

46 Stevens Road

Functional Servicing Report

VERSION 1 • JULY 2022

REPORT PREPARED FOR



Kaitlin Corporation
220 Duncan Mill Road, Suite 315
North York, ON
M3B 3J5

REPORT PREPARED BY

TYLin

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TYLin PROJECT NUMBER 10521

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1 INTRODUCTION

TYLin, formerly The Municipal Infrastructure Group (TMIG) has been retained by Kaitlin Corporation to prepare detailed engineering design in support of a proposed Assisted Care and Retirement Development (46 Stevens Road) located in Bowmanville, Clarington, Ontario. This Functional Servicing Report has been prepared in support of the re-zoning application process.

The subject lands are mostly vacant lands currently zoned agricultural with one existing dwelling, with a total approximate area of 8.63ha (21.3 acres) with frontage at the easterly limit of Stevens Road. The lands are currently zoned as Agricultural (A) and Environmentally Protected (EP) in the Clarington Official Plan (Map 3D) per By-Law 84-63 (dated March 2015). Out of the 8.63 Ha owned by the land developers, which includes portions of the main branch Bowmanville Creek, the area that is being developed is approximately 3.03 Ha.

The site is bounded by Stevens Road to the south, existing residential lots along Munday Court to the west and Bowmanville Creek to the north and east. Bowmanville Creek is regulated by the Central Lake Ontario Conservation Authority (CLOCA). See **Figure 1-1**.

The purpose of this report is to provide a brief of the proposed servicing, grading and stormwater management strategy for the proposed development, which includes the following:

- Preliminary site servicing plan;
- Preliminary site grading plan; and
- Stormwater management summary.

Figure 1-1 Location Plan

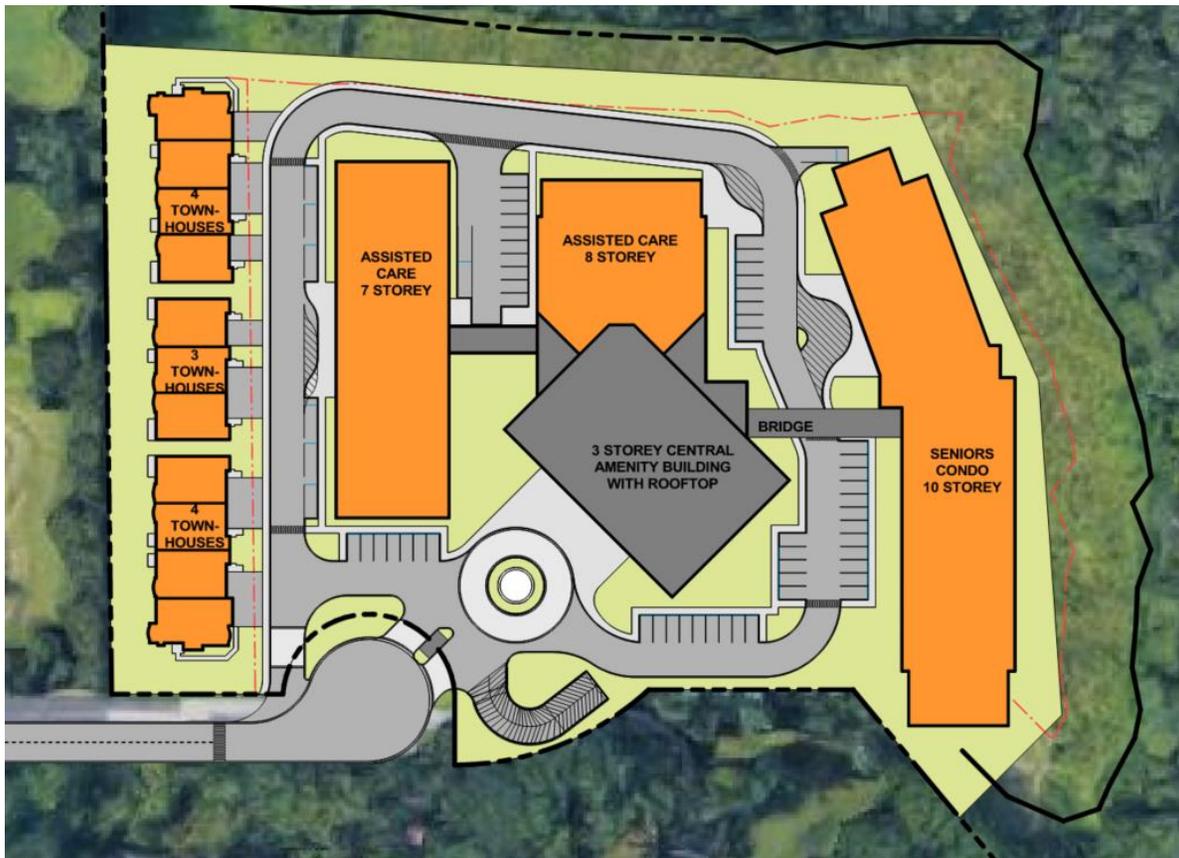


Image Sourced from Google Earth Pro

The proposed development site plan is shown on **Figure 1-2** and consists of a development area of 3.03 Ha. There will be a 10-storey condominium tower on the eastern side of the site, a 7-storey both connected to a central amenity building with an additional 8-storey assisted care building attached to it. There will be three separate 1-storey townhouses providing 11 total units. There will be an underground parking garage that will be underneath the proposed tower buildings.

A cul-de-sac entrance is proposed at the eastern limit of Stevens Road. The cul-de-sac will be connected to an internal road. The internal road will have lay-by parking and two entrances to the underground parking structure, one located on the south side of the site near the cul-de-sac entrance and the other on the northern side of the site between the 7-storey and 8-storey assisted care buildings.

Figure 1-2: Conceptual Site Plan (By Chamberlain Architect Services Limited)



Based on pre-consultation meetings with Durham Region, the theoretical population would be approximately 1182 people.

1.1 Background Information

Reports and correspondence related to this report include:

- 46 Stevens Road pre-consultation meeting (April 29, 2021) with Municipality of Clarington (Planning and Development, Public Works – Infrastructure, Emergency Services), Region of Durham Works Department, CLOCA, Kaitlin Group, and Weston Consulting
- Phase One Environmental Site Assessment Report prepared by GHD, dated October 2017.
- Environmental Impact Study prepared by GHD, dated April 2022.

The following historical drawings of the subject area were used in the preparation of the report. The following drawings are included in **Appendix A**:

- Stevens Property Survey prepared by JD Barnes (July 2003)
- G41-SAN, STM, WTR Servicing Maps prepared by Durham Region (April 2022)
- Stevens Road drawing no. C-04-W-340 contract number D2004-040 prepared by Durham Region (2004)
- Stevens Road drawing no. C-04-W-341 contract number D2004-040 prepared by Durham Region (2004)

Durham Region has also issued for tender the Brookhill sanitary sewer extension in 2022 under contract number D2022-29. The following drawings are included in **Appendix B**:

- Sanitary Sewer Drainage Scheme prepared by D.G. Biddle & Associates (August 2013)
- RR57/Hwy 2 Sanitary Sewer Design Sheet prepared by Durham Region (December 2021)
- Stevens Road drawing no. S-10 contract number D2022-29 prepared by CIMA (December 2021)
- Regional Road 57 drawing no. S-4 contract number D2022-29 prepared by CIMA (December 2021)
- Regional Road 57 drawing no. S-3 contract number D2022-29 prepared by CIMA (December 2021)
- Highway 2/King Street W. drawing no. SW-7 contract number D2022-29 prepared by CIMA (December 2021)
- Highway 2/King Street W. drawing no. S-8 contract number D2022-29 prepared by CIMA (December 2021)
- Highway 2/King Street W. drawing no. S-9 contract number D2022-29 prepared by CIMA (December 2021)

Local utilities including Rogers, Bell, Hydro One, Elexicon, Enbridge, Zayo and Telus have been contacted for record drawings in the area. Received drawings have been attached in **Appendix F**.

2 EXISTING CONDITIONS

The site is currently zoned agricultural and has areas environmentally protected due to Bowmanville Creek valley and the Brookhill Tributary valley. Based on pre-consultation with CLOCA:

“Both these valley systems have slope and erosion hazards associated with them. The hazard lands of these valleys will need to be determined based on a 15m toe erosion allowance, plus a projected stable 3:1 slope. This will form the Long Term Stable Slope (LTSS) of the valleyland. In accordance with the Clarington Official Plan, a 15 metres Vegetation Protection Zone is required adjacent to the valleyland. All development must be located beyond the LTSS and VPZ”.

In the Environmental Impact Study (EIS) prepared by GHD, the valleyland features are protected by a 30-metre vegetation protection zone (VPZ) from the Bowmanville Creek. A 15-metre buffer from the VPZ has also been established and is overlaid on the preliminary drawings. The dripline buffer shown was circulated in July 2022. In the conclusions of the EIS:

“The development of this site outside of the VPZ areas will not have a significant impact on the key natural heritage features and their ecological functions”.

The EIS is noted to be further refined at the detailed design stage to include detailed assessments on the grading and stormwater management strategies.

There is an existing single residential lot on the site. Based on the 2003 JD Barnes survey, there are existing Bell easements that travel through the site and based on preliminary utility circulation markups requests do not appear to have any active lines on them.

2.1 Site Servicing

Currently the site does not have any existing municipal sanitary or storm services. There is an existing municipal 200mm watermain within Stevens Road ROW that is within pressure zone 2 and has a residential connection to the site. There is an existing fire hydrant located on Stevens Road near the proposed site entrance. The Phase One Environmental Site Assessment (GHD, 2017) identified private water and sewage systems. The existing dug well and septic system will need to be removed as part of the development.

There is a proposed sanitary sewer maintenance hole (MH-G41-0029) that is being constructed as part of the Brookhill sanitary sewer extension by the Durham Region. This maintenance hole is located at the intersection of Stevens Road and Munday Court, approximately 160m west of the site. The sewer flows towards Bowmanville Road and is approximately 6.3m deep.

2.2 Site Drainage

The current site is a flat open space bordered by trees and drains west to east towards the Bowmanville Creek valley. At the northern and eastern limits of the site, there is existing sloping which falls approximately 12 metres to the Bowmanville Creek. Near the middle of the western property line, there is a highpoint which splits a portion of the drainage north towards the Bowmanville Creek and south towards existing Stevens Road ditches. The ditches along Stevens Road continue in an easterly direction towards Bowmanville Creek. There is an existing culvert at the current gravel driveway to the site.

2.3 Stevens Road

The site is located fronting the eastern limits of Stevens Road. Stevens Road is currently a rural asphalt road with 20-metre right-of-way. There is an existing swale along the northern side. The road currently has no sanitary or storm sewers underneath it. Along the northern side within the right-of-way are gas, buried CCTV, and above ground hydro poles. There is an existing 200mm watermain that is underneath the road. The current locations of the utilities do not match the standard Clarington 20m right-of-way cross-section C-208 as the existing asphalt surface is not centered on the right-of-way.

3 SITE GRADING

A preliminary site grading plan for the site is shown on drawing **GR01** in **Appendix E**.

For purposes of this FSR, the existing topographic data was obtained through open-source LIDAR data and has an accuracy of +/- 0.5m. A more accurate site topographic survey will be required at the detailed design stage.

3.1 Design Criteria

The grading criteria pertinent to the preliminary site grading from the Municipality of Clarington Design Guidelines and Standard Drawings (2010) are as follows:

- Investigate and maintain existing drainage of adjacent lands
- Self-contain storm drainage within the subdivision limits
- Maintain positive drainage (min. 2%) at all times (roads 0.5% min)
- Minimize the use of rear yard catch basins and retaining walls
- Direct all drainage flows away from houses
- Provide for safe overland routing of "Major Storm" flows
- Preserve trees/vegetation where feasible
- Maximum swale length 60 metres

3.2 Grading Design

The site will be graded to maintain the existing elevations along the property lines, with exception to the cul-de-sac entrance which will be regraded to ensure positive drainage to the stormwater inlet.

On the western side of the site a 3:1 slope downwards towards swales running parallel with the property lines. The swales will utilize the existing highpoint and split the drainage north towards the Bowmanville Creek valley and south towards Stevens Road ditch. The townhouse blocks will have split drainage, sending their backyard flows west towards the swales and the front drainage east towards the western most road.

The western most road will also have a highpoint located near the middle of the western 7 storey building that will split its drainage to the north and south. From the highpoint towards the north, the road is graded downwards around the northern road to a low point at the north-east corner of the site where the north road meets the east road. From the same highpoint on the western road, drainage will flow towards the southern road, where it will continue east towards the south-east corner of the site where the southern road meets the eastern road. The eastern road will follow a see-saw grade north and ultimately be graded to meet the same low point in the north-east corner of the site. From the ultimate low point at the north-east portion of the site, an emergency overland flow swale can be graded to direct flows towards the Bowmanville Valley Creek. Area drains and catch basins will be located throughout the road network.

An approximate 1m high retaining wall will be required along the southern limit of site. The road will be approximately 1m higher than the existing condition and 3:1 sloping cannot be accommodated from the top of curb to the to match the existing grades at the property line. The limit and extent of the retaining wall will be determined during detailed design.

To maintain positive drainage across the cul-de-sac entrance, the road elevation along the entrance will be required to be raised. A highpoint in the middle of the of the cul-de-sac will split the drainage between the site and the road ROW. As curb and gutter is proposed to be installed, they will be designed to outlet to the existing ditches, or to catch-basins that are connected to the nearby internal or external proposed storm sewers.

Grading to make up the difference in elevation along the northern and eastern property limits will be finalized with either sloping or retaining walls during detailed design stage when a more accurate site topographic survey is available and once development and grading limits around the VPZ are finalized.

4 STORMWATER MANAGEMENT AND SERVICING

The storm water management servicing plan is presented in drawing **GP01** in **Appendix E**. For further storm water management details refer to the Storm Water Management report prepared by TYLin, dated May 2022.

4.1 Internal Drainage

The site will utilize a storm water storage tank to control the post development peak flows to match the predevelopment peak flows for the 2-to-100 year storm event. Stormwater will be collected on-site via a series of catch basins and area drains and directed to an underground storage tank located in the northern portion of the site. The site will be designed such that the minor and major storm event is captured on site and released at the defined predevelopment rates as spoken to in the Stormwater Management Report. The site is graded such that the emergency overland flow will be directed to northeast corner of the site and spill to the Bowmanville Creek.

4.2 External Drainage

The existing residential lots along Munday Court are split drainage and a portion of their drainage enters the western side of the site. To account for this drainage two swales are being proposed. From the existing highpoint located near the middle of the western property line, one swale will flow uncontrolled to the northern top of the valley where it will then discharge to the Bowmanville Creek. The second swale will flow south and join the Stevens Road ditch and join the external drainage along Stevens Road.

The external drainage along Stevens Road currently runs west to east along ditches with a high point located near Munday Court. There is an existing culvert at the current gravel driveway to the site. The proposed cul-de-sac and underground parking entrance will prevent utilizing ditches to direct this flow to Bowmanville Creek.

To maintain the existing drainage along Steven Road a storm sewer network is proposed to capture the northern Steven's Road ditch and cul-de-sac flows via ditch inlet catchbasins and direct the flow easterly towards the Bowmanville Creek. The storm sewer network would run in the Stevens Road municipal right of way to Headwall-2 where it would discharge to Bowmanville Creek. This storm sewer is offset three metres to the south of the existing municipal right of way centreline to maintain clearance from the proposed sanitary sewer maintenance hole, existing fire hydrant and proposed underground parking entrance.

5 SANITARY SERVICING

5.1 External Sanitary Infrastructure

The site will ultimately be serviced by the proposed sanitary maintenance hole MH-G41-0029, which is located on Stevens Road approximately 160 metres west of the site. MH-G41-0029 is being built externally by the Region of Durham as part of the Brookhill sanitary sewer extension. The sewer extension takes flows from northern residential sites south along Bowmanville Avenue, east along King Street West, where it eventually crosses to the south and ties into existing sanitary sewers in Waverly Road.

5.2 Design Criteria

The sanitary sewer design flows were determined according to The Regional Municipality of Durham Design Specifications for Sanitary Sewers (April 2020). The design flow calculation is based on the peak design flow and infiltration component, where the peak flow is the average flow multiplied to the peaking factor. The parameters used are listed below, while the details and results of the calculation are found in section 5.3.

- Sewer capacity was computed using Manning's Formulas with a roughness coefficient of $n = 0.013$.
- Minimum velocity 0.60 m/s and minimum grade of 0.5% for all sewers.
- A minimum grade of 1% for the first upstream leg.
- The maximum velocity of any sewer shall be 3.65 m/s.
- Velocity change from the upstream pipe to the downstream pipe in a maintenance hole shall not decreased by more than 0.60 m/s.
- The peaking factor is determined by using Harmon's Peaking Factor (maximum = 4.0, minimum = 1.5).
- Infiltration is calculated based on 0.26 L/s/ha.
- Infiltration drainage areas of 1.84 Ha and 2.11 Ha have been added to MH-G41-0026 and MH-G42-0189 respectively to account for road area that was not included in the Region's design sheet.

5.3 Proposed Sanitary Servicing

5.3.1 External Site Servicing

Two sanitary maintenance holes are proposed in Stevens Road connecting from the site to the future sanitary manhole MH-G41-0029 at the intersection of Stevens Road and Munday Court as proposed by the Region of Durham. The sanitary sewers will be offset 1.5 metres to the south from Stevens Road centerline. As there is an existing 200mm watermain located in Stevens Road, the sanitary sewer alignment is proposed to maintain 2.5 metres horizontal clearance from the watermain.

A downstream analysis of the Brookhill sanitary sewer extension has been completed based on information provided by the Region of Durham. The sanitary design sheet and drainage scheme documents have been included in **Appendix B**. The site was originally planned to have a population of 160 people and the external sanitary sewer extension was designed to account for this population. Based on the pre-consultation meeting minutes an upper limit of 1182 residents may reside at the site. A comparison was done to demonstrate that the downstream pipes still have capacity with the increased population. A summary of the downstream flows at MH-G42-0189 are presented in **Table 5-1** below and the entire downstream analysis can be found in the design sheet in **Appendix C**.

