WATER AND WASTEWATER FUNCTIONAL SERVICING REPORT

2170 GHENT AVENUE

CITY OF BURLINGTON
REGION OF HALTON

PREPARED FOR:

NORTHERN CARDINAL HOMES LTD.

PREPARED BY:

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NOVEMBER 2024

CFCA FILE NO. 912-7186

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CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev. 0	November 8, 2024	Issued for 1st Submission ZBA

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 SITE DESCRIPTION 1

3.0 PROPOSED DEVELOPMENT 1

4.0 WATER SERVICING 2

4.1 Existing Water Servicing 2
4.2 Design Water Demand 3
4.3 Watermain Hydraulic Analysis 3
4.3.1 Analysis Methodology 4
4.3.2 Analysis Criteria 4
4.3.3 Analysis Results 4

4.4 Proposed Water Servicing 6

5.0 SANITARY SERVICING 6

5.1 Existing Sanitary Servicing 6
5.2 Wastewater Design Flow 6
5.3 External Sanitary Sewer Hydraulic Analysis 7
5.4 Proposed Sanitary Servicing 8

6.0 PRELIMINARY UTILITY STUDY 8

7.0 CONCLUSIONS AND RECOMMENDATIONS 9

LIST OF TABLES

Table 1: Population Estimates
Table 2: Estimated Domestic Design Water Demand
Table 3: Estimated Fire Demand Flows
Table 4: Existing Conditions Junction Results
Table 5: Existing Conditions Pipe Results
Table 6: Existing Fire Flow Results
Table 7: Proposed Conditions Junction Results
Table 8: Proposed Conditions Pipe Results
Table 9: Proposed Fire Flow Results
Table 10: Estimated Wastewater Design Flow
Table 11: External Sanitary Sewer Capacity Analysis Results

LIST OF APPENDICES

Appendix A: As-built Drawings
Appendix B: Water Servicing Supporting Calculations & Documentation
Appendix C: Water Modelling Results & Documentation
Appendix D: Sanitary Servicing Supporting Calculations & Documentation
Appendix E: Preliminary Utility Study Supporting Markups

LIST OF DRAWINGS

Drawing C101: Removals, Erosion and Sediment Control Plan
Drawing C102: Preliminary Servicing Plan
Drawing C103: Preliminary Grading Plan

LIST OF FIGURES

Figure 1: Pre and Post Development Drainage Plan

1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Northern Cardinal Homes to prepare a Water and Wastewater Functional Servicing Report to support the Zoning By-law Amendment (ZPA) application for the property located at 2170 Ghent Avenue (the Site) in the City of Burlington (the City) and Halton Region (the Region).

This report will demonstrate that the proposed development can be developed in accordance with the City of Burlington and Halton Region guidelines and standards from a fire and domestic water, wastewater, and stormwater servicing perspective.

The reports and design standards referenced during the preparation of this report includes:

- City of Burlington Pre-consultation Package (May 1, 2024)
- Halton Region Water and Wastewater Linear Design Manual (Version 5, October 2019)
- City of Burlington Growth Analysis Study (Dillon Consulting, June 2019)
- Fire Underwriters Survey Method – Water Supply for Public Fire Protection (2020)
- City of Burlington's Sustainable Building and Development Guidelines (December 2021)
- Updated Area Servicing Plan (ASP) for Stormwater, Water & Wastewater – Downtown Burlington (Wood, May 2020)

2.0 Site Description

The Site encompasses an area of 0.40 ha and is currently designated as Residential Medium Density (Official Plan, 2020) and zoned as a Residential Medium Density (RM2).

Currently, the Site consists of low-lying vegetation and lawn. The Site, located in a developed residential area in south Burlington, is bounded by Ghent Avenue to the north, existing low-rise apartments to the west, and existing single-family residential dwellings to the south and east. We understand the site historically was a single-family residential lot, but the home has been demolished.

The Site is not located within a regulated flood hazard and no spill hazard has yet to be defined, therefore, no Conservation Halton permit is required as part of the development application. According to the Pre-consultation Package (May 1, 2024), Conservation Halton defers the stormwater management review to the City (Stormwater Management Report provided under separate cover).

3.0 Proposed Development

The proposed development at 2170 Ghent Avenue includes:

- Twenty-one (21) 3-storey standard townhouse units.
- Associated parking and visitor parking.
- Amenity areas and green space

The proposed population for the development was calculated using both the design population guidelines from the Halton Region Water and Wastewater Linear Design Manual (Version 5, October 2019) and the City of Burlington Growth Analysis Study (Dillon Consulting, June 2019). The Growth Analysis Study population estimate is based on a persons per unit (PPU) forecast of 1.9 PPU for new units constructed from 2016-2041 of medium to high density type whereas the Halton Region Water and Wastewater Linear Design Manual population estimate is based on a persons per hectare method.

The estimated population for the proposed development based on the two design population guidelines are presented in Table 1.

Table 1: Population Estimates

Standard	Site Statistic[1]	Population Density	Proposed Population
Halton Region Water and Wastewater Linear Design Manual (Version 5, October 2019)	Total Site Area = 0.40 ha	135 persons/ha	54 persons
City of Burlington Growth Analysis Study (Dillon Consulting, 2019)	Proposed # of Units = 21	2.3 PPU	48 persons

1. Site Statistics based on Site Plan prepared by Limberlost Building Design (August, 2024).

The larger proposed population of 54 persons based on the Halton Region Water and Wastewater Linear Design Manual (2019) was used as the governing population to calculate the servicing demands for the Site.

4.0 Water Servicing

Halton Region is responsible for the operation and maintenance of the public water supply servicing the Site. The following sections outline the existing and proposed fire and domestic water servicing for the development.

4.1 Existing Water Servicing

According to the Sustainable Halton Water & Wastewater Master Plan (October 2011), the Site is in Pressure Zone B1 which generally includes all lands in Burlington between elevations 76.0 mASL and 101.4 mASL. Municipal water within Pressure Zone B1 is provided by an interconnected feedermain which is serviced by the Burlington, Burloak, and Oakville Water Purification Plants.

The Halton Region as-built drawing B-8452 (Sheet 3, August 1999) identified a municipal 250 mm diameter PVC watermain beneath Ghent Avenue and a fire hydrant located in the municipal ROW north of the Ghent Avenue and Clarendon Park Drive intersection. The municipal watermain beneath Ghent Avenue continues as a 250 mm diameter PVC watermain up to George Street to the east and connects to an existing 150mm PVC watermain further west on Ghent Avenue as shown on as-built drawing B-8451 (Sheets 2 and 5, August 1999).

Relevant as-builts showing the existing water servicing surrounding the Site are provided in **Appendix A**.

4.2 Design Water Demand

The design fire and domestic water demand for the proposed development was estimated using the following guidelines:

- Halton Region Water and Wastewater Linear Design Manual (Version 5, October 2019)
- Fire Underwriters Survey Method – Water Supply for Public Fire Protection (2020)

Table 2 summarizes the estimated domestic design water demand results and **Appendix B** contains detailed calculations.

Table 2: Estimated Domestic Design Water Demand

Standard[1]	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hourly Demand (L/s)
Halton Region Water and Wastewater Linear Design Manual (Version 5, October 2019)	0.17	0.39	0.70

Table 3 summarizes the estimated fire flow water demand and **Appendix B** contains detailed calculations.

Table 3: Estimated Fire Demand Flows

Method	Block	Fire Flow Water Demand		Duration (hr)
		(L/s)	(gpm)	
Fire Underwriters Survey (2020)	A	183	2,900	2.25
	B	183	2,900	2.25
	C	167	2,647	2.00

The fire flow demand was calculated for each block. The highest fire flow will dictate the Site's minimum requirement. Based on the Fire Underwriters Survey analysis, a maximum estimated fire flow of 183 L/s for a duration of 2.25 hours is required. Please note that the Fire Underwriters Survey value is a conservative estimate for comparison purposes only and the design of the fire flow system will be completed by others. The mechanical/sprinkler engineer for the proposed development will complete the required analyses for fire protection and the Architect will design fire separation methods according to the determined fire flow rate to meet the Regional watermain's available flows and pressures.

The total estimated design water demand for the proposed development is approximately 183.39 L/s – the sum of the domestic water maximum day demand and minimum fire flow (0.39 L/s + 183 L/s).

4.3 Watermain Hydraulic Analysis

A watermain hydraulic analysis was completed using the Region's InfoWater model provided on September 9, 2024. The watermain analysis was completed to confirm the Region's existing water distribution system can support the proposed development.

4.3.1 Analysis Methodology

Using the InfoWater model provided by the Region, the analysis was completed for the SS-2021-MDD scenario since it is used for high-level system capacity planning and available fire flow analysis. The analysis began by establishing existing conditions and was successfully initialized and run as an extension to ArcMap. The existing 2021 model scenario reflects the extent of the Region's water network currently in operation, which includes the subject property. A junction was added at the approximate Site location (J-SITE), but no further changes were made to the existing model. The default Run Manager parameters were also used.

Model inputs for the proposed conditions include adding the development's domestic demands and required fire flow to the new Site location (J-SITE) in the model. This junction and the surrounding area were analysed. Please refer to the schematic in **Appendix C** for details.

4.3.2 Analysis Criteria

The water pressure design criteria for watermains are based on the Region's Water and Wastewater Linear Design Manual (Version 5, October 2019) and are as follows:

- Minimum and maximum regular operating pressure range from 40 to 100 psi.
- Preferred operating pressures ranging from 50 to 80 psi.
- Maximum day demand plus fire flow shall not fall below 20 psi.
- Maximum velocity associated with low pressure is 3.5 m/s.

4.3.3 Analysis Results

2021 Existing Conditions

The maximum day demand existing condition results for the Site and surrounding watermains are summarized in Tables 4 and 5.

Table 4: Existing Conditions Junction Results

Junction ID	Demand (L/s)	Pressure (psi)
J-SITE	0.00	60

Table 5: Existing Conditions Pipe Results

Pipe ID	Velocity (m/s)
AUTOP350	0.12
WMN45030	0.12

The results for the Site location under fire flow conditions are summarized in the table below.

Table 6: Existing Fire Flow Results

Junction	Available Flow (L/s)	Pressure at Design Flow (psi)
J-SITE	401.0	28

As shown in the above tables, the pressure results for the Site junction fall within the Region's accepted range during maximum day demand and fire flow scenarios. The velocity of the surrounding pipes also fall within common operating ranges. Further output results are included in **Appendix C**.

2021 Proposed Conditions

The proposed maximum day demand condition results for the Site and connecting watermains are summarized in the tables below.

Table 7: Proposed Conditions Junction Results

Junction ID	Demand (L/s)	Pressure (psi)
J-SITE	0.39	60

Table 8: Proposed Conditions Pipe Results

Pipe ID	Velocity (m/s)
AUTOP350	0.13
WMN45030	0.12

The results for the Site location under fire flow conditions are summarized in the table below.

Table 9: Proposed Fire Flow Results

Junction	Available Flow (L/s)	Pressure at Design Flow (psi)
J-SITE	401.0	28

As summarized in the above tables, the results for the analyzed junction show that pressures fall within the Region's accepted range and there is adequate available fire flow during proposed conditions.

With respect to the Region's design criteria, water pressures under normal operating conditions were maintained within the preferred pressure range of 50 to 70 psi. Watermains experienced maximum velocities that were within common operating ranges. As such, there is sufficient capacity within the Region's water distribution system to support the proposed development. Further output information is included in **Appendix C**.

4.4 Proposed Water Servicing

The Site is proposed to be serviced by a 200 mm diameter PVC water service connected to the existing municipal 250 mm diameter PVC watermain beneath Ghent Avenue. The municipal connection will be facilitated within a valve chamber according to Halton Region standard guidelines. The proposed water service connection will be equipped with a property line valve and box.

The 200 mm diameter water service will be split into a 200 mm diameter fire line and a 100 mm diameter domestic water service as outlined in Halton Region Standard RH 409.010. The required water meter and backflow preventor will be located within the proposed development and details will be provided at Site Plan Approval. The proposed water service connection for the development will be located along the southwest property line, as shown in the Site Servicing Plan (Drawing C103).

5.0 Sanitary Servicing

The following sections outline the existing and proposed sanitary servicing for the Site. Halton Region is responsible for the collection and treatment of wastewater generated from the Site.

5.1 Existing Sanitary Servicing

The City of Burlington as-built drawing MG-1 (Sheet 3, February 1993) and Halton Region GIS Mapping both identified a municipal 250 mm diameter PVC sanitary sewer beneath Ghent Avenue installed at 0.28% to 0.55%. The Ghent Avenue municipal sanitary sewer accepts wastewater from the properties fronting Ghent Avenue west of Clarendon Park Drive (City of Burlington as-built drawing MG-1, March 2007).

The Ghent Avenue municipal sanitary sewer conveys wastewater to a 450 mm diameter sanitary sewer beneath Brant Street (City of Burlington as-built drawing MG-1, Sheet 1, February 1989). According to the Sustainable Halton Water & Wastewater Master Plan (October 2011), the Site is within the Burlington Skyway Wastewater Treatment Plant Drainage Area.

Relevant as-built drawings showing the existing sanitary sewer infrastructure surrounding the Site are provided in **Appendix A**.

5.2 Wastewater Design Flow

The total peak wastewater design flow according to the Halton Region Water and Wastewater Linear Design Manual (Version 5, October 2019) is calculated using the following formula:

$$Total\ Peak\ Wastewater\ Design\ Flow = Average\ Dry\ Weather\ Flow\ \times Peaking\ Factor + Infiltration\ Flow$$

Table 8 summarizes the estimated wastewater design flow results and **Appendix D** contains detailed calculations.

Table 10: Estimated Wastewater Design Flow

Standard[1]	Average Dry Weather Daily Flow (L/s)	Peaking Factor	Peak Dry Weather Flow (L/s)	Infiltration Flow (L/s)	Total Peak Wastewater Design Flow (L/s)
Halton Region Water and Wastewater Linear Design Manual (Version 5, October 2019)	0.17	4.00	0.69	0.11	0.80

1 Wastewater design flows were calculated using a 1.9 PPU based on the City of Burlington Growth Analysis Study (Dillon Consulting, 2019).

The proposed sanitary service lateral for the proposed development will be sized to convey a total peak wastewater design flow of 0.80 L/s.

5.3 External Sanitary Sewer Hydraulic Analysis

An external sanitary sewer hydraulic analysis was completed for the municipal 250 mm diameter sanitary sewer beneath Ghent Avenue to model the impacts the proposed development will have on the existing sanitary sewer distribution system. As requested by the Region, the analysis included the assessment of the Ghent Avenue municipal sanitary sewer to its connection at the Brant Street sanitary trunk sewer located approximately 650 m southeast of the site.

The drainage areas that contribute to the wastewater flow in the Ghent Avenue municipal sanitary sewer were determined based on as-built drawings and GIS mapping provided by the City and Region. Wastewater design flows from each drainage area were calculated using the Halton Region Water and Wastewater Linear Design Manual (Version 5, October 2019) and populations derived from existing land use and zoning classification. The proposed population of the proposed development was based on the 2.3 PPU outlined in the City of Burlington Growth Analysis Study as presented in Table 1 (Dillon Consulting, June 2019).

Existing and proposed conditions were modelled using a sanitary design sheet to review the development's impact on the existing Ghent Avenue municipal sanitary sewer. Results for each scenario are presented in Table 9 with supporting calculations and sanitary drainage plans provided in **Appendix D**.

Table 11: External Sanitary Sewer Capacity Analysis Results

Scenario	Ghent Avenue Sewer Size (mm)	Critical Sewer Slope[1]	Full Flow Velocity[1] (m/s)	Critical Sewer Capacity[1] (L/s)	Total Peak Wastewater Design Flow[2] (L/s)	Maximum Operating Capacity
Existing Conditions	250	0.22%	0.57	28	19.0	68%
Proposed Conditions (Full-Buildout)					19.9	71%

1. Critical sewer section with minimum slope, velocity, and capacity is located between MH14 and MH15.
2. Total peak wastewater design flow is taken at the most downstream point of the Ghent Avenue municipal sanitary sewer (i.e., at the connection with the Brant Street trunk sewer).

Under existing conditions, the Ghent Avenue municipal sanitary sewer is estimated to operate at 68% of its full flow capacity of approximately 28 L/s at the most critical section between MH14 and MH15 as illustrated in the Sanitary Drainage Plan. The remainder of the Ghent Avenue municipal sanitary sewer has an average operating capacity of 31%. Sanitary Design Sheets and Drainage Plans are provided in **Appendix D**.

In proposed conditions, the total peak wastewater design flow in the Ghent Avenue municipal sanitary sewer is proposed to increase by approximately 0.80 L/s and operate at 71% of its full flow capacity at the most critical section. The remainder of the Ghent Avenue municipal sanitary sewer has an average operating capacity of 39%.

The receiving 450mm diameter vitrified clay trunk sanitary sewer beneath Brant Street is estimated to have a full flow capacity of 78 L/s and is suspected to be operating well below its full flow capacity directly downstream of its connection with the Ghent Avenue municipal sanitary sewer (Wood, 2020). In detailed design stages, a construction phasing approach could be considered to reduce the immediate impacts the increased total wastewater design flows from the Site would have on the capacity of the existing sanitary sewer infrastructure.

The wastewater full flow velocity is estimated as 0.57 m/s in the critical section between MH14 and MH15 due to the shallow sewer slope of 0.22%. Ultimately, the proposed conditions will improve the scouring velocity within the Ghent Avenue municipal sanitary sewer due to the increased wastewater flows directed to the sanitary sewer system from the proposed development.

5.4 Proposed Sanitary Servicing

A 250 mm diameter PVC sanitary service lateral is proposed at 0.50% slope, connecting to the existing 250 mm diameter PVC sewer beneath Ghent Avenue in accordance with the Halton Region Linear Design Manual (Version 5, October 2019). The sanitary service lateral will be installed between a proposed property line maintenance hole and a proposed "doghouse" maintenance hole installed over the existing Ghent Avenue municipal sanitary sewer. Details of the connection are shown in the Site Servicing Plan (Drawing C102). An internal sanitary sewer network is proposed within the internal access road to provide a connection to each individual dwelling. The internal sanitary sewage collection system within each dwelling will be designed by the mechanical engineer to convey the wastewater to the proposed sanitary service lateral.

6.0 Preliminary Utility Study

A preliminary utility study has been initiated by Crozier to identify the location of existing utilities on Ghent Avenue in proximity to the Site including hydro, communications, and gas. The following utilities have been with supporting markups provided in Appendix E:

- **Burlington Hydro** – Active underhead and underground hydro ducts exist on Ghent Avenue and a service is provided to the Site. Additionally, two hydro poles exist on Ghent Avenue fronting the Site, one of which conflicts with the proposed Site entrance. The relocation of the hydro pole will be coordinated with Burlington Hydro during detailed design.

