

WESTMINSTER UNITED CHURCH MISSISSAUGA

PROPOSED RESIDENTIAL BUILDING DEVELOPMENT

FUNCTIONAL SERVICING REPORT

OCTOBER 04, 2023





PROPOSED RESIDENTIAL DEVELOPMENT FUNCTIONAL SERVICING REPORT

UNITED PROPERTY RESOURCE CORPORATION
C/O KINDRED WORKS

FUNCTIONAL SERVICING REPORT
ZBA & OPA

PROJECT NO.: 221-05528
DATE: OCTOBER 04, 2023

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1 INTRODUCTION

1.1 INTRODUCTION

WSP Canada Inc. (WSP) has been retained by United Property Resource Corporation c/o Kindred Works to prepare a Functional Servicing report in support of a Zoning By-Law Amendment (ZBA) and Official Plan Amendment (OPA) application for the proposed residential development located at 4094 Tomken Road (the "Site") in the City of Mississauga (the "City"). This report provides the conceptual framework for water distribution, sanitary sewage and storm drainage for this development. A Stormwater Management Report outlining the proposed quality and quantity controls for stormwater on this Site has been prepared by WSP under a separate cover.

The Site will be serviced by existing local municipal sewers and watermains located within adjoining municipal rights-of-way. Service connections will be extended into the proposed Site and coordinated with the building and mechanical consultants.

This report has been prepared in consultation with the requirements and available information from the City of Mississauga and the Regional Municipality of Peel. Specific documentation in which the report is based on includes, but is not limited to:

- ▶ Region of Peel Sanitary Sewer Design Criteria (March 2017)
- ▶ Region of Peel Watermain Design Criteria (June 2010)
- ▶ Region of Peel Public Works Stormwater Design Criteria and Procedural Manual (June 2019)
- ▶ City of Mississauga Transportation and Works Development Requirements Manual (August 2020)
- ▶ Various record drawings over neighbouring developed lands provided by the City of Mississauga

This report is intended to provide the functional servicing framework for the proposed development. All required approvals from the Region and all other governing bodies shall be obtained as part of the site plan application.

In preparing this Report, WSP staffs secured and reviewed available record drawings and CUMAP from the City of Mississauga for the surrounding municipal rights-of-way. In addition, WSP used the latest architectural plan prepared by KPMB Architects dated August 11, 2023 and a topographic survey prepared by Speight, Van Nostrand & Gibson Limited completed on April 04, 2022.

1.2 SITE DESCRIPTION

The Site is a 1.414 ha parcel located on the south corner of Rathburn Road East and Tomken Road. The Site is bounded to the Northeast by Tomken Road, to the Southeast by residential lots along Wetherby Line. The Southwest is bounded by residential lots along Westminster Place and Northwest is bounded by Rathburn Road East.

Under existing condition, the Site consists of a 7-storey brick apartment building, a Church building and associated parking and landscape areas. The existing church and 7-storey apartment building will be maintained in the ultimate condition.

The proposed development will consist of two 12-storey apartment buildings. The buildings will be comprised of a total of 250 apartment units, consisting of 158 – studio/1 bedroom, 62 – 2 bedroom, and 30 – 3 bedroom units and three (3) levels of underground parking. See architectural set prepared by KPMB Architects dated August 11, 2023.

Please refer to **Figure 1** for the Location Map, **Figure 2** for the Pre-Development Plan and **Figure 3** for an illustration of the Proposed Development Plan.



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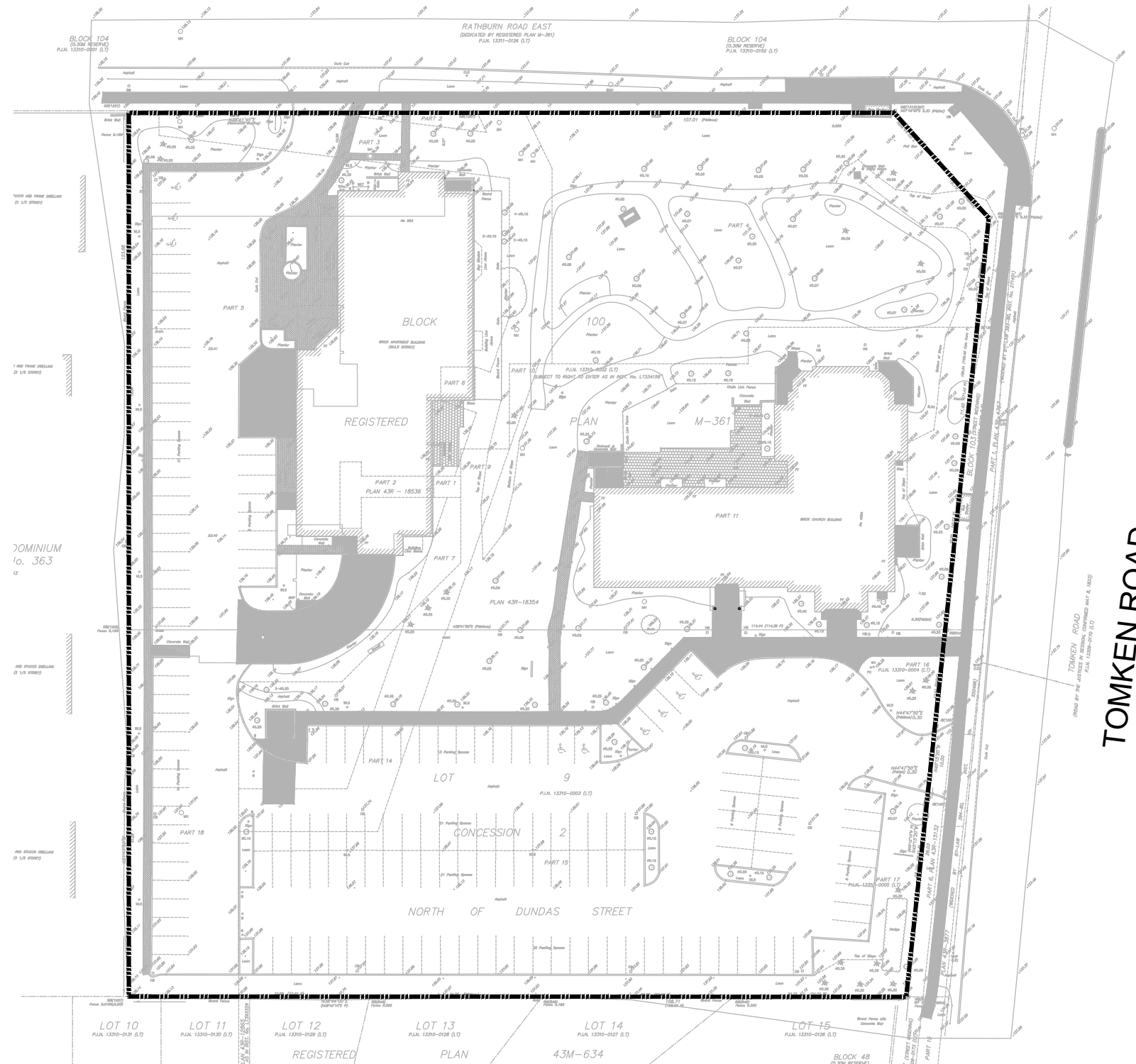
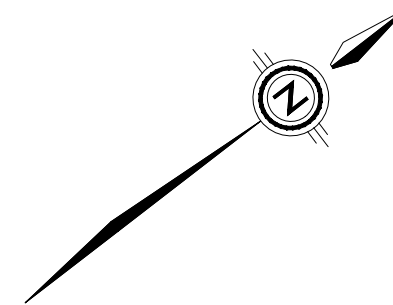
LOCATION PLAN



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RATHBURN ROAD EAST



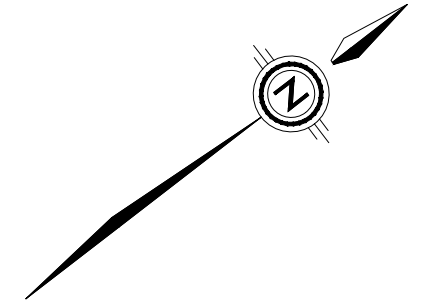
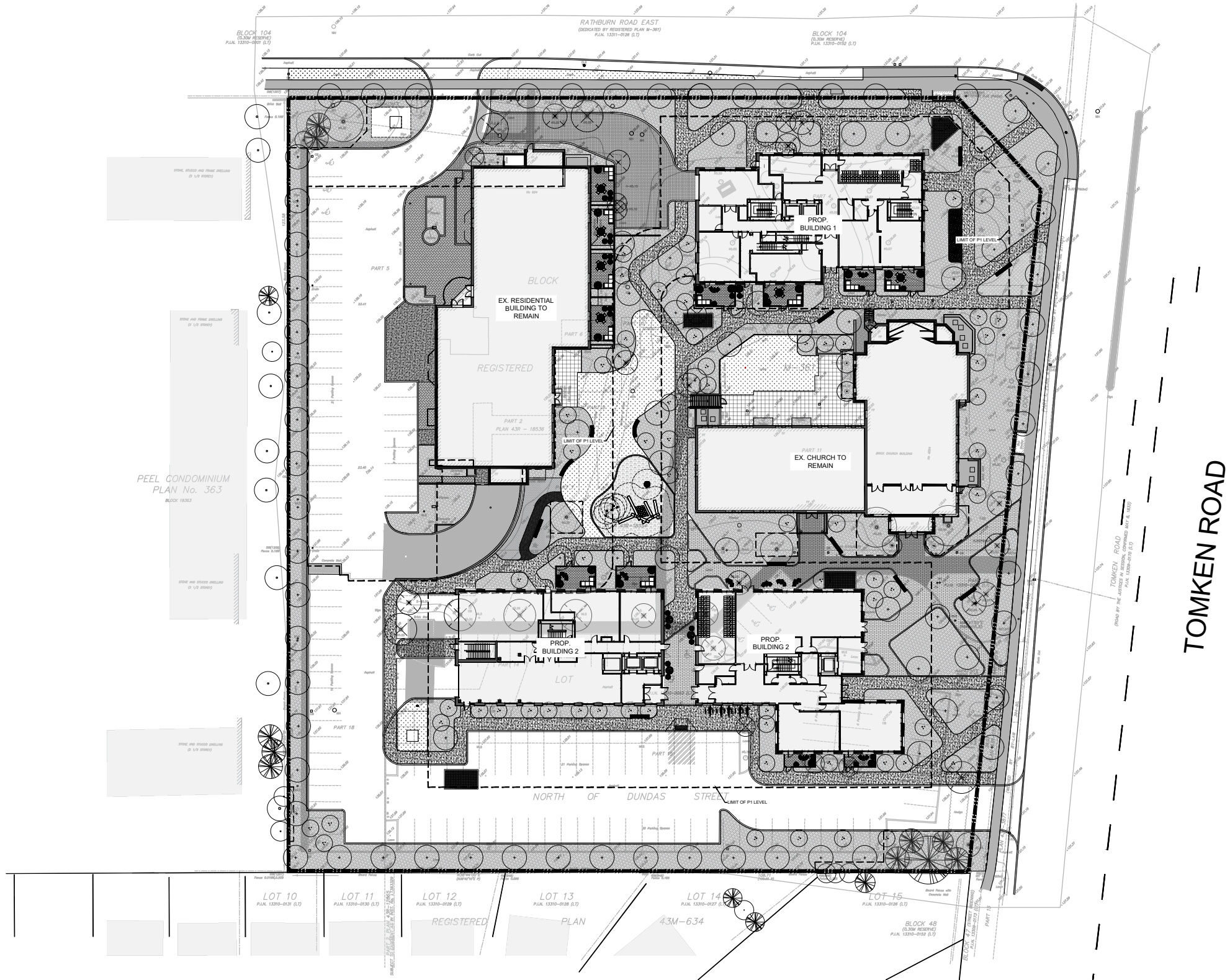
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PRE DEVELOPMENT PLAN	

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RATHBURN ROAD EAST



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2 WATER SUPPLY

2.1 EXISTING CONDITIONS

From the record drawings (Reference Dwgs: 05384-D and 32348-D) provided by the City, it was determined that there is a 600mm diameter watermain located along Rathburn Road East, and a 300mm and 1200mm diameter watermain located along Tomken Road.

