Final Report

FUNCTIONAL SERVICING REPORT

12304 Heart Lake Road, Caledon

Prepared for Broccolini
by IBI Group
November 15, 2021

Table of Contents

Table of Contents (continued)

Enclosures:

<u>Site Plan Drawings</u>
SG-01 – Site Grading 01
SG-02 – Site Grading 02
SG-03 – Site Grading 03
SG-04 – Site Grading 04
SS-01 – Site Servicing 01
SS-02 – Site Servicing 02
SS-03 – Site Servicing 03
SS-04 – Site Servicing 04
XS-01 - Sections

<u>Abbotside Way Extension Drawings</u>

1 Introduction

1.1 Background

IBI Group Canada (IBI) has been retained by Broccolini (the "Owner") to prepare a set of engineering drawings for the extension of Abbotside Way as part of a Development Agreement, and to prepare a Functional Servicing Report to support the Zoning By-Law Amendment (ZBA) and Site Plan Application (SPA) processes for a proposed industrial development located at 12304 Heart Lake Road in the Town of Caledon (the "Town") and the Region of Peel (the "Region"). The purpose of this report is to provide a municipal servicing strategy for both sanitary discharge, and water supply. More specifically, the report will present the following:

- Evaluate groundwater quantity and quality parameters from the hydrogeological report and develop a strategy to manage groundwater under both short- and long-term conditions
- Identify sanitary servicing opportunities and constraints and evaluate the capacity of the receiving municipal sewer.
- Identify water servicing opportunities and constraints, calculate the proposed domestic water and firefighting supply needs; and evaluate the capacity of the municipal infrastructure.

The following documents have been obtained from various sources:

- Approved Town of Caledon plan and profile drawings for Abbotside Way, prepared by SCS Consulting Group Ltd. (SCS), dated August 2016;
- Mayfield West Functional Servicing and Stormwater Management Study (Mayfield West FSR), prepared by David Schaeffer Engineering Ltd., dated November 2007;
- Region of Peel 2041 Wastewater Capital Program, dated June 2020;
- Speirs Giffen Avenue Ultimate Sanitary Area Drainage Plan, prepared by IBI Group, dated July 2019;
- Topographic Survey prepared by R-PE Surveying Ltd., dated September 2021; and,
- Architectural plans and site statistics prepared by Ware Malcomb.

1.2 Site Description

Located at 12304 Heart Lake Road in the Town of Caledon and Region of Peel, the overall subject site is approximately 37 ha in size, however, it should be noted that this report will only consider Phase 1 of the development, which consists of a 9.95 ha portion at the southwest of the site, bounded by Abbotside Way to the north, existing agricultural lands to the east, Highway 410 to the south, and an adjacent industrial development application to the west. A vicinity map and an aerial exhibit can be found as **Figure 1** and **Figure 2** respectively following the report.

The overall site is currently comprised of agricultural land and slopes in a southwesterly direction with a change in elevation starting at ±274 m at Heart Lake Road and falling to ±266 m at the west property line. A copy of the topographic survey can be found in **Appendix A** for reference.

The site is located within the Mayfield West Study Area for which a Functional Servicing and Stormwater Management Study was completed in November 2007.

1.3 Site Proposal

As previously noted, this report will only consider Phase 1 of the development, which includes a 48,610 m^2 building (Building 1) within a 9.95 ha portion at the southwest corner of the site. Construction will be slab on grade, with no underground levels. Sample architectural drawings can be found in **Appendix A** for reference.

It should also be noted that Abbotside Way will be extended in an easterly direction to Heart Lake Road and is to be conveyed to the Town through a Development Agreement.

2 Terms of Reference and Methodology

2.1 Terms of Reference

The terms of reference used for the scope of this report are based on the Region's Design, Specifications, and Procedures Manual for Linear Infrastructure, dated March 2017; the Town's Engineering design criteria; and the aforementioned background studies and reports.

2.2 Methodology: Sanitary Discharge

Peak sanitary sewer flows that consider infiltration will be calculated based on **Table 2.1** below, in accordance with the Region's design criteria. Based on the calculated peak flows, the adequacy of the existing infrastructure to support the proposed development will be discussed.

Table 2.1 Sanitary Design Parameters

Criteria	Unit	Source
Industrial Population	70 pp/ha	Peel
Average Flow	302.8 L/cap/day	Peel
Infiltration	0.0002 m^3/s/ha	Peel

2.3 Methodology: Water Usage

The domestic water usage will be calculated based on Table 2.2 below, in accordance with the Region's design criteria. Pressure and flow testing to determine the adequacy of the existing watermain to support the development with fire suppression in accordance with the Fire Underwriters Survey (FUS) Guidelines will be discussed in the subsequent sections.

Table 2.2 Water Design Parameters

Criteria	Unit	Source
ICI Average Consumption	300 L/Employee/day	Peel
Maximum Day Factor	1.4	Peel
Peak Hour Factor	3.0	Peel

3 Groundwater Discharge

3.1 Groundwater Quality

A hydrogeological assessment was carried out by EXP Services Inc. (EXP) to assess existing groundwater conditions from both quality and quantity perspectives. The following table is a summary of the observed groundwater quality parameters compared to the Region's limits for discharge:

Table 3.1 Groundwater Quality Exceedances

Parameter	Storm By-Law Criteria (µg/L)	Sanitary By-Law Criteria (µg/L)	Measured Reading (µg/L)
Total Manganese	5,000	50	78
Chloroform	40	2	2.8

Per the hydrogeological assessment, observed levels of Total Manganese and Chloroform exceed the City's and Region's threshold for discharge to storm sewer but meet the threshold for discharge to sanitary sewers. It is therefore recommended that all dewatering activities be discharged to the sanitary sewer without pre-treatment. Please see **Appendix B** for an excerpt copy of the hydrogeological assessment.

3.2 Short-term Groundwater Discharge

The anticipated average short-term groundwater discharge has been estimated by EXP as shown in the table below. At the time of this report, a dewatering plan was not made available. It is therefore assumed that groundwater pumping will operate for 16 hours per day resulting in a corresponding maximum pumping rate as shown:

Table 3.2 Short-Term Groundwater Discharge

Building	Average Discharge[1]	Average Discharge	Hours of Operation	Peak Discharge	Connection Outlet	Treatment Required
Building 1	640,000 L/day	7.4 L/s	16 hrs	11.1 L/s	Sanitary	None

It should be noted that a Permit to Take Water (PTTW) application must be submitted to the Ministry of the Environment, Conservation and Parks (MECP) if dewatering rates exceed 50 m^3/day.

3.3 Long-term Groundwater Discharge

Per the hydrogeological assessment, a Private Water Drainage System (PWDS) will not be required, as the building will utilize slab on grade construction. Please see **Appendix B** for an excerpt copy of the hydrogeological assessment.

[1] Includes short-term groundwater discharge with a safety factor of 2.0, and stormwater removal from a 15 mm precipitation event

4 Sanitary Drainage System

4.1 Existing Sanitary Drainage System

Per the Town's record information, local sanitary infrastructure consists of a 250 mm sanitary sewer within Abbotside Way which flows in a westerly direction and conveys flows to a 525 mm trunk sanitary sewer within Kennedy Road. Further east of the subject site, an existing 375 mm sanitary sewer is located within Speirs Giffen Avenue which conveys flows in an easterly direction to an existing 525 mm sanitary sewer within Dixie Road.

4.2 Proposed Sanitary Drainage System

As illustrated in the sanitary drainage area plan prepared by SCS, the overall site has been identified as industrial lands with a portion in the southwest corner allocated to be conveyed to the existing 250 mm sanitary sewer which will convey flows in a westerly direction to the Abbotside Way sanitary sewer system.

For the balance of the industrial lands, a conceptual 300 mm sanitary sewer with a 0.4% slope has been identified as part of the approved plan and profile drawings (#409 and #410) prepared by SCS. It is therefore proposed to install this 300 mm sanitary sewer which will convey flows in an easterly direction to Heart Lake Road as part of proposed **Abbotside Way Extension**.

It should be noted that this 300 mm sanitary sewer within Abbotside Way will be constructed as part of the enclosed **Abbotside Way Extension** drawing set, however will be plugged at Heart Lake Road and remain unused until such a time that Speirs Giffen Avenue is extended to Heart Lake Road per the Mayfield West FSR.

Copies of the approved plan and profile drawings prepared by SCS for the **Abbotside Way Extension** can be found in **Appendix A**. Excerpt copies of the Mayfield West FSR, Speirs Giffen sanitary drainage area plan, and the Livingston Estates drainage area plan prepared by SCS can be found in **Appendix C** for reference.

4.3 Post-Development Population

The following post-development population will be used to size the sanitary service connection:

Table 4.1 Post-Development Populations

Building	Area	Population Density	Pop.
Building 1	9.95 ha	70 pp/ha/day	697

Please see **Appendix C** for the detailed design sheet.

4.4 Post-Development Sanitary Design Flow

Based on the criteria set in **Section 2.2** and the post-development population, the corresponding post-development sanitary sewer flow is calculated as follows:

$$Q_{\text{Building 1}} = \left(\frac{302.8\ \text{L/c·d} \cdot 697\ \text{pers} \cdot 3.90_{\text{P.F.}}}{86400\ \text{s / day}}\right) + (0.20\ \ \text{L/s·ha} \cdot 9.95\ \text{ha}) = \mathbf{11.5\ L/s}$$

4.5 Sanitary Service Connection

A 250 mm sanitary service and control MH were installed at the time Abbotside Way was constructed as part of the Livingston Estates residential subdivision. The control MH was installed on the adjacent property to the west however was installed for the subject site within an easement. It is therefore proposed the existing 250 mm sanitary service be utilized to service Building 1.

The following table illustrates the peak flow and corresponding capacity of the existing service:

Table 4.2 Sanitary Service Performance

Building	From	To	Service Size (mm)	Service Slope	Peak Flow (L/s)	Capacity (L/s)	Percent of Full Flow
Bldg. 1	Cntrl.MH	Ex. 250 mm San. Sewer	200	1.0 %	11.5	34.2	34 %

As shown above, the sanitary service will convey the post-development peak sanitary flow while operating at 34% of full flow capacity.

Conceptual 300 mm sanitary services for future applications were identified as part of the approved plan and profile drawings prepared by SCS and will be installed as part of the **Abbotside Way Extension** to avoid future disruption to the municipal road.

Please see the approved plan and profile drawings prepared by SCS which can be found in **Appendix A**, the detailed design sheet which can be found in **Appendix C**, and the enclosed **Abbotside Way Extension** drawing set.

4.6 Sanitary Sewer (Abbotside Way Extension)

As previously mentioned, an existing 250 mm sanitary sewer at a 1.0% slope within Abbotside Way will be utilized to convey flows from Building 1 in a westerly direction.

Furthermore, a new 300 mm sanitary sewer shall be installed within the Abbotside Way extension at a 0.4% slope as outlined in the approved Livingston Estates Plan and Profile prepared by SCS. This new municipal sewer is to be capped until such a time as the proposed Speirs Giffen extension is built. Please see approved plan and profile drawings prepared by SCS which can be found in **Appendix A** for reference, and the new **Abbotside Way Extension** drawings enclosed for reference.

5 Water Supply System

5.1 Existing Water Supply System

Per the Town and Region's record information, local existing water infrastructure consists of a 300 mm watermain within Abbotside Way, a local 400 mm watermain within Heart Lake Road, and both a 900 mm and a 1200 mm feedermain within Heart Lake Road.

Hydrant flow testing was performed at existing fire hydrants along Abbotside Way to confirm the available water supply's flow-pressure response curve. These tests were performed on November 18, 2021 and were conducted in accordance with NFPA 291. The results are summarized as follows:

Table 6.1 Hydrant Response Curve

Abbotside Way			
Flow (gpm)	**Flow (L/s)**	**Pressure (psi)**	**Pressure (kPa)**
0	0	81	558
1,126	71.0	74	510
1,838	116.0	73	503

As shown above, static pressure within the system is expected to be approximately 81 psi. A copy of the hydrant flow test can be found in **Appendix D** for reference.

5.2 Proposed Water Supply System

As part of the Mayfield West FSR, the existing 300 mm watermain within Abbotside Way shall be extended within the proposed Abbotside Way extension and connected to the existing 400 mm watermain within Heart Lake Road. Please refer to the water distribution plan as part of the Mayfield West FSR which can be found in **Appendix D** for reference.

5.3 Domestic Water Supply Demands

The Average Day Demand (ADD), Peak Hour Demand (PHD), and Max Day Demand (MDD) for the overall site have been calculated using the criteria set in **Section 2.3**, and are summarized as follows:

Table 5.1 Domestic Water Demands

Building	Population	ADD (L/s)	PHD (L/s)	MDD (L/s)
Building 1	697	2.4	7.3	3.4

The domestic supply line for the building will be designed based on PHD while maintaining a minimum available pressure of 40 psi (275 kPa) at the face of the building. Please see **Appendix D** for the detailed calculations.

5.4 Fire Supply Demands

The recommended fire flow demand for the building has been calculated using the design criteria outlined in the Water Supply for Public Fire Protection Manual, 1999 by the Fire Underwriters Survey (FUS). As the building will constructed using fire resistive materials, the effective floor area is taken as the largest floor area plus 25 % of the two adjacent floors. The corresponding floor area and FUS factors will be applied as follows:

Table 5.2 Effective Floor Area and Fire Underwriters Survey Factors

Building	Floor Area (m^2)	Construction Coefficient	Building Occupancy	Sprinkler Adjustment	Proximity Factor
Building 1	48,610	0.6 (resistive)	-15% (limited)	-30%	+15%

Using the effective floor area for the building and the appropriate FUS factors, the required fire flow is calculated as follows:

Table 5.3 Fire Demand Calculations

Fire Flow (F) Calculation	Applying FUS factors	Adjusted Fire Flow	Total Demand (TD)
F = 220 · 0.6 √Area	F_1=F·0.85 = 24,650 L/min	Fire Flow = F_1 - F_2 + F_3	TD= FF + MDD
F = 220 · 0.6 √48,610 m^2	F_2=F_1·0.50 = 12,325 L/min	FF= 16,000 L/min *(rnd'd)*	TD= 266.7 L/s + 3.4 L/s
F = 29,000 L/min *(rnd'd)*	F_3=F_1·0.15 = 3,698 L/min	FF = 266.7 L/s	**TD= 270.1 L/s**

The fire supply line for the building will be designed based on Total Demand (Fire Flow + MDD) while maintaining a minimum available pressure of 20 psi (140 kPa) at the face of the building. Please see **Appendix D** for the detailed calculations.

5.5 System Pressure Under Normal Operation

As previously mentioned, the domestic service for the building shall be sized to convey domestic demands under normal system operating conditions (PHD) while maintaining a minimum available pressure of 40 psi (275 kPa). The residual pressure at the building is calculated by first interpolating the PHD residual pressure within the existing watermain, and then subtracting head losses within the system using the Hazen-Williams formula. The following table summarizes the residual pressure for the proposed domestic service:

Table 5-2 Residual Pressure under PHD Conditions

Flow Conditions	PHD (L/s)	Domestic Service (mm)	Residual Pressure @ Main		Residual Pressure @ Bldg.	
			(psi)	(kPa)	(psi)	(kPa)
PHD	7.3	150	81	558	81	557

As shown above, there is no appreciable head loss within the system, and the residual pressure at the building face is above the minimum acceptable pressure of 40 psi (275 kPa) under PHD conditions. Please see **Appendix E** for the detailed design calculations.

5.6 System Pressure Under Fire Flow

As previously mentioned, the fire service shall be sized to convey the total fire demand (Fire + MDD) while maintaining a minimum available pressure of 20 psi (140 kPa). The residual pressure at the building is calculated by first interpolating the residual pressure within the existing watermain, and then subtracting head losses within the system using the Hazen-Williams formula. The following table summarizes the residual pressure for the proposed fire service:

Table 5-3 Residual Pressure under Fire + MDD Conditions

Flow Conditions	FF+MDD (L/s)	Fire Service (mm)	Residual Pressure @ Main		Residual Pressure @ Bldg.	
			(psi)	(kPa)	(psi)	(kPa)
FF+MDD	270.1	300	43	295	38	262

As shown above, the residual pressure at the building face for the fire service is above the minimum acceptable pressure of 20 psi (140 kPa) under fire demand conditions (Fire + MDD). Please see **Appendix D** for the detailed design calculations.

5.7 Water Service Connections

To service the proposed building, a new 300 mm fire service is proposed to be looped around the building with two connections the 300 mm watermain within Abbotside Way. A separate 150 mm domestic service will tee off from the fire line, and a new valve and box shall be installed at the property line for each incoming service.

Each incoming 300 mm fire service shall be installed with a detector check valve placed in a 1800 mm precast chamber per Peel Dwg. 1-3-1, and the incoming 150 mm water service shall be installed with a meter placed in a 1500 mm precast chamber per Peel Dwg. 1-4-4.

The National Fire Protection Association (NFPA) considers any building over 23 m in height to be classified as a high-rise building and thus requires a remotely located secondary siamese connection for each zone. As the proposed building is less than 23 m in height, one siamese connection will suffice, however additional siamese connections may be required for multiple fire zones, and shall be confirmed at the Building Permit stage. All siamese connections shall be placed within 45 m of a hydrant.

Please see enclosed servicing drawings **SS-01** through **SS-04**, and the enclosed **Abbotside Way Extension** drawing set for reference.

5.8 Hydrant Coverage

Existing hydrants are located on the north side of Abbotside Way and on either side of Heart Lake Road. Four new municipal hydrants are proposed within the north boulevard of the **Abbotside Way Extension**. Additional private hydrants shall be installed around the permitter of Building 1, and as previously mentioned all proposed siamese connections shall be strategically placed within 45 m of a hydrant to satisfy OBC requirements.

Please see Drawings **SS-01** through **SS-04** and the enclosed **Abbotside Way Extension** drawing set for the location of all existing and proposed water infrastructure.

6 Conclusions and Recommendations

Sanitary Sewers

The receiving sanitary system within Abbotside Way, which was designed as part of the Mayfield West FSR, and detailed as part of the Livingston Estates FSR, has been sized to accommodate sanitary flows from the subject site.

Water Supply

The existing watermain network has been designed in accordance with the Mayfield West FSR. It is noted that additional hydrant testing will be conducted shortly, and it is expected that the watermain network will easily support the proposed fire and domestic water demands for the proposed development.

Summary

In summary, it can be concluded that both the Zoning By-Law Amendment and Site Plan Application can be supported from a municipal site servicing perspective subject to further fire flow testing.

Should you have any questions, please do not hesitate to contact the undersigned.

Respectfully Submitted,

IBI Group Canada Inc.