- **Enbridge** – An active 1 ¼" plastic gas main (420 kPa) runs along the south boulevard fronting the Site and another active 2" steel coated gas main runs along the north boulevard of Ghent Avenue (G-tel Engineering Inc. Markups, October 22, 2024).

- **Bell** – Bell infrastructure exists on both the north and south boulevards fronting the Site on Ghent Avenue (Bell Municipal Operations Department, October 23, 2024).

- **Cogeco** – Overhead fibre optic cable and copper cables are attached to Burlington Hydro owned poles locating on the north boulevard of Ghent Avenue (burlokf.dbg, October 22, 2024).

- **Hydro One** – Confirmed within email response transmission lines are not buried in this area.

Coordination with each utility provider will be continued throughout the design process to further understand the existing utility capacity, design loading, and integration of the utility services with the proposed development.

7.0 Conclusions and Recommendations

The proposed development located at 2170 Ghent Avenue in the City of Burlington involves constructing twenty-one (21) 3-story standard townhouse units with an associated internal access road, parking, and amenity areas. The proposed development can be developed in accordance with the City of Burlington and Halton Region guidelines and standards from a fire and domestic water, wastewater, and stormwater management perspective based on the information contained in this report and the following conclusions:

- A flood hazard assessment and Conservation Halton permit is not required as part of the development application. The Site is not located within a regulated flood hazard and no spill hazard has yet to be defined.

- Fire and domestic water supply for the Site is proposed using a 200 mm diameter fire line and 100 mm diameter domestic line extending from the 250 mm diameter municipal watermain beneath Ghent Avenue. The total estimated design water demand for the proposed development is approximately 184 L/s.

- There is sufficient capacity within the Region's water distribution system to support the proposed development based on a watermain hydraulic analysis using the Region's InfoWater model. The system is proposed to operate within Halton Region's preferred pressure range of 50 to 70 psi and velocities within common operating ranges.

- Sanitary servicing for the Site is provided with a 200 mm diameter sanitary sewer lateral installed at a slope of 0.50% extending from a proposed property line maintenance hole to a proposed "doghouse" maintenance hole installed over the existing 250 mm municipal sanitary sewer beneath Ghent Avenue. The total peak wastewater design flow for the proposed development is estimated to be 0.80 L/s.

- The municipal 250 mm diameter PVC sanitary sewer beneath Ghent Avenue is estimated to operate at a maximum 71% of its full flow capacity at its most critical section in proposed full-buildout conditions. The increased wastewater flow from the proposed development will improve the scouring velocity in the sewer.

- Refer to the Preliminary Stormwater Management Report (Crozier, 2024) for an assessment of stormwater management and storm servicing for the proposed development.

Based on the above conclusions, we support the proposed development application from the perspective of fire and domestic water supply, sanitary servicing, and stormwater management.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

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Engineering Intern, Land Development

C.F. CROZIER & ASSOCIATES INC.



Trevor Fraser, P. Eng.
Project Manager, Land Development


MB/tc

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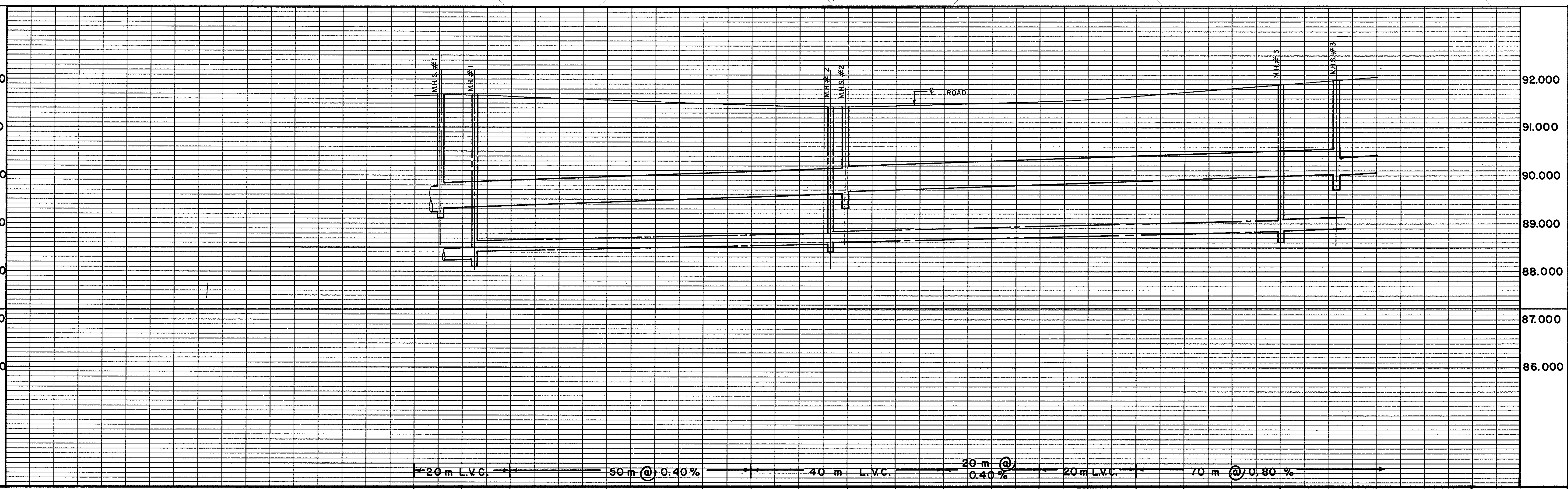
APPENDIX A

As-built Drawings

MG-1
SHEET 1 OF 4



FOR TYPICAL SECTIONS SEE DWG. MMS-92-D
SHEET 2 OF 2



CHAINAGE	0+000	0+010	0+020	0+040	0+060	0+070	0+080	0+090	0+100	0+110	0+120	0+130	0+140	0+150	0+160	0+180	0+200
℄ ELEVS.	91.640	91.675	91.660	91.580	91.500	91.460	91.430	91.420	91.430	91.460	91.500	91.540	91.590	91.660	91.740	91.900	92.060

STORM SEWER: 89.261 / 89.336 — 83.63 m - 525 mm ST. SEW. @ 0.35 %, CLASS 65-D PIPE, CLASS B-1 BEDDING — 89.632 / 89.674 — 102.44 m - 525 mm ST. SEW. @ 0.32 %, CLASS 65-D PIPE, CLASS B-1 BEDDING — 90.001 / 90.211

SANITARY SEWER: 88.387 / 88.412 — 73.55 m - 250 mm SAN. SEW. @ 0.22 % — 88.575 / 88.611 — 93.63 m - 250 mm SAN. SEW. @ 0.24 % — 88.839 / 88.846

Nº	Date	By	Revisions
1	Feb./89	D. Mis	"As constructed" (Contr. 86-4)

Design. Chk'd.
Drawn. D. M. Chk'd.
Date. FEBRUARY 1989
Scale. horiz. vert.
References.
Field Notes.
Bell ☐ Hydro ☐ Gas ☐ Cable ☐
Stamp.

Approvals

Municipal.
DIRECTOR OF PUBLIC WORKS
DATE

Regional.
COMMISSIONER OF PUBLIC WORKS.
DIRECTOR OF DESIGN & CONSTRUCTION.

Consultant.

Municipality.

CITY OF BURLINGTON

DEPARTMENT OF PUBLIC WORKS

Title.

GHENT AVENUE

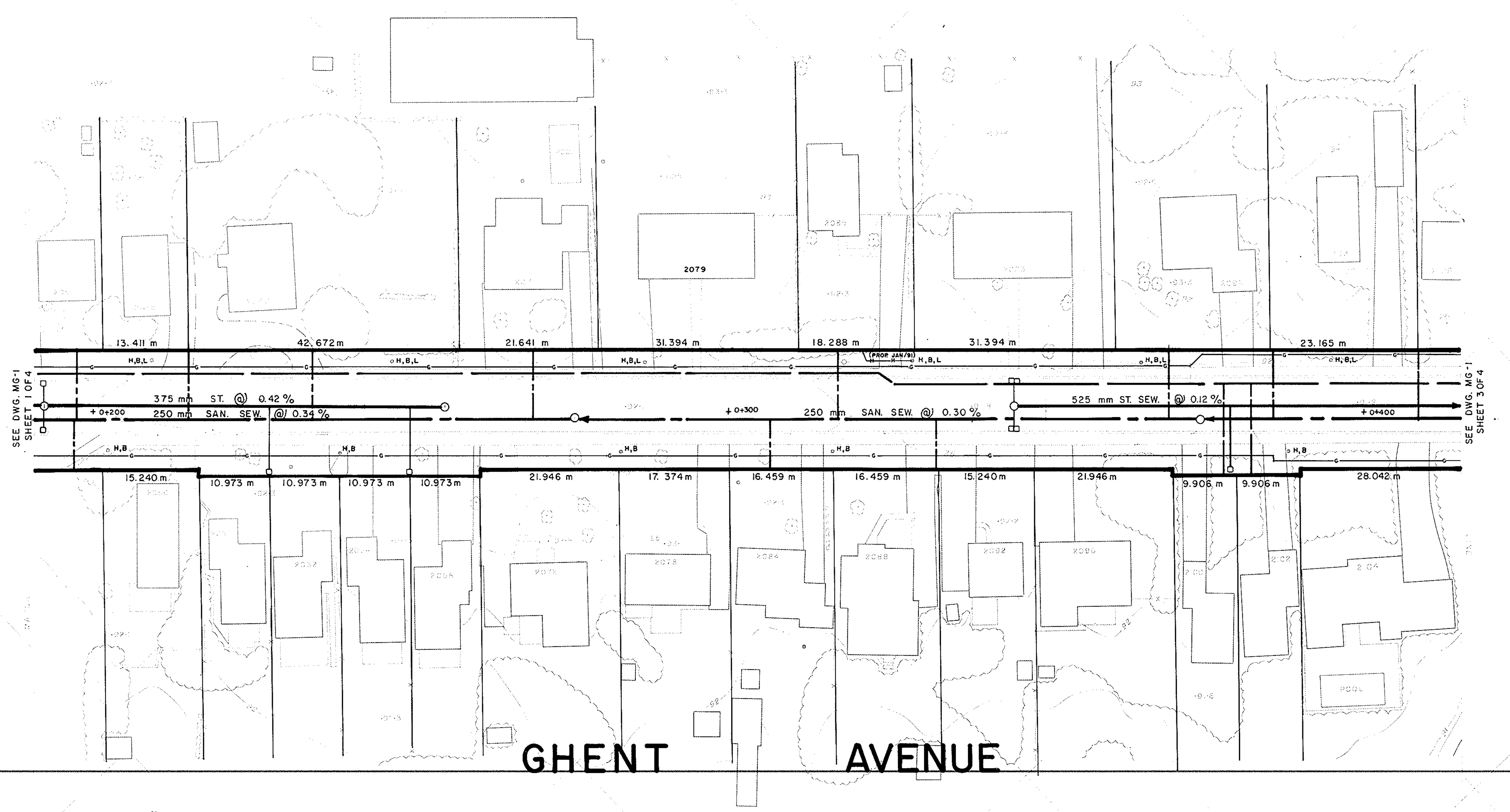
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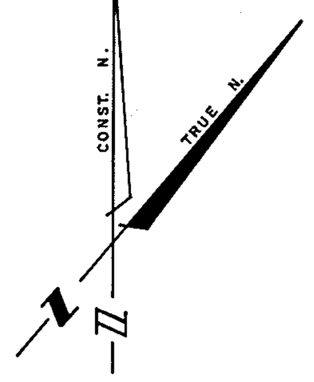
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Regional Dwg. Nº
Contract Nº.
Sheet 1 of 4

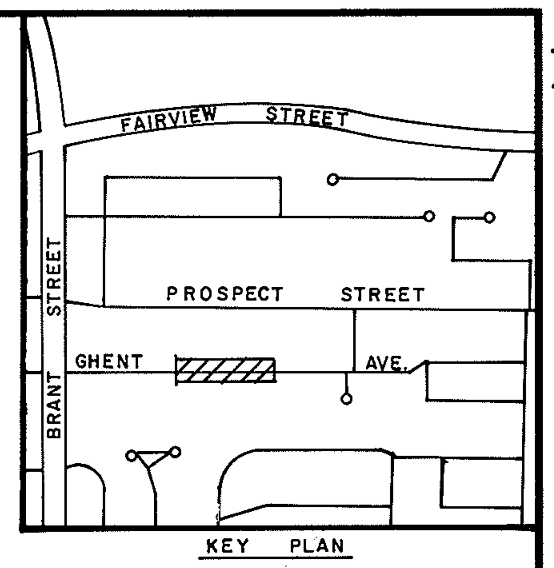
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Dimensions in millimetres unless otherwise noted.

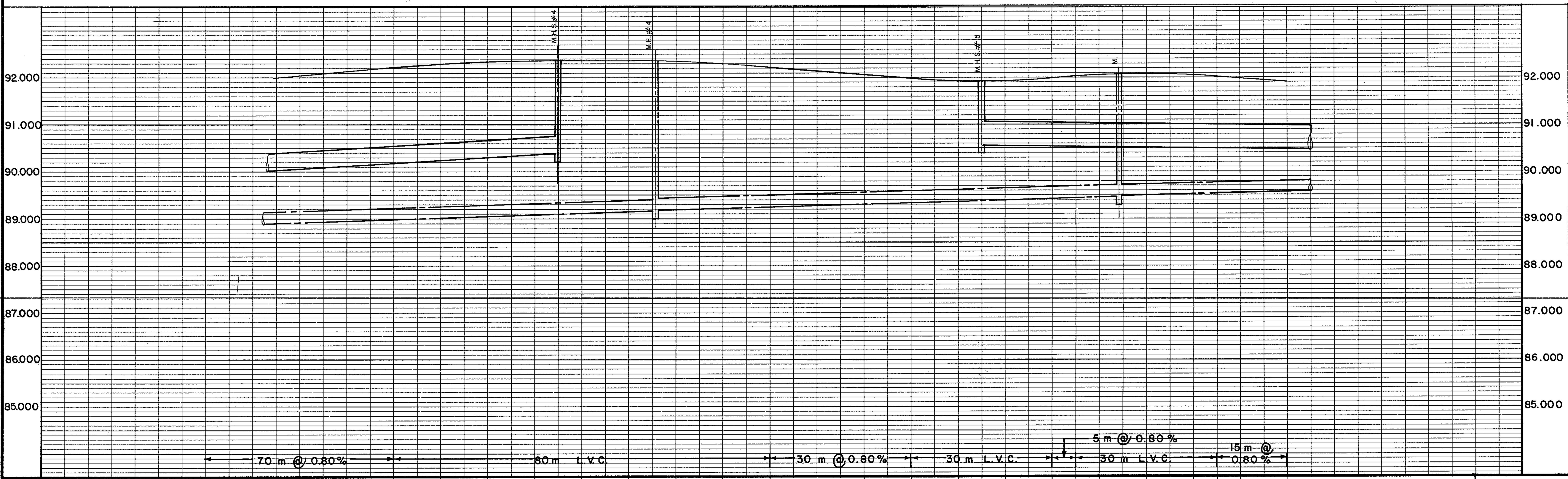
metric.







FOR TYPICAL SECTIONS SEE DWG. MMS-92-D
SHEET 2 OF 2



CHAINAGE	℄ ELEVS.
0+200	92.060
0+220	92.220
0+230	92.290
0+240	92.340
0+250	92.370
0+260	92.380
0+270	92.370
0+280	92.340
0+290	92.290
0+300	92.220
0+320	92.060
0+330	91.980
0+340	91.927
0+345	91.920
0+350	91.927
0+360	91.980
0+365	2.020
0+370	92.053
0+380	92.080
0+390	92.053
0+395	92.020
0+400	91.980
0+410	91.900

STORM SEWER: 63.12 m – 375 mm ST. SEW. @ 0.42 % | 90.387 | 90.559 | 79.94 m - 525 mm ST. SEW. @ 0.12 %

SANITARY SEWER: 95.76 m – 250 mm SAN. SEW. @ 0.34 % | 89.173 / 89.191 | 98.47 m – 250 mm SAN. SEW. @ 0.30 % | 89.488 / 89.489 | 94.94 m - 250 mm SAN. SEW. @ 0.35 %

Nº	Date	By	Revisions
I	Feb./89	D.Mis	"As constructed" (Contr. 86-4)

Design. | Chk'd.
Drawn. D.M. | Chk'd.
Date. FEBRUARY 1989
Scale. horiz. 0 vert. 0
References.
Field Notes.
Bell ☐ Hydro ☐
Gas ☐ Cable ☐
Stamp.

Approvals

Municipal.

DIRECTOR OF PUBLIC WORKS

DATE

Regional.

COMMISSIONER OF PUBLIC WORKS.

DIRECTOR OF DESIGN & CONSTRUCTION.

Consultant.

Municipality.

CITY OF BURLINGTON

DEPARTMENT OF PUBLIC WORKS

Title.

GHENT AVENUE

200 m - 420 m EAST OF BRANT STREET

Municipal Dwg. Nº. MG-I | Regional Dwg. Nº

Contract Nº.


