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39 Years

100 Gloucester Street

Servicing and Stormwater Management Report

100 Gloucester Street

City of Ottawa

Servicing and Stormwater Management Report

Prepared for:

Claridge Homes Corporation

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

November 30, 2022

Novatech File: 122173
Ref: R-2022-197

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Engineers, Planners & Landscape Architects

November 30, 2022

City of Ottawa
Planning, Infrastructure and Economic Development Department
Planning and Infrastructure Approvals Branch
110 Laurier Avenue West, 4th Floor
Ottawa ON, K1P 1J1

Attention: **Jean-Charles Renaud, RPP, MCIP**

Reference: **100 Gloucester Street**
Servicing and Stormwater Management Report
Our File No.: 122173

Please find enclosed the 'Servicing and Stormwater Management Report' for the above-noted development located in the City of Ottawa. This report is being submitted in support of the site plan application for the proposed development.

Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

NOVATECH

Greg MacDonald, P. Eng.
Director, Land Development and Public Sector Infrastructure

cc: Vincent Denomme, Claridge

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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Appendices

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Figures

1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed site plan located at 100 Gloucester Street located within the City of Ottawa. This report is prepared in support of the site plan application for the subject development. **Figure 1- Key Plan** shows the site location. A copy of the legal plan is included for reference.

1.1 Existing Conditions

The subject site is approximately 0.18 hectares (ha.) in size and consists of two properties, 84 Gloucester Street and 100 Gloucester Street. Presently, 84 Gloucester Street contains an existing parking lot and 100 Gloucester Street contains a six (6) storey residential building with ground floor retail. **Figure 2** shows the existing site conditions.

1.2 Proposed Development

The proposed site is denoted as lots 44, 45, and 46 (South Gloucester Street Lots) on Topographical Plan of Survey - Registered Plan 2996. The development will consist of a 27-storey tower with 324 residential units. A total of 99 underground parking spaces will be provided on 3 levels of underground parking, which will connect to the 70 Gloucester development. **Figure 3** shows the concept plan for the proposed development.

Correspondence from the City pre-consultation meeting for the proposed development is also included in **Appendix A** for reference.

2.0 SITE CONSTRAINTS

A geotechnical investigation was completed for the subject development and a report was prepared entitled 'Geotechnical Investigation, Proposed Multi-Storey Building, 84 & 100 Gloucester Street, Ottawa, Ontario, prepared by Patterson Group dated September 6, 2022. The following is a summary of the findings of the report:

- The subject site's soil profile, at the test hole locations, consisted of asphaltic concrete or a concrete slab underlain by fill, silty clay and glacial till. The fill material generally extends to approximate depths of 0.3m to 2.7m below the existing ground. Bedrock was encountered at depths ranging from 4.5m to 8.1m below existing ground.
- Seven boreholes were dug between March 31, 2022 and April 5, 2022 (BH1-22 through 7-22) and groundwater seepage was only observed within 3 of them. BHs 2-22, 3-22, and 4-22 revealed groundwater levels at depths 4.61m, 8.13m, and 3.72m below the existing ground surface, respectively. It should be noted that the groundwater levels may be higher during wet periods of the year such as the early spring.
- Due to the presence of silty clay deposits, a permissible grade raise restriction of 1m is recommended for grading of the subject site. If higher than permissible grade raises are required, preloading with or without a surcharge, lightweight fill, and/or other measures should be investigated to reduce the risk of unacceptable long-term post construction total and differential settlements

- The subsoil at this site is considered to be mainly a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.
- The excavation side slopes above groundwater level extending to a maximum of 3m depth should be cut back at 1H:1V or flatter.
- Slopes in excess of 3m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.
- It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides.
- It is expected that services will be installed by “cut and cover” methods and excavations will not be left open for extended periods of time.
- Due to the proximity of the underground parking levels to the site boundaries, temporary shoring is anticipated to be required for the support of the overburden soils and weathered or poor quality bedrock during excavation.
- It is anticipated that groundwater infiltration into the excavations should be controllable using open sumps.

3.0 WATER SERVICING

The proposed development will be serviced by two (2) 150mm diameter watermain that will connect to the existing 300mm diameter watermain within Gloucester Street. The proposed building will be sprinklered and equipped with a siamese connection located near the front entrance within 45m of a fire hydrant. Refer to the **General Plan of Services Drawing No. 122173-GP** for servicing details.

Water demand calculations have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines and the Ontario Building Code. The required fire demand was calculated using the Fire Underwriters Survey (FUS) Guidelines. The water demand and fire flow calculations are provided in **Appendix B** for reference. A summary of the water demand and fire flows are provided in **Table 3.1**.

Table 3.1: Domestic and Fire Water Demand Summary

Population	Commercial Area (m^2)	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
537	128	1.79	4.423	9.70	100

The above water demand information will be submitted to the City for boundary conditions from the City's water model. These boundary conditions will be used to confirm the performance of the proposed and existing watermain systems for three theoretical conditions:

1) High Pressure check under Average Day conditions
2) Peak Hour Demand
3) Maximum Day + Fire Flow Demand.

Refer to **Appendix B** for detailed water demand calculations.

4.0 SANITARY SERVICING

It is proposed to service this site with a 200mm diameter sanitary service to the existing 300mm diameter sanitary sewer in the Gloucester Street right-of-way.

Sanitary flows for the proposed development were calculated using criteria from Section 4 of the City of Ottawa Sewer Design Guidelines and the Ontario Building Code as follows:

- Residential Average Flow = 280 L/capita/day
- Studio apartment = 1.4 Person/unit
- 1 Bed apartment = 1.4 Person/unit
- 2 Bed apartment = 2.1 Person/unit
- 2Bedroom + apartment = 3.1 Person/unit
- Commercial flow = 125 L/seat/day
- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Commercial Peaking Factor = 1.0
- Peak Extraneous Flows (Infiltration) = 0.33 L/s/ha

The peak sanitary flow including infiltration was calculated to be 6.99 L/s. Detailed sanitary flow calculations are provided in **Appendix C** for reference.

5.0 STORM SERVICING AND STORMWATER MANAGEMENT

There is an existing 900mm diameter storm sewer within the Gloucester Street right of way fronting the planned development. It is proposed to service the site with two (2) 250mm storm service connections, both connected to the existing 900mm diameter. One (1) 250mm diameter service will convey the uncontrolled foundation drain flows, and the second 250mm diameter service will convey the controlled flows from the internal stormwater cistern outlet. Refer to the **General Plan of Services Drawing No.122173 - GP** for details.

The design criteria used in sizing the storm sewers are summarized below in **Table 5.1.**

Table 5.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

Refer to **Appendix D** for detailed storm drainage area plans and storm sewer design sheets.

5.1 Stormwater Management Design Criteria

Stormwater Management (SWM) design criteria for the proposed development were established through correspondence with the City of Ottawa and the City of Ottawa Sewer Design Guidelines (October 2012). The following criteria have been adopted to satisfy the requirement that on-site stormwater management be implemented to control post-development stormwater discharge:

- Control proposed development flows, up to and including the 100-year storm event to a 5-year allowable release rate calculated using a runoff coefficient (C) of 0.50 and a time of concentration (T_c) of 10 minutes, as per City of Ottawa requirements
- Provide source controls which are in conformity with the City of Ottawa requirements, where possible
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control

The approach to the stormwater management design is to determine the allowable release rate for the site, calculate the uncontrolled flow, and ensure that the remaining flow, in combination with the uncontrolled flow, does not exceed the allowable release rate. All proposed development runoff, in excess of the allowable release rate, will be attenuated on-site in a cistern located in the underground parking structure prior to being released into the storm sewers on Gloucester Street.

5.2 Existing Site Drainage

As mentioned previously the site is currently occupied by an existing parking lot and a 6-storey residential building. The site drains from the southern limit of the property north, toward Gloucester Street.

5.3 Quantity Control

The allowable release rate for the 0.18 ha site was calculated to be 26.5 L/s based on the SWM criteria provided by the City of Ottawa.

Total Drainage Area (A) = 0.183 ha	Q_{Allow} = 2.78 CIA
Runoff Coefficient (C_{Allow}) = 0.50	Q_{Allow} = 2.78 x 0.50 x 104.19mm/hr x 0.183
Intensity (I_{5Allow}) = 104.19mm/hr	Q_{Allow} = 26.50L/s

Design Storms

The design storms are based on City of Ottawa design storms. Design storms were used for the 5, 100, and 100+20%-year return periods.

Calculation Parameters

Post-development catchments were calcualted based on the proposed site plan and grading as shown on **Drawing 122173-GR**, and reflected on **Drawing 122173-SWM** within **Appendix D**. All the sub-catchments over proposed underground parking areas are assumed to be 100% impervious. The building roofs were assumed to have no depression storage.

The site has been divided into two (2) drainage areas for the post development condition. The drainage areas are as follows:

Area A-01:

- Area A-01 consists of the front, side, and rear terraces surrounding the proposed building. Stormwater flows from the terraces will be captured by area drains and conveyed internally to the proposed cistern.

Area R-01:

- Area R-01 consists of the two (2) podium roof tops and the tower roof top for the proposed building. Stormwater flows from the roofs will be captured by roof drains and conveyed internally to the proposed cistern.

The cistern will provide storage for storms up to and including the 100-year event. Flow from the cistern will be pumped to an elevation above the existing storm sewer's obvert, then conveyed by gravity to the existing 900mm diameter storm sewer in the Gloucester Street right-of-way.

Table **5.2 below** summarizes the flow, storage required, and storage provided for each of the site drainage areas.

Table 5.2: Stormwater Management Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	Cistern	**5 Year Storm Event**		**100 Year Storm Event**		Max. Vol. Provided (cu.m.)
				Flow (L/s)	Req Vol (cu.m)	Flow (L/s)	Req Vol (cu.m)	
A-01, R-01	0.183	0.90	5m x 5.2m x 2.5m	26.5	12.77	26.5	41.68	65.35
Post-Development Release Rate				**26.5**		**26.6**		
Allowable Release Rate				**26.5**		**26.5**		

Refer to **Appendix D** for Rational and Modified Method calculations and **Drawing 122173-SWM** for post development drainage areas.

5.4 Major Overland Flow Route

A major overland flow route will be provided for storms greater than the 100-year storm event. Stormwater will be directed to the surrounding rights-of-way. The major overland system is shown on the **Grading and Erosion Control Plan Drawing No. 122173-GR.**

6.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented on site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks (catchbasin inserts) will be placed in existing and proposed catchbasins and catchbasin manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the **Grading and Erosion Control Plan Drawing No. 122173-GR** for details.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Watermain

The analysis of the existing and proposed watermain network confirms the following:

- The two (2) proposed 150mm dia. watermain services which connect to the existing 300mm watermain within Gloucester Street can service the proposed development.
- Boundary Conditions will be requested to confirm pressures in the existing watermain infrastructure to meet the required domestic demands for the development.
- Boundary Conditions will be requested to confirm pressures for fire flow to service the proposed fire protections system.