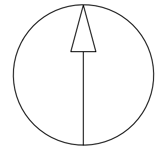
LICENSED PROFESSIONAL ENGINEER
J. M. JENKINS
November 15, 2021
PROVINCE OF ONTARIO

Jason Jenkins, P.Eng, P.E.
Associate Manager - Land Engineering

Tel: +1.905.763.2322 x 63542
E-Mail: Jason.Jenkins@ibigroup.com

https://ibigroup.sharepoint.com/sites/projects1/135636/internal documents/6.0_technical/6.04_civil/03_tech-reports/phase 1/zba and spa/revision 1/functional servicing/135636 - functional servicing report (revision 1).docx

Figure 1 – Vicinity Map



PROJECT NAME INDUSTRIAL DEVELOPMENT - PHASE 1 12304 HEART LAKE ROAD CALEDON, ONTARIO	IBI GROUP Unit 300 – 8133 Warden Avenue Markham ON L6G 1B3 Canada tel 905 763 2322 fax 905 763 9983 ibigroup.com

SCALE: N.T.S.	DATE: NOV 2021	FIGURE NAME KEY PLAN	FIGURE NO. FIG-1	REVISION
PROJECT ENG: JJ	DRAWN BY: NDS			
CHECKED BY: JJ	APPROVED BY:			
PROJECT NO: 135636				

File Location: J:\135636_12304Heart\7.0_Production\7.03_Design\04_Civil\Sheets\SPA\Phase 1\Figures\135636-SHT-FIG.dwg Last Saved: November 2, 2021, by Jasmine.Zhang Plotted: Thursday, November 4, 2021 10:44:25 AM by Nicolas Di Stefano

10mm

SCALE CHECK 1 in

Figure 2 – Aerial Plan

True North

PROJECT NAME INDUSTRIAL DEVELOPMENT - PHASE 1 12304 HEART LAKE ROAD CALEDON , ONTARIO	IBI **IBI GROUP** Unit 300 – 8133 Warden Avenue Markham ON L6G 1B3 Canada tel 905 763 2322 fax 905 763 9983 **ibigroup.com**

SCALE: N.T.S.	DATE: NOV 2021	FIGURE NAME AERIAL PLAN	FIGURE NO. FIG-2	REVISION
PROJECT ENG: JJ	DRAWN BY: NDS			
CHECKED BY: JJ	APPROVED BY:			
PROJECT NO: 135636				

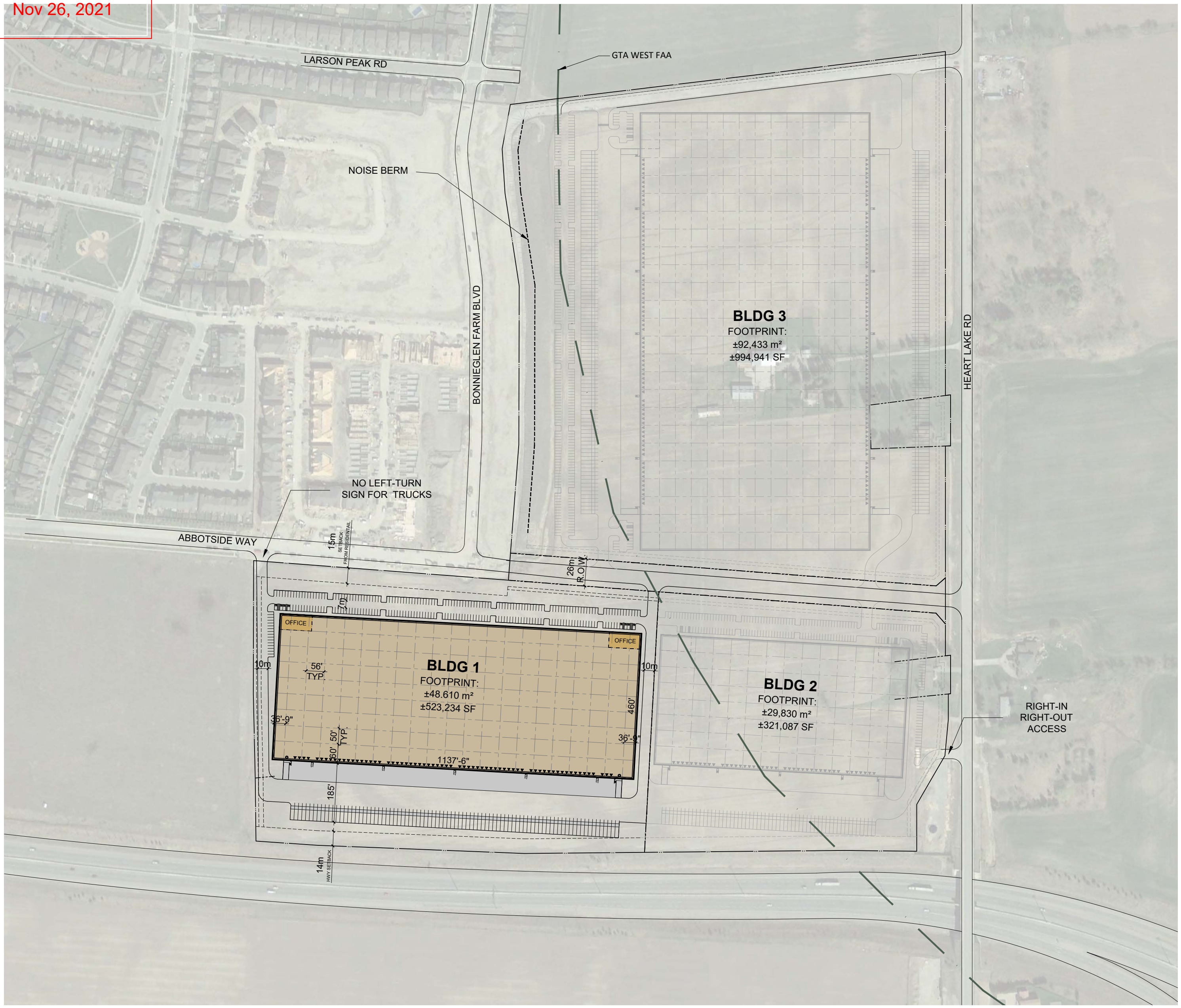
File Location: J:\135636_12304Heart\7.0_Production\7.03_Design\04_Civil\Sheets\SPA\Phase 1\Figures\135636-SHT-FIG.dwg Last Saved: November 2, 2021, by Jasmine.Zhang Plotted: Thursday, November 4, 2021 10:45:56 AM by Nicolas Di Stefano

10mm

SCALE CHECK
1 in

Appendix A – Background Information

Sample Architectural Drawings (Ware Malcomb)
Topographic Survey (R-PE)
Plan and Profile Drawings (Town of Caledon)



PROJECT DATA:

SITE AREA:		
GROSS:	91.52 AC	37.04 HA
	3,986,633 SF	370,370 m²
BUILDING AREA:		
BUILDING 1	523,234 SF	48,610 m²
BUILDING 2	321,087 SF	29,830 m²
BUILDING 3	994,941 SF	92,433 m²
TOTAL:	1,839,262 SF	170,873 m²
FAR:		
GROSS:		0.46
NET:		0.46
COVERAGE:		
GROSS:		46%
NET:		46%
BUILDING 1		
▲ DOCK-HIGH DOORS		67
O GRADE-LEVEL DOORS		2
PARKING REQUIRED:		
WAREHOUSE		
<7k m²	7,000 m²	78 STALLS
7k-20k m²	13,000 m²	90 STALLS
>20k m²	28,610 m²	170 STALLS
TOTAL		338 STALLS
PARKING PROVIDED:		247 STALLS
	@0.47/1000 SF	@0.51/100 m²
REQ. ACCESSIBLE		*To be confirmed by City*
TRAILER STALLS		86 STALLS
BUILDING 2		
▲ DOCK-HIGH DOORS		43
O GRADE-LEVEL DOORS		2
PARKING REQUIRED:		
WAREHOUSE		
<7k m²	7,000 m²	78 STALLS
7k-20k m²	13,000 m²	90 STALLS
>20k m²	9,830 m²	59 STALLS
TOTAL		226 STALLS
PARKING PROVIDED:		186 STALLS
	@0.58/1000 SF	@0.62/100 m²
REQ. ACCESSIBLE		*To be confirmed by City*
TRAILER STALLS		57 STALLS
BUILDING 3		
▲ DOCK-HIGH DOORS		146
O GRADE-LEVEL DOORS		4
PARKING REQUIRED:		
WAREHOUSE		
<7k m²	7,000 m²	78 STALLS
7k-20k m²	13,000 m²	90 STALLS
>20k m²	67,811 m²	404 STALLS
TOTAL		571 STALLS
PARKING PROVIDED:		481 STALLS
	@0.48/1000 SF	@0.52/100 m²
REQ. ACCESSIBLE		*To be confirmed by City*
TRAILER STALLS		191 STALLS

DEVELOPMENT STANDARDS:

ZONING:	MP/MS
MAX. F.A.R.:	0.50
MAX. COVERAGE:	50%
MAX. HEIGHT:	12.2 m [6]
BUILDING SETBACKS: [4]	
FRONT:	9 m
SIDE (INT):	3m, 6m [5]
SIDE (EXT):	7.5 m
REAR:	7.5 m
PARKING SETBACKS: [1,4]	
FRONT:	6 m
SIDE:	3 m
SIDE (EXT):	3 m
REAR:	3 m
DRIVEWAY	1.5m
LANDSCAPE REQ.:	10%
OFF-STREET PARKING:	
STANDARD:	2.75X6.0
DRIVE AISLE:	6 m
REQ. PARKING RATIO BY USE:	
WAREHOUSE: [2]	
≤7,000 m²	1/90 m²
7k - 20k m²	1/145 m²
>20,000 m²	1/168 m²
OFFICE: [3]	<15%

NOTES:

1 driveway setback - 1.5m from lot line

2 If accessory office use and retail net floor areas are 15% or less of the total net floor area:

Up to 7,000 m2 – 1 parking space per 90 m2 net floor area or portion thereof

7,000 to 20,000 m2 – 78 parking spaces, plus 1 parking space per 145 m2 of net floor area or portion thereof over 7000 m2

Over 20,000 m2 – 168 parking spaces, plus 1 parking space per 170 m2 of net floor area or portion thereof over 20,000 m2

3 If associated office or retail net floor areas are more than 15% of the total net floor area:
In addition to the standards contained above in, the applicable net floor areas exceeding 15% shall be subject to 1 parking space per 30 m2 of net floor area or portion thereof

4 14.0m from a provincial highway.
20m front yard abutting a residential zone. 15m exterior/interior side and rear yards abutting residential

5 3m on one side, 6m on the other

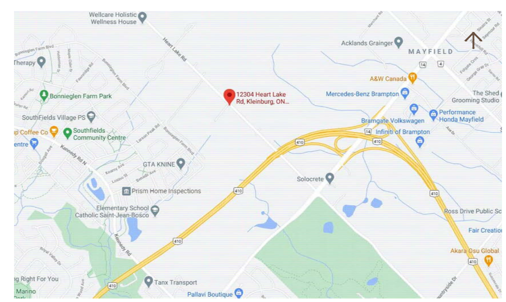
6 18m in MP zone, 12.2m in MS zone

NOTE: HEIGHT VARIANCE MAY BE REQUIRED DEPENDING ON ZONING

This conceptual design is based upon a preliminary review of entitlement requirements and on unverified and possibly incomplete site and/or building information, and is intended merely to assist in exploring how the project might be developed.

Stormwater Management Design:
ASSUMED UNDERGROUND SYSTEM

Boundary Source:
PDF ALTA SURVEY



1:1500
0 20m 40m 75m 150m

NORTH

scheme: 09

Conceptual Site Plan

BROCCOLINI

12304 Heart Lake Road
Caledon, ON, Canada

WARE MALCOMB

TOR21-0032-00
10.20.2021

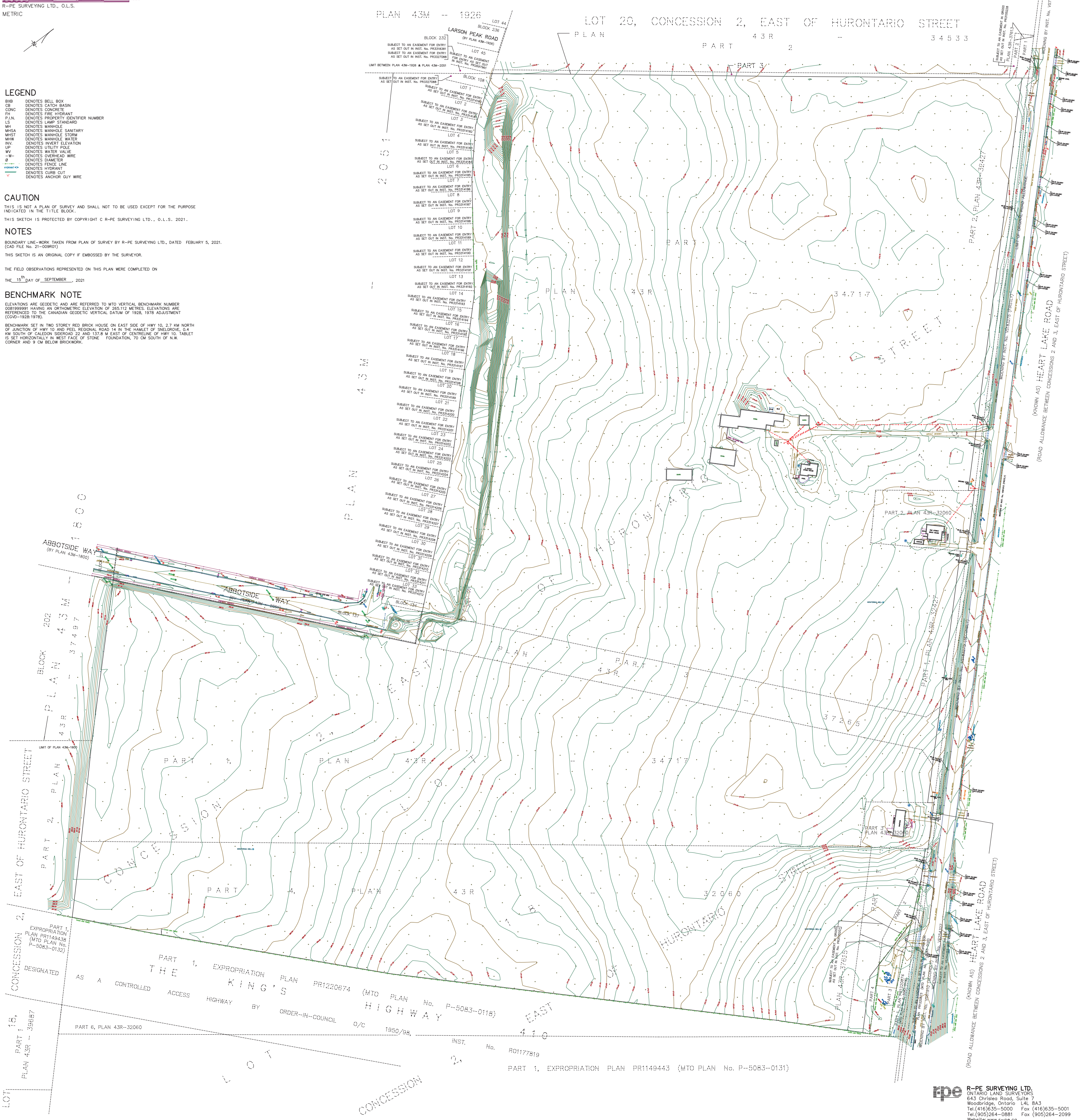
SHEET
1

SKETCH SHOWING ELEVATIONS FOR CONSULTANT'S USE

SCALE 1:1000

R–PE SURVEYING LTD., O.L.S.

METRIC



LEGEND

BXB	DENOTES BELL BOX
CB	DENOTES CATCH BASIN
CONC	DENOTES CONCRETE
FH	DENOTES FIRE HYDRANT
P.I.N.	DENOTES PROPERTY IDENTIFIER NUMBER
LS	DENOTES LAMP STANDARD
MH	DENOTES MANHOLE
MHSA	DENOTES MANHOLE SANITARY
MHST	DENOTES MANHOLE STORM
MHW	DENOTES MANHOLE WATER
INV.	DENOTES INVERT ELEVATION
UP	DENOTES UTILITY POLE
WV	DENOTES WATER VALVE
–W–	DENOTES OVERHEAD WIRE
Ø	DENOTES DIAMETER
	DENOTES FENCE LINE
HYDRANT	DENOTES HYDRANT
	DENOTES CURB CUT
	DENOTES ANCHOR GUY WIRE

CAUTION

THIS IS NOT A PLAN OF SURVEY AND SHALL NOT TO BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK.

NOTES

BOUNDARY LINE–WORK TAKEN FROM PLAN OF SURVEY BY R–PE SURVEYING LTD., DATED FEBUARY 5, 2021. (CAD FILE No. 21–009R01)

THIS SKETCH IS AN ORIGINAL COPY IF EMBOSSED BY THE SURVEYOR.

THE FIELD OBSERVATIONS REPRESENTED ON THIS PLAN WERE COMPLETED ON

THE 15th DAY OF SEPTEMBER, 2021

BENCHMARK NOTE

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO MTO VERTICAL BENCHMARK NUMBER 0081999991 HAVING AN ORTHOMETRIC ELEVATION OF 265.112 METRES. ELEVATIONS ARE REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928, 1978 ADJUSTMENT (CGVD–1928:1978).