Sheet 2 of 4

metric

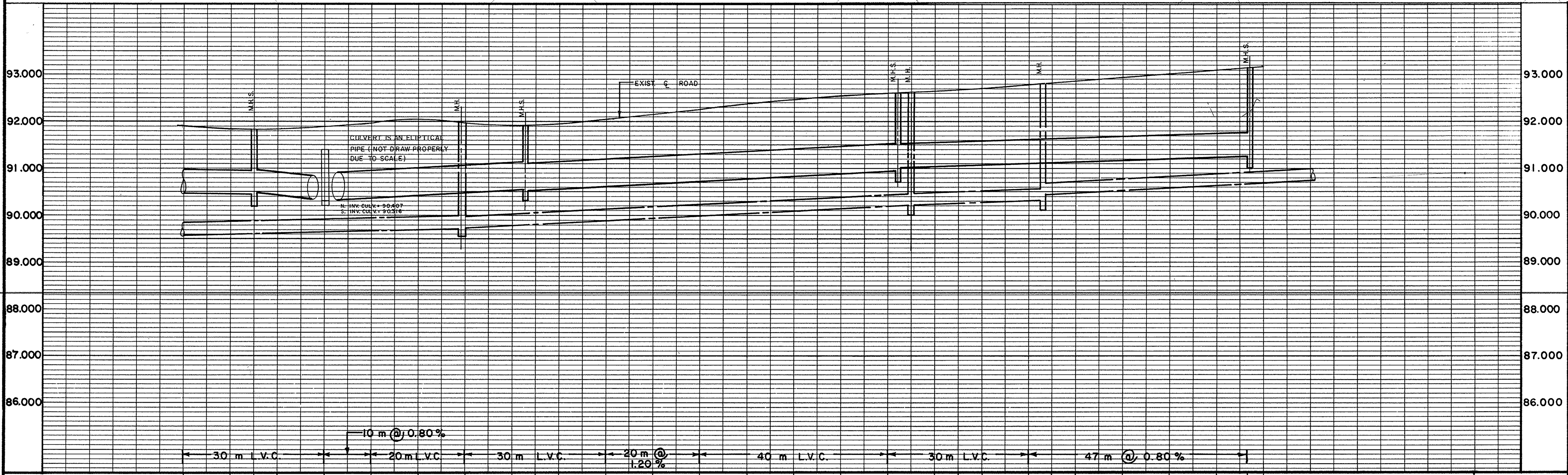
Dimensions in millimetres unless otherwise noted.

metric.

metric



FOR TYPICAL SECTIONS SEE DWG. MMS-92-D
SHEET 2 OF 2



CHAINAGE	℄ ELEVS.
0+410	91.900
0+420	91.847
0+425	91.840
0+430	91.847
0+440	91.900
0+450	91.980
0+460	92.020
0+470	91.980
0+480	91.933
0+485	91.935
0+490	91.953
0+500	92.040
0+510	92.160
0+520	92.280
0+530	92.390
0+540	92.480
0+550	92.550
0+560	92.600
0+570	92.647
0+575	92.675
0+580	92.707
0+590	92.780
0+594.913	92.819
0+600	92.860
0+610	92.940
0+620	93.020
0+630	93.100
0+637	93.156
0+640	93.180

STORM SEWER

90.461 / 90.391 — 13.62 m - 525 mm ST. SEW. @ 0.60 % — 90.310

90.326 — 41.62 m — 600 mm ST. SEW. @ 0.45 % — 90.513 / 90.509

79.21 m - 600 mm ST. SEW. @ 0.56 % — CLASS 65-D PIPE, CLASS B-1 BEDDING, SELECT NATIVE BACKFILL — 90.949 / 91.026

74.82 m - 525 mm ST. SEW. @ 0.32 % — 91.268

SANITARY SEWER

94.94 m - 250 mm SAN. SEW. @ 0.35 % — 89.824 / 89.837

96.08 m - 250 mm SAN. SEW. @ 0.38 % — 90.201 / 90.228

27.95 m - 250 mm SAN. SEW. @ 0.28 % — 90.307 / 90.420

89.85 m - 250 mm SAN. SEW. @ 0.55 %

10.914

Nº	Date	By	Revisions
2	Feb./93	S	"As constructed" (Contr. 92-13)
1	Feb./89	D. Mis	"As constructed" (Contr. 86-4)

Design. Chk'd.
Drawn. D.M. Chk'd.
Date. FEBRUARY 1989
Scale. horiz. vert.
References.

Approvals
Municipal.
DIRECTOR OF PUBLIC WORKS
DATE
Regional.
COMMISSIONER OF PUBLIC WORKS.
DIRECTOR OF DESIGN & CONSTRUCTION.

Field Notes.
Bell ☐ Hydro ☐
Gas ☐ Cable ☐
Stamp.

Consultant.

Municipality.

CITY OF BURLINGTON

DEPARTMENT OF PUBLIC WORKS

Title.

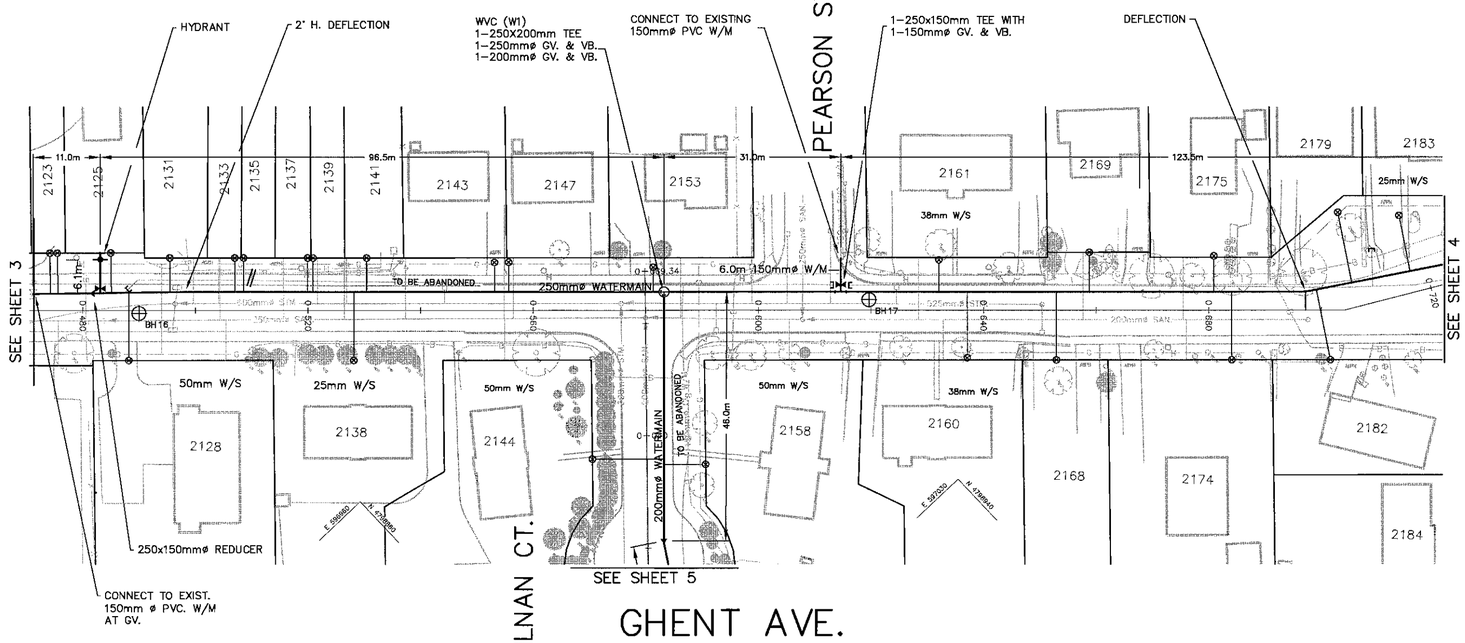
GHENT AVENUE

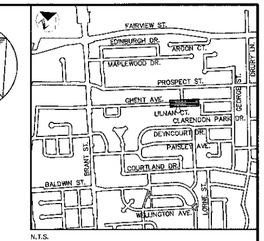
420 m E OF BRANT ST. — 90 m E OF LILNAN CT.

Municipal Dwg. Nº MG-1
Regional Dwg. Nº
Contract Nº.
Sheet 3 of 4

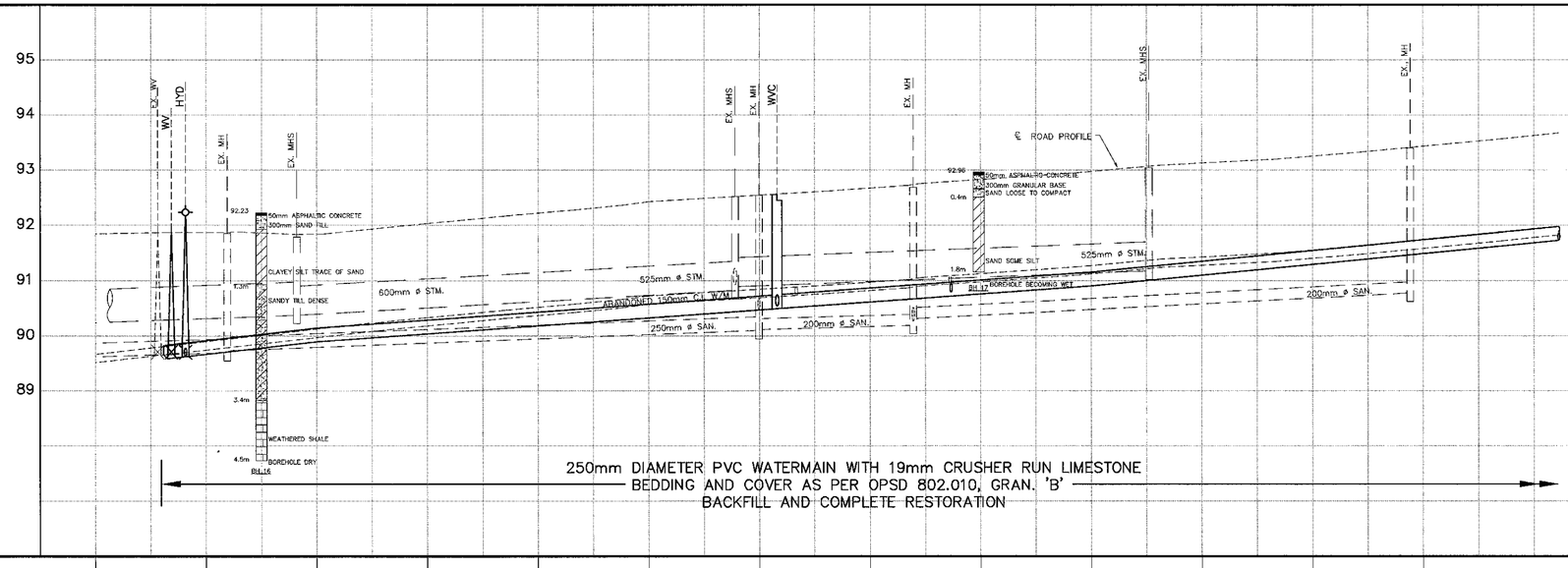
Dimensions in millimetres unless otherwise noted.

metric.





FOR GENERAL NOTES AND RESTORATION DETAIL, SEE SHEET 1.



EX. ℄ ELEVATIONS	91.85	91.87	91.84	92.04	92.22	92.43	92.55	92.67	92.83	92.97	93.13	93.26	93.44	93.63
PROPOSED WATERMAIN INVERTS	89.65	27.7m @ 1.05%	89.94	140.0m @ 0.72%						90.95	99.2m @ 0.99%			
PROPOSED SANITARY SEWER INVERTS														
STATIONS	0+460	0+480	0+500	0+520	0+540	0+560	0+580	0+600	0+620	0+640	0+660	0+680	0+700	0+720

1	SEP. '01	DMS	"AS CONSTRUCTED"	X
NO	Date	By	REVISIONS	MANU CAD

Design	M.S.B.	Ch'kd	Date AUGUST, 1999
Drawn	N.G.	Ch'kd	

Scale 1:500 Horiz. 10 5 0 10
1:50 Vert. 1 0.5 0 1

References DIARY #715

Field Notes

APPROVALS

Municipal

Regional

Director, Engineering Services

Manager, Design Services

Stamp

AS CONSTRUCTED

Halton

TITLE
250mm ø WATERMAIN REPLACEMENT
GHENT AVENUE
CITY OF BURLINGTON
108m W. OF LILNAN CT. TO 111m E. OF PEARSON ST.

Consultant File NO	Regional Drawing NO B - 8452
CONTRACT NO WS-1884-2000	Drawing NO SHEET 3 OF 5

B - 8452
PR-1884-2000 3 of 5

10/23/2001 09:26:14

Ghent Ave



Legend

Water Control Valve
- System
- SystemDP
- Zone
- ZoneDP

Water Service Valve
- CurbStop
- PropertyLine
- Secondary
- TappingValve

Water Hydrant

Water Fitting
- Cap
- Cross
- HBend
- MainStop
- Reducer
- Sleeve
- TappingSleeve
- Tee
- VBend

Water Chamber
- Chamber

Notes:

59.4 0 29.70 59.4 Metres

1: 1,188

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Information Valid as of: 8/8/2024

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

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APPENDIX B

Water Servicing Supporting Calculations & Documentation

Project: 2170 Ghent Avenue | **Created By:** MB | **Date:** 2024-08.14
Project No.: 0912-7186 | **Checked By:** TF | **Updated:** 2024-10-29

Proposed Domestic Water Demand

Total Townhouse Units	21		
Site Area	0.40	ha	
Population Density	135	persons/ha	
Total Population	55	persons	

Notes & References

Site Plan prepared by Limberlost Buiding Design dated August 8, 2024

Per Halton Water and Wastewater Linear Design Manual (October, 2019)

Water Demand (Residential):

Average Demand (L/capita/d)
275

Average Demand from Section 2.4.2 of Halton Water and Wastewater Linear Design Manual (October, 2019)

Average Daily Demand	15,020.78	L/day
	0.17	**L/s**

Max Day Factor	2.25
Peak Hour Factor	4.00

Peaking Factors from Section 2.4.2 of Halton Water and Wastewater Linear Design Manual (October, 2019)

Maximum Daily Flow	**0.39**	**L/s**

Max Day = Average Day Demand * Max Day

Peak Hour Flow	**0.70**	**L/s**

Peak Hour = Average Day Demand * Peak Hour

Land Use	Average Daily Water Demand (L/s)	Max Day Demand (L/s)	Peak Hourly Demand (L/s)
Residential	0.17	0.39	0.70
Total	**0.17**	**0.39**	**0.70**

CROZIER CONSULTING ENGINEERS

2170 Ghent Avenue
Fire Protection Volume Calculation

PROJECT: 2170 Ghent Avenue
PROJECT No.: 0912-7186
DATE: 2024.10.31
DESIGN: MB
CHECK: TF

SUMMARY OF FIRE DEMANDS

Block	Base Fire Flow [L/min]	Building Occupancy Reduction [L/min]	Sprinkler Reduction [L/min]	Surcharge for Surrounding Infrastructure [L/min]	Total Required Fire Flow [L/min]	Total Required Fire Flow [L/s]
A	**8,362**	**1,254**	**0**	**3,763**	**11,000**	**183**
B	**8,362**	**1,254**	**0**	**3,763**	**11,000**	**183**
C	**6,952**	**1,043**	**0**	**3,824**	**10,000**	**167**

2170 Ghent Avenue, City of Burlington
Townhouse Block A Fire Flow Calculation
CFCA File: 0912-7186

Date: 2024.08.14
Designed By: MB
Checked By: TF

Water Supply for Public Fire Protection (2020)
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow - Block A

1. An estimate of fire flow required for a given area may be determined by the formula:

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

Where:

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

=	1.5	for wood frame construction (structure essentially all combustible)
=	0.8	for type IV-A mass timber construction
=	0.9	for type IV-B mass timber construction
=	1.0	for type IV-C mass timber construction
=	1.5	for type IV-D mass timber construction
=	1.0	for ordinary construction (brick or other masonry walls, combustible floor and interior)
=	0.8	for non-combustible construction (unprotected metal structural components)
=	0.6	for fire-resistive construction (fully protected frame, floors, roof)

A = The largest floor area in square meters (plus the following percentages of the total areas of the other floors).

For Construction Coefficient from 1.0 to 1.5:
= 100% of ALL Floor Areas
For Construction Coefficient below 1.0:
- Floors With Any Unprotected Vertical Openings in the Building
= two largest adjoining floors + 50% all floors immediately above (max 8 floors)
- Floors With Any Protected Vertical Openings and Protected Exterior Vertical Communications
= 25% each of two immediately adjoining floors

Proposed Buildings

Area:

A= 1,445 sq.m — Based on Site Plan (Limberlost, August 8, 2024)

C= 1.0 — C coefficient to be confirmed by Architect

Therefore RFF = 8,362 L/min

Fire flow determined above shall not exceed:
30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

*Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0%		

Occupancy Type: Residential (C) Reduction %: -15%

1,254 L/min reduction
Subtotal = 7,108 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above may be reduced by up to 50% for complete automatic sprinkler protection.

Automatic Sprinkler Design System	Credit to part of building with coverage
Automatic sprinkler protection designed and installed in accordance with NFPA 13.	30%
Water supply is standard for both the system and Fire Department hose lines.	10%
Fully supervised system.	10%

Reduction %: 0%

- L/min reduction
Subtotal = 7,108 L/min

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 30 meters by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation	Charge	Separation	Charge
0 to 3 m	25%	20.1 to 30 m	10%
3.1 to 10 m	20%	>30 m	0%
10.1 to 20 m	15%		

To minimize surcharges for exposure , refer to Table 6 Exposure Adjustment Charges for Subject Building considering Construction types of Exposed Building Face

Exposed buildings

Direction	Distance (m)	Charge	Surcharge (L/min)
North	25	10%	836
South	23.8	10%	836
East	26	10%	836
West	15.5	15%	1,254
Total Surcharge			**3763**

Determine Required Fire Flow

No.1	8,362
No. 2	1,254 reduction
No. 3	0 reduction
No. 4	3,763 surcharge

Required Flow: 10,871 L/min

Rounded to nearest 1000 L/min: 11,000 L/min or **183 L/s**

2,904 USGPM

Note: USGPM = 0.264*(L/min)

Required Duration of Fire Flow	
Flow Required (L/min)	Duration (hours)
2,000 or less	1.00
3,000	1.25
4,000	1.50
5,000	1.75
6,000	2.00
8,000	2.00
10,000	**2.00**
12,000	**2.50**
14,000	3.00
16,000	3.50
18,000	4.00
20,000	4.50
22,000	5.00
24,000	5.50
26,000	6.00
28,000	6.50
30,000	7.00
32,000	7.50
34,000	8.00
36,000	8.50
38,000	9.00
40,000 and over	9.50

2170 Ghent Avenue, City of Burlington
Towhouse Block B Fire Flow Calculation
CFCA File: 0912-7186

Date: 2024.08.14
Designed By: MB
Checked By: TF

Water Supply for Public Fire Protection (2020)
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow - Block B

1. An estimate of fire flow required for a given area may be determined by the formula:

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

Where:

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

=	1.5	for wood frame construction (structure essentially all combustible)
=	0.8	for type IV-A mass timber construction
=	0.9	for type IV-B mass timber construction
=	1.0	for type IV-C mass timber construction
=	1.5	for type IV-D mass timber construction
=	1.0	for ordinary construction (brick or other masonry walls, combustible floor and interior)
=	0.8	for non-combustible construction (unprotected metal structural components)
=	0.6	for fire-resistive construction (fully protected frame, floors, roof)

A = The largest floor area in square meters (plus the following percentages of the total areas of the other floors).

For Construction Coefficient from 1.0 to 1.5:
= 100% of ALL Floor Areas
For Construction Coefficient below 1.0:
- Floors With Any Unprotected Vertical Openings in the Building
= two largest adjoining floors + 50% all floors immediately above (max 8 floors)
- Floors With Any Protected Vertical Openings and Protected Exterior Vertical Communications
= 25% each of two immediately adjoining floors

Proposed Buildings

Area:

A= 1,445 sq.m — Based on Site Plan (Limberlost, August 8, 2024)

C= 1.0 — C coefficient to be confirmed by Architect

Therefore RFF = 8,362 L/min

Fire flow determined above shall not exceed:
30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

*Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0%		

Occupancy Type: Residential (C) Reduction %: -15%

1,254 L/min reduction
Subtotal = 7,108 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above may be reduced by up to 50% for complete automatic sprinkler protection.