Sanitary Servicing

The analysis of the existing and proposed sanitary system confirms the following:

- It is proposed to service the development with a proposed 200mm Sanitary service which will connect to existing sewers within the Gloucester Street right-of-way.

Stormwater Management

The following provides a summary of the storm sewer and stormwater management system:

- The proposed development will be provided with two (2) services. An uncontrolled 250mm diameter foundation drain, and a 250mm diameter stormwater service from the proposed cistern.
- Stormwater quantity control is to be provided through the use of a cistern within the P1 parking level.
- The proposed storm sewer system is to connect to the existing 900mm diameter storm sewer in the Gloucester Street right-of-way.
- Storm flows will be conveyed through the implementation of area and roof drains.
- As per existing conditions, a major overland flow route has been provided to the surrounding right-of-ways.

Erosion and Sediment control

- Erosion and sediment control measures (i.e. filter fabric, catchbasin inserts, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

8.0 CLOSURE

This report is submitted in support of the site plan application and demonstrates adequate services for the development. Your review and approval of this report is requested.

NOVATECH

Prepared by:

Ryan Good, C.E.T.
Civil Engineering Technologist
Land Development Engineering

Reviewed by:

Greg MacDonald, P.Eng
Director, Land Development and Public Sector Infrastructure

Appendix A
Pre - Consultation Meeting Minutes

Pre-Application Consultation Meeting Notes

100 and 84 Gloucester Street, Ottawa
Meeting Date: Wednesday, April 20, 2022
PC2022-0084
MS Teams

Attendees:

City of Ottawa:
Jean-Charles Renaud, File Lead, Planner
Randolph Wang, Urban Designer
Wally Dubyk, Transportation
Reza Bakhit, Engineering
Parthvi Patel, Student

Applicant Team:
Vincent Denomme, Claridge Homes
Greg MacDonald
Nathan Godlovitch
Sayeh Jolan

Community Association:
Mary Huang

Subject: Development of 27-storey residential apartment building at 100 and 84 Gloucester Street

Proposal Details:

- An existing parking lot currently occupies 84 Gloucester Street, and a six-story office building occupies 100 Gloucester Street.
- Shared amenity space will include a ground-floor garden, swimming pool, and built complex.
- Approximately 321 units will be provided in total, with a mix of townhome, studio, one bedroom, two bedroom, and two+ bedroom units.

Technical Comments – City Staff

Planning Comments – Jean-Charles Renaud

- In the new Official Plan, there is a strong emphasis on the public realm and greenery. Ensure that appropriate soil volumes are provided for the trees.
- The Secondary Plan emphasizes the heritage nature of the area, review how the secondary plan asks you to interface with the heritage buildings.
- Address the different components of the secondary plan in submission documents, such as affordable housing.

- In the event that the ramp and garage door stay, their location close to the easement may create conflict due to people turning in the wrong way. Look into the landscape treatment in the front.
- I am not convinced to the appropriateness of the height of the podium as it seems quite tall.

Design Comments – Randolph Wang

1. A Design Brief is required. The Terms of Reference of the Design Brief is attached for convenience. Please note the requirements for both a wind study and a shadow study.
2. The site is within a Design Priority Area As such the design is subject to formal review by the City's Urban Design Review Panel. Please contact udrp@ottawa.ca for scheduling details and submission requirements.
3. With respect to the concept presented at the meeting, I appreciate the architect's efforts to break up the massing, and to create opportunities at grade for public realm. The design overall makes good sense given the complex situation.
    a. The floor plate and the location of the tower is generally in keeping with the directions of the applicable policies and guidelines. Further modifications to the floor plate are recommended to maintain a minimum 10m setback of the tower from all property lines.
    b. The cantilevered volume above the 6-storey podium on the west side should be removed. The overall massing composition should be of a 6-storey podium and a tower above it. A 9-storey podium is overwhelming for the narrow street.
    c. The angled setback of the ground floor is very interesting and useful for creating a more generous public realm within a very tight urban condition.
        ii. Urban design supports the option to remove the parking ramp if technically feasible so that a pedestrian "plaza" can be created and the main entrance of the building can be moved westwards to enliven the covered easement corridor.
            ii. Please study the relationship between the columns and wall to make sure the space between the wall and columns is sufficient and comfortable for pedestrians.
    d. Sufficient floor to ceiling height, at a minimum 4.5m should be provided for the covered easement corridor. Ideally, it should be 2-storeys.
    e. The two bedroom unit facing Gloucester is not most desirable. Considerations should be given to a different use at this location. If the two bedroom unit has to stay, considerations should be given to grade separation with the units being a few steps above the sidewalk.
    f. The architecture can benefit from some simplification with respect to color and material composition although the intent to breaking up the massing is appreciated. A careful study of the overall composition of the urban fabric consisting of buildings in the same street block will be useful to help understand how the design of this building can contribute.

Transportation Comments – Wally Dubyk

- Gloucester Street is classified as a Local road. There are no additional protected ROW limits identified in the OP.

- A Screening Form is to be submitted to determine if a transportation study is required. Consultants should fill in the form in Appendix 'B'. Click on the website: www.ottawa.ca/TIA
- Update to the TIA Guideline Forecasting Report
    - We would like to inform all consultants making TIA Forecasting Report submissions to the City of Ottawa as part of a development application, that all new applications (pre-consultation meetings dated after March 3, 2021) must use the NEW TRANS Trip Generation Manual when forecasting site generated trips using this manual (see attached).
    - The TRANS committee (a joint transportation planning committee serving the National Capital region) finalized a new manual early in March 2021. The document will be available in French and English on the TRANS website http://www.ncr-trans-rcn.ca/surveys/2009-trip-generation.
    - The new manual has simplified the conversion from vehicle trips to person trips and then trips by modal share. The City has also developed a spreadsheet that will apply the factors of location and building type to quickly provide the existing trip numbers by mode share.
- During the Analysis, ensure that both TDM checklists are filled out and appropriate measures are taken to achieve the target modal shares. In the future, please contact Tim Wei (tim.wei@ottawa.ca) to obtain a local snapshot of the Long-Range Transportation model to help inform background growth rates.

- Please keep in mind that on street parking is not a viable option for tenants. Ensure that potential tenants are aware that there is no provision for parking.

- Permanent structures such as curbing, stairs, retaining walls, and underground parking foundation also bicycle parking racks are not to extend into the City's right-of-way limits.
- The consultant should review the sight distance to the access and any obstructions that may hinder the view of the driver.
- The concrete sidewalks should be 2.0 metres in width and be continuous and depressed through the proposed accesses.
- Ensure that the pedestrian sidewalk has a clear and non-obstructive path of 2.0 metres width minimum and that the bicycle spaces do not interfere with the pedestrian crosswalk.
- The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb and boulevard to City standards.
- The Owner acknowledges and agrees that all private accesses to Roads shall comply with the City's Private Approach By-Law being By-Law No. 2003-447 as amended https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/private-approach-law-no-2003-447 or as approved through the Site Plan control process.
- Ensure that the driveway grade does not exceed 2% within the private property for a distance of 9.0 metres from the ROW limit; see Section 25 (u) of the Private Approach By-Law #2003-447. Any grade exceeding 6% will require a subsurface melting device.

- The Owner shall be required to enter into maintenance and liability agreement for all pavers, plant and landscaping material placed in the City right-of-way and the Owner shall assume all maintenance and replacement responsibilities in perpetuity.

- Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be located in safe, secure places near main entrances and preferably protected from the weather.
- Should the property Owner wish to use a portion of the City's road allowance for construction staging, prior to obtaining a building permit, the property Owner must obtain an approved Traffic Management Plan from the Manager, Traffic Management, Transportation Services Department. The city has the right for any reason to deny use of the Road Allowance and to amend the approved Traffic Management Plan as required.

Engineering Comments – Reza Bakhit

General:

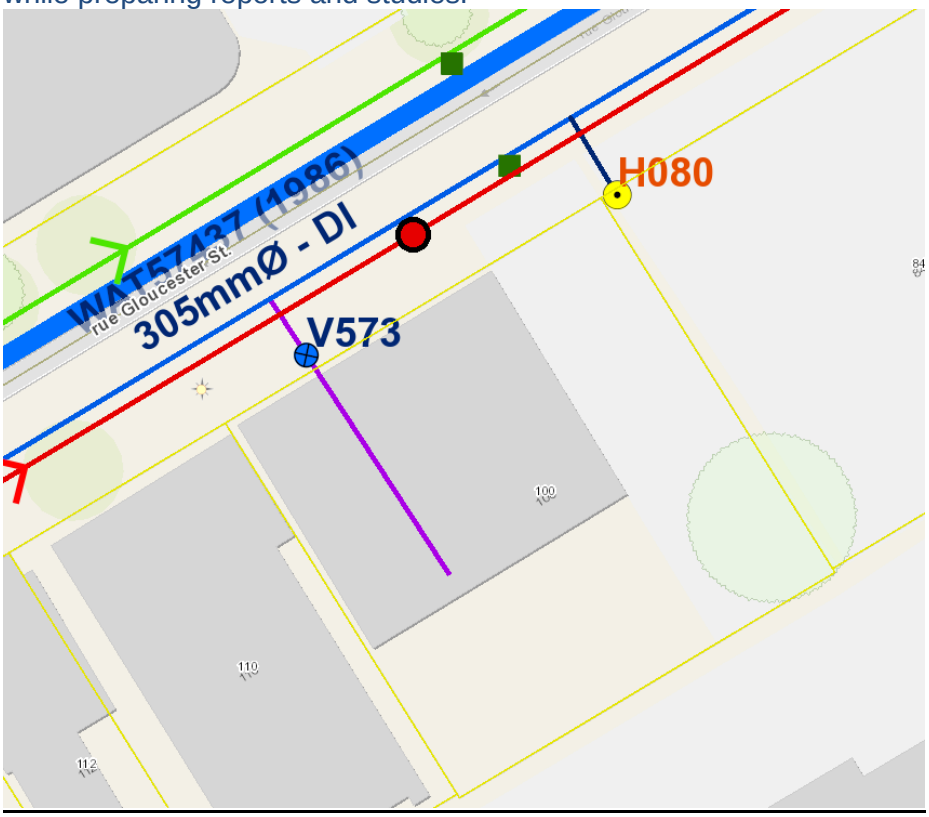
- It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an **Existing Conditions Plan**.
- Any easements on the subject site shall be identified and respected by any development proposal and shall adhere to the conditions identified in the easement agreement. A **legal survey plan** shall be provided and all easements shall be shown on the engineering plans.
- An application to consolidate the parcels (84 & 100 Gloucester Street) of land will be required otherwise the proposed stormwater works will be servicing more than one parcel of land and thus does not meet the exemption set out in O.Reg. 525/98. This would mean an **ECA would be required** regardless of who owns the parcels.