Table 5-1: Downstream Sewer Capacity Analysis

Design Scenario	MH-G42-0189 Design Flow (L/s)	MH-G42-0189 Design Capacity (L/s)	Capacity (%)
Durham Region Design Sheet (160 persons)	88.71	110.89	80%
TYLin Design Sheet (160 persons)	95.02	110.89	86%
TYLin Design Sheet (1182 persons)	107.24	110.89	97%

This demonstrates that the downstream Brookhill sanitary extension has capacity for the increased population size, however the system is nearing its design capacity.

5.3.2 Internal Site Servicing

Two internal sanitary maintenance holes are proposed within the site and are shown on the site servicing plan **GP01** in **Appendix E**. The sanitary sewers collect flows from the proposed townhouses on the western side of the site with one sanitary connection provided to the underground parking structure where sanitary flows will be direct via internal mechanical plumbing. The private internal sanitary sewers will connect into the proposed sanitary sewer in Stevens Road via a sanitary control manhole set 1.5m within the property.

6 WATER SERVICING

6.1 Existing Water Servicing

An existing 200mm diameter watermain is located along Stevens Road and terminates at dead end flushing hydrant C29 in the south boulevard at the eastern limit of Stevens Road. Refer to the as-built drawings in **Appendix A**. A hydrant flow test was performed on Stevens Road hydrants C28 and C29 to determine the actual static pressure and available flow and is provided in **Appendix D**. Based on this test the actual static pressure is 90.4 psi, in excess of the maximum O.B.C. allowance of 80 psi. Due to this excess, a private pressure reducing valve will be required. The existing 200mm watermain on Stevens Road will be maintained.

6.2 Proposed Water Servicing

Two proposed connections will be made to the existing 200mm watermain within Stevens Road via cut-in-tees. The two connections, consisting of a 200mm diameter firemain and 150mm diameter domestic, will enter an internal water meter and backflow preventer room in the underground parking level of the site. A private domestic watermain will exit from the underground parking level after passing through the domestic watermeter and backflow preventer to supply the 11 townhouse units via conventional lateral service connections. The other buildings and private hydrants on site will be serviced internally via mechanical plumbing system.

The proposed internal water distribution system will be designed to accommodate peak water demand as per the Region of Durham water design criteria.

The following criteria was used in determining the water demands for the proposed development:

- A total of 1182 residents at an average daily water demand of 364 L/cap/day
- A maximum hourly peaking factor of 3.8
- A maximum day demand of 18.92 L/s from a peak factor of 3.8
- A fire flow demand of 169 L/s

The designed water demand is the maximum day demand plus the fire flow demand. Therefore, the water demand is 188 L/s. Per the hydrant flow test the existing 200mm watermain in Stevens Road has an available flow of 194 L/s (3076 gpm) which is sufficient for the site based on the preliminary water demand calculation. The preliminary water demand calculations are based on limited site information at this time and will be refined at the detailed design stage to confirm the findings. If the available flow is deemed not sufficient to meet the fire flow demand, a private fire flow booster pump may be required. The preliminary domestic and fire water demand calculations are provided in **Appendix D**.

The layout of the watermain servicing for the proposed development is shown on the preliminary general servicing plan in **Appendix E**. The internal watermain distribution system will be a combination of 200mm and 150mm diameter mains, which should be sufficient to meet the maximum day and fire flow demands.

6.3 Fire Hydrant Coverage

Fire hydrant locations have been reflected on the general servicing plan in **Appendix E**. These locations are preliminary in nature and will be refined at the detailed design stage to meet O.B.C. coverage and location requirements.

7 EROSION AND SEDIMENT CONTROL

7.1 Preliminary Erosion and Sediment Control

During topsoil stripping and area grading, in addition to double row silt fences along the property line, two separate sediment traps will be utilized to prevent excess silt from escaping the site and reaching the Bowmanville Creek. One sediment trap is designed to take drainage from the northern half of the site (1.77ha) and the second is designed to take drainage from the southern half (1.99ha) of the site. The sediment traps will be 20m long, 10m wide, with a 0.5H:1V side slope and are sized for 125m³ per hectare of area they are accepting in accordance with the STEP Erosion and Sediment Control Guidelines for Urban Construction (2019). A portion of the external adjacent residential properties to the west flow into the site, as such the ponds have been sized to account for this additional area. Temporary 0.5-metre-deep swales along the northern, southern, and eastern property lines will direct storm runoff to the sediment traps. These temporary runoff swales will have silt soxx filters or rock check dams as an additional erosion control measure. A 10m wide, 30m long mud-mat and culvert will be placed at the site construction entrance location. Drawing **ESC01** in **Appendix E** demonstrates the proposed erosion control measures. A more detailed ESC plan for construction stages will be provided during detailed design.

8 UTILITIES

A preliminary investigation was made in the existing utility infrastructure in the adjacent Stevens Road right-of-way. The local utilities were contacted with a request to provide the latest system maps and plants. The results of those data requests are provided in **Appendix F**.

9 CONCLUSIONS

Based on our review and analysis, we conclude that the proposed development can be serviced by existing and future external infrastructure and internal proposed infrastructure based on the Region of Durham, Municipality of Clarington and CLOCA design criteria

A summary of our findings are as follows:

- Proposed site grading conforms the municipal design criteria.
- No grading or construction activities are proposed within the Bowmanville Creek flood line.
- A retaining wall is required along to site's southern boundary due to the elevation difference between the proposed internal graded and the existing elevations.
- The internal watermain system will be connected to the existing 200mm diameter watermain in Stevens Road.
- A water meter and backflow preventer will be provided internal to the site per region criteria.
- A private pressure reducing valve is required on site.
- Private hydrants will be proposed internal to the site per the Ontario Building Code.
- A 250mm diameter sanitary sewer is proposed to extend east in the Stevens Road right-of-way from the future sanitary stub (by others) at the intersection of Stevens Road and Munday Court.
- The anticipated peak sanitary flow from the proposed development is 19.45 L/s.

- Sanitary servicing of the site will be achieved with a conventional gravity pipe network out letting to the proposed sanitary sewer extension in Stevens Road.
- Post development stormwater flows will be controlled to predevelopment values.
- Site stormwater quantity control will be provided via underground storage tanks and orifice control structure.
- Site stormwater quality control will be provided via a treatment train approach of oil-grit separators, separator rows in the storage tank, and a plunge / settling pool at the site stormwater outlet.
- Storm water outlets located in the valley lands are located above the 100yr floodline.

This report is to be read in conjunction with the Stormwater Management Report prepared by T.Y.Lin, dated May 2022.

We trust you find the contents of this report satisfactory. Should you have any questions or comments please do not hesitate to contact the undersigned. Sincerely,

T.Y.Lin International Canada Inc.



Monica Ruiz, P.Eng., PMP
Director of Development

A handwritten signature in black ink, appearing to read "Caleb Donald".

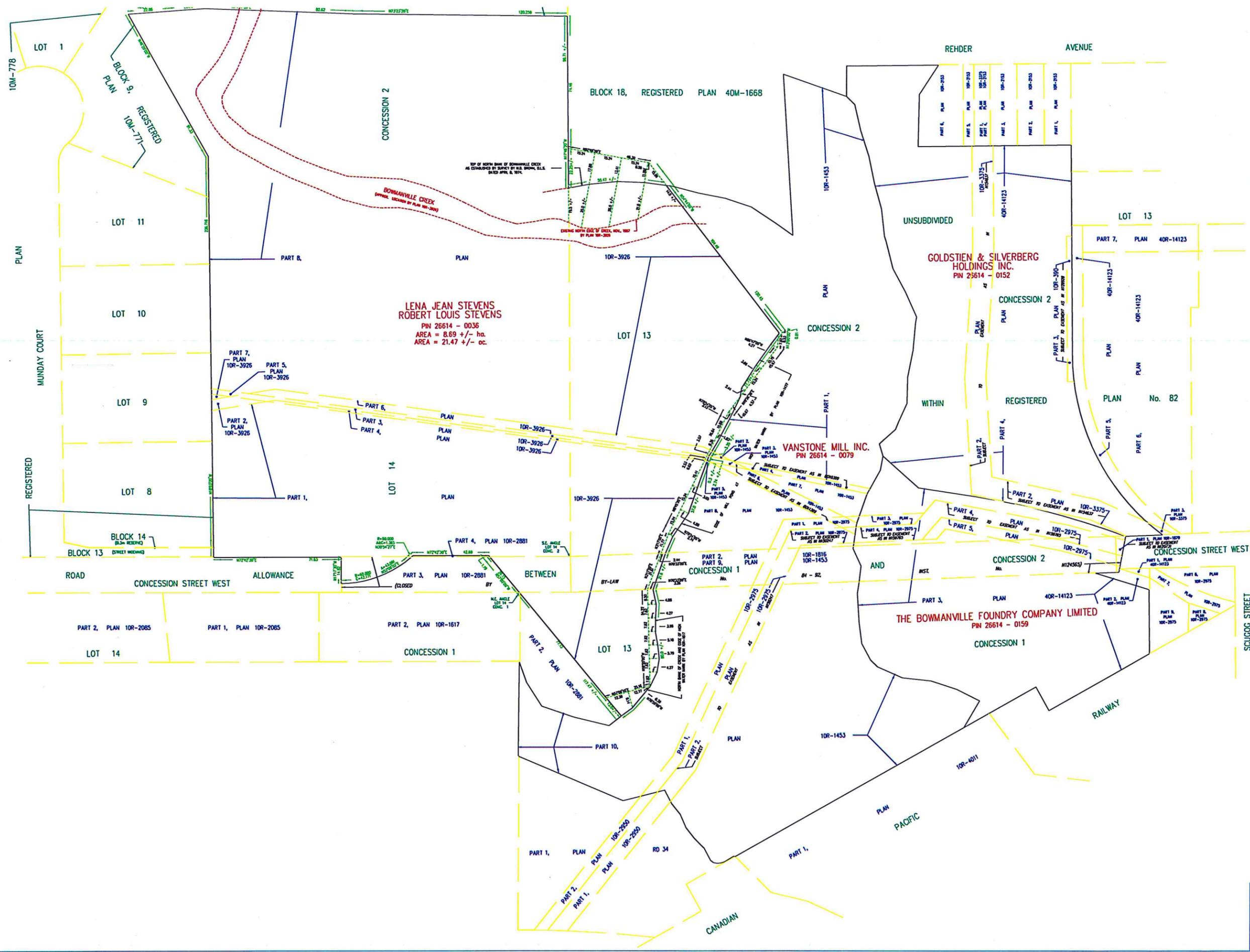
Caleb Donald, EIT
Designer

A handwritten signature in blue ink, appearing to read "Heikki Loorand".

Heikki Loorand, EIT
Engineer-In-Training

APPENDIX A

As-Built Drawings

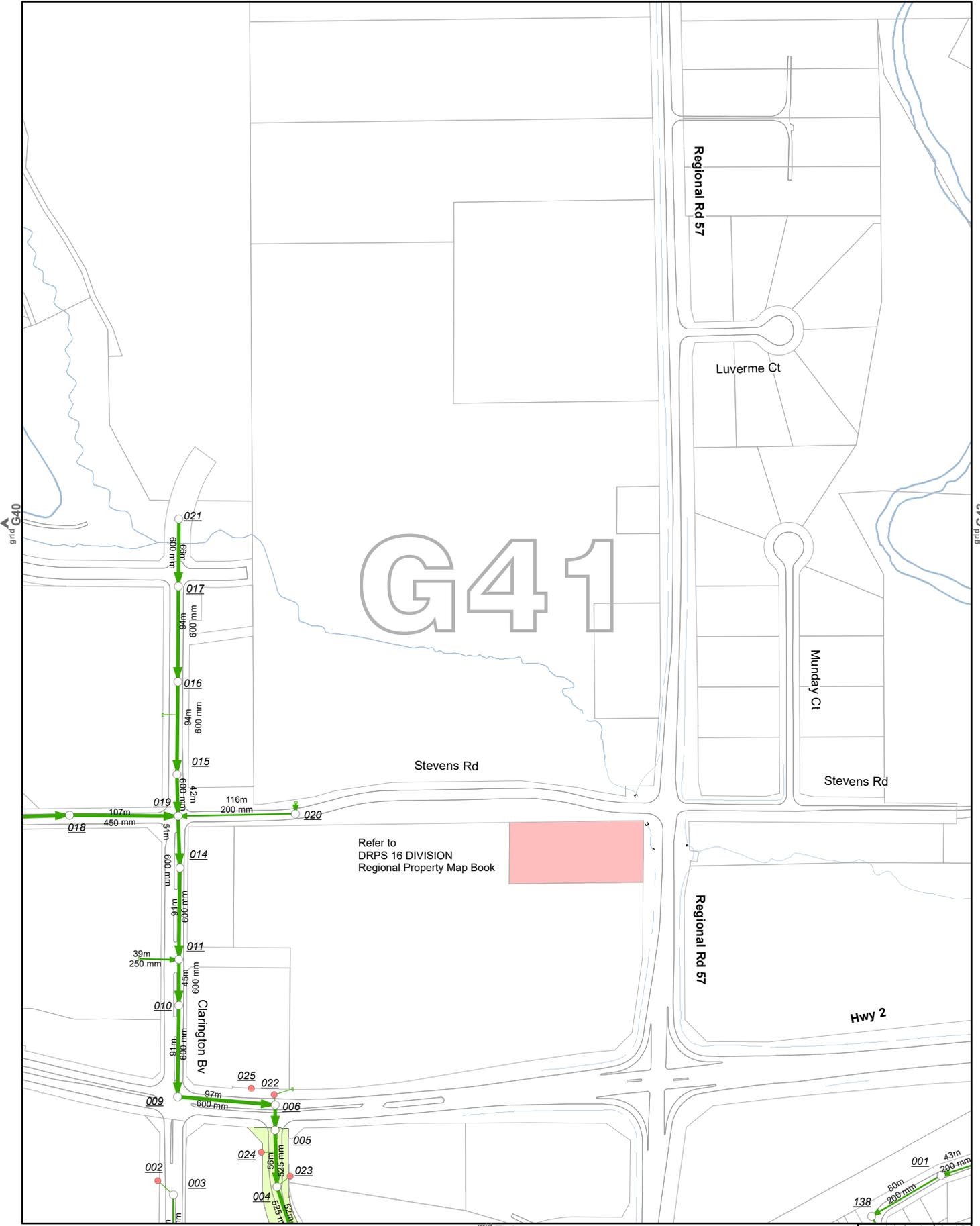


CONCESSION 2, PART OF THE ROAD ALLOWANCE BETWEEN CONCESSIONS 1 AND 2 (CLOSED BY BY-LAW No. 84-92, INST. No. N124565) AND PART OF UNSUBDIVIDED LOT 13 CONCESSION 2, WITHIN REGISTERED PLAN No. 82 MUNICIPALITY OF CLARINGTON REGIONAL MUNICIPALITY OF DURHAM SCALE 1 : 750

J. D. BARNES LIMITED
 METRIC DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.
 NOTES:
 BOUNDARY INFORMATION DERIVED FROM PLANS 10R-1453, 10R-3926 AND 40R-14123.
 INST. No. 8010399 AND 8011388 - (BELL CANADA EASEMENTS)
 INST. No. 8120233 - (REGIONAL MUNICIPALITY OF DURHAM EASEMENT) (CHAIRMAN'S SEWER)
 INST. No. 8129825 - (REGIONAL MUNICIPALITY OF DURHAM EASEMENT) (WATERMAIN)
 INST. No. 8150247 - (REGIONAL MUNICIPALITY OF DURHAM EASEMENT) (WATERMAIN)
 INST. No. 8154537 - (REGIONAL MUNICIPALITY OF DURHAM EASEMENT) (CHAIRMAN'S SEWER)
 INST. No. 8156765 - (REGIONAL MUNICIPALITY OF DURHAM EASEMENT) (WATERMAIN)

J. D. BARNES LIMITED
 110 SCUGOG COURT, #40 WESTY, ON L3R 9Y7
 T: (905) 763-1010 F: (905) 763-0234 www.jdbarnes.com

DRAWN BY: K.L.	CHECKED BY: S.C.C.	DATE: JULY 15 2011
PROJECT: 05-25-670-00		SCALE: 1:750



Force Main - Assumed
 Force Main - Issued for Construction
 Force Main - Maintenance

Trunk - Assumed
 Trunk - Maintenance
 Trunk - Issued for Construction

Sewerline - Assumed
 Sewerline - Maintenance
 Sewerline - Issued for Construction

G41

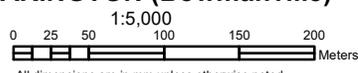
Refer to
 DRPS 16 DIVISION
 Regional Property Map Book



