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Assessment of Adequacy of Public Services 267 O'Connor Street, Ottawa ON



Assessment of Adequacy of Public Services 267 O'Connor Street, Ottawa ON

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1.0 INTRODUCTION

1.1 Background

In 2019, J.L. Richards & Associates Limited (JLR) was retained by Taggart Realty Management (TRM) to prepare a Site Servicing Report (SSR) and detailed design of municipal infrastructure in support of twin Condominium Towers sited at 267 O'Connor Street, in the City of Ottawa. This SSR had been prepared as supporting documentation to a joint Official Plan Amendment, Zoning By-Law Amendment (OPA/ZBLA) and Site Plan Control Application (SPCA) which subsequently was submitted for only the OPA/ZBLA and reviewed under the Urban Design review Panel (UDRP) process. This Revised Report has been revised to capture the requirements of an Assessment of Adequacy of Public Services (AAPS) and has also been prepared to outline the design objectives and criteria, servicing constraints and strategies for developing the subject lands with water, wastewater, storm and stormwater management services in accordance with:

- i. the Site Servicing Study Terms of Reference current as of this writing for Development Applications in the City of Ottawa (City);
- ii. the Ottawa Sewer Design Guidelines (2012) and associated Technical Bulletins;
- iii. the discussions held during a pre-consultation meeting with City staff, and
- iv. subsequent Email correspondences with the City.
- v. Consolidation of Official Plan and Zoning Amendment Comments 267 O'Connor Street

A copy of the Site Plan and Legal Plan is included in Appendix A while a copy of the preconsultation meeting and follow-up Email correspondence has been included in Appendix B.

1.2 Site Description and Background

The subject property is located within the urban limits of the City of Ottawa, specifically in the southeastern quadrant of the O'Connor Street and MacLaren Street intersection. As illustrated on Figure 1 (below), the subject site currently consists of an existing building and adjacent parking sited onto six (6) parcels. The site currently consists of a combination of asphalt and building which makes the subject property fully impervious.



Figure 1: Site Plan Location

The six (6) subject parcels when combined account for ±3,574 m2. Under the Zoning By-Law (ZBL), the subject properties are zoned R4UD[479].

TRM proposes to develop Twin residential Towers as follows:

- The Phase 2 Tower (southern) consists of a 25-storey building (229 units) fronting on Gilmour Street, and
- The Phase 1 Tower (northern) would consist of a 27-storey building (271 units) fronting onto MacLaren Street.

The Site Plan (Appendix A) provides a breakdown of the type of units for both towers.

1.3 Existing Infrastructure and Servicing

A review of existing services was carried out in the vicinity of the above-noted subject site to investigate the servicing requirements for the Condominium Towers. The following Drawings and Legal Plan were reviewed for the purpose of identifying the infrastructure bounding the subject property (refer to Appendix C for copy of Drawings):

- City of Ottawa Drawing 5026-3: Gilmour Street, revision No. 8 (01/14/2004); and
- City of Ottawa Drawing 2908, Sheet 4: MacLaren Street (June 1998).
- Other Drawings in the vicinity of the Site.

Based on this review, the following infrastructure has been identified to exist within the Gilmour Street, MacLaren Street and O'Connor Street Right-Of-Way (R.O.W.):

Watermains:

- 305mm diameter ductile iron watermain (circa 1976) located within Gilmour Street
- 406mm diameter unlined cast iron watermain (circa 1912) located within O'Connor Street
- 305mm diameter PVC watermain (circa 1997) located within MacLaren Street

As part of the water distribution system, fire (5) hydrants are in close proximity of the subject site and located: i) east of the existing building along O'Connor, ii) southeast quadrant of the O'Connor Street intersection, and iii) southwest quadrant of the O'Connor Street and MacLaren Street intersection.

Combined Sewers:

- 450 mm diameter concrete combined sewer (circa 1997) located within MacLaren Street (flowing west). This sewer connects to the 500 mm diameter concrete combined sewer (circa 1980) on O'Connor Street which flows northerly;
- 300 mm diameter PVC combined sewer (2004) located within Gilmour Street which connects to the O'Connor Street 300 mm diameter combined sewer which then flows in a southerly direction; and
- 375 mm diameter PVC combined sewer (circa 2004) located within Gilmour Street flowing in an easterly direction.

Figure 2 below shows the existing infrastructure bounding the subject property.



Figure 2: Existing Infrastructure

Based on existing grading and servicing (refer to topographical survey in Appendix A), the following is noted:

- Runoff from the parking area, east of the existing building, currently sheet flows to MacLaren Street where it is intercepted by the MacLaren Street 450 mm diameter combined sewer via roadway catch basins along this ROW.
- Rooftop flows and wastewater flows from the existing building converge in the building's basement into a single combined sewer lateral (350 mm diameter), which connects to the MacLaren Street 450 mm diameter combined sewer.
- Runoff from most of the parking area south of the existing building is captured by on-site
 catch basins that conveys the captured flows southerly via on-site storm sewers to the
 300 mm diameter storm lead which connects to a manhole located at the southern
 property limit adjacent to the Gilmour Street ROW. From that manhole, the captured
 flows are then conveyed westerly via the 300 mm diameter combined sewer along the
 Gilmour Street ROW where it eventually connects to the O'Connor Street 300 mm
 diameter combined sewer.

Based on existing servicing, the northern half of the property (±40%) is serviced by the 450 mm diameter combined sewer on MacLaren Street while the southern half of the property (±60%) is serviced off the 300 mm diameter combined sewer located on Gilmour Street that outlets to the O'Connor Street 300 mm diameter combined sewer. The pre-development drainage for the subject property is shown in the upper left corner of Drawing DST.