1. **Concern** about protection of the **736mm Backbone watermain** located within the ROW in Gloucester Street. Vibration and settlement monitoring plan will be required.

- A deep excavation and dewatering operations have the potential to cause damages to the neighboring adjacent buildings/ City infrastructure. Document that construction activities (excavation, dewatering, vibrations associated with construction, etc.) will not have an impact on any adjacent buildings and infrastructure.

1. Reference documents for information purposes :
   - Ottawa Sewer Design Guidelines (October 2012)
   - Technical Bulletin PIEDTB-2016-01
   - Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
   - Ottawa Design Guidelines – Water Distribution (2010)
   - Technical Bulletin ISTB-2021-03
   - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - City of Ottawa Environmental Noise Control Guidelines (January 2016)
   - City of Ottawa Accessibility Design Standards (2012) (City recommends development be in accordance with these standards on private property)
   - Ottawa Standard Tender Documents (latest version)
   - Ontario Provincial Standards for Roads & Public Works (2013)
   - Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-424 x.44455).

Please note that this is the applicant responsibility to refer to the latest applicable guidelines while preparing reports and studies.



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Stormwater Management Criteria and Information:

- **Water Quantity Control:** In the absence of area specific SWM criteria please control post-development runoff from the subject site, up to and including the **100-year storm event**, to **a 5-year pre-development level.** The pre-development runoff coefficient will need to be determined **as per existing conditions** but in no case more than 0.5. [**If 0.5 applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is greater than 0.5**]. The time of concentration (T_c) used to determine the pre-development condition should be calculated. *Tc should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations*].
- Any storm events greater than the established **5-year allowable** release rate, up to and including the **100-year storm event**, shall be detained on-site. The SWM measures required to avoid impact on downstream sewer system will be subject to review.
- Please note that foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention. **It is recommended that the foundation drainage system be drained**

by a sump pump connection to the storm sewer to minimize risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.

- **Water Quality Control:** Please consult with the local conservation authority (RVCA) regarding water quality criteria prior to submission of a Site Plan Control Proposal application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report.
- Please note that as per *Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14)* **there shall be no surface ponding on private parking areas during the 2-year storm rainfall event**.
- **Underground Storage:** Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.
  When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. **We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.**
  In the event that there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.
  Please provide information on UG storage pipe. Provide required cover over pipe and details, chart of storage values, capacity etc. How will this pipe be cleaned of sediment and debris?
  Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports (maintenance) etc.

  Provide a cross section of underground chamber system showing invert and obvert/top, major and minor HWLs, top of ground, system volume provided during major and minor events. UG storage to provide actual 2- and 100-year event storage requirements.

  In regard to all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective.
  Modeling can be provided to ensure capacity for both storm and sanitary sewers for the proposed development by City's Water Distribution Dept. – Modeling Group, through PM and upon request.

- Please note that the minimum orifice dia. For a plug style **ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s** in order to reduce the likelihood of plugging.

- Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A **topographical plan of survey** shall be provided as part of the submission and a note provided on the plans.
- Please provide a **Pre-Development Drainage Area Plan** to define the pre-development drainage areas/patterns. **Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution**.
- **If rooftop control** and storage is proposed as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a **Roof Drain Plan** as part of the submission.
- If **Window wells** are proposed, they are to be indirectly connected to the footing drains. A detail of window well with indirect connection is required, as is a note at window well location speaking to indirect connection.
- There must be at least **15cm of vertical clearance** between the spill elevation and the ground elevation at the building envelope that is in proximity of the flow route or ponding area. The exception in this case would be at reverse sloped loading dock locations. At these locations, a minimum of 15cm of vertical clearance must be provided below loading dock openings. Ensure to provide discussion in report and ensure grading plan matches if applicable.

Storm Sewer:

- A 900mm dia. CONC storm sewer (1987) is available within Gloucester Street**.**

Sanitary Sewer Maclaren St:

- A 250 mm dia. PVC Sanitary sewer (1990) is available within Gloucester Street**.**
- Please provide the new Sanitary sewer discharge and we confirm if sanitary sewer main has the capacity. An analysis and demonstration that there is sufficient/adequate residual capacity to accommodate any increase in wastewater flows in the receiving and downstream wastewater system is required to be provided. Needs to be demonstrated that there is adequate capacity to support any increase in wastewater flow.
- Please apply the wastewater design flow parameters *in Technical Bulletin PIEDTB-2018-01.*
- Sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) *Monitoring Devices*.
- A backwater valve is required on the sanitary service for protection.

Water :

- A 736mm PE backbone watermain (1999) is located within Gloucester Street. (**No Connection is permitted, please see the additional notes below**)
- A 305 mm dia. DI watermain (1986) is available within Gloucester Street**.**
- Existing residential service to be blanked at the main.
- **Water Supply Redundancy:** Residential buildings with a basic day demand greater than 50m^3/day (0.57 L/s) are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the *Ottawa Design Guidelines – Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration.*
- Please **review Technical Bulletin ISTB-2018-0**, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A **hydrant coverage figure** shall be

provided and **demonstrate there is adequate fire protection for the proposal**. Two or more public hydrants are anticipated to be required to handle fire flow.

- Boundary conditions are required to confirm that the require fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development. Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons. Please provide the following information to the City of Ottawa via email to request water distribution network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions.
    1. Type of Development and Units
    2. Site Address
    3. A plan showing the proposed water service connection location.
    4. **Average Daily Demand** (L/s)
    5. **Maximum Daily Demand** (L/s)
    6. **Peak Hour Demand** (L/s)
    7. **Fire Flow** (L/min)

[*Fire flow demand requirements shall be based on **Fire Underwriters Survey (FUS)** Water Supply for Public Fire Protection 1999*]
[Fire flow demand requirements shall be based on ISTB-2021-03]
Note: The OBC method can be used if the fire demand for the private property is less than 9,000 L/min. If the OBC fire demand reaches 9000 L/min, then the FUS method is to be used. Exposure separation distances shall be defined on a figure to support the FUS calculation and required fore flow (RFF).

1. **Hydrant capacity shall be assessed to demonstrate the RFF can be achieved**. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

Backbone watermain Note

- A 736mm PE backbone watermain (1999) is located within Gloucester Street. Please note that to ensure the integrity of the nearby watermain the applicant may be required to develop a Vibration and Settlement Monitoring Program. A Vibration and settlement Monitoring Specialist Engineer shall undertake monitoring, develop a **vibration and settlement monitoring plan**, and **prepare a protection plan**, an **emergency response plan**, ensure conformance and shall issue certificates of conformance. The Vibration and settlement Monitoring Specialist Engineer shall be a licensed engineer in the Province of Ontario with a minimum of five years of experience in the field of Vibration and settlement monitoring. Vibration and settlement monitors are to be to be placed directly on the watermain. The maximum peak particle velocities are to be in accordance with Table 1 of the City of Ottawa Specification F-1201.

Snow Storage:

1. Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patters or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy

driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site please indicate this on the plan(s).

Gas pressure regulating station

A gas pressure regulating station may be required depending on HVAC needs (typically for 12+ units). Be sure to include this on the Grading, Site Servicing, SWM and Landscape plans. This is to ensure that there are no barriers for overland flow routes (SWM) or conflicts with any proposed grading or landscape features with installed structures and has nothing to do with supply and demand of any product.

Regarding Quantity Estimates:

Please note that external Garbage and/or bicycle storage structures are to be added to QE under Landscaping as it is subject to securities.In addition, sump pumps for Sanitary and Storm laterals and/or cisterns are to be added to QE under Hard items as it is subject to securities, even though it is internal and is spoken to under SWM and Site Servicing Report and Plan.

Permits and Approvals:

- Please note that this project will be subject to an Environmental Compliance Approval (ECA) for Private Sewage Works. (Any connection to a combined Sewer system required the Ministry (MECP) approval)

Required Engineering Plans and Studies:

PLANS:

- Existing Conditions and Removals Plan
- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan
- Roof Drainage Plan (If rooftop utilized as a SWM component)
- Foundation Drainage System Detail (if applicable)
- Topographical survey

REPORTS:

- Site Servicing and Stormwater Management Report
- Geotechnical Study/Investigation
- Slope Stability Assessment Reports (if required, please see requirements below)
- Noise Control Study
- Phase I ESA
- Phase II ESA (Depending on recommendations of Phase I ESA)
- RSC (Record of the site Conditions)
- ECA (If the SWM facility services two parcels)
- Site lighting certificate
- Wind analysis
- Shadow Study
- Vibration and settlement monitoring and protection plan for 736mm Backbone watermain

Please refer to the **City of Ottawa Guide to Preparing Studies and Plans [Engineering]:** Specific information has been incorporated into both the Guide to Preparing Studies and Plans for a site plan. The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.
Added to the general information for servicing and grading plans is a note that an O.L.S. should be engaged when reporting on or relating information to property boundaries or existing conditions. The importance of engaging an O.L.S. for development projects is emphasized.

Phase One Environmental Site Assessment:

- A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.
- The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.
- Official Plan Section 4.8.4:

https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-4-review-development-applications#4-8-protection-health-and-safety

Geotechnical Investigation:

- A Geotechnical Study/Investigation shall be prepared in support of this development proposal.
- Reducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long term damages associated with lowering the groundwater in this area.
- Geotechnical Study shall be consistent with the **Geotechnical Investigation and Reporting Guidelines for Development Applications**.

https://documents.ottawa.ca/sites/documents/files/geotech_report_en.pdf

Slope Stability Assessment Reports

- A report addressing the stability of slopes, prepared by a qualified geotechnical engineer licensed in the Province of Ontario, should be provided wherever a site has slopes (existing or proposed) steeper than 5 horizontal to 1 vertical (i.e., 11 degree inclination from horizontal) and/or more than 2 metres in height.
- A report is also required for sites having retaining walls greater than 1 metre high, that addresses the global stability of the proposed retaining walls.
  https://documents.ottawa.ca/en/document/slope-stability-guidelines-development-applications

Noise Study:

- A **Transportation Noise Assessment** is required as the subject development is located within 100m proximity of an Arterial Road
- A **Stationary Noise Assessment** is required in order to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines.

https://documents.ottawa.ca/sites/default/files/documents/enviro_noise_guide_en.pdf

Wind analysis:
When greater than 9 storey in height Wind Study for all buildings/dwellings.

1. A wind analysis must be prepared, signed and stamped by an engineer who specializes in pedestrian level wind evaluation. Where a wind analysis is prepared by a company which do not have extensive experience in pedestrian level wind evaluation, an independent peer review may be required at the expense of the proponent.

Terms of Reference: Wind Analysis (ottawa.ca)

Shadow Study
When greater than 9 storey in height, a Shadow Study required for all buildings/dwellings.

Exterior Site Lighting:

1. Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Fourth (4th) Review Charge:
Please be advised that additional charges for each review, after the 3rd review, will be applicable to each file. There will be no exceptions.