In addition, from the record drawings, topographic survey, and Street View images from Google Maps, it was determined there are four (4) existing fire hydrants located within the vicinity of the site. There is an existing private hydrant within the subject property located near the north entrance of the site and is to be relocated on-site. Additionally, there is one public fire hydrant located immediately outside the west property limits adjacent to the existing apartment building, one located on the north side of Rathburn Road East and one fire hydrant located on the north side of Tomken Road. Please refer to **Figure 4** for the location of existing watermains and appurtenances in the area.

Table 1.1: Existing Domestic Water Demand

	Existing Residential Building	Existing Institutional Building
Water Demand Rate	280 Litres/Person/Day	300 Litres/Person/Day
Population Density	Site: 475 Person/Ha	1/3 x number of students (600 students minimum)
Total Area	0.43	-
Equivalent Population	204	200
Total Average Water Demand from Site	0.66 L/s	0.69 L/s
Peaking Factor (Apartment)	Peak Hour: 3.00 and Maximum Day: 2.00	Peak Hour: 3.00 and Maximum Day: 1.40
Peak Water Demand from Site	Peak Hour: 1.99 L/s Max. Day: 1.32 L/s	Peak Hour: 2.08 L/s Max. Day: 0.97 L/s
Total Peak Water Demand from Site	Peak Hour: 4.07 L/s Max. Day: 2.30 L/s	

2.2 DOMESTIC WATER DEMANDS

The following table shows the water demand calculations prepared for the proposed development using the Region of Peel Watermain Design Criteria dated June 2010:

Table 2.2: Proposed Domestic Water Demand

	Short Term	Long Term
Residential Water Demand Rate (Multi-Unit)	409 Litres/Person/Day	280 Litres/Person/Day
Population Density	Bachelor: 1.4 Person/Unit 1 Bedroom: 1.4 Person/Unit Two Bedroom: 2.1 Person/Unit Three Bedroom: 3.1 Person/Unit	
Total Units	250	
Equivalent Population	676	
Average Water Demand	3.20 L/s	2.19 L/s
Total Average Water Demand from Site	4.56 L/s	3.55 L/s
Peaking Factor (Apartment)	Peak Hour: 3.00 and Maximum Day: 2.00	Peak Hour: 3.00 and Maximum Day: 2.00
Peak Water Demand	Peak Hour: 9.60 L/s Max. Day: 6.40 L/s	Peak Hour: 6.57 L/s Max. Day: 4.38 L/s
Total Peak Water Demand from Site	Peak Hour: 13.67 L/s Max. Day: 8.70 L/s	Peak Hour: 10.64 L/s Max. Day: 6.68 L/s

The estimated average day domestic demand under the existing condition is 2.30 L/s and peak hour demand is 4.07 L/s. The estimated max day domestic demand for the proposed development is 6.40 L/s and the peak hour demand is 9.60 L/s. Therefore, the final max day water demand will increase to 8.70 L/s and the peak hour demand will increase to 13.67 L/s due to the proposed development. Detailed pre-and post-development calculations are included in **Appendix B**.

Estimated fire flows for the proposed development have been prepared using the recommendations of the Water Supply for Public Fire Protection, 1999 – Fire Underwriters Survey (FUS). The fire flow demand for the first mid-rise 12-storey building were calculated considering the building to be non-combustible and with sprinklered system. The calculated fire flows are 4,000 L/min (66.6 L/s or 1055 US GPM). The estimated fire flows for the proposed second mid-rise 12-storey building was calculated to be 6,000 L/min (equal to 100 L/s or 1583 US GPM) based on the largest floor (level 5) and the two adjoining floors above it (level 4 and 6). The fire flow calculations have been prepared considering that the building will be non-combustible and that it will be equipped with a sprinkler system. For detailed calculations, refer to **Appendix A**. FUS Calculations needed.

To estimate the water demand of the development, two (2) scenarios were compared: peak hour demand, and fire flow plus maximum day demand. The fire flow plus maximum day demand scenario generates a demand of 113.67 L/s.

2.3 PROPOSED WATER SERVICES AND APPURTENANCES

New domestic and fire water services to the proposed development will be provided in compliance with the Region of Peel Servicing Requirements.

The proposed buildings will be serviced from the existing 300mm diameter watermain on Tomken Road. A service connection consisting of a 200 mm diameter watermain that will split at the property line into a 200mm diameter fire water service and a 150 mm diameter domestic service provided in a 'h-style' connection, as per Region of Peel standard will be provided for the two proposed mid-rise 12-storey buildings.

The water service locations will be coordinated with Mechanical Consultant. The services will be extended to the limit of the underground structure from the 300mm diameter watermain on Tomken Road, complete with valves and boxes at the property line. A water meter and backflow preventer will be provided for the domestic service lines while a detector assembly will be provided for the fire service line within the mechanical rooms. The mechanical room will be accessible to the Region and provide remote readout locations for the Region's use. Details of the rooms' layout will be provided by the Mechanical Consultant.

The Siamese connections will be located in front of the buildings within 45m of a fire hydrant. Three (3) additional private hydrants are proposed within the site, in addition to the relocated existing private hydrant, in order to comply with City By-Law 1036-81.

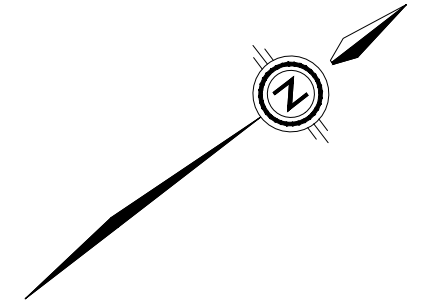
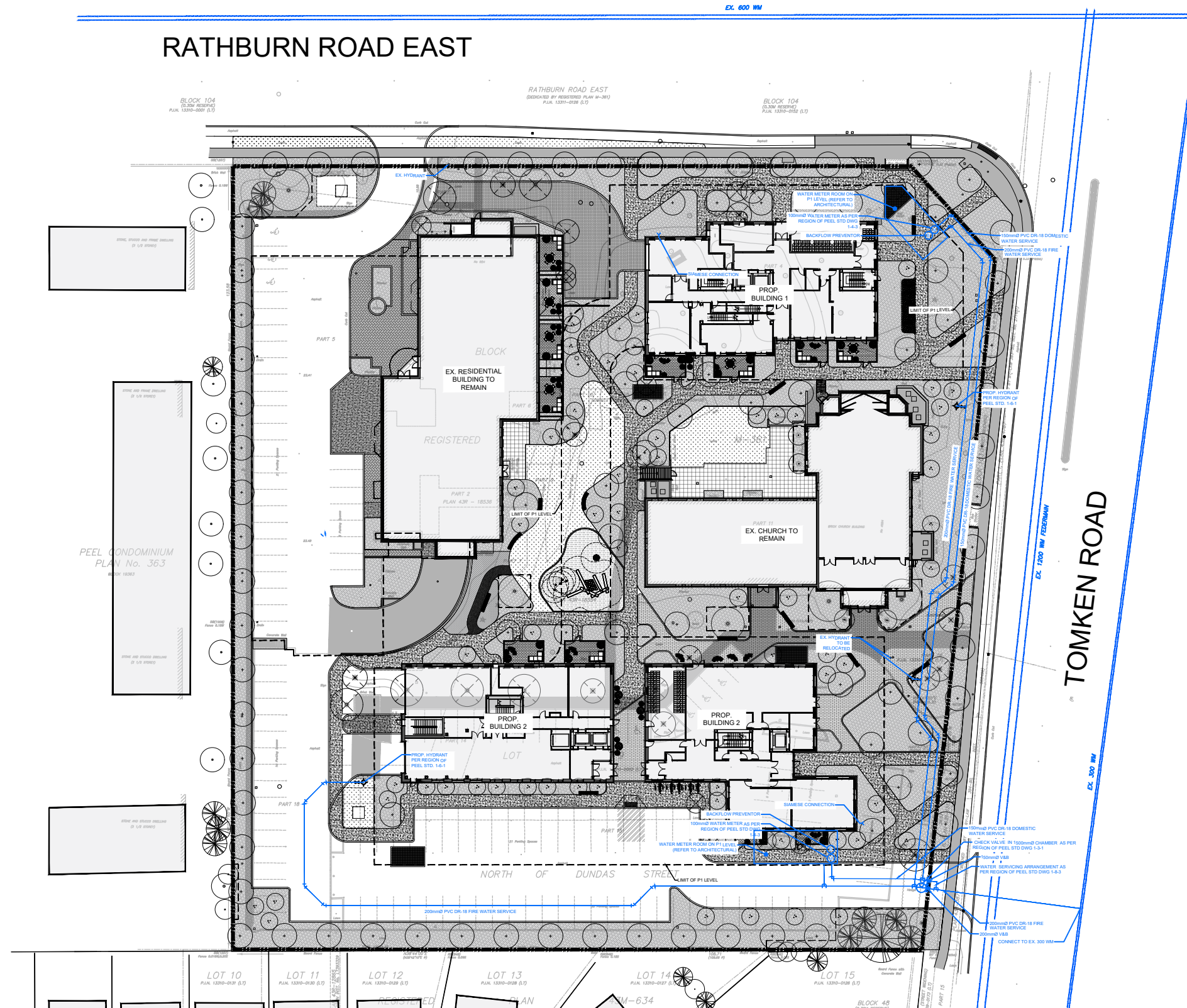
The proposed Water Servicing Plan is shown on **Figure 4**.

2.4 HYDRANT FLOW TEST

The maximum estimated fire flow demand for the proposed north and south buildings are 1,055 USGPM and 1,583 USGPM, respectively. Two hydrant flow tests for the Site were completed on August 10, 2022 on Rathburn Road East and Tomken Road. The hydrant flow tests conducted show a flow of ~34,700 USGPM and ~17,000 USGPM could be achieved on Rathburn Road East and Tomken Road, respectively, while maintaining a water pressure of 20psi. The tests show that fire flow available exceeds the fire demand calculated above. Therefore, we can conclude that the existing watermains adjacent to the site are adequate to support the domestic and fire water demand of the proposed development and no watermain

upgrades are required to support the proposed development. Please refer to **Appendix A** for hydrant flow test results and fire flow calculations.

RATHBURN ROAD EAST



LEGEND:

- LIMIT OF PROPERTY
- EX. WATERMAIN
- PROP. W/M CONNECTION
- HYDRANT
- VALVE & BOX
- M WATER METER
- B BACKFLOW PREVENTER

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WATERMAIN PLAN



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FILENAME: C:\Users\cagc072008\ACCDocs\WSP Canada projects (AMER)\DOFiles\221-05528 Westminister Mississauga\MUN\FSR\221-05528_FIG 3.dwg
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3 SANITARY SEWAGE SYSTEM

3.1 EXISTING SEWER SYSTEM

From the record drawings (Reference Dwgs: 05384-D and 32348-D) provided by the City, it was determined that there is

- ▶ A 300mm diameter PVC sanitary sewer on Rathburn Road East draining north to discharge to the 350mm diameter sewer running along Rathburn Road East, which in turn drains to the 400mm diameter sewer on Rathburn Road East.