1.4 Municipal Design Guidelines

This Site Servicing Report and associated engineering drawings were prepared in accordance with the following:

- Ottawa Sewer Design Guidelines (October 2012) and associated Technical Bulletins as of this writing.
- City of Ottawa Water Distribution Guidelines complete and associated Technical Bulletins as of this writing.
- Detail Drawings as well as well as Sewer Material Specifications including:
 - Sewer Connection (2003-513) and Sewer Use (2003-514) By-Laws
 - Watermains/Services Material Specifications as well as Water and Road Standard Detail Drawings
 - Water By-Law (2018-167)

1.5 Pre-Consultation, Permits and Approvals

A pre-consultation meeting was held between TRM, its Consultant Team, and the City of Ottawa via a Teams Meeting on June 30, 2020 (refer to Appendix B for a copy of the pre-consultation meeting notes). Subsequently, follow up Emails (Appendix B) with the reviewer of the City of Ottawa were issued to establish the criteria of discharge to the receiving combined sewers. The storm discharge criteria used for the preparation of this AAPS report is presented in Section 4.2 (below).

Once the AAPS is approved under the joint OPA/ZBLA, the redevelopment of the above-referenced property will be subject to the municipal Site Plan control approval process with the City of Ottawa.

2.0 WATER SERVICING

2.1 Design Criteria

Headloss calculations were carried out for the proposed residential Towers sited at 267 O'Connor Street to confirm that the existing supply from the municipal system bounding the site and proposed water service laterals can provide adequate supply while complying with both the Ottawa Design Guidelines (ODG) for Water Distribution (July 2010), and Technical Bulletins ISDTB-2014-02, ISTB-2018-02 and ISTB-2021-03. The above-noted documents have been referred to in this Report as the ODG.

The ODG requires that a water supply system be designed to satisfy the following demand criteria:

- maximum day demand plus fire flow; and
- maximum hourly demand (peak hour demand).

Fire flow requirements within this private property must comply with the 2020 Fire Underwriters Survey (FUS).

Section 2.4 (below) provides additional details with respect to fire flow requirements.

2.2 System Pressures

Section 4.2.2 of the ODG requires that new development additions to the public water distribution system be designed such that the minimum and maximum water pressures, as well as flow rates, conform to the following:

- i. Under maximum hourly demand conditions (peak hour), the pressures shall not fall below 276 kPa (40 psi).
- ii. During periods of simultaneous maximum day and fire flow demand, the residual pressure at any point in the distribution system shall not be less than 140 kPa (20 psi).
- iii. In accordance with the Ontario Code & Guide for Plumbing, the static pressure at any fixture shall not exceed 552 kPa (80 psi) in areas that may be occupied.
- iv. The maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi) in unoccupied areas.
- v. Feedermains, which have been provided primarily for the purpose of redundancy, shall meet, at a minimum, the basic day plus fire flow demand. This criterion is not applicable to this analysis as there are only watermain laterals proposed as part of this project.

The headloss calculations shown below were completed to demonstrate compliance to the above watermain pressure under the various demand conditions.

2.3 Water Demands

To assess the headloss along the proposed water service laterals (Drawing C001 at the back of the Report), the above-noted water demand scenarios were evaluated against the pressure criteria listed in Section 2.2 using the well-known Hazen-Williams equation.

The theoretical domestic demands for 267 O'Connor Street were calculated based on the information provided by TRM and shown on the Site Plan (Appendix A). For the Southern Tower (Phase 2), a total of 229 units are proposed consisting of a mix of studios and 1- and 2-bedrooms. For the Northern Tower (Phase 1), a total of 271 units are proposed also consisting of a mix of studios and 1- and 2-bedrooms.

Based on densities of 1.4 (studios and 1-bedroom) and 2.1 (2-bedroom) persons per unit (Table 4.1 of the ODG – Water Distribution), total populations of 365 and 444 were calculated for Southern (Phase 2) and Northern (Phase 1) Towers, respectively (refer to Appendix D1 for detailed calculations). Given that the theoretical population for each tower is below 500, the peaking factors used for 267 O'Connor Street were extracted from Table 3-3 of the Ministry of the Environment, Conservation and Parks' (MECP) publication entitled "Design Guidelines for Drinking-Water Systems, 2008" herein referred as the MECP Design Guidelines.

Table 1 summarizes the overall water demands for 267 O'Connor, which were calculated based on an average day consumption rate of 280 L/cap/day. The calculated demands were based on populations of 365 and 444 using the recommended peaking factors of the MECP Design Guidelines (Table 3-3) for populations less than 500. These demands were then used to assess headloss under various demand scenarios along the proposed water servicing.

The average day demands exceed the 50 m3/day (0.578 L/s) threshold. Therefore, for redundancy, the water servicing consists of twin 200 mm diameter water laterals for each Tower (Drawing C001) with an isolation valve located on the existing watermain between the two service laterals. The headloss calculations were conducted assuming that total theoretical demand was solely drawn from one of the twin 200 mm diameter watermain service laterals. Appendix D1 includes the detailed domestic demand calculations for the Southern (Phase 2) and Northern (Phase 1) Towers.