Construction approach – Please contact the Right-of-Ways Permit Office Tmconstruction@ottawa.ca early in the Site Plan process to determine the ability to construct site and copy File Lead on this request.

Please note that these comments are considered preliminary based on the information available to date and therefore maybe amended as additional details become available and presented to the City. It is the responsibility of the applicant to verify the above information. The applicant may contact me for follow-up questions related to engineering/infrastructure prior to submission of an application if necessary.

Community Comments – Mary Huang

- Are there any family sized units, and what is your position on accessibility? Are you considering universal design? What is the nature of the rezoning that you are requesting?
    - *RE: Response from applicant team to community questions:* The unit mix is not finalized yet but I believe that we do have a small number of three-bedroom units. We are following OBC standards with 15% of units being accessible and adaptable. 15% of each unit type are build to OBC Standards.
- OBC standards are weak at 15%, with an aging population there is a need for more accommodation. Consider wider corridors and doorways as they would be difficult to change afterwards.
- Consider barrier free showers, potentially designate some floors for this. These may be useful for able-body people as well.
- I hope Claridge looks into the possibility of including some affordable units.
- The majority of new buildings only hold studio and two-bedroom units, family units are needed as there are very few currently existing.

Appendix B
Water Servicing

Zoning: R5B[482] F(3.0)

2022-06-29

100 GLOUCESTER

PARKING SUMMARY

	GROSS FLOOR AREA		CAR PARKING PROVIDED
	sq²	m²	
P3	14 773	1 372,46	33
P2	14 773	1 372,46	33
P1	14 773	1 372,46	33
TOTAL	**44 319**	**4 117**	**99**

BUILDING SUMMARY

STOREYS	GROSS FLOOR AREA (m²)		AMENITIES		COMMERCIAL		SERVICES		CIRCULATION/MEC/ ELEC AREA		GROSS LESSABLE AREA (included commercial)		EFFICIENCY (%)	UNITS
	m²	pi²	m²	pi²	m²	pi²	m²	pi²	m²	pi²	m²	pi²		
GR	**782**	**8 423**	217	2 336	128	1 378	132	1 421	**127**	**1 371**	**395**	**4 253**	**50%**	**3**
2	**802**	**8 633**	29	307					**148**	**1 591**	**626**	**6 735**	**78%**	**13**
3,4,5	**2 731**	**29 392**							**410**	**4 417**	**2 320**	**24 975**	**85%**	**51**
6	**958**	**10 308**							**132**	**1 422**	**826**	**8 886**	**86%**	**20**
7	**876**	**9 430**							**129**	**1 389**	**747**	**8 042**	**85%**	**17**
8 to 27	**15 000**	**161 459**							**2256**	**24 286**	**12 744**	**137 173**	**85%**	**220**
TOTAL	**21 149**	**227 644**	**246**	**2 643**	**#**	**128**	**1 378**	**132**	**1 421**	**3075**	**34 476**	**17 657**	**190 063**	**83%**	**324**

UNIT SUMMARY

	GR	2	3,4,5	6	7	8 to 27	TOTAL	% TYPES	Target
TOWNHOME (A)	0	0	0	0	0	0	**0**	**0,0%**	
STUDIO (B)	0	3	18	12	9	0	**42**	**13,0%**	10-15%
1 BEDROOM (C)	1	7	30	8	6	140	**192**	**59,3%**	50%-60%
2 BEDROOMS (D)	2	3	3	0	2	60	**70**	**21,6%**	20%-30%
2+ BEDROOMS (E)	0	0	0	0	0	20	**20**	**6,2%**	5%
TOTAL	**3**	**13**	**51**	**20**	**17**	**220**	**324**		

ARCHITECTES:
EVOQ
1435, RUE SAINT-ALEXANDRE, BUREAU 1000
MONTRÉAL (QUÉBEC) H3A 2G4
T. 514-393-9490 F. 514-393-9498
info@evoqarchitecture.com

