

2705460 ONTARIO INC.

RESIDENTIAL DEVELOPMENT 112 MONTREAL ROAD, OTTAWA, ON SITE SERVICING REPORT

MARCH 5, 2020





**RESIDENTIAL DEVELOPMENT
112 MONTREAL ROAD,
OTTAWA, ON
SITE SERVICING REPORT**

2705460 ONTARIO INC.

SITE PLAN APPROVAL

**PROJECT NO.: 19M-01935-00
DATE: MARCH 2020**

**WSP
2611 QUEENSVIEW DRIVE, SUITE 300
OTTAWA, ON, CANADA, K2B 8K2**

TEL.: +1 613-829-2800

WSP.COM



March 5, 2020

Momentum – Planning & Communications
1165 Greenlawn Crescent
Ottawa, ON K2C 1Z4

Attention: Dennis Jacobs, MCIP. RPP

Dear Sir:

Subject: 112 Montreal Road – Site Servicing Report

Please find attached our site servicing report issued for site plan approval.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Ding Bang'.

Ding Bang (Winston) Yang, P.Eng.
Project Engineer

WSP ref.: 19M-01935-00

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Issued for Site Plan Approval			
Date	2020-03-05			
Prepared by	Ding Bang (Winston) Yang, P.Eng.			
Signature				
Checked by	Ishaque Jafferjee, P.Eng.			
Signature				
Authorised by				
Signature				
Project number	19M-01935-00			
Report number				
File reference				

SIGNATURES

PREPARED BY



Ding Bang (Winston) Yang, P.Eng.
Project Engineer

REVIEWED BY



Ishaque Jafferjee, P.Eng.
Senior Project Engineer

This report was prepared by WSP Canada Group Ltd. for the account of 2705460 Ontario Inc, in accordance with the professional services agreement. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP Canada Group Ltd.'s best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP Canada Group Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

The original of the technology-based document sent herewith has been authenticated and will be retained by WSP for a minimum of ten years. Since the file transmitted is now out of WSP's control and its integrity can no longer be ensured, no guarantee may be given with regards to any modifications made to this document.

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	ExEcutive summary	1
1.2	Location Map and Plan	2
1.3	Higher level studies	2
1.4	Available existing and proposed infrastructure	3
1.5	Geotechnical sutdy	3
2	WATER DISTRIBUTION	4
2.1	Consistency with master servicing study and availability of public infrastructure	4
2.2	System constraints and boundary conditions	4
2.3	Confirmation of adequate domestic supply and pressure	4
2.4	Confirmation of adequate fire flow protection	6
2.5	Check of high pressure	6
2.6	Reliability requirements	6
3	WASTEWATER DISPOSAL	7
3.1	Design Criteria	7
3.2	Calculations for New sanitary sewer	7
3.3	Verification of available capacity in downstream sewer	7
4	SITE STORM SERVICING	9
4.1	Existing condition	9
4.2	Drainage drawing	9
4.3	Water quantity control objective	9
4.4	Water quality control objective	9
4.5	Design criteria	9
4.6	Proposed minor system	9

4.7	Stormwater management	10
5	SEDIMENT AND EROSION CONTROL	11
5.1	General	11
6	APPROVAL AND PERMIT REQUIREMENTS	13
6.1	General	13
7	CONCLUSION CHECKLIST.....	14
7.1	Conclusions and recommendations.....	14
7.2	Comments received from review agencies.....	14

TABLES

TABLE 2-1:	BOUNDARY CONDITIONS (CITY OF OTTAWA)	4
TABLE 2-2:	SUMMARY OF WATER PRESSURE FROM EPANET RESULTS	5

FIGURES

FIGURE 1-1 SITE LOCATION	2
--------------------------------	---

APPENDICES

A

- TOPOGRAPHIC SURVEY PLAN

B

- CITY OF OTTAWA CORRESPONDENCE (BOUNDARY CONDITIONS)
- WATER DEMAND AND FIRE FLOW CALCULATION
- FIRE FLOW LETTER FROM ARCHITECT
- EPANET RESULTS

C

- SANITARY FLOW CALCULATION

D

- GRADING PLAN C02
- SERVICING PLAN C03
- STORM DRAINAGE AREA PLAN C04

E

- EROSION AND SEDIMENT CONTROL PLAN C05

1 INTRODUCTION

1.1 EXECUTIVE SUMMARY

WSP was retained by 2705460 Ontario Inc. C/O Anand Aggarwal to provide servicing, grading and stormwater management design services, in support of the site plan approval, for the proposed residential development located at 112 Montreal Road, in the City of Ottawa. The proposed development consists of three high rise towers, towers A and B - 19 storeys and tower C- 16 storeys, over 3 levels of underground parking garage. This report will provide sufficient detail to demonstrate that the proposed development can be supported by the existing municipal infrastructure services, such as watermain, sanitary and storm sewers and that the servicing design conforms to the applicable standards and guidelines. The report will also include measures to be taken during the construction to minimize erosion and sedimentation. A separate report (112 Montreal Road – Stormwater Management Report) will be provided detailing stormwater management approach, addressing the quantity control and quality measures in accordance with the applicable guidelines.

Currently, the site is occupied by a number of one and two storey buildings, paved parking areas, trees and grassed areas over islands and along the perimeter of the property. The total lot area was considered to be 1.236 ha in size. The site is bounded by commercial development to the north and east, and residential development to the south and west.

The subject site consists of multiple lots and parts City of Ottawa (refer to Appendix A for the Topographical Survey Plan). Based on the topographic survey plan, the overall topography of the site is relatively flat, with parking areas and buildings sloping towards Montreal Road. The drainage and sewage from the site is currently directed to the existing municipal sewers on Montreal Road. The domestic water to the site is also off Montreal Road's existing municipal watermain.

The City of Ottawa required that the design of a drainage and stormwater management system in this development must be prepared in accordance with the following documents:

- Sewer Design Guidelines, City of Ottawa, October 2012;
- Stormwater Management Planning and Design Manual, Ministry of the Environment, March 2003; and
- Stormwater Management Facility Design Guidelines, City of Ottawa, April 2012

This report was prepared utilizing servicing design criteria obtained from the City of Ottawa and outlines the design for water, sanitary wastewater and stormwater facilities.

The format of this report matches that of the servicing study checklist found in Section 4 of the City of Ottawa's Servicing Study Guidelines for Development Applications, November 2009.

The following municipal services are available within Montreal Road, Vanier Parkway, Gardner Street and Palace Street adjacent to the development as recorded from the following as-built drawings received from the City:

Montreal Road

- ▶ 300 mm watermain, 1050 mm storm sewer and 600 mm sanitary sewer.

Vanier Parkway

- ▶ 600 mm watermain (backbone), 375 mm, 450 mm and 1800 mm storm sewers, no sanitary sewer.

Gardner Street

- ▶ 150 mm watermain, 375 mm storm sewer, 250 mm sanitary sewer

Palace Street

- ▶ 150 mm watermain, no storm sewer available in the close proximity, 375 mm sanitary sewer

It is proposed that:

- On-site stormwater management system, employing internal stormwater cistern will be provided to attenuate flow rates leaving the subjected site. Existing drainage patterns, previously established controlled flow rates and storm sewers will be maintained. Refer to stormwater management report for details.

1.2 LOCATION MAP AND PLAN

The proposed three high rise buildings are located at 112 Montreal Road, in the City of Ottawa at the location shown in Figure 1-1 below.



Figure 1-1 Site Location

1.3 HIGHER LEVEL STUDIES

The review for servicing has been undertaken in conformance with, and utilizing information from, the following documents:

- Ottawa Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa including all amendments issued as part of Technical Bulletins.
 - Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including all amendments issued as part of Technical Bulletins.
 - Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
 - Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
 - Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 1999.
-

1.4 AVAILABLE EXISTING AND PROPOSED INFRASTRUCTURE

As described above, all municipal mains (sanitary, storm and watermain) are available and located along Montreal Road. A new sanitary service, a new storm service and two new water services isolated by a valve will be connected to the Montreal Road sewers and one water service will be connected to the Palace Street watermain for redundancy. Quantity control is required to restrict the discharge leaving the development area, thus the on-site storm runoff will be captured by the proposed deck drains and roof drains and directed to the external cistern located on the north side of the building off of Montreal Road.

1.5 GEOTECHNICAL SUTDY

Exp services Inc. completed a preliminary geotechnical investigation report of the subject property. Based on the report, bedrock was encountered at depths ranging from 5.6 m to 8.1 m below the ground surface. With this proximity of rock from the surface, the location and depth of services may not require any removal of bedrock and its recommendations have been taken into account in developing the engineering specifications.

2 WATER DISTRIBUTION

2.1 CONSISTENCY WITH MASTER SERVICING STUDY AND AVAILABILITY OF PUBLIC INFRASTRUCTURE

The subject property lies within the City of Ottawa’s 1E pressure zone. The proposed development will be serviced by two 200mm diameter service laterals isolated by a valve box from the existing 300 mm diameter municipal main located on Montreal Road. Based on our analysis, the entire property can be serviced off Montreal Road municipal main. However, to avoid vulnerability in the system or in the event of Montreal Road closure due to the re-development, as advised by the City, the proposed development will also be serviced by additional single 150 mm diameter service lateral from the existing 150 mm diameter municipal main located on Palace Street. The watermain will be internally looped by the mechanical engineer. The proposed buildings will be fully sprinklered and fire protection will be provided with the fire department Siamese connection within 45 m of the proposed private fire hydrant located on the south side of the property close to Palace Street. The Siamese connections are located immediately beside the main entrance to the building as shown on the site plan, as well as, on all the engineering plans.

Due to the limited available fire flow capacity on Palace Street, we have proposed two water services off of Montreal Road to ensure redundancy in the event one of the sections of Montreal Road watermain is under maintenance. No changes are required to the existing City water distribution system to allow servicing for this property.

2.2 SYSTEM CONSTRAINTS AND BOUNDARY CONDITIONS

Boundary conditions have been provided by the City of Ottawa at the connection along the Montreal Road 305mm watermain and Palace Street 155mm watermain. Tower C has the maximum fire flow of 133 l/s (8,000 l/min) which was estimated by FUS method.