3.2 EXISTING SEWAGE FLOWS

As mentioned in the previous sections, existing condition of the Site consists of a one 7-storey apartment, and a Church building. It was determined from the record drawings that sanitary services connections for this block connects to the 300mm sanitary sewer on Rathburn Road East.

Based on the Region of Peel design criteria for sanitary sewers, the pre-development sewage peak flow rate to the 300mm diameter sewer is estimated as 6.15 L/s assuming a 0.28L/s/ha infiltration drain allowance. Please refer to **Appendix B** for detailed pre-development sanitary flow calculations.

Table 3: Existing Sanitary flows (Pre-Development Condition)

Development	Existing Building
Average Residential Sewage Flow	302.8 litres/person/day
Total Existing Residential Population	204
Average Existing daily Residential Flow	0.72 L/s
Harmon Peaking Factor: $M = 1 + 14 / (4 + p^{0.5})$ where p = population in thousands	4.14
Total Existing Institutional Population	200
Average Existing daily Institutional Flow	0.70 L/s
Harmon Peaking Factor: $M = 1 + 14 / (4 + p^{0.5})$ where p = population in thousands	4.15
Groundwater Discharge (pump rate)	0.0 L/s
Infiltration	0.28 L/s
Total Sanitary Flow from Site	6.15 L/s

3.3 PROPOSED SEWAGE FLOWS

The proposed development will connect to the existing 300mm sanitary sewer on Rathburn Road East which in turn connects to the 350mm diameter sanitary sewer on Rathburn Road East.

Please Refer to **Figure 5** for the sanitary servicing plan which shows the existing sanitary sewers and proposed sanitary service connection.

In order to calculate the peak sanitary flows to the sanitary sewer system, the following design criteria have been utilized:

Table 4: Proposed Sanitary flows (Post-Development Condition)

Development	Proposed Building
Average Residential Sewage Flow	302.8 litres/person/day
Total Proposed Residential Population	676
Total Post Development Population	1080
Average Proposed Daily Residential Flow	2.37 L/s
Total Average Post Development Daily Residential Flow	4.35 L/s
Harmon Peaking Factor $M = 1 + 14 / (4 + p^{0.5})$ where p = population in thousands	3.90
Groundwater Discharge (pump rate)	0.00 L/s
Infiltration	0.28 L/s
Total Sanitary Flow from Site	15.68 L/s

An estimate of the pre- and post-development sanitary sewage flows has been calculated and is included in **Appendix B**. The pre-development condition flow is 6.15 L/s while the post development is 15.68 L/s. Therefore, the flows from the Site discharging to the 300mm diameter sanitary sewer on Rathburn Road East will increase by 9.53 L/s with the proposed development.

3.4 PROPOSED SANITARY SERVICE CONNECTION

One 250mm PVC sanitary service connection is proposed for this development. This service connection will connect to the proposed manhole connecting to the existing 300mm sanitary sewer on Rathburn Road East which in turn connects to the 350mm diameter sanitary sewer going through the intersection of Rathburn Road East and Tomken Road. One sanitary control manhole is proposed near the property line to connect directly to the 300mm sanitary sewer on Rathburn Road East.

In addition, a three (3)-level underground parking structure is proposed for the proposed apartment buildings and it is expected that there will be no groundwater discharge to municipal sewer required since the foundation will be designed as a watertight (bathtub) system. Please refer to Section 3.6 for more information regarding the expected long-term dewatering rates. See proposed **Figure 5** for details on proposed services.

3.5 SANITARY SEWER CAPACITY ANALYSIS

WSP has prepared a pre- and post-development downstream sanitary sewer analysis. The analysis includes calculations for the wet weather flow condition, where an infiltration (0.28 L/s/ha) has been added to the calculated sanitary flow. The sanitary flow for the sewershed was calculated using the Region of Peel Sanitary Sewer Design Criteria as outlined in Section 3.2. The sanitary generation from the site outlined in Section 3.4 was applied to the pre-development analysis to form the analysis of the post-development conditions. See Appendix C for the Sanitary Sewer Design Sheets. To facilitate this analysis, a Sanitary Sewer Drainage Area Plan has been created and is included in Appendix C.

In the post development condition, the analysis demonstrates that the existing municipal sewer system has adequate capacity to support the addition of 9.53 L/s of flow from the proposed development without surcharging in any leg. Consequently, WSP concludes that the existing municipal sewer can accept the flow from the proposed site and no external sewer improvements are required.

3.6 GROUNDWATER

A Hydrogeological Review Report has been prepared for the Site by Grounded Engineering Inc. and dated August 31, 2022. The report details the soil and groundwater conditions, groundwater quality and the construction and permanent dewatering rates.

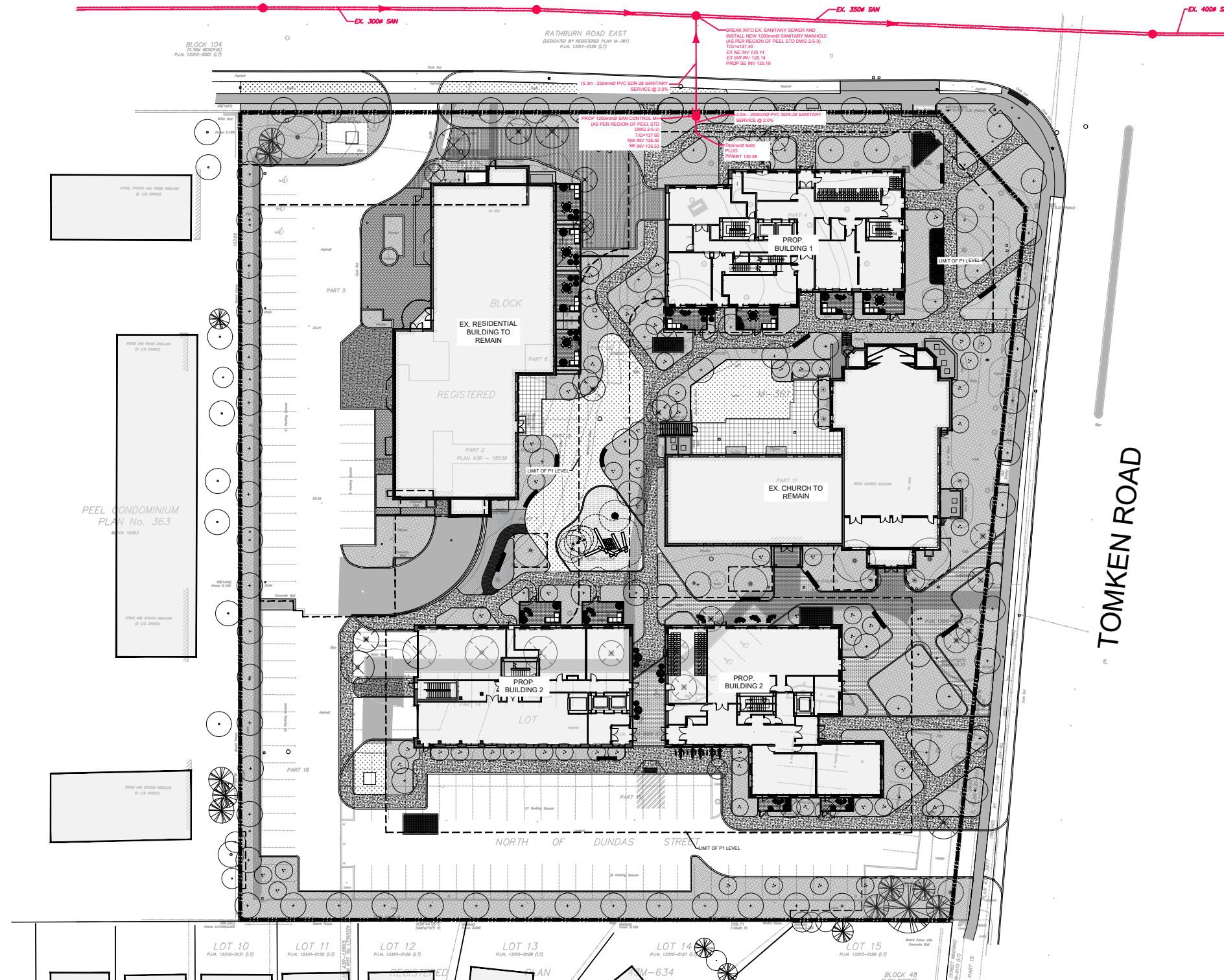
The combined maximum groundwater seepage and 25mm design rainfall event construction dewatering rate is expected to be around 76.4 L/min (1.27 L/s) and 134.0 L/min (2.23 L/s) for the proposed north and south buildings, respectively, while the permanent dewatering rate is expected to be 51.4 L/min (0.86 L/s) and 94.4 L/min (1.57 L/s) for the north and south buildings, respectively. These results are based on a proposed BFE and three (3) levels of underground parking. There is no proposed groundwater discharge to municipal sewer since the foundation will be designed as watertight (bathtub system). Therefore, the groundwater flows were not considered in estimating the post-development sanitary flows and the external sanitary sewer capacity analysis.

All construction water encountered during the construction phase will be managed on site and any excess water will be hauled away using an MOE approved contractor to a licensed disposal facility. Please refer to **Appendix D** for excerpts from the Hydrogeological Review Report prepared by Grounded.

3.7 MECP PROCEDURE F-5-5 COMPLIANCE

The proposed development does not connect to a combined sanitary sewer system therefore F-5-5 is not applicable.

RATHBURN ROAD EAST




- LEGEND:**
- — — — — LIMIT OF PROPERTY
 - == == == EX. SANITARY SEWER
 - — — — — PROP. SAN CONNECTION

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SANITARY SERVICING PLAN

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FILENAME: C:\Users\cagco72008\ACCDocs\WSP Canada projects (AMER)\DOFiles\221-05528 Westminster Mississauga\MUN\FSR\221-05528_FIG 3.dwg
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4 STORM DRAINAGE

4.1 STORMWATER MANAGEMENT REPORT

A Stormwater Management (SWM) Report for this development has been prepared under a separate cover. The Report is in compliance with the Region of Peel Public Works Stormwater Design Criteria and Procedural Manual and it identifies the stormwater quantity and quality controls under which this Site will operate.

4.2 EXISTING CONDITIONS

From the record drawings (Reference Dwgs: 05384-D and 32348-D) provided by the City, it was determined that there is:

- ▶ A 1800mm diameter concrete storm sewer on Rathburn Road East.
- ▶ A 900mm diameter sewer along Tomken Road.

From the topographic survey and record drawings, the Site is currently serviced by the 1800mm diameter storm sewer along Rathburn Road East. Based on the topographic information the Site generally slopes from the east corner to the west corner toward Tomken Road.

4.3 PROPOSED STORM SERVICING

The existing buildings and their surrounding areas that are to remain will continue to be collected and discharged under existing conditions. The majority of the proposed Site runoff will be captured by proposed catchbasin manholes, roof drains and area drains within the proposed landscaped area around the proposed apartment buildings. The proposed stormwater drainage catchbasins and area drains will be directed to the proposed underground stormwater cistern on the P1 level.

Quality control will be provided using an OGS device as outlined in the SWM report on a separate cover. Quantity control will be provided by a proposed cistern within the P1 parking level. Outflow from the storm cistern will be controlled by an orifice tube to match the design release rate outlined in the SWM report prepared by WSP under a separate cover.