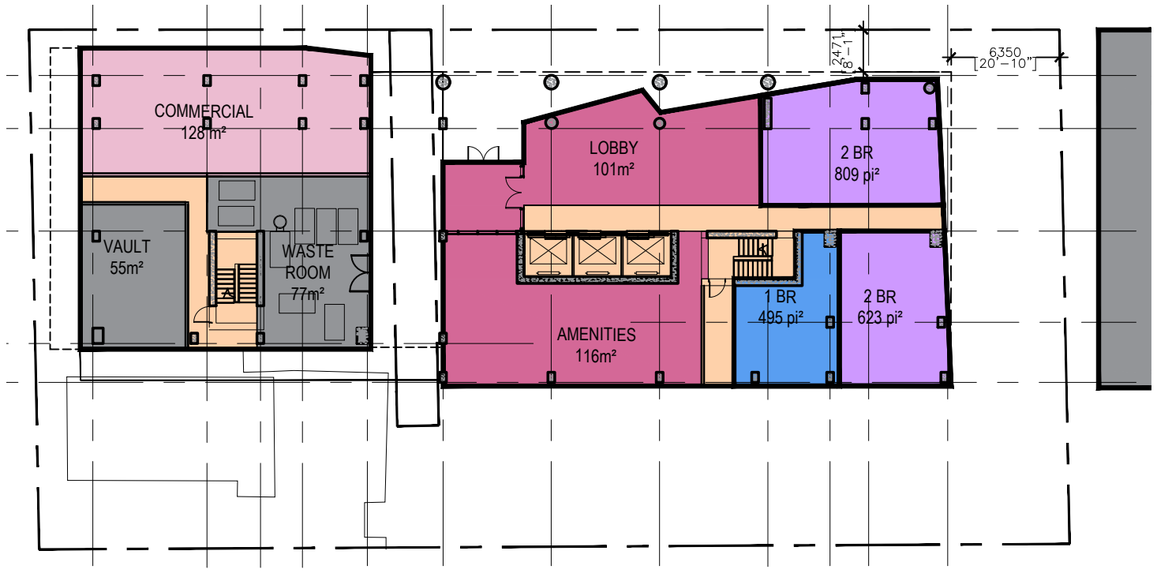
PROJET:
100 GLOUCESTER

TITRE DU DESSIN:
SUMMARY

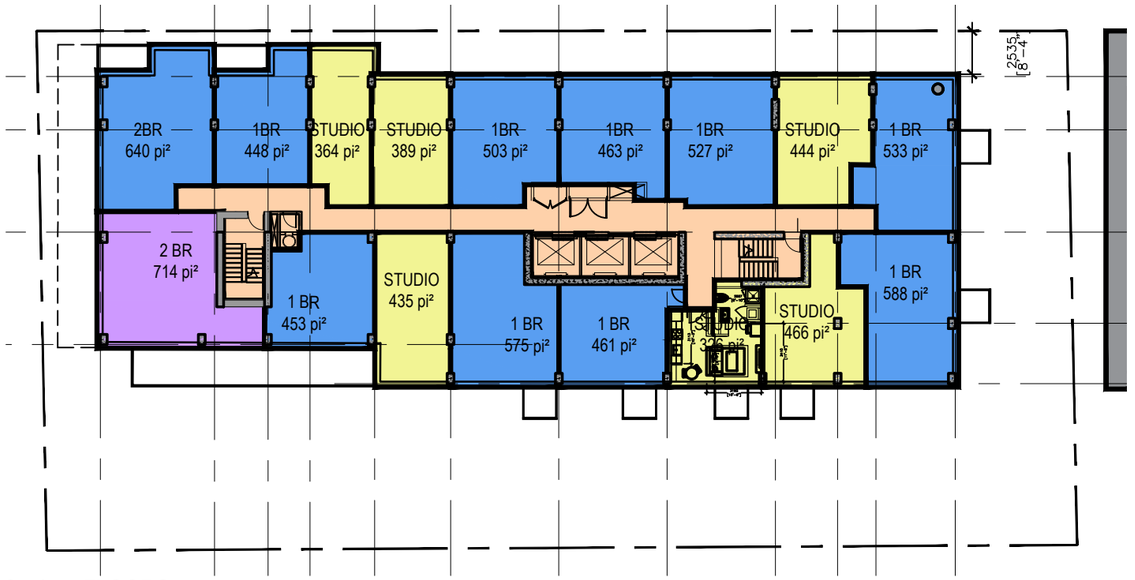
CONÇU:	XX	APPROUVÉ:	XX
DESSINÉ:	XX	DATE:	AAAA-MM-JJ
VÉRIFIÉ:	XX	ÉCHELLE:	0:000

Nº PROJET: 0000-00

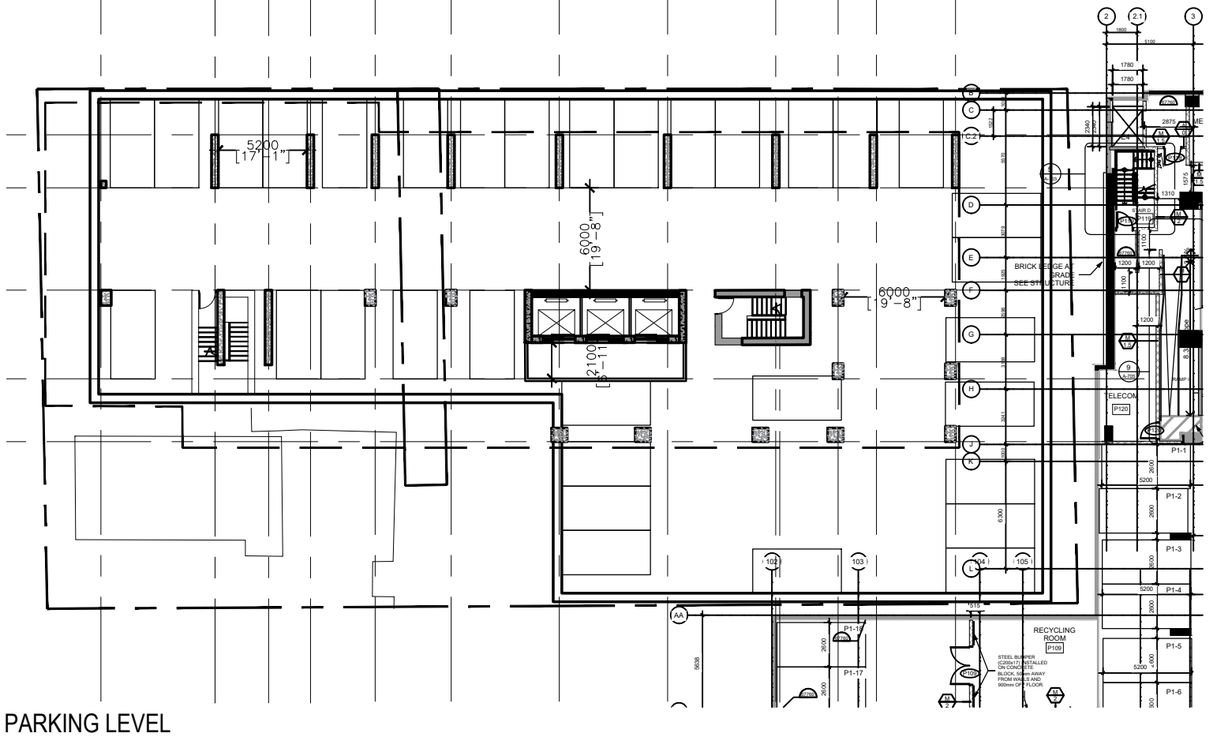
Nº DESSIN: A-000



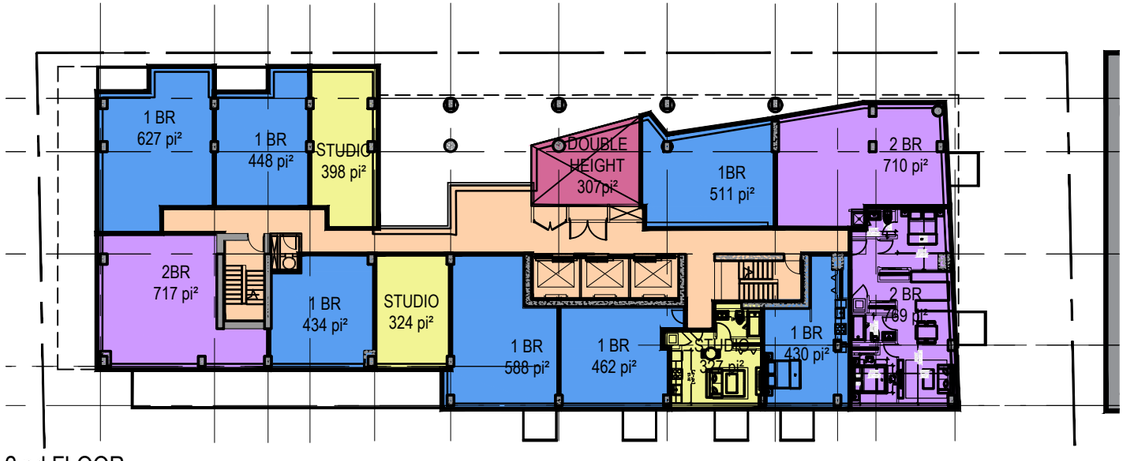
GROUND FLOOR



3 - 4 - 5 FLOORS



PARKING LEVEL



2 nd FLOOR

ARCHITECTES:
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1435, RUE SAINT-ALEXANDRE, BUREAU 1000
MONTRÉAL (QUÉBEC) H3A 2G4
T. 514-393-9490 F. 514-393-9498
info@evoqarchitecture.com

PROJET:
100 GLOUCESTER

TITRE DU DESSIN:
FLOOR PLANS

CONÇU:	XX	APPROUVÉ:	XX
DESSINÉ:	XX	DATE:	AAAA-MM-JJ
VÉRIFIÉ:	XX	ÉCHELLE:	1/350

N° PROJET: 0000-00

N° DESSIN: A-000

7th FLOOR

6th FLOOR

ARCHITECTES:
EVOQ
1435, RUE SAINT-ALEXANDRE, BUREAU 1000
MONTRÉAL (QUÉBEC) H3A 2G4
T. 514-393-9490 F. 514-393-9498
info@evoqarchitecture.com

PROJET:
100 GLOUCESTER

TITRE DU DESSIN:
FLOOR PLANS

CONÇU:	XX	APPROUVÉ:	XX
DESSINÉ:	XX	DATE:	AAAA-MM-JJ
VÉRIFIÉ:	XX	ÉCHELLE:	0:000

Nº PROJET: 0000-00

Nº DESSIN: A-000

Table 1
Water Demand

Occuupancy	Unit Type: Retail Area (m^2)	Studio	1 Bed Apartment	2 Bed Apartment	2 Bed + Apartment	Total Units	Total Population	Total Demand (L/s): Avg Day	Max. Daily	Peak Hour
100 Gloucester Street										
Residential		42	192	70	20	324	537	1.74	4.35	9.57
Commercial	128							0.05	0.07	0.13
Total			192	70				1.79	4.42	9.70

Design Parameters:

-Studio	1.4	persons/unit	**City of Ottawa Water Distribution Guidelines**
- 1 Bed Apartment	1.4	persons/unit	
- 2 Bed Apartment	2.1	persons/unit	
- 2 Bed + Apartment	3.1	persons/unit	
- Average Domestic Flow	280	L/c/day	
- Commercial Space	125	L/seat/day*	**Daily Demands from OBC Table 8.2.1.3**

(*assumed 1 seat/4m^2)

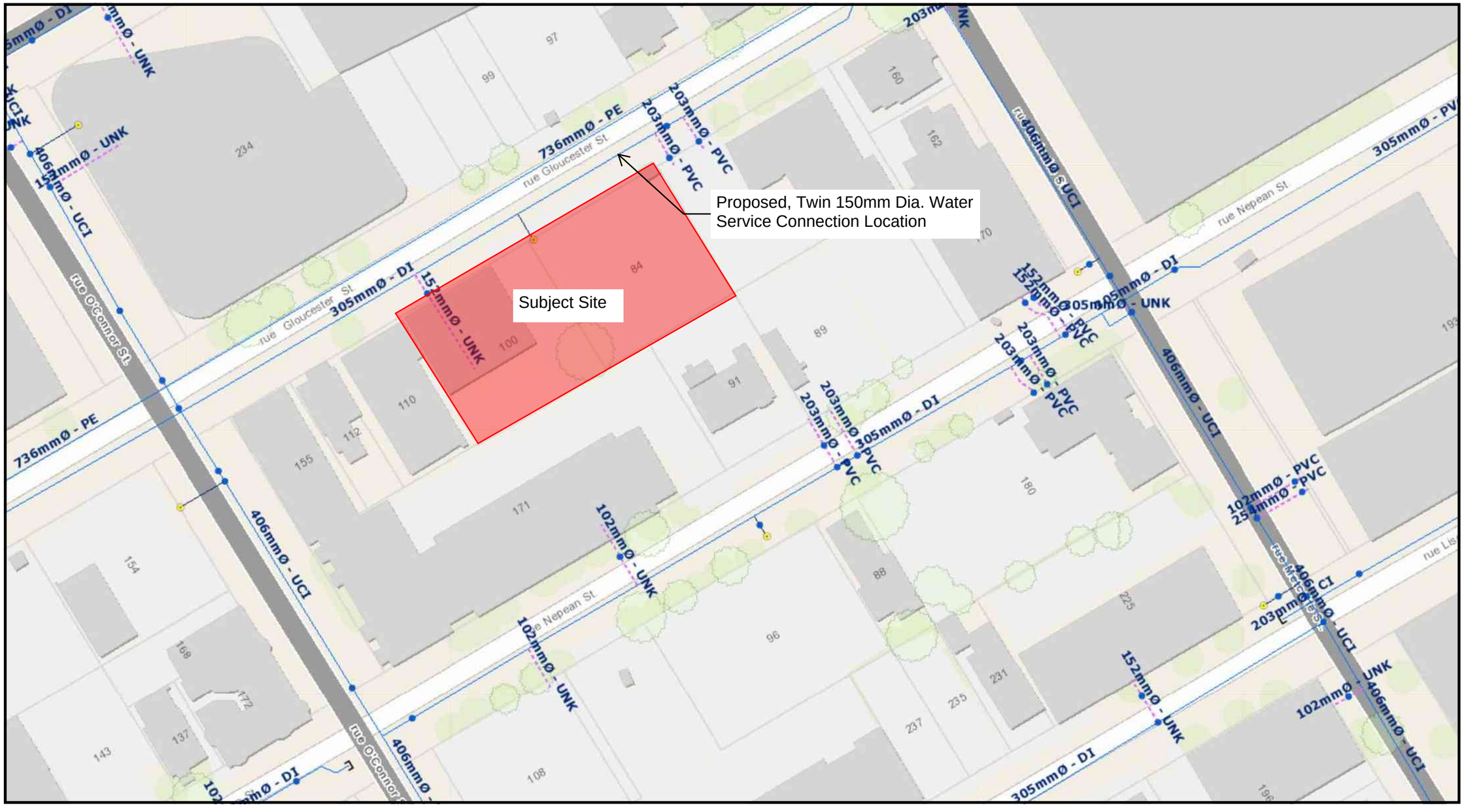
Residential Peaking Factors City of Ottawa Water Distrubution Guidelines:

Conditions	Peaking Factor		Units
Maximum Day	2.5	x avg day	L/c/day
Peak Hour	2.2	x max day	L/c/day

Commercial Peaking Factors City of Ottawa Water Distribution Guidelines

Conditions	Peaking Factor		Units
Maximum Day	1.5	x avg day	L/c/day
Peak Hour	1.8	x max day	L/c/day

100 Gloucester Street - Proposed Water Service Connection



FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122173
Project Name: 100 Gloucester St.
Date: 11/7/2022
Input By: Ryan Good, C.E.T
Reviewed By: Anthony Mestwarp, P.Eng

Legend: Input by User; No Information or Input Required

Building Description: 27 Storey Building with 1 Storey Podium
Type I - Fire resistive construction (2 hrs)

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	958			
		Number of Floors/Storeys	27			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**1,437**	
	F	**Base fire flow without reductions**				**5,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**4,250**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-1,068**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	13000	50%		
				Cumulative Total	**-25%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**3,188**
		East Side	3.1 - 10 m		20%	
		South Side	10.1 - 20 m		15%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**75%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**6,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**100**
				or	USGPM	1,585

GLOUCESTER STREET

Approximate Crown of Road

Approximate Crown of Road

SPEED BUMP

15.12m

SITE BENCHMARK
FH TOP OF SPINDLE
ELEV = 71.83

110 GLOUCESTER
EXISTING 3 STORY APARTMENT
FFE=71.59

HIGHRISE PROFILE

27 STORY BUILDING
100 GLOUCESTER
FFE = 71.40

HIGHRISE PROFILE

27 STORY BUILDING
84 GLOUCESTER
FFE = 71.40

HIGHRISE PROFILE

70 GLOUCESTER
EXISTING 28 STORY BUILDING
FFE=71.56

EXISTING BALCONY

EXISTING GRATE

EXISTING RETAINING WALL

EXISTING GAS METER

EXISTING DOOR SILL ELEVATION=72.88

UNDERGROUND PARKING LIMIT

EXISTING UNDERGROUND PARKING STALLS

1.669

2.64m

EXISTING INGROUND POOL

9.42m

6.76m

Door Sill Elevation=71.70

EXISTING RETAINING WALL

EXISTING HAND RAIL

EXISTING RETAINING WALL

EXISTING RETAINING WALL

PROPERTY LINE

BUILDING ENTRANCE

2.64m OFFSET DIMENSION

NOVATECH
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Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
100 GLOUCESTER