Water Demand (L/s) Demand Scenario Southern Tower Northern Tower Combined (Phase 2) (Phase 1) (Phases 1 &2) Average Day 1.18 1.44 2.62 3.95 4.35 Maximum Day 8.30 5.93 6.53 12.46 Peak Hour 0.29 0.430.72 Minimum Hour

Table 1: Theoretical Water Demands

2.4 Fire Flow Requirements

The City has specified that the 2020 Fire Underwriters Survey (FUS) method shall be used to calculate the required fire flow (RFF).

The required fire flow for the Residential Towers was calculated as 167 L/s for the Phase 1 (north) Tower and 150 L/s for the Phase 2 (south) Tower. Each Tower was calculated separately to account for the exposure of one tower to the other. The first floor of the podium was included in the effective area calculation for each Tower. The exposure distances were calculated conservatively from the podium footprint for all three (3) faces of each Tower, except for the inner face, where the exposure distance is the distance between the two (2) Towers. Refer to Appendix D3 for the detailed RFF calculations.

Both buildings for the project area will be equipped with a fully supervised automatic sprinkler designed and installed in accordance with NFPA 13. In the analysis, a sprinkler flow of 4,150 L/min (69.2 L/s) was assumed and applied to each building as recommended per Ontario Building Code (OBC). The sprinkler system allowance total of 4,150 L/min (69.2 L/s) is the sum of the hose stream allowance of 950 L/min plus the sprinkler system flow of 3,200 L/min.

2.5 Watermain Sizing and Roughness Coefficients

The existing and proposed watermain layout for 267 O'Connor is shown on the Site Servicing Plan (Drawing C001) at the back of the Report. The proposed water servicing for 267 O'Connor consists of the following:

Southern Tower (Phase 2)

- Water supply to the Southern Tower (Phase 2) will be provided by twin 200 mm diameter water service laterals that will connect to the Gilmour Street 305 mm diameter watermain. Given the population and demand for the Southern Tower, a second 200 mm diameter water service lateral is proposed to minimize the risk of water supply interruption to this Tower. To minimize disturbance to O'Connor Street, it is proposed to have the twin 200 mm diameter water service laterals connected to the Gilmour Street 305 mm diameter watermain, and an isolation valve is proposed along the 305 mm diameter, between the twin 200 mm diameter service laterals. The twin 200 mm diameter service laterals will converge into a single service within the mechanical room of the Southern Tower.
- The twin 200 mm diameter water service laterals will provide both domestic and supply to the internal fire suppression system within the Southern Tower (Phase 2). One of the twin 200 mm diameter water service laterals will provide the supply for domestic demands and fire suppression feed with the second water lateral as a backup. The mechanical engineer will be responsible to size and design a pump to supply domestic demands as well as a fire pump to provide adequate supply to the sprinkler system. As per the OBC, these systems will be designed in accordance with NFPA 13 where a total demand of 69.2 L/s (4,150 L/min) needs to be accounted; 53.3 L/s (3,200 L/min) for the fire suppression system and 15.8 L/s (950 L/min) for the hose allowance. Assuming a

sprinkler flow allowance of 69.2 L/s is conservative for this type of product. It will be confirmed as part detailed design once a mechanical engineer has been retained by TRM.

- The fire department connection (FDC) will be located near the southwest corner of the Southern Tower, off Gilmour Street in proximity of the mechanical room within the prescribed distance to an existing fire hydrant on Gilmour Street.
- The headloss calculations described in Section 2.7 (domestic and fire flow) were completed with the estimated demand/flow being drawn from a single 200 mm diameter service lateral.

Northern Tower (Phase 1)

- Water supply to the Northern Tower (Phase 1) will be provided by twin 200 mm diameter water service laterals that will connect to the MacLaren Street 305 mm diameter watermain. Given the population and demand for the Northern Tower, a second 200 mm diameter water service lateral is proposed to minimize the risk of water supply interruption to this Tower. To minimize disturbance to O'Connor Street, it is proposed to have the twin 200 mm diameter water service laterals connected to the MacLaren Street 305 mm diameter watermain, and an isolation valve is proposed along the 305 mm diameter, between the twin 200 mm diameter service laterals. These twin 200 mm diameter service laterals will converge into a single service within the mechanical room of the Northern Tower.
- The twin 200 mm diameter water service laterals will provide both domestic and supply to the internal fire suppression system within the Northern Tower (Phase 1). One of the twin 200 mm diameter water service lateral will provide the supply for domestic demands and fire suppression feed with the second 200 mm diameter lateral as a backup. The mechanical engineer will be responsible to size and design a pump to supply domestic demands as well as a fire pump to provide adequate supply to the fire suppression system. As per the OBC, these systems will be designed in accordance with NFPA 13 where a total demand of 69.2 L/s (4,150 L/min) needs to be accounted; 53.3 L/s (3,200 L/min) for the fire suppression system and 15.8 L/s (950 L/min) for the hose allowance.
- The fire department connection will be located at the north face of the Northern Tower, off MacLaren Street in proximity of the mechanical room within the prescribed distance to an existing fire hydrant on MacLaren Street.
- The headloss calculations described in Section 2.7 (domestic and fire flow) were completed with the estimated demand/flow being drawn from a single 200 mm diameter service lateral.

2.6 Hydraulic Boundary Conditions

The headloss calculations were carried out under various water demand scenarios described in Sections 2.3 and 2.4. Boundary conditions were requested for each of the Towers sited at 267 O'Connor. Boundary conditions received from the City dated August 11, 2020 (Appendix D2) have been summarized (below) in Table 2.