**The Regional Municipality of Durham
 Works Department
 Sanitary Sewer System**

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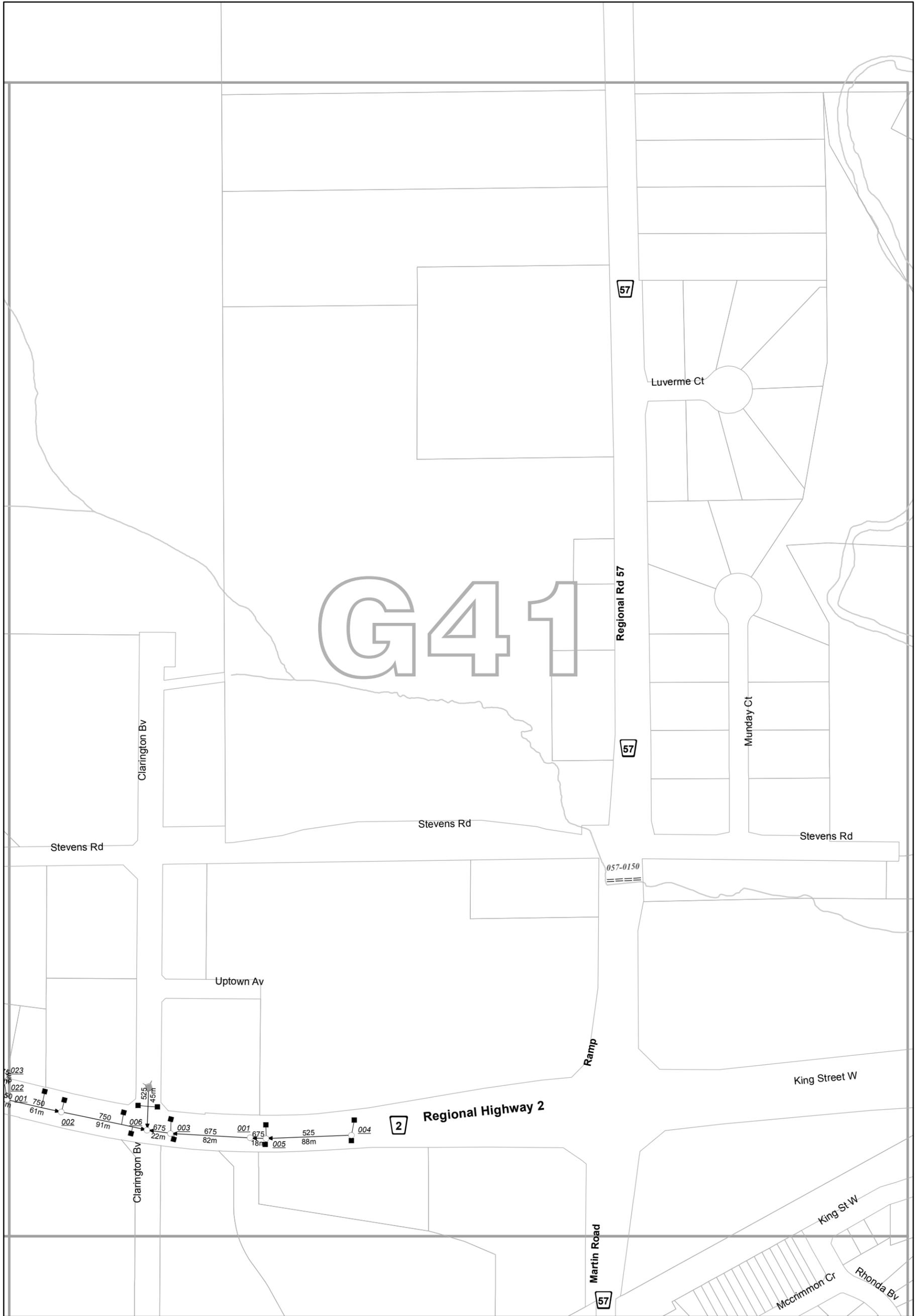
CLARINGTON (Bowmanville)



APRIL 1, 2022

Servicing Note:
 THIS MAP DEPICTS LOCAL PROXIMITY OF SERVICES ONLY. IT IS NOT TO BE USED TO DETERMINE INDIVIDUAL SITE SERVICING AVAILABILITY OR AVAILABILITY OF CAPACITY WITHIN THE SYSTEM. FOR DETAILED SITE SERVICING INFORMATION PLEASE CONTACT THE DEVELOPMENT APPROVALS SECTION OF THE WORKS DEPARTMENT.

H40	H41	H42
G40	G41	G42
F40	F41	F42



G40

Clarington Bv

Stevens Rd

Uptown Av

Clarington Bv

Stevens Rd

Regional Highway 2

57

Regional Rd 57

57

057-0150

Ramp

Martin Road

57

Luverme Ct

Munday Ct

Stevens Rd

King Street W

King St W

Mccrimmon Cr

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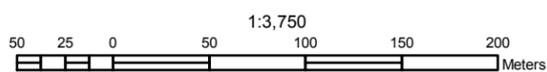
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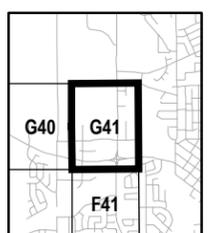
**The Regional Municipality of Durham
Works Department
Storm Sewer System**

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*Municipality of CLARINGTON
(BOWMANVILLE)*



Revised June 2010
Issued for construction up to May 2010

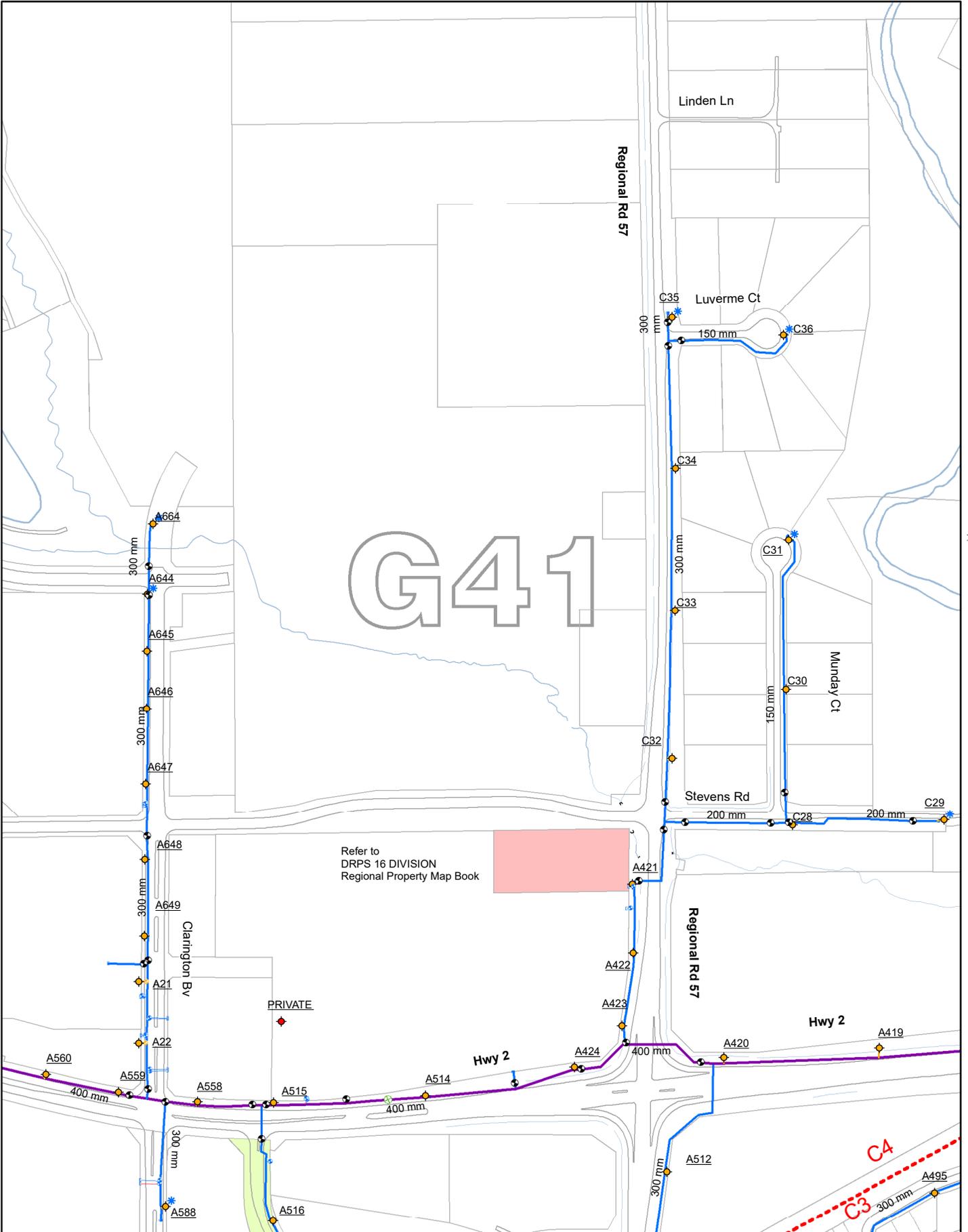


grid H41

grid G40

grid G42

grid F41



- Feeder Main - Issued for Construction
- Feeder Main - Assumed or In Service
- Feeder Main - Maintenance
- Raw Feeder Main - Assumed

- Water Main - Issued for Construction
- Water Main - Not In Service

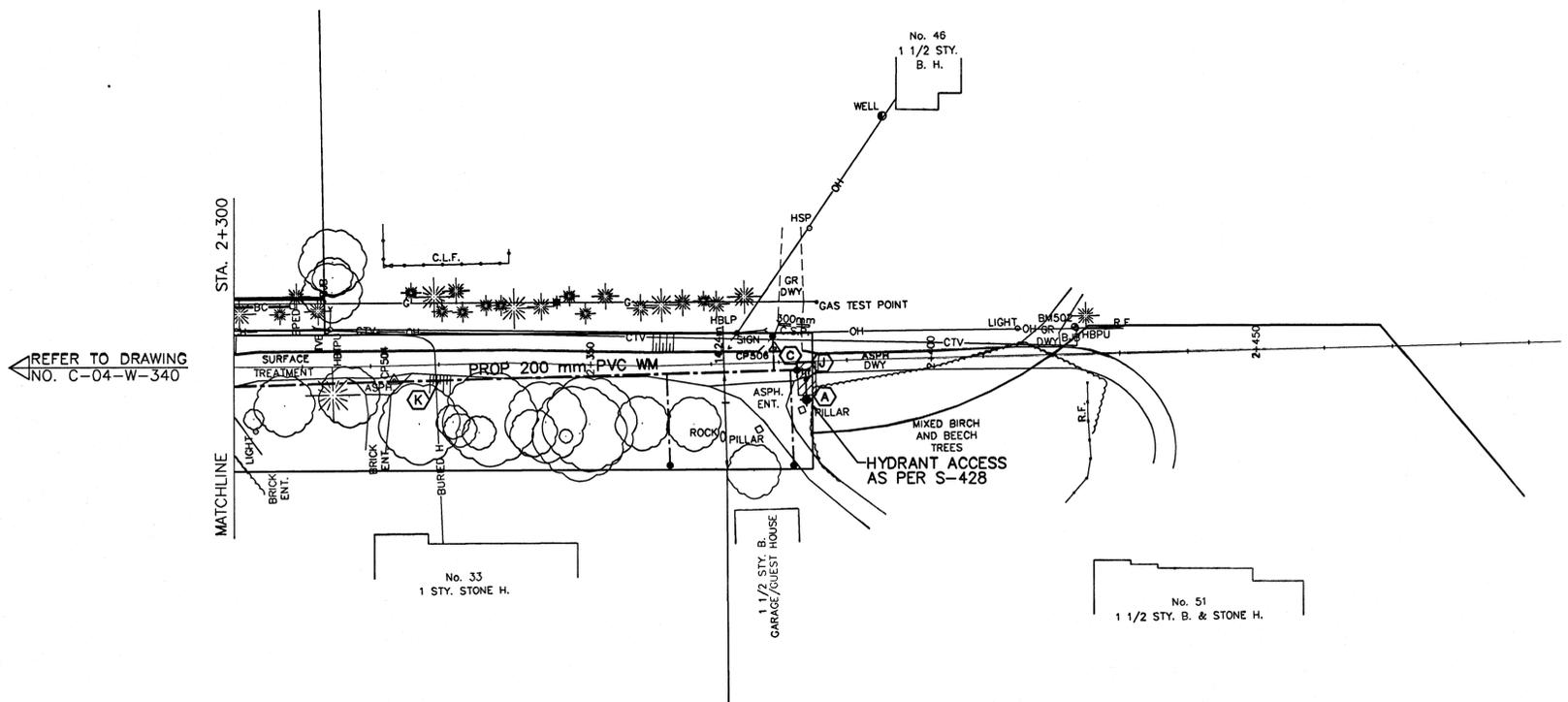
- Water Main - Assumed or In Service
- Water Main - Maintenance
- Raw Water Main - Assumed

The Regional Municipality of Durham Works Department Water Supply System
 This map has been produced from a variety of sources. The Region of Durham does not make any representations concerning the accuracy, likely results, or reliability of the use of the materials. The Region hereby disclaims all representations and warranties. © Teranet Inc. and its suppliers. All rights reserved. Produced by Durham Region under license with the Ontario Ministry of Natural Resources, copyright Queen's Printer for Ontario, 2021. May not be reproduced without permission. Not a plan of survey. Drainage provided by © First Base Solutions 2019.

CLARINGTON (Bowmanville)
 1:5,000
 0 25 50 100 150 200 Meters
 All dimensions are in mm unless otherwise noted.
 March 25, 2022

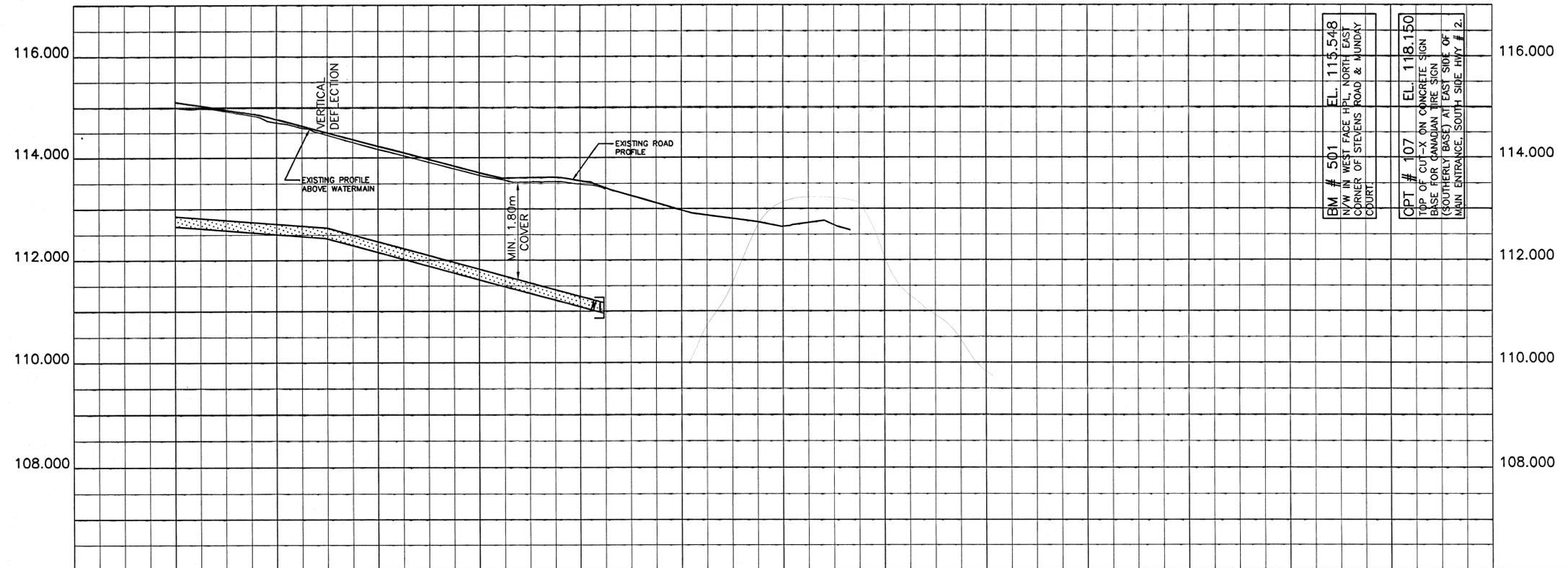
Servicing Note:
 THIS MAP DEPICTS LOCAL PROXIMITY OF SERVICES ONLY. IT IS NOT TO BE USED TO DETERMINE INDIVIDUAL SITE SERVICING AVAILABILITY OR AVAILABILITY OF CAPACITY WITHIN THE SYSTEM. FOR DETAILED SITE SERVICING INFORMATION PLEASE CONTACT THE DEVELOPMENT APPROVALS SECTION OF THE WORKS DEPARTMENT.

H40	H41	H42
G40	G41	G42
F40	F41	F42



REFER TO DRAWING NO. C-04-W-340

STEVENS ROAD



BM # 501 EL. 115.548
N/W IN WEST FACE H.P. NORTH EAST
CORNER OF STEVENS ROAD & MUNDAY
COURT

CPT # 107 EL. 118.150
TOP OF CUT-X ON CONCRETE SIGN
BASE FOR CANADIAN TIRE SIGN
(SOUTHERLY BASE) AT EAST SIDE OF
MAIN ENTRANCE, SOUTH SIDE HWY # 2.

PROPOSED WATERMAIN DATA			
MARK	DESCRIPTION	CHAINAGE	TOP OF WATERMAIN ELEVATION
A	PROPOSED HYDRANT ASSEMBLY (STORZ)(*HYD EXTENSION REQ'D)	2+383.91	111.188
C	PROP 200 mm GATE VALVE	2+382.65	111.221
J	PROPOSED MECHANICAL PLUG	2+384.66	111.168
K	PROPOSED VERTICAL DEFLECTION	2+330.00	112.627

REFER TO DWG C-04-W-337 & C-04-W-338 FOR WATERMAIN NOTES AND RESTORATION NOTES

NOTE: FOR 'AS CONSTRUCTED' SERVICE CONNECTION LOCATIONS, REFER TO LATERAL LOCATION SHEETS.