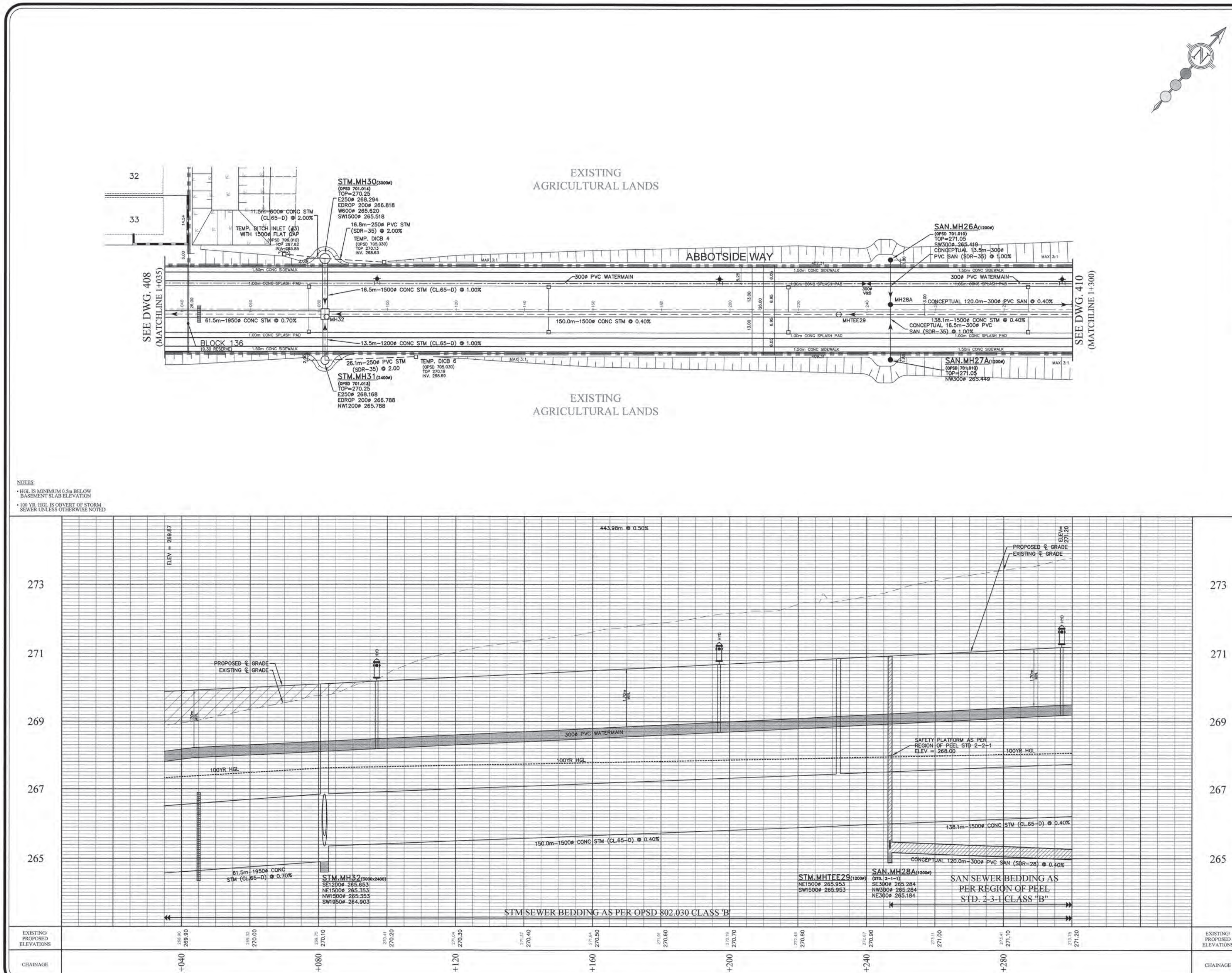
BENCHMARK SET IN TWO STOREY RED BRICK HOUSE ON EAST SIDE OF HWY 10, 2.7 KM NORTH OF JUNCTION OF HWY 10 AND PEEL REGIONAL ROAD 14 IN THE HAMLET OF SNELGROVE, 0.4 KM SOUTH OF CALEDON SIDEROAD 22 AND 137.8 M EAST OF CENTRELINE OF HWY 10. TABLET IS SET HORIZONTALLY IN WEST FACE OF STONE FOUNDATION, 70 CM SOUTH OF N.W. CORNER AND 9 CM BELOW BRICKWORK.

R–PE SURVEYING LTD.
ONTARIO LAND SURVEYORS
643 Chrislea Road, Suite 7
Woodbridge, Ontario L4L 8A3
Tel.(416)635–5000 Fax (416)635–5001
Tel.(905)264–0881 Fax (905)264–2099
Website: www.r–pe.ca

DRAWN: S.L.

JOB No. 21–279 CAD FILE No. 21–279TP01

TOWN OF CALEDON
PLANNING
RECEIVED
Nov 26, 2021



NOTES:
- HGL IS MINIMUM 0.5m BELOW BASEMENT SLAB ELEVATION
- 100 YR. HGL IS OBVERT OF STORM SEWER UNLESS OTHERWISE NOTED

SITE
KEY PLAN
N.T.S.

BENCHMARK: ELEV. 264.941
ON THE NORTH FACE AT THE EAST CORNER OF A GREY BRICK BUNGALOW LOCATED ON THE SOUTH SIDE OF SEVENTEENTH SIDEROAD (REGION ROAD #14) APPROX. 122m EAST OF SECOND LINE EAST.

LEGEND:
- LIMIT OF PROPERTY
- SANITARY SEWER/MANHOLE
- STORM SEWER/MANHOLE
- STORM SEWER/MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING STORM MANHOLE
- SINGLE CATCHBASIN WITH 19.8L/S INLET CONTROL DEVICE (ICD)
- DOUBLE CATCHBASIN WITH 19.8L/S INLET CONTROL DEVICE (ICD)
- EXISTING SINGLE CATCHBASIN
- EXISTING DOUBLE CATCHBASIN
- HYDRANT AND VALVE
- EXISTING HYDRANT AND VALVE
- VALVE AND BOX
- EXISTING VALVE AND BOX
- EXISTING HYDRO POLE/LAMP STANDARDS
- EXISTING WATERMAIN REDUCER
- 93 LOT NUMBER
- 65 FUTURE / EXISTING LOT NUMBER
- EXISTING WATER SERVICE BOX LOCATION
- WATER SERVICE BOX LOCATION (WATER SERVICE AT 90° TO WATERMAIN UNLESS OTHERWISE SHOWN)
- INFILTRATION TRENCH (SEE DWG 901 FOR DETAIL)
- FROST COLLAR INSTALLED ON WATER SERVICE BOX
- EXISTING TREES
- EXISTING TREES TO BE REMOVED
- EXISTING OVERHEAD WIRES
- TYPICAL DUAL SERVICE CONNECTION INCLUDES ONE DOUBLE STORM CONNECTION AND ONE SINGLE SANITARY CONNECTIONS AT 90° TO SEWERS AS PER REGION OF PEEL STANDARD DWG 2-4-4 (UNLESS OTHERWISE SHOWN)
- SINGLE STORM AND SINGLE SANITARY CONNECTIONS
- COMMUNITY MAILBOX PAD, SEE DETAILS ON 900 SERIES DRAWINGS; CANADA POST SPEC. E10X-ENG-##; NUMBER OF MODULES
- EXISTING COMMUNITY MAILBOX PAD
- DRIVEWAY LOCATION
- EXISTING DRIVEWAY LOCATION
- 4:1 SLOPE EMBANKMENT (UNLESS OTHERWISE NOTED)
- TOPSOIL BERM
- 1.8m HIGH NOISE FENCE (SEE DRAWING 901 FOR DETAIL)
- EXISTING PRIVACY FENCE
- ANTI-SEEPAGE COLLAR (SEE DRAWING 901)
- PROPOSED PAVEMENT WIDENING
- (M) INFRASTRUCTURE TO BE MAINTAINED
- (R) INFRASTRUCTURE TO BE REMOVED
- (RE) INFRASTRUCTURE TO BE RELOCATED
- (P) TREES TO BE PRESERVED

TOPOGRAPHIC SURVEY PROVIDED BY HOLDING JONES VANDERVEEN INC., JULY 2014

REVISIONS

No.	DESCRIPTION	DATE	BY	APPROVED
.	ISSUED FOR CONSTRUCTION	AUG/16	D.W.	-

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

TOWN OF CALEDON
6311 OLD CHURCH ROAD
CALEDON, ONTARIO L7C 1J6
TEL: (905) 584-2272
FAX: (905) 584-4325

DIGRAM DEVELOPMENTS CALEDON INC.
LIVINGSTON ESTATES - PHASE 2 (T-13001C)
ABBOTSIDE WAY
STA. 1+035 TO 1+300

LICENSED PROFESSIONAL ENGINEER D.WOO 100073980 PROVINCE OF ONTARIO

DATE:	JUNE 2016	DESIGNED BY:	S.W.L/D.W.	CHECKED BY:	M.R.C./S.M.S.
SCALE:	H 1:500 V 1:50	DRAWN BY:	M.J.O./J.Y.L.	CHECKED BY:	P.A.S.

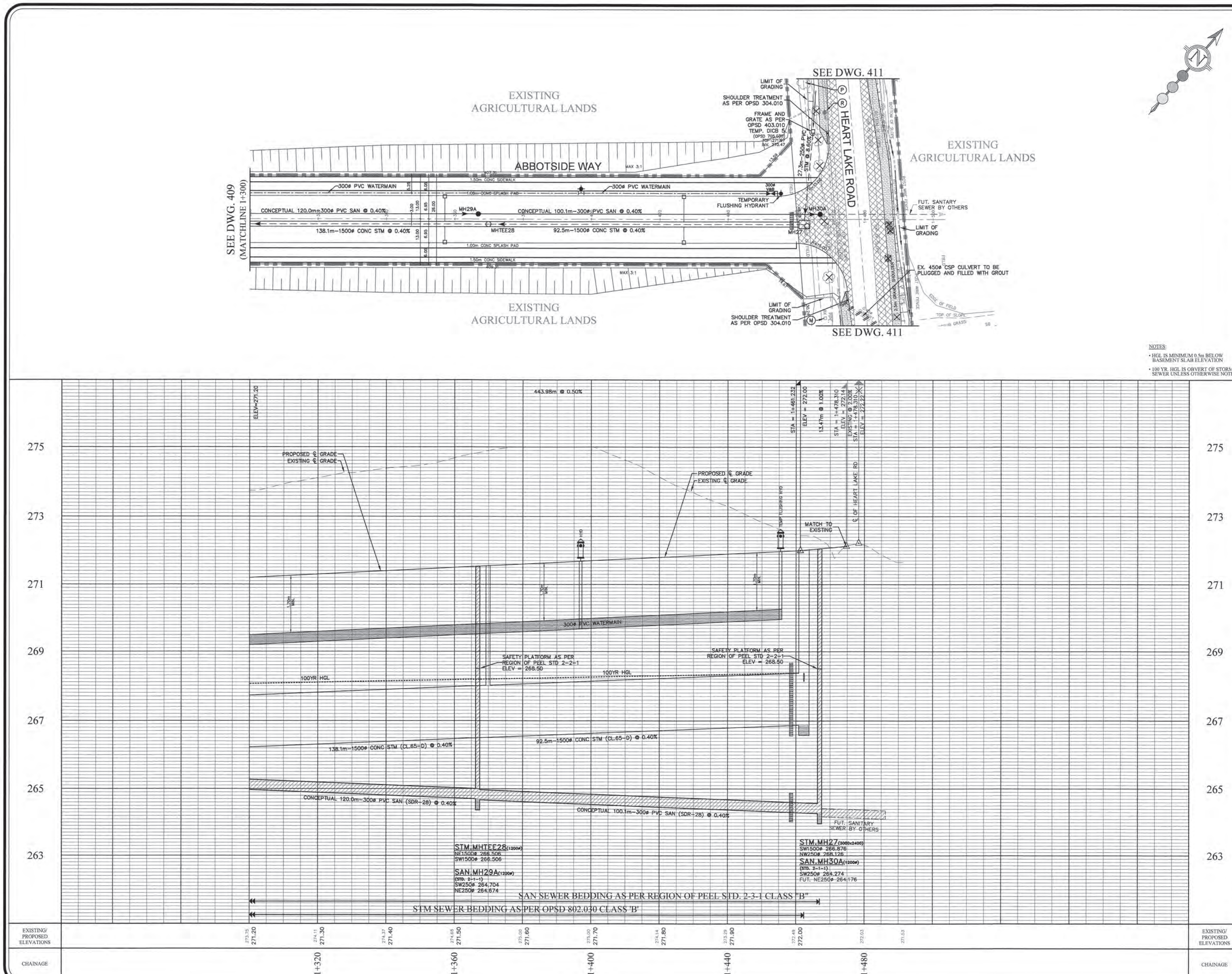
HORIZONTAL

APPROVED FOR CONSTRUCTION
THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.
THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS-CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO.
DATE: Aug 4/16 APPROVED BY:

PROJECT No: 1551
DRAWING No: 409

File: P:\1551 Livingston Estates\Drawings\Phase 1\Pep\1551D-PROF-409.dwg - Revised by <LJM> : Thu, Jun 16 2016 - 10:40am

TOWN OF CALEDON
PLANNING
RECEIVED
Nov 26, 2021



NOTES:
- HGL IS MINIMUM 0.5m BELOW BASEMENT SLAB ELEVATION
- 100 YR. HGL IS OBVERT OF STORM SEWER UNLESS OTHERWISE NOTED

SITE
KEY PLAN
N.T.S.

BENCHMARK: ELEV. 264.941
ON THE NORTH FACE AT THE EAST CORNER OF A GREY BRICK BUNGALOW LOCATED ON THE SOUTH SIDE OF SEVENTEENTH SIDEROAD (REGION ROAD #14) APPROX. 122m EAST OF SECOND LINE EAST.

LEGEND:
LIMIT OF PROPERTY
SANITARY SEWER/MANHOLE
STORM SEWER/MANHOLE
STORM SEWER/MANHOLE
EXISTING SANITARY MANHOLE
EXISTING STORM MANHOLE
SINGLE CATCHBASIN WITH 19 RL/S INLET CONTROL DEVICE (ICD)
DOUBLE CATCHBASIN WITH 19 RL/S INLET CONTROL DEVICE (ICD)
EXISTING SINGLE CATCHBASIN
EXISTING DOUBLE CATCHBASIN
HYDRANT AND VALVE
EXISTING HYDRANT AND VALVE
VALVE AND BOX
EXISTING VALVE AND BOX
EXISTING HYDRO POLE/LAMP STANDARDS
EXISTING WATERMAIN REDUCER
LOT NUMBER
FUTURE / EXISTING LOT NUMBER
EXISTING WATER SERVICE BOX LOCATION
WATER SERVICE BOX LOCATION (WATER SERVICE AT 90° TO WATERMAIN UNLESS OTHERWISE SHOWN)
INFILTRATION TRENCH (SEE DWG 901 FOR DETAIL)
FROST COLLAR INSTALLED ON WATER SERVICE BOX
EXISTING TREES
EXISTING TREES TO BE REMOVED
EXISTING OVERHEAD WIRES
TYPICAL DUAL SERVICE CONNECTION INCLUDES ONE DOUBLE STORM CONNECTION AND ONE SINGLE SANITARY CONNECTIONS AT 90° TO SEWERS AS PER REGION OF PEEL STANDARD DWG 2-4-4 (UNLESS OTHERWISE SHOWN)
SINGLE STORM AND SINGLE SANITARY CONNECTIONS
COMMUNITY MAILBOX PAD, SEE DETAILS ON 900 SERIES DRAWINGS
CANADA POST SPEC. E10X-ENG-## NUMBER OF MODULES
EXISTING COMMUNITY MAILBOX PAD
DRIVEWAY LOCATION
EXISTING DRIVEWAY LOCATION
4:1 SLOPE EMBANKMENT (UNLESS OTHERWISE NOTED)
TOPSOIL BERM
1.8m HIGH NOISE FENCE (SEE DRAWING 901 FOR DETAIL)
EXISTING PRIVACY FENCE
ANTI-SEEPAGE COLLAR (SEE DRAWING 901)
PROPOSED PAVEMENT WIDENING
INFRASTRUCTURE TO BE MAINTAINED
INFRASTRUCTURE TO BE REMOVED
INFRASTRUCTURE TO BE RELOCATED
TREES TO BE PRESERVED

TOPOGRAPHIC SURVEY PROVIDED BY HOLDING JONES VANDERVEEN INC., JULY 2014.

REVISIONS

No.	DESCRIPTION	DATE	BY	APPROVED
-	ISSUED FOR CONSTRUCTION	AUG/16	D.W.	-

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

TOWN OF CALEDON
6311 OLD CHURCH ROAD
CALEDON, ONTARIO L7C 1J6
TEL: (905) 584-2272
FAX: (905) 584-4325

DIGRAM DEVELOPMENTS CALEDON INC.
LIVINGSTON ESTATES - PHASE 2 (T-13001C)
ABBOTSIDE WAY
STA. 1+300 TO 1+491.459

LICENSED PROFESSIONAL ENGINEER D. WOO 100073980 PROVINCE OF ONTARIO

DATE:	JUNE 2016	DESIGNED BY:	S.W.L/D.W.	CHECKED BY:	M.R.C./S.M.S.
SCALE:	H 1:500 V 1:50	DRAWN BY:	M.J.O./J.Y.L.	CHECKED BY:	P.A.S.

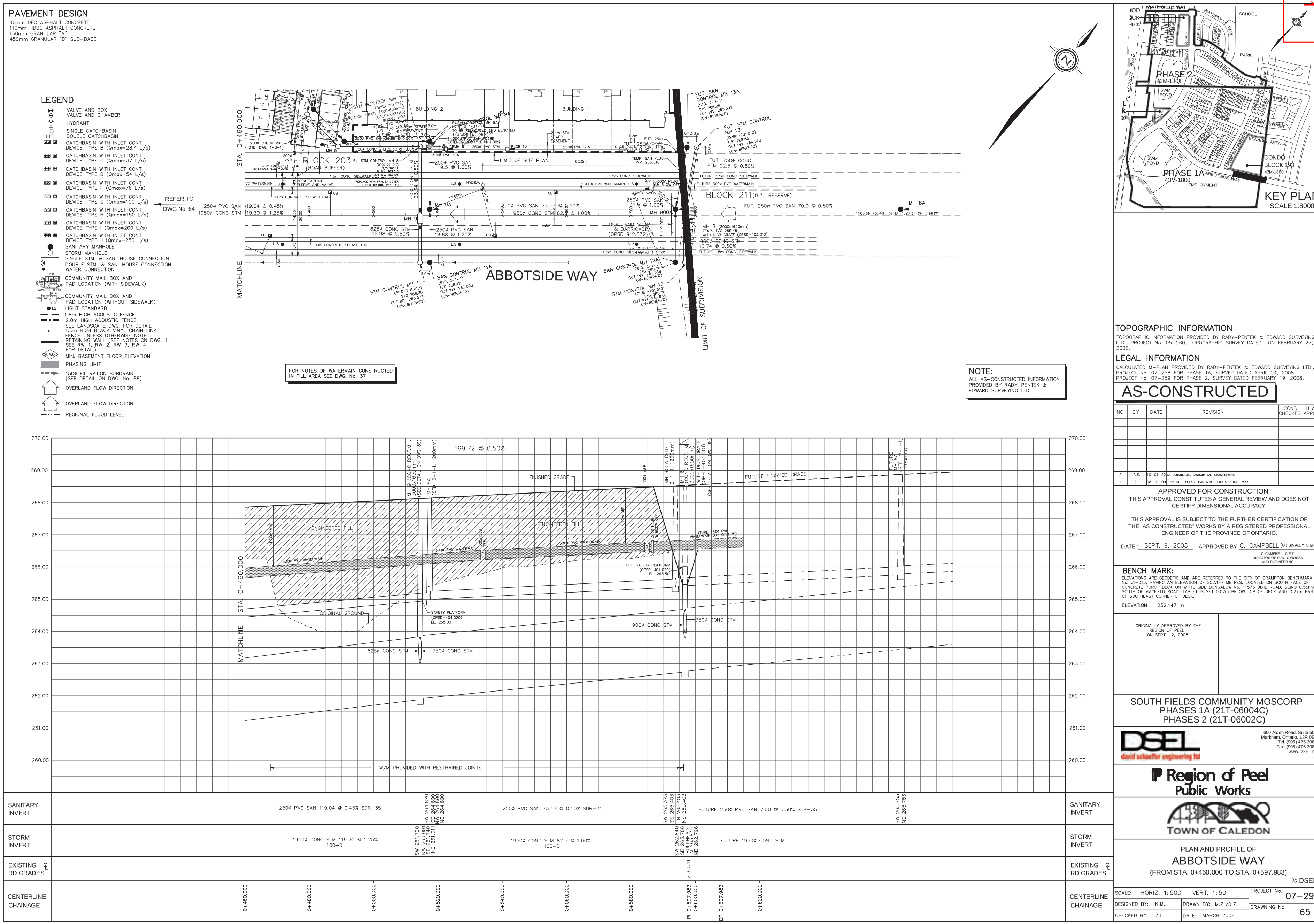
HORIZONTAL

APPROVED FOR CONSTRUCTION
THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.
THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS-CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO.
DATE: Aug 4/16 APPROVED BY:

PROJECT No. 1551
DRAWING No. 410

File: P:\1551 Livingston Estates\Drawings\Phase 1\Pnp\15510-PROF-410.dwg – Revised by <LJM> : Thu, Jun 16 2016 – 10:41am

TOWN OF CALEDON
PLANNING
RECEIVED
Nov 26, 2021



TOPOGRAPHIC INFORMATION
TOPOGRAPHIC INFORMATION PROVIDED BY RADY-PENTEK & EDWARD SURVEYING LTD., PROJECT No. 05-260, TOPOGRAPHIC SURVEY DATED ON FEBRUARY 27, 2008.