The Storm Servicing Plan with the proposed service connection in relation to the existing municipal infrastructure is shown on **Figure 6**. For detailed hydrologic modelling, storage and storm flow calculations, please refer to the Stormwater Management Report prepared by WSP Canada Inc. under a separate cover.

4.4 MINOR STORM DRAINAGE SYSTEM

The onsite storm drainage system will be designed to convey the runoff from the 100-year storm event. This will ensure runoff from the Site for all storm events up to and including the 100-year storm event will be conveyed to proposed stormwater cistern. Rooftop drains and at-grade area drains shall be sized by the mechanical consultant to capture the 100-year flow with a 50% clogging factor and convey the flows to the internal mechanical storm plumbing system and ultimately to the stormwater cistern.

A cistern with a footprint of 150 m² and a height of 2.25 m will be located on the north east side below the south building of the proposed shared underground parking lot (P1 level) and will connect to the existing 900mm concrete storm sewer along Tomken Road. As per City's requirements, a storm control manhole will be located inside the building very close to the property line to connect to the existing storm sewer on Tomken Road via a proposed 150mm storm service connection at 2% slope. The control manhole will have an access hatch accessible at grade outside the building. An emergency overflow will be provided at the top of the cistern with discharge to grade to ensure flows will not back up into the building under major storm events. The new storm service connection and control manhole will be designed per the Region of Peel Standards and Specification.

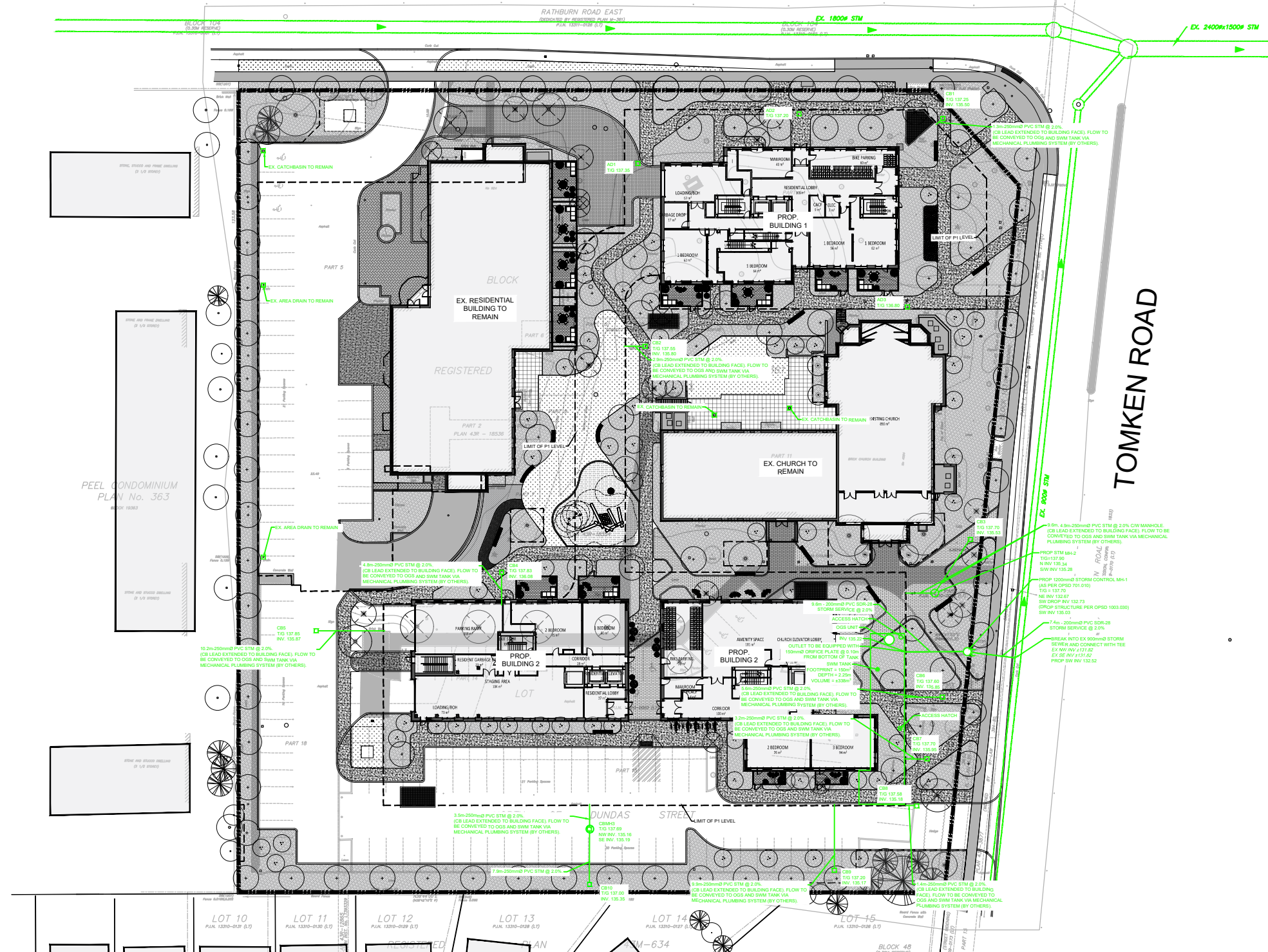
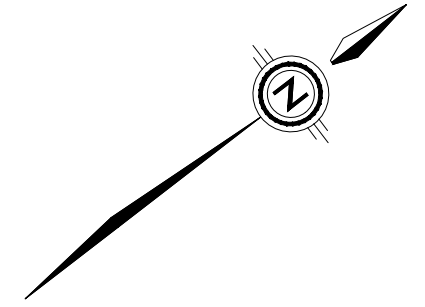
4.5 MAJOR STORM DRAINAGE SYSTEM

The major storm system is a conveyance system for flows in excess of the minor system flows. Stormwater runoff from events up to and including the 100-year storm event will be contained on-site and directed to the stormwater cistern.

All storm runoffs will be collected on site by catchbasin manholes and area drains directed to the proposed stormwater cistern via the building's plumbing system and will discharge to the existing municipal storm sewer system at a controlled rate using an orifice tube. Since all storm flows, up to 100-year storm events, will be reduced to pre-development levels, the existing storm sewer system will have reduced flows under the post-development condition. Refer to the separate Stormwater Management Report for stormwater management calculation details.

An emergency overflow will be provided at the top of the cistern with discharge to grade on Tomken Road and ultimately to the right-of-way of Rathburn Road East. This will prevent flow from backing up into the building's plumbing system if the primary cistern outlet is blocked or if a storm event greater than the 100-year storm event occurs. In addition, the Site will be graded so that all runoffs will flow away from all proposed buildings towards Rathburn Road East and Tomken Road.

RATHBURN ROAD EAST



- LEGEND:**
- LIMIT OF PROPERTY
 - EX. STORM SEWER
 - PROP. STM CONNECTION
 - PROP. STM CATCHBASIN/ AREA DRAIN

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UNITED PROPERTY RESOURCE CORPORATION
 c/o KINDRED WORKS

TITLE
4094 TOMKEN ROAD

STORM SERVICING PLAN



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Checked	P.D.C.	Drawn	G.M.C. & F.E.
Date	JUL 2023	Proj. No.	221-05528
Scale	1:750	Figure No.	6

FILENAME: C:\Users\caag072008\ACCDocs\WSP Canada projects (AMER)\DOIFiles\221-05528 Westminister Mississauga\MUN\FSR\221-05528_FIG 3.dwg
 PLOTDATE: Jul 25, 2023 - 9:27am, CAGC072008

5 SITE GRADING

5.1 SITE GRADING

The existing grading and drainage patterns in the areas surrounding and directly related to the existing buildings that are to remain shall be maintained. The preliminary grading design of the proposed development will direct all of the minor storm drainage (up to and including the 100-year storm event) to the on-site collection points so that the drainage is contained within the Site. An overland flow route for the major storm drainage will be provided to direct runoff to Rathburn Road East and Tomken Road. The overland flow will direct drainage away from proposed and existing structures on-site and surrounding the Site. The Site grading will also take into consideration the following:

- ▶ Existing grades along all boundaries are to be matched so that there will be no impact to adjacent properties.
- ▶ Minimize disruption to the Rathburn Road East and Tomken Road right-of-way containing existing utilities and services.
- ▶ Promote drainage into the minor storm sewer system.
- ▶ Building floor level will be set to avoid building / property damage during all design storms; and
- ▶ Entrance ramps into loading areas will be protected from major storm flows.

During construction, Erosion and Sediment Control measures will be provided to prevent sediment runoff to the municipal storm system. Fencing and tree hoarding will be erected surrounding the perimeter of the Site and any tree protection area per arborist report, and mud mats will be required at Site access points. In addition, municipal catchbasins on the adjacent rights-of-way will be protected with sediment control devices.

5.2 UTILITIES

Record drawings provided to WSP by the City of Mississauga does not provide information regarding the existing gas and telecommunication utilities available to service the Site. However, based on drawings provided by Bell Canada, Rogers, and Alectra there are existing telecommunication conduits along Rathburn Road East and Tomken Road. There are four existing hydro-poles along Tomken Road.

6 CONCLUSIONS

6.1 WATER

The proposed water connection to service the two proposed apartment buildings will include a h-style water connection composed of a 200 mm diameter service connection which will split into a 200mm diameter fire and a 150 mm domestic connection at the property line. The water service connection will connect to the existing 300mm PVC watermain on Tomken Road. Water meter and backflow preventors are proposed for the 150 mm diameter domestic connections while a detector assembly will be provided for the 200 mm diameter fire connection. Fire flow and domestic demand flow calculations for the Development have been completed and are included in **Appendix A** and **Appendix B**, respectively. The Hydrant Flow Test is also included in **Appendix A**.

6.2 SANITARY

The proposed sanitary servicing for the Site will include one 250mm PVC sanitary service connection for the proposed apartment buildings. Both service connections will connect to the proposed manhole connecting to the existing 300mm sanitary sewer on Rathburn Road East, which in turn will discharge to the 350mm sanitary sewer Rathburn Road East. One sanitary control manhole is proposed at the building line very close to the property line prior to connecting to the 300mm sanitary sewer on Rathburn Road East per the Region of Peel requirements. The construction dewatering rate is expected to be around 76.4 L/min and 134.0 L/min and the permanent groundwater dewatering rate is expected to be around 51.4 L/min and 94.4 L/min for the north and south proposed buildings, respectively. The permanent dewatering flow was not considered in estimating the post-development sanitary flows and the external sanitary sewer capacity analysis because the building foundation will be constructed as a watertight bathtub system.

A downstream sanitary sewer capacity analysis has been developed for the proposed development and results are included in **Appendix C**. The results confirm no negative effects on the downstream sanitary sewer under the wet weather condition.

6.3 STORM

The proposed storm servicing for the Site will include a 200 mm PVC storm service connection for the development. The storm service connection will connect to the existing 900mm concrete storm sewer on Tomken Road. A storm control manhole will be installed inside the building very close to the property line prior to connecting the existing storm sewer on Tomken Road as per Region of Peel requirements.

Stormwater runoff from the Site will be capture by proposed catchbasins, roof drains and area drains on site and conveyed to the proposed stormwater cistern located on the P1 level. The stormwater cistern will capture and attenuate the post-development runoff to the allowable release rate for the Site. Since the post-development flows will be attenuated to below pre-development levels, no downstream storm sewer analysis was conducted, and downstream upgrades are not required. A water quality treatment unit is proposed to treat the controlled at-grade runoff of the Site while runoff from the roof will bypass the water quality treatment unit and discharge directly into the cistern. Please refer to the Stormwater Management Report prepared by WSP under a separate cover for more information.