NO.	DATE	NAME	REVISIONS

LOCATION APPROVAL
MUNICIPALITY OF CLARINGTON *[Signature]* DATE *04/13/04*

UTILITIES VERIFIED			
ROGERS CABLE T.V.	2003 12 29	HYDRO ONE	2003 10 12
BELL CANADA	2003 11 27	VERIDIAN CONN.	2003 12 23
CONSUMERS GAS	2003 11 24	MUN. OF CLARINGTON	2004 06 04

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES REQUIRE ADVANCE NOTICE PRIOR TO DIGGING, FOR STAKE OUT. THE REGION ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

REGISTERED PROFESSIONAL ENGINEER
[Signature]
PROVINCE OF ONTARIO
04/06/04

SURVEY DATA DATE
2003 05 02

SCALE
HORIZONTAL 1:500
10m 0 10m
VERTICAL 1:50
1m 0 1m

DRAWN:	J. BRUCE	DATE:	2003 11
DESIGN:	J. BRUCE	DATE:	2004 03
CHECKED:	P. STORMS	DATE:	2004 06
APPROVED:	A. W. HO	DATE:	2004 06

THE REGIONAL MUNICIPALITY OF DURHAM
WORKS DEPARTMENT
WHITBY ONTARIO

STEVENS ROAD		
FROM 80 m EAST OF MUNDAY CT TO 165 m EAST OF MUNDAY CT		
CONCESSION	REG. RD. NO.	AREA MUNICIPALITY
		CLARINGTON (BOWMANVILLE)
DRAWING NUMBER	CONTRACT NUMBER	SHEET NUMBER
C-04-W-341	D2004-040	7 OF 10

NOTE: ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

APPENDIX B

Regional Sanitary Sewer Extension Drawings



REGIONAL MUNICIPALITY OF DURHAM SANITARY SEWER DESIGN SHEET (METRIC)

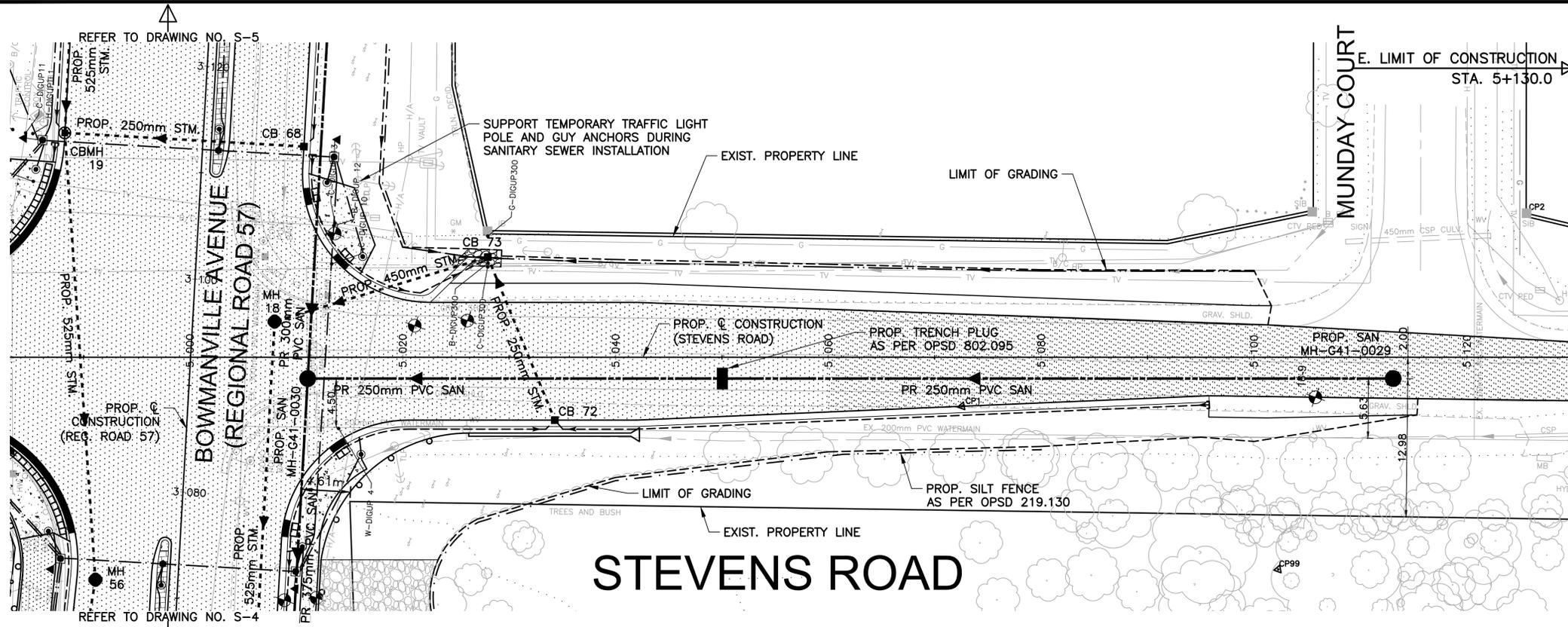


MUNICIPALITY:
 PROJECT: **RR57/Hwy 2**
 FROM: **Kings Hill Lane/Waverly Road**
 TO: **Future Brookill Boulevard**
 CONTRACT NO.:

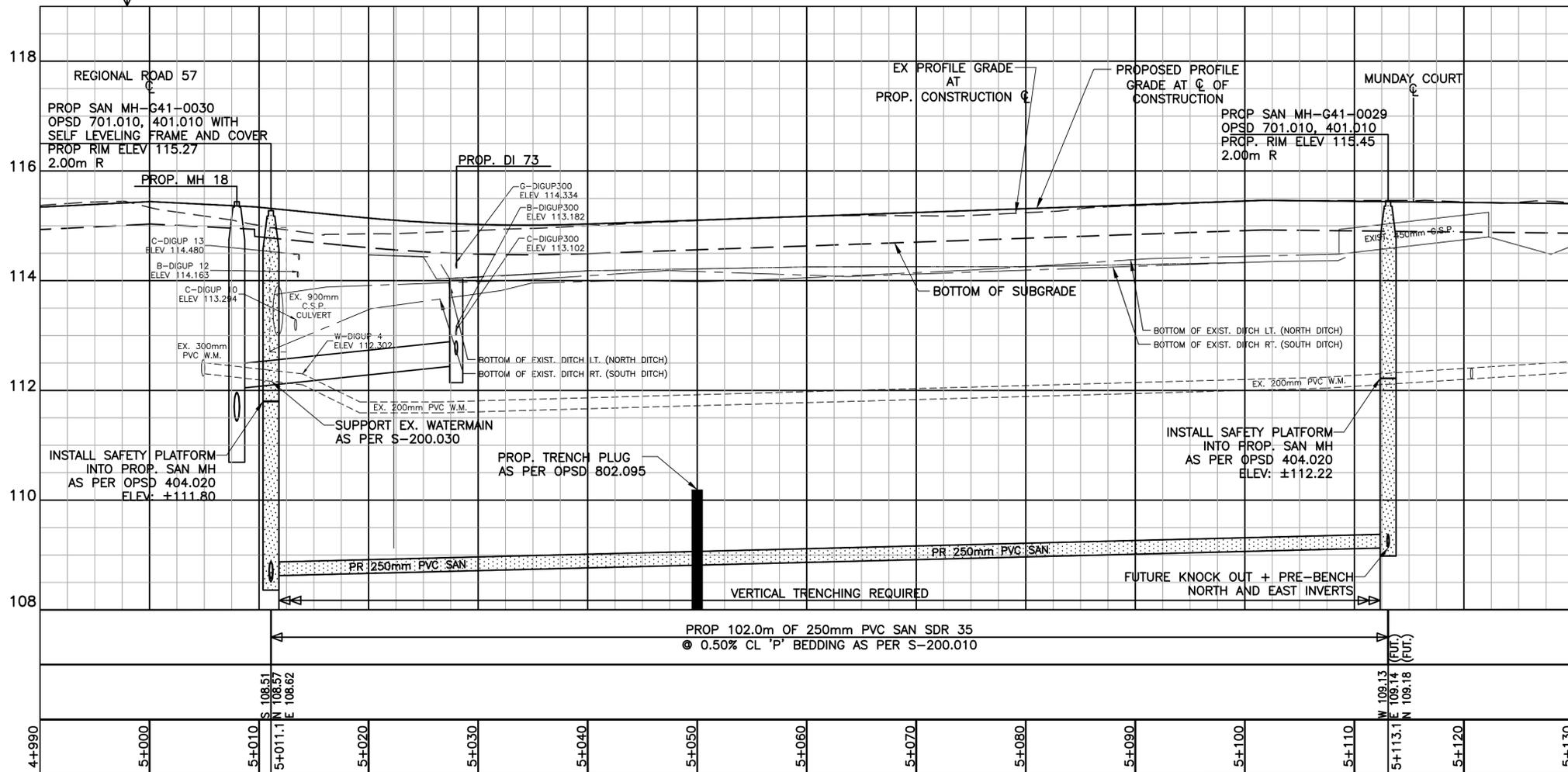
DESIGNED BY: M.D.
 CHECKED BY: P.T.
 MANNING'S "n":
 DATE: 12-01-21 TIME: 09:28 AM

- NOTES:**
- 1) MINIMUM VELOCITY = 0.60 m/s
 - 2) MAXIMUM VELOCITY = 3.65 m/s
 - 3) INFILTRATION 0.26 l/s = 22.5 m³/Ha/DAY
 INFILTRATION 0.52 l/s = 45.0 m³/Ha/DAY (Foundation Drain Connections)
 - 4) INDUSTRIAL 2.08 l/s (local sewers) 1.04 l/s (trunk sewers)
 1.04 l/s (trunk sewer)
 - 5) EXISTING CONDITION INCLUDES COMMITTED DEVELOPMENT
 - 6) USE ACTUAL METRIC I.D. PIPE SIZE IN mm
 - 7) COMMERCIAL FLOOR SPACE INDEX=50% UNLESS OTHERWISE KNOWN

SUBDIVISION AREA	RESIDENTIAL				COMMERCIAL			INDUST.	INSTIT.	FLOW IN LITRES PER SECOND					PROPOSED SEWER				PRESENT CONDITION	
	GROSS AREA (Ha)	POP. DENSITY (PERSONS/ PER Ha)	POP.	PEAK FLOW FACTOR	LOT AREA (Ha)	FLOOR SPACE INDEX	FLOOR AREA (Ha)	LOT AREA (Ha)	LOT AREA (Ha)	RESIDENTIAL FLOW		COMM. 2.08 l/s	INDUS. 2.08 l/s	INSTIT. 1.30 l/s	TOTAL FLOW l/s	ACT. PIPE SIZE (mm)	SLOPE %	Q l/s	V m/s	SURCHARGED %
										INFIL. 0.26 l/s	SEWAGE 0.0042 l/s									
North of Stevens Road	40.11		0 4,408 0 0			0.00 0.00 0.00 0.00												0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
	40.11		4,408	3.30			0.00	0.00	0.00	10.43	61.01	0.00	0.00	0.00	71.44	300	1.00	96.70	1.37	0.00
East of Stevens Road	8.92		0 206 0 0			0.00 0.00 0.00 0.00												0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
	8.92		206	3.80			0.00	0.00	0.00	2.32	3.29	0.00	0.00	0.00	5.61	250	0.50	42.05	0.86	0.00
S/W corner of RR57 & Stevens Rd S/E corner of RR57 & Hwy 2 Church N/E corner of RR57 & Hwy 2			0 0 0		2.80	1.00	0.00 2.80 0.00 0.00		0.80 4.30									0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
	49.03		4,614	3.28			2.80	0.00	5.10	12.75	63.51	5.82	0.00	6.63	88.71	375	0.40	110.89	1.00	0.00



STEVENS ROAD



118
116
114
112
110
108

118
116
114
112
110
108

LENGTHS, SIZES AND GRADES
SAN SEWER INVERT ELEV
Q OF CONSTRUCTION CHAINAGE

4+990	5+000	5+010	5+011.1	5+020	5+030	5+040	5+050	5+060	5+070	5+080	5+090	5+100	5+110	5+113.1	5+120	5+130
-------	-------	-------	---------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	---------	-------	-------

PROP 102.0m OF 250mm PVC SAN SDR 35
@ 0.50% CL 'P' BEDDING AS PER S-200.010

NOTE: ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

GENERAL NOTES:

REFER TO ROADWORKS DRAWINGS FOR PROPOSED STORM SEWER AND ROAD DESIGN.

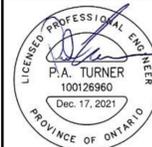
FINAL LOCATION OF TRENCH PLUGS SHALL BE VERIFIED IN THE FIELD DURING CONSTRUCTION BY GEOTECHNICAL ENGINEER.



415 Baseline Road West, 2nd Floor, Bowmanville, ON L1C 5M2 CANADA

NO.	DATE	NAME	REVISIONS
UTILITIES VERIFIED			
ROGERS	2018 01 02	VERIDIAN	2019 01 23
BELL CANADA	2019 02 04		
ENBRIDGE GAS	2017 11 14		
HYDRO ONE	2017 12 14		

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES REQUIRE ADVANCE NOTICE PRIOR TO DIGGING, FOR STAKE OUT. THE REGION ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.



DRAWN: P. MERRETT
DESIGN: A. YANG
CHECKED: P. TURNER
APPROVED: P. TURNER

SURVEY DATA DATE

2015 05 12

SCALE

HORIZONTAL 0 5m

VERTICAL 1m 0 1m

DATE: 2019 01 05

DATE: 2019 12 13

DATE: 2021 12 08

DATE: 2021 12 08



THE REGIONAL MUNICIPALITY OF DURHAM
WORKS DEPARTMENT
WHITBY ONTARIO

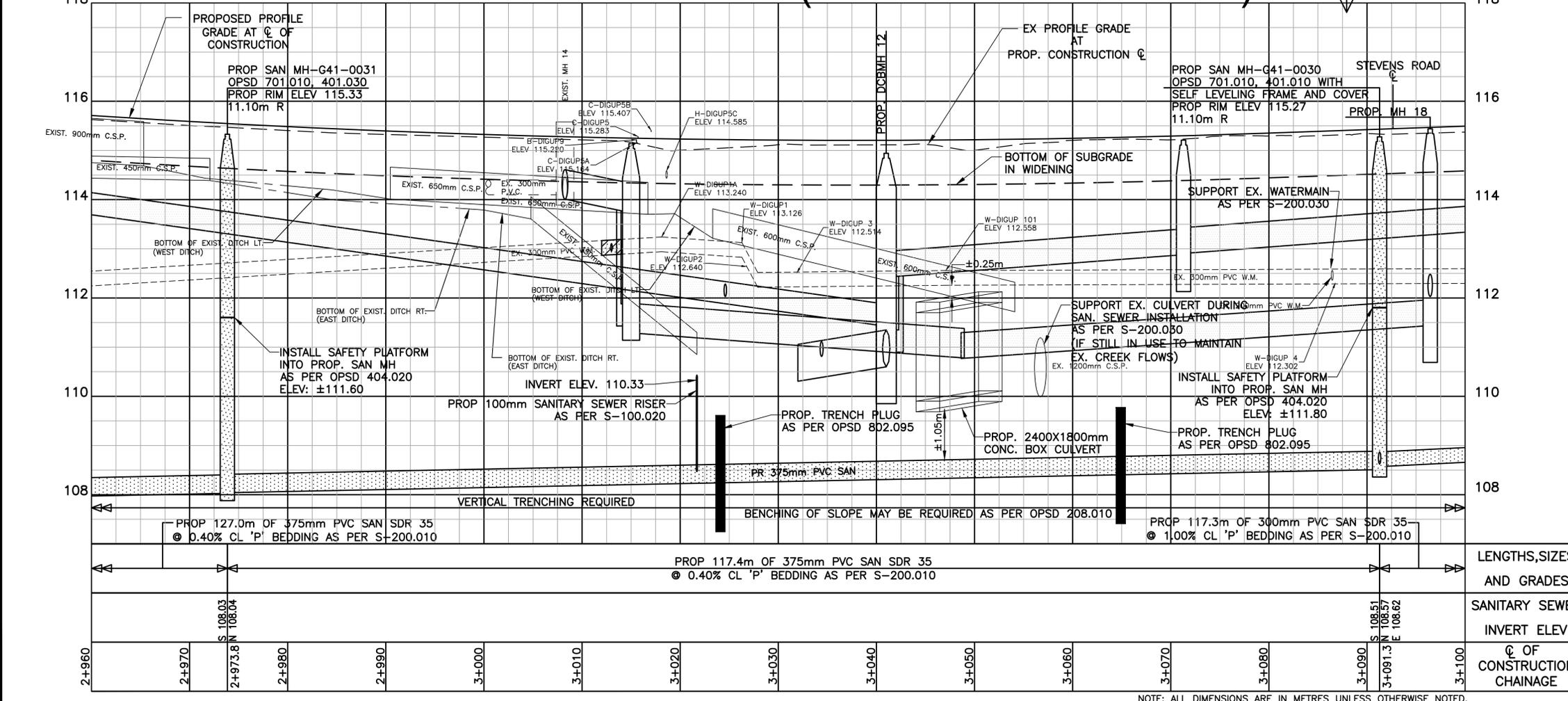
STEVENS ROAD FROM REGIONAL ROAD 57 TO MUNDAY COURT

CONCESSION 1/2	REG. RD NO. 57	AREA MUNICIPALITY MUNICIPALITY OF CLARINGTON
DRAWING NUMBER S-10	CONTRACT NUMBER D2022-29	SHEET NUMBER 55 OF 153



BOWMANVILLE AVENUE (REGIONAL ROAD 57)

GENERAL NOTES:
 REFER TO ROADWORKS DRAWINGS FOR PROPOSED STORM SEWER AND ROAD DESIGN.
 FINAL LOCATION OF TRENCH PLUGS SHALL BE VERIFIED IN THE FIELD DURING CONSTRUCTION BY GEOTECHNICAL ENGINEER.