Table 2-1: Boundary Conditions (City of Ottawa)

SCENARIO	@ Montreal Road connection	@ Palace Street connection
Basic Day (MAX HGL)	118.2m	118.2m
Peak Hour (MIN HGL)	107.5m	106.5m
Max Day + Fire Flow @20psi	110.5m	85L/s

2.3 CONFIRMATION OF ADEQUATE DOMESTIC SUPPLY AND PRESSURE

Water demands are based on Table 4.2 of the Ottawa Design Guidelines – Water Distribution. As previously noted, the development is considered as residential development, consisting of bachelor and 1-bedroom units. A water demand calculation sheet is included in Appendix B, and the total water demands are summarized as follows:

WSP (2018 Bulletin)		
Tower A	Tower B	Tower C

Average Day	1.22 l/s	1.26 l/s	0.97 l/s
Maximum Day	3.04 l/s	3.16 l/s	2.42 l/s
Peak Hour	6.70 l/s	6.95 l/s	5.32 l/s

The 2010 City of Ottawa Water Distribution Guidelines stated that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

The site has been analyzed as summarized below and in Table 2-2 to ensure all the City of Ottawa minimum criteria for water pressures are met for the two conditions (maximum day + fire flow and peak hour). The analysis was carried out using EPANET hydraulic and water quality analysis based on the boundary conditions provided by the City of Ottawa. The detailed EPANET output results are also included in the Appendix B.

With respect to a maximum daily demand of 8.62 L/s and fire flow of 133 L/s for the proposed development. The model indicated that both the pressure drop and the velocities in the pipe were acceptable and were within the City of Ottawa's minimum pressure requirements.

With respect to a peak hour demand of 18.97 L/s, the model indicated that both the pressure drop and the velocities in the pipe were also acceptable and within the City of Ottawa's minimum pressure requirements.

Refer to Appendix B for detail water distribution analyze output.

Table 2-2: Summary of Water Pressure from EPANET results

SCENARIO	@ Montreal Road connection		@ Palace Street connection		@ Hydrant	
	(psi)	(kPa)	(psi)	(kPa)	(psi)	(kPa)
Max Day + Fire Flow	77.3	533.0	46.6	321.3	39.1	269.6
Peak Hour (MIN HGL)	75.8	522.6	75.2	518.5		
Basic Day (Max HGL)	91.1	628.1	91.1	628.1		

2.4 CONFIRMATION OF ADEQUATE FIRE FLOW PROTECTION

The fire flow rate has been calculated using the Fire Underwriters Survey (FUS) method. The method takes into account the type of building construction, the building occupancy, the use of sprinklers and the exposures to adjacent structures. Assuming fire resistive construction with fully sprinkler system, the fire flow demand of 7,000 l/min (117 l/s) for towers A and B, and 8,000 l/min (133 l/s) for tower C have been calculated. Copy of the FUS calculations are included in Appendix B.

The maximum fire demand of 8,000 l/min can be delivered through one private fire hydrant located on the south side of the property close to Palace Street.

The proposed three high rise towers on site will be serviced by the two 203 mm water lines off the 305 mm public watermain from Montreal Road. The two 203 mm feeder mains will merge together inside the property and will run along the west property line from north to south, then connect to the existing 155 mm watermain along Palace Street. Two water service stubs will be provided for building connections along the stretch. The proposed towers will have fully sprinklered system and fire protection will be provided with the fire department Siamese connection within 45 m of the private fire hydrant. The Siamese connections are located close to the main entrance of each tower, excluding Tower A, the Siamese connection for Tower A will be moved to Tower B to accommodate the minimum distance requirement to a private hydrant.

The boundary condition for Maximum Day and Fire Flow results in a pressure of 269.6 kPa at the ground floor level. In the guidelines, a minimum residual pressure of 140 kPa must be maintained in the distribution system for a fire flow and maximum day event. As a pressure of 250.50 kPa is achieved, the fire flow requirement is exceeded.

2.5 CHECK OF HIGH PRESSURE

High pressure is a concern. The maximum water pressure inside the building at the connection is determined with the maximum HGL condition, resulting in a pressure of 628.1 kPa which is more than the 552 kPa threshold in the guideline in which pressure control is required. Based on this result, pressure control is required for this building.

2.6 RELIABILITY REQUIREMENTS

Three shut off valves are provided for this site, two are located on the north boundary close to Montreal Road, the third one is located on the south west corner of the site, close to Palace Street. And one shut off valve is introduced along the 305mm watermain along Montreal Road for future maintenance or emergency purpose. Water can be supplied to the building from both end of the Montreal Road and Palace Street and which they can be isolated for future emergency circumstance.

3 WASTEWATER DISPOSAL

3.1 DESIGN CRITERIA

In accordance with the City of Ottawa's Sewer Design Guidelines, the following design criteria have been utilized in order to predict wastewater flows generated by the subject site and complete the sewer design;

• Minimum Velocity	0.6 m/s
• Maximum Velocity	3.0 m/s
• Manning Roughness Coefficient	0.013
• Total est. hectares residential use	1.236
• Average sanitary flow for residential use	280 l/c/d
• Infiltration Allowance (Total)	0.33 l/ha/s
• Minimum Sewer Slopes – 200 mm diameter	0.32%

The area of 1.236 ha represents the lot area of the new residential development and immediate surrounding area to the sides of the new buildings. This is the sanitary collection area that is being considered to contribute to the existing 600mm sanitary sewer along Montreal Road.

3.2 CALCULATIONS FOR NEW SANITARY SEWER

The criteria to determine anticipated actual peak flow based on site used as described in Ottawa Sewer Design Guidelines Appendix 4-A are as follows, refer to appendix C for detail calculation/

• Residential	280 l/c/d
• Total population Tower A	376
• Total population Tower B	390
• Total population Tower C	299

	(2018 Bulletin)		
	Tower A	Tower B	Tower C
Peak flow	4.17 l/s	4.32 l/s	3.35 l/s
Extraneous flow	0.14 l/s	0.14 l/s	0.14 l/s
Total Peak flow	4.31 l/s	4.46 l/s	3.49 l/s

The on-site sanitary sewer network has been designed in accordance with the total peak sanitary flow of 12.25 l/s as described above.

The 375 mm diameter sanitary sewer from the sanitary manhole 1 to the building will have a slope of 0.5 %, and a capacity of 123.98 l/s, with a velocity of 1.12 m/s. The 375 mm diameter sanitary sewer from the sanitary manhole 1 to the existing 600 mm sanitary sewer will have a slope of 0.5 %, and a capacity of 123.98 l/s, with a velocity of 1.12 m/s. The servicing pipe capacity exceeds the estimated peak sanitary flow rate of 12.25 l/s for the proposed development site.

3.3 VERIFICATION OF AVAILABLE CAPACITY IN DOWNSTREAM SEWER

The capacity of the downstream 600 mm diameter sewer at 0.116% slope is 209.12 l/s, which is adequate for the flow assumptions from the proposed site as noted above. This existing downstream sewer has already serviced the 1.236 ha of the subjected property on the south side of Montreal Road. Assuming the existing area generates a proportional flow to that estimated above, the existing 600 mm sanitary sewer should have enough capacity to convey the peak flow from the

proposed development site. In addition, correspondence with the City of Ottawa staff did not identify any capacity issues with existing municipal sewers on Montreal Road.

4 SITE STORM SERVICING

4.1 EXISTING CONDITION

The subject site is located at the southwest intersection of Montreal Road and Vanier Parkway, currently is dominated by an asphalt parking lot consists with multiple one to two storeys buildings. The subject site is serviced with a series of storm sewers which collect runoff from the various buildings and significant parking lots. Most runoff from the subject site is ultimately directed to a 1050 mm diameter trunk storm sewer, which runs from west to east along Montreal Road. There are also series of sewers adjacent to the site including a 375 mm diameter storm sewer in Gardner Street and 375 mm and 1800 mm diameter storm sewers in Vanier Parkway. In excess of the minor system capacity, the storm runoff will flow overland to Montreal Road right of way.

4.2 DRAINAGE DRAWING

Drawings C03 show the receiving storm sewer and site storm sewer network. Drawings C02 provide proposed grading and drainage, and include existing grading information. Drawing C04 provides a post-construction drainage sub-area plan. Site sub-area information is provided in Appendix D.

4.3 WATER QUANTITY CONTROL OBJECTIVE

Refer to the Stormwater Management Report for the water quantity objective for the site.

4.4 WATER QUALITY CONTROL OBJECTIVE

Refer to the Stormwater Management Report for the water quality objective for the site.

4.5 DESIGN CRITERIA

The stormwater system was designed following the principles of dual drainage, making accommodation for both major and minor flow. Refer to the Stormwater Management Report for further details.

4.6 PROPOSED MINOR SYSTEM

The proposed development will be serviced by 375 mm storm service connection and a manhole off 1050 mm storm sewer located on Montreal Road. As described in the storm water management report, runoff from the site will be collected by deck drains, roof drains and a trench drain that will be directed to the underground cistern located on the north end of the site outside of the building footprint. The outlet pipe from the cistern will be equipped with an inlet restrictor to restrict post development flows to pre-development levels. The subject development site has been designed to accommodate the allowable release rate of 120 L/s leaving the site with 98 l/s from the cistern and 21.5 l/s from the uncontrolled areas.

Perimeter foundation drainage from the proposed development will discharge into the sump pit inside the building and eventually outlet to the existing 1050 mm storm sewer via a forcemain on the north side of the site. The forcemain will be designed and provided by the mechanical engineer.

4.7 STORMWATER MANAGEMENT

Refer to Stormwater Management report for details.

5 SEDIMENT AND EROSION CONTROL

5.1 GENERAL

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction. Silt fences will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fences will remain in place until the working areas have been stabilized or re-vegetated. Catch basins and manholes will have filter fabric installed under the grate during construction to protect from silt entering the storm sewer system. A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

Erosion and sediment controls must be in place during construction. Recommendations to the contractor will be included in the erosion and sediment control plan C05 and are summarized below:

During all construction activities, erosion and sedimentation shall be controlled by the following techniques:

Prior to start of construction:

- ▶ Install silt fence along the perimeter of the property line.
- ▶ Install filter fabric or silt sack filters in all the catchbasins and manholes that exist within the vicinity of the site.

During construction:

- ▶ Minimize the extent of disturbed areas and the duration of exposure and impacts to existing grading.
- ▶ Perimeter vegetation to remain in place until permanent storm water management is in place otherwise, immediately install silt fence when the existing site is disturbed at the perimeter.
- ▶ Protect disturbed areas from overland flow by providing temporary swales to the satisfaction of the field engineer. Tie-in temporary swale to existing catchbasins as required.
- ▶ Provide temporary cover such as seeding or mulching if disturbed area will not be rehabilitated within 30 days.
- ▶ Inspect silt fences, filter fabric filters and catch basin sumps weekly and within 24 hours after a storm event. Clean and repair when necessary.
- ▶ Drawing to be reviewed and revised as required during construction.
- ▶ Erosion control fencing to be also installed around the base of all stockpiles.
- ▶ Do not locate topsoil piles and excavation material closer than 2.5m from any paved surface, or one which is to be paved before the pile is removed. All topsoil piles are to be seeded if they are to remain on site long enough for seeds to grow (longer than 30 days).
- ▶ Control wind-blown dust off site by seeding topsoil piles and other areas temporarily (provide watering as required and to the satisfaction of the engineer).
- ▶ No alternate methods of erosion protection shall be permitted unless approved by the field engineer.
- ▶ City roadway and sidewalk to be cleaned of all sediment from vehicular tracking as required.
- ▶ Provide gravel entrance (mud mat) wherever equipment leaves the site to provide mud tracking onto paved surfaces.