FUS SEPERATION

SCALE 1 : 250

DATE NOV 2022 | JOB 122173 | FIGURE SEP

SHT11X17.DWG - 279mmX432mm

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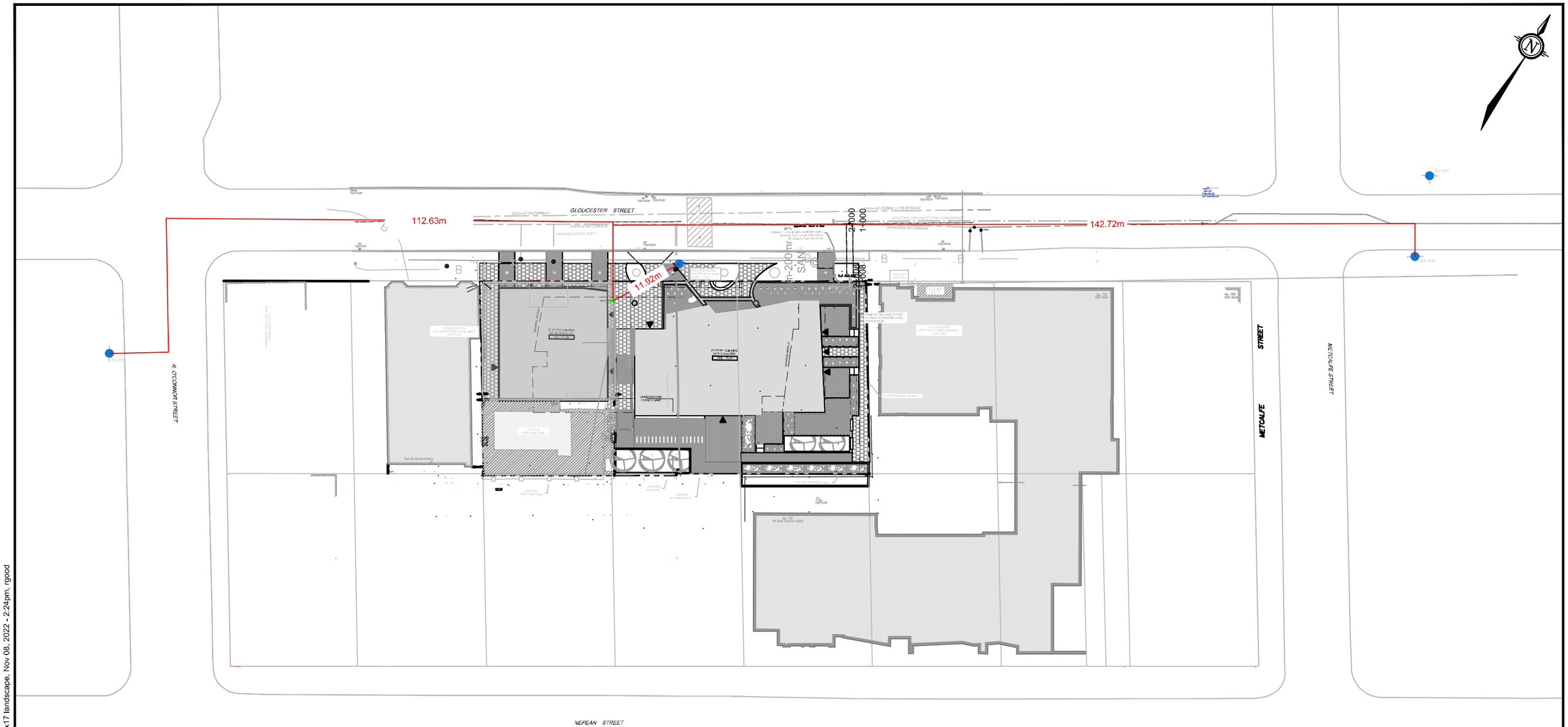

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Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
100 GLOUCESTER

COVERAGE PLAN

SCALE 1 : 600 (0, 6, 12, 18, 24)
DATE NOV 2022
JOB 122173
FIGURE HYD

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Appendix C
Sanitary Servicing

GLOUCESTER STREET

SPEED BUMP

Approximate Crown of Road

Approximate Crown of Road

EX 250mmØ SAN @ 0.97%

EX SANMH 105

EX 250mmØ SAN @ 0.64%

SANMH 100

EX 250mmØ SAN @ 0.64%

4.4m-200mmØ SAN @ 1.00%

SITE BENCHMARK
FH TOP OF SPINDLE
ELEV = 71.83

EXISTING BALCONY

EXISTING GRATE

SANITARY SERVICE CAPPED
1m FROM FOUNDATION WALL.
SAN INV=67.68

110 GLOUCESTER
EXISTING 3 STORY APARTMENT
FFE=71.59

HIGHRISE PROFILE

27 STORY BUILDING
100 GLOUCESTER
FFE = 71.40

0.18
SAN-01
324 537

27 STORY BUILDING
84 GLOUCESTER
FFE = 71.40

HIGHRISE PROFILE

70 GLOUCESTER
EXISTING 28 STORY BUILDING
FFE=71.56

EXISTING DOOR SILL
ELEVATION=71.68

UNDERGROUND
PARKING LIMIT

EXISTING RETAINING WALL

EXISTING
INGROUND POOL

Door Sill Elevation=71.70

EXISTING RETAINING WALL

EXISTING
HAND RAIL

EXISTING
RETAINING WALL

EXISTING RETAINING WALL

LEGEND

- SANITARY DRAINAGE AREA
- 0.18 / SAN-01 / 324 | 537 — DRAINAGE AREA (ha)
  DRAINAGE AREA ID
  NO. UNITS / TOTAL POPULATION
- PROPOSED SANITARY MANHOLE AND SEWER
- EXISTING SANITARY MANHOLE AND SEWER
- BUILDING ENTRANCE

NOVATECH
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Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
100 GLOUCESTER

SANITARY DRAINAGE AREA PLAN

SCALE 1 : 250 (0 2 4 6 8 10)

DATE NOV 2022 | JOB 122173 | FIGURE SAN

SHT11X17.DWG - 279mmX432mm

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SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122173
Project Name: 100 Gloucester Street
Date Prepared: 11/8/2022
Date Revised:
Input By: Ryan Good, C.E.T
Reviewed By: Anthony Mestwarp, P.Eng
Drawing Reference: 122173- SAN

Legend:
- PROJECT SPECIFIC INFO
- USER DESIGN INPUT
- CUMULATIVE CELL
- CALCULATED DESIGN CELL OUTPUT

LOCATION			DEMAND																	DESIGN CAPACITY							
			RESIDENTIAL FLOW									COMMERCIAL FLOW						EXTRANEOUS FLOW			PROPOSED SEWER PIPE SIZING / DESIGN						
AREA	FROM MH	TO MH	Studio	1 Bed Apartment	2 Bed Apartment	2 Bed + Apartment	POPULATION (in 1000's)	CUMULATIVE POPULATION (in 1000's)	PEAK FACTOR M	AVG POPULATION FLOW (L/s)	PEAKED DESIGN POP FLOW (L/s)	AREA (m^2)	CUMULATIVE AREA (m^2)	DESIGN COMMERICAL FLOW (L/s)	COMMERICAL PEAK FACTOR	PEAKED COMMERCIAL FLOW	Total Area (ha.)	Accum. Area (ha.)	DESIGN EXTRAN. FLOW (L/s)	TOTAL DESIGN FLOW (L/s)	PIPE LENGTH (m)	PIPE SIZE (mm) AND MATERIAL	PIPE ID ACTUAL (m)	ROUGH. (n)	DESIGN GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak Design / Qcap
SAN-01	BLDG	SANMH 100	42	192	70	20	0.537	0.537	3.96	1.74	6.88	128.000	128.000	0.05	1.00	0.05	0.18	0.18	0.06	6.99	4.4	200 PVC	0.203	0.013	1.00	34.2	1.06	20.4%

Design Parameters:

1. Residential Flows					
-Studio	1.4	Person/ Unit			**As per City of Ottawa Sewer Design Guidelines, 2012**
-1 Bed Apartment	1.4	Person/ Unit			
-2 Bed Apartment	2.1	Person/ Unit			
-2 Bed + Apartment	3.1	Person/ Unit			
2. Commercial Flow					
-Retail Area (451.95m^2)	125	L/seat/day			**As per OBC Section 8.2** (*assumed 1 seat/4m^2)
3. Q Avg capita flow	**280**	L/capita/day			**As per City of Ottawa - Technical Bulletin ISTB-2018-01**
4. M = Harmon Formula (maximum of 4.0)					**As per Harmon Formula**
5. K =	**1.0**				
6. Commercial Peak Factor	**1.0**				**As per City of Ottawa - Technical Bulletin ISTB-2018-01**
7. Peak Extraneous Flow =	**0.33**	**L/sec/ha**			