NO.	DATE	NAME	REVISIONS
UTILITIES VERIFIED			
ROGERS	2018 01 02	VERIDIAN	2019 01 23
BELL CANADA	2019 02 04		
ENBRIDGE GAS	2017 11 14		
HYDRO ONE	2017 12 14		

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES REQUIRE ADVANCE NOTICE PRIOR TO DIGGING, FOR STAKE OUT. THE REGION ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

LICENSED PROFESSIONAL ENGINEER
 P.A. TURNER
 100126960
 Dec 17, 2021
 PROVINCE OF ONTARIO

SURVEY DATA DATE
2015 05 12

SCALE
 HORIZONTAL 1:500
 VERTICAL 1:100

DRAWN: P. MERRETT
 DESIGN: A. YANG
 CHECKED: P. TURNER
 APPROVED: P. TURNER

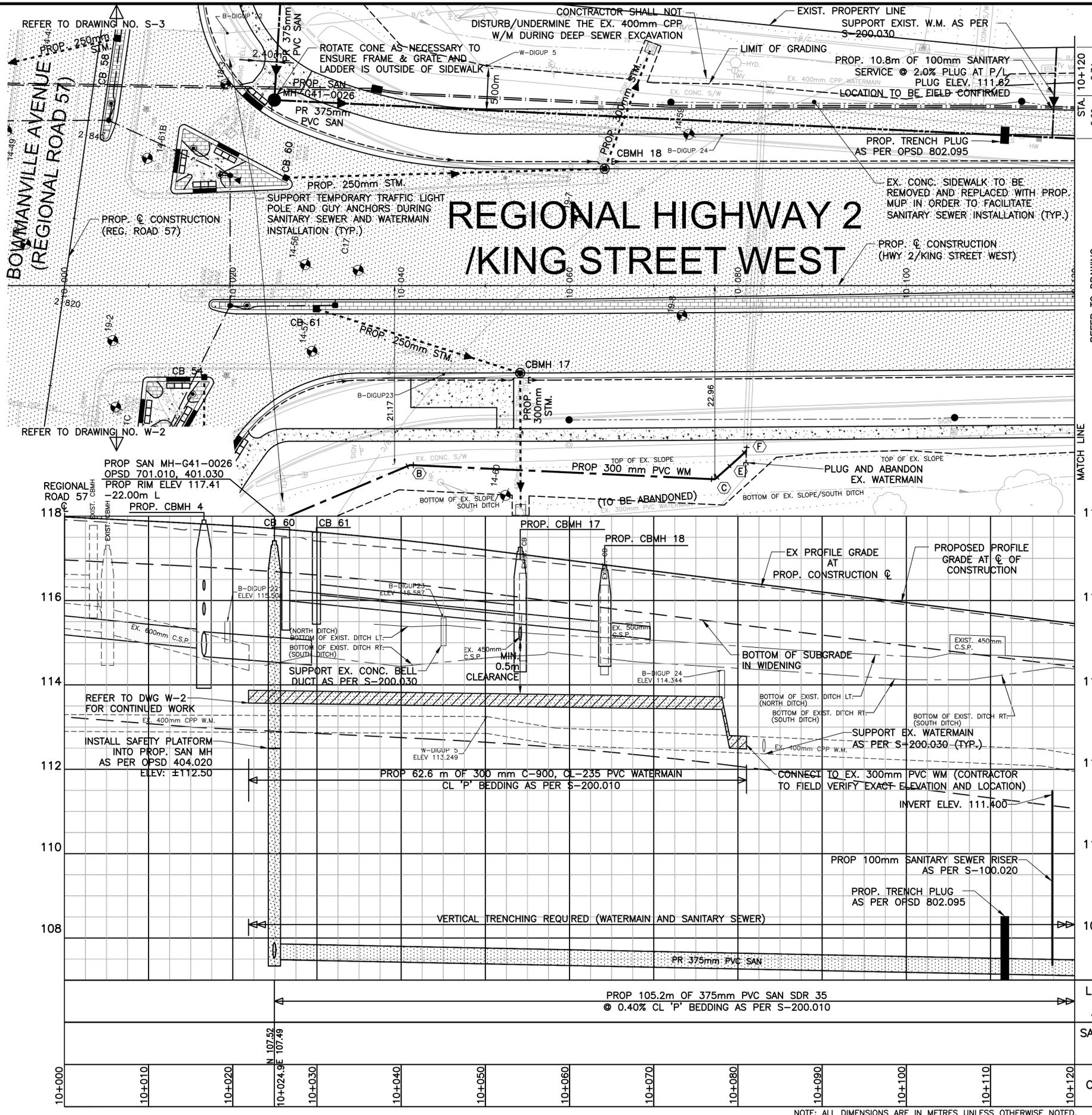
DATE: 2019 01 05
 DATE: 2019 12 13
 DATE: 2021 12 08
 DATE: 2021 12 08

THE REGIONAL MUNICIPALITY OF DURHAM
 WORKS DEPARTMENT
 WHITBY ONTARIO

REGIONAL ROAD 57		
FROM 130m SOUTH OF STEVENS ROAD TO 10m NORTH OF STEVENS ROAD		
CONCESSION 1/2	REG. RD NO. 57	AREA MUNICIPALITY MUNICIPALITY OF CLARINGTON
DRAWING NUMBER S-4	CONTRACT NUMBER D2022-29	SHEET NUMBER 49 OF 153

Plotted - December 16, 2021 File: Z:\Cima-C14\Projects\C14-00278 - RR 57 Design (Durham)\400-Drawings and Sheets\C14-00278-RR57-Sub.dwg
 2:1960 2:1970 2:1973.8 2:1980 2:1990 3:1000 3:1010 3:1020 3:1030 3:1040 3:1050 3:1060 3:1070 3:1080 3:1090 3:1091.3 3:1100

NOTE: ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.



REFER TO DRAWING NO. S-3

REFER TO DRAWING NO. W-2

REFER TO DRAWING NO. S-8

REFER TO DRAWING NO. S-8

STA. 10+120

MATCH LINE

LENGTHS, SIZES AND GRADES

SANITARY SEWER

INVERT ELEV

Q OF CONSTRUCTION CHAINAGE

PROPOSED WATERMAIN DATA

MARK	DESCRIPTION	STATION	TOP OF WATERMAIN
B	300mm 22.5° BEND	10+041.08	113.82 m
C	300mm 45° HORIZ. BEND (ROTATED DOWN)	10+077.26	113.72 m
E	45° VERT. BEND	10+079.00	112.80 m
F	CUT INTO 300mm 45° BEND AND CONNECT TO EXISTING 300mm PVC WATERMAIN	10+081.02	± 112.78 m

GENERAL NOTES:

REFER TO ROADWORKS DRAWINGS FOR PROPOSED STORM SEWER AND ROAD DESIGN.

THE CONTRACTOR SHALL COORDINATE THEIR WATERMAIN COMMISSIONING PLAN IN CONSULTATION WITH THE CONTRACT ADMINISTRATOR AND OBTAIN APPROVAL PRIOR TO ORDERING ANY MATERIALS AND COMMENCING WITH THE CONSTRUCTION.

FINAL LOCATION OF TRENCH PLUGS SHALL BE VERIFIED IN THE FIELD DURING CONSTRUCTION BY GEOTECHNICAL ENGINEER.

GENERAL NOTES:

REFER TO ROADWORKS DRAWINGS FOR PROPOSED STORM SEWER AND ROAD DESIGN.

FINAL LOCATION OF TRENCH PLUGS SHALL BE VERIFIED IN THE FIELD DURING CONSTRUCTION BY GEOTECHNICAL ENGINEER.

CIMA+

415 Baseline Road West, 2nd Floor, Bowmanville, ON L1C 5M2 CANADA

T. 905.897.4464

NO.	DATE	NAME	REVISIONS
UTILITIES VERIFIED			
ROGERS	2018 01 02	VERIDIAN	2019 01 23
BELL CANADA	2019 02 04		
ENBRIDGE GAS	2017 11 14		
HYDRO ONE	2017 12 14		

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES REQUIRE ADVANCE NOTICE PRIOR TO DIGGING. FOR STAKE OUT. THE REGION ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

PROFESSIONAL ENGINEER

P.A. TURNER
100126960
Dec. 17, 2021
PROVINCE OF ONTARIO

SURVEY DATA DATE: 2015 05 12

SCALE: HORIZONTAL 1:500, VERTICAL 1:100

DRAWN: P. MERRETT
DESIGN: A. YANG
CHECKED: P. TURNER
APPROVED: P. TURNER

DATE: 2019 01 05
DATE: 2019 12 13
DATE: 2021 12 08
DATE: 2021 12 08

THE REGIONAL MUNICIPALITY OF DURHAM

WORKS DEPARTMENT

WHITBY ONTARIO

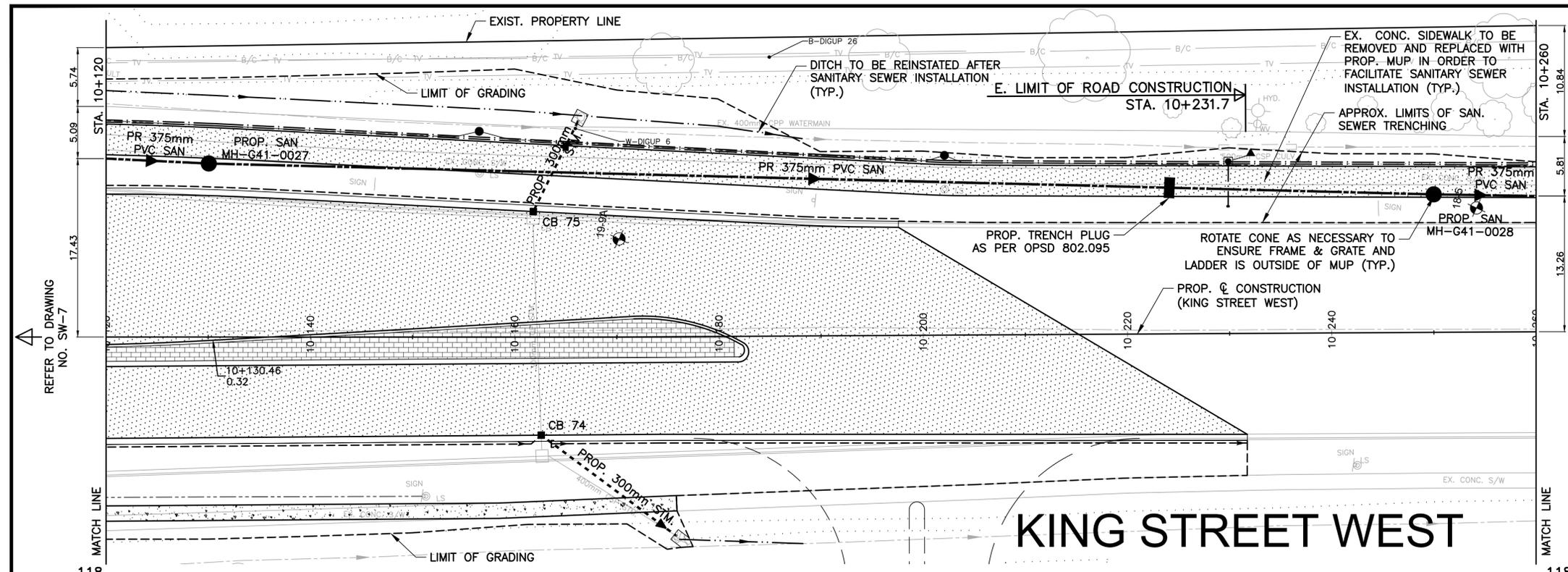
HIGHWAY 2/KING STREET W.

FROM REGIONAL ROAD 57 TO 120m EAST OF REGIONAL ROAD 57

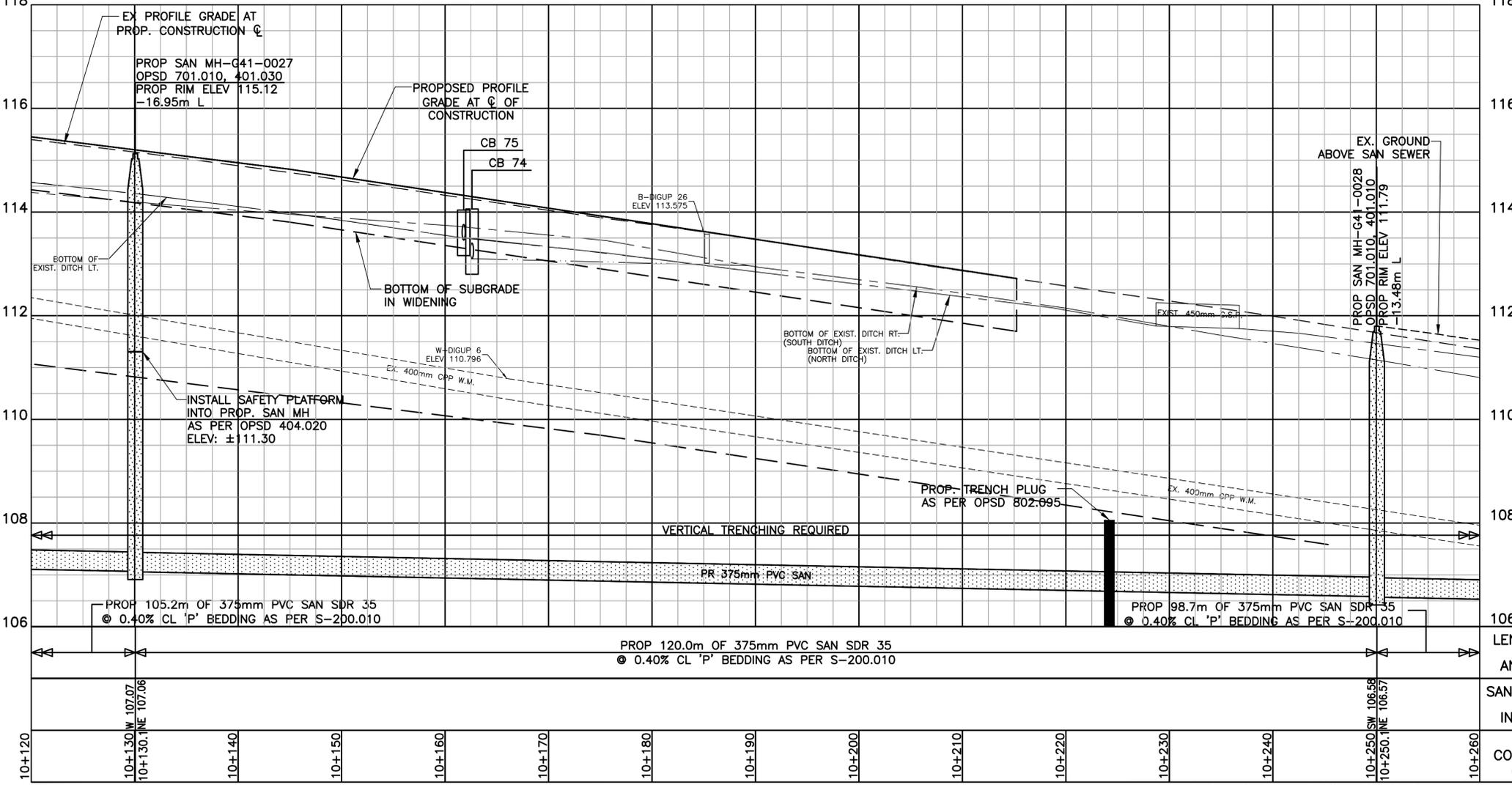
CONCESSION 1/2	REG. RD NO. 57	AREA MUNICIPALITY MUNICIPALITY OF CLARINGTON
DRAWING NUMBER SW-7	CONTRACT NUMBER D2022-29	SHEET NUMBER 52 OF 153

Plotted - December 16, 2021 File: Z:\Cima-C14\Projects\C14-00078 - BR 57 Design (Durham)\400-Drawings and Sketches\C14-00078 - BR 57 Regional Road 57 - SW.dwg
 PLOTTER: HP DesignJet T1100PS

NOTE: ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.



KING STREET WEST



NOTE: ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.



NO. S-9
REFER TO DRAWING

GENERAL NOTES:
REFER TO ROADWORKS DRAWINGS FOR PROPOSED STORM SEWER AND ROAD DESIGN.
FINAL LOCATION OF TRENCH PLUGS SHALL BE VERIFIED IN THE FIELD DURING CONSTRUCTION BY GEOTECHNICAL ENGINEER.



NO.	DATE	NAME	REVISIONS
UTILITIES VERIFIED			
ROGERS	2018 01 02	VERIDIAN	2019 01 23
BELL CANADA	2019 02 04		
ENBRIDGE GAS	2017 11 14		
HYDRO ONE	2017 12 14		

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES REQUIRE ADVANCE NOTICE PRIOR TO DIGGING. FOR STAKE OUT. THE REGION ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

LICENSED PROFESSIONAL ENGINEER
P.A. TURNER
100126960
Dec 17, 2021
PROVINCE OF ONTARIO

SURVEY DATA DATE
2015 05 12

SCALE
HORIZONTAL
0 5m 5m
VERTICAL
0 1m 1m

DRAWN: P. MERRETT	DATE: 2019 01 05
DESIGN: A. YANG	DATE: 2019 12 13
CHECKED: P. TURNER	DATE: 2021 12 08
APPROVED: P. TURNER	DATE: 2021 12 08

THE REGIONAL MUNICIPALITY OF DURHAM

WORKS DEPARTMENT

WHITBY ONTARIO

KING STREET W.		
FROM 120m EAST OF REGIONAL ROAD 57 TO 260m EAST OF REGIONAL ROAD 57		
CONCESSION 1/2	REG. RD NO. 57	AREA MUNICIPALITY MUNICIPALITY OF CLARINGTON
DRAWING NUMBER S-8	CONTRACT NUMBER D2022-29	SHEET NUMBER 53 OF 153

Plotted - December 16, 2021 File: Z:\Cima-C14\Projects\C14-00278 - BR 57 Design (Durham)\400-Drawings and Sheets\C14-00278-000 Regional Road 57-SW.dwg

APPENDIX C

Sanitary Design Calculations



**160 PEOPLE ON SITE
(ORIGINAL D.G. BIDDLE ASSUMPTION)**

THE REGIONAL MUNICIPALITY OF DURHAM
SANITARY SEWER DESIGN SHEET
REGION PROVIDED DESIGN FLOWS

PROJECT : 46 Stevens Road
JOB No. : 10521
Location: Clarington

DESIGNED BY: HL / CD
CHECKED BY : MR
DATE : 5/18/2022

MH. No.	Residential			Peak flow factor	Total Population	Total Area	Commercial			Indus. Lot area (ha)	Institutional Lot (ha)	Flow in L/s				Proposed Sewer						
	Gross area (ha)	Population density (persons/unit)	Population				Lot area (ha)	Floor space Index	Floor area (ha)			Res. flow		Comm. L/S	Indus. L/S	Inst. L/S	Total flow L/s	Pipe Size mm	Slope %	Capacity in L/s	Velocity in m/s	
												Infil* L/S	Sewage L/S									
North of Stevens Road																						
SAN MH-G4-0030			4408	3.30	4408	40.11						10.43	61.20				71.62	300	1.00	96.70	1.37	
East of Stevens Road																						
"Munday Court" (Future) PROP SAN MH201A	5.37		39	4.00	39	5.37						1.40	0.66				2.05	200	1.00	32.80	1.04	
"Stevens Road" (Site)* PROP SAN MH 102A	3.03		160	4.00	160	2.93						0.76	2.70				3.46	250	1.00	59.47	1.21	
"Stevens Road" (South) PROP SAN MH 101A	0.62		7	4.00	167	3.55						0.92	2.81				3.74	250	1.00	59.47	1.21	
SAN MH-G41-0029			206	4.00	206	9.02						2.35	3.47				5.82	250	0.50	42.05	0.86	
South of Stevens Road																						
<i>SW corner of RR57 & STEVENS</i>																						
MH-G41-0031				3.28	4614	49.13					0.80	0.80	12.77	63.70			1.04	77.51	375	0.40	110.89	1.00
MH-G41-0026**	1.84			3.28	4614	50.97					0.80	13.25	63.70				1.04	78.79	375	0.40	110.89	1.00
<i>Church in NW corner of RR57 & HWY 2</i>																						
MH-G41-0027				3.28	4614	50.97					4.30	5.10	13.25	63.70			6.61	88.67	375	0.40	110.89	1.00
MH-G41-0028				3.28	4614	50.97					5.10	13.25	63.70				6.61	88.67	375	0.40	110.89	1.00
MH-G42-0188				3.28	4614	50.97					5.10	13.25	63.70				6.61	88.67	375	0.40	110.89	1.00
<i>SE corner or RR57 & HWY 2</i>																						
MH-G42-0189***	2.11			3.28	4614	53.08	2.80	1.00	2.80		5.10	13.80	63.70	5.83			6.61	95.05	375	0.40	110.89	1.00