- ▶ During wet conditions, tires of all vehicles/equipment leaving the site are to be scrapped.
- ▶ Any mud/material tracked onto the road shall be removed immediately by hand or rubber tire loader.
- ▶ Take all necessary steps to prevent building material, construction debris or waste being spilled or tracked onto abutting properties or public streets during construction and proceed immediately to clean up any areas so affected.
- ▶ All erosion control structure to remain in place until all disturbed ground surfaces have been stabilized either by paving or restoration of vegetative ground cover.
- ▶ During the course of construction, if the engineer believes that additional prevention methods are required to control erosion and sedimentation, the contractor will install additional silt fences or other methods as required to the satisfaction of the engineer.
- ▶ The contractor shall implement best management practices, to provide for protection of the area drainage system and the receiving watercourse, during construction activities. The contractor acknowledges that failure to implement appropriate erosion and sediment control measures may be subject to penalties imposed by any applicable regulatory agency.

6 APPROVAL AND PERMIT REQUIREMENTS

6.1 GENERAL

The proposed development is subject to site plan approval and building permit approval.

No approvals related to municipal drains are required.

No permits or approvals are anticipated to be required from the Ontario Ministry of Transportation, National Capital Commission, Parks Canada, Public Works and Government Services Canada, or any other provincial or federal regulatory agency.

7 CONCLUSION CHECKLIST

7.1 CONCLUSIONS AND RECOMMENDATIONS

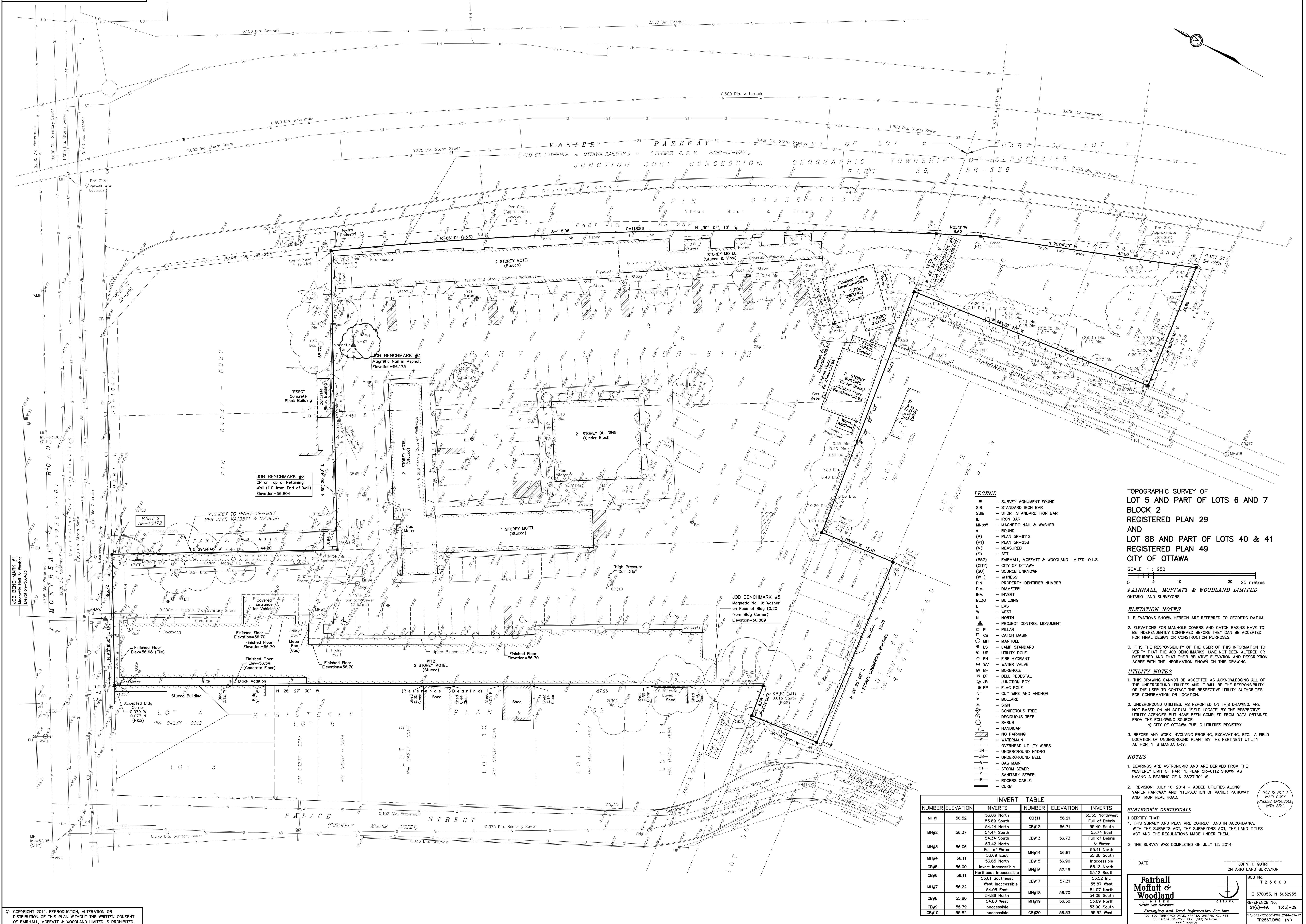
It is concluded that the proposed development can meet all provided servicing constraints and associated requirements. It is recommended that this report be submitted to the City of Ottawa in support of the application for site plan approval.

7.2 COMMENTS RECEIVED FROM REVIEW AGENCIES

N/A

A

- TOPOGRAPHIC SURVEY PLAN



DATE	JOHN H. GUTHRIE ONTARIO LAND SURVEYOR
Fairhall Moffatt & Woodland REALTIES Ontario Land Surveys <i>Surveying and Land Information Services</i> 100-600 TERRY FOX DRIVE, KANATA, ONTARIO K2L 4B6 TEL: (613) 591-2580 FAX: (613) 591-1495 www.fmc.on.ca	JOB NO. T 2 5 E 370053, REFERENCE NO. 21(a)-49, S:\065\2580\01 TP25621

INVERT TABLE					
NUMBER	ELEVATION	INVERTS	NUMBER	ELEVATION	INVERTS
MH#1	56.52	53.86 North 53.89 South	CB#11	56.21	55.58 Northeast Full of Debris
MH#2	56.37	54.24 North 54.34 South 53.42 North	CB#12	56.71	55.40 South 55.74 East Full of Debris & Water
MH#3	56.06	Full of Water 53.69 East 53.65 North	MH#14	56.81	55.41 North 55.38 South
MH#4	56.11		CB#15	56.90	Inaccessible
CB#5	56.00	Invert Inaccessible	MH#16	57.45	55.13 North 55.12 South
CB#6	56.11	North Inaccessible 55.01 Inaccessible	CB#17	57.31	55.52 Inv.
MH#7	56.22	West Inaccessible 54.05 East 54.96 North	MH#18	56.70	55.87 North 54.05 South
CB#8	55.80	54.80 West	MH#19	56.50	53.89 North
CB#9	55.79	Inaccessible			53.90 South
CB#10	55.82	Inaccessible	CB#20	56.33	55.52 West

APPENDIX

B

- CITY OF OTTAWA CORRESPONDENCE
(BOUNDARY CONDITIONS)
- WATER DEMAND AND FIRE FLOW
CALCULATION
- FIRE FLOW LETTER FROM ARCHITECT
- EPANET RESULTS

Jafferjee, Ishaque

From: Wu, John <John.Wu@ottawa.ca>
Sent: January-27-20 10:54 AM
To: Jafferjee, Ishaque
Subject: RE: 112 Montreal Road Multi Residential Development - Sanitary and Potable Adequacy
Attachments: 112 Montreal Jan 2020.pdf

The following are boundary conditions, HGL, for hydraulic analysis at 112 Montreal Rd (zone 1E) assumed to be connected to the 305mm on Montreal Rd and 152mm on Palace (see attached PDF for locations).

	Montreal Road connection	Palace connection
Minimum HGL	107.5m	106.5m
Maximum HGL	118.2m	118.2m
MaxDay + FireFlow (133 L/s)	110.5m	Available flow @20psi = 85 L/s

Note: The maximum pressure is estimated to be more than 80 psi at both connections. A pressure check at completion of construction is recommended to determine if pressure control is required.

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

John

From: Jafferjee, Ishaque <Ishaque.Jafferjee@wsp.com>
Sent: January 23, 2020 11:30 AM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Yang, Winston <Winston.Yang@wsp.com>
Subject: RE: 112 Montreal Road Multi Residential Development - Sanitary and Potable Adequacy

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi John,

No problem.

The fire flow calculations were attached in the earlier email. It was a combined pdf with 2 pages. Here it is attached again for your review along with confirmation from the architect regarding construction use.

Ishaque Jafferjee, P.Eng
T +1 613-690-3923



From: Wu, John <John.Wu@ottawa.ca>
Sent: January-23-20 9:58 AM
To: Jafferjee, Ishaque <Ishaque.Jafferjee@wsp.com>
Subject: RE: 112 Montreal Road Multi Residential Development - Sanitary and Potable Adequacy

We only provide watermain boundary conditions, all other will be reviewed and circulated when the application is been submitted.
Please provide the calculation of the Fire Flow.

John

From: Jafferjee, Ishaque <Ishaque.Jafferjee@wsp.com>
Sent: January 23, 2020 9:53 AM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Yang, Winston <Winston.Yang@wsp.com>; David Renfroe <davidrenfroe@outlook.com>; Gauthier, Steve <Steve.Gauthier@ottawa.ca>
Subject: 112 Montreal Road Multi Residential Development - Sanitary and Potable Adequacy

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi John,

Please see attached the potable and sanitary servicing plan for this proposed development along with domestic & fire demand and sanitary demand calculations. We would like to request **boundary conditions** of the potable distribution network and **capacity** of the downstream sanitary sewer system along Montreal Road.

The demand calculations have been based on the latest City of Ottawa design standards and technical bulletins.