Table 2: Hydraulic Boundary Conditions

Water Demand Scenario	MacLaren (m)	O'Connor (m)	Gilmour (m)
Minimum HGL	106.9	106.9	106.8
Maximum HGL	115.0	115.0	115.0
MDD + FF (333 L/s)	107.7	108.0	107.1

The previous August 2020 Boundary Conditions shown above were used for the following updated design as the updated demands and fire flows are lower than those used by the City of Ottawa to generate the Boundary Conditions shown in Table 2. Therefore, the updated headloss analysis described in the following section is conservative.

2.7 **Headloss Calculations**

The proposed servicing as presented on Drawing C001 was evaluated under domestic (minimum and maximum HGL) as well as during a maximum day combined to a fire flow demand condition. Due to the demand at each of the Towers, the proposed servicing at each of the Towers consists of twin 200 mm diameter watermain service laterals that will converge into a single watermain in the mechanical room, upstream of the water meter. The length of the twin service laterals is ±7.95 m for the Phase 2 Tower (Southern) and ±7.2 m for the Phase 1 Tower (Northern) (Drawing C001). These lengths have been used to evaluate headloss along both service laterals. Sections 2.7.1 to 2.7.3 summarizes the headloss calculations and associated findings.

2.7.1 **Peak Hour Demand**

Northern Tower (Phase 1)

The simulation results found the pressure at the Northern Tower (Phase 1) during the peak hour condition to be 346 kPa (50.2 psi) (refer to Appendix D4), which exceeds the minimum pressure criterion of 276 kPa (40 psi) per Design Guidelines.

Southern Tower (Phase 2)

The simulation results found the pressure at the Southern Tower (Phase 2) during the peak hour condition to be 347 kPa (50.3 psi) (refer to Appendix D4), which exceeds the minimum pressure criterion of 276 kPa (40 psi) per Design Guidelines.

2.7.2 **Maximum Day plus Fire Flow**

Northern Tower (Phase 1)

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The simulation results found the pressure at the Northern Tower (Phase 1) during the maximum day plus sprinkler demand to be 352 kPa (51.1 psi) (refer to Appendix D4), which exceeds the minimum pressure criterion of 140 kPa (20 psi) per Design Guidelines.

Southern Tower (Phase 2)

The simulation results found the pressure at the Southern Tower (Phase 2) during the maximum day plus sprinkler demand condition to be 348 kPa (50.5 psi) (refer to Appendix D4), which exceeds the minimum pressure criterion of 140 kPa (20 psi) per Design Guidelines.

2.7.3 Maximum HGL

Northern Tower (Phase 1)

Based on a minimum hour demand of 0.43 L/s, the simulation results found the pressure at the Northern Tower (Phase 1) is 426 kPa (61.8 psi) (refer to Appendix D4), which is below the maximum pressure criterion of 552 kPa (80 psi) per the Ontario Building Code.

Southern Tower (Phase 2)

Based on a minimum hour demand of 0.29 L/s, the simulation results found the pressure at the Southern Tower (Phase 2) is 428 kPa (62.1 psi) (refer to Appendix D4), which is below the maximum pressure criterion of 552 kPa (80 psi) per the Ontario Building Code.

2.8 Summary and Conclusions

Based on the above watermain servicing details, it is recommended that proposed twin 200 mm diameter watermains, as shown on the Site Servicing (Drawing C001), be constructed to provide water servicing for the Southern Tower (connection to Gilmour Street) and Northern Tower (connection to MacLaren Street) recognizing that domestic and fire pumps will be sized by the Owner's mechanical engineer.

3.0 WASTEWATER SERVICING

3.1 Background

Currently, wastewater flows from a Building fronting on MacLaren Street is collected by an internal piping system which merges in the basement with the storm piping (rooftop flows). This single 350 mm diameter sewer outlets to the MacLaren Street 450 mm diameter combined sewer. Given that the property does not include any building fronting on Gilmour Street, there are no wastewater flows currently being discharged into the existing 300 mm diameter combined sewer on Gilmour Street.

It is proposed that wastewater flows generated by 267 O'Connor be collected by an internal piping system in each Tower that will convey the wastewater flows for the Phase 2 Tower and Phase 1 Tower to the Gilmour Street and MacLaren Street combined sewers, respectively (refer to Drawing C001 - Site Servicing).

3.2 Design Criteria

Maximum velocity

(for smooth wall pipes)

Minimum allowable slopes

Manning Roughness Coefficient

The proposed sanitary services for 267 O'Connor Street twin towers were designed based on the City of Ottawa Sewer Design Guidelines ((OSDG) - (October 2012)) and associated Technical Bulletins. Key design parameters have been summarized in Table 3.

Design Criteria Design Value Reference Residential average flow 280 L per capita/day ISTB-2018-01 Harmon Formula x 0.8 Residential peaking factor City Section 4.4.1 Commercial average flow 28,000 L/gross/ha/day ISTB-2018-01 ICI peaking factor 1.0/1.5 ISTB-2018-01 Infiltration Allowance 0.05 L/s/ha (dry I/I) 0.33 L/s/ha ISTB-2018-01 0.28 L/s/ha (wet I/Í) Minimum velocity $0.6 \, \text{m/s}$ OSDG Section 6.1.2.2

3.0 m/s

0.013

Varies

Table 3: Wastewater Servicing Design Criteria

3.3 Theoretical Sanitary Peak Flow and Proposed Sanitary Servicing

Wastewater flows from the Southern and Northern Towers will discharge into the municipal systems via individual sanitary service laterals. Wastewater flows from the Southern Tower will discharge into the Gilmour Street 300 mm diameter combined sewer while flows from the Northern Tower will discharge to the MacLaren Street 450 mm diameter combined sewer.