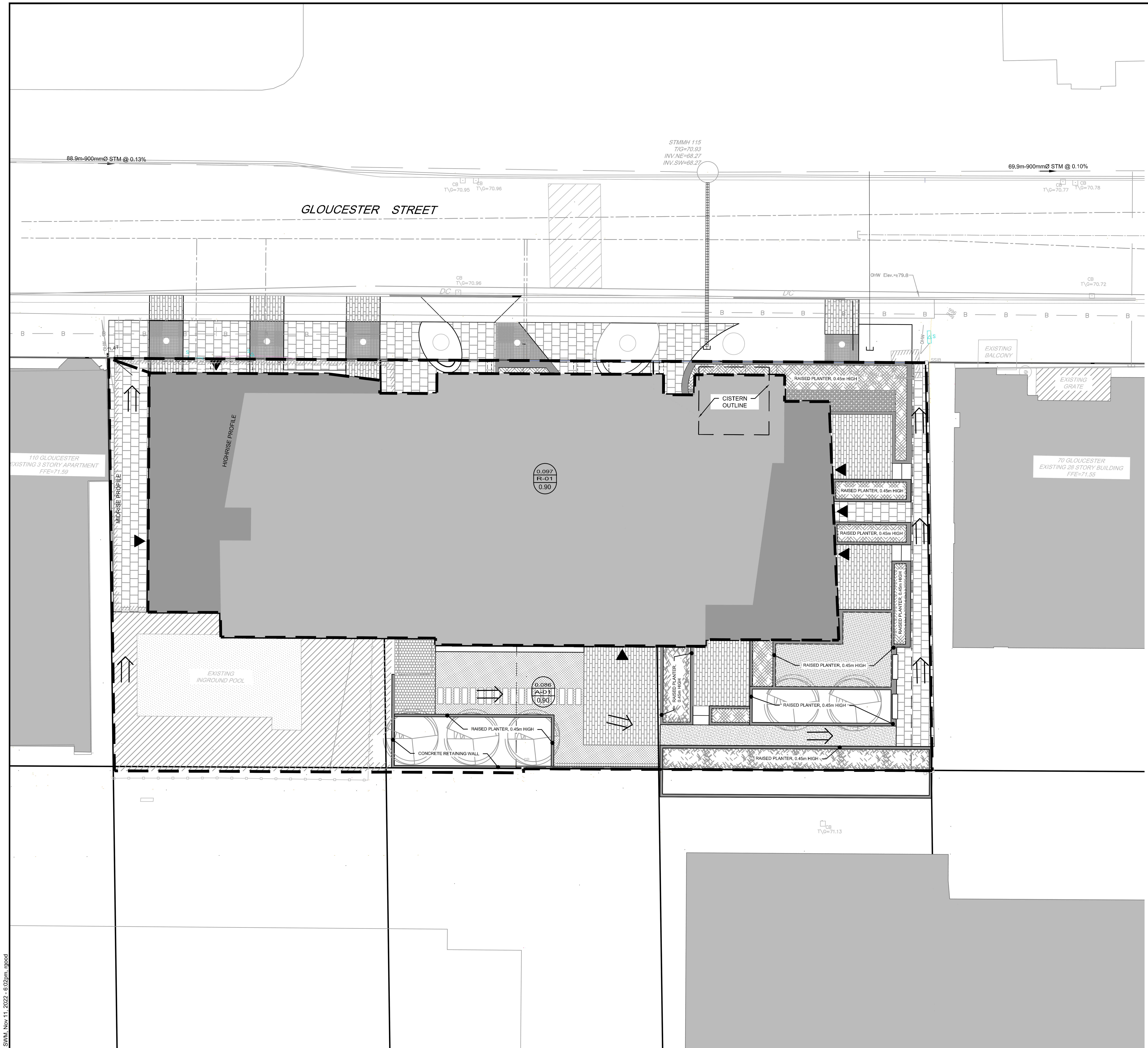
CAPACITY EQUATION

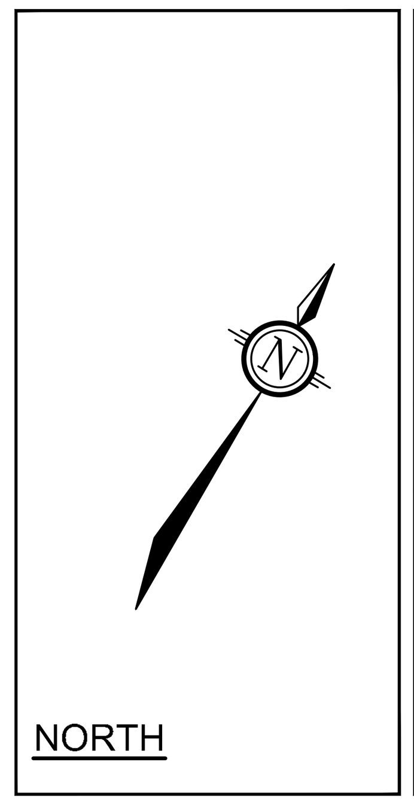
Q full= (1/n) A R^(2/3)S_o^(1/2)

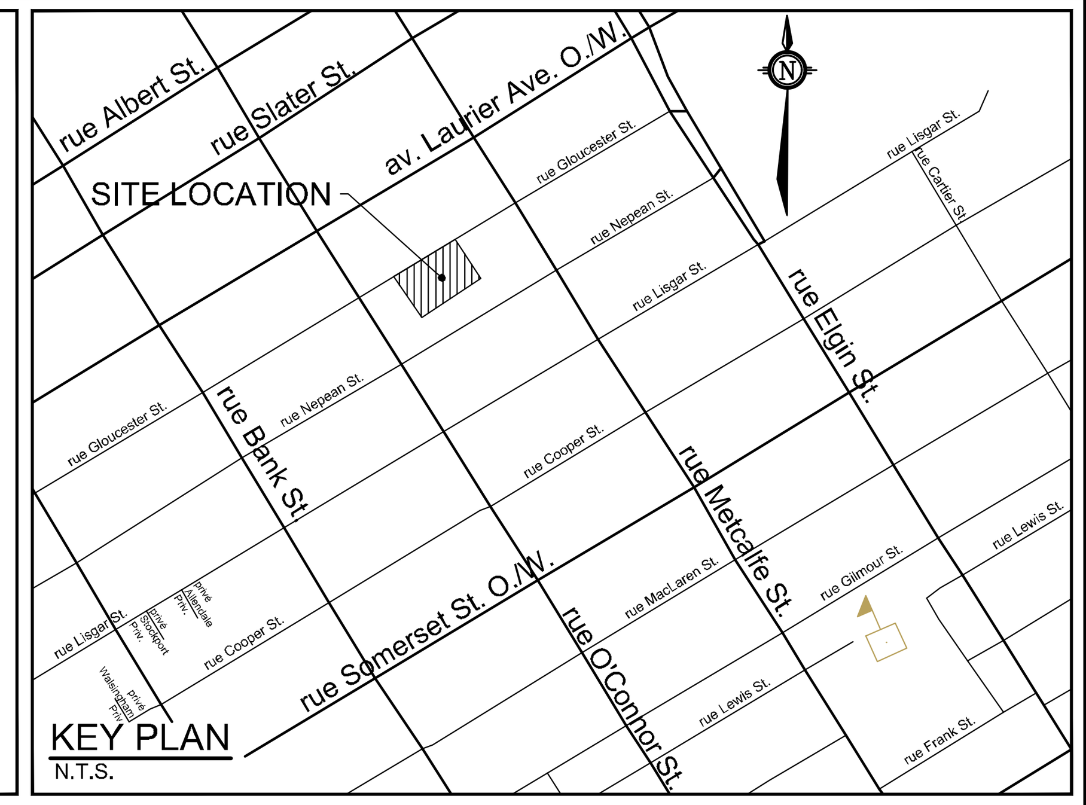
Where : Q full = Capacity (L/s)

n = Manning coefficient of roughness (0.013)
A = Flow area (m^2)
R = Wetter perimenter (m)
So = Pipe Slope/gradient

Appendix D
Storm Servicing







LEGEND

- STORM DRAINAGE AREA
- 0.395 / R-01 / 0.85 — DRAINAGE AREA (ha), DRAINAGE AREA ID, RUNOFF COEFFICIENT
- PROPOSED SANITARY MANHOLE AND SEWER
- EXISTING SANITARY MANHOLE AND SEWER
- BUILDING ENTRANCE

M:\2022\122173\CAD\Civil\122173-SWM.dwg, SWM, Nov 11, 2022 - 6:02pm, rgood

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

CLARIDGE HOMES

CLARIDGE HOMES
SUITE 2001,
210 GLADSTONE AVENUE,
OTTAWA , ONTARIO
K2P 0Y6.

CLARIDGE HOMES

No.	REVISION	DATE	BY
1.	XXXX	JAN1/10	XXX

SCALE: 1:150 (bar scale 0 2 4 6)

DESIGN: RJG
CHECKED: GJM
DRAWN: RJG/MF
CHECKED: ARM
APPROVED: GJM

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
84 & 100 GLOUCESTER STREET

DRAWING NAME
STORMWATER MANAGEMENT PLAN

PROJECT No. 122173-00
REV: REV # 1
DRAWING No. 122173-SWM

STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #:	122173
Project Name:	100 Gloucester Street
Date Prepared:	11/11/2022
Date Revised:	
Input By:	Ryan Good
Reviewed By:	Greg MacDonald
Drawing Reference:	122173-SWM

Legend:

PROJECT SPECIFIC INFO
USER DESIGN INPUT
CUMILATIVE CELL
CALCULATED DESIGN CELL OUTPUT
USER AS-BUILT INPUT

LOCATION			DEMAND												CAPACITY						
			AREA							FLOW					PROPOSED SEWER PIPE SIZING / DESIGN						
From MH	To MH	Area ID	Hardscape	Landscaping	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)			Peak Flow	TOTAL UNRESTRICTED PEAK FLOW (QDesign)	PIPE PROPERTIES					CAPACITY	FULL FLOW VELOCITY	TIME OF FLOW	QPEAK DESIGN / QFULL
										2yr	5yr	100yr			LENGTH	SIZE / MATERIAL	ID ACTUAL	ROUGHNESS	DESIGN GRADE				
			0.90	0.20	(ha)				(min.)				(L/s)	(L/s)	(m)	(mm / type)	(m)		(%)	(L/s)	(m/s)	(min.)	(%)
BLDG	EX STM,	A-01,R-01	0.18	0.00	0.18	0.90	0.46	0.46	10.00	76.81			35.21	**35.2**	13.3	250 PVC	0.254	0.013	1.00	62.0	1.22	0.18	56.8%
					0.00		0.00	0.00	10.00				0.00										
					0.00		0.00	0.00	10.00				0.00										

DEMAND EQUATION

Q = 2.78 AIR

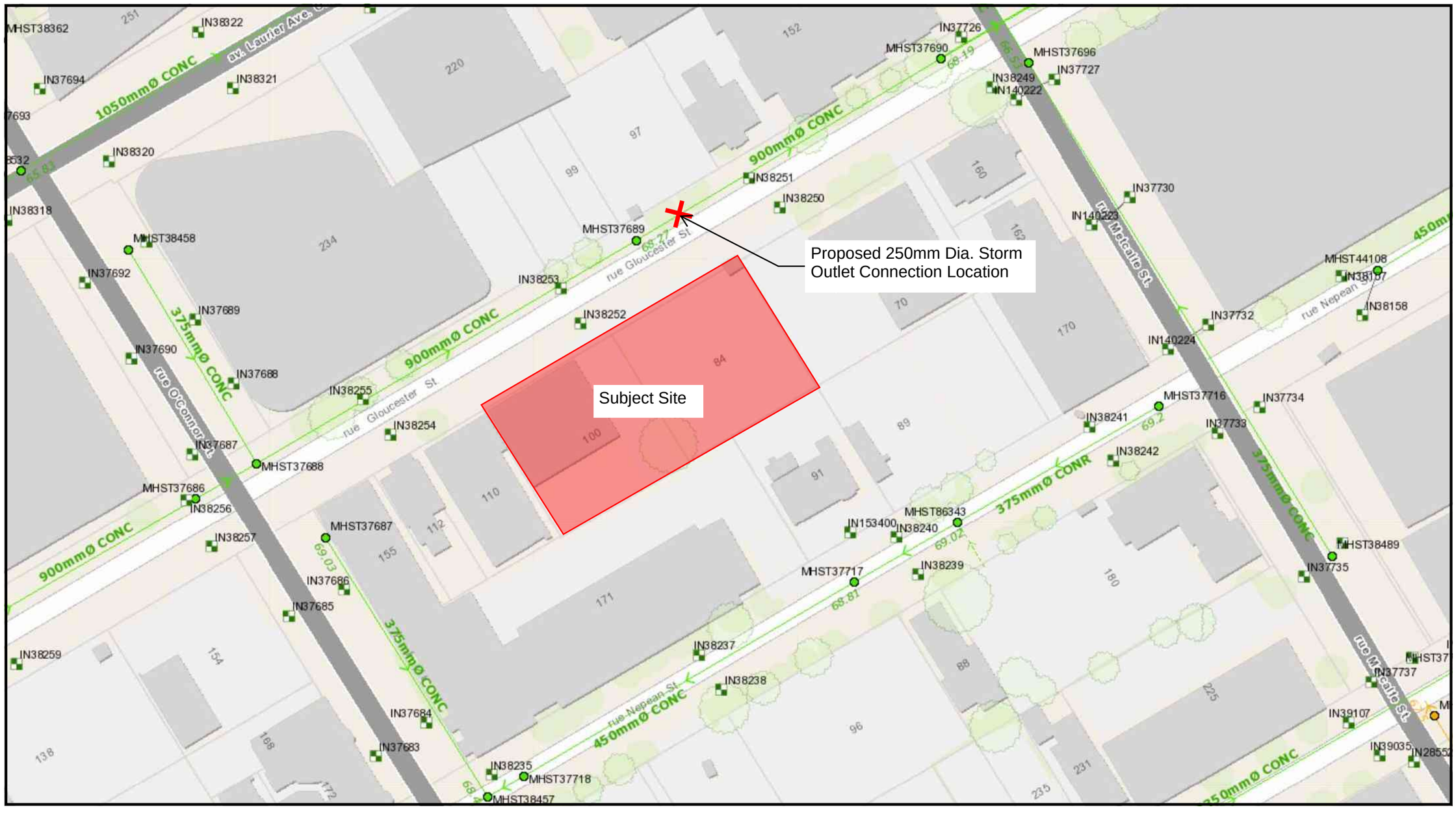
Where : Q = Peak flow in litres per second (L/s)
A = Area in hectares (ha)
R = Weighted runoff coefficient (increased by 25% for 100-year)
I = Rainfall intensity in millimeters per hour (mm/hr)
Rainfall Intensity (I) is based on City of Ottawa IDF data presented in the City of Ottawa Sewer Design Guidelines (Oct. 2012)