LEGAL INFORMATION
CALCULATED M-PLAN PROVIDED BY RADY-PENTEK & EDWARD SURVEYING LTD., PROJECT No. 07-258 FOR PHASE 1A, SURVEY DATED APRIL 24, 2008. PROJECT No. 07-259 FOR PHASE 2, SURVEY DATED FEBRUARY 19, 2008.

AS-CONSTRUCTED

NO.	BY	DATE	REVISION	CONS. CHECKED	TOWN APPR'D
2	A.S.	10-01-22	AS-CONSTRUCTED SANITARY AND STORM SEWERS		
1	Z.L.	08-10-09	CONCRETE SPLASH PAD ADDED FOR ABBOTSIDE WAY		

APPROVED FOR CONSTRUCTION
THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.

THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO.

DATE : SEPT. 9, 2008 APPROVED BY: C. CAMPBELL (ORIGINALLY SIGNED)
C. CAMPBELL C.E.T.
DIRECTOR OF PUBLIC WORKS AND ENGINEERING

BENCH MARK:
ELEVATIONS ARE GEODETIC AND ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. JI-313, HAVING AN ELEVATION OF 252.147 METRES. LOCATED ON SOUTH FACE OF CONCRETE PORCH DECK ON WHITE SIDE BUNGALOW No. 11575 DIXIE ROAD, BEING 0.55km SOUTH OF MAYFIELD ROAD. TABLET IS SET 0.07m BELOW TOP OF DECK AND 0.27m EAST OF SOUTHEAST CORNER OF DECK.
ELEVATION = 252.147 m

ORIGINALLY APPROVED BY THE REGION OF PEEL ON SEPT. 12, 2008

SOUTH FIELDS COMMUNITY MOSCORP
PHASES 1A (21T-06004C)
PHASES 2 (21T-06002C)

DSEL david schaeffer engineering ltd
600 Alden Road, Suite 500
Markham, Ontario, L3R 0E7
Tel. (905) 475-3080
Fax. (905) 475-3081
www.DSEL.ca

Region of Peel Public Works

TOWN OF CALEDON

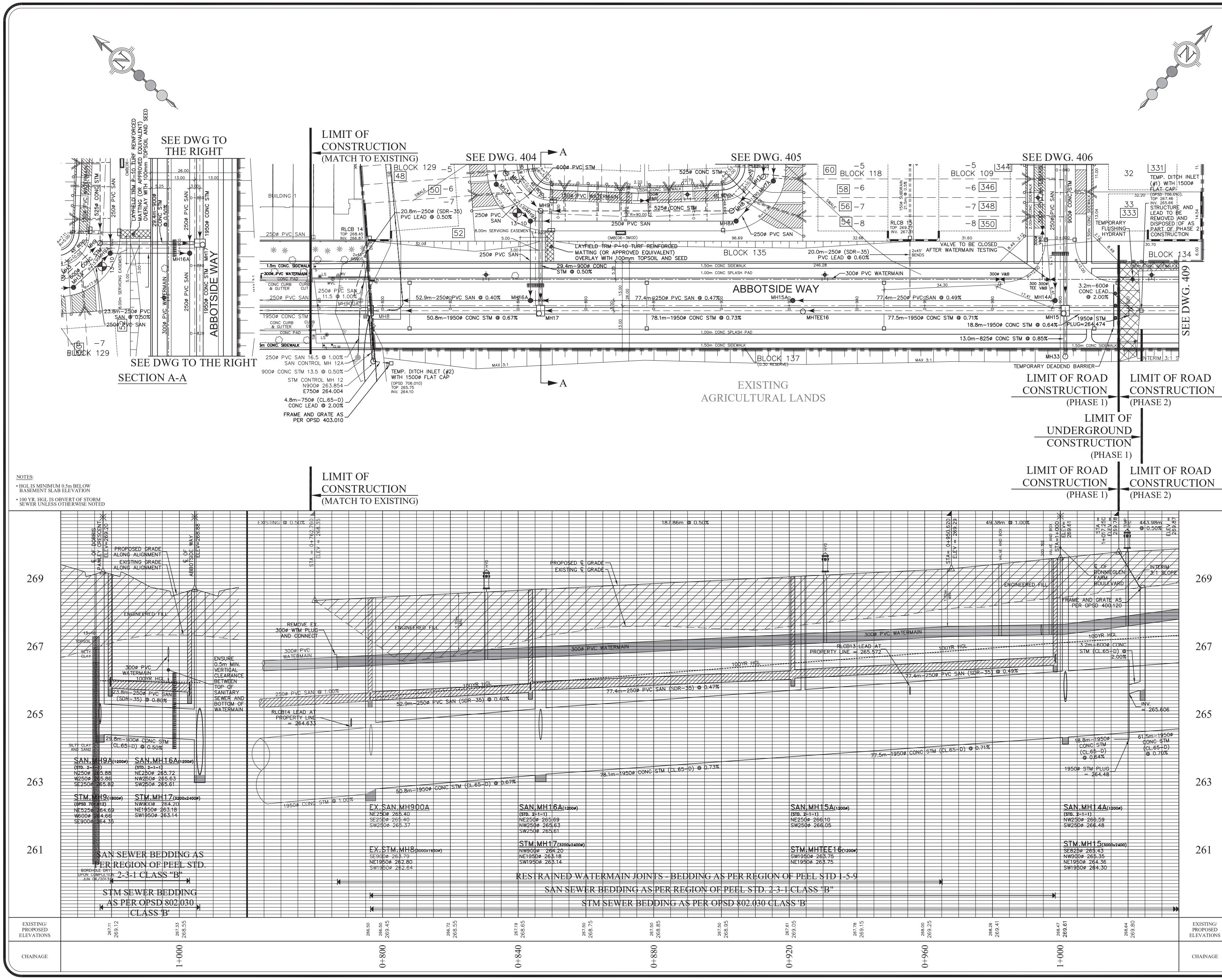
PLAN AND PROFILE OF
ABBOTSIDE WAY
(FROM STA. 0+460.000 TO STA. 0+597.983)

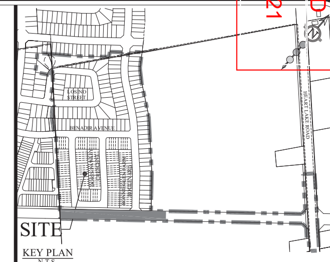
© DSEL

SCALE: HORIZ. 1:500	VERT. 1:50	PROJECT No. 07-294	
DESIGNED BY: K.M.	DRAWN BY: M.Z./D.Z.	DRAWING No. 65	
CHECKED BY: Z.L.	DATE: MARCH 2008		

TOWN OF CALEDON
PLANNING
RECEIVED

Nov 26, 2021





BENCHMARK: ELEV. 264.941

ON THE NORTH FACE AT THE EAST CORNER OF A GREY BRICK BUNGALOW LOCATED ON THE SOUTH SIDE OF SEVENTEENTH SIDEROAD (REGION ROAD #14) APPROX. 122m EAST OF SECOND LINE EAST.

LEGEND:

- LIMIT OF PROPERTY
- SANITARY SEWER/MANHOLE
- STORM SEWER/MANHOLE
- STORM SEWER/MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING STORM MANHOLE
- SINGLE CATCHBASIN WITH 19.8L/S INLET CONTROL DEVICE (ICD)
- DOUBLE CATCHBASIN WITH 19.8L/S INLET CONTROL DEVICE (ICD)
- EXISTING SINGLE CATCHBASIN
- EXISTING DOUBLE CATCHBASIN
- HYDRANT AND VALVE
- EXISTING HYDRANT AND VALVE
- VALVE AND BOX
- EXISTING VALVE AND BOX
- L.S. EXISTING HYDRO POLE/LAMP STANDARDS
- EXISTING WATERMAIN REDUCER
- 93 LOT NUMBER
- 93 MUNICIPAL ADDRESS
- 65 FUTURE / EXISTING LOT NUMBER
- EXISTING WATER SERVICE BOX LOCATION
- WATER SERVICE BOX LOCATION (WATER SERVICE AT 90° TO WATERMAIN UNLESS OTHERWISE SHOWN)
- INFILTRATION TRENCH (SEE DWG 901 FOR DETAIL)
- FROST COLLAR INSTALLED ON WATER SERVICE BOX
- EXISTING TREES
- OW EXISTING OVERHEAD WIRES
- TYPICAL DUAL SERVICE CONNECTION INCLUDES ONE DOUBLE STORM CONNECTION AND ONE SINGLE SANITARY CONNECTIONS AT 90° TO SEWERS AS PER REGION OF PEEL STANDARD DWG 2-4-4 (UNLESS OTHERWISE SHOWN)
- SINGLE STORM AND SINGLE SANITARY CONNECTIONS
- CMB(##-#MOD) COMMUNITY MAILBOX PAD, SEE DETAILS ON 900 SERIES DRAWINGS; CANADA POST SPEC. E10X-ENG-##; NUMBER OF MODULES
- EXISTING COMMUNITY MAILBOX PAD
- DRIVEWAY LOCATION
- EXISTING DRIVEWAY LOCATION
- 4:1 SLOPE EMBANKMENT (UNLESS OTHERWISE NOTED)
- TOPSOIL BERM
- 1.8m HIGH NOISE FENCE (SEE DRAWING 901 FOR DETAIL)
- EXISTING PRIVACY FENCE
- ANTI-SEEPAGE COLLAR (SEE DRAWING 901)
- PROPOSED PAVEMENT WIDENING
- M INFRASTRUCTURE TO BE MAINTAINED
- R INFRASTRUCTURE TO BE REMOVED
- RE INFRASTRUCTURE TO BE RELOCATED
- P TREES TO BE PRESERVED

AS-CONSTRUCTED

TOPOGRAPHIC SURVEY PROVIDED BY HOLDING JONES VANDERVEEN INC., JULY 2014

REVISIONS

No.	DESCRIPTION	DATE	BY	APPROVED
1.	AS-CONSTRUCTED SUBMISSION	OCT/18	D.W.	-
2.	REVISED AS-CONSTRUCTED SUBMISSION	MAY/19	D.W.	-

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

TOWN OF CALEDON
6311 OLD CHURCH ROAD
CALEDON, ONTARIO L7C 1J6
TEL: (905) 584-2272
FAX: (905) 584-4325

DIGRAM DEVELOPMENTS CALEDON INC.

LIVINGSTON ESTATES - PHASE 1 (T-13001C)

ABBOTSIDE WAY
STA. 0+800 TO 1+035

DATE:	MAY 2019	DESIGNED BY:	S.W.L/D.W.	CHECKED BY:	M.R.C./S.M.S.
SCALE:	H 1:500 V 1:50	DRAWN BY:	M.J.O./J.Y.L.	CHECKED BY:	P.A.S.

5 0 10 20 30 40 HORIZONTAL

APPROVED FOR CONSTRUCTION
THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.

THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS-CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO

DATE:________ APPROVED BY:________

PROJECT No: 1551

DRAWING No: 408

File: P:\1551 Livingston Estates\Drawings\Phase 1\As-builts\Pnp\1551AB-PROF-408.dwg – Revised by <TMCNEIL> : Mon, Oct 04 2021 – 11:10am

Appendix B – Groundwater

Excerpt Hydrogeological Investigation (EXP)

12304 Heart Lake Road, Caledon, Ontario

L7C 2J2

Hydrogeological Investigation and Water Balance Assessment

Client:
Broccolini Limited Partnership No. 6
2680 Skymark Avenue, Suite 800, Mississauga, Ontario L4W 5L6

Attention: Mr. Ben Wilson

Type of Document:
Final

Project Name:
12304 Heart Lake Road, Caledon, Ontario

Project Number:
BRM-21004344-D0

EXP Services Inc.
1595 Clark Boulevard
Brampton, ON, L6T 4V1
t: 905.793.9800
f: 905.793.0641

Date Submitted:
2021-11-12

Table of Contents

One (1) map was created for the Site to show groundwater contours of the overburden water-bearing zone (Figure 6). Accordingly, the groundwater flow directions in overburden interpreted to be southeast and southwest of the Site.

Groundwater levels are expected to show seasonal fluctuations and vary in response to prevailing climate conditions. This may also affect the direction and rate of flow. It is recommended to conduct seasonal groundwater level measurements to provide more information on seasonal groundwater level fluctuations.

3.3 Hydraulic Conductivity Testing

Four (4) Single Well Response Tests (SWRT's) were completed on monitoring wells BH/MW 1, BH/MW 9, BH/MW 16, and BH/MW 25 on October 7 and 12, 2021. The tests were completed to estimate the saturated hydraulic conductivity (K) of the soils at the well screen depths. Please note that SWRT was not possible to conduct for BH/MW 30 since the well was dry during the monitoring period.

The static water level within each monitoring well was measured prior to the start of testing. In advance of performing SWRTs, each monitoring well underwent development to remove fines introduced into the screens following construction. The development process involved purging of the monitoring wells to induce the flow of fresh formation water through the screen. Each monitoring well was permitted to fully recover prior to performing SWRTs.

Hydraulic conductivity values were calculated from the SWRT and constant rate test data as per Hvorslev's solution included in the Aqtesolv Pro. V.4.5 software package. The semi-log plots for normalized drawdown versus time are included in Appendix C.

A summary of the hydraulic conductivities (K-values) estimated from the SWRTs are provided in Table 3-2.

Table 3-2: Summary of Hydraulic Conductivity Testing

Monitoring Well	Well Depth (mbgs)	Screen Interval (mbgs)		Soil Formation Screened	Estimated Hydraulic Conductivity (m/s)
		from	to		
BH/MW 1	7.60	4.60	7.60	Clayey Silt Till and Sandy Silt Till	3.1E-06
BH/MW 9	7.57	4.57	7.57	Clayey Silt Till and Sandy Silt Till	4.0E-07
BH/MW 16	7.49	4.49	7.49	Clayey Silt Till	3.3E-07
BH/MW 25	7.55	4.55	7.55	Clayey Silt Till	3.9E-07
				Highest Estimated K Value	3.1E-06
				Geometric Mean of Estimated K values	6.3E-07

SWRTs provide K-estimates of the geological formation surrounding the well screens and may not be representative of bulk formation hydraulic conductivity. As shown in Table 3-2, the highest K-value of the tested water-bearing zone is 3.1E-06 m/s, and the geometric mean of the K-values is 6.3E-07 m/s.

3.4 Groundwater Quality

To assess the suitability for discharging pumped groundwater into the sewers owned by the Regional Municipality of Peel / City of Mississauga during dewatering activities, one (1) groundwater sample was collected from monitoring well BH/MW 1 on October 12, 2021, using a peristaltic pump.

Prior to collecting the noted water sample, approximately three (3) standing well volumes of groundwater were purged from the referred well. The samples were collected unfiltered and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as required. Dedicated nitrile gloves were used during sample handling. The groundwater samples were submitted for analysis to Bureau Veritas Laboratory, a CALA certified independent laboratory in Mississauga, Ontario. Analytical results are provided in Appendix D.

Table 3-3 summarizes exceedance(s) of the Sanitary (Table 1) and Storm (Table 2) Sewer Use By-Law parameters.

When comparing the chemistry of the collected groundwater samples to the Regional Municipality of Peel Sanitary and Combined Sewer Discharge Criteria (By-Law Number 53-2010, Table 1), there were no parameter exceedances to be reported.

When comparing the chemistry of the collected groundwater samples to the Regional Municipality of Peel Storm Sewer Discharge Criteria (By-Law Number 53-2010, Table 2) the following parameters reported an exceedance: Total manganese and Chloroform

Reporting detection limits (RDLs) were below the Sewer Use By-Law parameter criteria of Tables 1 and 2.

Table 3-3: Summary of Analytical Results

Parameter	Units	City of Mississauga / Regional Municipality of Peel Sanitary and Combined Sewer Discharge Limit (Table 1)	City of Mississauga / Regional Municipality of Peel Storm Sewer Discharge Limit (Table 2)	Concentration BH/MW 1 12-Oct-21
Total Manganese (Mn)	µg/L	5,000	50	**78**
Chloroform	µg/L	40	2	**2.8**

Bold – Exceeds City of Mississauga / Regional Municipality of Peel Storm Sewer Discharge Limit (Table 2).

For the short-term dewatering system (construction phase), it is anticipated that TSS levels and some other parameters (for example, Total Metals) in the pumped groundwater may become elevated and exceed both, Sanitary and Storm Sewer Use By-Law limits. To control the concentration of TSS and associated metals, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction dewatering activities to discharge to the applicable sewer system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment contractor/process engineer.

The water quality results presented in this report may not be representative of the long-term condition of groundwater quality onsite. As such, regular water quality monitoring is recommended for the post-construction phase, as required by the City.

An agreement to discharge into the sewers owned by the City of Mississauga / Regional Municipality of Peel will be required prior to releasing dewatering effluent.

The Environmental Site Assessment Report(s) shall be reviewed for more information on the groundwater quality conditions at the Site.

3.5 Infiltration Testing

EXP completed four (4) infiltration rate tests (INF 1, INF 9, INF 25 and INF 30) within the Site area on October 7 and 12, 2021. These tests were conducted in proximity of selected monitoring wells: September 7, 2021, at BH/MW 1 (INF 1), BH/MW 9 (INF 9), BH/MW 30 (INF 30) and BH/MW 25 (INF 25).

Infiltration tests were conducted at depths ranged from 0.6 mbgs to 0.9 mbgs. The reported water levels at these monitoring wells are; 4.24 mbgs (BH/MW 1), 5.92 mbgs (BH/MW 9), and <7.58 (BH/MW 30) on October 7, 2021, and 6.66 mbgs (BH/MW 25) on October 12 15, 2021 (Table 3.2).

The stratigraphy of the shallow subsurface comprises a silt/sand with some pebbles. Table 3.5 below shows a summary of field saturated hydraulic conductivity (Kfs) testing and design infiltration rates, as per the Low Impact Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010, Appendix G. The estimated field saturated hydraulic conductivities were correlated to infiltration rates based on the relationship provided in Appendix D of the guideline.