APPENDIX

A FUS CALCULATIONS & HYDRANT FLOW TEST RESULTS

APPENDIX A

FIRE FLOW CALCULATIONS - PROPOSED BUILDING 1

Project: 409 Tomken Road
Job No.: 221-05528

Fire Flow Calculation Procedure per Water Supply for Public Fire Protection, 1999 by Fire Underwriter Survey, p 20

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

where

F = Fire flow in Litres per minute (Lpm)
 C = coefficient related to the type of construction
 A = total floor area in square metres

- A. Determine Type of Construction**
 => Assumed Fire-resistive construction (fully protected frame, floors, roof)
 Therefore C = 0.6
- B. Determine Ground Floor Area**
 => Assumed Fire-resistive building with vertical openings and exterior vertical communications properly protected
 Therefore A = Largest Floor + 25% of 2 immediately adjoining floors
 A = 645 + 0.25*(645 + 645)
 A = 968 m²
- C. Determine Height in Storeys**
 => 12Storeys
- D. Determined the Fire Flow**
 F = 220 x 0.6 x $\sqrt{968}$
 F = 4,000 Lpm
- E. Determine Increase or Decrease for Occupancy**
 => Reduction for Combustible Construction
 Therefore 0% reduction
 0% reduction of 4000 Lpm = - Lpm
 4000 - 0 = 4,000 Lpm
- F. Determine Decrease for Automatic Sprinkler Protection**
 => Has Automatic Sprinkler Protection (Per NFPA 13 Standards)
 Therefore 30% reduction (assumed)
 30% reduction of 4000 Lpm = 1,200 Lpm
- G. Determine the Total Increase For Exposures**
- | Face | Distance (m) | Charge | Note |
|------------|--------------|--------|-----------------------------|
| West Side | 16.50 | 15% | Existing Apartment Building |
| East Side | 51.40 | 0% | Existing Home |
| North Side | 113.70 | 0% | Existing Tomken Plaza |
| South Side | 6.00 | 20% | Existing Church Buidling |
| | | Total | 35% of 4,000 = 1,400 Lpm |
- H. Req'd Fire Flow = E - F + G**
 F = 4,200 Lpm
 F = 4,000 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
 F = 1,055 US GPM

APPENDIX A

FIRE FLOW CALCULATIONS - PROPOSED BUILDING 2

Project: 409 Tomken Road
Job No.: 221-05528

Fire Flow Calculation Procedure per Water Supply for Public Fire Protection, 1999 by Fire Underwriter Survey, p 20.

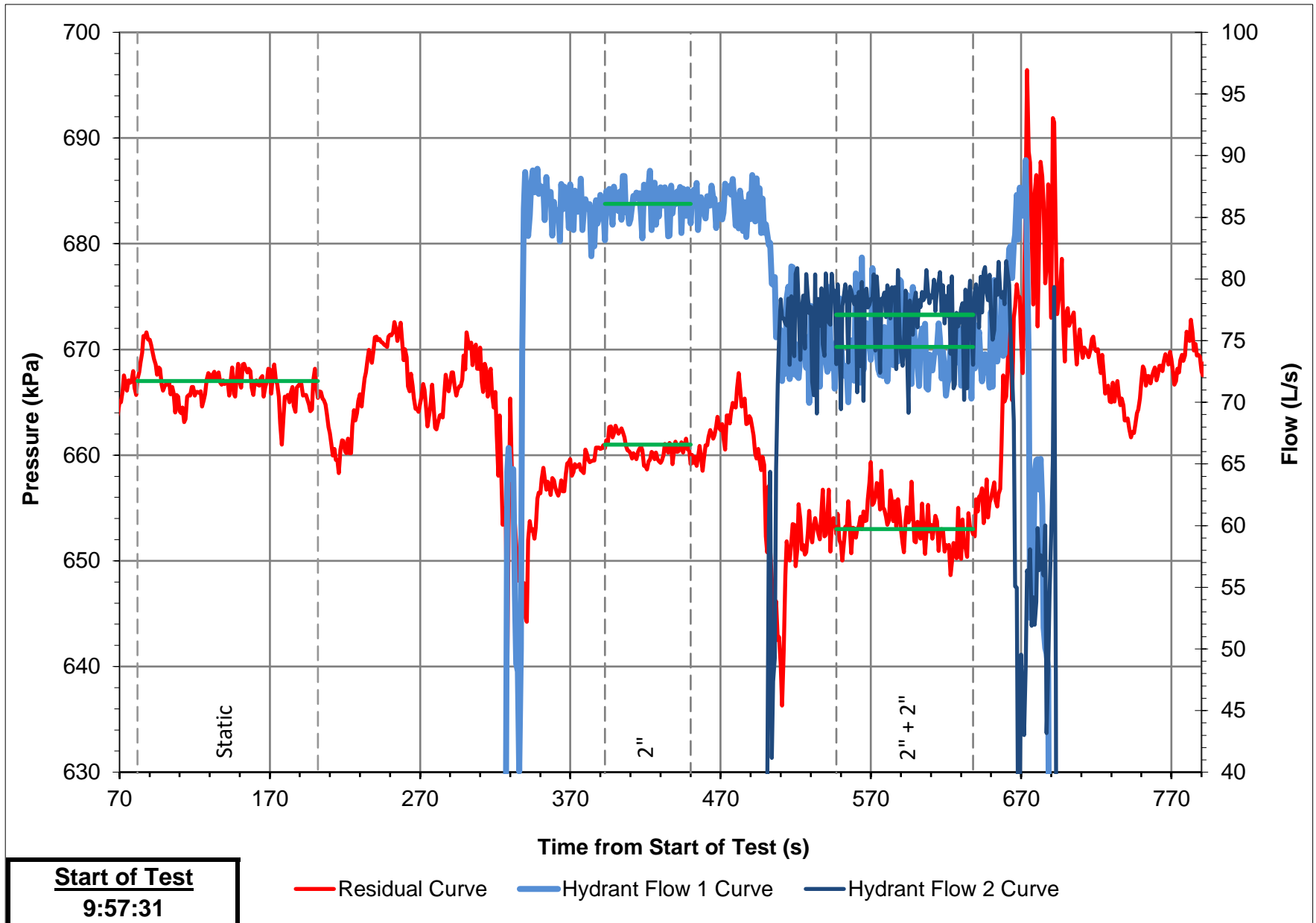
$$F = 220 C \sqrt{A}$$

where

F = Fire flow in Litres per minute (Lpm)
 C = coefficient related to the type of construction
 A = total floor area in square metres

- A. Determine Type of Construction**
 => Assumed Fire-resistive construction (fully protected frame, floors, roof)
 Therefore C = 0.6
- B. Determine Ground Floor Area**
 => Assumed Fire-resistive building with vertical openings and exterior vertical communications properly protected
 Therefore A = Largest Floor + 25% of 2 immediately adjoining floors
 $A = 1316 + 0.25(1315 + 1223)$
 A = 1,951 m²
- C. Determine Height in Storeys**
 => 12 Storeys
- D. Determined the Fire Flow**
 $F = 220 \times 0.6 \times \sqrt{1951}$
 F = 6,000 Lpm
- E. Determine Increase or Decrease for Occupancy**
 => Reduction for Combustible Construction
 Therefore 0% reduction
 0% reduction of 6000 Lpm = - Lpm
 6000 - 0 = 6,000 Lpm
- F. Determine Decrease for Automatic Sprinkler Protection**
 => Has Automatic Sprinkler Protection (Per NFPA 13 Standards)
 Therefore 30% reduction (assumed)
 30% reduction of 6000 Lpm = 1,800 Lpm
- G. Determine the Total Increase For Exposures**
- | Face | Distance (m) | Charge | Note |
|--------------|--------------|------------|------------------------------|
| West Side | 34.70 | 5% | Existing Condominium Complex |
| East Side | 50.70 | 0% | Existing Home |
| North Side | 13.20 | 15% | Existing Church Building |
| South Side | 34.80 | 5% | Existing Home |
| Total | | 25% | of 6,000 = 1,500 Lpm |
- H. Req'd Fire Flow = E - F + G**
 F = 5,700 Lpm
 F = 6,000 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
 F = 1,583 US GPM

4094 Tomken Rd



Subject Watermain Details

Diameter: 300 mm Material: PVC
 Area: 0.071 m²

Subject Hydrant & Valve Details

Residual Hydrant:
 Flow Hydrant:

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual Hydrant		Flow Hydrant				Total Flow		Velocity
			Residual (S1)		Port 1 (S1)		Port 2 (S2)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	
Static	82	202	667	96.7	0.0	0	0.0	0	0.0	0	0.0
2"	393	450	661	95.9	86.1	1365	0.0	0	86.1	1365	1.2
2"			0	0.0	0.0	0	0.0	0	0.0	0	0.0
1" + 2"			0	0.0	0.0	0	0.0	0	0.0	0	0.0
2" + 2"	547	638	653	94.7	74.5	1181	77.1	1222	151.6	2403	2.1



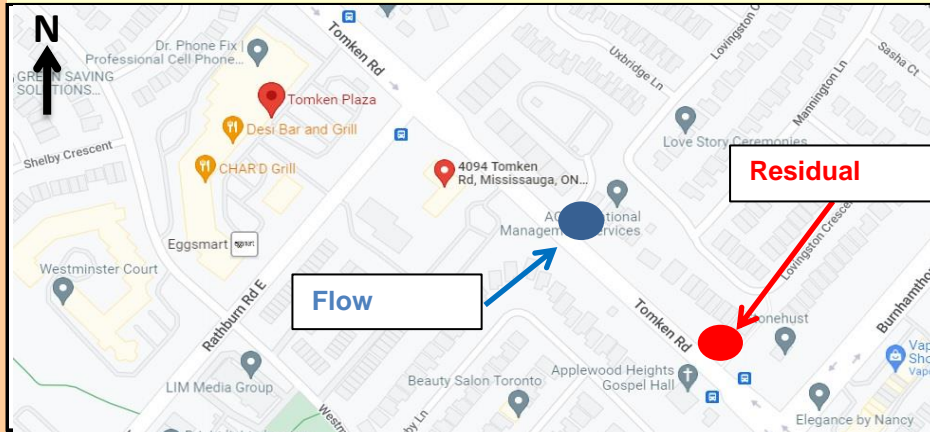
4094 Tomken Rd

HYDRANT FLOW TEST RESULTS

Date: **10-Aug-22**
 Tested By: **Sen**

Time: **9:57**
 (hh/mm)

Municipality: **City of Mississauga**
 Operator: **Dan**
 Test No: **1**



Conditions before Test (STATIC)

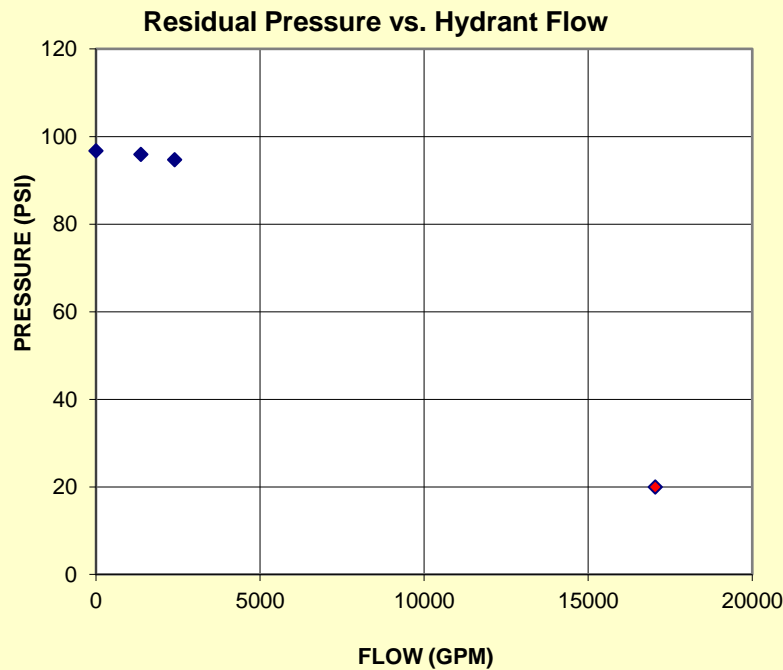
Residual Hydrant:	96.7 psi	667 kPa
Hydrant that will Flow:	96.7 psi	667 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference:	0.0 ft	0.0 m

(Flow El. - Residual El.)