Based on the proposed densities for apartment buildings (as recommended by the OSDG), the peak wastewater flows were calculated based on the design value of 280 L per capita per day (per Table 3) and populations of 365 (Southern Tower) and 444 (Northern Tower).

Peak wastewater flows of 4.22 L/s and 5.05 L/s were calculated for the Southern (Phase 2) and Northern (Phase 1) Towers, respectively based on the following parameters (refer to Appendix F for Detailed Wastewater Flow Calculations):

- i. Residential average unit flow rate of 280 L/capita/day;
- ii. Theoretical population of 365 (Southern) and 444 (Northern);
- iii. Peaking factors of 3.433 and 3.400, calculated in accordance with the Harmon formula for the Southern and Northern Towers, respectively;

OSDG Section 6.1.2.2

OSDG Section 6.1.8.2

OSDG Table 6.2, Section

6.1.2.2

iv. Total infiltration allowance calculated based on 0.05 L/s/ha (dry I/I), and (0.28 L/s/ha (wet I/I), in accordance with the OSDG and ISTB-2018-01. Based on the phasing limit of each phase, a combined I/I allowance of 0.06 L/s was estimated for the Southern and Northern Tower (refer to Appendix E).

In addition to the above-noted contributions including I/I (dry and wet), the groundwater flow allowance of 0.17 L/s estimated by Paterson, was proportionally added to the above-noted peak wastewater flows. Once added, total peak wastewater flows of 4.22 L/s and 5.05 L/s were calculated for the Southern Tower (Phase 2) and Northern Tower (Phase 1), respectively.

3.3.1 Proposed Sanitary Service Lateral Sizing

To accommodate the above design flow targets of 4.22 L/s and 5.05 L/s, the following is proposed:

- For the Phase 2 Tower, it is proposed to re-use the existing Gilmour Street 300 mm diameter combined sewer as depicted on Drawing C001. The re-use of this sanitary sewer will minimize disturbance along Gilmour Street, provided that its structural condition is proven to be satisfactory. Should this sewer require to be replaced, it is proposed that a 300 mm diameter sanitary sewer be used so that the connection works at the existing manhole within the ROW be kept to a minimum
- A proposed 200 mm diameter sanitary sewer lateral at 1.0% slope is proposed to convey the wastewater flows from the Phase 1 Tower to MacLaren Street as shown on Drawing C001.

The above-noted 200 mm diameter and 300 mm diameter sanitary sewers can accommodate peak design flows up to 34.2 L/s (200 mm diameter sewer) under free-flowing condition, which exceeds the requirements for both Towers.

3.4 Summary and Conclusions

Based on the above wastewater servicing details, it is recommended that the wastewater servicing shown on the Site Servicing (Drawing C001) be implemented to provide wastewater servicing for the Southern and Northern Towers.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

4.1 Background

Runoff generated by the proposed Towers at 267 O'Connor will be collected by a series of internal drains and sewers that will outlet to two (2) separate combined sewer outlets. Runoff from the Southern Tower (Phase 2) will discharge to the Gilmour Street 300 mm diameter combined sewer while runoff from the Northern Tower (Phase 1) will outlet to the MacLaren Street 450 mm diameter combined sewer. Runoff collected from most of the POPS will discharge into the Gilmour Street combined sewer, which matches the current drainage divide within the property (Section 4.3).

4.2 Storm Criteria

This AAPS and associated drawings have been prepared based on the discussions held at the pre-consultation meeting and subsequent Email correspondences. The storm design criteria used in this design is based on the following:

- The allowable peak flow shall be estimated based on a 1:5-year intensity which is to be calculated based on a Runoff Coefficient (C-Factor) of 0.40 given that the site is currently fully impervious (C-Factor=0.9).
- The allowable peak flow is to be calculated using the IDF statistics (per the Ottawa Sewer Design Guidelines – (OSDG)) based on the calculated time of concentration (Tc) reflecting existing condition. The calculated Tc shall not be less than a Tc of 10 mins.
- The allowable peak flow will reflect the current drainage divide between MacLaren Street and Gilmour Street.
- The outlets for the Condominium Towers should reflect the existing condition. The outlet for the Phase 2 tower (wastewater & storm) will be the existing 300 mm diameter combined sewer on Gilmour Street, while the outlet for the Phase 1 tower (wastewater & storm) will be 450 mm diameter combined sewer on MacLaren Street.
- The post development flows will be limited to the allowable peak flow for both outlets and will be set once the wastewater peak flow and groundwater flow contributions are subtracted from the 1:5-year calculated peak flows.
- The post-development peak flows shall be controlled up to the 1:100-year storm to the
 allowable peak flow by means of on-site storage. On-site measures would consist of
 rooftop storage, at grade ponding, underground cistern or a combination of these
 measures which will be confirmed at detailed design
- All storm contributions conveyed to the MacLaren Street and Gilmour Street combined sewers, will be controlled by means of inlet control devices (ICD) and/or rooftop drains equipped with flow control devices.
- The subject property is tributary to combined sewers and consists of rooftops and privately owned, public accessible space (POPS). As a result, there is no water quality control requirements given the proposed surfaces.

4.3 Allowable Release Rate

Storm servicing and stormwater management for the subject property is to be developed to limit the 1:100-year post-development flow from the subject property to the prescribed allowable peak flows of both outlets. As per the storm criteria described in Section 4.2, the allowable peak flow is to be estimated based on the 1:5-year design storm which shall be estimated based on a maximum C-Factor of 0.40. Further, the wastewater peak flows and groundwater peak flow should be subtracted from the 1:5-year peak flow.