Infiltration rate testing locations are shown on Figure 4 and infiltration rate analysis is provided in Appendix E.

Table 3.4: Summary of Infiltration Testing Results

Infiltration Test Location/ MW ID	Depth of Hole (mbgs)	Formation tested	Field Saturated Hydraulic Conductivity, Kfs (cm/s)	Infiltration Rate (mm/hr)
INF 1 (BH/MW 1)	0.60	Clayey Silt Till	3.4×10^{-6}	19
INF 9 (BH/MW 9)	0.75	Clayey Silt Till	3.5×10^{-6}	19
INF 25 (BH/MW 25)	0.90	Clayey Silt Till	2.7×10^{-6}	18
INF 30 (BH/MW 30)	0.70	Clayey Silt to Sandy Silt (Fill)	9.0×10^{-6}	24
		Geometric Mean	4.12×10^{-6}	20
			Design Infiltration Rate*	8 (20/2.5)

Notes:
*Safety Factor of 2.5 was applied to calculate the design infiltration rate (Low Impact Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010, Appendix D).

The estimated design infiltration rate based on percolation rate testing for the Site is 8 mm/hr.

A 15 mm precipitation event was utilized for estimating the stormwater volume. The calculation of the stormwater volume is included in Appendix G.

The estimate of the stormwater volume only accounts for direct precipitation into the excavation. The dimensions of the excavation are considered in the dewatering calculations. Runoff from outside of the excavation's footprint is excluded and it should be directed away from the excavation.

During precipitation events greater than 15 mm (ex: 100-year storm), measures should be taken by the contractor to retain stormwater onsite in a safe manner to not exceed the allowable water taking and discharge limits, as necessary. A two (2) and a one hundred (100) year storm events over a 24-hour period are 57.3 and 125.2 mm, respectively, which would produce 2,419 and 5,286 L of water within Building 1 footprint area.

5.4 Results of Dewatering Rate Estimates

5.4.1 Construction Dewatering Rate Estimate

For this assessment, it was assumed that the proposed construction plans include an excavation without shoring system. EXP should be retained to review the assumptions outlined in this section, should a shoring system be included.

Short-term (construction) dewatering calculations are presented in Appendix G.

Based on the assumptions provided in this report, the results of the dewatering rate estimate can be summarized as follows:

Table 4-2 Summary of Construction Dewatering Rate (Without Basement)

Description	Building 1 (L/day)
Estimated Short Term Dewatering Rate (without safety factor or precipitation)	5,000
With Factor of Safety of 2.0 (excluding precipitation) for permit	**10,000**
From Precipitation Event of 15 mm in one day for whole building footprint	630,000
With Factor of Safety of 2.0 (including precipitation) for designs, and budgeting	640,000
Radius of Influence from sides of excavation (m)	16

It should be noted that the construction dewatering is required mainly to remove rainwater from the excavation after rainfall events. The MECP regulates the groundwater taking and since the estimated flow rate is less than 50,000 L/day then no MECP water taking permit (EASR or PTTW) is required.

The peak dewatering flow rates does not account for flow from utility beddings and variations in hydrogeological properties beyond those encountered during this investigation. Local dewatering may be required for pits (elevator pits, sump pits, raft) and for localized areas with permeable, soft, or wet soil conditions. Local dewatering is not considered to be part of this assessment, but contractor should be ready to install additional system to manage such conditions. Dewatering estimates should be reviewed once the pit dimensions are available.

All grading around the perimeter of the excavation should be graded away from the excavation and ramp/site access to redirect runoff away from excavation.

The contractor is responsible for the design of the dewatering system to ensure that dry conditions are always maintained within the excavation at all costs.

As shown on Table 4.2, more than 90% of the dewatering volume is expected to be required after rainfall events. As such it is suggested to revise the construction plan to reduce the area of excavation kept open at any given point of time.

5.4.2 Post-Construction Dewatering Rate Estimate

As per preliminary Site drawings, it is our present understanding that the proposed Building 1 will be constructed without basements. Therefore, no long-term dewatering requirements are anticipated for the proposed Building 1.

5.5 MECP Water Taking Permits

5.5.1 Short-Term Discharge Rate (Construction Phase)

In accordance with the Ontario Water Resources Act, if the water taking for the construction dewatering is more than 50,000 L/day but less than 400,000 L/day, then an online registration in the Environmental Activity and Sector Registry (EASR) with the MECP will be required. If groundwater dewatering rates onsite exceed 400,000 L/day, a Category 3 Permit to Take Water (PTTW) will be required from the MECP.

As of July 1, 2021, an amendment of O. Reg. 63/16 has come into effect and replaced the former subsection 7 (5) such that the water taking limit of 400,000 L/day would apply to groundwater takings of each dewatered work area only, excluding stormwater.

The dewatering estimates including a safety factor and excluding precipitation is stated below. The MECP construction dewatering rate excludes the precipitation amount and is the rate used for the permit application.

Table 4-4: MECP Construction Dewatering Flow Rate

Scenario	Total Flow Rate Buildings 1 (L/day)
MECP Construction Dewatering Flow Rate with Safety Factor of 2.0 (excluding rainwater collection)	10,000

Based on the estimated construction dewatering rates, an EASR from the MECP will not be required to facilitate the construction dewatering program of the Site.

Appendix C – Sanitary Analysis

Excerpt Mayfield West Functional Servicing Study
Speirs Giffen Avenue Ultimate Sanitary Area Drainage Plan
Livingston Estates Sanitary Drainage Area Plan
Sanitary Demand Calculations

FUNCTIONAL SERVICING
AND
STORMWATER MANAGEMENT
STUDY

FOR

MAYFIELD WEST COMMUNITY

IN THE

TOWN OF CALEDON

NOVEMBER 2007

TABLE OF CONTENTS

Section **Page No.**

3.0 WASTEWATER SERVICING

3.1 Background Information

Town of Caledon commissioned various studies in order to define the servicing requirements for Mayfield West. The following studies were used to define the preliminary wastewater servicing requirements:

- Mayfield West Community Development Plan Study, Existing Water Supply and Sanitary Sewage System, CG&S, November 1996 (Background Studies)
- Mayfield West Community Development Plan Study, Water Supply and Sanitary Sewage System Function Servicing, CG&S, February 1997 (Background Studies)
- Region of Peel Sewer and Watermain Maps
- Region of Peel Design Criteria, October 2000

The Background Studies commissioned by Town of Caledon for water and wastewater are included in ***Appendix A.***

The above documents form the basis of this report.

3.2 Existing Wastewater Services

An existing 525 mm diameter sanitary sewer is located at the intersection of Mayfield Road and Inder Heights Drive. The Background Studies determined that the sewer is able to accommodate sanitary flows from 10,000 people.

An existing 750 mm diameter sanitary sewer is located on Dixie Road, terminating approximately 1,800 metres south of Mayfield Road. Discussions with Region of Peel have confirmed that the capacity of the existing sewer is not a constraint to the development of this community.

The location of the existing sanitary sewers is illustrated in ***Figure 3.***

3.3 Population Assumptions

Residential

In accordance with population projections provided by Town of Caledon, the following residential population is currently being considered:

Mayfield West ➢ 8,500 people
Snells Hollow ➢ 2,000 people

Employment

As of this writing, employment populations have not been finalized. As such, an assumption of 70 people per hectare has been applied in accordance with Region of Peel Design Criteria.

3.4 Proposed Sanitary Servicing

Region of Peel has included an allowance for the ultimate development of Mayfield West in the planning of the existing infrastructure. Accordingly, existing sewer pipes have been sized to convey the predicted Mayfield West flows. Furthermore, major infrastructure such as treatment plants and pump stations has sufficient existing and planned capacity to accommodate the development of the new community.

The Mayfield West community will be serviced by a network of new gravity sewers designed in accordance with Region of Peel design criteria. Two sanitary outlets will be used to service the Mayfield West Community, as follows:

Inder Heights Drive

An existing 525 mm diameter sanitary sewer is located at the intersection of Mayfield Road and Inder Heights Drive. The Background Studies determined that the sewer is able to accommodate sanitary flows from 10,000 people.

It is proposed that the entire residential population in Mayfield West will be directed to the Inder Heights sewer. The total population contribution to Inder Heights is calculated as follows:

Table 1
Population Assumptions

Community	Population
Snells Hollow	1,400
Mayfield Residential	8,500
Mayfield Employment	600
Total	**10,500**

It should be noted that the total Snells Hollow population of 2,000 people has been split between the Inder Heights and Dixie sewers in accordance with the Background Studies. The split has been estimated as 1,400 / 600 (Inder Heights / Dixie).

It should also be noted that since the time of the Background Studies per capita flow generation rates have been reduced, due in large part to recent Building Code amendments which require water conservation fixtures in all new residential construction. As such, it is expected that the additional population can be accommodated in the Inder Heights sewer. It is recommended that sanitary flows be monitored during buildout of the community to ensure that the capacity of the receiving sewers in not exceeded.

Consideration should also be included for the potential future extension of the Mayfield West urban boundary up to Old School Road. Assuming the same residential land use and population density as the existing community, there is the potential for approximately 25.8 hectares of residential development which will drain to the Inder Heights sewer. This corresponds to 258 units and an additional population of 902. As stated previously, flow monitoring is recommended to ensure that the capacity of the receiving sewers in not exceeded.

Dixie Road

An existing 750 mm diameter sanitary sewer is located on Dixie Road, terminating approximately 1,800 metres south of Mayfield Road. Discussions with Region of Peel have confirmed that the capacity of the existing sewer is not a constraint to the development of this community.

The employment lands and the research campus will be directed to the Dixie Road sewer.

Consideration should also be included for the potential future extension of the Mayfield West urban boundary up to Old School Road. Assuming the same residential and employment land use and population density as the existing community, there is the potential for approximately 18.0 hectares of residential development and 90.6 hectares of employment development which will drain to the Dixie sewer. For the residential component, this corresponds to 180 residential units and an additional residential population of 630. For the employment component, this corresponds to an additional residential population of 4,530.

The conceptual sanitary sewer plan is illustrated in ***Figure 3***. The conceptual sanitary profiles are illustrated in ***Appendix B.***

3.5 Permanent Sanitary Pump Station

A permanent pump station is required in order to convey sanitary flows from approximately 65.7 hectares originating in the north-west portion of the residential lands (between Kennedy Road and Hwy 10). A gravity sewer cannot provide service to this area for the following reasons:

- The elevation of Etobicoke Creek precludes a gravity crossing on Hwy 10 to the west, as the valley is several metres lower than the lowest possible sewer invert.
- The low grades in this area cannot be serviced to the new internal trunk sewer to the east.

The peak sanitary flow generated from this area is estimated as 43 l/s.

The pump station will discharge by forcemain to the new internal trunk sewers located to the east.

As mentioned previously, the sewer design has regard for the possible expansion of Mayfield West up to Old School Road. If the Inder Heights sewer is found to be constrained by the expansion population, it is recommended that the pump station flows be redirected to Hwy 10 via a new forcemain. The flows will be pumped under Etobicoke Creek and drained by a new gravity sewer ultimately connecting to the Valleywood Subdivision. The redirection of flows would be a requirement of the future expansion area, and would only be triggered by a limitation in downstream capacity as identified through flow monitoring.

4.0 WATER SERVICING

4.1 Background Information

Town of Caledon commissioned various studies in order to define the servicing requirements for Mayfield West. The following studies were used to define the preliminary water servicing requirements:

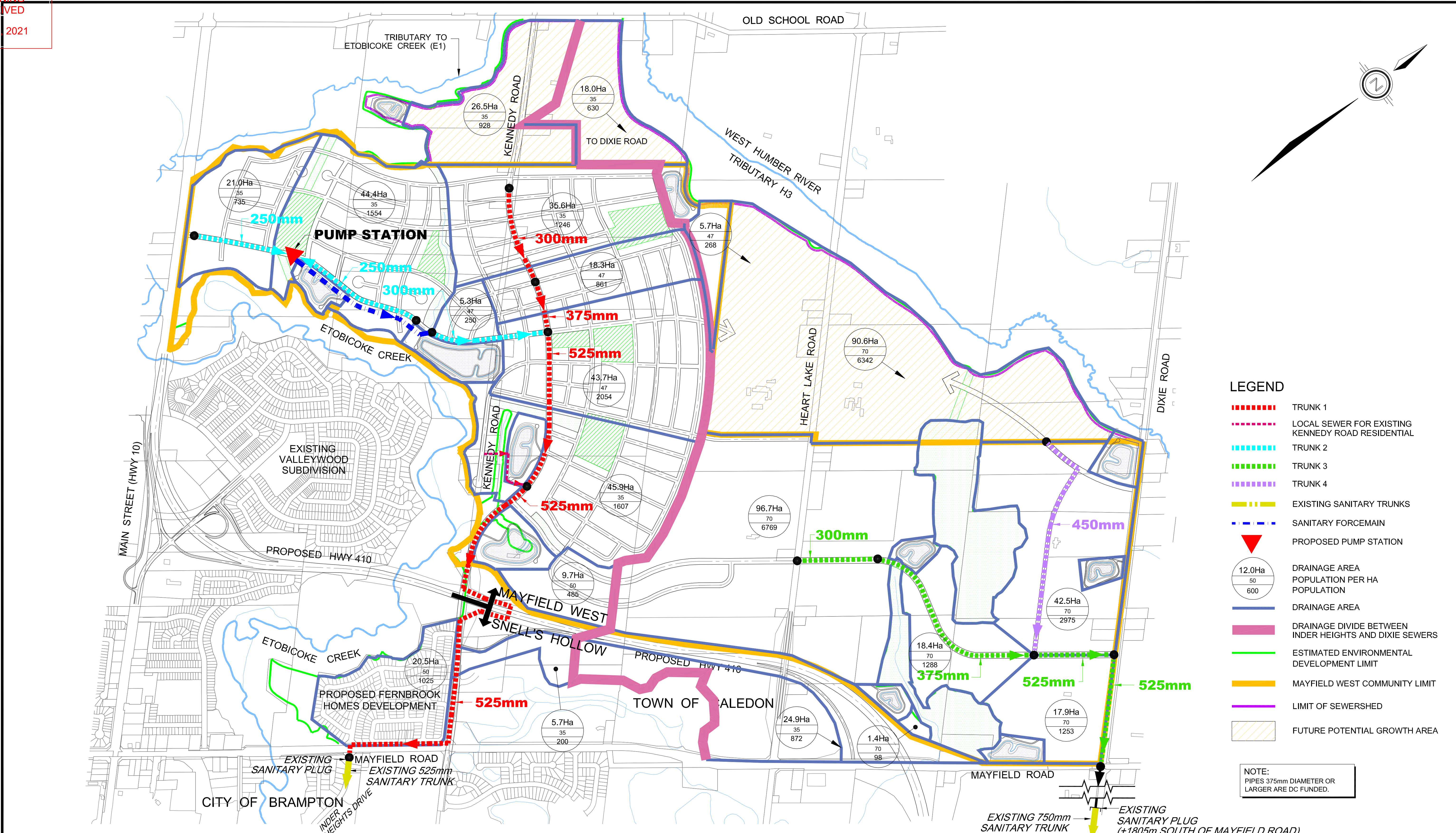
- Mayfield West Community Development Plan Study, Existing Water Supply and Sanitary Sewage System, CG&S, November 1996 (Background Studies)
- Mayfield West Community Development Plan Study, Water Supply and Sanitary Sewage System Function Servicing, CG&S, February 1997 (Background Studies)
- The Region of Peel, Development Charges, March 27, 2007 (Background Studies)
- Region of Peel Sewer and Watermain Maps
- Region of Peel Design Criteria

The above documents form the basis of this report.

4.2 Existing Watermains

Existing watermains are currently available in the vicinity of Mayfield West as shown in ***Figure 4.***

The Region of Peel will be constructing the Mayfield West elevated tank at the corner of Kennedy Road and King Street, located to the north of the study area. The project will also include the construction of a new 600 mm transmission main and a new 400 mm distribution main on Kennedy Road.



COSCORP Master Builder

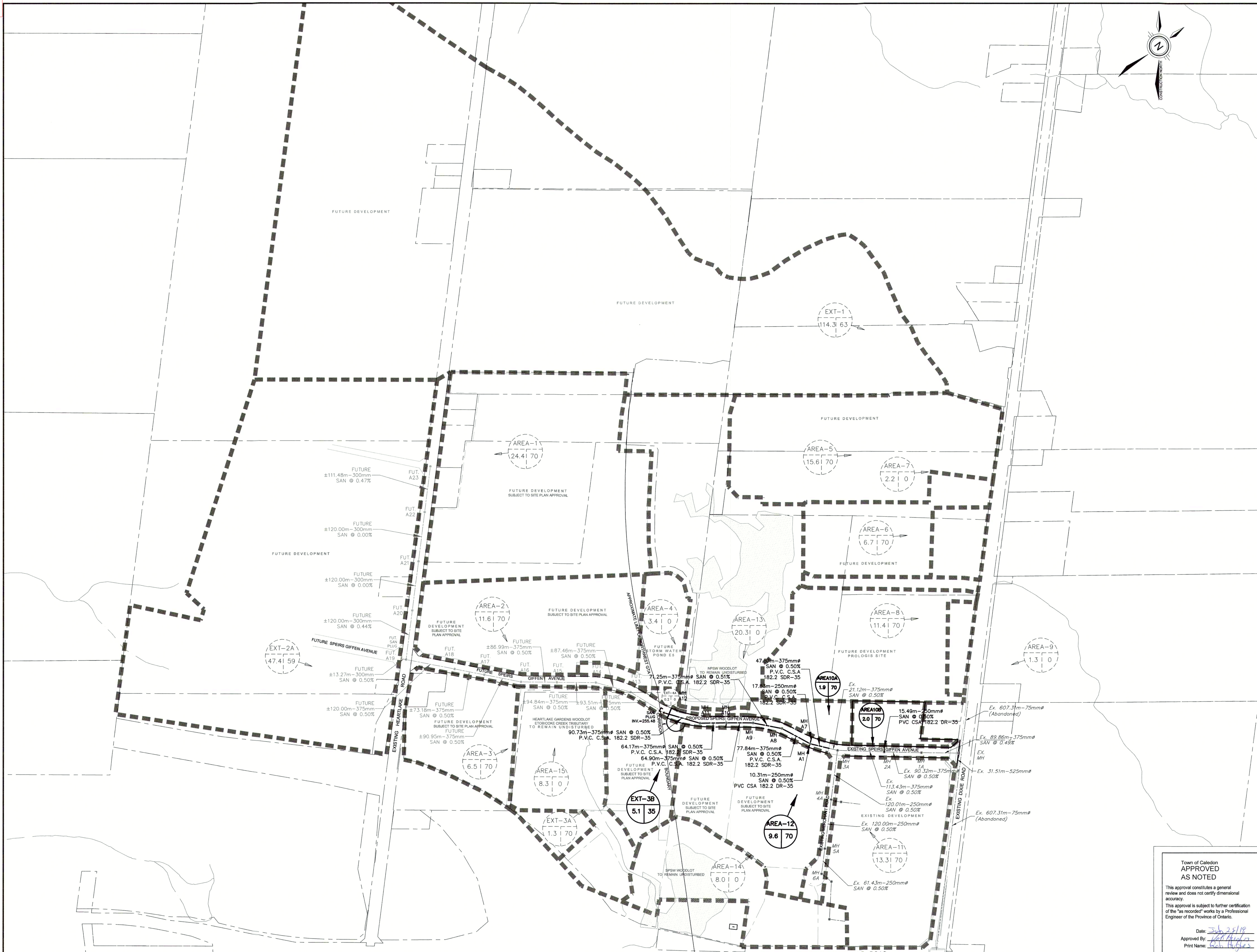
Monarch by Taylor Woodrow

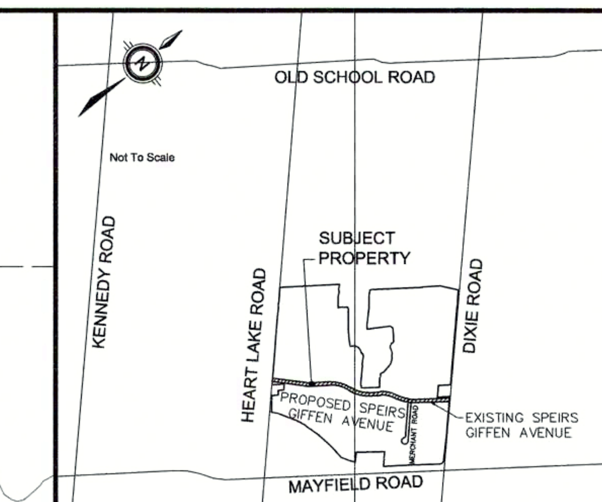
DAVID SCHAEFFER ENGINEERING LTD.
600 ALDEN ROAD., SUITE 500
MARKHAM, ONTARIO., L3R 0E7
(905) 475-3080

MAYFIELD WEST COMMUNITY
CONCEPTUAL SANITARY SERVICING
TOWN OF CALEDON

DATE: AUGUST 2006
SCALE: 1:15000
PROJECT No.: 05-266
FIGURE 3

TOWN OF CALEDON
PLANNING
RECEIVED
Nov 26, 2021





KEY MAP - N.T.S.