* DG Biddle Design had assumed population of 160 people for site
 ** MH-G41-0026 includes an extra 1.84 Ha of infiltration to account for Road area from Stevens Road and Bowmanville Avenue
 *** MH-G41-0189 includes an extra 2.11 Ha of infiltration to account for Road area from Highway 2

Source information includes:
 Sanitary Drainage scheme from 'Brookhill Neighbourhood Sanitary Sewer Extension' By d.G. Biddle Dated August 2013
 "RR57/Hwy 2" Sanitary Sewer Design Sheet by Region of Durham stamped 02/07/2022

TYLin

1182 PEOPLE ON SITE (REVISED SITE PLAN STATISTICS)

THE REGIONAL MUNICIPALITY OF DURHAM
SANITARY SEWER DESIGN SHEET
REGION PROVIDED DESIGN FLOWS

PROJECT : 46 Stevens Road
JOB No. : 10521
Location: Clarington

DESIGNED BY: HL / CD
CHECKED BY : MR
DATE : 5/18/2022

MH. No.	Residential			Peak flow factor	Total Population	Total Area	Commercial			Indus. Lot area (ha)	Institutional Lot (ha)	Flow in L/s				Proposed Sewer						
	Gross area (ha)	Population density (persons/unit)	Population				Lot area (ha)	Floor space Index	Floor area (ha)			Res. flow		Comm. L/S	Indus. L/S	Inst. L/S	Total flow L/s	Pipe Size mm	Slope %	Capacity in L/s	Velocity in m/s	
												Infil* L/S	Sewage L/S									
North of Stevens Road																						
SAN MH-G4-0030			4408	3.30	4408	40.11						10.43	61.20				71.62	300	1.00	96.70	1.37	
East of Stevens Road																						
"Munday Court" (Future) PROP SAN MH201A	5.37		39	4.00	39	5.37						1.40	0.66				2.05	200	1.00	32.80	1.04	
"Stevens Road" (Site)* PROP SAN MH 102A	3.03		1182	3.75	1182	2.93						0.76	18.68				19.45	250	1.00	59.47	1.21	
"Stevens Road" (South) PROP SAN MH 101A	0.62		7	3.75	1189	3.55						0.92	18.79				19.71	250	1.00	59.47	1.21	
SAN MH-G41-0029			1228	3.74	1228	9.02						2.35	19.35				21.70	250	0.50	42.05	0.86	
South of Stevens Road																						
<i>SW corner of RR57 & STEVENS</i>																						
MH-G41-0031				3.20	5636	49.13					0.80	0.80	12.77	75.90			1.04	89.71	375	0.40	110.89	1.00
MH-G41-0026**	1.84			3.20	5636	50.97					0.80	13.25	75.90				1.04	90.99	375	0.40	110.89	1.00
<i>Church in NW corner of RR57 & HWY 2</i>																						
MH-G41-0027				3.20	5636	50.97					4.30	5.10	13.25	75.90			6.61	100.86	375	0.40	110.89	1.00
MH-G41-0028				3.20	5636	50.97					5.10	13.25	75.90				6.61	100.86	375	0.40	110.89	1.00
MH-G42-0188				3.20	5636	50.97					5.10	13.25	75.90				6.61	100.86	375	0.40	110.89	1.00
<i>SE corner or RR57 & HWY 2</i>																						
MH-G42-0189***	2.11			3.20	5636	53.08	2.80	1.00	2.80		5.10	13.80	75.90	5.83			6.61	107.24	375	0.40	110.89	1.00

* DG Biddle Design had assumed population of 160 people for site
 ** MH-G41-0026 includes an extra 1.84 Ha of infiltration to account for Road area from Stevens Road and Bowmanville Avenue
 *** MH-G41-0189 includes an extra 2.11 Ha of infiltration to account for Road area from Highway 2

Source information includes:
 Sanitary Drainage scheme from 'Brookhill Neighbourhood Sanitary Sewer Extension' By d.G. Biddle Dated August 2013
 "RR57/Hwy 2" Sanitary Sewer Design Sheet by Region of Durham stamped 02/07/2022

APPENDIX D

Hydrant Flow Test and Fire Underwriter Survey



THE REGIONAL MUNICIPALITY OF DURHAM
WORKS DEPARTMENT

FLOW TEST SUMMARY AND RESULTS

Requested by: <u>Caleb Donald</u>	Account No.: _____
Company: <u>TYLin International Canada Inc.</u>	
Address: <u>209 Dundas St East, Suite 301</u>	Telephone: <u>905-441-1695</u>
<u>Whitby, Ontario</u>	Email: <u>caleb.donald@tylin.com</u>
<u>L1N7H8</u>	
Test Location: <u>46 Stevens Rd</u>	
Municipality: <u>Town of Bowmanville</u>	
Date: <u>10-May-22</u>	Time: <u>11:30AM</u>
Conducted by: <u>K.J</u>	

Flow Hydrant: C29
Monitoring Hydrant: C28

Nozzle Size (in.)	Residual Pressure (p.s.i.)		Pitot Gauge	
	Field Reading @ Monitoring Hydrant	Actual @ Flow Hydrant (adjusted)*	Pressure (p.s.i.)	Flow (i.g.p.m.)
STATIC	87.5	90.4		0.0
1-1/2	81.6	84.5	82.7	505.4
1-3/4	76.7	79.6	76.2	660.3
2-1/2	75.2	78.1	71.3	1182.2
2 x 2-1/2	61.6	64.5	41.0	1792.9

Hydrant Elevations (ft.)	
Flow Hydrant:	<u>370.7</u>
Static Hydrant:	<u>377.3</u>
Difference:	<u>-6.6</u>
Pressure Diff. (p.s.i.):	<u>-2.9</u>

* Calculation based on gain/loss in pressure due to elevation difference between flow & monitoring hydrants

Comments: _____
 Flow for 1-1/2 & 1-3/4 nozzle calculated using Discharge of smooth nozzles
 Flow for 2-1/2 nozzle calculated using Discharge for circular outlets

Results	
Static Pressure	<u>90.4</u>
Flow at 20 p.s.i. (I.g.p.m.):	<u>3076</u> (approx.)
Checked by: _____	

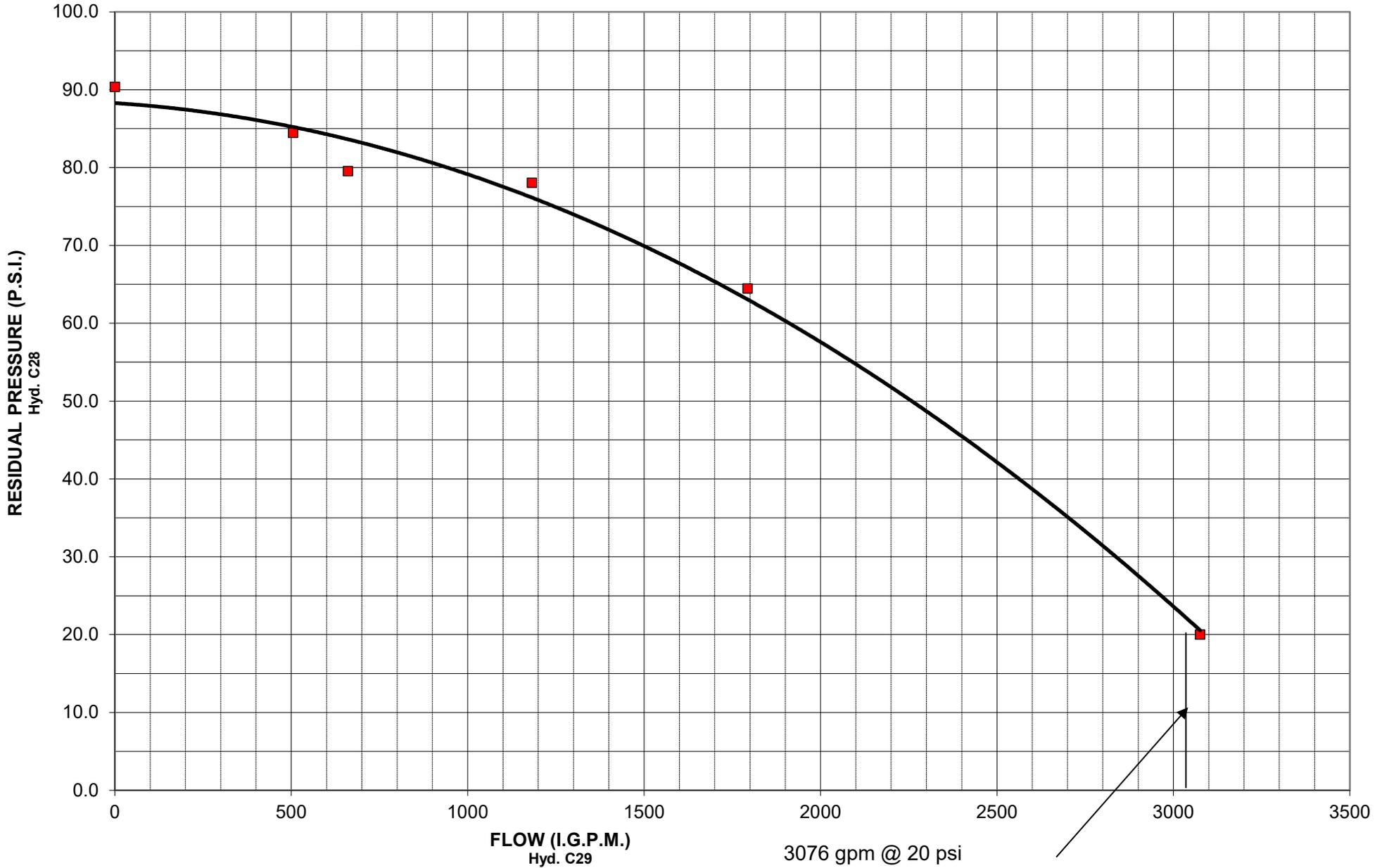
Disclaimer for Fire Flow Tests

While the Regional Municipality of Durham (hereinafter referred to as the "Region") makes every effort to ensure that the information contained herein is accurate and up to date, the Region shall not be held liable for improper or incorrect use of the data and information described and/or contained herein. The user must make his/her own determination as to its accuracy and suitability for the user's own use. The data, information and related graphics contained herein are not legal documents and are not intended to be used as such. The user hereby recognizes that the information and data are dynamic and may change over time without notice. The Region makes no commitment to update the information or data contained herein. The user recognizes and acknowledges that the data and information provided by the Region was acquired by the Region for a specific purpose and this information may be inaccurate or unreliable if used for other purposes. The Region is not responsible for your use or reliance upon this information. The Region does not warrant or guarantee the results of the use of the information provided to you by the Region in terms of correctness, accuracy, reliability, completeness, usefulness, timeliness or otherwise. The entire risk as to the results of any information obtained from the Region is entirely assumed by the recipient.

FIRE FLOW TEST

(Graph of Residual Pressure vs. Hydrant Flow)

Location: 46 Stevens Rd
Municipality: Bowmanville
Date: May 10, 2022

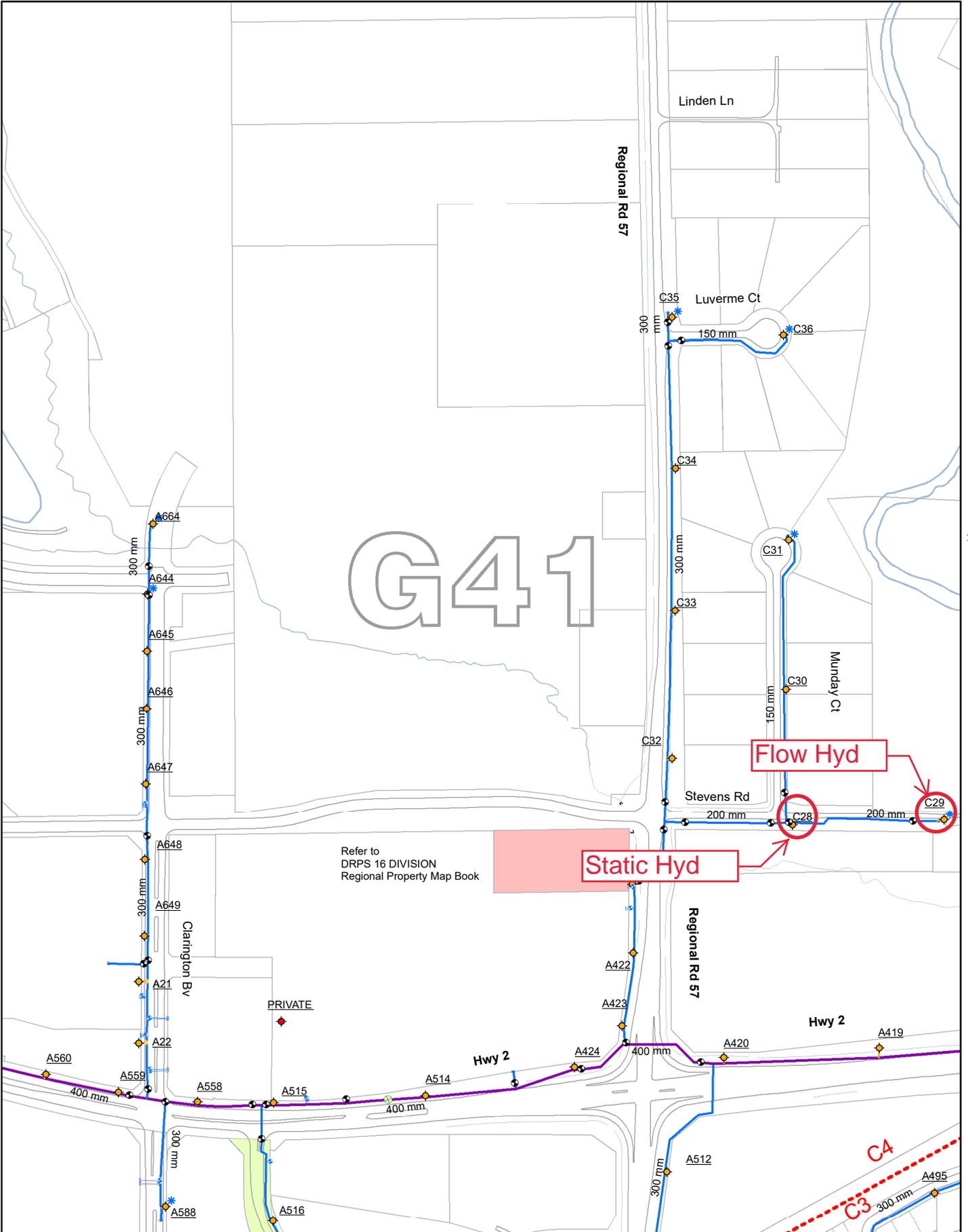


grid H41

grid G40

grid G42

grid F41



- Feeder Main - Issued for Construction
- Feeder Main - Assumed or In Service
- Feeder Main - Maintenance
- Raw Feeder Main - Assumed

- Water Main - Issued for Construction
- Water Main - Not In Service

- Water Main - Assumed or In Service
- Water Main - Maintenance
- Raw Water Main - Assumed

Refer to
DRPS 16 DIVISION
Regional Property Map Book

Static Hyd

Flow Hyd

The Regional Municipality of Durham Works Department Water Supply System
 This map has been produced from a variety of sources. The Region of Durham does not make any representations concerning the accuracy, likely results, or reliability of the use of the materials. The Region hereby disclaims all representations and warranties. © Teranet Inc. and its suppliers. All rights reserved. Produced by Durham Region under license with the Ontario Ministry of Natural Resources, copyright Queen's Printer for Ontario, 2021. May not be reproduced without permission. Not a plan of survey. Drainage provided by © First Base Solutions 2019.

CLARINGTON (Bowmanville)
 1:5,000
 0 25 50 100 150 200 Meters
 All dimensions are in mm unless otherwise noted.
 March 25, 2022

Servicing Note:
 THIS MAP DEPICTS LOCAL PROXIMITY OF SERVICES ONLY. IT IS NOT TO BE USED TO DETERMINE INDIVIDUAL SITE SERVICING AVAILABILITY OR AVAILABILITY OF CAPACITY WITHIN THE SYSTEM. FOR DETAILED SITE SERVICING INFORMATION PLEASE CONTACT THE DEVELOPMENT APPROVALS SECTION OF THE WORKS DEPARTMENT.