To evaluate the allowable peak flows, the various areas were delineated based on their type and outlet locations and were assigned a C-Factor as shown on a Drainage Area Plan (refer to Drawing DST – Pre-Development Drainage Plan). These areas for both outlet locations have been summarized in Table 4 (below).

Table 4: Pre-Development (Existing) Condition Surfaces

Overall Parcel (per Topographic Survey)					
Surface Details	Area (m²)	C-Factor			
Area tributary to Gilmour Street					
Parking area	2,205.77	0.90			
TOTAL:	2,205.77	0.90			
Surface Details	Area (m²)	C-Factor			
Area tributary to MacLaren Street					
Parking	559.74	0.90			
Building	767.45	0.90			
TOTAL:	1,327.19	0.90			

Based on the above surface breakdown, ±2206 m² is tributary to Gilmour Street while ±1,327 m² to MacLaren Street. Pre-development (existing) peak flows were estimated under both the 1:5 year and 1:100 year and presented below for information purposes.

Based on the review of the current site condition (existing condition survey) and length of the various flow paths, the Time of Concentration (Tc) was estimated for both outlets (refer to Appendix F1 for details). The Tc calculations were carried out based on the Uplands Method and have shown that the Tc for both outlets was well below 10 minutes given the short and efficient flow paths (i.e., asphalt parking sloping and short sections of sewers). Consequently, a Tc of 10 minutes has been used for both outlets to calculate the pre-development peak flows (refer to Appendix F1 for the Uplands Chart for the flow paths and corresponding velocities). Table 5 below shows the 1:5-year and 1:100-year peak flows under existing conditions based on a C-Factor of 0.90.

Table 5: Existing Peak Flows

Outlet Location	Area Type	Area (m²)	C-Factor	1:5-year Qp (L/s)	1:100-year Qp (L/s)
Gilmour	Parking	2205.77	0.90	57.5	98.5
MacLaren	Parking	559.74			
MacLaren	Building	767.45	0.90		
Total MacLaren		1327.19	0.90	35.6	61.1

-14-

Based on existing development conditions, peak flows of 57.5 L/s and 98.5 L/s are conveyed to Gilmour Street under the 1:5-year and 1:100-year, respectively. Similarly, peak flows of 35.6 L/s and 61.1 L/s are conveyed to MacLaren Street under the 1:5-year and 1:100-year, respectively. These flows are reflective of the current hard surfaces (refer to Appendix F1 for detailed calculations for existing condition peak flow assessment).

Given the storm discharge criteria noted by the City, the allowable peak flow at both outlets was then estimated based on a C-Factor of 0.40 while subtracting the sanitary peak flows and groundwater contributions. Appendix F1 includes the allowable peak flow calculation under post-development for both outlets, which have been summarized below in Table 6.

Table 6: Allowable Peak Flows

Outlet Location	Area (m²)	C- Factor	1:5-year Qp (L/s)	Sanitary (L/s)	Groundwater (L/s)	Allowable Qp (L/s)
Gilmour	2,205.77	0.40	25.6	4.22	0.085	21.26
Total MacLaren	1,327.19	0.40	15.4	5.05	0.085	10.71

The storm and stormwater management servicing described in the section below was developed to meet the allowable peak flows noted above for both outlets.

4.4 Storm Servicing

The general storm and stormwater servicing constraints used to develop the detailed design for 267 O'Connor are listed in Table 7 below.

Table 7: Storm Servicing Design Criteria

General Design Criteria

Storm drains are to be designed by the mechanical engineer to convey the calculated flows presented herein in accordance with the Ontario Building Code. The calculated peak flows were estimated with the Rational Method and the City of Ottawa Intensity-Duration-Frequency (IDF) curves.

Peak flows estimated based on an inlet time of ten (10) minutes, as per the Technical Bulletin ISDTB-2012-4.

Calculated peak flows to be estimated based on weighted average C-Factors. The weighted C-Factors have been calculated based on 0.90 for all hard surfaces and 0.60 for all landscaped areas where applicable.

The sum of all storm flows to be controlled to the allowable peak flow noted in Table 6.

The 1:100-year peak flows to be detained by means of on-site retention measures; i) at grade surface ponding, ii) rooftop storage, or iii) stormwater cistern.

Provide measures to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

4.5 Proposed Stormwater Management Solution and Calculations

4.5.1 Water Quantity Requirements

Storm servicing and stormwater management for 267 O'Connor was developed to limit the 1:100-year post-development flows below the allowable peak flows of 21.26 L/s and 10.71 L/s for the Gilmour and MacLaren outlets, respectively. As part of the grading exercise, a number of low points (3) were introduced in the site's grading for areas surrounding the Towers; these low points have labelled as LP1 to LP3 on Drawing C003.

Given that these low points and area drains are part of the POPS' structure, their design will be completed by the mechanical engineer, including sizing of the internal piping that will be part of the underground garage.

The stormwater management strategy also includes rooftop storage and restrictions. Rooftop storage along with underground storage via a cistern for the Gilmour outlet, were adapted to the allowable release rate, site constraints, and proposed grading. It should be noted that this report was prepared to demonstrate that the storm and stormwater management servicing could meet the allowable release rate at both outlets. Once the joint OPA/ZBLA is approved, the stormwater management strategy will be coordinated with TRM's mechanical engineer and could potentially be revised upon comments from the City. At that time, stormwater management cistern for the MacLaren outlet may be incorporated into the design to improve the level of service along the hard scaped surfaces.