Site Description

- Three high-rise condominium apartment towers with a 3 levels of underground parking below.
- Proposed services for connection:
 - o 250mm PVC sanitary (Montreal Road)
 - o 200mm PVC watermain (Montreal Road)
 - o 150mm PVC watermain (Palace Street)

Water Demand

- Average Day Demand: **3.45 L/s**
- Max Day Demand: **8.62 L/s**
- Peak Hour Demand: **18.96 L/s**
- Fire Demand (max of the three towers): **133 L/s**
- **Max Day + Fire Demand: 141.6 L/s**

Sanitary Demand

- **Peak Design Flow (incl. infiltration): 12.2 L/s**

Should you have any questions please do not hesitate to contact us.

Thank you,

Ishaque Jafferjee, P.Eng

Team Lead

Municipal Infrastructure



T+ 1 613-690-3923

F+ 1 613-829-8299

2611 Queensview Drive, Suite 300
Ottawa, Ontario,
K2B 8K2 Canada

wsp.com

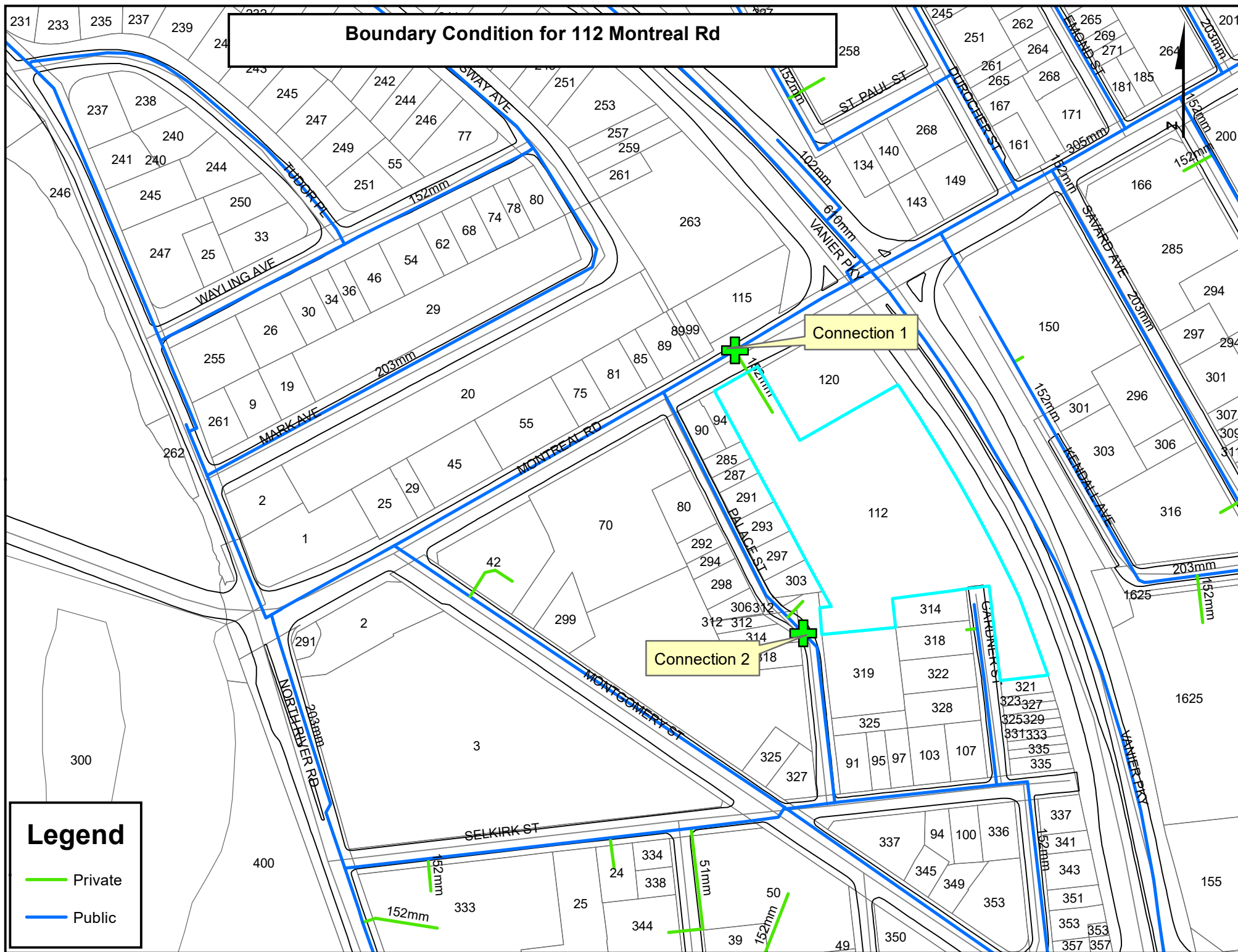
NOTICE: This communication and any attachments ("this message") may contain information which is privileged, confidential, proprietary or otherwise subject to restricted disclosure under applicable law. This message is for the sole use of the intended recipient(s). Any unauthorized use, disclosure, viewing, copying, alteration, dissemination or distribution of, or reliance on, this message is strictly prohibited. If you have received this message in error, or you are not an authorized or intended recipient, please notify the sender immediately by replying to this message, delete this message and all copies from your e-mail system and destroy any printed copies. You are receiving this communication because you are listed as a current WSP contact. Should you have any questions regarding WSP's electronic communications policy, please consult our Anti-Spam Commitment at www.wsp.com/casl. For any concern or if you believe you should not be receiving this message, please forward this message to caslcompliance@wsp.com so that we can promptly address your request. Note that not all messages sent by WSP qualify as commercial electronic messages.

AVIS : Ce message, incluant tout fichier l'accompagnant (« le message »), peut contenir des renseignements ou de l'information privilégiés, confidentiels, propriétaires ou à divulgation restreinte en vertu de la loi. Ce message est destiné à l'usage exclusif du/des destinataire(s) voulu(s). Toute utilisation non permise, divulgation, lecture, reproduction, modification, diffusion ou distribution est interdite. Si vous avez reçu ce message par erreur, ou que vous n'êtes pas un destinataire autorisé ou voulu, veuillez en aviser l'expéditeur immédiatement et détruire le message et toute copie électronique ou imprimée. Vous recevez cette communication car vous faites partie des contacts de WSP. Si vous avez des questions concernant la politique de communications électroniques de WSP, veuillez consulter notre Engagement anti-pourriel au www.wsp.com/lcap. Pour toute question ou si vous croyez que vous ne devriez pas recevoir ce message, prière de le transférer au conformitelcap@wsp.com afin que nous puissions rapidement traiter votre demande. Notez que ce ne sont pas tous les messages

Boundary Condition for 112 Montreal Rd

Legend

- Private
- Public



WATER DISTRIBUTION - PROPOSED DOMESTIC DEMANDS

Demand Type	Amount	Units
Average Day Demand		
Residential	= 280	L/c/d
Light Industrial	= 35000	L/gross ha/d
Heavy Industrial	= 55000	L/gross ha/d
Shopping Centres	= 2500	L/(1000m2/d)
Hospitals	= 900	L/(bed/d)
Schools	= 70	L/(Students/d)
Trailer Parks no Hook-Ups	= 340	L/(space/d)
Trailer Parks with Hook-Ups	= 800	L/(space/d)
Campgrounds	= 225	L/(campsite/d)
Mobile Home Parks	= 1000	L/(Space/d)
Motels	= 150	L/(bed-space/d)
Hotels	= 225	L/(bed-space/d)
Tourist Commercial	= 28000	L/gross ha/d
Other Commercial	= 28000	L/gross ha/d

Maximum Daily Demand:			
Residential	=	2.5 x average day	L/c/d
Industrial	=	1.5 x average day	L/gross ha/d
Commercial	=	1.5 x average day	L/gross ha/d
Institutional	=	1.5 x average day	L/gross ha/d

Maximum Hour Demand:			
Residential	=	2.2 x maximum day	L/c/d
Industrial	=	1.8 x maximum day	L/gross ha/d
Commercial	=	1.8 x maximum day	L/gross ha/d
Institutional	=	1.8 x maximum day	L/gross ha/d

Unit Type	Person / Unit
Single Family	3.4
Semi-detached	2.7
Duplex	2.3
Townhouse (row)	2.7
Apartments:	
Bachelor	1.4
1 Bedroom	1.4
2 Bedroom	2.1
3 Bedroom	3.1
Average Apt.	1.8

Population Calculator	Tower A	Tower B	Tower C
Single Family			
Semi-detached			
Duplex			
Townhouse (row)			
Bachelor	39	26	15
1 Bedroom	79	90	57
2 Bedroom	84	92	72
3 Bedroom	11	11	15
Average Apt.			
Total Population	376	390	299

	Tower A		Tower B		Tower C	
Demand Type =	Residential		Residential		Residential	
Average Day Demand =	280	L/c/d	280	L/c/d	280	L/c/d
Population =	376		390		299	
=	280 x 376		280 x 390		280 x 299	
=	105,196	L/day	109,116	L/day	83,580	L/day
Average Daily Flow =	1.22	L/s	1.26	L/s	0.97	L/s
Daily Demand Type =	Residential		Residential		Residential	
Max. Daily Factor =	2.5	L/c/d	2.5	L/c/d	2.5	L/c/d
=	2.5 x Average Daily Flow		2.5 x Average Daily Flow		2.5 x Average Daily Flow	
=	2.5 x 105,196		2.5 x 109,116		2.5 x 83,580	
=	262,990	L/day	272,790	L/day	208,950	L/day
Maximum Daily Demand =	3.04	L/s	3.16	L/s	2.42	L/s
Hour Demand Type =	Residential		Residential		Residential	
Max. Hour Factor =	2.2	L/c/d	2.2	L/c/d	2.2	L/c/d
=	2.2 x Max Daily Flow		2.2 x Max Daily Flow		2.2 x Max Daily Flow	
=	2.2 x 262,990		2.2 x 272,790		2.2 x 208,950	
=	578,578	L/day	600,138	L/day	459,690	L/day
Maximum Hour Demand =	6.70	L/s	6.95	L/s	5.32	L/s

Aveage Daily Flow (L/s) **3.45**
 Maximum Daily Demand (L/s) **8.62**
 Maximum Hour Demand (L/s) **18.96**

WATER DISTRIBUTION - PROPOSED FIRE FLOW DEMANDS

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

Type of Construction Coefficient:		Comments
Wood Frame	1.5	(all structurally combustible)
Ordinary	1.0	(brick, masonry wall, combustible floor and interior)
Non-Combustible	0.8	(unprotected metal structural component, masonry or metal walls)
Fire Resistive	0.6	(fully protected frame, floors and roof)

Combustibility:		
Non-Combustible	-25%	
Limited Combustible	-15%	
Combustible	0%	
Free Burning	15%	
Rapid Burning	25%	