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P _r (psi)	Fire Flow at Minimum Residual, Q _r (USGPM)	Fire Flow at Minimum Residual, Q _r (L/s)	10% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	96.7	96.7				
Single Port Tests									
2"	66.5	1365.0	86.1	95.9	95.9	20	15627	986	NO
2"						20			
Two Port Test									
1"						20			
2"									
Two Port Test									
2"	49.8	1181.0	74.5	94.7	94.7	20	17039	1075	NO
2"	53.3	1222.0	77.1						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
96.7	667	17000	1073

* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	42800 L
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Rounded up to closest 100L

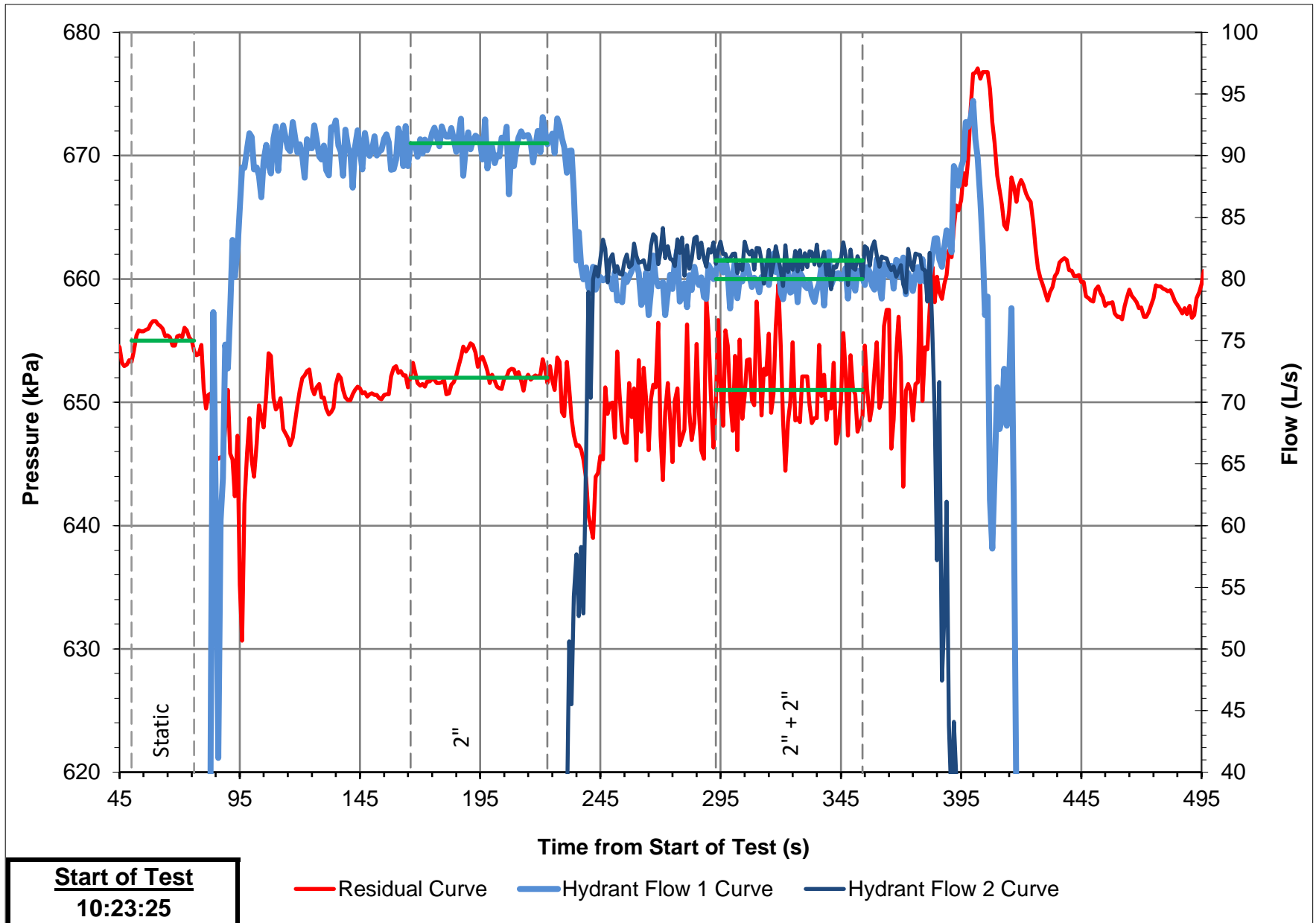
DISCLAIMER FOR FIRE FLOW TESTS

While WSP makes every effort to ensure that the information contained herein is accurate and up to date, WSP is not responsible for unintended 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. The information is representative for a dynamic water system that may change over time.

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925 Rathburn Rd E



Subject Watermain Details

Diameter: 600 mm Material: CON
 Area: 0.283 m²

Subject Hydrant & Valve Details

Residual Hydrant:
 Flow Hydrant:

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual Hydrant		Flow Hydrant				Total Flow		Velocity
			Residual (S1)		Port 1 (S1)		Port 2 (S2)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	
Static	50	76	655	95.0	0.0	0	0.0	0	0.0	0	0.0
2"	166	223	652	94.6	91.0	1442	0.4	6	91.4	1449	0.3
2"			0	0.0	0.0	0	0.0	0	0.0	0	0.0
1" + 2"			0	0.0	0.0	0	0.0	0	0.0	0	0.0
2" + 2"	293	354	651	94.4	80.0	1268	81.5	1292	161.5	2560	0.6



925 Rathburn Rd E HYDRANT FLOW TEST RESULTS

Date: **10-Aug-22**
 Tested By: **Sen**

Time: **10:23**
 (hh/mm)

Municipality: **City of Mississauga**
 Operator: **Dan**
 Test No: **2**



Conditions before Test (STATIC)

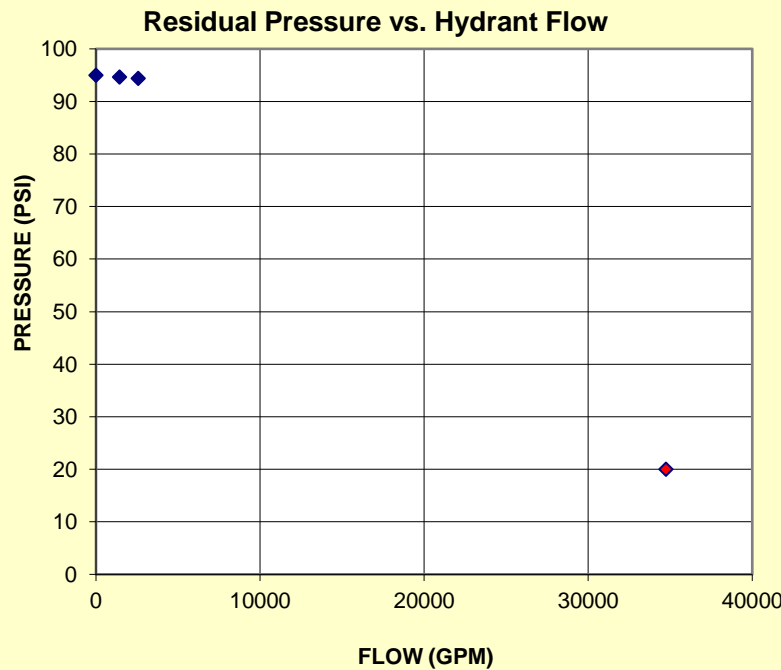
Residual Hydrant:	95.0 psi	655 kPa
Hydrant that will Flow:	95.0 psi	655 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference:	0.0 ft	0.0 m

(Flow El. - Residual El.)

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P _r (psi)	Fire Flow at Minimum Residual, Q _r (USGPM)	Fire Flow at Minimum Residual, Q _r (L/s)	10% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	95.0	95.0				
Single Port Tests									
2"	74.3	1442.0	91.0	94.6	94.6	20	24353	1536	NO
2"						20			
Two Port Test									
1"						20			
2"									
Two Port Test									
2"	57.4	1268.0	80.0	94.4	94.4	20	34728	2191	NO
2"	59.6	1292.0	81.5						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
95.0	655	34700	2189

* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	31300 L
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Rounded up to closest 100L

DISCLAIMER FOR FIRE FLOW TESTS

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APPENDIX

B DOMESTIC WATER DEMAND AND SANITARY FLOW CALCULATIONS

APPENDIX B

4094 Tomken Road

Pre-Development Site Statistics

Residential

Unit Type	Area (ha)	Pop Density (ppl/ha)	Population
Apartment	0.43	475	204

Note: Population calculated per Region of Peel Sanitary Sewer Design Criteria Section 2.1. Existing population is less than 475 persons/ hectare, therefore, 475 person/ hectare is used for calculations. Assuming 0.43ha of the site is for residential purpose.

Institutional

Total Church Population = 600 people (minimum)
 Equivalent Population Factor = 0.33 (R.O.P. Sani Design Criteria - Junior Public Schools)
 Total Inst. Population = 200 persons

Pre-Development Sanitary Flow

Res Population = 204
 Avg Res Flow = 0.72 L/s (assumes 302.8L/cap/d)
 Res Peak Factor = 4.14 (Harmon Formula)
 Peak Res Flow = 2.97 L/s

Inst Population = 200
 Avg Inst Flow = 0.70 L/s (assumes 302.8L/cap/d)
 Inst Peak Factor = 4.15 (Harmon Formula)
 Peak Inst Flow = 2.91 L/s

Total Site Area = 1.42 ha
 Infiltration = 0.28 L/s

Total Avg San Flow = **1.70 L/s**
 Total Peak San Flow = **6.15 L/s**

Pre-Development Water Demand

Res Population = 204
 Avg Res Demand = 0.66 L/s (assumes 280L/cap/d)
 Max Day Factor = 2.00
 Max Day Flow = **1.32 L/s**
 Peak Hour Factor = 3.00
 Peak Hour Flow = **1.99 L/s**

Inst. Population = 200
 Avg Inst Demand = 0.69 L/s (assumes 300L/cap/d)
 Max Day Factor = 1.40
 Max Day Flow = **0.97 L/s**
 Peak Hour Factor = 3.00
 Peak Hour Flow = **2.08 L/s**

Total Max Day Flow = **2.30 L/s**
 Total Peak Hour Flow = **4.07 L/s**

APPENDIX B
4094 Tomken Road
Post-Development Site Statistics

Proposed

Unit Type	Unit Count	Population (see above)
Studio + 1 Bedroom	158	427
2 Bedroom	62	168
3 Bedroom	30	81
TOTAL (Proposed)	250	676

Post-Development Sanitary Flow

Proposed Population =	676
Avg Flow =	2.37 L/s (assumes 302.8L/cap/d)
Peak Factor =	3.90 (Harmon Formula)
Peak Flow =	9.25 L/s
Total Site Area =	1.42 ha
Infiltration =	0.28 L/s
Total Avg San Flow (Ex. & Prop.) =	4.35 L/s
Total Peak San Flow (Ex. & Prop.) =	15.68 L/s