H40	H41	H42
G40	G41	G42
F40	F41	F42

Project: **46 Stevens Road**
10521

Fire Flow Calculations
10 Storey Condo Building



Prepared by: C.D.
 Checked by: M.R
 Date: May 18, 2022

Maximum Hour Demand

Population = 1182 persons
 Ave. Day Demand = 364 L/cap/day as per Region Criteria
 = 299 L/min
 Max. Hourly Peaking Factor = 3.8 (Residential)
 Max. Domestic Flow Rate F_{dom} = 1135 L/min
18.92 L/s

Maximum Day plus Fire Flow

Based on Fire Underwriters Survey

1 $F = 220 C (\sqrt{A})$

Where F= Fire flow in Lpm

C= construction type coefficient

= 0.6 fire resistive construction

A = total floor area in sq.m. excluding basements, includes garage

Floor	Area (sq.m)	%
1	2,744	100%
2	2,744	100%
3	2,744	50%
4	2,744	50%
5	2,744	50%
6	2,744	50%
7	2,744	50%
8	2,744	50%
9	2,744	50%
10	2,744	50%

Largest Area= 16,464 sq.m
 F = 16,937 L/min

Round to nearest 1000 l/min

F = 17,000 L/min

2 Occupancy Reduction

15% Reduction for limited combustible residential occupancy

Reduction = 2550 L/min

F = 14,450 L/min

3 Sprinkler Reduction

30% Reduction for NFPA Sprinkler System

Reduction = 10115 L/min

4 Separation Charge

*Assumed all buildings will be sprinklered therefore no separation adjustment

0% North Side

0% East Side

0% South Side

0% West Side

0% Total Separation Charge, 10115 L/min
169 L/s

Note: Maximum Total Separation Charge is 75%

5 Domestic Flow Calculations

Population = 1182 persons
 Ave. Day Demand = 364 L/cap/day
 = 299 L/min

5.0 L/s

Max. Daily Peaking Factor = 3.8 (Residential)

Max. Domestic Flow Rate F_{dom} = 1135 L/min

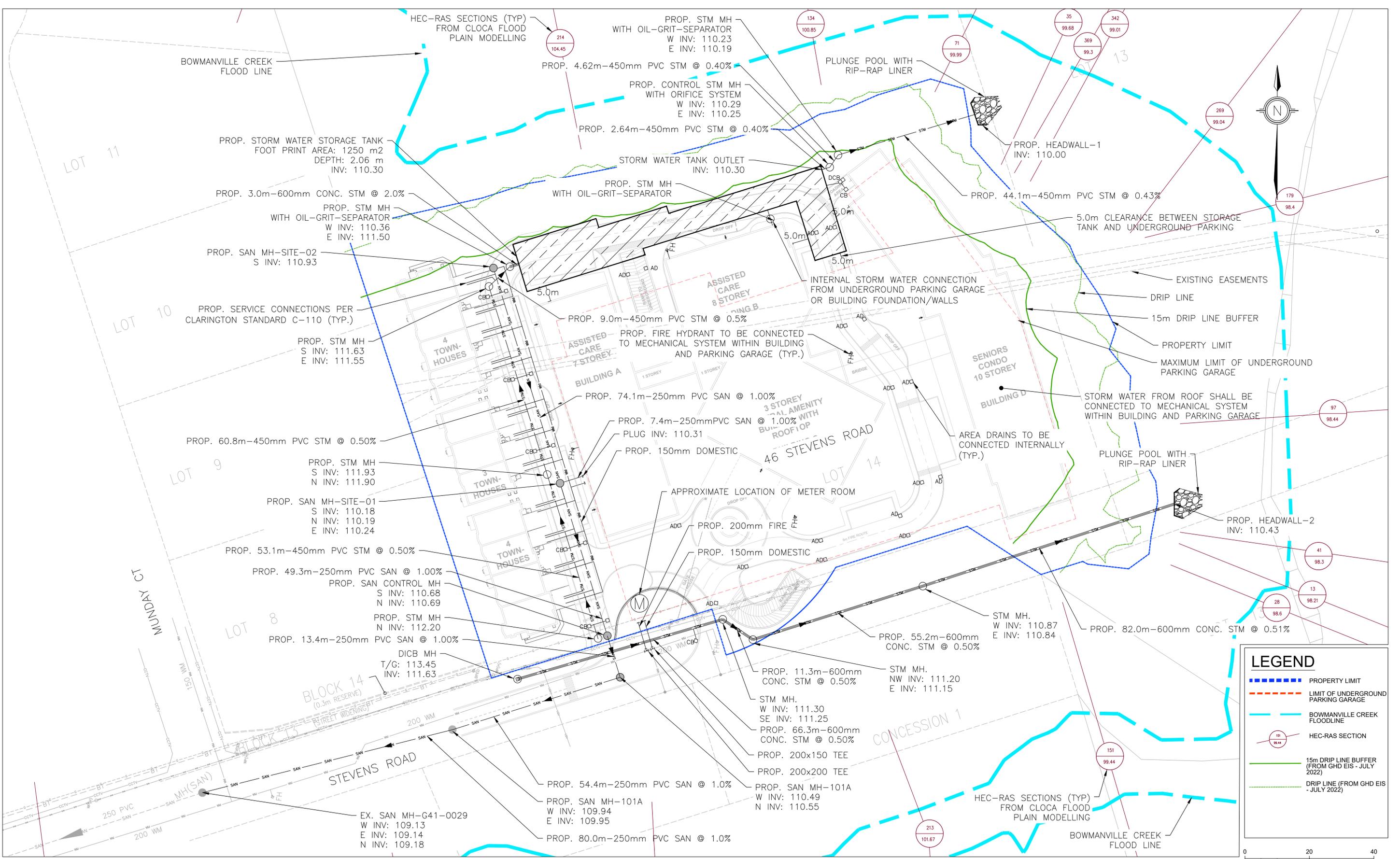
18.92 L/s

$$F = \frac{\text{Fire Flow}}{169} + \frac{\text{Max. Demand}}{18.92} = \underline{\underline{188 \text{ L/s}}}$$

APPENDIX E

Drawings

File: G:\Projects\2021\10521 - Bowmanville - 46 Stevens Road\600_DSGN\03_Models\FSR\Servicing\10521 - Servicing Base Pipe Modelling.dwg. Layout: GP01 Date: Jul 13, 2022 - 2:49pm. Edit By: thekkilborand



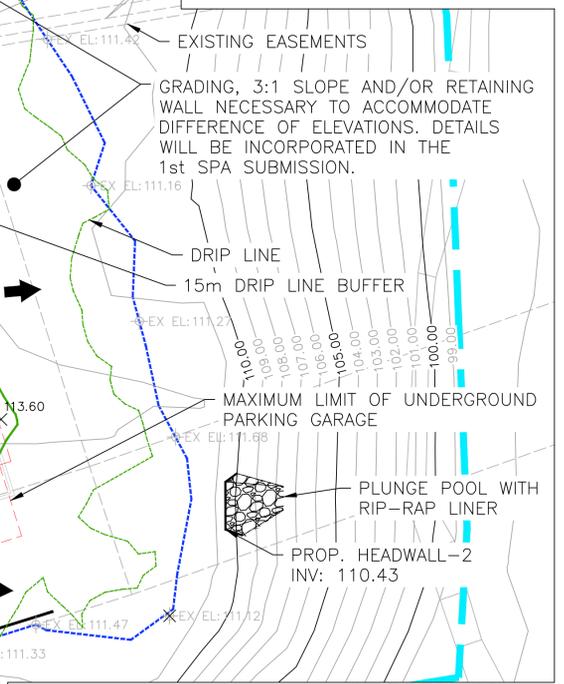
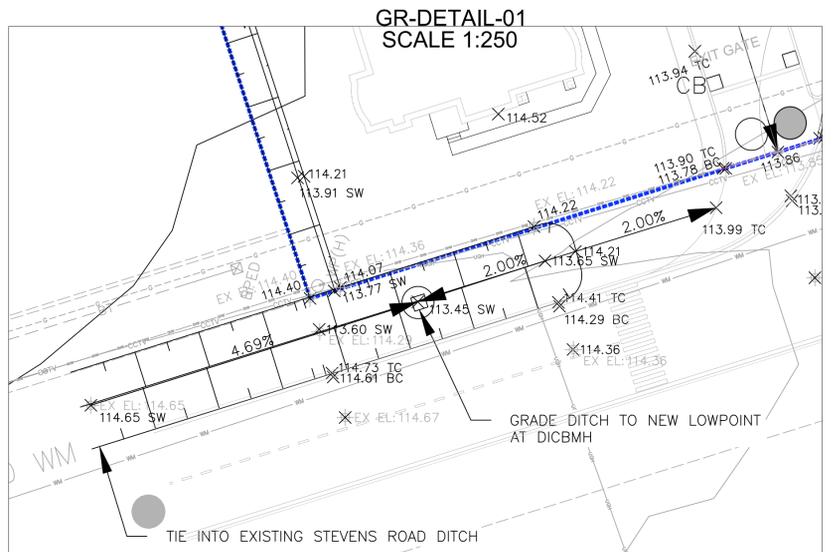
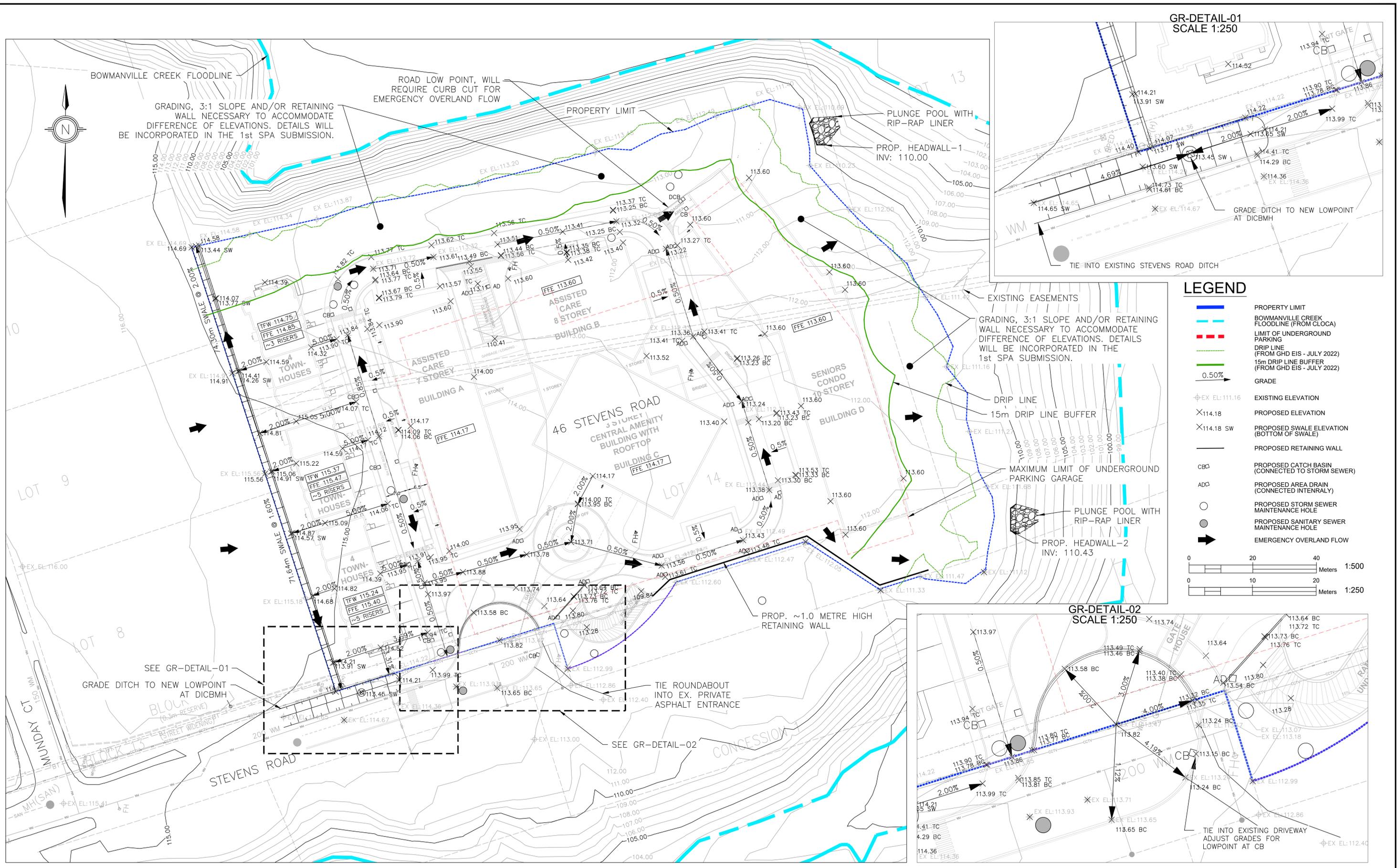
LEGEND

- PROPERTY LIMIT
- LIMIT OF UNDERGROUND PARKING GARAGE
- BOWMANVILLE CREEK FLOODLINE
- HEC-RAS SECTION
- 15m DRIP LINE BUFFER (FROM GHD EIS - JULY 2022)
- DRIP LINE (FROM GHD EIS - JULY 2022)



**46 STEVENS ROAD
 FUNCTIONAL SERVICING REPORT
 PRELIMINARY GENERAL SERVICING PLAN**

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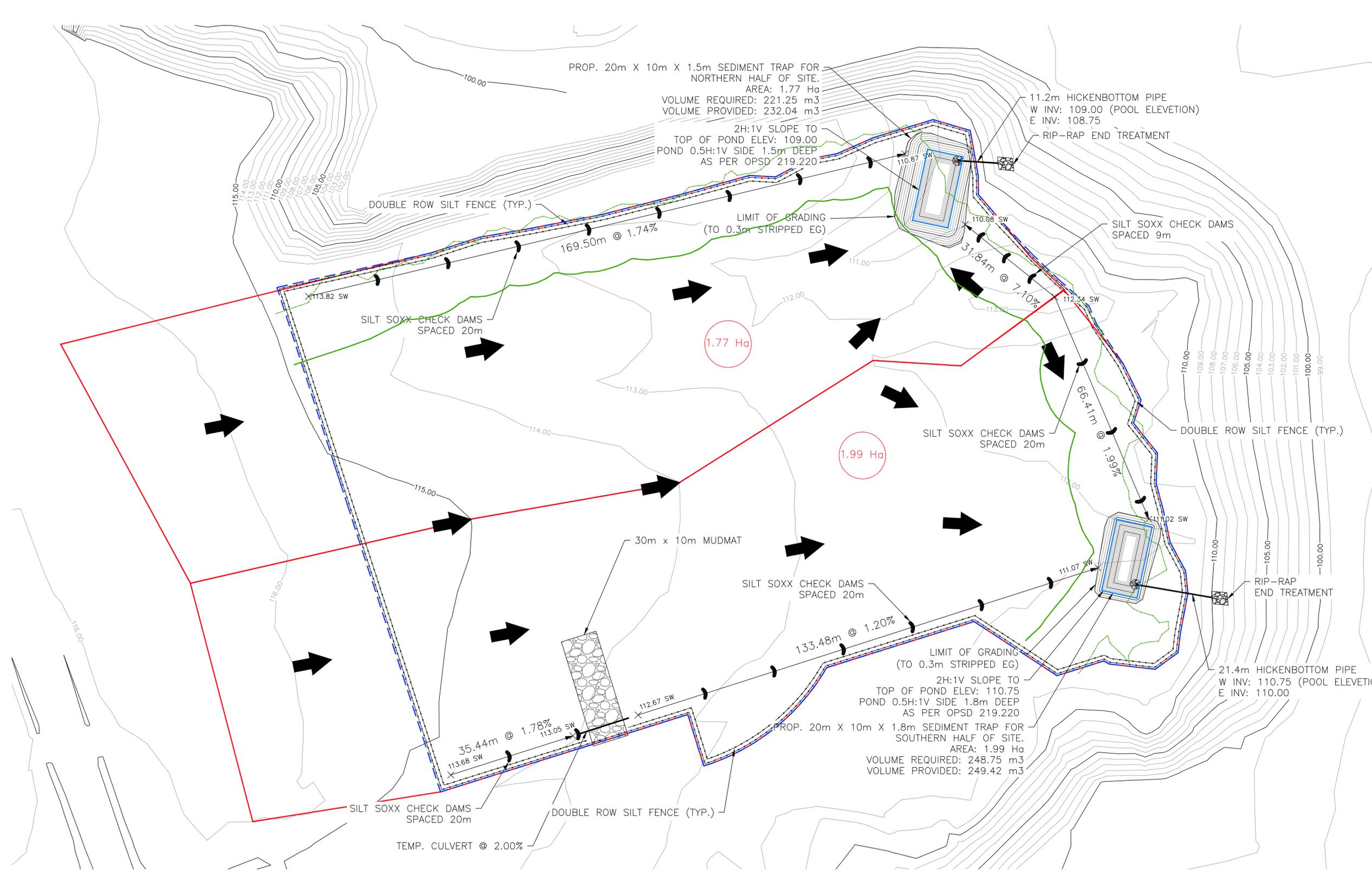
LEGEND

- PROPERTY LIMIT
- BOWMANVILLE CREEK FLOODLINE (FROM CLOCA)
- - - LIMIT OF UNDERGROUND PARKING
- DRIP LINE (FROM GHD EIS - JULY 2022)
- 15m DRIP LINE BUFFER (FROM GHD EIS - JULY 2022)
- 0.50% GRADE
- ⊕ EX EL: 111.16 EXISTING ELEVATION
- × 114.18 PROPOSED ELEVATION
- × 114.18 SW PROPOSED SWALE ELEVATION (BOTTOM OF SWALE)
- PROPOSED RETAINING WALL
- CB PROPOSED CATCH BASIN (CONNECTED TO STORM SEWER)
- ADD PROPOSED AREA DRAIN (CONNECTED INTERNALLY)
- PROPOSED STORM SEWER MAINTENANCE HOLE
- PROPOSED SANITARY SEWER MAINTENANCE HOLE
- EMERGENCY OVERLAND FLOW

0 20 40 Meters 1:500

0 10 20 Meters 1:250

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LEGEND

- PROPERTY LIMIT
- OVERLAND FLOW ROUTE
- SEDIMENT TRAP DRAINAGE BOUNDARY
- SILT SOXX CHECK DAM
- CUTOFF SWALE CENTERLINE ELEVATION
- DOUBLE ROW SILT FENCE
- 10.44Ha SEDIMENT TRAP DRAINAGE AREA
- HICKENSBOTTOM DRAINAGE PIPE
- 15m DRIP LINE BUFFER (FROM GHD EIS - JULY 2022)
- DRIP LINE (FROM GHD EIS - JULY 2022)
- TOP OF SEDIMENT TRAP

APPENDIX F

Existing Utilities



Application for Plant Location and Consent

Mark Up Number	35325	Date Received from Applicant	2022-05-10 16:11:53
MU Administrator Name	Divya Purushothaman		
Mark Up Response Date	2022-05-26 10:55:17		

Applicant Information

Applicant	TYLin		
Applicant Ref Number	N/A		
Applicant First Name	Heikki	Applicant Last Name	Loorand
Applicant Phone Number	905.738.5700	Extension	
Applicant Email	heikki.loorand@tylin.com		

Construction Details

Project Municipality	Clarington
Project Location	46 Stevens Rd
Project Street	
Detail Type of Construction Taking Place	Please see the attached drawing
Opportunity for Joint Build	No
Is it in Conflict	No
Conflict Identified Date	
Conflict Comments	

Group Mark Up #

Critical Mark Up Details Pertaining Bell Plant Location

Existing and/or proposed Bell Canada underground plant are indicated on the attached plan
Not for PUCC approval - Mark up only
Caution - Bell has plant around proposed area. Tie-in measurements are a guideline only and physical verification may be required by applicant to determine the true separation between plant. Call for locates. Maintain min 0.6m horizontal clearance and min 0.3m vertical clearance when crossing Bell. Within 1m of Bell and when crossing Bell, hand dig.

