH = | 4.7 | m |
| $R_{0\,=}$ | 16.1 | m |
| $r_s$+ $R_{0=}$ | 93 | m |
| a = | 38 | m |
| b = | 202 | m |
| $r_{s\,=}$ | 76 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 477,000 | 331.3 |
| Rainfall | 223,000 | 154.9 |
| Total | 700,000 | 486.1 |

**100 year storm event (L/day): 779,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 477,000 | 331.3 |
| Infiltration | 18,000 | 12.5 |
| Total | 495,000 | 343.8 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 09

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 184.6 | masl |
| Highest Water Level | 180 | masl |
| Base of Excavation | 177.1 | masl |
| Drawdown Target | 175.9 | masl |
| Aquifer Bottom | 168 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 1.30E-06 | m/s |
| H = | 12.0 | m |
| $h_w$ = | 7.9 | m |
| dH = | 4.1 | m |
| $R_{0\,=}$ | 14.0 | m |
| $r_s$+ $R_{0=}$ | 49 | m |
| a = | 52 | m |
| b = | 57 | m |
| $r_{s\,=}$ | 35 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 255,000 | 177.1 |
| Rainfall | 86,000 | 59.7 |
| Total | 341,000 | 236.8 |

**100 year storm event (L/day): 301,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 255,000 | 177.1 |
| Infiltration | 10,000 | 6.9 |
| Total | 265,000 | 184.0 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 10

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 180.1 | masl |
| Highest Water Level | 179.5 | masl |
| Base of Excavation | 175.6 | masl |
| Drawdown Target | 174.4 | masl |
| Aquifer Bottom | 170 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 1.30E-06 | m/s |
| H = | 9.5 | m |
| $h_w$ = | 4.4 | m |
| dH = | 5.1 | m |
| $R_0$ = | 17.4 | m |
| $r_s$+ $R_0$= | 93 | m |
| a = | 52 | m |
| b = | 186 | m |
| $r_s$ = | 76 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 363,000 | 252.1 |
| Rainfall | 281,000 | 195.1 |
| Total | 644,000 | 447.2 |

**100 year storm event (L/day): 981,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 363,000 | 252.1 |
| Infiltration | 6,000 | 4.2 |
| Total | 369,000 | 256.3 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 11

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 182.5 | masl |
| Highest Water Level | 179 | masl |
| Base of Excavation | 178 | masl |
| Drawdown Target | 176.8 | masl |
| Aquifer Bottom | 170 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 1.30E-06 | m/s |
| H = | 9.0 | m |
| $h_w$ = | 6.8 | m |
| dH = | 2.2 | m |
| $R_{0\,=}$ | 7.5 | m |
| $r_s$+ $R_{0=}$ | 80 | m |
| a = | 70 | m |
| b = | 159 | m |
| $r_{s\,=}$ | 73 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 375,000 | 260.4 |
| Rainfall | 323,000 | 224.3 |
| Total | 698,000 | 484.7 |

**100 year storm event (L/day): 1,129,000**

| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 375,000 | 260.4 |
| Infiltration | 8,000 | 5.6 |
| Total | 383,000 | 266.0 |

**Legend:**

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

# Equivalent Well Radius - PILE & LAGGING BLOCK 12

| | | |
|---|---|---|
| $R_0$ | = | $3000*dH*K^{0.5}$ |
| $r_s$ | = | $(a+b)/3.14$ |
| $r_s$ | = | $((a*b)/3.14)^{0.5}$ |
| Q | = | $\frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$ |

applies when a/b <1.5 and $R_0$>>rs

| | | |
|---|---|---|
| Ground Surface | 180 | masl |
| Highest Water Level | 178.8 | masl |
| Base of Excavation | 175.5 | masl |
| Drawdown Target | 174.3 | masl |
| Aquifer Bottom | 170 | masl |
| Rain Fall | 0.029 | m |
| Factor of Safety | 3.0 | |
| Hydrualic Gradient | 1 | |
| K = | 1.30E-06 | m/s |
| H = | 8.8 | m |
| $h_w$ = | 4.3 | m |
| dH = | 4.5 | m |
| $R_{0=}$ | 15.4 | m |
| $r_s$+ $R_{0=}$ | 85 | m |
| a = | 76 | m |
| b = | 141 | m |
| $r_{s=}$ | 69 | m |

| SHORT TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 312,000 | 216.7 |
| Rainfall | 311,000 | 216.0 |
| Total | 623,000 | 432.6 |