Based on the grading and the types of proposed surfaces (roof, hard scaped and landscaped), the various surfaces along with the calculated C-Factors have been delineated on Drawing C003 (Post-Development Drainage Plan). Buildings and hard scaped areas were assigned a C-Factor of 0.90 while soft scaped areas (landscaped and planters) will be set to a conservative C-Factor of 0.60 when a landscape plan is available at the SPCA stage of the project. All areas depicted on Drawing C003 are controlled by means of restrictors except for three (3) small areas; Area 1, Area 2 and Area 8, which are at-grade surfaces and abutting the roadways. Given that Areas 1,2 and 8 do not include restrictors, they have been accounted as uncontrolled flow and used in the assessment of the stormwater management strategy.

A summary of the various areas depicted on Drawing C003 follows:

Area 1: Small strip of land (56.32 m²) that is proposed to sheet flow uncontrolled towards Maclaren Street. This flow was accounted as uncontrolled flow in the stormwater management assessment.

Area 2: Small strip of land (57.82 m²) that is proposed to sheet flow uncontrolled towards Maclaren Street. This flow was accounted as uncontrolled flow in the stormwater management assessment.

Area 3: Area 3 is the Phase 1 Tower, with a footprint of 971.22 m². Additional details regarding storage volume and release rate is shown below.

Areas 4, 5, 6 and 9: At grade Low Point Areas denoted as A4-LP1 (606.34 m²), A5-LP2 (171.70m²), A6-LP3 (355.33m²) on the Ponding Area Table, having the static ponding characteristics shown on Drawing C003. This area is currently assumed to consist of only hard scaped areas, with a runoff coefficient of 0.90 and is directed to the underground cistern tributary to the Gilmour combined sewer.

Area 7:Area 7 is the Phase 2 Tower, with a footprint of 1193.43 m². Additional details regarding storage volume and release rate is shown below.

Area 8: Strip of land (86.57 m²) that is proposed to sheet flow uncontrolled towards Maclaren Street. This flow was accounted as uncontrolled flow in the stormwater management assessment.

Rooftop Servicing (Areas 3 and 7):

Regarding rooftop storage and restrictions, the following assumptions were made based on experience with other condominium tower projects:

- Rooftop storage could easily be introduced up to 60% of the Tower footprint with a maximum ponding depth of 0.15 m, which is within the snow load design requirement. Based on the footprint of both towers, the storage volume estimated is 87.41 m³ and 107.41 m³ and for the and Phase 1 Tower (Area 3) and Phase 2 Tower (Area 7), respectively.
- It was assumed that the rooftop weirs could consist of a Watts Adjustable Accutrol Weir which under 150 mm ponding depth, would release a maximum of 0.315 L/s (5 gpm)

Assessment of Adequacy of Public Services 267 O'Connor Street, Ottawa ON

when fully closed (refer to Appendix F2 for copy of the Manufacturer's detail sheet for Watts weir).

 Based on the footprint of both towers, it was assumed that 12 of the Watts weirs could provide the necessary rooftop coverage. Based on this configuration, storm flows from both Towers would be limited to 3.78 L/s up to the 1:100-year storm. The mechanical engineer could opt in the use of other type of restrictors. However, to maintain the integrity of the proposed stormwater management strategy each roof shall be restricted to a maximum of 3.78 L/s while providing the minimum rooftop storage noted above.

To assess storage volume requirements for both rooftops and cistern detention areas, the Modified Rational Method (MRM) was used. Given that the proposed stormwater management strategy includes an internal cistern, the MRM calculation was carried out assuming the half the design flow (50%) for areas tributary to the cistern.

4.5.2 Stormwater Management Assessment

An evaluation of the stormwater management system design was carried out under the 1:100-year storm which has been documented in Appendix F2. To limit peak flows from the at-grade detention areas, restrictors are proposed (to be designed by the mechanical engineer) as noted in the Ponding Area Table (Drawing C003).

Ponding volumes provided by grading (Drawing C002) have been included in the Ponding Area Volume Table on Drawing C003.

Other details for each area have been summarized in the Ponding Area Table (Drawing C003), including the proposed ICD capture rates, maximum static ponding depth and elevation and the maximum static volume. These will be reviewed and coordinated with TRM's mechanical engineer in greater details at detailed design.

The stormwater management assessment carried out and presented in Appendix F2 has been summarized in Table 8 (Phase 2) and Table 9 (Phase 1).

Table 8: Stormwater Management Assessment (Phase 2)

			Max Static	ICD/Cister n Flow	Unc	Volume	Storage
Area	Area	Static	Surface Volume	Flow (L/s)	Flow (L/s)	(m3)	Туре
No.	(m2)	Depth	(m3)	100 yr	100 yr	Used	
Gilmour soutlet	Street						
A4/LP1	606.34	0.11	4.82	3.40		9.39	Cistern
A5/LP2	171.70	0.12	1.98	3.40		9.39	Cistern
A6/LP3	355.33	0.11	2.37	3.40		9.39	Cistern
Area 7	1194.43	0.15	107.41	3.78		46.57	Rooftop
Area 8	86.57	N/A	N/A	Unc	3.87	N/A	Uncontrolled
Area 9	74.54	N/A	N/A	3.40		9.39	Cistern
				1:100 year Flows (ICD+Unc):	21.26		
	Allowable: 21.26						

It should be noted that:

- The "N/A" was assigned to Area 9 (Table 8) as this area flows towards the inside of the building where it will be captured by a trench or area drain and directed to the cistern; Therefore, depth of flow along this steep slope is irrelevant., and
- The cistern was conceptually sized to release 10.28 L/s; however, the MRM calculations were completed based on 50% of this release rate (5.14 L/s) as shown in Appendix F2. To simplify the summary in Table 8, the 10.28 L/s was divided in four areas which was displayed four times as 2.57 L/s.