PROCEDURES TO FOLLOW:

1. Request locates prior to construction 1-800-400-2255
2. If exact location and depth are critical – test pits are recommended
3. Bell Canada plant location information is approximate
4. If the location of your proposed design changes, it will be necessary to re-apply
5. Permits expire six (6) months from approval date

Signature:

Divya Purushothaman

Date:

2022-05-26

TYLin Note:

CAD .dwg markup received from Bell

The drawing is for markup only and not for permit to proceed construction.

Drawing may not be copied or used by others without the written consent of Bell Canada.

Feature State (Excluding In Service)

-  State - Proposed Removed
-  State - Proposed Abandon
-  State - Proposed
-  State - Out of Service
-  State - Constructed
-  State - Abandoned

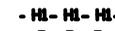
Feature State (In Service)

-  High Voltage - 44000/25000V
-  High Voltage - 27600/16000V
-  High Voltage - 13800/8000V
-  High Voltage - 12470/7200V
-  High Voltage - 8320/4800V
-  High Voltage - 4160/2400V
-  Low Voltage (excluding streetlights)
-  Low Voltage (streetlights)
-  Single Phase Red (all high voltage)
-  Single Phase White (all high voltage)
-  Single Phase Blue (all high voltage)

Feature - WIRE

-  Underground
-  Overhead
-  Neutral

Feature - OWNERSHIP

-  Wire - Non Elexicon
-  Wire - Elexicon

Feature - LOAD

-  Meter
-  Meter Whitby (interim)
-  Meter Critical Customer
-  Meter Primary Wholesale
-  Meter Non Residential/Commercial
-  Generator
-  Streetlight
-  Streetlight Disconnect

Feature - TRANSFORMER

-   Transformer 1 PH Pole Mount / Step Transformer
-   Transformer 2 PH Pole Mount
-   Transformer 3 PH Pole Mount
-   Transformer 3PH 1 Unit
-   Transformer Centre Tap
-   Transformer In-Pole / Vault / Sub Platform
-   Transformer Pad Mounted
-   Transformer Bolted Busbar
-   Power Transformer
-   Potential Transformer
-   Current Transformer
-  Elbow
-  Elbow with Fault Indicator

Feature - CIVIL

-   Pole
-   Guy / Anchor
-  Span Guy
-  Structure Flush to Grade Box
-  Structure Manhole
-  Structure Pedestal
-  Structure Vault
-  Trench

Feature - SWITCHING

-  Breaker
-  Switch Fused
-  Switch Solid
-  Switch Opener
-  Switch Air Break
-  Switch Interruptible / Recloser
-  Switch Interruptible / Recloser SCADA
-  Switch Load Break
-  Switch Load Interrupter SCADA
-  Capacitor
-  Capacitor SCADA
-  Switchgear 1 Bay
-  Switchgear 2 Bays
-  Sectionalizer
-  Switchgear 4 Bays
-  Switchgear 5 Bays
-  Switchgear 6 Bays
-  Switchgear Load Break SCADA
-  Switchgear Load Break
-  Switchgear Fuse
-  Switchgear Interruptible SCADA

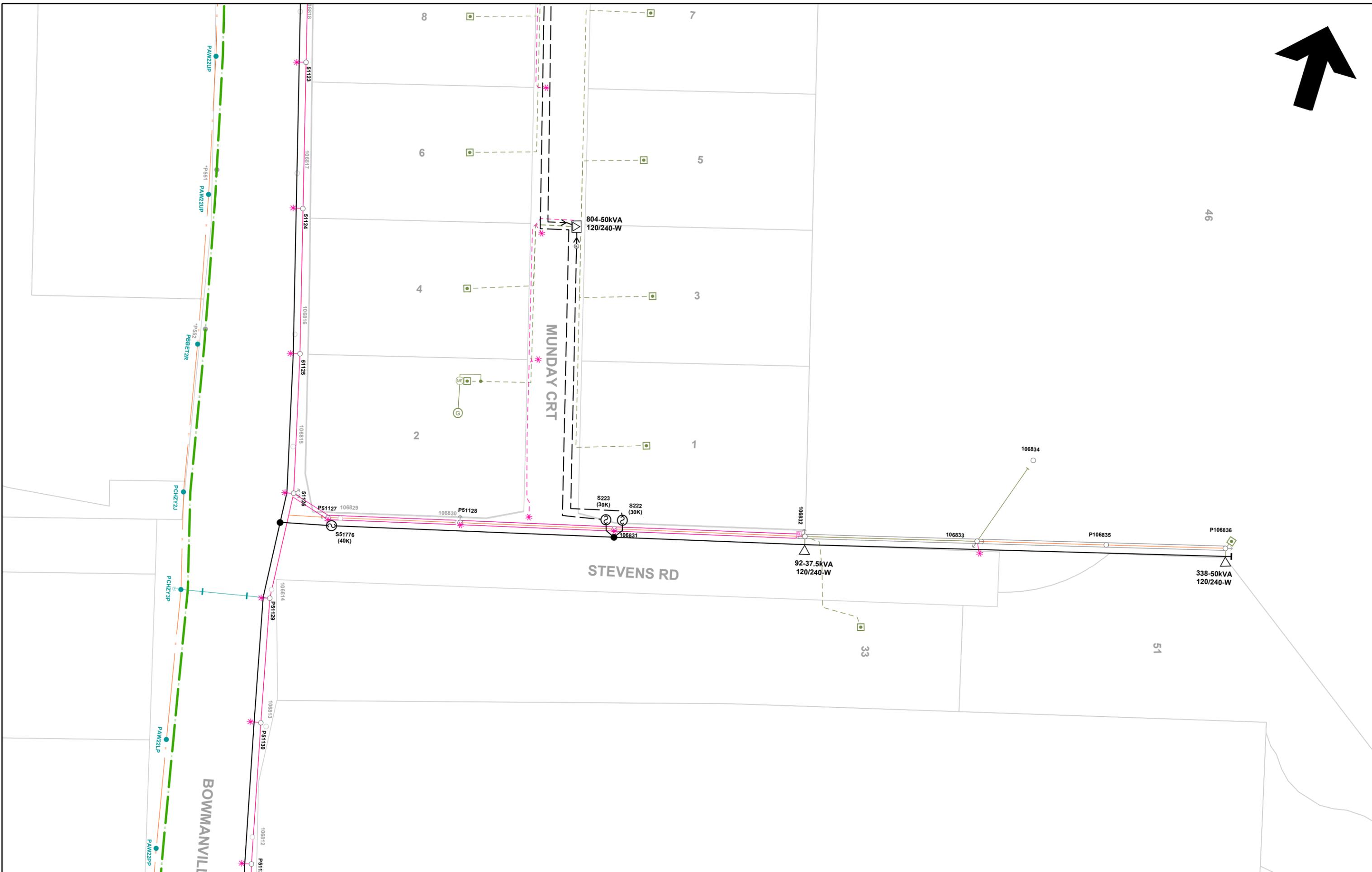
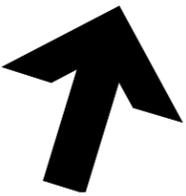
Feature - SENSOR

-  Arrester
-  Fault Indicator
-  Fault Indicator SCADA
-  Regulator

Feature - CONDUCTOR NODE

-  Tap
-  Splice / Sleeve
-  Jumper
-  Dead End





EGD File Number:

Re:

- By law utility locations must be obtained prior to starting any excavation or ground disturbance activity, such as pile driving, boring, auguring or digging. Contact Ontario One Call at 1-800-400-2255 or www.on1call.com at least 5 business days before beginning work to obtain utility locates.
- Refer to the “Third Party Requirements in the Vicinity of Natural Gas Facilities” for requirements and precautions for working safety in the vicinity of natural gas pipelines. The most recent version of this document is available at: <https://enbridgegas.com/-/media/extranet-pages/safety/before-you-dig/Third-Party-Requirements-in-the-Vicinity-of-Natural-Gas-Facilities>
- Enbridge’s responses are based on the information available and are valid for a period of 6 months from issue.

VITAL MAIN

- You are working within 3.0m of a Vital Main Pipeline. In order to accommodate Enbridge vital main standby requirements, our Damage Prevention department must be contacted a minimum of three business days prior to commencing any excavation at 1-866-922-3622 to schedule a site meeting.

CONFLICT

- We have an **OBJECTION** to your proposed plant as indicated. Please refer to attached drawings for information on our existing or proposed gas plant our existing and/or proposed gas plant within the road allowance.
- You must submit a revised design for our approval that meets the requirements detailed in the Third-Party Requirements guidelines before proceeding.
- If relocation of our plant is required, please contact:

Toronto Region	Janice Page	(416) 495-5373	janice.page@enbridge.com
Central Region West	Meetpal Chhina	(905) 458-2159	Meetpal.Chhina@enbridge.com
Central Region East	Ashu Kahol	(905) 927-3017	ashu.kahol@enbridge.com
Ottawa Region	James Arbuthnott	(613) 748-6840	james.arbuthnott@enbridge.com
Niagara Region	Rob D’Onofrio	(905) 641-4876	robert.donofrio@enbridge.com

EASEMENT REQUIRED

- Enbridge has no objection to this proposed application. Prior to Land Sale/Closure, we require an easement to protect our existing gas infrastructure. Please contact Charlene Parent at (416) 753-6641 or email charlene.parent@enbridge.com

NO CONFLICT

- We have **NO OBJECTION** to your proposed plant as indicated. Please refer to the attached drawings for information on our existing and/or proposed gas plant within the road allowance.
- GAS MAINS MUST BE FIELD LOCATED. Before digging, please call ONTARIO ONE CALL at 1-800-400-2255 for free gas locates.

GENERAL LOCATION

- The information provided is for GENERAL LOCATION only and is not an approval. Detailed plans must be submitted for our review before an approval will be granted.
- Refer to the attached drawings for information on our existing and/or proposed gas plant within the road allowance.

Atlas Plate Legend

	Proposed
	Construct
	Pending Decomission
	Active, Low Pressure
	Active, Medium Pressure
	Active, Intermediate Pressure
	Active, High Pressure
	Active, High Pressure PE
	Active, Extra High Pressure
	Active, Unodourized Transmission Pressure, IMP;VITAL
	Proposed, IMP; NEB;VITAL
	Construct, IMP;VITAL
	Active, Intermediate Pressure, IMP;NEB
	Active, High Pressure, NEB; VITAL
	Active, Extra High Pressure, IMP;NEB; VITAL
	Pending Decomission, IMP;NEB;VITAL

Line Pressure Descriptors

LP	Low pressure
MP	Medium Pressure
IMP	Integrity Management Program (main)
HP	High pressure
XHP	Extra high pressure
VITAL	Vital Gas main
IP	Intermediate Pressure

Abbreviations

Pipe Descriptors

PS	Plastic main
SC	Steel coated main
ST	Steel main
NEB	National Energy Board
NPS	Nominal Pipe Size (<i>Number denotes pipe size in inches e.g. NPS 8 = Nominal Pipe Size 8 inches</i>)

Topographical Feature Descriptors:

AE	Asphalt edge
BL	Building Line
BP	Bell pole/pedestal
BPED	Bell pedestal
C/L	Centreline of road way/pavement
CB	Catch Basin
CL	Curb line/curb or edge of pavement
DCB	Double catch basin
E/P	Edge of Pavement
E/W SL	East of the west street line
FH	Fire Hydrant
FL	Fence line
HP	Hydro pole
HT	Hydro transformer or hydro box
LP	Light post
LS	Light Standard
MH	Manhole
N/S SL	North of the south street line
POLE L	Pole line
POLE(S)	Pole(s)
S/S SL	South of the south street line
SL	Street line or property line
SM	Sewer manhole
SWK	Sidewalk or walk
UW	Under sidewalk
W/E SL	West of the east street line
WVCH	Water valve chamber

Main Reference Descriptors

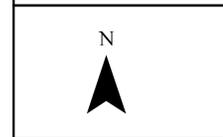
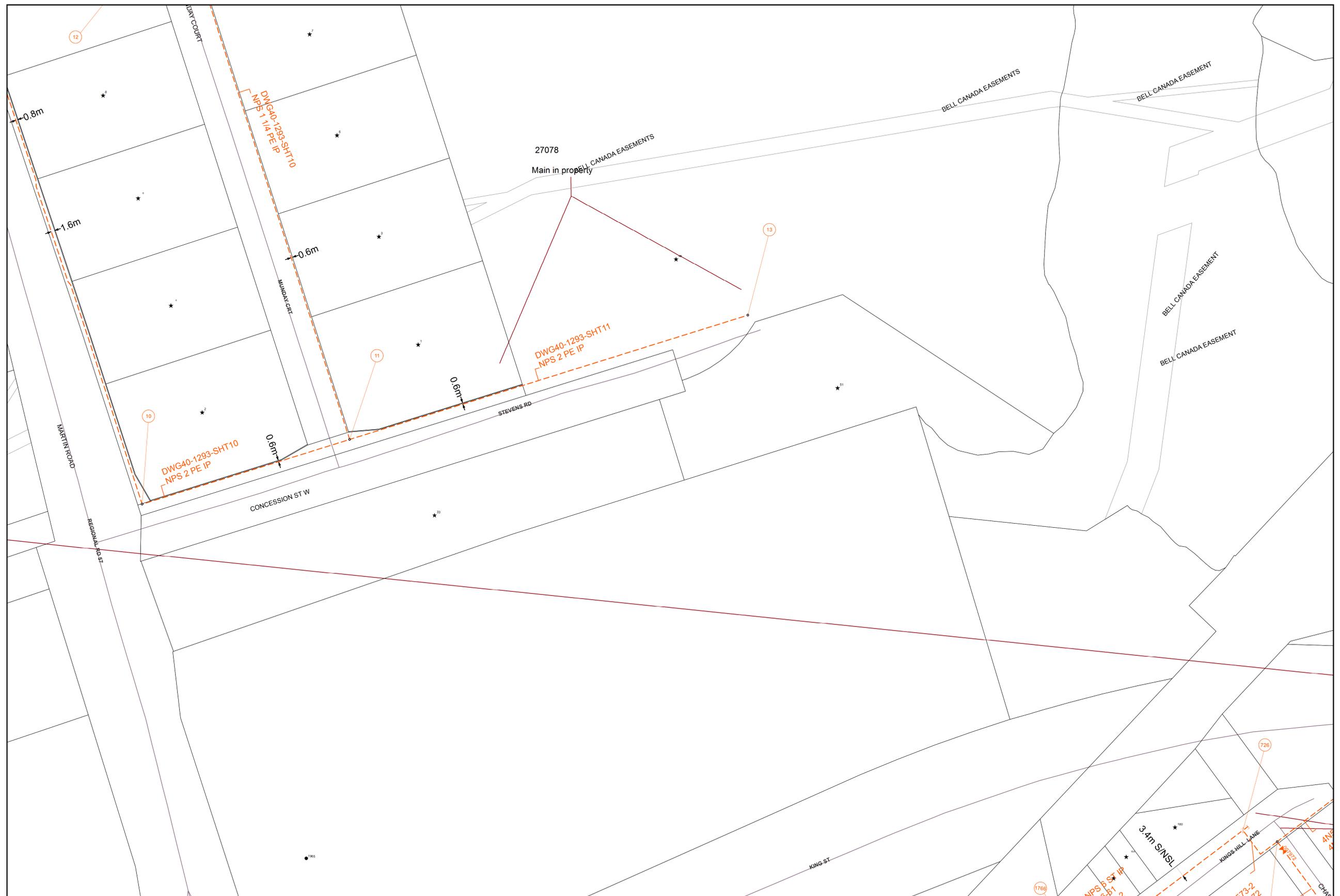
N/S SL	North of the south street line
S/S SL	South of the south street line
W/E SL	West of the west street line
E/W SL	East of the west street line
N/S CL	North of the south curb line
S/N CL	South of the north curb line
E/W CL	East of the west curb line
W/E CL	West of the east curb line
E/E CL	East of the east curb line
W/W CL	West of the west curb line
N/N CL	North of the north curb line
S/S CL	South of the south curb line
E/P	Edge of pavement
C/L	Centre line of road
W/WBL	West of west building line
W/EBL	West of east building line
E/EBL	East of east building line
N/NBL	North of north buliding line
N/SBL	North of south buliding line
S/SBL	South of south buliding line
S/NBL	South of north building line
Inside	Measured from centreline of street furniture towards streetline
Outside	Measured from centreline of street furniture towards road



Plotted By: Sai Surayanarayana Chella

Date Plotted: 5/12/2022 8:43:12 AM

Note : Map is not to scale.



Plotted By: Sai Surayanarayana Chella

Date Plotted: 5/12/2022 8:45:40 AM

Note : Map is not to scale.