**100 year storm event (L/day): 1,087,000**

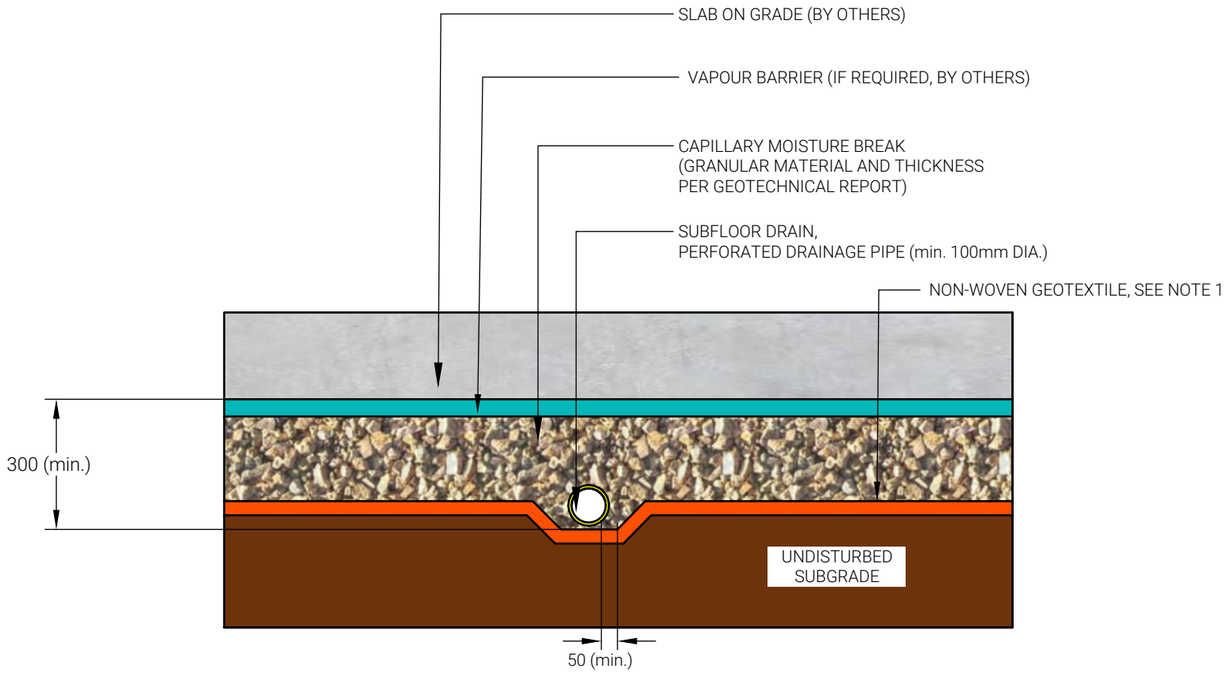
| LONG TERM | | |
|---|---|---|
| **Summary** | **L/day** | **L/min** |
| Groundwater | 312,000 | 216.7 |
| Infiltration | 16,000 | 11.1 |
| Total | 328,000 | 227.8 |