Automatic Sprinkler Design System	Credit to part of building with coverage
Automatic sprinkler protection designed and installed in accordance with NFPA 13.	30%
Water supply is standard for both the system and Fire Department hose lines.	10%
Fully supervised system.	10%

Reduction %: 0%

- L/min reduction
Subtotal = 7,108 L/min

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 30 meters by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation	Charge	Separation	Charge
0 to 3 m	25%	20.1 to 30 m	10%
3.1 to 10 m	20%	>30 m	0%
10.1 to 20 m	15%		

To minimize surcharges for exposure , refer to Table 6 Exposure Adjustment Charges for Subject Building considering Construction types of Exposed Building Face

Exposed buildings

Direction	Distance (m)	Charge	Surcharge (L/min)
North	34	0%	0
South	20.8	10%	836
East	15.5	15%	1,254
West	8	20%	1,672
Total Surcharge			**3763**

Determine Required Fire Flow

No.1	8,362	
No. 2	1,254	reduction
No. 3	0	reduction
No. 4	3,763	surcharge

Required Flow:	**10,871**	**L/min**		
Rounded to nearest 1000 L/min:	**11,000**	**L/min**	or	**183 L/s**
				2,904 USGPM

Note: USGPM = 0.264*(L/min)

Required Duration of Fire Flow	
Flow Required (L/min)	Duration (hours)
2,000 or less	1.00
3,000	1.25
4,000	1.50
5,000	1.75
6,000	2.00
8,000	2.00
10,000	**2.00**
12,000	**2.50**
14,000	3.00
16,000	3.50
18,000	4.00
20,000	4.50
22,000	5.00
24,000	5.50
26,000	6.00
28,000	6.50
30,000	7.00
32,000	7.50
34,000	8.00
36,000	8.50
38,000	9.00
40,000 and over	9.50

2170 Ghent Avenue, City of Burlington
Townhouse Block C Fire Flow Calculation
CFCA File: 0912-7186

Date: 2024.08.14
Designed By: MB
Checked By: TF

Water Supply for Public Fire Protection (2020)
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow - Block C

1. An estimate of fire flow required for a given area may be determined by the formula:

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

Where:

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

=	1.5	for wood frame construction (structure essentially all combustible)
=	0.8	for type IV-A mass timber construction
=	0.9	for type IV-B mass timber construction
=	1.0	for type IV-C mass timber construction
=	1.5	for type IV-D mass timber construction
=	1.0	for ordinary construction (brick or other masonry walls, combustible floor and interior)
=	0.8	for non-combustible construction (unprotected metal structural components)
=	0.6	for fire-resistive construction (fully protected frame, floors, roof)

A = The largest floor area in square meters (plus the following percentages of the total areas of the other floors).

For Construction Coefficient from 1.0 to 1.5:
= 100% of ALL Floor Areas
For Construction Coefficient below 1.0:
- Floors With Any Unprotected Vertical Openings in the Building
= two largest adjoining floors + 50% all floors immediately above (max 8 floors)
- Floors With Any Protected Vertical Openings and Protected Exterior Vertical Communications
= 25% each of two immediately adjoining floors

Proposed Buildings

Area:

A= 999 sq.m — Based on Site Plan (Limberlost, August 8, 2024)

C= 1.0 — C coefficient to be confirmed by Architect

Therefore RFF = 6,952 L/min

Fire flow determined above shall not exceed:
30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

*Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0%		

Occupancy Type: Residential (C) Reduction %: -15%

1,043 L/min reduction
Subtotal = 5,909 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above may be reduced by up to 50% for complete automatic sprinkler protection.

Automatic Sprinkler Design System	Credit to part of building with coverage
Automatic sprinkler protection designed and installed in accordance with NFPA 13.	30%
Water supply is standard for both the system and Fire Department hose lines.	10%
Fully supervised system.	10%

Reduction %: 0%

- L/min reduction
Subtotal = 5,909 L/min

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 30 meter by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation	Charge	Separation	Charge
0 to 3 m	25%	20.1 to 30 m	10%
3.1 to 10 m	20%	>30 m	0%
10.1 to 20 m	15%		

To minimize surcharges for exposure , refer to Table 6 Exposure Adjustment Charges for Subject Building considering Construction types of Exposed Building Face

Exposed buildings

Direction	Distance (m)	Charge	Surcharge (L/min)
North	20.8	10%	695
South	26	10%	695
East	7	20%	1,390
West	15	15%	1,043
Total Surcharge			**3824**

Determine Required Fire Flow

No.1	6,952			
No. 2	1,043	reduction		
No. 3	0	reduction		
No. 4	3,824	surcharge		
Required Flow:	**9,733**	**L/min**		
Rounded to nearest 1000 L/min:	**10,000**	**L/min**	or	**167 L/s**
				2,640 USGPM

Note: USGPM = 0.264*(L/min)

Required Duration of Fire Flow	
Flow Required (L/min)	Duration (hours)
2,000 or less	1.00
3,000	1.25
4,000	1.50
5,000	1.75
6,000	2.00
8,000	2.00
10,000	**2.00**
12,000	2.50
14,000	3.00
16,000	3.50
18,000	4.00
20,000	4.50
22,000	5.00
24,000	5.50
26,000	6.00
28,000	6.50
30,000	7.00
32,000	7.50
34,000	8.00
36,000	8.50
38,000	9.00
40,000 and over	9.50

APPENDIX C

Water Modelling Results & Documentation

CROZIER
CONSULTING ENGINEERS

Project: 2170 Ghent Ave
Project No.: 0912-7186
Design By: MJ
Date: October 25, 2024

Existing Junction Results - Maximum Day Demand

Junction ID	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (psi)
J-SITE	0.00	93.29	135.33	60
WCV12944	0.00	93.50	135.34	59
WCV12945	0.05	93.50	135.34	59
WCV9474	0.00	93.00	135.33	60
WCV9475	0.03	92.50	135.33	61
WCV9476	0.03	92.50	135.33	61
WFT14322	0.13	94.00	135.34	59
WFT14362	0.07	93.50	135.34	59
WFT14366	0.00	93.50	135.34	59
WFT14418	0.03	93.00	135.33	60
WFT14421	0.08	93.00	135.33	60
WFT14436	0.00	92.50	135.33	61
WFT20365	0.00	93.00	135.33	60
WFT20370	0.19	93.00	135.33	60
WFT33280	0.11	93.50	135.35	59
WFT33282	0.03	93.50	135.34	59
WFT404	0.20	93.00	135.33	60

CROZIER
CONSULTING ENGINEERS

Project: 2170 Ghent Ave
Project No.: 0912-7186
Design By: MJ
Date: October 25, 2024

Existing Pipe Results - Maximum Day Demand

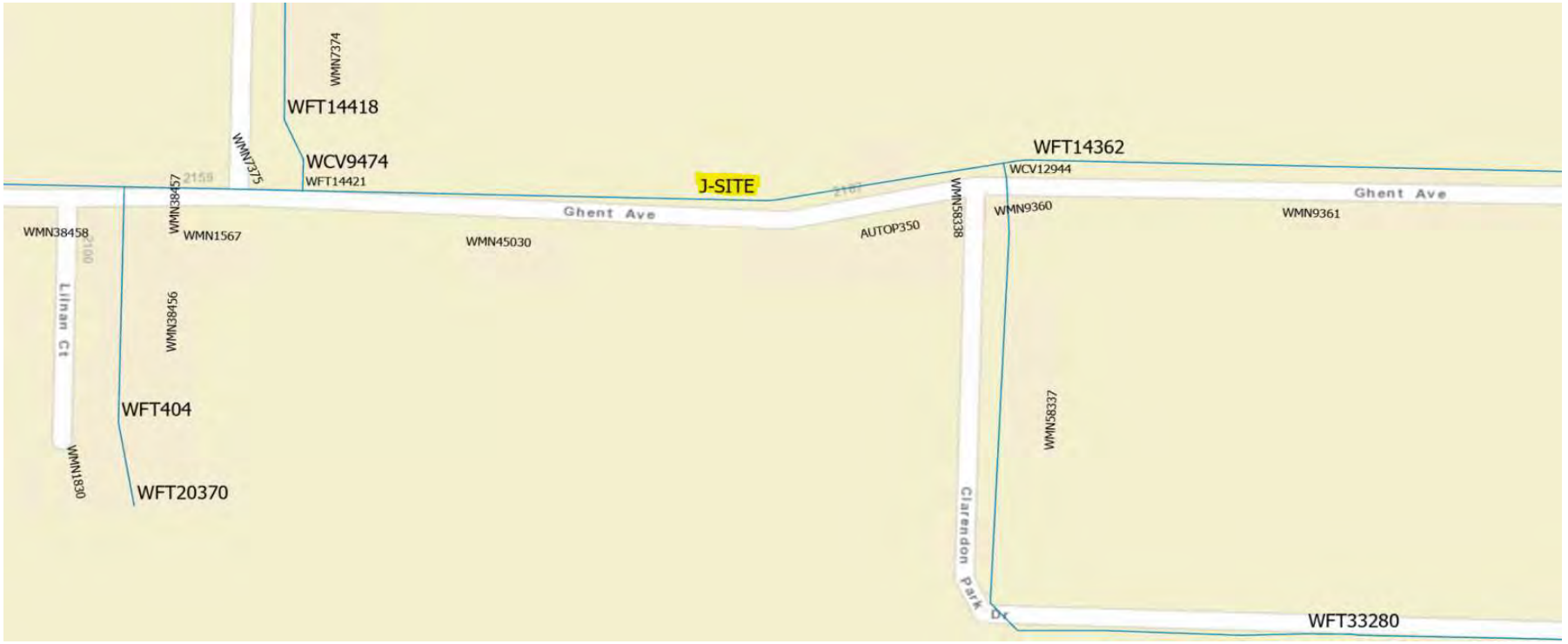
ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (ML/d)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)	Status
AUTOP350	J-SITE	WCV12945	51.70	250.00	143.00	-0.51	0.12	0.00	0.07	Open
WMN1567	WFT14436	WFT14421	31.42	250.00	143.00	-0.31	0.07	0.00	0.03	Open
WMN1830	WFT404	WFT20370	16.11	150.00	143.00	0.02	0.01	0.00	0.00	Open
WMN38452	WFT14322	WFT32964	85.61	250.00	143.00	-0.38	0.09	0.00	0.04	Open
WMN38454	WFT14421	WCV9474	3.05	150.00	143.00	0.20	0.13	0.00	0.15	Open
WMN38455	WCV9474	WFT20365	2.91	150.00	143.00	0.20	0.13	0.00	0.14	Open
WMN38456	WFT404	WCV9475	38.72	200.00	143.00	-0.03	0.01	0.00	0.00	Open
WMN38457	WCV9475	WFT14436	6.18	200.00	143.00	-0.04	0.01	0.00	0.00	Open
WMN38458	WFT14470	WCV9476	98.54	250.00	143.00	-0.27	0.06	0.00	0.02	Open
WMN38459	WCV9476	WFT14436	1.59	250.00	143.00	-0.27	0.06	0.00	0.02	Open
WMN45028	WFT14366	WCV12944	2.96	150.00	143.00	-0.15	0.10	0.00	0.09	Open
WMN45030	WFT14421	J-SITE	69.44	250.00	143.00	-0.51	0.12	0.00	0.07	Open
WMN45031	WCV12945	WFT14366	2.98	250.00	143.00	-0.52	0.12	0.00	0.07	Open
WMN58334	WCV25059	WFT33280	141.73	150.00	147.00	0.16	0.11	0.01	0.10	Open
WMN58337	WFT33280	WFT33282	128.43	150.00	147.00	0.16	0.10	0.01	0.09	Open
WMN58338	WCV12944	WFT33282	10.34	150.00	143.00	-0.15	0.10	0.00	0.09	Open
WMN7374	WFT14388	WFT14418	92.16	150.00	138.00	-0.20	0.13	0.01	0.15	Open
WMN7375	WFT14418	WFT20365	8.23	150.00	143.00	-0.20	0.13	0.00	0.15	Open
WMN9360	WFT14366	WFT14362	4.78	250.00	143.00	-0.36	0.09	0.00	0.04	Open
WMN9361	WFT14362	WFT14322	99.46	250.00	143.00	-0.37	0.09	0.00	0.04	Open

CROZIER

Project: 2170 Ghent Ave
Project No.: 0912-7186
Design By: MJ
Date: October 25, 2024

Existing Junction Results - Fire Flow Design

Junction ID	Capacity Assessment	Total Demand (L/s)	Hydrant Available Flow (L/s)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demad (psi)	Critical Node Pressure for Design Run (psi)	Hydrant Design Flow (L/s)	Hydrant Pressure at Design Flow (psi)
J-SITE	PASS	0	401	J-SITE	28	60	20	458.9	28


WMN7374
WFT14418
WMN7375
WCV9474
WFT14421
J-SITE
WFT14362
WCV12944
Ghent Ave
WMN38457
WMN38458
WMN1567
WMN45030
AUTOP350
WMN58338
WMN9360
WMN9361
Lilnan Ct
WMN38456
WFT404
WMN1830
WFT20370
WMN58337
Clarendon Park Dr
WFT33280

CROZIER
CONSULTING ENGINEERS

Project: 2170 Ghent Ave
Project No.: 0912-7186
Design By: MJ
Date: October 25, 2024

Proposed Junction Results - Maximum Day Demand

Junction ID	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (psi)
J-SITE	0.39	93.29	135.33	60
WCV12944	0.00	93.50	135.33	59
WCV12945	0.05	93.50	135.33	59
WCV9474	0.00	93.00	135.32	60
WCV9475	0.03	92.50	135.32	61
WCV9476	0.03	92.50	135.32	61
WFT14322	0.13	94.00	135.34	59
WFT14362	0.07	93.50	135.33	59
WFT14366	0.00	93.50	135.33	59
WFT14418	0.03	93.00	135.32	60
WFT14421	0.08	93.00	135.32	60
WFT14436	0.00	92.50	135.32	61
WFT20365	0.00	93.00	135.32	60
WFT20370	0.19	93.00	135.32	60
WFT33280	0.11	93.50	135.35	59
WFT33282	0.03	93.50	135.33	59
WFT404	0.20	93.00	135.32	60

CROZIER
CONSULTING ENGINEERS

Project: 2170 Ghent Ave
Project No.: 0912-7186
Design By: MJ
Date: October 25, 2024

Proposed Pipe Results - Maximum Day Demand

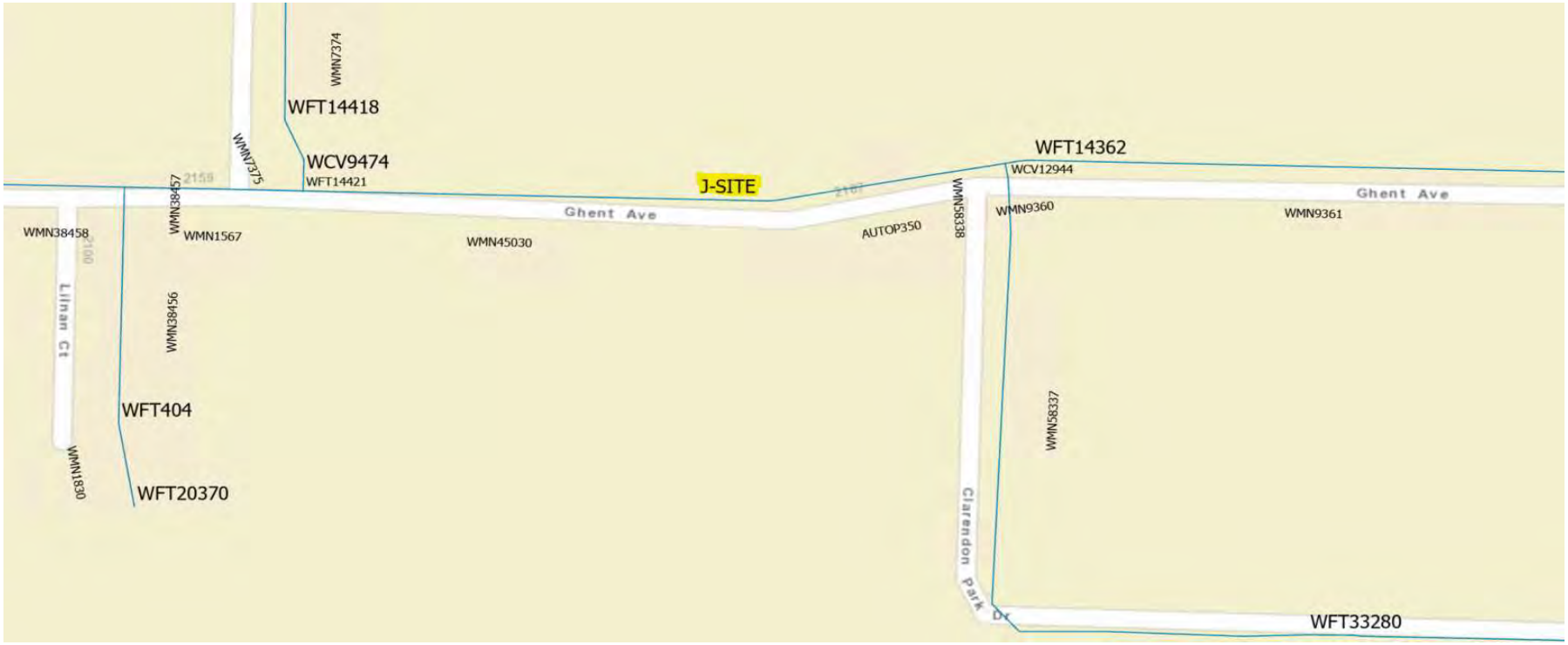
ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (ML/d)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)	Status
AUTOP350	J-SITE	WCV12945	51.70	250.00	143.00	-0.53	0.13	0.00	0.08	Open
WMN1567	WFT14436	WFT14421	31.42	250.00	143.00	-0.30	0.07	0.00	0.03	Open
WMN1830	WFT404	WFT20370	16.11	150.00	143.00	0.02	0.01	0.00	0.00	Open
WMN38452	WFT14322	WFT32964	85.61	250.00	143.00	-0.40	0.09	0.00	0.04	Open
WMN38454	WFT14421	WCV9474	3.05	150.00	143.00	0.19	0.13	0.00	0.14	Open
WMN38455	WCV9474	WFT20365	2.91	150.00	143.00	0.19	0.13	0.00	0.13	Open
WMN38456	WFT404	WCV9475	38.72	200.00	143.00	-0.03	0.01	0.00	0.00	Open
WMN38457	WCV9475	WFT14436	6.18	200.00	143.00	-0.04	0.01	0.00	0.00	Open
WMN38458	WFT14470	WCV9476	98.54	250.00	143.00	-0.26	0.06	0.00	0.02	Open
WMN38459	WCV9476	WFT14436	1.59	250.00	143.00	-0.26	0.06	0.00	0.02	Open
WMN45028	WFT14366	WCV12944	2.96	150.00	143.00	-0.16	0.10	0.00	0.09	Open
WMN45030	WFT14421	J-SITE	69.44	250.00	143.00	-0.50	0.12	0.00	0.07	Open
WMN45031	WCV12945	WFT14366	2.98	250.00	143.00	-0.54	0.13	0.00	0.07	Open
WMN58334	WCV25059	WFT33280	141.73	150.00	147.00	0.17	0.11	0.01	0.10	Open
WMN58337	WFT33280	WFT33282	128.43	150.00	147.00	0.16	0.10	0.01	0.09	Open
WMN58338	WCV12944	WFT33282	10.34	150.00	143.00	-0.16	0.10	0.00	0.09	Open
WMN7374	WFT14388	WFT14418	92.16	150.00	138.00	-0.19	0.12	0.01	0.14	Open
WMN7375	WFT14418	WFT20365	8.23	150.00	143.00	-0.19	0.13	0.00	0.14	Open
WMN9360	WFT14366	WFT14362	4.78	250.00	143.00	-0.38	0.09	0.00	0.04	Open
WMN9361	WFT14362	WFT14322	99.46	250.00	143.00	-0.39	0.09	0.00	0.04	Open