Post-Development Water Demand - Short Term

	Residential (Prop.)	Residential (Ex.)	Institutional	Total	
Population =	676	204	200	1080	
Consumption Rate =	409	280	300	---	
Avg Demand =	3.20	0.66	0.69	4.56	L/s
Max Day Factor =	2.00	2.00	1.40	---	
Max Day Flow =	6.40	1.32	0.97	8.70	L/s
Peak Hour Factor =	3.00	3.00	3.00	---	
Peak Hour Flow =	9.60	1.99	2.08	13.67	L/s
Fire Flow =	165	158	134	---	L/s
Maximum Day + Fire Flow =	171.40	159.32	134.97	---	L/s

Post-Development Water Demand - Long Term

	Residential (Prop.)	Residential (Ex.)	Institutional	Total	
Population =	676	204	200	1080	
Consumption Rate =	280	280	300	---	
Avg Demand =	2.19	0.66	0.69	3.55	L/s
Max Day Factor =	2.00	2.00	1.40	---	
Max Day Flow =	4.38	1.32	0.97	6.68	L/s
Peak Hour Factor =	3.00	3.00	3.00	---	
Peak Hour Flow =	6.57	1.99	2.08	10.64	L/s
Fire Flow =	165	105	165	---	L/s
Maximum Day + Fire Flow =	169.38	106.58	165.97	---	L/s

REGION OF PEEL MULTI-USE DEMAND TABLE

WATER CONNECTION

Connection Point			
1. Existing Rathburn Road East			
2. Tomken Road, 125m south east of Rathburn Road East			
Pressure zone of connection point			
	Residential	Institutional	Total
Total equivalent population to be serviced	1080		1080
Total lands to be serviced (ha)	1.42		1.42

Hydrant Flow Test					
Hydrant Flow Test Location 1			Hydrant Flow Test Location 2		
4094 Tomken Road			925 Rathburn Road East		
	Pressure (kPa)	Time		Pressure (kPa)	Time
Minimum water pressure	140	9:57	Minimum water pressure	140	10:23
Maximum water pressure	667	9:57	Maximum water pressure	655	10:23

Water demands					
No.	Demand type	Ex. Western Heights Montessori Academy	Ex. Apartment	Prop. Development	Total
		Institutional	Residential	Residential	
1	Average day flow (L/s)	0.69	0.66	3.20	4.55
2	Maximum day flow (L/s)	0.97	1.32	6.40	8.70
3	Peak hour flow (L/s)	2.08	1.99	9.60	13.67
4	Fire flow (L/s) ²⁾	134.20	157.50	165.00	456.70
Analysis					
5	Maximum day plus fire flow (L/s)	135.17	158.82	171.40	465.39
6	Peak hour flow (L/s)	2.08	1.99	9.60	13.67
7	Maximum demand flow (L/s)	135.17	158.82	171.40	465.39

WASTEWATER CONNECTION

Connection points³⁾:		Proposed Rathburn Road East, 70m south west of Tomken Road	Ex Rathburn Road East	Total
Total Lands to be serviced (ha):		0.95	0.47	1.42
Total equivalent population to be serviced⁴⁾:	Residential	676	204	880
	Institutional	0	200	200
	Total	676	404	1,080
8	Wastewater Sewer Effluent (m³/s):	9.53	6.15	15.68

¹⁾ Please refer to design criteria for population equivalencies

²⁾ Please reference the Fire Underwriters Survey Document

³⁾ Please specify the connection point (wastewater line or manhole ID

⁴⁾ Please complete as many uses are necessary for the development.

APPENDIX

C EXTERNAL SANITARY SEWER CAPACITY ANALYSIS

**THE REGIONAL MUNICIPALITY OF PEEL
SANITARY DESIGN CHART
WESTMINSTER - CITY OF MISSISSAUGA
PRE-DEVELOPMENT CONDITION**

Residential S.F. Homes = 50 persons per hectare
 Residential Semi-Detached/Townhomes = 70 persons per hectare
 Apartment and condo = 475 persons per hectare
 Commercial = 50 persons per hectare
 Industrial = 70 persons/ha
 Institutional (Schools,Churches) = 1/3 x # students

CONSULTANT:
WSP CANADA INC

* DESIGN FLOWS AS PER REGION OF
PEEL SANITARY SEWER DESIGN FLOW

DATE: OCT 2022

DESIGNED BY: GC

DRAINAGE AREA PLAN NO.:

Manning's n= 0.013

CHECKED BY: AW

LOCATION	FROM MH	TO MH	AREA (ha)	Res. AREA (ha)	Res. POP.	Comm. AREA (ha)	Comm. POP.	Inst. AREA (ha)	Inst. POP.	CUMM. AREA (ha)	CUMM. POP.	DESIGN SEWAGE FLOW (L/sec)	Peaking Factor	PEAK SEWAGE FLOW (L/sec)	INFILTRATION FLOW * 0.200 (L/sec/ha)	TOTAL FLOW (L/sec)	LENGTH (m)	GRADIENT (%)	PIPE SIZE (mm)	CAPACITY (L/sec)	% FULL	VELOCITY FULL (m/sec)	VELOCITY ACTUAL (m/sec)
Rathburn Road																							
S1		1792868	15.36	4.33	491	4.96	248	0.57	200	15.36	939												
SITE (Westminster United Church)	1792868	1792780	1.42	-	204	-	-	-	200	16.78	1343												
S2		1792780	12.26	12.26	613	-	-	-	-	29.04	1956												
	1792780	1792781	-	-	-	-	-	-	-	29.04	1343	6.9	3.59	24.6	5.8	30.4	87.0	2.58	250	95.5	31.87%	1.95	1.71
	1792781	1792778	-	-	-	-	-	-	-	29.04	1956	6.9	3.59	24.6	5.8	30.4	32.0	6.00	250	145.7	20.90%	2.97	2.31
S3		1792778	4.94	4.94	247	-	-	-	-	33.98	2203												
	1792778	1792777	-	-	-	-	-	-	-	33.98	2203	7.7	3.55	27.4	6.8	34.2	57.0	6.00	250	145.7	23.50%	2.97	2.40
Uxbridge Lane	1792777	1792776	0.27	0.27	14	-	-	-	-	34.25	2216	7.8	3.55	27.6	6.9	34.4	55.0	6.00	250	145.7	23.64%	2.97	2.43
	1792776	1792775	0.16	0.16	8	-	-	-	-	34.41	2225												
	1792775	1792760	0.59	0.59	30	-	-	-	-	35.00	2254	7.9	3.54	28.0	7.0	35.0	80.0	0.50	375	124.0	28.23%	1.12	0.95
S4		1792760	1.61	1.61	105	-	-	-	-	36.61	2359												
Lovington Crescent	1792760	1792759	0.41	0.41	21	-	-	-	-	37.03	2380	8.3	3.53	29.4	7.4	36.8	60.0	0.37	375	106.6	34.52%	0.97	0.88
S5		1792759	1.17	1.17	59	-	-	-	-	38.20	2439												
	1792759	1792761	0.16	0.16	8	-	-	-	-	38.36	2447	8.6	3.52	30.1	7.7	37.8	59.0	0.61	375	136.9	27.62%	1.24	1.05
	1792761	1792758	0.23	0.23	12	-	-	-	-	38.59	2458	8.6	3.51	30.3	7.7	38.0	63.0	0.50	375	124.0	30.65%	1.12	0.98
S6		1792758	5.33	5.33	267	-	-	-	-	43.92	2725												
Corbet Drive	1792758	1792741	-	-	-	-	-	-	-	43.92	2725	9.5	3.48	33.2	8.8	42.0	68.0	2.20	375	260.1	16.15%	2.35	0.00
S7		1792741	1.50	1.50	75	-	-	-	-	45.41	2799												
S8		1792741	28.30	28.30	1415	-	-	-	-	73.71	4214												
	1792741	1792740	-	-	-	-	-	-	-	73.71	4214	14.8	3.31	48.9	14.7	63.7	87.0	1.00	375	175.3	36.32%	1.59	1.46
	1792740	1792739	0.06	0.06	3	-	-	-	-	73.77	4217	14.8	3.31	49.0	14.8	63.7	71.0	0.80	375	156.8	40.63%	1.42	1.35
	1792739	1792736	-	-	-	-	-	-	-	73.77	4217	14.8	3.31	49.0	14.8	63.7	91.0	0.80	375	156.8	40.63%	1.42	1.35
Ibis Court	1792736	1792737	1.22	1.22	61	-	-	-	-	74.99	4278	15.0	3.31	49.6	15.0	64.6	63.3	0.44	450	189.1	34.15%	1.19	1.06
	1792737	1792738	-	-	-	-	-	-	-	74.99	4278	15.0	3.31	49.6	15.0	64.6	59.4	0.25	450	142.6	45.30%	0.90	0.87
Easement	1792738	WWND 6326916	-	-	-	-	-	-	-	74.99	4278	15.0	3.31	49.6	15.0	64.6	36.0	0.58	450	217.1	29.74%	1.37	1.17

**THE REGIONAL MUNICIPALITY OF PEEL
SANITARY DESIGN CHART
WESTMINSTER - CITY OF MISSISSAUGA
POST-DEVELOPMENT CONDITION**

Residential S.F. Homes = 50 persons per hectare
 Residential Semi-Detached/Townhomes = 70 persons per hectare
 Apartment and condo = 475 persons per hectare
 Commercial = 50 persons per hectare
 Industrial = 70 persons/ha
 Institutional (Schools,Churches) = 1/3 x # students