**Legend:**

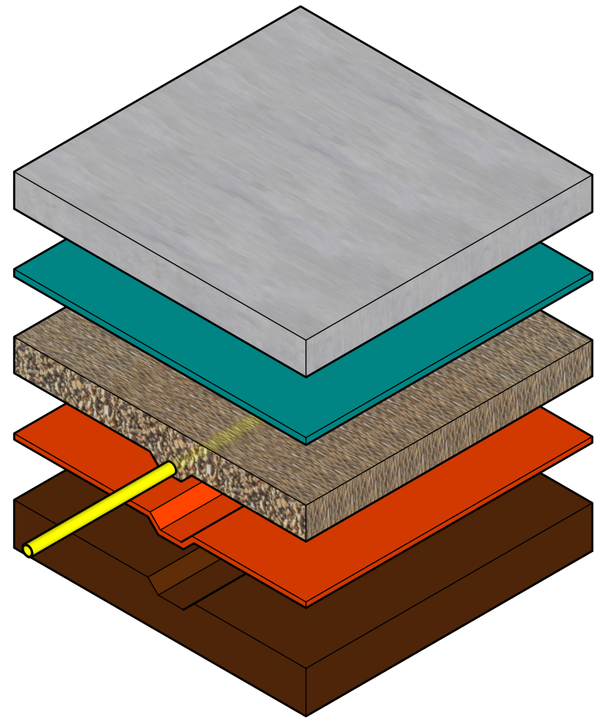
K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
$h_w$ = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

**Reference:** J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

**OBJECTS ARE COLOR-CODED BETWEEN TWO VIEWS FOR CLARITY**




**SECTIONAL VIEW**



**ISOMETRIC VIEW**

**NOTES**

1. WHEN THE SUBGRADE CONSISTS OF COHESIONLESS SOIL, IT MUST BE SEPARATED FROM THE SUBFLOOR DRAINAGE LAYER USING A NON-WOVEN GEOTEXTILE (WITH AN APPARENT OPENING SIZE OF < 0.250mm AND A TEAR RESISTANCE OF > 200 N).

2. TYPICAL SCHEMATIC ONLY. MUST BE READ IN CONJUNCTION WITH GEOTECHNICAL REPORT.

GROUNDED ENGINEERING

Title

# BASEMENT SUBDRAIN TYPICAL DETAIL

# APPENDIX E



# 1 GENERAL

These specifications are suitable for use as a technical specification only, relating to the engineering aspects as discussed in Grounded's corresponding geotechnical report for the site. If this technical specification is to be used as a tender document, the geotechnical report and this technical specification must be read in conjunction with the relevant supporting tender documents, prepared by others.

This specification must be read in conjunction with Grounded's geotechnical report for the site. Wherever there is conflicting advice, Grounded's geotechnical report for the site governs.

## 1.1 Description

Engineered Fill refers to earthworks (earth fill) designed and constructed with engineering inspection and testing to support foundations at SLS loads for a design net geotechnical reaction.

Site preparation for Engineered Fill operations must only be conducted under the full time inspection and testing of a Third Party Testing Agency (Testing Engineer), with review by the Geotechnical Engineer, in order to ensure adequate compaction and fill quality.

Poured concrete foundation walls must be provided with nominal reinforcing steel to provide stiffening of the foundation walls and to protect against excessive crack formation within the foundation walls.

The Engineered Fill to be constructed is shown on the Design Drawings prepared by the Design Civil Engineer and as described by these specifications. The work included in this section includes the following:

1. Topsoil stripping from the ground surface below all Engineered Fill areas,
2. Test pit excavating into the subgrade to a) investigate subgrade suitability for the support of Engineered Fill and b) observe and document any prior existing fill materials,
3. Proof-rolling of the subgrade below all Engineered Fill areas, to detect the presence and extent of unstable ground conditions,
4. Excavating and removing unstable/unacceptable subgrade materials, or the implementation of other approved subgrade stabilization measures (as required) prior to the placement of Engineered Fill,
5. Surveying of ground elevations prior to placing Engineered Fill,
6. Supply, placement, and compaction of approved clean earth as specified herein, with full time inspection and testing,
7. Surveying of ground elevations on completion of Engineered Fill placement,
8. Providing and maintaining survey layout of the Engineered Fill areas, and monitoring of ground elevations throughout the construction of Engineered Fill.

## 1.2 The Project Parties

1. The term Contractor shall refer to the individual or firm who will be carrying out the earthworks related to preparation and construction of Engineered Fill.
2. The term Testing Engineer shall refer to the individual or firm who will be carrying out the full time inspection and testing of the earthworks related to preparation and construction of Engineered Fill.

3. The term Geotechnical Engineer shall refer to Grounded Engineering.

4. The term Design Civil Engineer shall refer to the individual or firm who will be carrying out the Site Grading Design (pre-grading), the determination of Design Foundation Grades for the structures on the site, and the choice of lots and site areas to receive Engineered Fill.