CAPACITY EQUATION

Q full= (1/n) A R^(2/3)So^(1/2)

Where : Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A = Flow area (m^2)
R = Wetter perimenter (m)
So = Pipe Slope/gradient

100 Gloucester Street - Proposed Storm Outlet Connection



Time to Peak Calculations - Existing Conditions

TABLE 1A: Time of Concentration (Uplands Overland Flow Method)

Area ID	Overland Flow						Channel Flow			Overall	
	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (Uplands (m/s)	Travel Time (min)	Length (m)	Velocity * (m/s)	Travel Time (min)	Time of Concentration (min)	Time to Peak (min)
PRE	31.12	71.52	71.16	1.2%	2.5	0.21	N/A	N/A	N/A	0.21	0.14

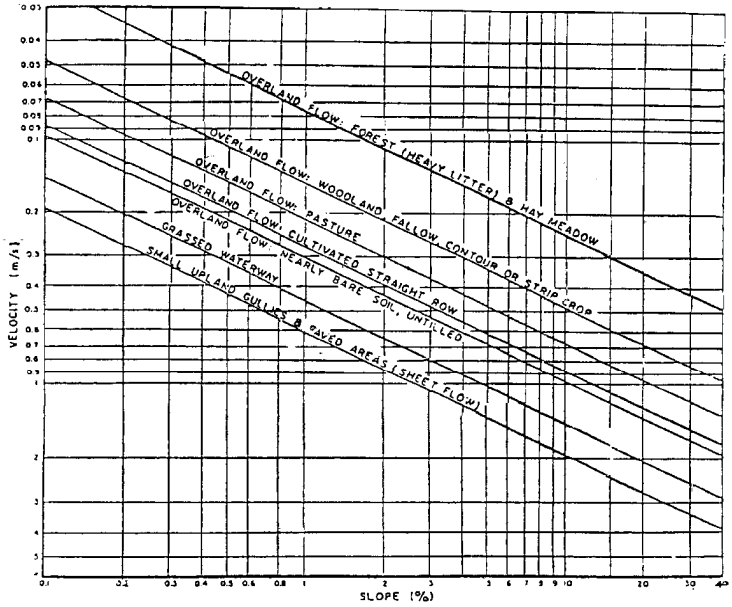


Figure A.5.2: Upland Method for Estimating Time of Concentration
(SCS National Engineering Handbook, 1971)

PROJECT #: 122173
PROJECT NAME: 100 Goucester Street
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: November, 2022

TABLE 2A: Pre-Development Runoff Coefficient "C" - PRE

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	Hard	0.183	0.90	0.90	1.00
0.183	Soft		0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

TABLE 2B: Pre-Development Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Gloucester Street	0.183	0.90	10	**35.2**	**47.7**	**90.8**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

TABLE 3A: Allowable Runoff Coefficient "C"

Area	"C"
Total	0.50
0.183	

TABLE 3B: Allowable Flows

Outlet Options	Area (ha)	"C"	Tc (min)	$Q_{5\ Year}$ (L/s)	Q_{ALLOW} (L/s)
Gloucester Street	0.183	0.50	10	**26.5**	**26.5**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

TABLE 12A: Post-Development Runoff Coefficient "C" - A-01,R-01

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.086	0.90		1.00	
0.183	Roof	0.097	0.90	0.90	1.00	1.00
	Soft	0.000	0.20		0.25	

TABLE 12B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01,R-01

0.183 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	0	167.22	76.69	26.50	50.19	0.00
	5	103.57	**47.50**	**26.50**	**21.00**	**6.30**
	10	76.81	35.22	26.50	8.72	5.23
	15	61.77	28.33	26.50	1.83	1.64

TABLE 12C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01,R-01

0.183 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	0	230.48	105.70	26.50	79.20	0.00
	5	141.18	64.74	26.50	38.24	11.47
	10	**104.19**	**47.78**	**26.50**	**21.28**	**12.77**
	15	83.56	38.32	26.50	11.82	10.64
	20	70.25	32.22	26.50	5.72	6.86

TABLE 12D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01,R-01

0.183 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	5	242.70	123.67	26.50	97.17	29.15
	10	178.56	90.98	26.50	64.48	38.69
	15	**142.89**	**72.81**	**26.50**	**46.31**	**41.68**
	20	119.95	61.12	26.50	34.62	41.54
	25	103.85	52.92	26.50	26.42	39.62

TABLE 12E: 100+20 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01,R-01

0.183 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR +20%	10	214.27	109.18	26.50	82.68	49.61
	15	171.47	87.37	26.50	60.87	54.79
	20	**143.94**	**73.34**	**26.50**	**46.84**	**56.21**
	25	124.62	63.50	26.50	37.00	55.50
	30	110.24	56.17	26.50	29.67	53.41

* Storage Volumes calculated using 50% of the allowable release rate as per City of Ottawa Standards.

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

TABLE 12F: Structure information - A-01,R-01

Structures	Size Dia.(mm)	Area (m^2)	T/G	Inv IN	Inv OUT	Inv Overflow
STORAGE TANK	N/A	26.00	71.21	N/A	69.04	70.00

TABLE 12G: Storage Provided - A-01,R-01

Area A-01,R-01: Storage Table				
Elevation (m)	System Depth (m)	TANK Volume (m^3)	Underground Volume (m^3)*	
68.400	0.00	0.00	0.00	
68.500	0.10	2.60	2.60	
68.600	0.20	5.20	5.20	
68.700	0.30	7.80	7.80	
68.800	0.40	10.40	10.40	
68.900	0.50	13.00	13.00	
69.000	0.60	15.60	15.60	
69.100	0.70	18.20	18.20	
69.200	0.80	20.80	20.80	
69.300	0.90	23.40	23.40	
69.400	1.00	26.00	26.00	
69.500	1.10	28.60	28.60	
69.600	1.20	31.20	31.20	
69.700	1.30	33.80	33.80	
69.800	1.40	36.40	36.40	
69.900	1.50	39.00	39.00	
70.000	1.60	41.60	41.60	
70.100	1.70	44.20	44.20	
70.200	1.80	46.80	46.80	
70.300	1.90	49.40	49.40	
70.400	2.00	52.00	52.00	
70.500	2.10	54.60	54.60	
70.600	2.20	57.20	57.20	
70.700	2.30	59.80	59.80	
70.800	2.40	62.40	62.40	
70.900	2.50	65.00	65.00	**Top Of Tank**
71.000	2.60	65.11	65.11	
71.100	2.70	65.23	65.23	
71.200	2.80	65.34	65.34	
71.210	2.81	65.35	65.35	**Top of Grate**

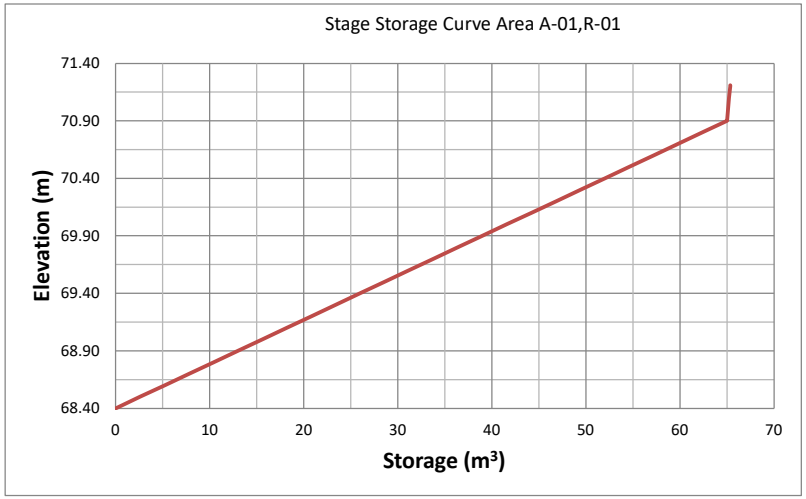


TABLE 5G: FLOW SUMMARY- STM TANK

Control Device *PUMP*					
Design Event	**Flow (L/S)**	**Head (m)**	**Elev (m)**	**Outlet dia. (mm)**	**Required Volume (m^3)**
1:2 Year	26.50	0.24	68.64	250.00	6.30
1:5 Year	26.50	0.39	68.89	250.00	12.77
1:100 Year	26.50	1.30	70.00	250.00	41.68
1:100+20% Year	26.50	1.76	70.56	250.00	56.21

*NOTE: Design head taken from the permanent water elevation.

Table 7: Post-Development Stormwater Mangement Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	Oulet Location	Control	2 Year Storm Event				5 Year Storm Event				100 Year Storm Event			
					Release (L/s)	Head (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Head (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Head	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)
A-01,R-01	0.183	0.90	Gloucester Street	0	26.50	0.24	6.30	65.35	26.50	0.39	12.77	65.35	26.50	1.30	41.68	65.35
Total					**26.5**				**26.5**				**26.5**			
Allowable					**26.5**				**26.5**				**26.5**			