CONSULTANT:
WSP CANADA INC

* DESIGN FLOWS AS PER REGION OF
PEEL SANITARY SEWER DESIGN FLOW

DATE: OCT 2022

DESIGNED BY: GC

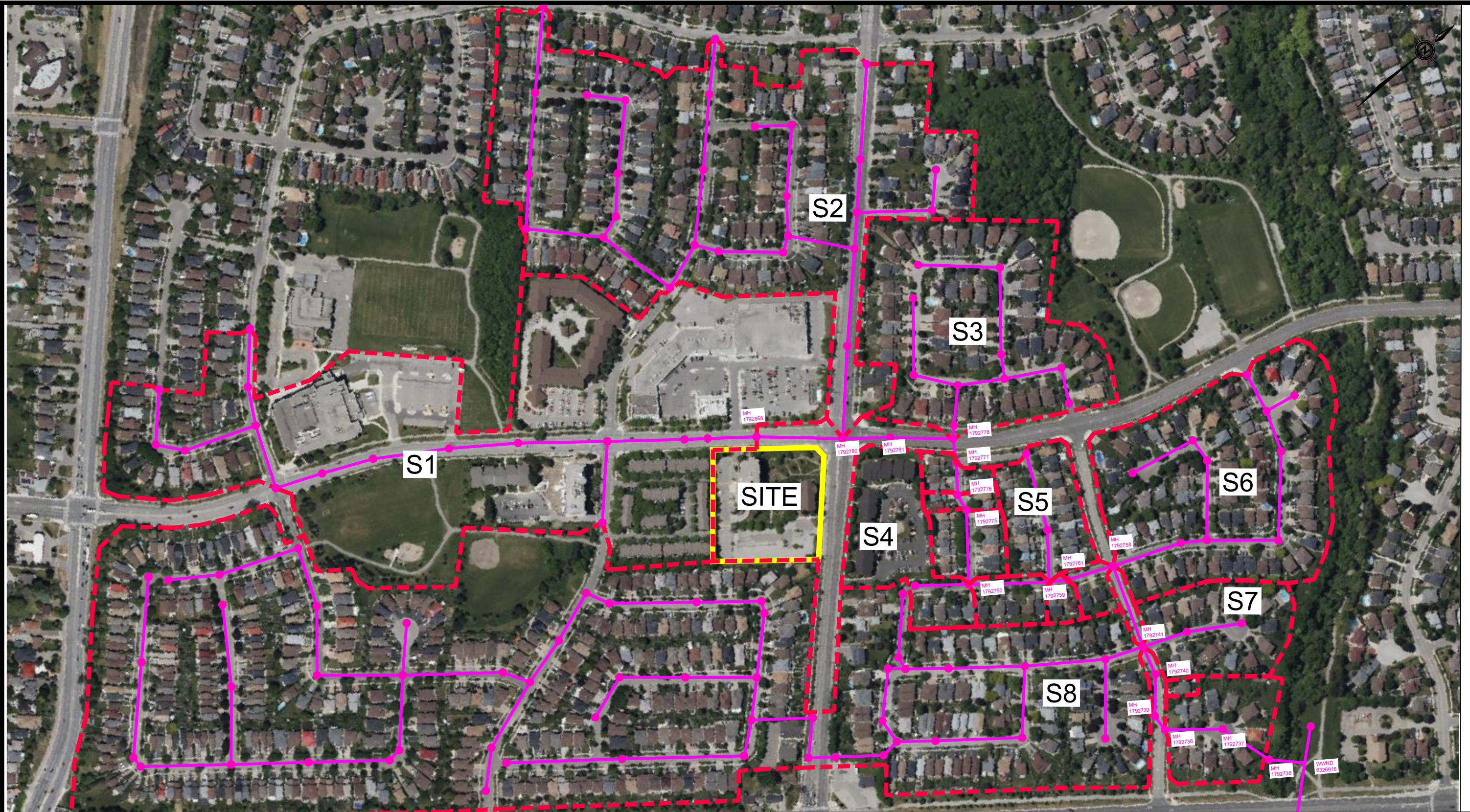
DRAINAGE AREA PLAN NO.:

Manning's n= 0.013

CHECKED BY: AW

LOCATION	FROM MH	TO MH	AREA (ha)	Res. AREA (ha)	Res. POP.	Comm. AREA (ha)	Comm. POP.	Inst. AREA (ha)	Inst. POP.	CUMM. AREA (ha)	CUMM. POP.	DESIGN SEWAGE FLOW (L/sec)	Peaking Factor	PEAK SEWAGE FLOW (L/sec)	INFILTRATION FLOW * 0.200 (L/sec/ha)	TOTAL FLOW (L/sec)	LENGTH (m)	GRADIENT (%)	PIPE SIZE (mm)	CAPACITY (L/sec)	% FULL	VELOCITY FULL (m/sec)	VELOCITY ACTUAL (m/sec)
Rathburn Road																							
S1		1792868	15.36	4.33	491	4.96	248	0.57	200	15.36	939												
SITE (Westminster United Church)	1792868	1792780	1.42	-	880	-	-	-	200	16.78	2019												
S2		1792780	12.26	12.26	613	-	-	-	-	29.04	2632												
	1792780	1792781	-	-	-	-	-	-	-	29.04	2019	9.2	3.49	32.2	5.8	38.0	87.0	2.58	250	95.5	39.78%	1.95	1.83
	1792781	1792778	-	-	-	-	-	-	-	29.04	2632	9.2	3.49	32.2	5.8	38.0	32.0	6.00	250	145.7	26.09%	2.97	2.49
S3		1792778	4.94	4.94	247	-	-	-	-	33.98	2879												
	1792778	1792777	-	-	-	-	-	-	-	33.98	2879	10.1	3.46	34.9	6.8	41.7	57.0	6.00	250	145.7	28.61%	2.97	2.52
Uxbridge Lane	1792777	1792776	0.27	0.27	14	-	-	-	-	34.25	2892	10.1	3.46	35.0	6.9	41.9	55.0	6.00	250	145.7	28.75%	2.97	2.52
	1792776	1792775	0.16	0.16	8	-	-	-	-	34.41	2901												
	1792775	1792760	0.59	0.59	30	-	-	-	-	35.00	2930	10.3	3.45	35.4	7.0	42.4	80.0	0.50	375	124.0	34.23%	1.12	1.00
S4		1792760	1.61	1.61	105	-	-	-	-	36.61	3035												
Lovington Crescent	1792760	1792759	0.41	0.41	21	-	-	-	-	37.03	3056	10.7	3.44	36.8	7.4	44.2	60.0	0.37	375	106.6	41.45%	0.97	0.92
S5		1792759	1.17	1.17	59	-	-	-	-	38.20	3115												
	1792759	1792761	0.16	0.16	8	-	-	-	-	38.36	3123	10.9	3.43	37.5	7.7	45.2	59.0	0.61	375	136.9	32.99%	1.24	1.09
	1792761	1792758	0.23	0.23	12	-	-	-	-	38.59	3134	11.0	3.43	37.6	7.7	45.3	63.0	0.50	375	124.0	36.58%	1.12	1.04
S6		1792758	5.33	5.33	267	-	-	-	-	43.92	3401												
Corbet Drive	1792758	1792741	-	-	-	-	-	-	-	43.92	3401	11.9	3.40	40.5	8.8	49.3	68.0	2.20	375	260.1	18.94%	2.35	0.00
S7		1792741	1.50	1.50	75	-	-	-	-	45.41	3475												
S8		1792741	28.30	28.30	1415	-	-	-	-	73.71	4890												
	1792741	1792740	-	-	-	-	-	-	-	73.71	4890	17.1	3.25	55.8	14.7	70.5	87.0	1.00	375	175.3	40.21%	1.59	1.49
	1792740	1792739	0.06	0.06	3	-	-	-	-	73.77	4893	17.1	3.25	55.8	14.8	70.6	71.0	0.80	375	156.8	44.99%	1.42	1.38
	1792739	1792736	-	-	-	-	-	-	-	73.77	4893	17.1	3.25	55.8	14.8	70.6	91.0	0.80	375	156.8	44.99%	1.42	1.38
Ibis Court	1792736	1792737	1.22	1.22	61	-	-	-	-	74.99	4954	17.4	3.25	56.4	15.0	71.4	63.3	0.44	450	189.1	37.76%	1.19	1.12
	1792737	1792738	-	-	-	-	-	-	-	74.99	4954	17.4	3.25	56.4	15.0	71.4	59.4	0.25	450	142.6	50.09%	0.90	0.90
Easement	1792738	WWND 6326916	-	-	-	-	-	-	-	74.99	4954	17.4	3.25	56.4	15.0	71.4	36.0	0.58	450	217.1	32.89%	1.37	1.20

FILENAME: C:\Users\cagc072008\A\CCDOCS\WSP Canada projects (AMER)\LDO\Files\221-05528 Westminster Mississauga\MUNIFSR\221-05528-FIG 7.dwg
PLOTDATE: Oct 12, 2022 - 2:54pm, CAGC072008



CLIENT
UNITED PROPERTY RESOURCE CORPORATION
c/o KINDRED WORKS

TITLE
4094 TOMKEN ROAD

SEWER SHED PLAN



100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 www.wsp.com

Checked	A.W.	Drawn	G.C.
Date	OCT 2022	Proj. No.	221-05528
Scale	1:4000	Figure No.	7

APPENDIX

D HYDROGEOLOGICAL REPORT EXCERPTS



Executive Summary

Grounded Engineering Inc. (Grounded) was retained by UPRC c/o Kindred Works to conduct a Hydrogeological Review for the proposed redevelopment of 4094 Tomken Road in Mississauga, Ontario. The conclusions of the investigation are summarized as follows:

Site Information

Existing Development					
Site	Above Grade Levels	Below Grade Levels			
		Level #	Lowest Finished Floor		Approximate Base of Foundations (masl)
			Depth (m)	Elevation (masl)	
4094 Tomken Road	1	2	Approx. 6	Approx. 129.0	Unknown.

Proposed Development					
Site	Above Grade Levels	Below Grade Levels			
		Level #	Lowest Finished Floor		Approximate Base of Foundations (masl)
			Depth (m)	Elevation (masl)	
North Building	13	3	Approx. 12	126.8	126.0
South Building	13	4	Approx. 13	125.7	125.0

Site Conditions

Site Stratigraphy					
Stratum/Formation	Aquifer or Aquitard	Depth Range (mbgs)	Elevation Range (masl)	Hydraulic Conductivity (m/s)	Method
Fill	Aquifer	0.1 to 1.5	136.7 to 138.0	1.0×10^{-5}	Literature ¹
Clayey Silt Till	Aquitard	0.8 to 3.8	134.2 to 137.2	5.0×10^{-9}	Grain size
Weathered Bedrock	Aquifer	3.0 to 7.5	130.4 to 134.9	1.0×10^{-6}	Slug test
Sound Bedrock	Aquitard	7.5	130.4	1.0×10^{-6}	Slug test

Groundwater Quality				
Sample ID	Sample Date	Sample Expiry Date	City of Mississauga Storm Sewer Limits	Region of Peel Sanitary and Combined Sewer Limits
SW-UF-BH2	June 14, 2022	N/A	Exceeds	Exceeds

¹ Freeze and Cherry (1979)



Groundwater Control

Stored Groundwater (pre-excavation/dewatering)						
	Volume of Excavation (m ³)	Volume of Excavation Below Water Table (m ³)	Estimated Volume of Stored Groundwater		Estimated Volume of Available Groundwater	
			m ³	L	m ³	L
North Building	18,498	12,016	1,500	1,500,000	900	900,000
South Building	34,816	23,664	2,700	2,700,000	1,700	1,700,000

North Building:

Short Term (Construction) Steady State Groundwater Quantity – Safety Factor of 2.0 Used					
Estimated Groundwater Seepage		Design Rainfall Event (25mm)		Estimated Total Daily Water Takings	
L/day	L/min	L/day	L/min	L/day	L/min
70,000	48.6	40,000	27.8	110,000	76.4

Long Term (Permanent) Steady State Groundwater Quantity – Safety Factor of 2.0 Used					
Estimated Groundwater Seepage		Estimated Infiltrated Stormwater – Design Rainfall Event (25mm)		Estimated Total Daily Water Takings	
L/day	L/min	L/day	L/min	L/day	L/min
70,000	48.6	4,000	2.8	74,000	51.4

South Building:

Short Term (Construction) Steady State Groundwater Quantity – Safety Factor of 2.0 Used					
Estimated Groundwater Seepage		Design Rainfall Event (25mm)		Estimated Total Daily Water Takings	
L/day	L/min	L/day	L/min	L/day	L/min
125,000	86.8	68,000	47.2	193,000	134.0

Long Term (Permanent) Steady State Groundwater Quantity – Safety Factor of 2.0 Used					
Estimated Groundwater Seepage		Estimated Infiltrated Stormwater – Design Rainfall Event (25mm)		Estimated Total Daily Water Takings	
L/day	L/min	L/day	L/min	L/day	L/min
125,000	86.8	11,000	7.6	136,000	94.4



Land Stability		
	Short Term (Construction)	Long Term (Permanent)
Maximum Zone of Influence (m)	26	26
Maximum Potential Settlement (mm)	0	0

Regulatory Requirements	
Environmental Activity and Sector Registry (EASR) Posting	Required
Short Term Permit to Take Water (PTTW)	Not Required
Long Term Permit to Take Water (PTTW)	Required
Short Term Discharge Agreement City of Mississauga/Region of Peel	Required
Long Term Discharge Agreement City of Mississauga/Region of Peel	Required