# 2 MATERIALS

## 2.1 Definitions

1. Topsoil is the layer of naturally organic soil typically found at the ground surface and commonly in the range of about 100 to 300 mm thick.

2. Earth Fill is soil material which has been placed by humans and has not been deposited by nature over a long period of time.

3. Subgrade Soil is the “in situ” (in place) native soil beneath any earth fill and/or topsoil layer(s).

4. Disturbed Soil is soil material which was originally deposited naturally but has since been disturbed or reworked in place, usually by agriculture activities. Disturbed Soil may or may not be suitable Subgrade Soil; see our Geotechnical Report.

5. Weathered Soil is soil material which is naturally deposited but weathered in place due to its exposure to the elements. Weathered Soil may or may not be suitable Subgrade Soil; see our Geotechnical Report.

6. Engineered Fill soils must consist of clean earth materials, not excessively wet, free of organics and topsoil, free of deleterious materials such as building rubble, wood, plant materials. It is placed in thin lifts of no more than 150 mm in thickness. Cohesionless soils such as sand or gravel are the easiest to place and compact.

7. All values stated in metric units shall be considered as accurate.

# 3 ENGINEERED FILL DESIGN

## 3.1 Design Foundation Pressure

1. Engineered Fill can be expected to experience post-construction settlement on the order of 1 percent of the depth of the Engineered Fill. The time (after initial placement) over which this settlement typically occurs depends on the composition of the Engineered Fill as follows:

   a) sand or gravel soil; several days
   b) silt soil; several weeks
   c) clay or clayey soil; several months.

   The placement of Engineered Fill might also result in post-construction settlement of the natural soil.

   The timing of foundation construction must consider the post-construction settlement of the Engineered Fill and the foundation soil.

2. Unless otherwise stated, the Engineered Fill is to be placed over the entire lot area or site area.

3. Engineered Fill is to extend up to at least 1 m above the highest level of required foundation support. Typically, this can be within 1 m of the design final grades. Additional common fill can be placed over the Engineered Fill to provide protection against environmental factors such as wind, frost, precipitation, and the like.

4. An allowable design foundation pressure (net geotechnical reaction at SLS for 25 mm of settlement) of 150 kPa is typically recommended for the Engineered Fill, unless it consists of glaciolacustrine silt and clay in which case a lower design foundation pressure will need to be determined on a site specific basis. Foundations shall have minimum widths of 0.8 m for continuous strip footings, and minimum dimensions of 1 m for column footings.

5. At the foundation level, sufficient Engineered Fill shall be constructed to ensure that it extends at least 1.0 m laterally beyond the edge of any foundations, and that it extends outward within an area defined by a 1 to 1 line downward from the edge of any Engineered Fill.

6. Foundations placed on the Engineered Fill must be provided with nominal reinforcing steel for stiffening of basement foundation walls and for protection against excessive minor cracking. The reinforcing steel must consist of 2-15M bars continuous at the top of the foundation wall, and 2-15M bars continuous at the bottom of the foundation walls.

7. At the time of foundation construction, foundation excavations must be reviewed by the Geotechnical Engineer to confirm suitable bearing capacity of the Engineered Fill. The Geotechnical Engineer must inspect the foundation subgrade immediately after excavation, and must inspect the foundation subgrade immediately prior to placement of concrete for footings. The Geotechnical Engineer must also inspect the placement of reinforcing steel in the foundation walls. Written approval must be obtained from the Geotechnical Engineer prior to,

   a) placement of footing concrete, and
   b) placement of foundation wall concrete.

# 4 CONSTRUCTION

## 4.1 Survey Layout

1. The survey layout shall be carried out and maintained throughout the construction of Engineered Fill activities. A suitable layout stake shall be placed at the corners of the start and finish of every block or work area to receive Engineered Fill.

2. At least two temporary survey elevation benchmarks shall be provided for every work area to receive Engineered Fill, to assist in monitoring the level of the Engineered Fill as it is constructed. Benchmark positions may need to be reviewed by Grounded if consolidation settlement is expected to influence their elevations.