CROZIER

Project: 2170 Ghent Ave
Project No.: 0912-7186
Design By: MJ
Date: October 25, 2024

Proposed Junction Results - Fire Flow Design

Junction ID	Capacity Assessment	Total Demand (L/s)	Hydrant Available Flow (L/s)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demad (psi)	Critical Node Pressure for Design Run (psi)	Hydrant Design Flow (L/s)	Hydrant Pressure at Design Flow (psi)
J-SITE	PASS	183.4	401	J-SITE	28	52	20	458.9	28


WMN7374
WFT14418
WMN7375
WCV9474
WFT14421
J-SITE
WFT14362
WCV12944
2159
2167
Ghent Ave
Ghent Ave
WMN38457
WMN38458
WMN1567
WMN45030
AUTOP350
WMN58338
WMN9360
WMN9361
2100
Lilnan Ct
WMN38456
WFT404
WMN1890
WFT20370
WMN58337
Clarendon Park Dr
WFT33280

APPENDIX D

Sanitary Servicing Supporting Calculations & Documentation

Project: 2170 Ghent Avenue
Project No.: 912-7186
Created By: MB
Checked By: TF
Date: 2024.10.21
Updated: 2024.10.25

Domestic Wastewater Design Flow - City of Burlington Growth Analysis Study PPU

Total Site Area = 0.40 ha

Block	Unit Count
A	7
B	8
C	6
Total	**21**

Residential Population:

Population Density = 2.3 PPU
Population = 48 persons

Design Parameters:

Residential Dry Weather Flow = 0.275 m^3/capita/d

Residential Average Dry Weather Wastewater Flow:

Average Dry Weather Daily Flow = 13,283 L/d
= **0.15** L/s

Modified Harmon Peak Factor:

K_{av} = 1.0

M = 4.00

Peak Dry Weather Flow = **0.61** L/s

Infiltration Flow:

Infiltration = 0.286 L/ha/s
Total Infiltration = **0.11** L/s

Total Peak Design Flow = **0.73** L/s

Summary Table:

Average Dry Weather Daily Flow (L/s)	Peaking Factor	Peak Dry Weather Flow (L/s)	Infiltration Flow (L/s)	Total Peak Wastewater Design Flow (L/s)
0.15	4.00	0.61	0.11	0.73

Notes & References

Total site area and unit count from Site Plan prepared by Limberlost Building Design (August, 2024).

Population Per Unit (PPU) from City of Burlington Growth Analysis Study's 25 year PPU forecast for new Units Constructed from 2016-2041 for medium density units such as townhouses, apartments, and duplexes (Dillion Consulting, June 2019).

Wastewater design flow criteria from Table 3-1 from the Region of Halton Linear Design Manual (Version 5, October 2019)

Residential Average Dry Weather Daily Flow (L/s) = Average Dry Weather Flow (m^3/capita/day) * Population * 1000 / 86400

$$M = K_{av} \times \left(1 + \frac{14}{4 + \sqrt{P + P_e}}\right)$$

where, $$K_{av} = \frac{A_R + 0.80 \times (A_I + A_C)}{A_R + A_I + A_C}$$

and
M = ratio of peak flow to average flow*
P = tributary population in thousands
P_e = equivalent tributary population in thousands
A_R = residential land use area (ha)
A_I = industrial land use area (ha)
A_C = commercial land use area (ha)

Peak Dry Weather Flow = Total Average Dry Sanitary Flow * M

Total Peak Design Flow = Peak Dry Weather Flow + Total Infiltration

Infiltration flow from Section 3.2.1 from the Region of Halton Linear Design Manual (Version 5, October 2019)

CROZIER CONSULTING ENGINEERS

Project: 2170 Ghent Avenue
Project No.: 912-7186
Created By: MB
Checked By: TF
Date: 2024.10.21
Updated: 2024.10.25

Domestic Wastewater Design Flow - Region of Halton Population Estimates

Total Site Area = 0.40 ha

Residential Population:

Population Density = 135
Population = 54

Design Parameters:

Residential Dry Weather Flow = 0.275 m^3/capita/d

Residential Average Dry Weather Wastewater Flow:

Average Dry Weather Daily Flow = 14,850 L/d
= **0.17** L/s

Modified Harmon Peak Factor:

K_{av} = 1.0

M = 4.00

Peak Dry Weather Flow = **0.69** L/s

Infiltration Flow:

Infiltration = 0.286 L/ha/s
Total Infiltration = **0.11** L/s

Total Peak Design Flow = **0.80** L/s

Summary Table:

Average Dry Weather Daily Flow (L/s)	Peaking Factor	Peak Dry Weather Flow (L/s)	Infiltration Flow (L/s)	Total Peak Wastewater Design Flow (L/s)
0.17	4.00	0.69	0.11	0.80

Notes & References

Total site area and unit count from Site Plan prepared by Limberlost Building Design (August, 2024).

Population density estimates from Tables 3-1 from the Region of Halton Water and Wastewater Linear Design Manual (Version 5, October 2019).

Wastewater design flow criteria from Table 3-1 from the Region of Halton Linear Design Manual (Version 5, October 2019)

Residential Average Dry Weather Daily Flow (L/s) = Average Dry Weather Flow (m^3/capita/day) * Population * 1000 / 86400

$$M = K_{av} \times \left(1 + \frac{14}{4 + \sqrt{P + P_e}}\right)$$

where, $$K_{av} = \frac{A_R + 0.80 \times (A_I + A_C)}{A_R + A_I + A_C}$$

and
M = ratio of peak flow to average flow*
P = tributary population in thousands
P_e = equivalent tributary population in thousands
A_R = residential land use area (ha)
A_I = industrial land use area (ha)
A_C = commercial land use area (ha)

Peak Dry Weather Flow = Total Average Dry Sanitary Flow * M

Total Peak Design Flow = Peak Dry Weather Flow + Total Infiltration

Infiltration flow from Section 3.2.1 from the Region of Halton Linear Design Manual (Version 5, October 2019)

2170 Ghent Avenue

Existing Conditions

EXTERNAL SANITARY SEWER CAPACITY ANALYSIS

PREPARED BY: MB **DATE:** 2024.10.31
CHECKED BY: TF **UPDATED:** /
PROJECT No.: 912-7186

Type of Development[1]	Equivalent Population Density
Light Commercial (MXE & MXG)[4]	90 persons/ha
Medium to High Density Residential Apartment Units[7]	2.3 PPU

Mannings "n":	0.013
Peak Factor (M):	1+(14/4+(P/1000)^0.5) <= 4
Avg. Daily/Capita Flow (L/cap/d)[4]:	275
Commercial Avg. Daily/Capita Flow (m^3/ha/d)[4]:	24.75
Infiltration Allowance (L/ha.s):	0.286

CATCHMENT I.D.[2,3,4]	STREET Address	FROM MH NO	TO MH NO	AREA (Ha)	Number of Units	POP.[4,7]	TOTAL TRIB. POP.	RESIDENTIAL PEAK FACTOR	RESIDENTIAL AVG. FLOW (l/s)	RESIDENTIAL MAX. FLOW (l/s)	COMMERCIAL PEAK FACTOR	COMMERCIAL AVG. FLOW (l/s)	COMMERICAL MAX. FLOW (l/s)	INSTUTIONAL PEAK FACTOR	INSTITUTIONAL AVG. FLOW (l/s)	INSTITUTIONAL MAX. FLOW (l/s)	MAX FLOW (l/s)	INFILT. (l/s)	TOTAL FLOW (l/s)	Cumulative Flow (l/s)	LENGTH (m)	PIPE DIAM.[5] (mm)	SLOPE (%)	CAP. (l/s)	CAP. (%)	FULL FLOW VELOCITY (m/s)
101	Propsect Ave ROW	1	2	0.95	3	86	86	4.26	0.27	1.16	4.00	0.00	0.00	4.00	0.00	0.00	1.16	0.27	**1.43**	**1.43**	85.5	250	0.44%	**39**	**4%**	0.80
102	Propsect Ave ROW	1	2	0.50		45	131	0.00	0.14	0.00	4.00	0.14	0.57	4.00	0.00	0.00	0.57	0.14	**0.72**	**2.15**	85.5	250	0.44%	**39**	**5%**	0.80
103	Propsect Ave ROW	1	2	0.26	7	16	147	4.39	0.05	0.23	4.00	0.00	0.00	4.00	0.00	0.00	0.23	0.07	**0.30**	**2.45**	58.0	250	0.44%	**39**	**6%**	0.80
104	Propsect Ave ROW	1	2	0.19	2	5	151	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.05	**0.12**	**2.57**	58.0	250	0.44%	**39**	**7%**	0.80
G1	Propsect Ave ROW	1	2	0.19	0		151	0.00	0.00	0.00	4.00	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**2.62**	58.0	250	0.44%	**39**	**7%**	0.80
105	Propsect Ave ROW	2	3	0.16	7	16	167	4.39	0.05	0.23	4.00	0.00	0.00	4.00	0.00	0.00	0.23	0.05	**0.27**	**2.89**	58.0	250	0.24%	**29**	**10%**	0.59
106	Propsect Ave ROW	2	3	3.04	0	274	441	0.00	0.87	0.00	4.00	0.87	3.48	4.00	0.00	0.00	3.48	0.87	**4.35**	**7.24**	58.0	250	0.24%	**29**	**25%**	0.59
107	Propsect Ave ROW	2	3	0.29	8	18	459	4.39	0.06	0.26	4.00	0.00	0.00	4.00	0.00	0.00	0.26	0.08	**0.34**	**7.58**	58.0	250	0.24%	**29**	**26%**	0.59
G2	Propsect Ave ROW	2	3	0.16		0	459	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**7.63**	58.0	250	0.24%	**29**	**26%**	0.59
G3	Propsect Ave ROW	3	4	0.12		0	459	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.03	**0.03**	**7.66**	58.0	250	0.71%	**50**	**15%**	1.02
111	Propsect Ave ROW	5	4	0.13	2	5	5	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.04	**0.10**	**0.10**	85.5	250	0.47%	**41**	**0%**	0.83
110	Propsect Ave ROW	5	4	0.16	2	5	9	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.05	**0.11**	**0.21**	85.5	250	0.47%	**41**	**1%**	0.83
108	Propsect Ave ROW	5	4	1.72		155	164	0.00	0.49	0.00	4.00	0.49	1.97	4.00	0.00	0.00	1.97	0.49	**2.46**	**2.68**	85.5	250	0.47%	**41**	**7%**	0.83
109	Propsect Ave ROW	5	4	0.07	1	2	166	4.46	0.01	0.03	4.00	0.00	0.00	4.00	0.00	0.00	0.03	0.02	**0.05**	**2.73**	85.5	250	0.47%	**41**	**7%**	0.83
G4	Propsect Ave ROW	5	4	0.18		0	166	0.00	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**2.78**	85.5	250	0.47%	**41**	**7%**	0.83
112	Pearson Ave ROW	4	7	0.16	3	7	633	4.43	0.02	0.10	4.00	0.00	0.00	4.00	0.00	0.00	0.10	0.05	**0.14**	**10.59**	50.5	250	0.33%	**34**	**31%**	0.70
113	Pearson Ave ROW	4	7	0.07	1	2	635	4.46	0.01	0.03	4.00	0.00	0.00	4.00	0.00	0.00	0.03	0.02	**0.05**	**10.64**	50.5	250	0.33%	**34**	**31%**	0.70
G5	Pearson Ave ROW	4	7	0.19		0	635	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**10.69**	97.0	250	0.33%	**34**	**31%**	0.70
114	Ghent Ave ROW	6	7	0.20	3	7	7	4.43	0.00	0.01	4.00	0.00	0.00	4.00	0.00	0.00	0.01	0.06	**0.07**	**0.07**	74.0	250	0.51%	**42**	**0%**	0.87
115	Ghent Ave ROW	6	7	0.07	1	2	9	4.46	0.00	0.00	4.00	0.00	0.00	4.00	0.00	0.00	0.00	0.02	**0.02**	**0.09**	74.0	250	0.51%	**42**	**0%**	0.87
116 (Site)	Ghent Ave ROW	6	7	0.40	1	2	12	4.46	0.00	0.00	4.00	0.00	0.00	4.00	0.00	0.00	0.00	0.11	**0.12**	**0.21**	74.0	250	0.51%	**42**	**0%**	0.87
117	Ghent Ave ROW	6	7	0.18	2	5	16	4.44	0.00	0.01	4.00	0.00	0.00	4.00	0.00	0.00	0.01	0.05	**0.06**	**0.27**	74.0	250	0.51%	**42**	**1%**	0.87
118	Ghent Ave ROW	6	7	0.13	1	2	18	4.46	0.00	0.00	4.00	0.00	0.00	4.00	0.00	0.00	0.00	0.04	**0.04**	**0.31**	74.0	250	0.51%	**42**	**1%**	0.87
G6	Ghent Ave ROW	6	7	0.23		0	18	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.07	**0.07**	**0.37**	74.0	250	0.51%	**42**	**1%**	0.87
119	Ghent Ave	7	9	0.11	1	2	656	4.46	0.01	0.03	4.00	0.00	0.00	4.00	0.00	0.00	0.03	0.03	**0.06**	**11.13**	74.0	250	0.28%	**31**	**35%**	0.64
G7	Ghent Ave	7	9	0.05		0	656	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.01	**0.01**	**11.14**	74.0	250	0.28%	**31**	**35%**	0.64
								0.00	0.00	0.00																
120	Lilnan Court	8	9	1.10	8	18	18	4.39	0.06	0.26	4.00	0.00	0.00	4.00	0.00	0.00	0.26	0.31	**0.57**	**0.57**	71.7	200	0.50%	**23**	**2%**	0.74
G8	Lilnan Court ROW	8	9	0.13		0	18	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.04	**0.04**	**0.61**	87.6	200	0.50%	**23**	**3%**	0.74
121	Ghent Ave	9	10	0.15	2	5	679	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.04	**0.11**	**11.86**	74.0	250	0.38%	**37**	**32%**	0.75
122	Ghent Ave	9	10	0.19	6	14	692	4.40	0.04	0.19	4.00	0.00	0.00	4.00	0.00	0.00	0.19	0.05	**0.25**	**12.11**	74.0	250	0.38%	**37**	**33%**	0.75
G9	Ghent Ave	9	10	0.15		0	692	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.04	**0.04**	**12.15**	71.7	250	0.38%	**37**	**33%**	0.75
123	Ghent Ave	10	11	0.57	3	51	744	4.31	0.16	0.70	4.00	0.00	0.00	4.00	0.00	0.00	0.70	0.16	**0.87**	**13.02**	87.6	250	0.35%	**35**	**37%**	0.72
124	Ghent Ave	10	11	0.22	6	14	757	4.40	0.04	0.19	4.00	0.00	0.00	4.00	0.00	0.00	0.19	0.06	**0.26**	**13.27**	87.6	250	0.35%	**35**	**38%**	0.72
125	Ghent Ave	10	11	0.43	2	5	762	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.12	**0.19**	**13.46**	74.0	250	0.35%	**35**	**38%**	0.72
126	Ghent Ave	10	11	0.27	3	7	769	4.43	0.02	0.10	4.00	0.00	0.00	4.00	0.00	0.00	0.10	0.08	**0.17**	**13.64**	74.0	250	0.35%	**35**	**39%**	0.72
G10	Ghent Ave	10	11	0.20		0	769	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.06	**0.06**	**13.69**	71.7	250	0.35%	**35**	**39%**	0.72
127	Ghent Ave	11	12	0.37		33	802	4.35	0.11	0.46	4.00	0.00	0.00	4.00	0.00	0.00	0.46	0.11	**0.57**	**14.26**	87.6	250	0.30%	**33**	**44%**	0.66
G11	Ghent Ave	11	12	0.17		0	802	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**14.31**	87.6	250	0.30%	**33**	**44%**	0.66
128	Ghent Ave	11	12	1.18		106	908	4.24	0.34	1.43	4.00	0.00	0.00	4.00	0.00	0.00	1.43	0.34	**1.77**	**16.08**	87.6	250	0.30%	**33**	**49%**	0.66
129	Ghent Ave	12	13	0.23	10	23	931	4.37	0.07	0.32	4.00	0.00	0.00	4.00	0.00	0.00	0.32	0.07	**0.39**	**16.46**	87.6	250	0.34%	**35**	**47%**	0.71
130	Ghent Ave	12	13	0.40	4	9	941	4.42	0.03	0.13	4.00	0.00	0.00	4.00	0.00	0.00	0.13	0.11	**0.24**	**16.71**	87.6	250	0.34%	**35**	**48%**	0.71
131	Ghent Ave	12	13	0.45	6	14	954	4.40	0.04	0.19	4.00	0.00	0.00	4.00	0.00	0.00	0.19	0.13	**0.32**	**17.03**	87.6	250	0.34%	**35**	**49%**	0.71
G12	Ghent Ave	12	13	0.22		0	954	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.06	**0.06**	**17.09**	87.6	250	0.34%	**35**	**49%**	0.71
132	Ghent Ave	13	14	0.24	4	9	964	4.42	0.03	0.13	4.00	0.00	0.00	4.00	0.00	0.00	0.13	0.07	**0.20**	**17.29**	87.6	250	0.24%	**29**	**59%**	0.59
G13	Ghent Ave	13	14	0.17		0	964	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**17.34**	87.6	250	0.24%	**29**	**60%**	0.59
133	Ghent Ave	13	14	1.50	38	87	1051	4.26	0.28	1.18	4.00	0.00	0.00	4.00	0.00	0.00	1.18	0.43	**1.61**	**18.95**	87.6	250	0.24%	**29**	**65%**	0.59
G14	Ghent Ave	14	15	0.12		0	1051	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.03	**0.03**	**18.99**	87.6	250	0.22%	**28**	**68%**	0.57
G15	Ghent Ave	15	16	0.07		0	1051	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.02	**0.02**	**19.01**	87.6	250	0.22%	**28**	**68%**	0.57
								0.00	0.00	0.00																
B3	Brant Ave	16	17	0.13		0	769	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.04	**0.04**	**13.67**	87.6	450	0.65%	**230**	**6%**	1.45
B3	Brant Ave	17	18	0.13		0	941	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.04	**0.04**	**16.75**	87.6	450	0.65%	**230**	**7%**	1.45