LEGEND

- MH1A – PROPOSED SANITARY MANHOLE
- PROPOSED SANITARY SEWER
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY FLOW DIRECTION

PROPOSED SANITARY DRAINAGE AREA — 115 / 0.26 / 0.84 — AREA NUMBER, AREA (Hectares), POPULATION DENSITY

EXISTING/FUTURE SANITARY DRAINAGE AREA — 9.2 / 3.42 / 0.85 — AREA NUMBER, AREA (Hectares), POPULATION DENSITY

– SANITARY DRAINAGE AREA BOUNDARY

FOR CONSTRUCTION

BENCHMARK
J1-313, 252.147M, SOUTH FACE OF CONCRETE PORCH DECK ON WHITE SIDE BUNGALOW, NO. 11575 DIXIE ROAD, BEING 0.55KM SOUTH OF MAYFIELD ROAD.

REV #	DATE	BY	REVISIONS
7	07/24/19	J.P.	ISSUED FOR CONSTRUCTION

IBI GROUP
200 East Wing-360 James Street North
Hamilton ON L8L 1H5 Canada
tel 905 546 1010 fax 905 546 1011
ibigroup.com

TOWN OF CALEDON

Region of Peel
working with you

LICENSED PROFESSIONAL ENGINEER
JULY 24 2019
J. R. R. PERKS
PROVINCE OF ONTARIO
SEAL

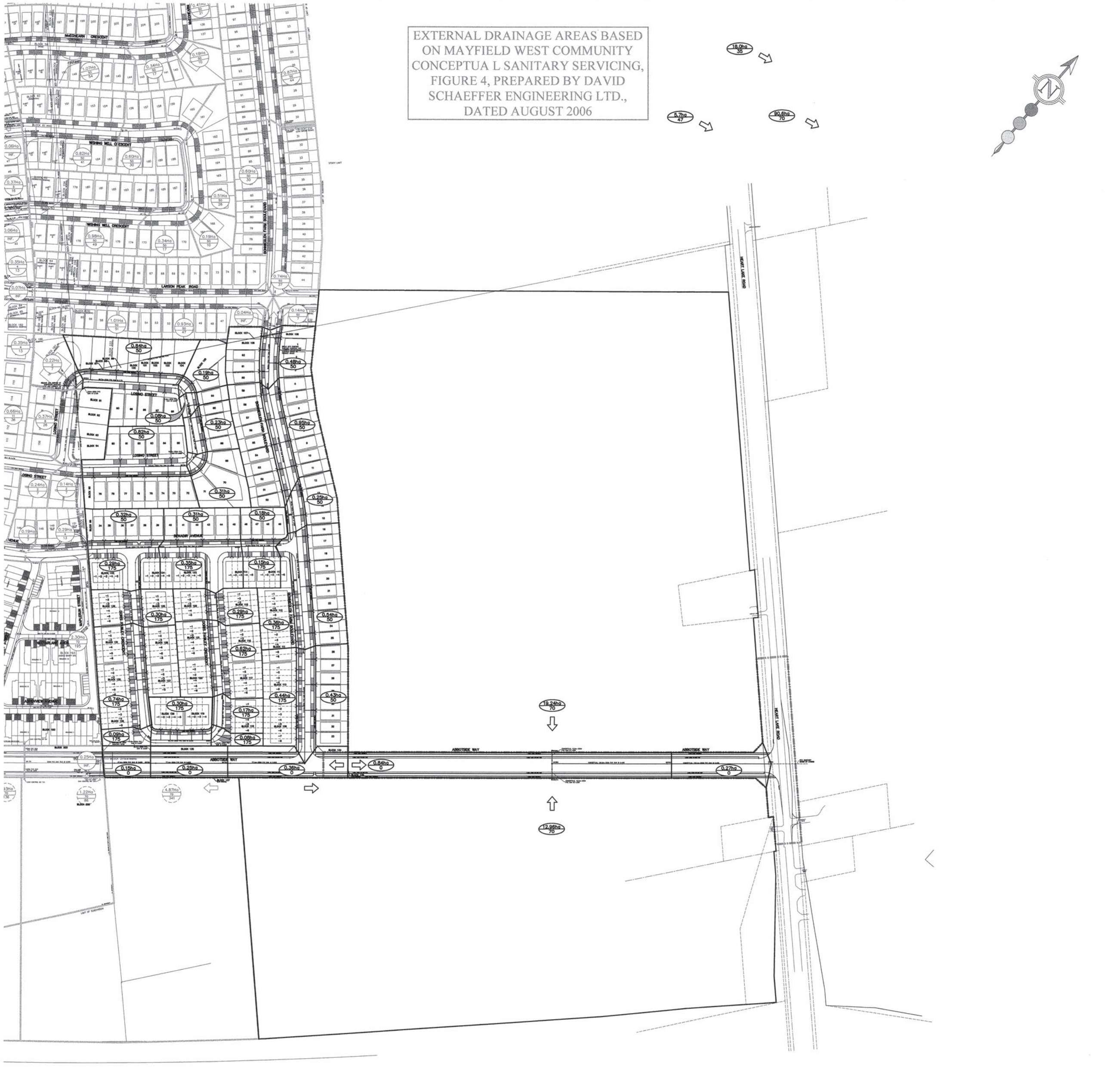
Town of Caledon
APPROVED
AS NOTED
This approval constitutes a general review and does not certify dimensional accuracy.
This approval is subject to further certification of the "as recorded" works by a Professional Engineer of the Province of Ontario.
Date: July 28/19
Approved By: Rob Hughes
Print Name: Rob Hughes

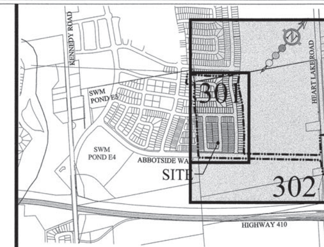
TITLE:
SPEIRS GIFFEN AVENUE - PH 2
MAYFIELD WEST INDUSTRIAL LANDS

ULTIMATE SANITARY AREA DRAINAGE PLAN

DATE:	2018-06-08	DESIGNED BY:	M.E.S.
SCALE:	1:4000	DRAWN BY:	M.E.S.
		CHECKED BY:	J.P.
FILE NO.	116965	REG OF PEEL PROJECT NO.	C-06-302
13 of 35		DWG NO.	116965-SAN1

FILE:J:\116965_AbbotsideWay\5.9 Drawings\59civil\layouts\116965-SAN.dwg LAYOUT:SAN1
LAST SAVED BY:Thomas.watkins, Wednesday, July 24, 2019 3:55:55 PM PLOTTED BY:Thomas Watkins Thursday, July 25, 2019 10:27:50 AM





KEY PLAN
N.T.S.

BENCHMARK: ELEV. 264.941

ON THE NORTH FACE AT THE EAST CORNER OF A GREY BRICK BUNGALOW LOCATED ON THE SOUTH SIDE OF SEVENTEENTH SIDEROAD (REGION ROAD #14) APPROX. 122m EAST OF SECOND LINE EAST.

LEGEND:

- SANITARY MANHOLE
- EXISTING SANITARY MANHOLE
- SINGLE SERVICE CONNECTION
- DUAL SERVICE CONNECTIONS
- 100 LOT/BLOCK NUMBER
- FUTURE / EXISTING LOT NUMBER
- LIMIT OF PROPERTY
- SANITARY DRAINAGE BOUNDARY
- EXISTING SANITARY DRAINAGE BOUNDARY
- 0.30ha / 50 — CATCHMENT AREA (HECTARES) / NUMBER OF PERSONS PER HECTARE
- 5.67Ha / 39 / 222 — EXISTING CATCHMENT AREA (HECTARES) / NUMBER OF UNITS / NUMBER OF PERSONS
- 1.01Ha / 50 / 51 — EXISTING CATCHMENT AREA (HECTARES) / NUMBER OF PERSONS PER HECTARE / NUMBER OF PERSONS
- SANITARY FLOW DIRECTION

TOPOGRAPHIC SURVEY PROVIDED BY HOLDING JONES VANDERVEEN INC., JULY 2014

REVISIONS

No.	DESCRIPTION	DATE	BY	APPROVED
-	ISSUED FOR CONSTRUCTION	AUG/16	D.W.	-

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

TOWN OF CALEDON
6311 OLD CHURCH ROAD
CALEDON, ONTARIO L7C 1J6
TEL: (905) 584-2272
FAX: (905) 584-4325

DIGRAM DEVELOPMENTS CALEDON INC.

LIVINGSTON ESTATES - PHASE 1 & 2 (T-13001C)

EXTERNAL SANITARY DRAINAGE PLAN

LICENSED PROFESSIONAL ENGINEER
D. WOO
100073980
June 20, 2016
PROVINCE OF ONTARIO

DATE:	JUNE 2016	DESIGNED BY:	S.W.L./D.W.	CHECKED BY:	M.R.C./S.M.S.
SCALE:	1:2000	DRAWN BY:	M.J.O./J.Y.L.	CHECKED BY:	P.A.S.

10 5 0 10 20 30 40 50 60 70 80

APPROVED FOR CONSTRUCTION
THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.

THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS-CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO

DATE:________ APPROVED BY: ________

PROJECT No: 1551

DRAWING No: 302

File: P:\1551 Livingston Estates\Drawings\Phase 1\Dr\1551D-SANI-302.dwg - Revised by <JLM> : Thu, Jun 16 2016 - 10:36am

TOWN OF CALEDON PLANNING RECEIVED
Nov 26, 2021

12304 Heart Lake Road

Industrial Development

IBI

Peel Region Design Criteria for Sanitary Sewers

Domestic Flow =	302.8	L/cap/day
Population Density =	70	pp/ha
Infiltration=	0.20	L/s/ha
Mannings=	0.013	
Minimum Velocity =	0.75	m/s
Maximum Velocity =	3.50	m/s

Industrial

For light industrial areas, use an equivalent population of 70 persons per hectare. Refer to Standard Drawing ~~2-5-2~~ 2-9-2 for sanitary sewage flows. Individual studies are to be made for special industries and major industrial areas.

Sanitary Sewer Design Sheet

Project Name: 12304 Heart Lake Road
Project Number: 135636
Date: October 29, 2021
Designed By: Jason Jenkins, P.Eng., P.E.

	From	To	DESIGN FLOW CALCULATIONS											SEWER DESIGN & ANALYSIS								Notes
			Area (ha)	Density (pp/ha)	Population	Cumulative Area (ha)	Cumulative Population	Peaking Factor	Sewage Flow (L/s) *(1)*	Infiltration Flow (L/s) *(2)*	Comm. Flow (L/s) *(3)*	Ground Water (L/s) *(4)*	Total Flow, Qd (L/s) *(1) thru (4)*	Nominal Diameter (mm)	Pipe Slope (%)	Pipe Length (m)	Full Flow Capacity, Qf (L/s)	Full Flow Velocity (m/s)	Actual Velocity (m/s)	Percent of Full Flow (%)		
Phase 1	**Services**																					
Building 1	Ctrl. MH	Ex. Sewer	9.95	70	697	10.0	697	3.90	9.5	2.0	0.0	0.0	11.5	200	1.0%	10.0	34.2	1.06	0.95	34%		San. Service

Appendix D – Water Analysis

Excerpt Mayfield West Functional Servicing Study
Heart Lake Road - Capital Works Projects (Region of Peel)
Watermain Plan and Profile Drawings (Region of Peel)
Water Demand Calculations

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT STUDY

FOR

MAYFIELD WEST COMMUNITY

IN THE

TOWN OF CALEDON

NOVEMBER 2007

The peak sanitary flow generated from this area is estimated as 43 l/s.

The pump station will discharge by forcemain to the new internal trunk sewers located to the east.

As mentioned previously, the sewer design has regard for the possible expansion of Mayfield West up to Old School Road. If the Inder Heights sewer is found to be constrained by the expansion population, it is recommended that the pump station flows be redirected to Hwy 10 via a new forcemain. The flows will be pumped under Etobicoke Creek and drained by a new gravity sewer ultimately connecting to the Valleywood Subdivision. The redirection of flows would be a requirement of the future expansion area, and would only be triggered by a limitation in downstream capacity as identified through flow monitoring.

4.0 WATER SERVICING

4.1 Background Information

Town of Caledon commissioned various studies in order to define the servicing requirements for Mayfield West. The following studies were used to define the preliminary water servicing requirements:

- Mayfield West Community Development Plan Study, Existing Water Supply and Sanitary Sewage System, CG&S, November 1996 (Background Studies)
- Mayfield West Community Development Plan Study, Water Supply and Sanitary Sewage System Function Servicing, CG&S, February 1997 (Background Studies)
- The Region of Peel, Development Charges, March 27, 2007 (Background Studies)
- Region of Peel Sewer and Watermain Maps
- Region of Peel Design Criteria

The above documents form the basis of this report.

4.2 Existing Watermains

Existing watermains are currently available in the vicinity of Mayfield West as shown in ***Figure 4.***

The Region of Peel will be constructing the Mayfield West elevated tank at the corner of Kennedy Road and King Street, located to the north of the study area. The project will also include the construction of a new 600 mm transmission main and a new 400 mm distribution main on Kennedy Road.

Construction of the elevated tank and Zone 7 watermains is scheduled for fall of 2007.

4.3 Proposed Water Servicing

The Mayfield West community will be serviced by a network of new watermains designed in accordance with Town of Caledon design criteria and M.O.E. guidelines.

The conceptual watermain requirements were defined through the Background Studies.

The primary water distribution network will be comprised primarily of 300 mm mains, with the exception of the following 400 mm watermains:

- East / west industrial collector from the north / south industrial collector to Dixie Road.
- North / south industrial collector
- Dixie Road from Mayfield Road to East / west industrial collector
- East/ west residential collector from Main Street (Hwy 10) to Kennedy Road

The water distribution requirements were verified through watermain modeling for Mayfield West based on the proposed Secondary Plan. The watermain analysis conducted by MacViro Consultants in included in ***Appendix C***.

The conceptual watermain plan is illustrated in ***Figure 4***.

Final watermain sizing will be completed at the detailed design stage based on the actual development characteristics. Furthermore, the water distribution should be looped in order to provide system security.

4.4 Mayfield West Elevated Tank and Associated Watermains

It is noted that the proposed Secondary Plan requires the realignment of Kennedy Road from it current location to a new corridor located to the east. Based on the Region's construction schedule of the Kennedy Road watermains for fall of 2007, the watermains may be placed in their final location along the Mayfield West community's realignment of Kennedy Road.

In the event that the Region's elevated tank and watermain proceed in advance of the community approvals and construction, portions of the new Kennedy Road watermains will have to be relocated to conform with the new road alignment. Satisfactory construction and financial arrangement would be made between the owners' and Region of Peel for the relocation of the watermains. Furthermore, there would be limited development in the area prior to triggering the need to relocate the Kennedy Road watermains. As such, opportunities to reduce the size of the watermains during the initial construction should be explored such that the throw-away costs are minimized. Further analysis and discussions with the Region are required to implement an interim design solution.