3. The ground elevations of the subgrade approved for receiving Engineered Fill shall be surveyed and recorded on a regular grid pattern. Engineered Fill shall not be placed on any work area without the written approval of the Testing Engineer.

4. The ground elevations of the Engineered Fill on each work area shall be surveyed and recorded on a regular grid pattern at the end of each day during the placement of Engineered Fill.

5. On completion of Engineered Fill construction, the final ground elevations shall be surveyed and recorded on a regular grid pattern.

## 4.2 Topsoil Stripping

1. The Geotechnical Engineer must observe the stripping of topsoil from the areas proposed for Engineered Fill, from start to finish.

2. Topsoil must be stripped from the entire building site area. The Geotechnical Engineer must photograph the work areas which have been suitably stripped.

### 4.3 Test Holes Into Subgrade

1. After topsoil has been stripped, the exposed subgrade must be investigated for the presence of old buried fill or deleterious material, which may be unsuitable (as determined by the Testing Engineer or the Geotechnical Engineer) for the support of Engineered Fill.

2. Exploratory test pits must be dug using a small backhoe, on a suitable pattern, to observe an appropriate representation of the entire site area.

3. The Testing Engineer or Geotechnical Engineer must observe the digging and backfilling of the test pits; must log the test pit stratigraphy; must obtain soil samples at maximum depth intervals of 0.3m; and must photograph each dug test pit.

4. If the test pits discover any old buried fill or deleterious materials, it must be excavated and removed from the Engineering Fill area down to undisturbed, stable native soil.

5. All test pits must be properly backfilled and compacted in thin lifts (max. 150mm thickness) to at least 98 percent Standard Proctor Maximum Dry Density (SPMDD), at the optimum water content plus or minus 2 percent. The Testing Engineer or Geotechnical Engineer must observe the backfilling and compaction of the test pits.

### 4.4 Subgrade Proof-rolling

1. Prior to placing any Engineered Fill, the exposed subgrade must be proofrolled under the observation of the Testing Engineer.

2. If unstable subgrade conditions are encountered, the unstable subgrade must be sub-excavated. If wet site conditions exist during filling, stabilization with granular materials may be required.

### 4.5 Engineered Fill Placement

1. Engineered fill must not be placed without the approval of the Testing Engineer. Prior to placing any Engineered Fill, the topsoil must be stripped, the subgrade must be investigated for old buried fill or deleterious material, the subgrade must be proof-rolled, and the subgrade elevations must be surveyed.

2. Prior to the placement of Engineered Fill, the source or borrow area for the Engineered Fill must be evaluated for its suitability both geotechnically and environmentally. Samples of the proposed fill material must be obtained and tested by the Testing Engineer. The samples must be tested in a geotechnical laboratory for Standard Proctor Maximum Dry Density. Samples must also be tested per the requirements of Ontario Regulation 406/19, prior to approval of the material for use as Engineered Fill. The results of the lab testing must be approved by the Geotechnical Engineer and the results of the environmental testing must be approved by the site Qualified Person, prior to import.

3. The Engineered Fill must be placed in maximum loose lift thicknesses of 150 mm. Each lift of Engineered Fill must be compacted with a heavy roller, to at least 98 percent Standard Proctor Maximum Dry Density (SPMDD), at the optimum water content plus or minus 2 percent.

4. Field density tests must be taken by the Testing Engineer, on each lift of Engineered Fill, on each lot area. Any Engineered Fill which is tested and found to not meet the specifications, shall be either removed or, reworked and retested.

5. Engineered fill must not be placed during the period of the year when cold weather occurs, i.e. when there are freezing ambient temperatures during the daytime and overnight.

### 4.6 Certification

1. The Testing Engineer shall provide written summaries of the compaction and lab testing to the Geotechnical Engineer on a frequency of not less than every two weeks.

2. Upon Completion of the Engineered Fill placement the Testing Engineer will provide certification to the Geotechnical Engineer of General Compliance with this specification.

3. Upon receipt of the certification from the Testing Engineer, the Geotechnical Engineer will provide the owner with a Certificate of Engineered Fill