Notes:

1. Zoning designations and parcel boundaries were obtained from City of Burlington's Zoning Bylaw Interactive Map accessed February 14, 2024. MXE and MXG Zoning was assumed to match Light Commercial Type of Development according to Table 3-2 in the Region of Halton Linear Design Manual (Version 5, October 2019) and based on existing land use.
2. The location of the existing sanitary sewer infrastructure and service laterals were obtained from engineering as-built drawings and GIS Mapping provided by the City and the Region (October 2023).
3. Equivalent Population Densities and Unit Sewage Flows taken from Table 3-1 and 3-2 of the Region of Halton's Water and Wastewater Linear Design Manual (Version 5, October 2019)

2170 Ghent Avenue

Existing Conditions

EXTERNAL SANITARY SEWER CAPACITY ANALYSIS

PREPARED BY: MB **DATE:** 2024.10.31
CHECKED BY: TF **UPDATED:** /
PROJECT No.: 912-7186

Type of Development[1]	Equivalent Population Density
Light Commercial (MXE & MXG)[4]	90 persons/ha
Medium to High Density Residential Apartment Units[7]	2.3 PPU

Mannings "n":	0.013
Peak Factor (M):	1+(14/4+(P/1000)^0.5) <= 4
Avg. Daily/Capita Flow (L/cap/d)[4]:	275
Commercial Avg. Daily/Capita Flow (m^3/ha/d)[4]:	24.75
Infiltration Allowance (L/ha.s):	0.286

CATCHMENT I.D.[2,3,4]	STREET Address	FROM MH NO	TO MH NO	AREA (Ha)	Number of Units	POP.[4,7]	TOTAL TRIB. POP.	RESIDENTIAL PEAK FACTOR	RESIDENTIAL AVG. FLOW (l/s)	RESIDENTIAL MAX. FLOW (l/s)	COMMERCIAL PEAK FACTOR	COMMERCIAL AVG. FLOW (l/s)	COMMERICAL MAX. FLOW (l/s)	INSTUTIONAL PEAK FACTOR	INSTITUTIONAL AVG. FLOW (l/s)	INSTITUTIONAL MAX. FLOW (l/s)	MAX FLOW (l/s)	INFILT. (l/s)	TOTAL FLOW (l/s)	Cumulative Flow (l/s)	LENGTH (m)	PIPE DIAM.[5] (mm)	SLOPE (%)	CAP. (l/s)	CAP. (%)	FULL FLOW VELOCITY (m/s)
101	Propsect Ave ROW	1	2	0.95	3	86	86	4.26	0.27	1.16	4.00	0.00	0.00	4.00	0.00	0.00	1.16	0.27	**1.43**	**1.43**	85.5	250	0.44%	**39**	**4%**	0.80
102	Propsect Ave ROW	1	2	0.50		45	131	0.00	0.14	0.00	4.00	0.14	0.57	4.00	0.00	0.00	0.57	0.14	**0.72**	**2.15**	85.5	250	0.44%	**39**	**5%**	0.80
103	Propsect Ave ROW	1	2	0.26	7	16	147	4.39	0.05	0.23	4.00	0.00	0.00	4.00	0.00	0.00	0.23	0.07	**0.30**	**2.45**	58.0	250	0.44%	**39**	**6%**	0.80
104	Propsect Ave ROW	1	2	0.19	2	5	151	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.05	**0.12**	**2.57**	58.0	250	0.44%	**39**	**7%**	0.80
G1	Propsect Ave ROW	1	2	0.19	0		151	0.00	0.00	0.00	4.00	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**2.62**	58.0	250	0.44%	**39**	**7%**	0.80
105	Propsect Ave ROW	2	3	0.16	7	16	167	4.39	0.05	0.23	4.00	0.00	0.00	4.00	0.00	0.00	0.23	0.05	**0.27**	**2.89**	58.0	250	0.24%	**29**	**10%**	0.59
106	Propsect Ave ROW	2	3	3.04	0	274	441	0.00	0.87	0.00	4.00	0.87	3.48	4.00	0.00	0.00	3.48	0.87	**4.35**	**7.24**	58.0	250	0.24%	**29**	**25%**	0.59
107	Propsect Ave ROW	2	3	0.29	8	18	459	4.39	0.06	0.26	4.00	0.00	0.00	4.00	0.00	0.00	0.26	0.08	**0.34**	**7.58**	58.0	250	0.24%	**29**	**26%**	0.59
G2	Propsect Ave ROW	2	3	0.16		0	459	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**7.63**	58.0	250	0.24%	**29**	**26%**	0.59
G3	Propsect Ave ROW	3	4	0.12		0	459	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.03	**0.03**	**7.66**	58.0	250	0.71%	**50**	**15%**	1.02
111	Propsect Ave ROW	5	4	0.13	2	5	5	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.04	**0.10**	**0.10**	85.5	250	0.47%	**41**	**0%**	0.83
110	Propsect Ave ROW	5	4	0.16	2	5	9	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.05	**0.11**	**0.21**	85.5	250	0.47%	**41**	**1%**	0.83
108	Propsect Ave ROW	5	4	1.72		155	164	0.00	0.49	0.00	4.00	0.49	1.97	4.00	0.00	0.00	1.97	0.49	**2.46**	**2.68**	85.5	250	0.47%	**41**	**7%**	0.83
109	Propsect Ave ROW	5	4	0.07	1	2	166	4.46	0.01	0.03	4.00	0.00	0.00	4.00	0.00	0.00	0.03	0.02	**0.05**	**2.73**	85.5	250	0.47%	**41**	**7%**	0.83
G4	Propsect Ave ROW	5	4	0.18		0	166	0.00	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**2.78**	85.5	250	0.47%	**41**	**7%**	0.83
112	Pearson Ave ROW	4	7	0.16	3	7	633	4.43	0.02	0.10	4.00	0.00	0.00	4.00	0.00	0.00	0.10	0.05	**0.14**	**10.59**	50.5	250	0.33%	**34**	**31%**	0.70
113	Pearson Ave ROW	4	7	0.07	1	2	635	4.46	0.01	0.03	4.00	0.00	0.00	4.00	0.00	0.00	0.03	0.02	**0.05**	**10.64**	50.5	250	0.33%	**34**	**31%**	0.70
G5	Pearson Ave ROW	4	7	0.19		0	635	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**10.69**	97.0	250	0.33%	**34**	**31%**	0.70
114	Ghent Ave ROW	6	7	0.20	3	7	7	4.43	0.02	0.10	4.00	0.00	0.00	4.00	0.00	0.00	0.10	0.06	**0.15**	**0.15**	74.0	250	0.51%	**42**	**0%**	0.87
115	Ghent Ave ROW	6	7	0.07	1	2	9	4.46	0.01	0.03	4.00	0.00	0.00	4.00	0.00	0.00	0.03	0.02	**0.05**	**0.21**	74.0	250	0.51%	**42**	**0%**	0.87
116 (Site)	Ghent Ave ROW	6	7	0.40	21	48	58	4.32	0.15	0.66	4.00	0.00	0.00	4.00	0.00	0.00	0.66	0.11	**0.78**	**0.99**	74.0	250	0.51%	**42**	**2%**	0.87
117	Ghent Ave ROW	6	7	0.18	2	5	62	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.05	**0.12**	**1.10**	74.0	250	0.51%	**42**	**3%**	0.87
118	Ghent Ave ROW	6	7	0.13	1	2	64	4.46	0.01	0.03	4.00	0.00	0.00	4.00	0.00	0.00	0.03	0.04	**0.07**	**1.17**	74.0	250	0.51%	**42**	**3%**	0.87
G6	Ghent Ave ROW	6	7	0.23		0	64	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.07	**0.07**	**1.24**	74.0	250	0.51%	**42**	**3%**	0.87
119	Ghent Ave	7	9	0.11	1	2	702	4.46	0.01	0.03	4.00	0.00	0.00	4.00	0.00	0.00	0.03	0.03	**0.06**	**12.00**	74.0	250	0.28%	**31**	**38%**	0.64
G7	Ghent Ave	7	9	0.05		0	702	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.01	**0.01**	**12.01**	74.0	250	0.28%	**31**	**38%**	0.64
								0.00	0.00	0.00																
120	Lilnan Court	8	9	1.10	8	18	18	4.39	0.06	0.26	4.00	0.00	0.00	4.00	0.00	0.00	0.26	0.31	**0.57**	**0.57**	71.7	200	0.50%	**23**	**2%**	0.74
G8	Lilnan Court ROW	8	9	0.13		0	18	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.04	**0.04**	**0.61**	87.6	200	0.50%	**23**	**3%**	0.74
121	Ghent Ave	9	10	0.15	2	5	725	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.04	**0.11**	**12.73**	74.0	250	0.38%	**37**	**35%**	0.75
122	Ghent Ave	9	10	0.19	6	14	738	4.40	0.04	0.19	4.00	0.00	0.00	4.00	0.00	0.00	0.19	0.05	**0.25**	**12.97**	74.0	250	0.38%	**37**	**35%**	0.75
G9	Ghent Ave	9	10	0.15		0	738	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.04	**0.04**	**13.02**	71.7	250	0.38%	**37**	**36%**	0.75
123	Ghent Ave	10	11	0.57	3	51	790	4.31	0.16	0.70	4.00	0.00	0.00	4.00	0.00	0.00	0.70	0.16	**0.87**	**13.88**	87.6	250	0.35%	**35**	**39%**	0.72
124	Ghent Ave	10	11	0.22	6	14	803	4.40	0.04	0.19	4.00	0.00	0.00	4.00	0.00	0.00	0.19	0.06	**0.26**	**14.14**	87.6	250	0.35%	**35**	**40%**	0.72
125	Ghent Ave	10	11	0.43	2	5	808	4.44	0.01	0.07	4.00	0.00	0.00	4.00	0.00	0.00	0.07	0.12	**0.19**	**14.33**	74.0	250	0.35%	**35**	**41%**	0.72
126	Ghent Ave	10	11	0.27	3	7	815	4.43	0.02	0.10	4.00	0.00	0.00	4.00	0.00	0.00	0.10	0.08	**0.17**	**14.50**	74.0	250	0.35%	**35**	**41%**	0.72
G10	Ghent Ave	10	11	0.20		0	815	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.06	**0.06**	**14.56**	71.7	250	0.35%	**35**	**41%**	0.72
127	Ghent Ave	11	12	0.37		33	848	4.35	0.11	0.46	4.00	0.00	0.00	4.00	0.00	0.00	0.46	0.11	**0.57**	**15.13**	87.6	250	0.30%	**33**	**46%**	0.66
G11	Ghent Ave	11	12	0.17		0	848	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**15.17**	87.6	250	0.30%	**33**	**47%**	0.66
128	Ghent Ave	11	12	1.18		106	954	4.24	0.34	1.43	4.00	0.00	0.00	4.00	0.00	0.00	1.43	0.34	**1.77**	**16.94**	87.6	250	0.30%	**33**	**52%**	0.66
129	Ghent Ave	12	13	0.23	10	23	977	4.37	0.07	0.32	4.00	0.00	0.00	4.00	0.00	0.00	0.32	0.07	**0.39**	**17.33**	87.6	250	0.34%	**35**	**50%**	0.71
130	Ghent Ave	12	13	0.40	4	9	987	4.42	0.03	0.13	4.00	0.00	0.00	4.00	0.00	0.00	0.13	0.11	**0.24**	**17.57**	87.6	250	0.34%	**35**	**51%**	0.71
131	Ghent Ave	12	13	0.45	6	14	1000	4.40	0.04	0.19	4.00	0.00	0.00	4.00	0.00	0.00	0.19	0.13	**0.32**	**17.90**	87.6	250	0.34%	**35**	**52%**	0.71
G12	Ghent Ave	12	13	0.22		0	1000	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.06	**0.06**	**17.96**	87.6	250	0.34%	**35**	**52%**	0.71
132	Ghent Ave	13	14	0.24	4	9	1010	4.42	0.03	0.13	4.00	0.00	0.00	4.00	0.00	0.00	0.13	0.07	**0.20**	**18.16**	87.6	250	0.24%	**29**	**62%**	0.59
G13	Ghent Ave	13	14	0.17		0	1010	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.05	**0.05**	**18.21**	87.6	250	0.24%	**29**	**62%**	0.59
133	Ghent Ave	13	14	1.50	38	87	1097	4.26	0.28	1.18	4.00	0.00	0.00	4.00	0.00	0.00	1.18	0.43	**1.61**	**19.82**	87.6	250	0.24%	**29**	**68%**	0.59
G14	Ghent Ave	14	15	0.12		0	1097	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.03	**0.03**	**19.85**	87.6	250	0.22%	**28**	**71%**	0.57
G15	Ghent Ave	15	16	0.07		0	1097	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.02	**0.02**	**19.87**	87.6	250	0.22%	**28**	**71%**	0.57
								0.00	0.00	0.00																
B3	Brant Ave	16	17	0.13		0	815	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.04	**0.04**	**14.54**	87.6	450	0.65%	**230**	**6%**	1.45
B3	Brant Ave	17	18	0.13		0	987	4.50	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00	0.00	0.04	**0.04**	**17.61**	87.6	450	0.65%	**230**	**8%**	1.45

Notes:

1. Zoning designations and parcel boundaries were obtained from City of Burlington's Zoning Bylaw Interactive Map accessed February 14, 2024. MXE and MXG Zoning was assumed to match Light Commercial Type of Development according to Table 3-2 in the Region of Halton Linear Design Manual (Version 5, October 2019) and based on existing land use.
2. The location of the existing sanitary sewer infrastructure and service laterals were obtained from engineering as-built drawings and GIS Mapping provided by the City and the Region (October 2023).
3. Equivalent Population Densities and Unit Sewage Flows taken from Table 3-1 and 3-2 of the Region of Halton's Water and Wastewater Linear Design Manual (Version 5, October 2019)



Figure Notes:
1. Maintenance holes and sewers are approximated based on available as-constructed drawings and GIS Mapping. Sanitary lateral locations have been simplified to demonstrate the connections to the main line sewers of interest.
2. Zoning designations and parcel boundaries were obtained from City of Burlington's Zoning Bylaw Interactive Map accessed October, 2024.
3. Prospect Street, Pearson Street, and Ghent Avenue ROW areas only contribute infiltration flow to the sanitary sewer system as no population is associated with these areas.
4. Drainage areas have been assumed based on property limits rather than detailed topographic information.

ID
A(ha) | POP
Catchment ID
Area (in ha) | Population

- Existing Sanitary Maintenance Hole
- Existing Sanitary Sewer
- Sanitary Service Lateral
- Catchment Area Boundary
- Contours (1m)