Sprinkler Protection:		
Complete Sprinkler System	-50%	(max.)
NFPA 13 Conformed	-30%	(max.)
If Water Supply Standard for Both System and Fire Lines	-10%	additional (max.)
Fully Supervised System	-10%	additional (max.)
None	0%	

	Tower A			Tower B			Tower C		
Type of Construction Coefficient	Fire Resistive			Fire Resistive			Fire Resistive		
	0.6			0.6			0.6		
No. of Storeys	19			19			16		
Gross Floor Area (m ²)	5,700 m ²			5,700 m ²			5,700 m ²		
Fire Flow, F (L/min)	9,966 L/min			9,966 L/min			9,966 L/min		
F(round)	10,000 L/min			10,000 L/min			10,000 L/min		
Modification 1: Occupancy Combustibility	Limited Combustible			Limited Combustible			Limited Combustible		
Occupancy Credit	-15%			-15%			-15%		
F(mod1) = F(round) + Occupancy Credit	8,500 L/min			8,500 L/min			8,500 L/min		
Modification 2: Sprinkler Protection	Complete Sprinkler System			Complete Sprinkler System			Complete Sprinkler System		
Sprinkler Credit	-50%			-50%			-50%		
Additional Credit	None			None			None		
	0			0			0		
Sprinkler Credit	-4,250 L/min			-4,250 L/min			-4,250 L/min		
F(mod2) = F(mod1) + Sprinkler Credit	4,250 L/min			4,250 L/min			4,250 L/min		
Modification 3: Exposure Distances									
North	14.3	m	15%	26.2	m	10%	19.8	m	15%
South	26.2	m	10%	20.1	m	10%	25.3	m	10%
East	60	m	0%	60	m	0%	30.3	m	5%
West	30.3	m	5%	25.3	m	10%	12	m	15%
Total % =	30%			30%			45%		
	8,500 x 0.30			8,500 x 0.30			8,500 x 0.45		
Exposure Credit	2,550 L/min			2,550 L/min			3,825 L/min		
F(mod3) = F(mod2) + Exposure Credit	6,800 L/min			6,800 L/min			8,075 L/min		
F(final) = F(mod3) rounded to nearest 1,000L/min	7,000 L/min			7,000 L/min			8,000 L/min		
F(final)	117 L/s			117 L/s			133 L/s		



WOODMAN ARCHITECT & ASSOCIATES LTD.

4 Beechwood Ave, Suite 201, Ottawa, ON, K1L 8L9
Tel. (613) 228-9850 Fax. (613) 228-9848
E-mail. mailbox@woodmanarchitect.com

January 20, 2020

WSP
Municipal Infrastructure
2611 Queensview Drive, Suite 300
Ottawa, ON
K2B 8K2

RE: 112 Montreal Road
Fire Flow's and confirmation of building classification

Attention: Ishaque Jafferjee, Team Lead

Dear Ishaque,

As per your request, this letter is to confirm that all three buildings proposed for 112 Montreal Road will have a building classification of OBC 3.2.2.42 Group C, Any height, Any area, Sprinklered.

OBC 3.2.2.42 Group C, Any Height, Any area, Sprinklered

- (1) The building is classified as Group C.
- (2) The building referred to in Sentence (1) shall be of noncombustible construction, and,
 - (a) The building shall be sprinklered,
 - (b) Floor assemblies shall be fire separations with a fire-resistance rating not less than 2 h,
 - (b) mezzanines shall have a fire-resistance rating not less than 1 h, and
 - (c) loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly.

OBC 3.2.2.73 Group F, Division 3, Any Height, Any area

A 3 storey storage garage below grade of non-combustible construction where floor assemblies shall be fire separations with a fire resistance rating of not less than 2 hrs.

The occupancy shall be sprinklered and regulated by Subsection 3.2.6.

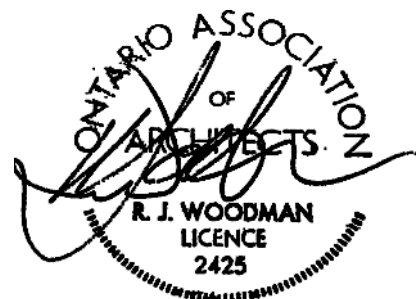
Group A Division 2 - Fitness and Amenity areas are subsidiary uses to the Primary Group 'C' classification. Group E uses are less than 10% of the ground floor as per OBC 3.2.2.8 (1).

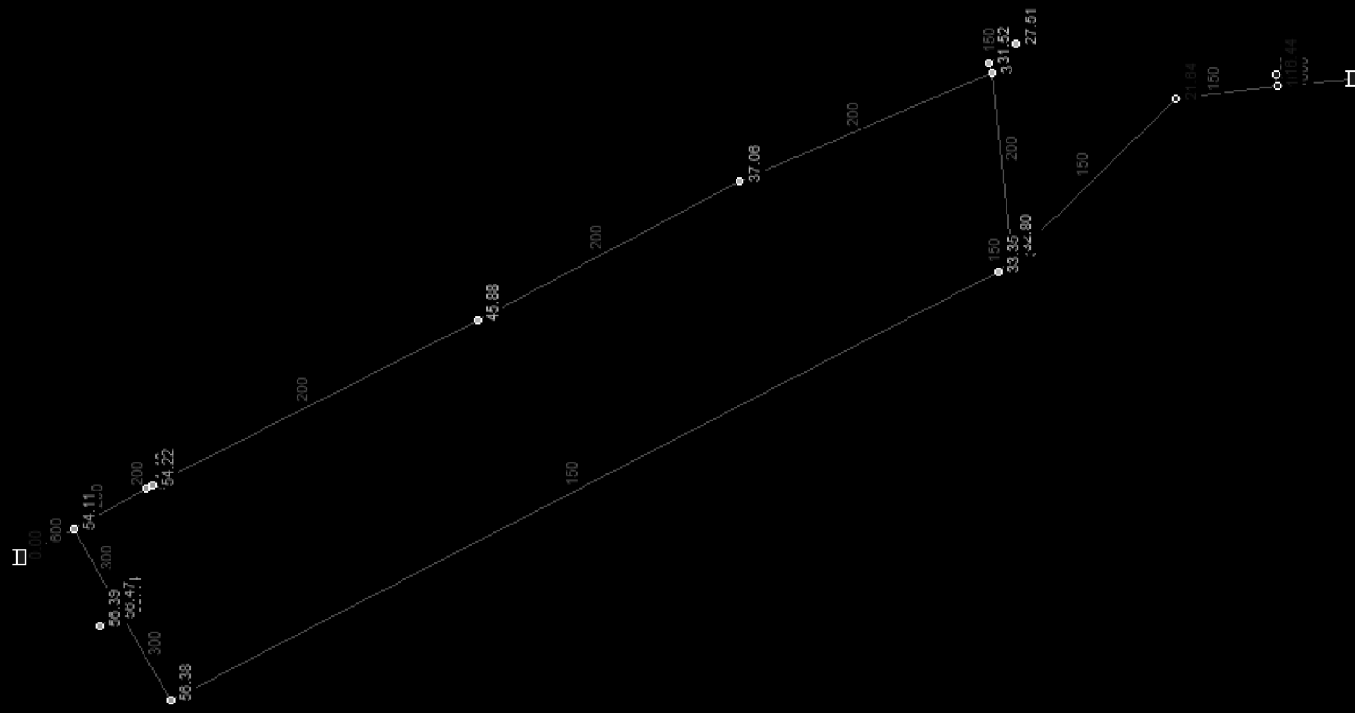
Trusting that these responses to your inquiries are satisfactory.

Yours truly,



Woodman Architect & Associates Ltd.
Robert J. Woodman, OAA, OAQ, NSAA, MRAIC





```

*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                *
*                               Analysis for Pipe Networks                  *
*                               Version 2.0                                *
*****

```

Input File: Towers-Case 1 - MDD+FF option 2.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
2	14	11	12.91	300
3	11	9	13.20	300
5	11	12	1.06	150
6	12	13	2.17	150
7	9	8	123.04	150
8	8	4	3.15	150
9	4	3	29.55	150
10	4	5	0.83	150
11	5	6	23.66	200
12	6	7	1.46	150
13	3	1	13.52	150
14	1	2	1.51	150
23	14	15	11.06	200
24	15	16	1.00	200
29	1	30	9.85	600
15	16	18	47.96	200
18	7	21	4.41	150
19	18	23	39.18	200
20	23	6	36.15	200
1	14	17	8.08	600

Node Results:

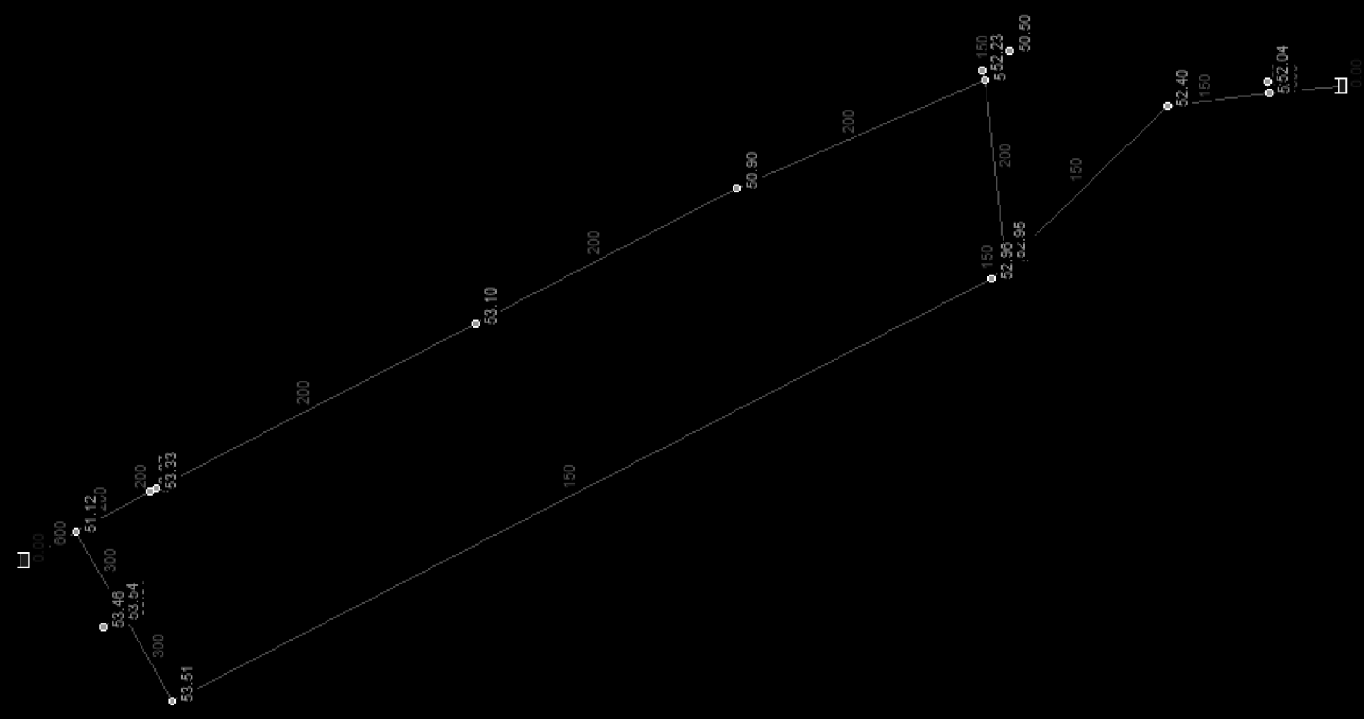
Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	70.90	16.42	0.00
2	0.00	70.90	16.44	0.00
3	0.00	75.91	21.64	0.00
4	0.00	86.86	30.35	0.00
5	4.31	86.89	32.80	0.00
6	0.00	87.15	32.27	0.00
7	0.00	86.39	31.52	0.00
8	0.00	87.44	33.35	0.00
9	0.00	110.37	56.38	0.00
11	0.00	110.43	56.44	0.00
12	0.00	110.43	56.47	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality
13	0.00	110.43	56.39	0.00
14	0.00	110.49	54.11	0.00
15	0.00	108.50	54.43	0.00
16	4.31	108.32	54.22	0.00
18	0.00	100.08	45.88	0.00
21	133.00	84.11	27.51	0.00
23	0.00	93.36	37.06	0.00
30	110.93	70.90	0.00	0.00 Reservoir
17	-252.55	110.50	0.00	0.00 Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
2	76.54	1.08	4.54	Open
3	76.54	1.08	4.54	Open
5	0.00	0.00	0.00	Open
6	0.00	0.00	0.00	Open
7	76.54	4.33	186.33	Open
8	76.54	4.33	186.33	Open
9	110.93	6.28	370.42	Open
10	-34.38	1.95	42.33	Open
11	-38.69	1.23	10.87	Open
12	133.00	7.53	518.40	Open
13	110.93	6.28	370.42	Open
14	0.00	0.00	0.00	Open
23	176.00	5.60	179.79	Open
24	176.00	5.60	179.79	Open
29	110.93	0.39	0.27	Open
15	171.69	5.47	171.72	Open
18	133.00	7.53	518.40	Open
19	171.69	5.47	171.72	Open
20	171.69	5.47	171.72	Open
1	-252.55	0.89	1.42	Open



```

*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.0                                 *
*****

```

Input File: Towers Case 2 - PH.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
2	14	11	12.91	300
3	11	9	13.20	300
5	11	12	1.06	150
6	12	13	2.17	150
7	9	8	123.04	150
8	8	4	3.15	150
9	4	3	29.55	150
10	4	5	0.83	150
11	5	6	23.66	200
12	6	7	1.46	150
13	3	1	13.52	150
14	1	2	1.51	150
23	14	15	11.06	200
24	15	16	1.00	200
29	1	30	9.85	600
15	16	18	47.96	200
18	7	21	4.41	150
19	18	23	39.18	200
20	23	6	36.15	200
1	14	17	8.08	600

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	106.50	52.02	0.00
2	0.00	106.50	52.04	0.00
3	0.00	106.67	52.40	0.00
4	0.00	107.04	50.53	0.00
5	9.48	107.04	52.95	0.00
6	0.00	107.10	52.22	0.00
7	0.00	107.10	52.23	0.00
8	0.00	107.05	52.96	0.00
9	0.00	107.50	53.51	0.00
11	0.00	107.50	53.51	0.00
12	0.00	107.50	53.54	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality
13	0.00	107.50	53.46	0.00
14	0.00	107.50	51.12	0.00
15	0.00	107.44	53.37	0.00
16	9.48	107.43	53.33	0.00
18	0.00	107.30	53.10	0.00
21	0.00	107.10	50.50	0.00
23	0.00	107.20	50.90	0.00
30	17.76	106.50	0.00	0.00 Reservoir
17	-36.72	107.50	0.00	0.00 Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
2	9.16	0.13	0.09	Open
3	9.16	0.13	0.09	Open
5	0.00	0.00	0.00	Open
6	0.00	0.00	0.00	Open
7	9.16	0.52	3.65	Open
8	9.16	0.52	3.65	Open
9	17.76	1.01	12.45	Open
10	-8.60	0.49	3.25	Open
11	-18.08	0.58	2.66	Open
12	0.00	0.00	0.00	Open
13	17.76	1.01	12.45	Open
14	0.00	0.00	0.00	Open
23	27.56	0.88	5.80	Open
24	27.56	0.88	5.80	Open
29	17.76	0.06	0.01	Open
15	18.08	0.58	2.66	Open
18	0.00	0.00	0.00	Open
19	18.08	0.58	2.66	Open
20	18.08	0.58	2.66	Open
1	-36.72	0.13	0.04	Open


```

*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.0                                *
*****

```

Input File: Tower Case 3 - ND.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
2	14	11	12.91	300
3	11	9	13.20	300
5	11	12	1.06	150
6	12	13	2.17	150
7	9	8	123.04	150
8	8	4	3.15	150
9	4	3	29.55	150
10	4	5	0.83	150
11	5	6	23.66	200
12	6	7	1.46	150
13	3	1	13.52	150
14	1	2	1.51	150
23	14	15	11.06	200
24	15	16	1.00	200
29	1	30	9.85	600
15	16	18	47.96	200
18	7	21	4.41	150
19	18	23	39.18	200
20	23	6	36.15	200
1	14	17	8.08	600

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	118.20	63.72	0.00
2	0.00	118.20	63.74	0.00
3	0.00	118.20	63.93	0.00
4	0.00	118.20	61.69	0.00
5	0.00	118.20	64.11	0.00
6	0.00	118.20	63.32	0.00
7	0.00	118.20	63.33	0.00
8	0.00	118.20	64.11	0.00
9	0.00	118.20	64.21	0.00
11	0.00	118.20	64.21	0.00
12	0.00	118.20	64.24	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality
13	0.00	118.20	64.16	0.00
14	0.00	118.20	61.82	0.00
15	0.00	118.20	64.13	0.00
16	0.00	118.20	64.10	0.00
18	0.00	118.20	64.00	0.00
21	0.00	118.20	61.60	0.00
23	0.00	118.20	61.90	0.00
30	0.00	118.20	0.00	0.00 Reservoir
17	0.00	118.20	0.00	0.00 Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
2	0.00	0.00	0.00	Open
3	0.00	0.00	0.00	Open
5	0.00	0.00	0.00	Open
6	0.00	0.00	0.00	Open
7	0.00	0.00	0.00	Open
8	0.00	0.00	0.00	Open
9	0.00	0.00	0.00	Open
10	0.00	0.00	0.00	Open
11	0.00	0.00	0.00	Open
12	0.00	0.00	0.00	Open
13	0.00	0.00	0.00	Open
14	0.00	0.00	0.00	Open
23	0.00	0.00	0.00	Open
24	0.00	0.00	0.00	Open
29	0.00	0.00	0.00	Open
15	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	0.00	0.00	0.00	Open
20	0.00	0.00	0.00	Open
1	0.00	0.00	0.00	Open

APPENDIX

C

- SANITARY FLOW CALCULATION

SANITARY SEWAGE - PROPOSED SANITARY FLOWS

Average Wastewater Flows:	
Residential	280 L/c/d
Commercial	28,000 L/gross ha/
Institutional	28,000 L/gross ha/
Light Industrial	35,000 L/gross ha/
Heavy Industrial	55,000 L/gross ha/

Peaking Factors:	
Residential	Harmon Equation
Commercial (>20% Area)	1.5
Commercial (<20% Area)	1.0
Institutional (>20% Area)	1.5
Institutional (<20% Area)	1.0
Industrial	Per Figure in Appendix 4-B

$$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{\frac{1}{2}}} \right) * K$$

where P = population

K = correction factor = 0.8

Peak Extraneous Flows:	
Infiltration Allowance	0.33
Less than 10 ha:	
Foundation Drain Allowance	5.0
10 ha - 100 ha:	
Foundation Drain Allowance	3.0
Greater than 100 ha:	
Foundation Drain Allowance	2.0

Unit Type	Person Per Unit	Tower A	Tower B	Tower C
Single Family	3.4			
Semi-detached	2.7			
Duplex	2.3			
Townhouse (row)	2.7			
Apartments:				
Bachelor	1.4	39	26	15
1 Bedroom	1.4	79	90	57
2 Bedroom	2.1	84	92	72
3 Bedroom	3.1	11	11	15
Average Apt.	1.8			
Total Population		376	390	299

	Tower A			Tower B			Tower C		
	Residential			Residential			Residential		
Demand Type=	280			280			280		
Average Day Demand=		L/c/d			L/c/d			L/c/d	
Population	376			390			299		
Site Area (ha)	0.413			0.413			0.413		
Average Daily Flow=	280	x	376	280	x	390	280	x	299
	105,196		L/day	109,116		L/day	83,580		L/day
	1.22		L/s	1.26		L/s	0.97		L/s
Peaking Factor Type	Residential			Residential			Residential		
	3.4		*Max=4	3.4		*Max=4	3.5		*Max=4
	3.4	x	average day	3.4	x	average day	3.5	x	average day
	3.4	x	105,196	3.4	x	109,116	3.5	x	83,580
Peak Daily Flow=	360,607		L/day	373,396		L/day	289,480		L/day
	4.17		L/s	4.32		L/s	3.35		L/s
Infiltration Allowance	0.28			0.28			0.28		
	0.28	x	lot area	0.28	x	lot area	0.28	x	lot area
	0.28	x	0.413	0.28	x	0.413	0.28	x	0.413
	0.12		L/s	0.12		L/s	0.12		L/s
Peak Extraneous Flow=									
	peak daily flow	+	extraneous flow	peak daily flow	+	extraneous flow	peak daily flow	+	extraneous flow
	4.17	+	0.12	4.32	+	0.12	3.35	+	0.12
Total Peak Design Flow=	4.29		L/s	4.44		L/s	3.47		L/s