5.0 STORM DRAINAGE

5.1 Background Information

The following studies were used to define the preliminary drainage and stormwater management requirements:

- **"DRAFT" Etobicoke Creek Headwaters Subwatershed Background Report, Surface Water Quality,** December 2004, Toronto and Region Conservation Authority

- **A Report Card on the Health of the Humber River Watershed**, July 2000, Toronto and Region Conservation Authority

- **2003 Humber Watershed Progress Report**, Toronto and Region Conservation Authority

- **Greening our Watersheds: Revitalization Strategies for Etobicoke and Mimico Creeks**, May 2002, Toronto and Region Conservation Authority

- **Etobicoke Creek Flood Control Study, Watershed Management Strategy, Final Report**, May 1995, Revised September 1996, Fred Schaeffer & Associates Ltd. (***Etobicoke Creek Study***)

- **West Humber River Subwatershed Study,** February 1996, Aquafor Beech Limited (***West Humber Study***)

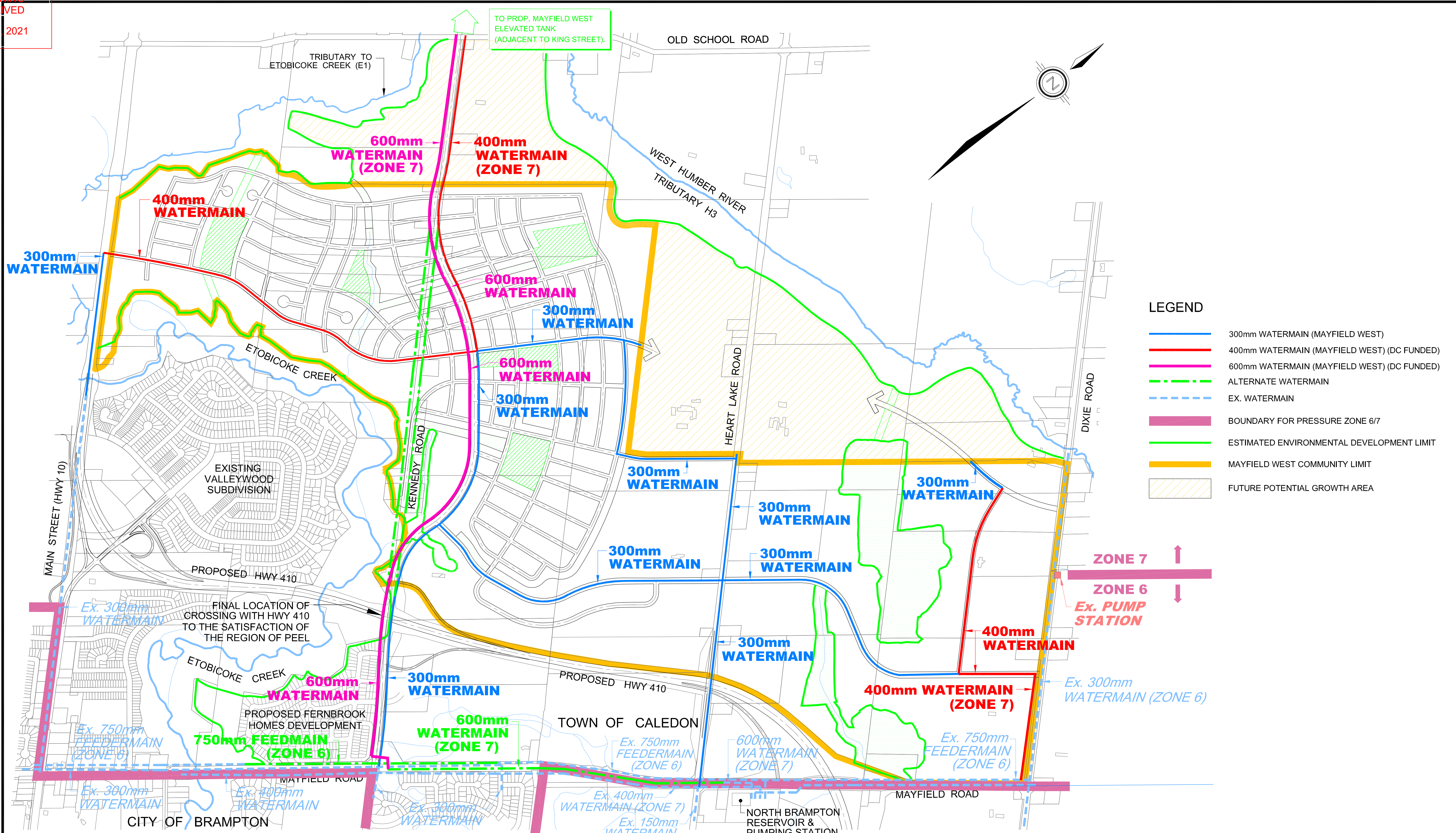
- **Stormwater Management Planning and Design Manual,** March 2003, Ministry of Environment ***(SWMP Design Manual)***

- **Town of Caledon Development Standards, Policies and Guidelines, Ver. 3,** January 2005

The above documents form the basis of this report.

5.2 Existing Features and Drainage Patterns

The Mayfield West community is largely defined by the major drainage features which frame the community. To the south west, the main branch of Etobicoke Creek forms a well defined development limit. An unnamed tributary of Etobicoke Creek creates the north-west limit of the community. The H3 tributary of the West Humber River creates



COSCORP Master Builder

Monarch by Taylor Woodrow

DAVID SCHAEFFER ENGINEERING LTD.
600 ALDEN ROAD., SUITE 500
MARKHAM, ONTARIO., L3R 0E7
(905) 475-3080

MAYFIELD WEST COMMUNITY CONCEPTUAL WATER DISTRIBUTION PLAN TOWN OF CALEDON

DATE:	AUGUST 2006
SCALE:	1:15000
PROJECT No.:	05-266
FIGURE	4

H:\05266\Figures\MESP\Subm_3\ColorFigures\04F_266watermain.dwg, 10/18/2007 12:09:24 P

LEGEND

PROP. 1200mm SUB-TRANSMISSION MAIN

PROP. 900mm FEEDERMAIN

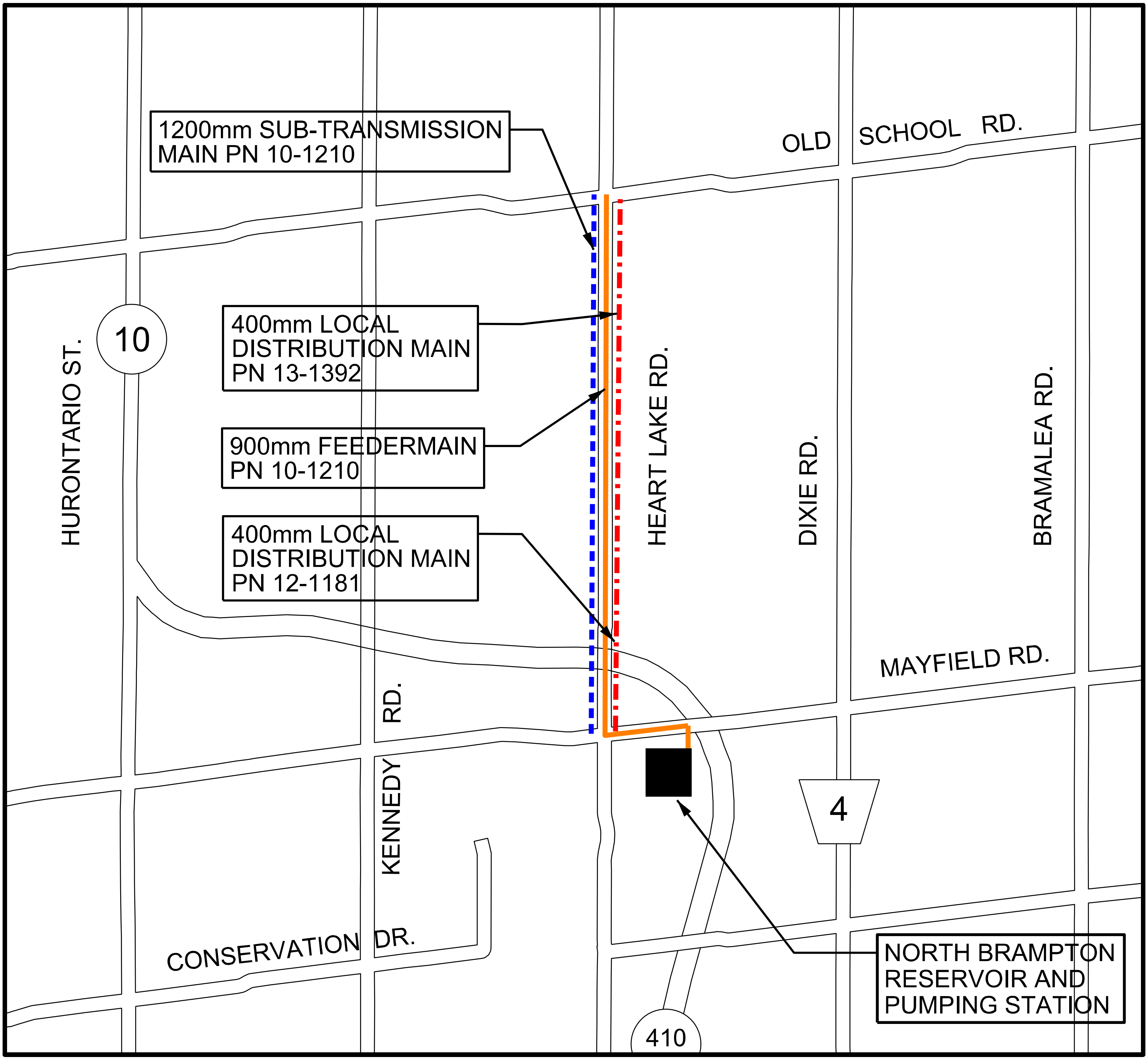
PROP. LOCAL DISTRIBUTION WATERMAINS

Region of Peel
working with you

PROJECTS 10-1210, 12-1181, 13-1392

HEART LAKE ROAD - VCTORIA FEEDERMAIN CONTRACT 2
FROM MAYFIELD ROAD TO OLD SCHOOL ROAD

PROJECT MANAGER:JAIME ACOSTA x-7922
COUNCILLOR:J. DOWNEY, G. MCCLURE
CONTRACTOR:PACHINO CONSTRUCTION
INSPECTOR:JIMMY ARMSTRONG x-3246



PUBLIC WORKS
10 PEEL CENTRE DRIVE - SUITE B, 4th FLOOR, BRAMPTON ON L6T 4B9 (905) 791-7800

TOWN OF CALEDON
PLANNING
RECEIVED
Nov 26, 2021

DISCLAIMER

These records are based upon available and unverified information and may prove inaccurate.
The Region of Peel disclaims any responsibility should these records be relied upon to the detriment of any person.

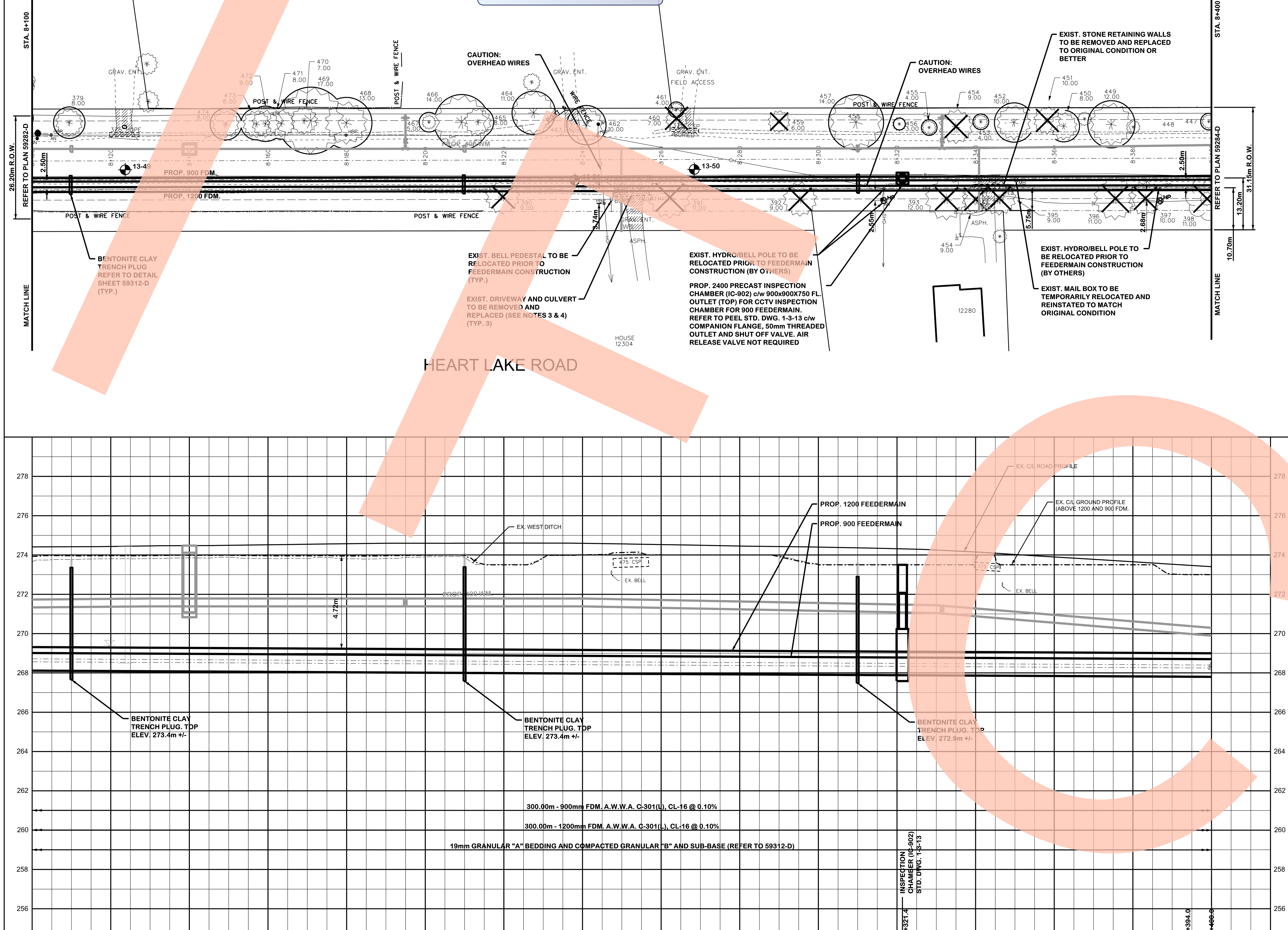
PLEASE NOTE: THIS DRAWING IS NOT MARKED AS CONSTRUCTED

INFORMATION ONLY

900 FEEDERMAIN DATA

ITEM	DESCRIPTION	STATION	BASELINE OFFSET	STANDARD DRAWING	FEEDERMAIN INVERT	REMARKS / COORDINATES	
IC-902	INSPECTION CHAMBER	8+321.40	4.99m RT.	1-3-13	267.88	N 4845731.731	E 595717.360

ALL COORDINATES SHOWN ARE GRID 6° UTM-17N, NAD 83



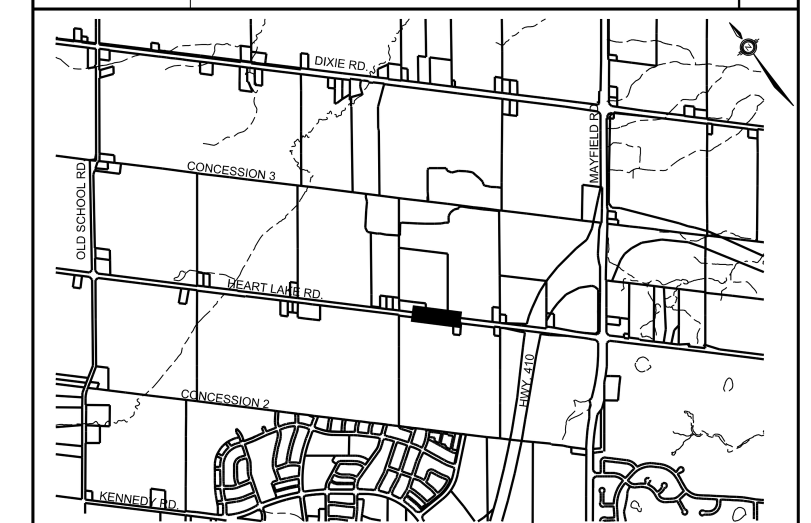
268.11															267.80	INV. EL. 900 FDM.
268.11															267.80	INV. EL. 1200 FDM.
274.41	274.43	274.48	274.52	274.57	274.60	274.61	274.59	274.53	274.45	274.40	274.32	274.15	273.90	273.65	273.41	EX. ROAD ELEV.
8+100	8+120	8+140	8+160	8+180	8+200	8+220	8+240	8+260	8+280	8+300	8+320	8+340	8+360	8+380	8+400	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS	03.22.2017	A.F.
STORM SEWERS			BELL U/G CABLE	-	-
WATERMAINS			HYDRO U/G CABLE	-	-
TRANSIT			HYDRO ONE	11.18.2016	A.F.
PARKS & REC.			CTV	12.20.2016	A.F.
ONT. CLEAN WATER			COMMUNIC. CABLES	11.29.2016	A.F.

REVISIONS

DATE	DETAILS	INIT.
MAY 3/2017	ISSUED FOR TENDER	N.L.
SEP. 14/2017	ISSUED FOR CONSTRUCTION	N.L.



KEY PLAN (N.T.S.)

NOTES:

1. FOR GENERAL NOTES, SEE PLAN 59272-D.
2. EXISTING UTILITIES TO BE LOCATED VIA DAYLIGHTING AT ALL PROPOSED WATER SERVICE LOCATIONS PRIOR TO CONSTRUCTION.
3. EXISTING DRIVEWAY CULVERTS TO BE REMOVED AND REPLACED WITH MINIMUM OF 375mm INTERNAL DIAMETER, OR WITH SAME INTERNAL DIAMETER IF THE EXISTING SIZE IS LARGER THAN 375mm INTERNAL DIAMETER, HDPE SMOOTH WALL (BOSS 2000) PIPE TO MATCH EXISTING INVERTS, GRADE AND WITH A MINIMUM LENGTH OF 7.0m, AS PER TOWN OF CALEDON REQUIREMENTS.
4. ALL DRIVEWAYS ARE TO BE RESTORED TO EXISTING CONDITION OR BETTER, WITH MATCHING MATERIAL (I.E. ASPHALT FOR ASPHALT, GRAVEL FOR GRAVEL), TO THE PROPERTY LINE. EXISTING DRIVEWAY RETAINING WALLS TO BE REMOVED AND REPLACED TO MATCH EXISTING CONDITIONS OR BETTER.

HATCH

General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS20 Proposed Water Service, Size In mm
B.M. No. Elev.
Description
Location
The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

LICENSED PROFESSIONAL ENGINEER
N. L. J. LISCIO
100181711
2017-09-14
PROVINCE OF ONTARIO

Chkd.

LICENSED PROFESSIONAL ENGINEER
M. MUDASSAR
100055238
2017-09-14
PROVINCE OF ONTARIO

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL:
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

1:500 0 5 10 15 20m HORIZONTAL SCALE
1:100 0 1 2 3 4m VERTICAL SCALE

Region of Peel
Working for you

HEART LAKE ROAD

(FROM OLD SCHOOL RD. TO NORTH BRAMPTON P.S.)