CROZIER

2170 Ghent Avenue

Sanitary Drainage Plan
Existing Conditions

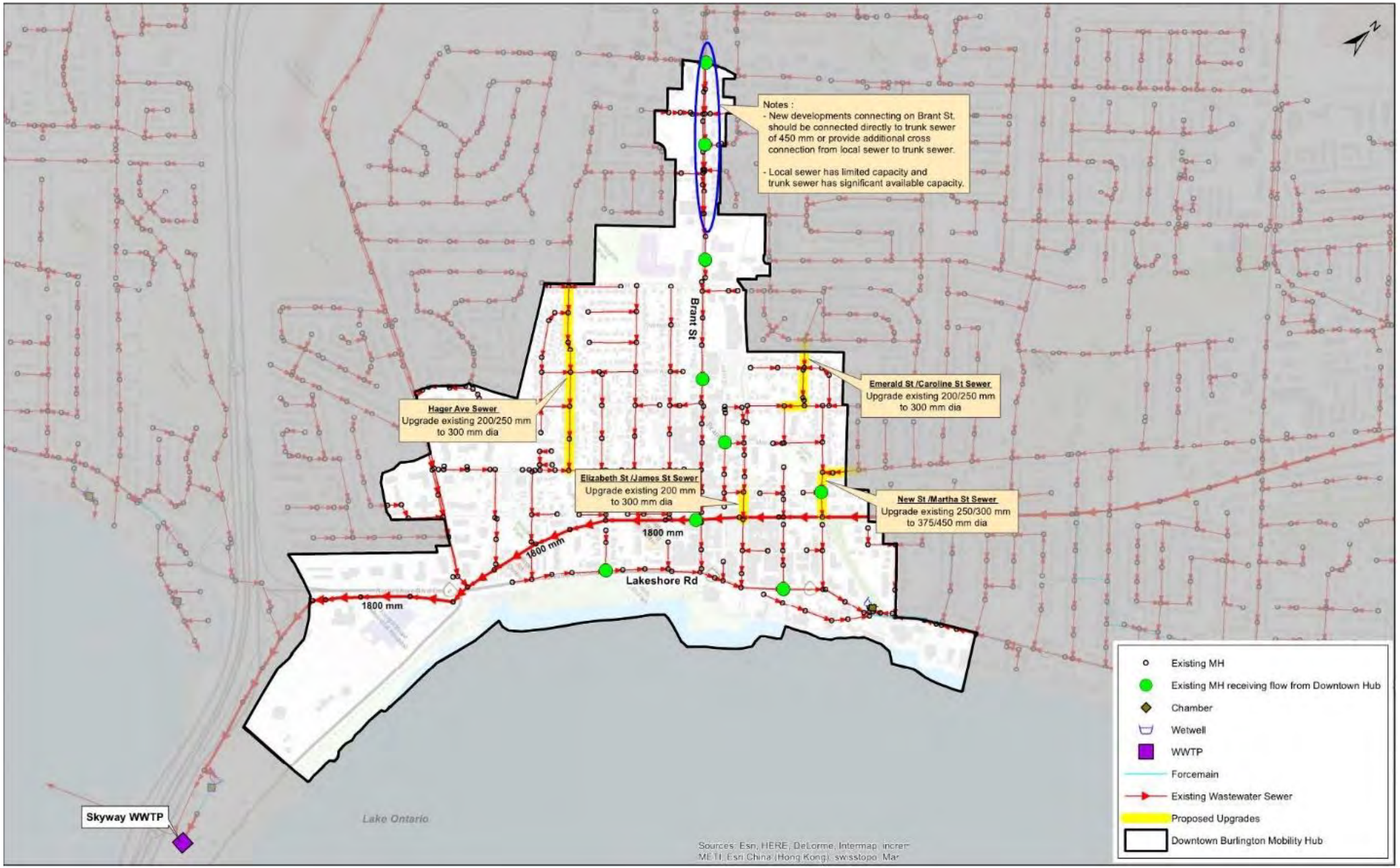
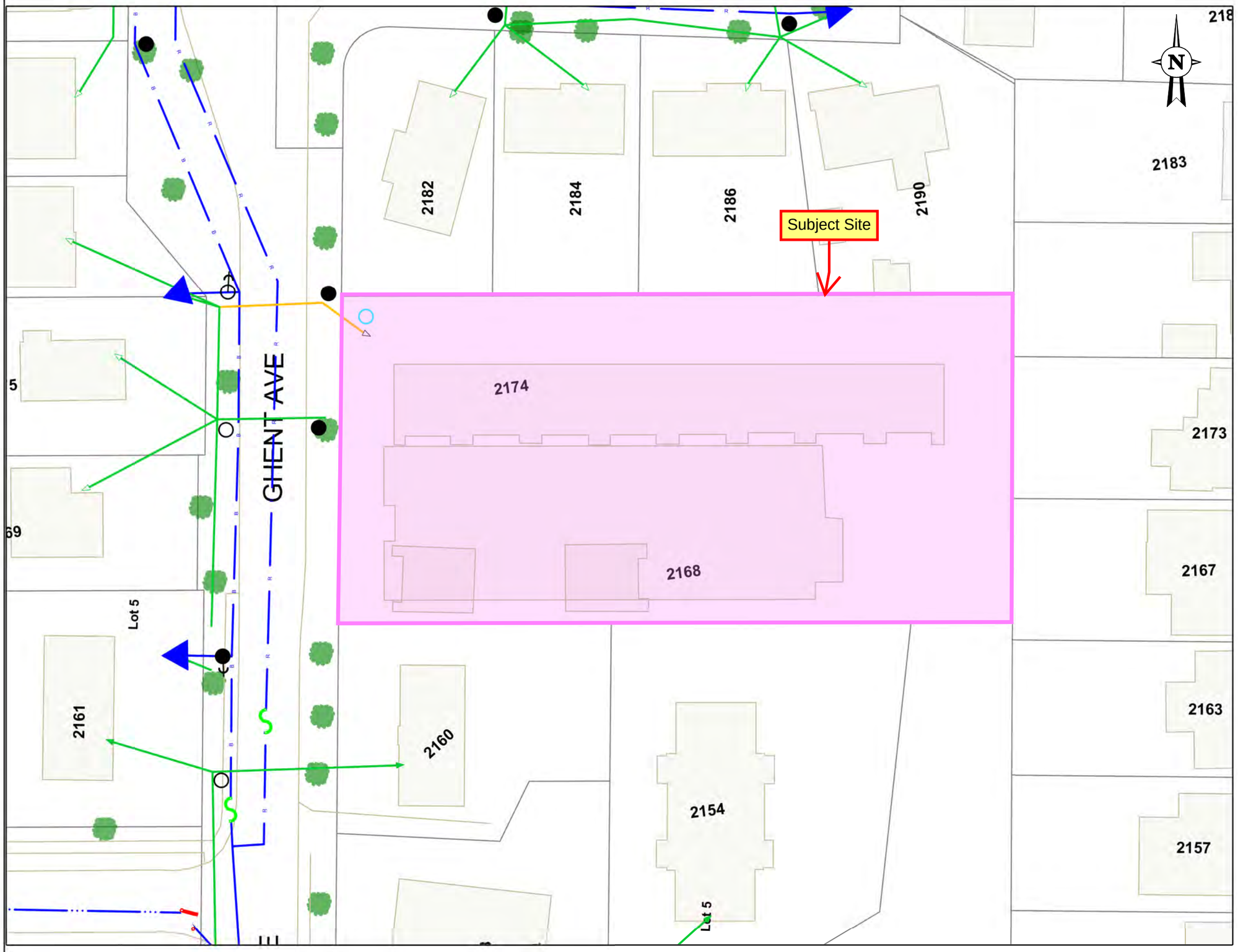


Figure 6.2: Recommended Wastewater System Upgrades

APPENDIX E

Preliminary Utility Study Supporting Markups



LEGEND

COLOUR CHART

27600-3PH/16000-1PH	BROWN
13800-3PH/8000-1PH	RED
4160-3PH/2400-1PH	BLUE
ALL SECONDARY VOLTAGES	GREEN
PROPOSED	MAGENTA
CUSTOMER OWNED	CYAN
DUCT	YELLOW

CONDUCTORS

- OH / UG — 3PH PRIMARY DISTRIBUTION
- R R OH / R R UG — 1PH PRIMARY DISTRIBUTION
- OH / UG — SECONDARY DISTRIBUTION

SYMBOLS

POLES
- POLE
- PROPOSED POLE
- SPAN GUY
- DOWN GUY/ANCHOR

TRANSFORMERS
- 1PH POLE MOUNTED TRANSFORMER
- 3PH POLE MOUNTED TRANSFORMER
- 1PH PADMOUNTED TRANSFORMER
- 3PH PADMOUNTED TRANSFORMER
- 3PH PADMOUNT VAULT TRANSFORMER
- SUBMERSIBLE TRANSFORMER

CIVIL
- MH — CONCRETE MANHOLE
- P — PEDESTAL
- SWITCHING CUBICLE
- CONCRETE ENCASED DUCT
- DIRECT BURIED DUCT

METERS
- SECONDARY METER
- PRIMARY METER BANK

SWITCHES

OPEN CLOSED
- FUSED SWITCH
- SOLID SWITCH
- ABS SWITCH
- INTELLIRUPTER SWITCH
- SCADAMATE SWITCH

Date	Revision	I.O.No.	By	Appr

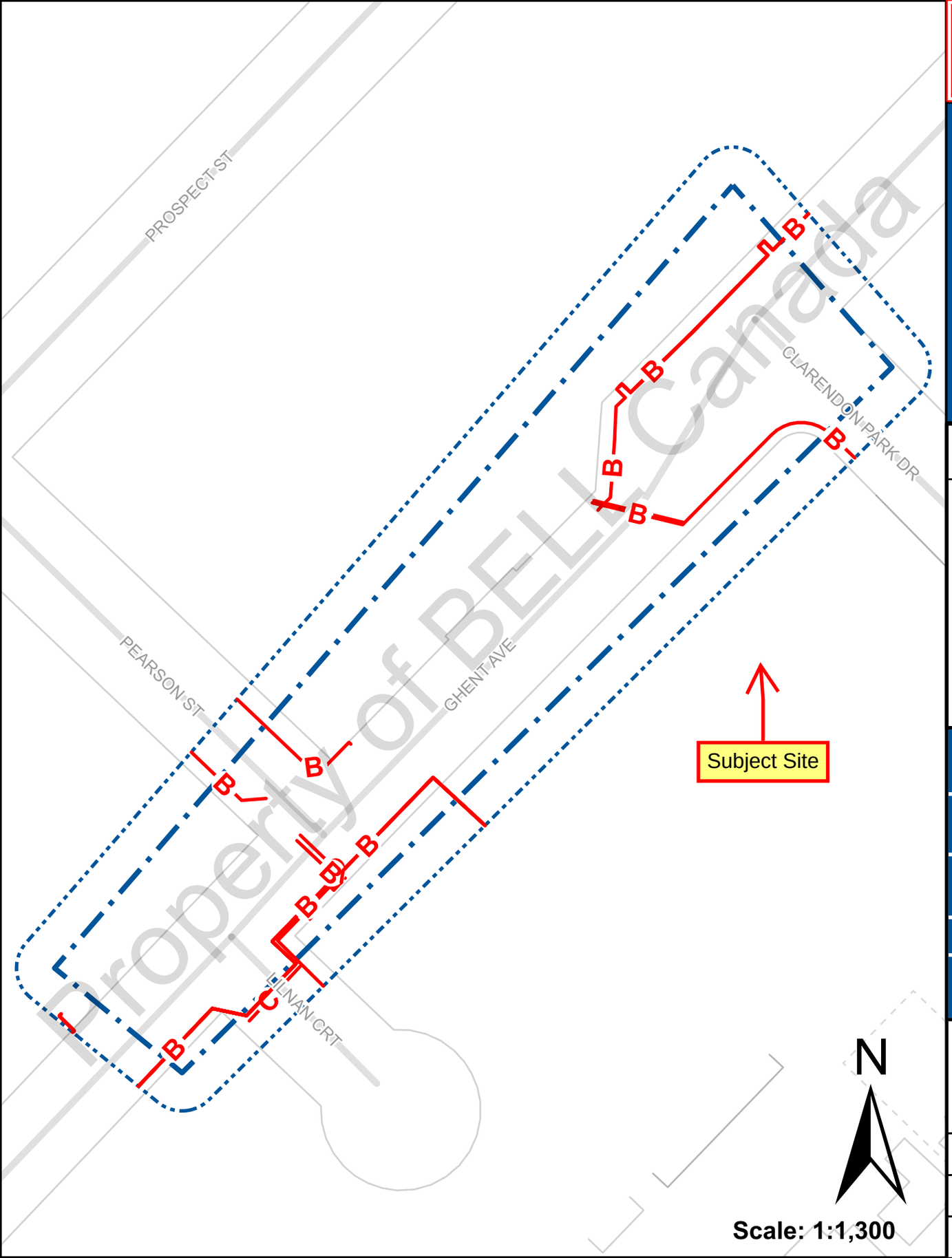
BURLINGTON HYDRO INC.

Title: 2168 to 2174 GHENT AVENUE BHI ASSET LOCATION * PLANNING *

Design By: LC	Date: 10/29/2024	
Scale:	I.O.#:	
MC#: 1:500	W.O.#:	Project#:
Approved By:	Date:	

Drawing No.: **BHI-241029-05LC**


PEARSON ST
LILNAN CRT
DEYNCOURT DR
CLARENDO
8 S CT 420kPa
1 1/4 S CT 420kPa
1 1/4 PE4 N/A 420kPa
2 S CT 420kPa
1 1/4 PE1 N/A 420kPa
METER MANIFOLD
SERVICES E,F,G
AP 10



Property of BELL Canada

PLEASE NOTE:

THIS DRAWING IS INTENDED FOR PRE-ENGINEERING MARKUP ONLY - NOT FOR PERMIT TO PROCEED CONSTRUCTION. BELL CANADA PLANT LOCATION IS APPROXIMATE

Bell

Municipal Operations Department
Floor 2, 100 Wynford Drive
Toronto, Ontario, M3C 4B4

Email: bellmarkups@bell.ca

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Bell Canada Legend Info

- B — BELL Infrastructure
- C — Existing Conduit
- One Call Center - Dig Area
- Dig Area Buffer (10.0m)

CALL FOR LOCATES
1-800-400-2255

HAND DIG
If within 1m of Bell plant

HAND DIG
when crossing Bell plant

Maintain clearance of 0.6m

If further details required
you must acquire Locates or Test Pits

Ticket request date:
22-10-2024 09:50:06
Ticket creation date:
23-10-2024 04:50:45

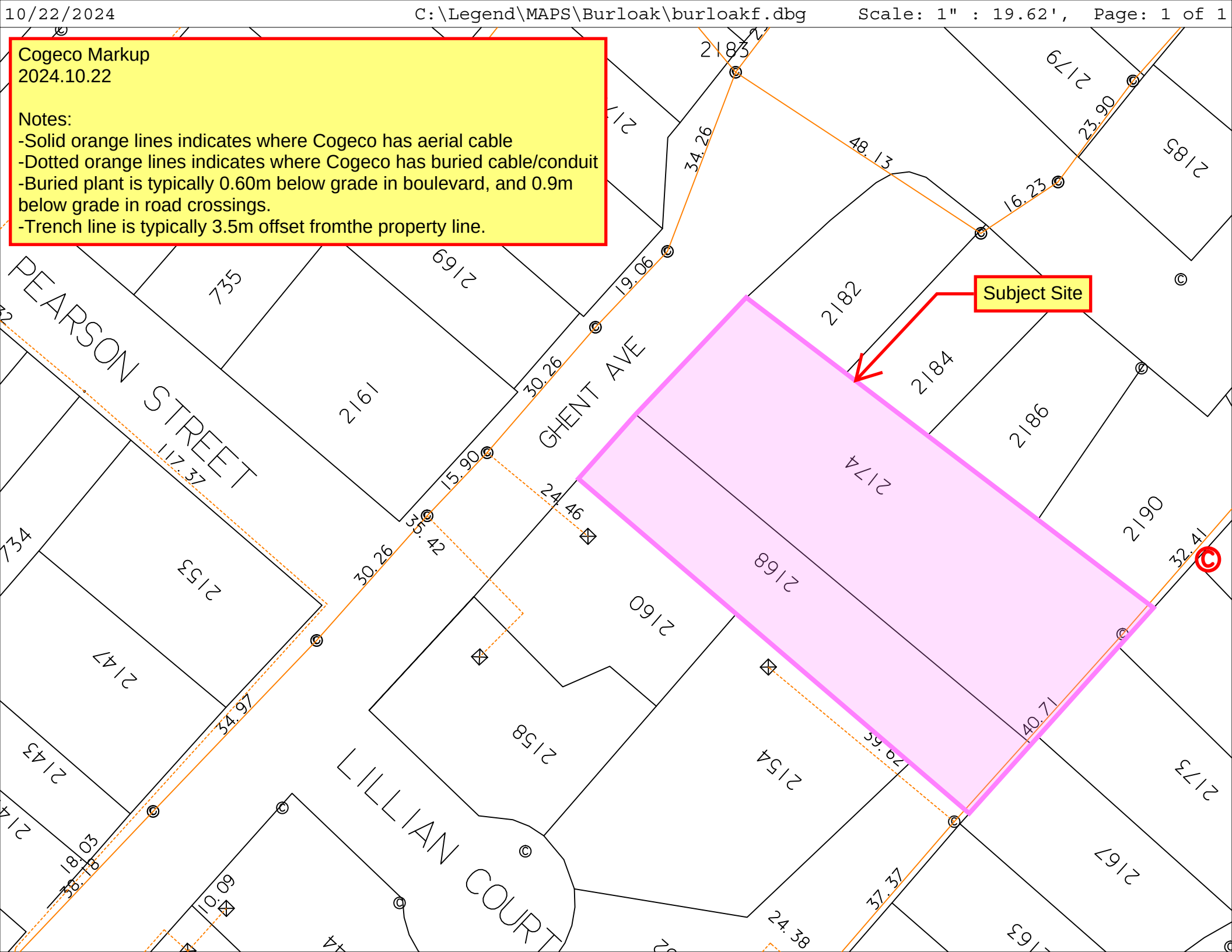
Markup #: 2024436285

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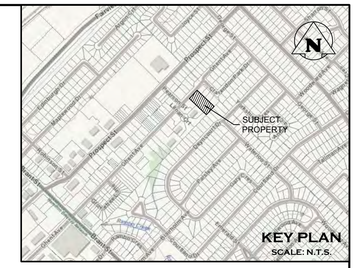
Location: 2168 GHENT AVE

Cogeco Markup
2024.10.22

Notes:
-Solid orange lines indicates where Cogeco has aerial cable
-Dotted orange lines indicates where Cogeco has buried cable/conduit
-Buried plant is typically 0.60m below grade in boulevard, and 0.9m below grade in road crossings.
-Trench line is typically 3.5m offset fromthe property line.



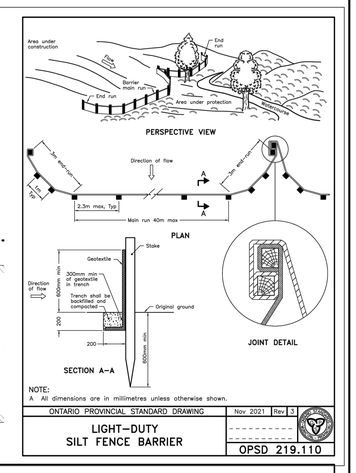
DRAWINGS



KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- x — x — x — EXISTING FENCE
- EXISTING GRADE
- 215.00 — EXISTING OVERLAND FLOW DIRECTION
- MUD-MAT; SEE DETAIL
- SF — SEDIMENT CONTROL FENCE; SEE DETAIL
- SILT SACK; SEE DETAIL

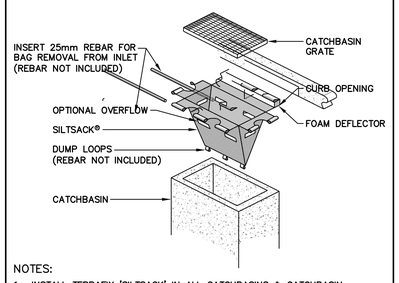


NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev 3
LIGHT-DUTY SILT FENCE BARRIER		OPSD 219.110

'SILTSACK' DETAIL

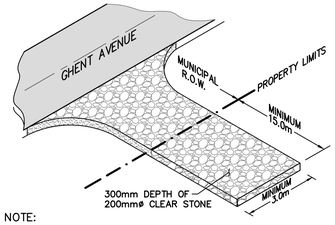
SCALE: N.T.S.



NOTES:
1. INSTALL TERRAFIX 'SILTSACK' IN ALL CATCHBASINS & CATCHBASIN MANHOLES AFFECTED BY CONSTRUCTION.
2. INSTALL TERRAFIX 'SILTSACK' IN ALL NEW CATCHBASINS & CATCHBASIN MANHOLES.

MUD MAT DETAIL

SCALE: N.T.S.



NOTE:
GEOTEXTILE (TERRAFIX 270R) TO BE PLACED AS SEPARATION BARRIER BETWEEN EXISTING GROUND AND CLEAR STONE.

EXISTING HYDRO POLE TO BE RELOCATED (BY OTHERS)

EXISTING TREE TO BE REMOVED (BY OTHERS)

PROPOSED TEMPORARY MUD MAT SEE DETAIL ON THIS SHEET

INSTALL SILT SACK IN EX. CATCHBASIN; SEE DETAIL ON THIS SHEET

CONCRETE PADS TO BE REMOVED AND DISPOSED OF OFF SITE (TYP.)