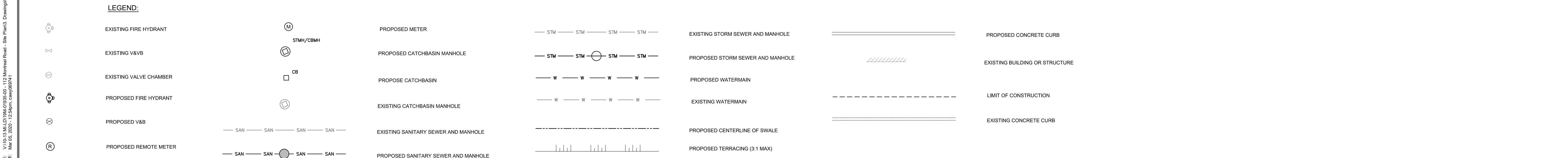
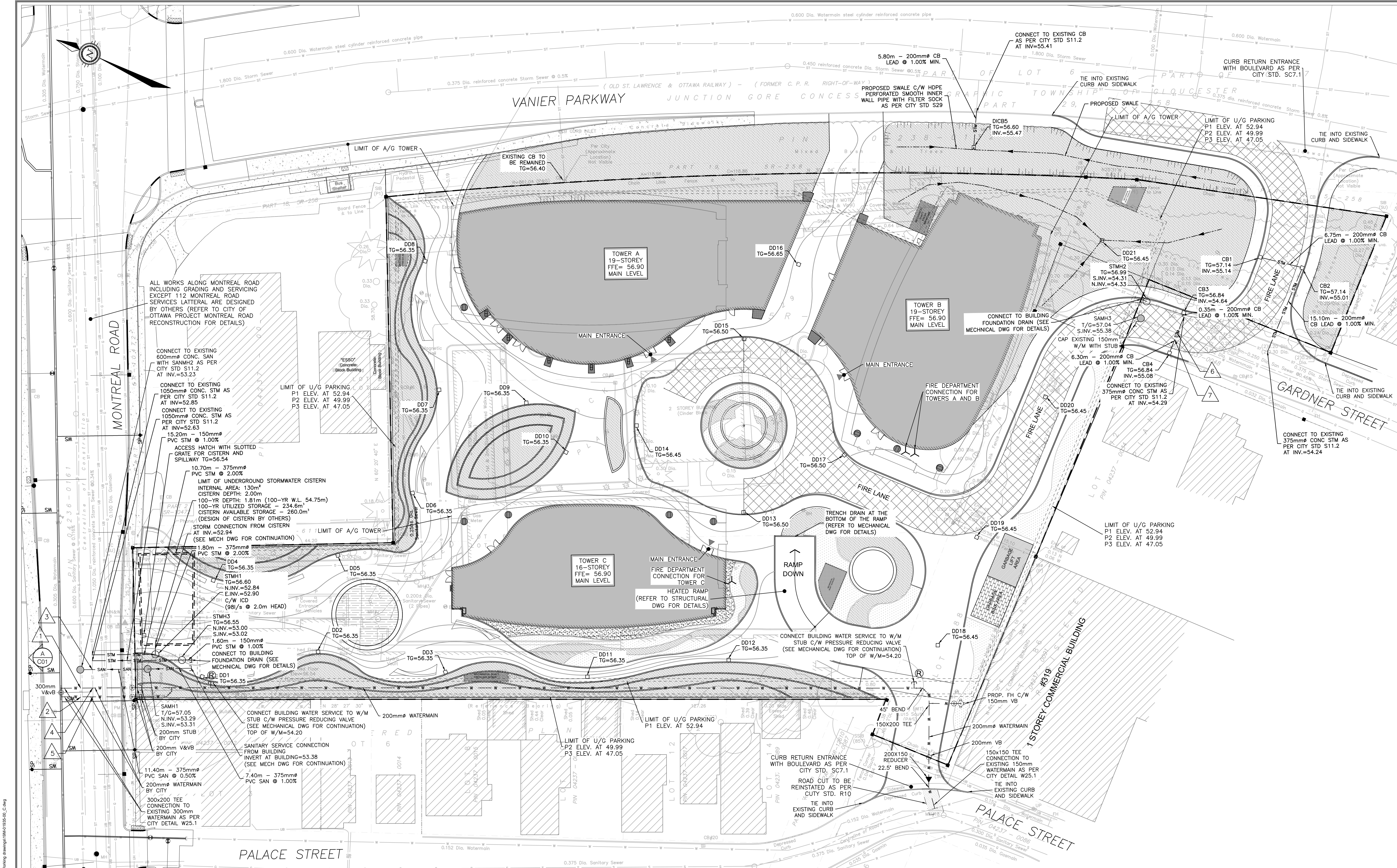
*Total site area was divided by 3 (for 3 towers) to calculate infiltration allowance for each building

Total Peak Sanitary Flow 12.19 L/s

APPENDIX

D

- GRADING PLAN C02
- SERVICING PLAN C03
- STORM DRAINAGE AREA PLAN C04



GENERAL NOTES:

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THE PLANS, SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY OR FOR PROBLEMS WHICH ARISE FROM OTHERS FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEERS GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED.

CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

KEY PLAN
(N.T.S.)

No.	REVISIONS	BY	DATE
01	SITE PLAN APPROVAL	D.Y.	2020-03-06

HORIZONTAL SCALE:
SCALE: 1:300

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

REGISTERED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2020-03-06
PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER
I. M. JAFFERIE
100164153
2020-03-06
PROVINCE OF ONTARIO

NOT VALID UNLESS SIGNED AND DATED

wsp

2611 Queensview Dr. Ottawa, ON Canada K2B 8K2
t: 613.829.2800 f: 613.829.8299 www.wspgroup.com

CLIENT

2705460 ONTARIO INC.
C/O ANAND AGGARWAL
MANOR PARK MANAGEMENT
231 BRITTANY DRIVE, SUITE D
OTTAWA, ON K1K 0R8

WOODMAN ARCHITECT & ASSOCIATES LTD.
4 BEECHWOOD, SUITE 201, OTTAWA, ONTARIO, CANADA K1L 8L9
TEL: 613 228 9850 • FAX: 613 228 9848 • mabb@woodmanarchitect.com

ANNIS, O'SULLIVAN, VOLLEBEKK
Ontario Land Surveyors
114 CONQUEST GATE, SUITE 100, NEPEAN, ONTARIO, K2E 7S6
TEL: (613) 727-0850 FAX: (613) 727-1079

DESIGNED BY: D.Y. DRAWN BY: D.Y. APPROVED BY: I.J.

PROJECT

112 MONTREAL ROAD
RESIDENTIAL DEVELOPMENT

DRAWING TITLE

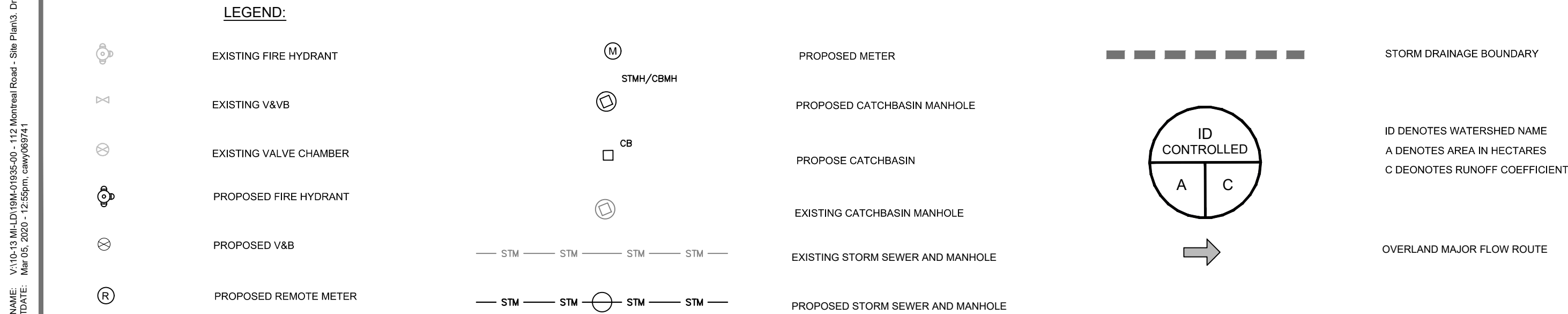
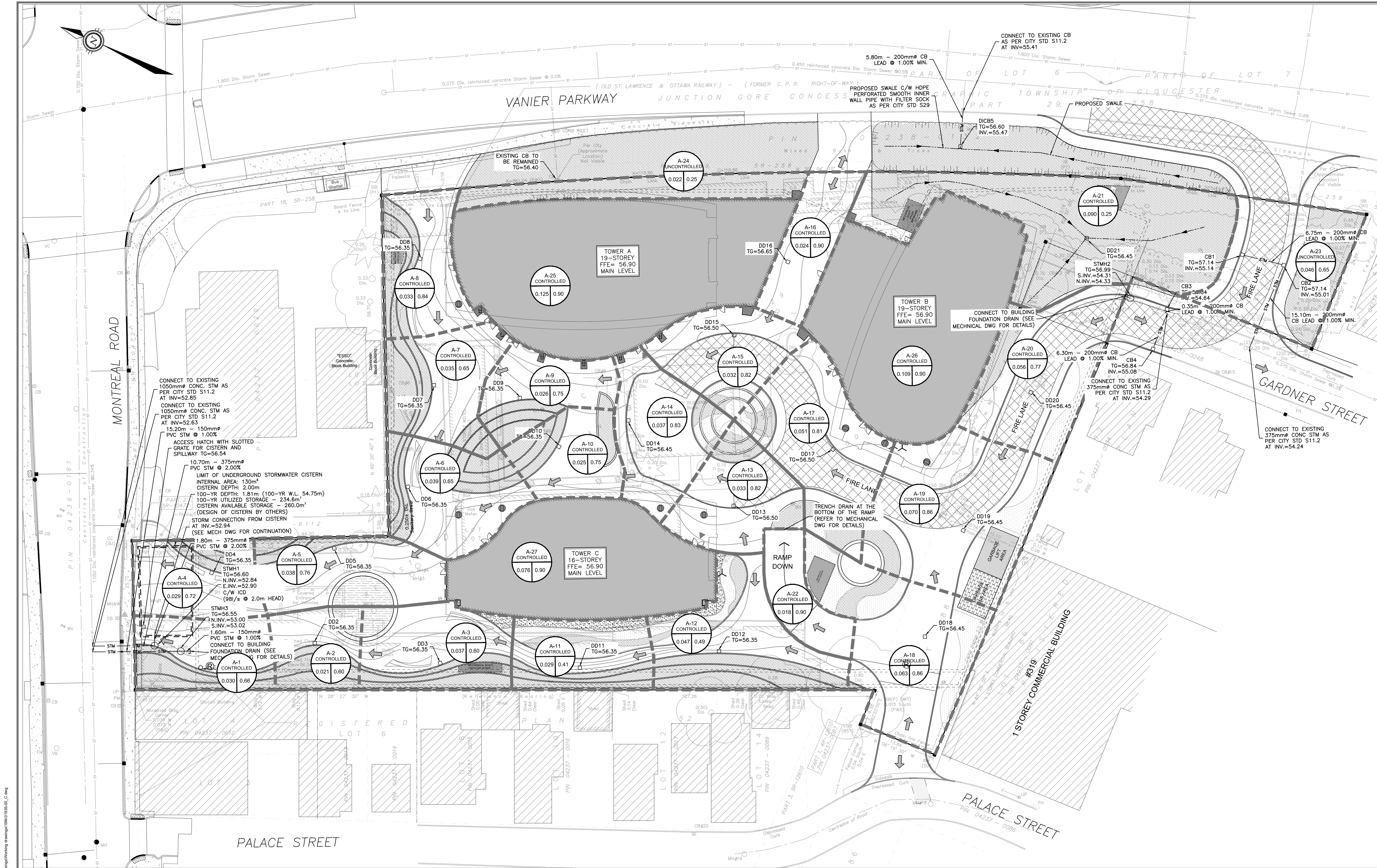
SERVICING PLAN

PROJECT NO.
19M-01935-00

DRAWING NO.