VICTORIA FEEDERMAIN - CONTRACT 2
PROP. 1200MM AND 900MM FEEDERMAIN

STA. 8+100 TO STA. 8+400

CAD Area	-	Area	C-06/C-07	Project No.	10-1210, 13-1392
Checked by	N.L./M.M.	Drawn by	A.F.	Plan No.	59283-D
Date	SEPTEMBER 2017	Sheet	13 of 143		

SERVICE CONNECTION DATA

ROLL NUMBER	NAME	STATION	ADDRESS	SERVICE CONNECTION 19mm	SERVICE CONNECTION 25mm	SERVICE CONNECTION 50mm	SERVICE CONNECTION 150mm	LENGTH TO PROPERTY LINE (M) 19mm	LENGTH TO PROPERTY LINE (M) 25mm	LENGTH TO PROPERTY LINE (M) 50mm	LENGTH TO PROPERTY LINE (M) 150mm	COORDINATES @ P/L	
-	-	8+250.00	12304			1				20.65		N 4845772.610	E 595657.220
-	-	8+340.85	12280		1				15.75			N 4845712.201	E 595725.448

400 WATERMAIN DATA

ITEM	DESCRIPTION	STATION	BASELINE OFFSET	STANDARD DRAWING	WATERMAIN INVERT	REMARKS / COORDINATES	
PVI-416	0°06' VERT. DEFL.	8+130.00	3.01m LT.	-	271.40	N 4845871.685	E 595586.586
LVC-407	LINE VALVE CHAMBER	8+140.00	3.00m LT.	1-3-19	271.40	N 4845864.655	E 595593.703
PVI-417	0°13' VERT. DEFL.	8+240.00	2.84m LT.	-	271.40	N 4845794.383	E 595664.846
PVI-418	0°44' VERT. DEFL.	8+330.00	2.67m LT.	-	271.05	N 4845731.137	E 595728.876

ALL COORDINATES SHOWN ARE GRID 6° UTM-17N, NAD 83

SERVICE DATA

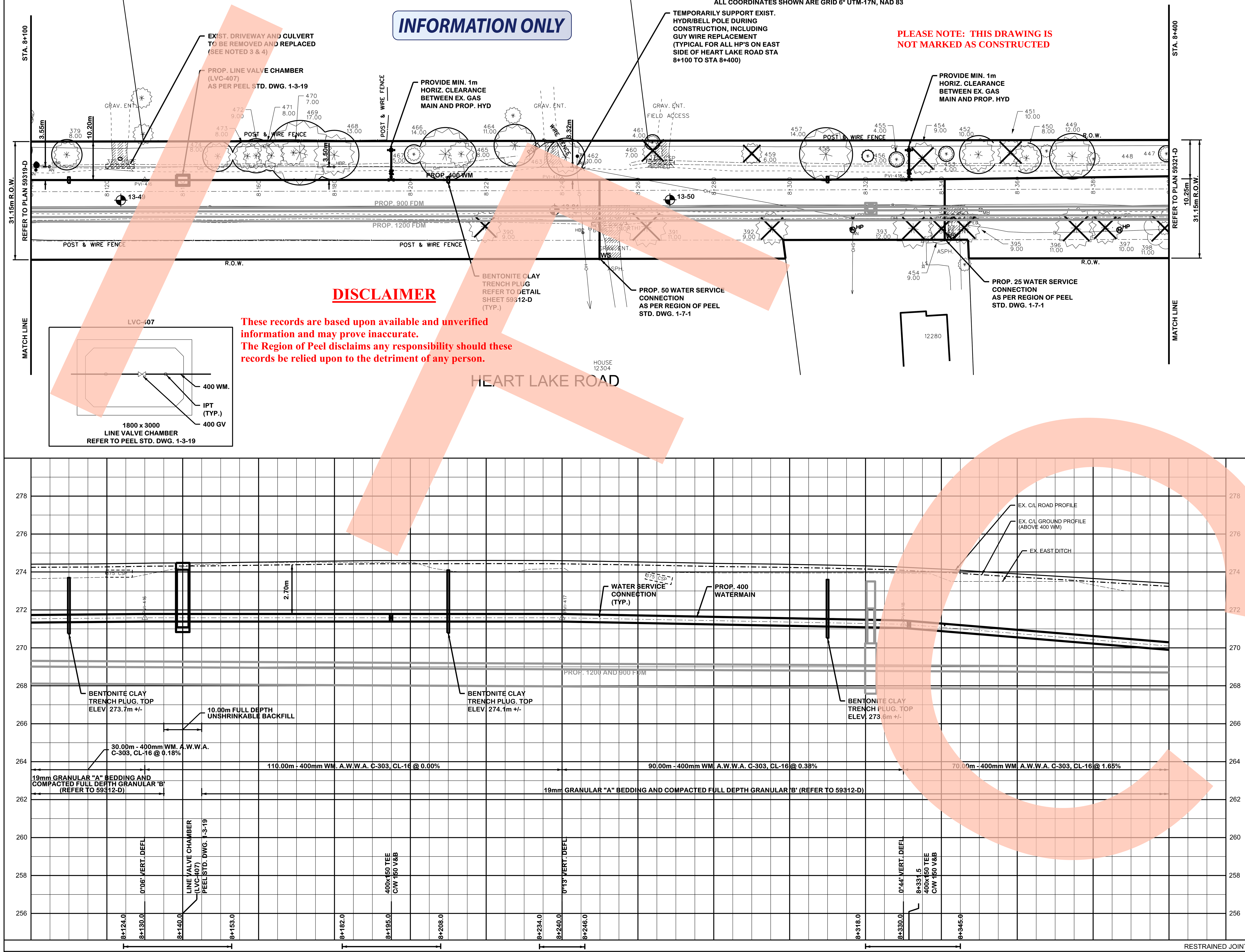
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS	03.22.2017	A.F.
STORM SEWERS			BELL U/G CABLE	-	-
WATERMAINS			HYDRO U/G CABLE	-	-
TRANSIT			HYDRO ONE	11.18.2016	A.F.
PARKS & REC.			CTV	12.20.2016	A.F.
ONT. CLEAN WATER			COMMUNIC. CABLES	11.29.2016	A.F.

REVISIONS

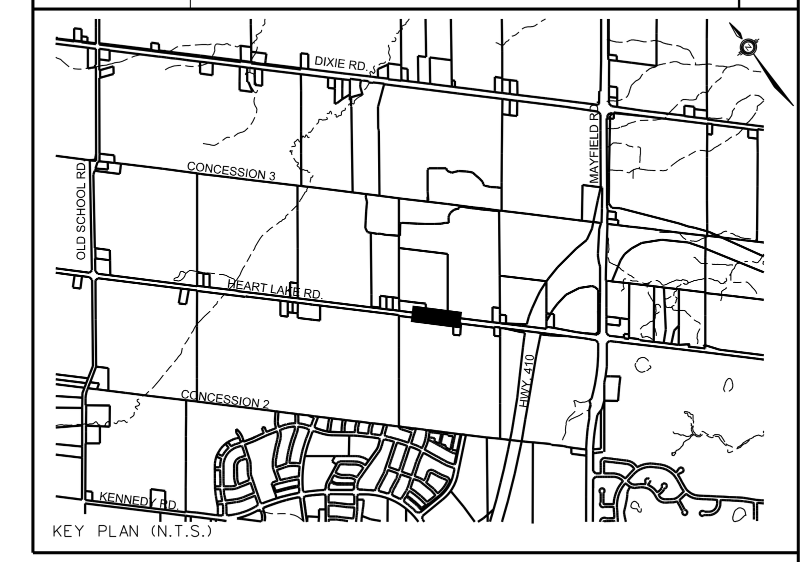
DATE	DETAILS	INIT.
MAY 3/2017	ISSUED FOR TENDER	N.L.
SEP. 14/2017	ISSUED FOR CONSTRUCTION	N.L.

INFORMATION ONLY

PLEASE NOTE: THIS DRAWING IS NOT MARKED AS CONSTRUCTED



271.33	271.37	271.40	271.40	271.40	271.40	271.40	271.40	271.31	271.24	271.16	271.08	270.88	270.55	270.22	269.90	BOT. EL. OF WM.
274.41	274.43	274.48	274.52	274.57	274.60	274.61	274.59	274.53	274.45	274.40	274.32	274.15	273.90	273.65	273.41	EX. ROAD ELEV.
8+100	8+120	8+140	8+160	8+180	8+200	8+220	8+240	8+260	8+280	8+300	8+320	8+340	8+360	8+380	8+400	ROAD CHAINAGE



NOTES:

1. FOR GENERAL NOTES, SEE PLAN 59272-D.
2. EXISTING UTILITIES TO BE LOCATED VIA DAYLIGHTING AT ALL PROPOSED WATER SERVICE LOCATIONS PRIOR TO CONSTRUCTION.
3. EXISTING DRIVEWAY CULVERTS TO BE REMOVED AND REPLACED WITH MINIMUM OF 375mm INTERNAL DIAMETER, OR WITH SAME INTERNAL DIAMETER IF THE EXISTING SIZE IS LARGER THAN 375mm INTERNAL DIAMETER, HDPE SMOOTH WALL (BOSS 2000) PIPE TO MATCH EXISTING INVERTS AND GRADE.
4. ALL DRIVEWAYS ARE TO BE RESTORED TO EXISTING CONDITION OR BETTER, WITH MATCHING MATERIAL (I.E. ASPHALT FOR ASPHALT, GRAVEL FOR GRAVEL), TO THE PROPERTY LINE. EXISTING DRIVEWAY RETAINING WALLS TO BE REMOVED AND REPLACED TO MATCH EXISTING CONDITIONS OR BETTER.

HATCH

General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS20 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

LICENSED PROFESSIONAL ENGINEER N. L. J. LISCIO 100181711 2017-09-14 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER M. MUDASSAR 100055238 2017-09-14 PROVINCE OF ONTARIO

Chkd.

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL:
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

1:500 — 0 5 10 15 20m — HORIZONTAL SCALE

1:100 — 0 1 2 3 4m — VERTICAL SCALE

Region of Peel
Working for you

HEART LAKE ROAD

(FROM OLD SCHOOL RD. TO NORTH BRAMPTON P.S.)

VICTORIA FEEDERMAIN - CONTRACT 2
PROP. 400MM WATERMAIN

STA. 8+100 TO STA. 8+400

CAD Area	-	Area	C-06/C-07	Project No. 10-1210, 13-1392
Checked by	N.L./M.M.	Drawn by	A.F.	Plan No. 59320-D
Date	SEPTEMBER 2017	Sheet	50 of 143	

HYDRANT FLOW TESTING

NOTE:Hydrants tested according to NFPA 291: Recommended Practice for Fire Flow Testing and Marking of Hydrants

GENERAL INFORMATION

General Information

Date of Testing	18-Nov-21
Project Number:	135636
Site Location / Address:	12304 Heart Lake
Region / Municipality	Peel Region
Hydrants Opened By:	Peel Region
Tested by:	Daniel S Val V

HYDRANT TEST INFORMATION

Hydrant Test Location - Residual Hydrant=R, Flow Hydrant=F (North at Top)

Test Data

Time of Test	8:14 AM
Pipe Size (mm)	300
Flow Hydrant Test Location (description)	101 Abbotside Way and Learmont Ave
Residual Hydrant Test Location (description)	First hydrant east of 101 Abbotside Way and Learmont Ave
Static Pressure(PSIG)	81

Q1 Test Data (1 Orifice)

# OUTLETS	ORIFICE SIZE(IN)	PITOT PRESSURE(PSIG)	FLOW(USGPM)	RESIDUAL PRESSURE(PSIG)
1	2.5	45	1126	74

QT Test Data (2 Orifices)

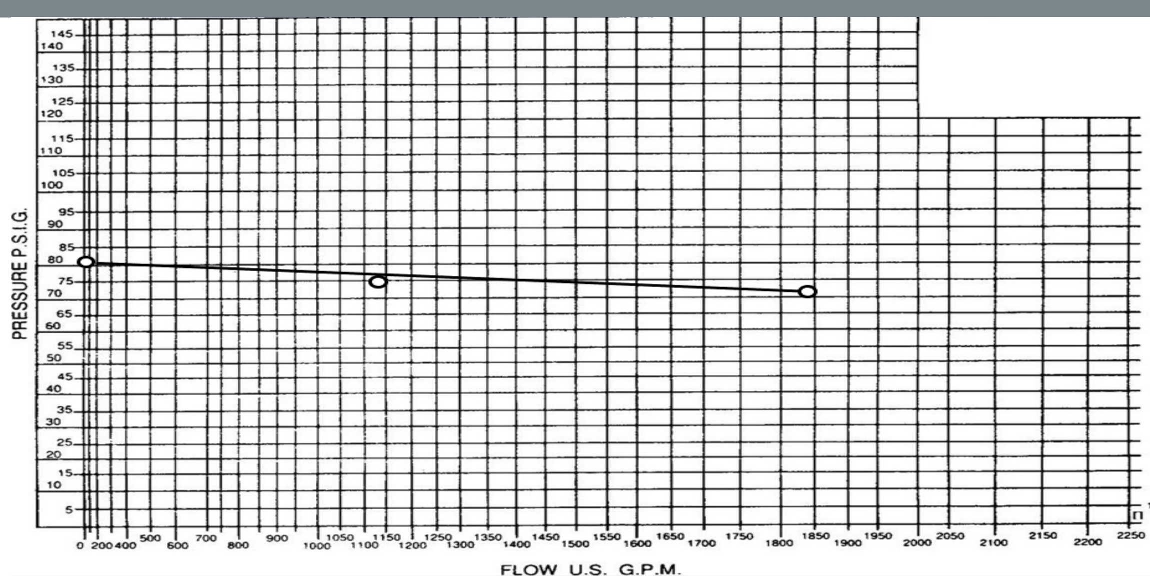
# OUTLETS	ORIFICE SIZE(IN)	PITOT PRESSURE(PSIG)	FLOW(USGPM)	RESIDUAL PRESSURE(PSIG)
2	2.5	30	1838	73

Calculations

FORMULA: Q= 29.83 cd^2√p....................................Where: c- coefficient of discharge (1 in smooth pipe)
.. d- pipe diameter (inches)
...p- pitot reading (psig)

Q1 - 1 Orifice(s)	Q1= (29.83)(0.9)(2.5)^2 √45=1126
QT - 2 Orifice(s)	QT= 2(29.83)(0.9)(2.5)^2 √30=1838
Static Pressure(PSIG)	81

Test Results - Plot



12304 Heart Lake Road

Industrial Development

DOMESTIC WATER DEMAND CALCULATIONS

Project Name: 12304 Heart Lake Road
Project Number: 135636
Date: November 12, 2021
Designed By: Jason Jenkins, P.Eng., P.E.

1. ADD = 300 L/cap/day per Region of Peel standards
2. Population Densities per Region of Peel standards
3. Peaking factors per Region of Peel standards

Peaking Factors		
Land Use	Peak Hour	Maximum Day
ICI	3.00	1.40

					(ADDxP.F.)	*(ADDxP.F.)*
	Units / Area	Density	Population	ADD (L/s)	PHD (L/s)	MDD (L/s)
Building 1	9.95 ha	70 pp/ha	697	2.4	7.3	3.4
		Totals	**697**	**2.4**	**7.3**	**3.4**

12304 Heart Lake Road

Industrial Development

FIRE FLOW DEMAND CALCULATIONS

Project Name: 12304 Heart Lake Road
Project Number: 135636
Date: November 12, 2021
Designed By: Jason Jenkins, P.Eng., P.E.

Based on the Water Supply for Public Fire Protecetion Manual, 1999 by the Fire Underwriters Survey

Step 1: Calculate Fire Flow (based on area)

Construction Coefficient =	0.6	
Largest Floor Area =	48,610	m2
Floor Above =	0	m2
Floor Below =	0	m2
Area =	48,610	m2
Fire Flow (F) =	**29,000**	L/min

$$F = 220C\sqrt{A}$$

F = required fire flow (L/min)
C = coefficient related to type of construction
- 0.6 for fire resistive (fully protected, 3-hr ratings)
- 0.8 for non combustable (i.e. unprotected metal buildings)
- 1.0 for ordinary construction
- 1.5 for wood frame construction

A = total floor area excluding basements 50% below grade

** If vertical openings are inadequately protected, consider two largest two largest adjoining floors plus 50% of each of any floors above up to eight floors.*
** If vertical openings are adequately protected (one hour rating), consider largest floor area + 25% of two immediately floors.*

Step 2: Adjustment for Building Occupancy (shall not be less than 2000 L/s)

Occupancy Adjustment =	-0.15	
F_1 = Fire Flow x Adjustment =	**24,650**	L/min

Non-Combust.	-25%	Free Burning	15%
Limited Comb.	-15%	Rapid Burning	25%
Combustable	No change		

Step 3: Adjust F1 for Fire Supression System

Sprinkler Adjustment =	50%	
$F_2 = F_1$ x Adjustment =	**12,325**	L/min

Automatic Sprinklers (monitored)	-50%
Adequatly Designed System	-30%

Step 4: Adjust F1 for Exposure / Proximity (shall not exceed 75%)

Proximity Adjustment =	15%	(max 75%)
$F_3 = F_1$ x Factor =	**3,698**	L/min

Separation	Adjustment	Separation	Adjustment
0m to 3m	25%	20.1m to 30m	10%
3.1m to 10m	20%	30.1m to 45m	5%
10.1m to 20m	15%		

Step 5: Calculate Adjusted Fire Flow (shall not be less than 2000 L/min or greater than 45,000 L/min)

F_1 =	24,650	L/min
$- F_2$ =	12,325	L/min
+ F3 =	3,698	L/min
Fire Flow =	16,000	L/min
Fire Flow =	**266.7**	L/s
Total Demand (Fire Flow + MDD) =	**270.1**	L/s

$$\text{Fire Flow} = F_1 - F_2 + F_3$$

Checks:
Fire Flow greater than 2000 L/min
Fire Flow less than 45,000 L/min

12304 Heart Lake Road

Industrial Development

HEAD LOSS CALCULATIONS

Project Name: 12304 Heart Lake Road
Project Number: 135636
Date: November 12, 2021
Designed By: Jason Jenkins, P.Eng., P.E.

Hydrant Flow Test - Abbotside Way

Flow (gpm)	Flow (L/s)	Flow (L/min)	Pressure (psi)	Pressure (kPa)
0	0.0	0	81	**558**
1,126	71.0	4,262	74	**510**
1,838	116.0	6,958	73	**503**

Residual Pressure at Main

Source: Walski, Thomas M. (2007): Advanced Water Distribution Modeling and Management

$$Q_R = Q_F \times \frac{hr^{0.54}}{hf^{0.54}}$$

where: Q_R = flow predicted at desired residual pressure
Q_F = total flow measured during test
h_r = pressure drop to desired residual pressure
h_f = pressure drop to measured during test

	Flow (gpm)	Flow (L/s)	Flow (L/min)	Residual Pressure @ Main (psi)	Residual Pressure @ Main (kPa)	
Domestic (PHD)	115	7.3	435	**81**	**558**	
Fire Flow (Fire+MDD)	4,281	270.1	16,203	**43**	**295**	Projecting Curve to Fire Flow
To 20 psi	3,579	225.8	13,547	**54**	**369**	Projecting Curve to 20 psi

(1 gal = 3.785 L) *(Goal Seek)*

Residual Pressure at Building

$$h_L = \frac{10.675 * L * Q^{1.85}}{C^{1.85} * D^{4.8655}}$$

where: h_L = Pressure Drop (m)
L = Length of Service (m)
Q = Flow Rate (m^3/s)
D = Pipe Diameter (m)
C = Roughness Coefficient

PHD Conditions

	Domestic	
L=	50.0	m
Q=	0.007	m^3/s
D=	150	mm
C=	100	
h_L=	**0.1**	m
h_L=	**4.7**	in
h_L=	**0.2**	psi
h_L=	**1.2**	kPa

Fire + MDD Conditions

	Fire Service	
L=	70.0	m
Q=	0.270	m^3/s
D=	300	mm
C=	120	
h_L=	**3.3**	m
h_L=	**130.1**	in
h_L=	**4.7**	psi
h_L=	**32.4**	kPa

	Flow (gpm)	Flow (L/s)	Flow (L/min)	Residual Pressure @ Bldg. (psi)	Residual Pressure @ Bldg. (kPa)
Domestic	115	7.3	435	**81**	**557**
Fire	4,281	270.1	16,203	**38**	**262**

Residual Pressure (DOMESTIC) at building is greater than 40 psi (275 kPa).

Residual Pressure (FIRE) at building is greater than 20 psi (140 kPa).