CONCRETE PADS TO BE REMOVED AND DISPOSED OF OFF SITE

CONCRETE PADS TO BE REMOVED AND DISPOSED OF OFF SITE

LIGHT DUTY SILT FENCE TO BE INSTALLED ON PROPERTY LINE AS PER OPSD 219.110

#2182 1 STOREY BRICK DWELLING

#2160 3 STOREY BRICK BUILDING

#2154 3 STOREY BRICK BUILDING

SHED

SCALE: 1:200

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6. DO NOT SCALE DRAWINGS.

TEMPORARY BENCHMARKS

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO BENCHMARK No. 00819838007 HAVING AN ELEVATION OF 99.883m. LOCATED ON THE MOST SOUTHERLY OF TWO STEEL AND CONCRETE BRIDGES CARRYING THE CNR OVER BRANT ST. (THE MOST SOUTHERLY BRIDGE IS CARRYING A SPUR LINE). BENCHMARK IS SET VERTICALLY IN THE TOP OF THE S.E. ABUTMENT, 1.45m MOUTH OF THE MOST SOUTHERLY RAIL OF SPUR LINE, 14.85m WEST OF SIGNAL LIGHT #078, 10cm WEST OF EAST EDGE, 35cm NORTH OF HANDRAIL.
WAHBA SURVEYING, PROJECT No. 24-048 DATED JULY 30, 2024

Town: CITY OF Burlington

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR 1st SUBMISSION ZBA	2024/11/08

Engineer

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

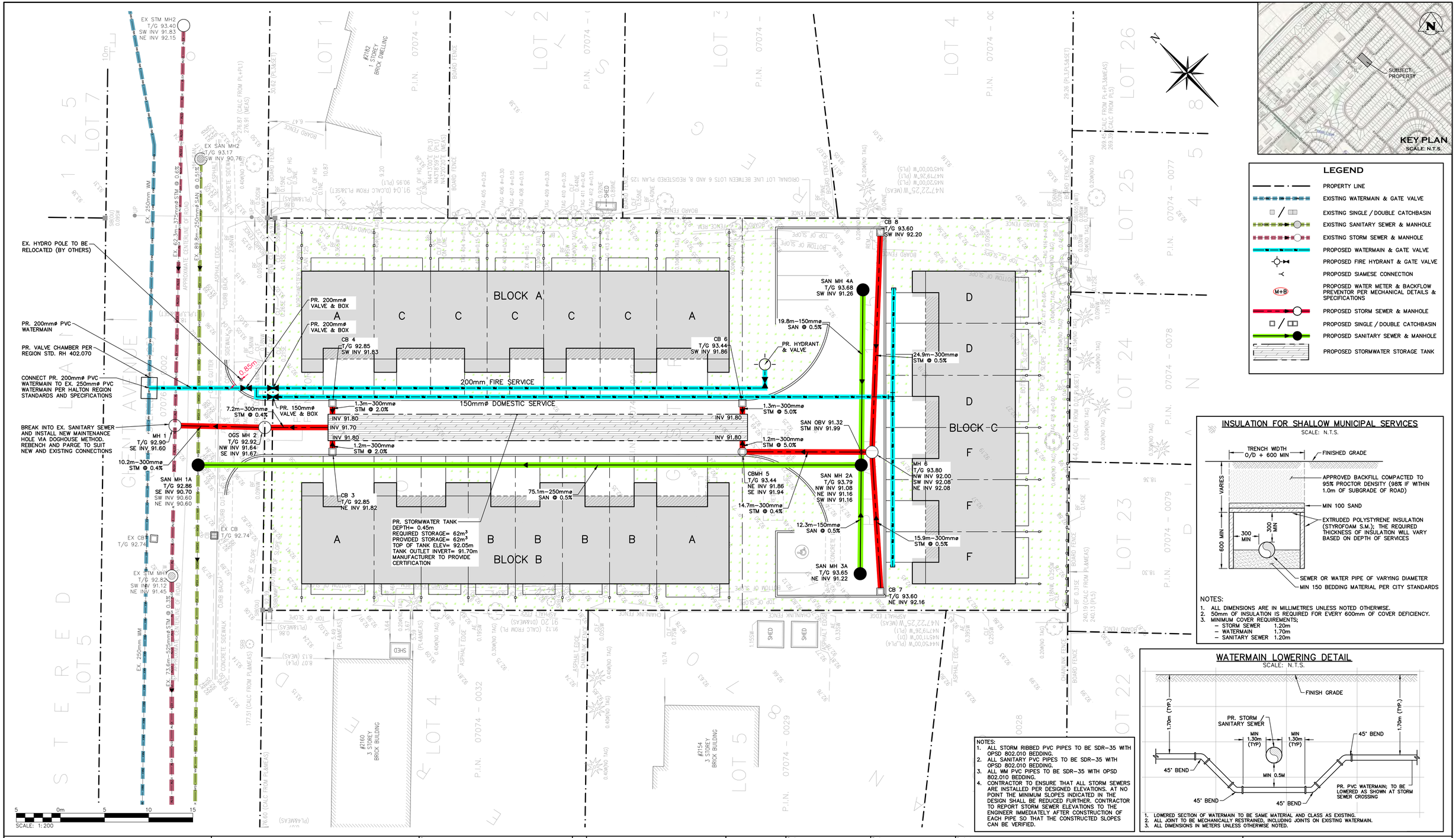
Engineer

Project: 2170 GHENT AVENUE BURLINGTON, ONTARO

Drawing: PRELIMINARY EROSION AND SEDIMENT CONTROL PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
S.C.	S.C./M.B.	912-7186
Check By	Check By	Drawing
M.B./T.F.	T.F.	C101



LEGEND

- PROPERTY LINE
- EXISTING WATERMAIN & GATE VALVE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- PROPOSED WATERMAIN & GATE VALVE
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED SIAMESE CONNECTION
- PROPOSED WATER METER & BACKFLOW PREVENTOR PER MECHANICAL DETAILS & SPECIFICATIONS
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED STORMWATER STORAGE TANK

INSULATION FOR SHALLOW MUNICIPAL SERVICES

SCALE: N.T.S.

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. 50mm OF INSULATION IS REQUIRED FOR EVERY 600mm OF COVER DEFICIENCY.
3. MINIMUM COVER REQUIREMENTS;
   - STORM SEWER 1.20m
   - WATERMAIN 1.70m
   - SANITARY SEWER 1.20m

WATERMAIN LOWERING DETAIL

SCALE: N.T.S.

1. LOWERED SECTION OF WATERMAIN TO BE SAME MATERIAL AND CLASS AS EXISTING.
2. ALL JOINT TO BE MECHANICALLY RESTRAINED, INCLUDING JOINTS ON EXISTING WATERMAIN.
3. ALL DIMENSIONS IN METERS UNLESS OTHERWISE NOTED.

NOTES:
1. ALL STORM RIBBED PVC PIPES TO BE SDR-35 WITH OPSD 802.010 BEDDING.
2. ALL SANITARY PVC PIPES TO BE SDR-35 WITH OPSD 802.010 BEDDING.
3. ALL WM PVC PIPES TO BE SDR-35 WITH OPSD 802.010 BEDDING.
4. CONTRACTOR TO ENSURE THAT ALL STORM SEWERS ARE INSTALLED PER DESIGNED ELEVATIONS. AT NO POINT THE MINIMUM SLOPES INDICATED IN THE DESIGN SHALL BE REDUCED FURTHER. CONTRACTOR TO REPORT STORM SEWER ELEVATIONS TO THE ENGINEER IMMEDIATELY AFTER CONSTRUCTION OF EACH PIPE SO THAT THE CONSTRUCTED SLOPES CAN BE VERIFIED.

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TEMPORARY BENCHMARKS

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WAHBA SURVEYING, PROJECT No. 24-048 DATED JULY 30, 2024

Town: CITY OF Burlington

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Engineer

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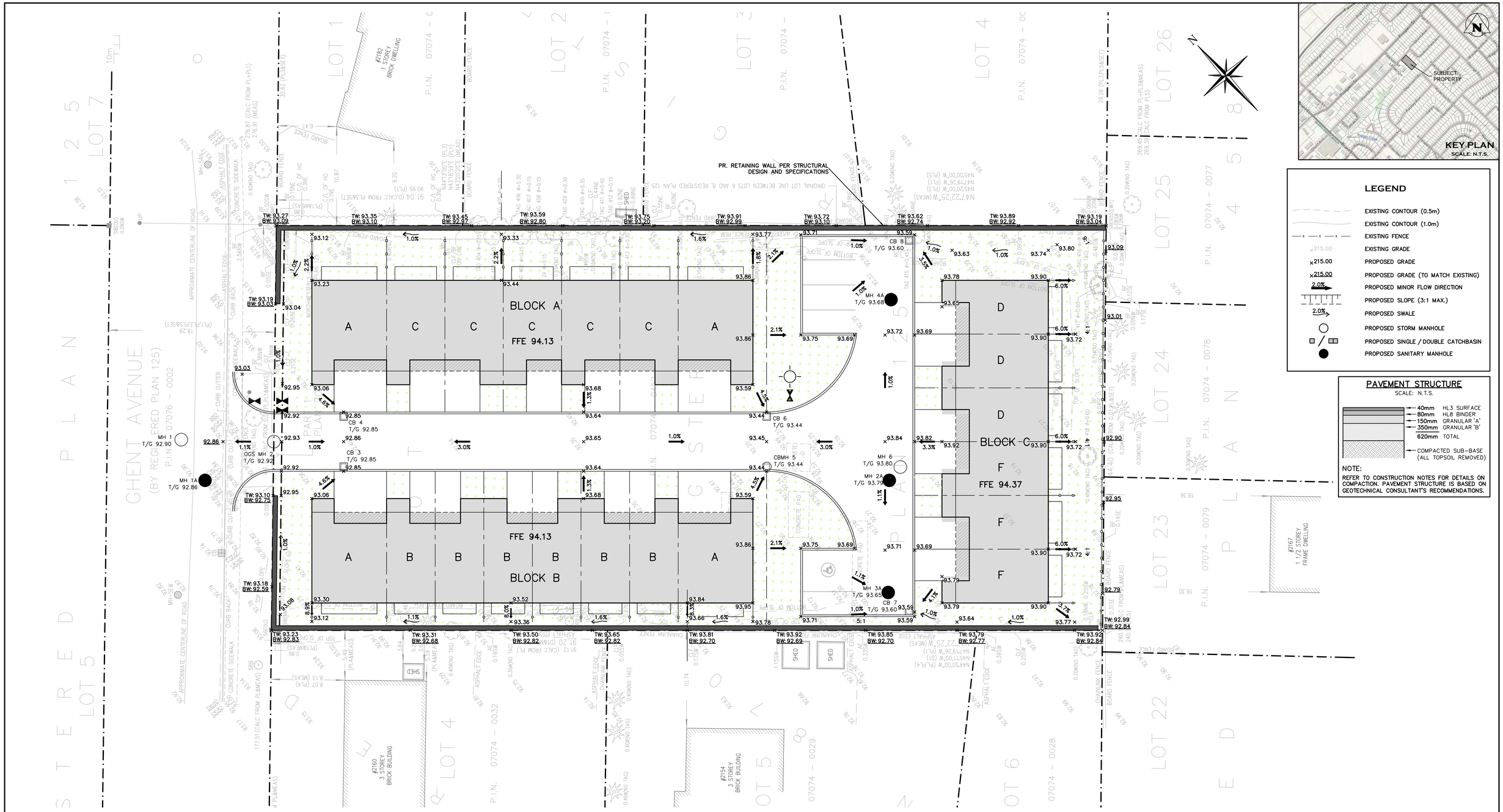
Engineer

Project: 2170 GHENT AVENUE
BURLINGTON, ONTARIO

Drawing: PRELIMINARY SITE SERVICING PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
S.C.	S.C./M.B.	912–7186
Check By	Check By	Drawing
M.B./T.F.	T.F.	C102



LEGEND

- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING FENCE
- EXISTING GRADE
- PROPOSED GRADE
- PROPOSED GRADE (TO MATCH EXISTING)
- PROPOSED MINOR FLOW DIRECTION
- PROPOSED SLOPE (3:1 MAX.)
- PROPOSED SWALE
- PROPOSED STORM MANHOLE
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- PROPOSED SANITARY MANHOLE

PAVEMENT STRUCTURE

SCALE: N.T.S.

40mm	HL3 SURFACE
80mm	HL8 BINDER
150mm	GRANULAR 'A'
350mm	GRANULAR 'B'
620mm	TOTAL
	COMPACTED SUB-BASE (ALL TOPSOIL REMOVED)

NOTE:
REFER TO CONSTRUCTION NOTES FOR DETAILS ON COMPACTION. PAVEMENT STRUCTURE IS BASED ON GEOTECHNICAL CONSULTANT'S RECOMMENDATIONS.

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WAHBA SURVEYING, PROJECT No. 24-048 DATED JULY 30, 2024

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Engineer

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Engineer

Project: 2170 GHENT AVENUE
BURLINGTON, ONTARIO

Drawing: PRELIMINARY SITE GRADING PLAN

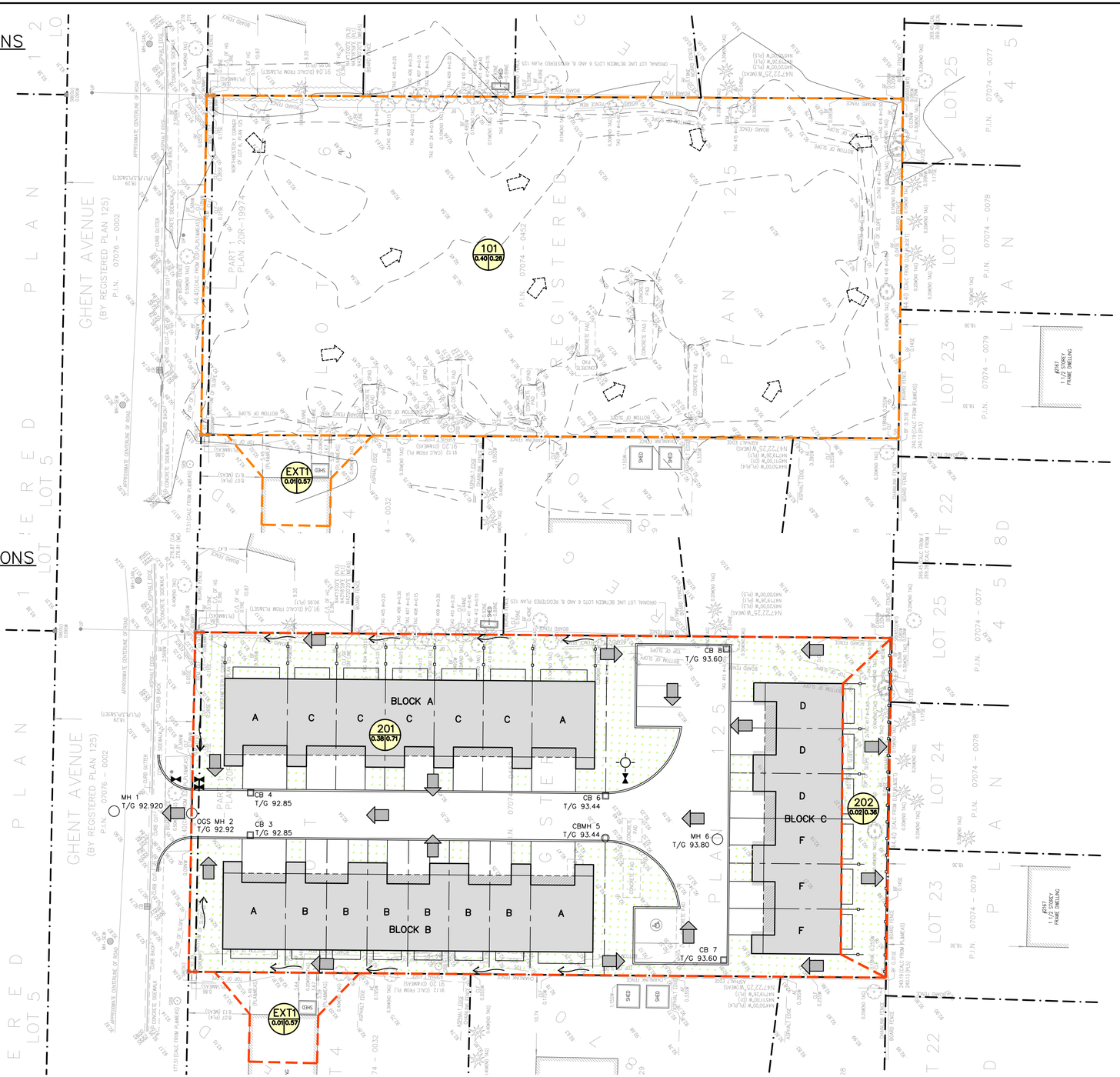
CROZIER CONSULTING ENGINEERS

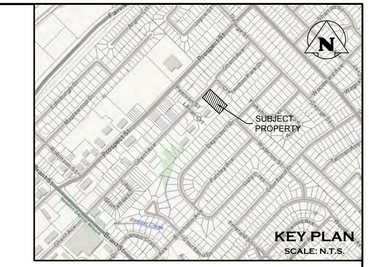
Drawn By: S.C.	Design By: S.C./M.B.	Project:	912-7186
Check By: M.B./T.F.	Check By: T.F.	Drawing:	C103

FIGURES

PRE-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CONDITIONS





LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- × 215.00 EXISTING GRADE
- PROPOSED SWALE
- PROPOSED OVERLAND FLOW DIRECTION
- EXISTING OVERLAND FLOW DIRECTION
- PRE-DEVELOPMENT DRAINAGE
- POST-DEVELOPMENT DRAINAGE
- ID / A | XX — STORM DRAINAGE CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT

10 0m 10 20
SCALE: 1:300

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ELEVATIONS ARE GEODETIC AND ARE REFERRED TO BENCHMARK No. 008198380O7 HAVING AN ELEVATION OF 99.883m. LOCATED ON THE MOST SOUTHERLY OF TWO STEEL AND CONCRETE BRIDGES CARRYING THE CNR OVER BRANT ST. (THE MOST SOUTHERLY BRIDGE IS CARRYING A SPUR LINE). BENCHMARK IS SET VERTICALLY IN THE TOP OF THE S.E. ABUTMENT, 1.45m MOUTH OF THE MOST SOUTHERLY RAIL OF SPUR LINE, 14.85m WEST OF SIGNAL LIGHT #078, 10cm WEST OF EAST EDGE, 35cm NORTH OF HANDRAIL.
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Engineer

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Engineer

Project: 2170 GHENT AVENUE
BURLINGTON, ONTARIO

Drawing: PRELIMINARY PRE & POST STORM DRAINAGE PLANS

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
S.C.	S.C./M.B.	912-7186
Check By	Check By	Drawing
M.B./T.F.	T.F.	C104