C03

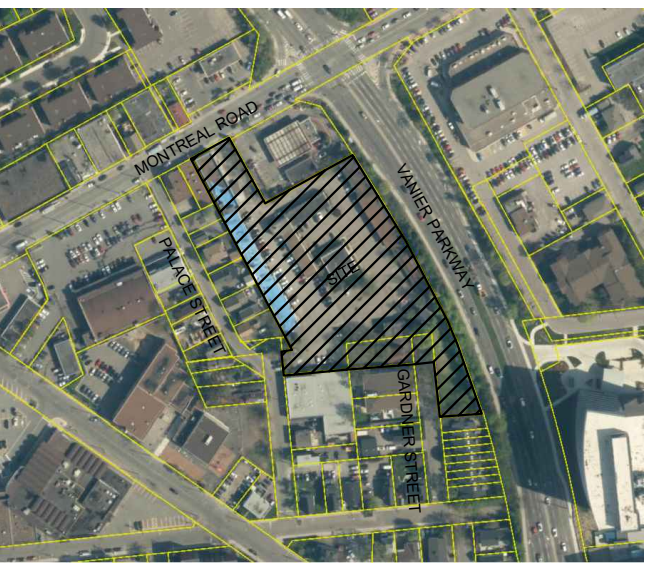
#XXXX



GENERAL NOTES:

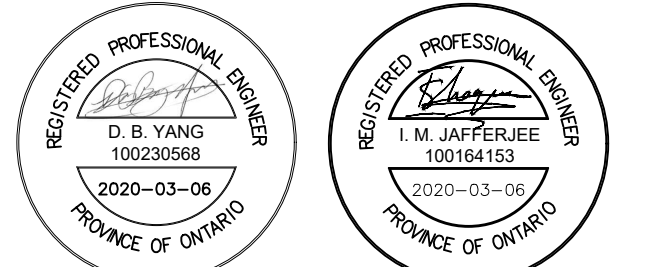
THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THE PLANS, SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED.

CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.



KEY PLAN
(N.T.S.)

01	SITE PLAN APPROVAL	D.Y.	2020-03-06
No.	REVISIONS	BY	DATE
HORIZONTAL SCALE:			
5m 2 0 5 10m			
SCALE: 1:300			
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048			



wsp

2611 Queensview Dr. Ottawa, ON Canada K2B 8K2
t: 613.829.2800 f: 613.829.8299 www.wspgroup.com

CLIENT

2705460 ONTARIO INC.
C/O ANAND AGGARWAL
MANOR PARK MANAGEMENT
231 BRITTANY DRIVE, SUITE D
OTTAWA, ON K1K 0R8

WOODMAN ARCHITECT & ASSOCIATES LTD.

4 BEECHWOOD, SUITE 201, OTTAWA, ONTARIO, CANADA K1L 8L9
TEL: 613.228.9850 • FAX: 613.228.9848 • malibu@woodmanarchitect.com

ANNIS, O'SULLIVAN, VOLLEBEKK
Ontario Land Surveyors
114 CONQUEST GATE, SUITE 100, NEPEAN, ONTARIO, K2E 7S6
TEL: (613) 727-0850 FAX: (613) 727-1079

DESIGNED BY: D.Y. DRAWN BY: D.Y. APPROVED BY: I.J.
PROJECT

112 MONTREAL ROAD
RESIDENTIAL DEVELOPMENT

DRAWING TITLE

STORM DRAINAGE
AREA PLAN

PROJECT NO.
19M-01935-00

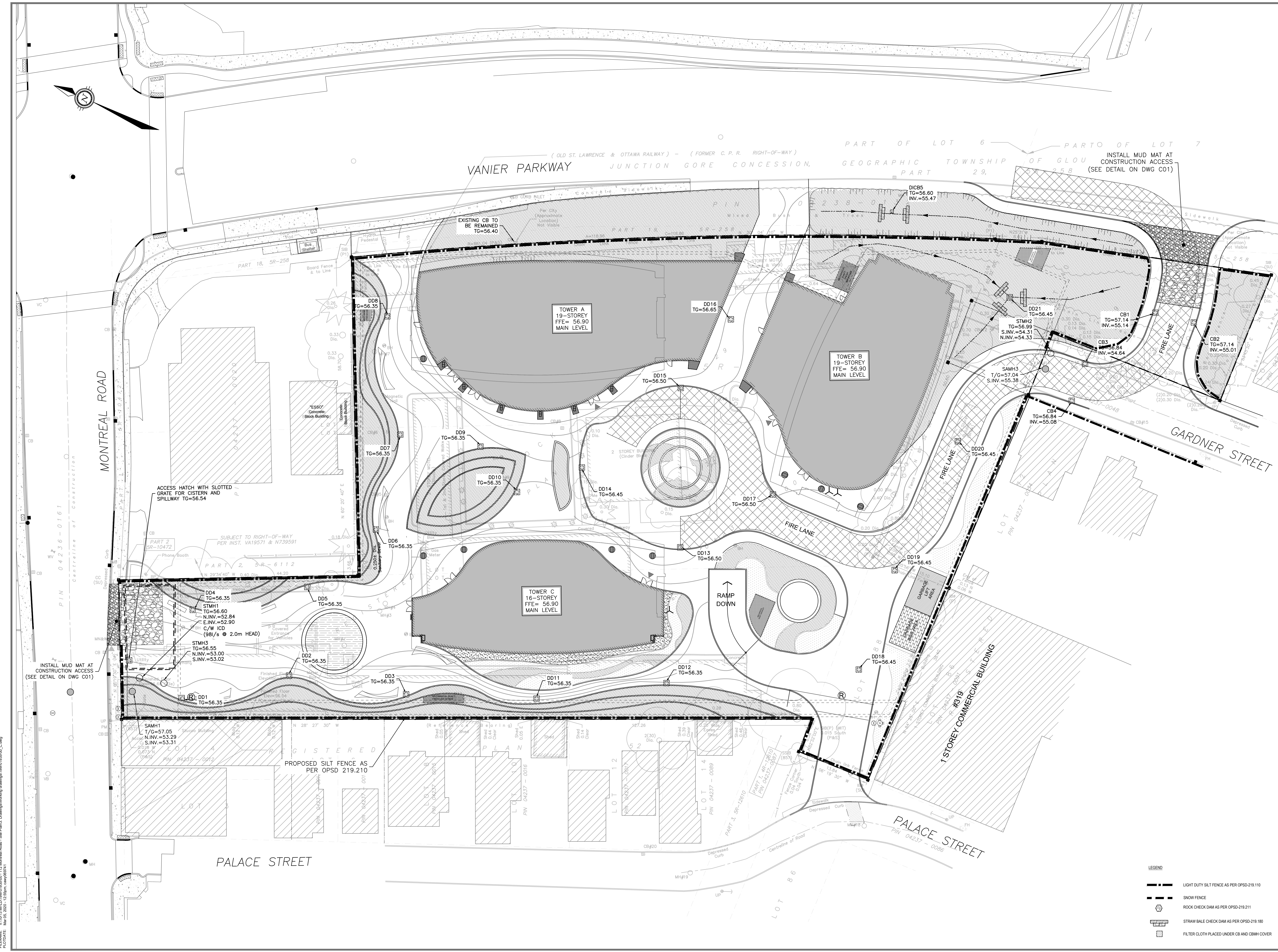
DRAWING NO.
C04

#XXXX

APPENDIX

E

- EROSION AND SEDIMENT CONTROL PLAN C05



GENERAL NOTES:

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THE PLANS, SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES OR CONFLICTS, WHICH ARE ALLEGED.

CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

01	SITE PLAN APPROVAL	D.Y.	2020-03-06
No.	REVISIONS	BY	DATE

HORIZONTAL SCALE:
SCALE: 1:300

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

NOT VALID UNLESS SIGNED AND DATED

2611 Queenswood Dr. Ottawa, ON Canada K2B 8K2
t: 613.829.2800 f: 613.829.8299 www.wspgroup.com

CLIENT

2705460 ONTARIO INC.
C/O ANAND AGGARWAL
MANOR PARK MANAGEMENT
231 BRITTANY DRIVE, SUITE D
OTTAWA, ON K1K 0R8

WOODMAN ARCHITECT & ASSOCIATES LTD.

4 BEECHWOOD, SUITE 201, OTTAWA, ONTARIO, CANADA K1L 8L9
TEL: 613 228 9850 • FAX: 613 228 9848 • info@woodmanarchitect.com

ANNIS, O'SULLIVAN, VOLLEBEKK
Ontario Land Surveyors
114 CONQUEST GATE, SUITE 100, NEPEAN, ONTARIO, K2E 7S6
TEL: (613) 727-0850 • FAX: (613) 727-1079

DESIGNED BY:	D.Y.	DRAWN BY:	D.Y.	APPROVED BY:	I.J.
PROJECT					

112 MONTREAL ROAD
RESIDENTIAL DEVELOPMENT

DRAWING TITLE

SEDIMENTATION AND EROSION CONTROL PLAN

PROJECT NO.
19M-01935-00

DRAWING NO.
C05

FILENAME: V19M-01935-00-112 Montreal Road - Site Plan3, Drawings/Working drawings/19M-01935-00_C.dwg
PLOTDATE: Apr 05, 2020 - 12:56pm cwp/050741

D07-XX-XX-XXXX

#XXXX

APPENDIX