Based on the above, the sum of all 1:100-year flows (ICD, cistern plus uncontrolled) is estimated at 21.26 L/s which matches the allowable peak flow of 21.26 L/s. Hence, the storm discharge criterion is met.

The above ponding elevations under the 1:100-year shows that the Phase 2 building will be protected during this event. Hence, the Phase 2 Tower is protected during the 1:100 year.

Max Static Volume ICD Flow Unc Storage Area Static Volume Flow (L/s) (m3)Type Area Flow (L/s) 100 yr No. (m2)Depth (m3)100 yr Used MacLarenStreet outlet 2.52 Area 1 56.32 N/A N/A N/A N/A N/A 2.58 Area 2 57.82 N/A N/A N/A N/A N/A 0.15 87.41 3.78 35.34 Area 3 971.22 Rooftop 1:100 year Flows 8.88 (ICD+Unc): Allowable: 10.71

Table 9: Stormwater Management Assessment (Phase 1)

The sum of all 1:100-year flows (ICD plus uncontrolled) is estimated at 8.88 L/s which is less than the allowable peak flow of 10.71 L/s. Hence, the storm discharge criterion is met.

The above ponding elevations under the 1:100-year shows that the Phase 1 building will also be protected during those extreme events. Hence, the Phase 1 Tower is protected during the 1:100 year.

4.5.3 Water Quality

Storm runoff generated by the twin towers sited at 267 O'Connor is conveyed to the Gilmour Street and MacLaren Street combined sewer systems. The proposed development will consist of twin high-rise condominium towers and privately owned, public accessible space (POPS). As a result of the outlets and types of surfaces, no water quality control measures are proposed.

4.6 Summary and Conclusions

The storm and stormwater management solutions presented in this Report were found to fulfill the water quantity and quality criteria presented in Section 4.2. The assumptions made for the rooftop of both Towers and the cistern tributary to Gilmour Street (i.e., storage and capacity) will require to be reviewed by TRM's mechanical engineer. Similarly, the internal piping will require to be designed by the mechanical engineer. As noted above, once rezoning has been approved and the stormwater management servicing reviewed by the mechanical engineer, cistern(s) requirements in the design to improve the level of service along the hard scaped surfaces would be further reviewed.

Desktop calculations (Appendix F2) were carried out to assess the effectiveness of the proposed grading, servicing and stormwater management design under the 1:100-year storm. This assessment has demonstrated that the rooftop controls along with the cistern storage and controls could accommodate the 1:100-year storm while protecting the Phase 1 and Phase 2 towers. In light of the above, it is recommended that the storm and stormwater management solution shown on Site Servicing (Drawing C001), Grading (Drawing C002) and Post-Development Drainage (Drawing C003) be implemented to provide storm servicing for the proposed development.

5.0 EROSION AND SEDIMENTATION CONTROL

At the on-set of the construction of the Condominium Towers, substantial excavation will be completed for the underground garage for both Towers. As a result, runoff from the site will mostly be contained in the excavation area. As such, appropriate erosion and sedimentation control measures, as outlined in the Ontario Ministry of Natural Resources (MNR) Guidelines on Erosion and Sediment Control for Urban Construction Sites, will be implemented to trap sediment on site. The following erosion and sedimentation control measures could be implemented during construction (refer to Drawing C004):

- Supply and installation of a silt fence barrier, as per OPSD 219.110, if required;
- Supply and installation of filter fabric between the frame and cover of catch basins and
 maintenance holes adjacent to the project area during construction, to prevent sediment
 from entering the sewer system. The filter fabric is to be inspected regularly and
 corrected as required;
- Stockpiling of material during construction is to be located offsite;
- Sandbags are to be placed blocking part of the sewer pipe in the connecting storm
 maintenance holes to eliminate construction debris from entering the existing storm
 sewer system. The sandbags are to be removed after the proposed storm sewers have
 been fully cleaned.

The proposed erosion control measures (refer to Drawing C004) shall conform to the following documents:

- "Guidelines on Erosion and Sediment Control for Urban Construction Sites" published by Ontario Ministries of Natural Resources, Environment, Municipal Affairs, and Transportation & Communication, Association of Construction Authorities of Ontario and Urban Development Institute, Ontario, May 1987.
- "MTO Drainage Manual", Chapter F: "Erosion of Materials and Sediment Control", Ministry of Transportation & Communications, 1985.
- "Erosion and Sediment Control" Training Manual by Ministry of Environment, Spring 1998.
- Applicable Regulations and Guidelines of the Ministry of Natural Resources.

Assessment of Adequacy of Public Services 267 O'Connor Street, Ottawa ON

This report has been prepared by J.L. Richards & Associates Limited for TRM's exclusive use. Its discussions and conclusions are summary in nature and cannot properly be used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report is based on information, drawings, data, or reports provided by the named client, its agents, and certain other suppliers or third parties, as applicable, and relies upon the accuracy and completeness of such information. Any inaccuracy or omissions in information provided, or changes to applications, designs, or materials may have a significant impact on the accuracy, reliability, findings, or conclusions of this report.

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J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:

Reviewed by:

J. S. G. FORGET

SPOKINCE OF ONITH

Steve Picken, C.Tech. Civil Technician

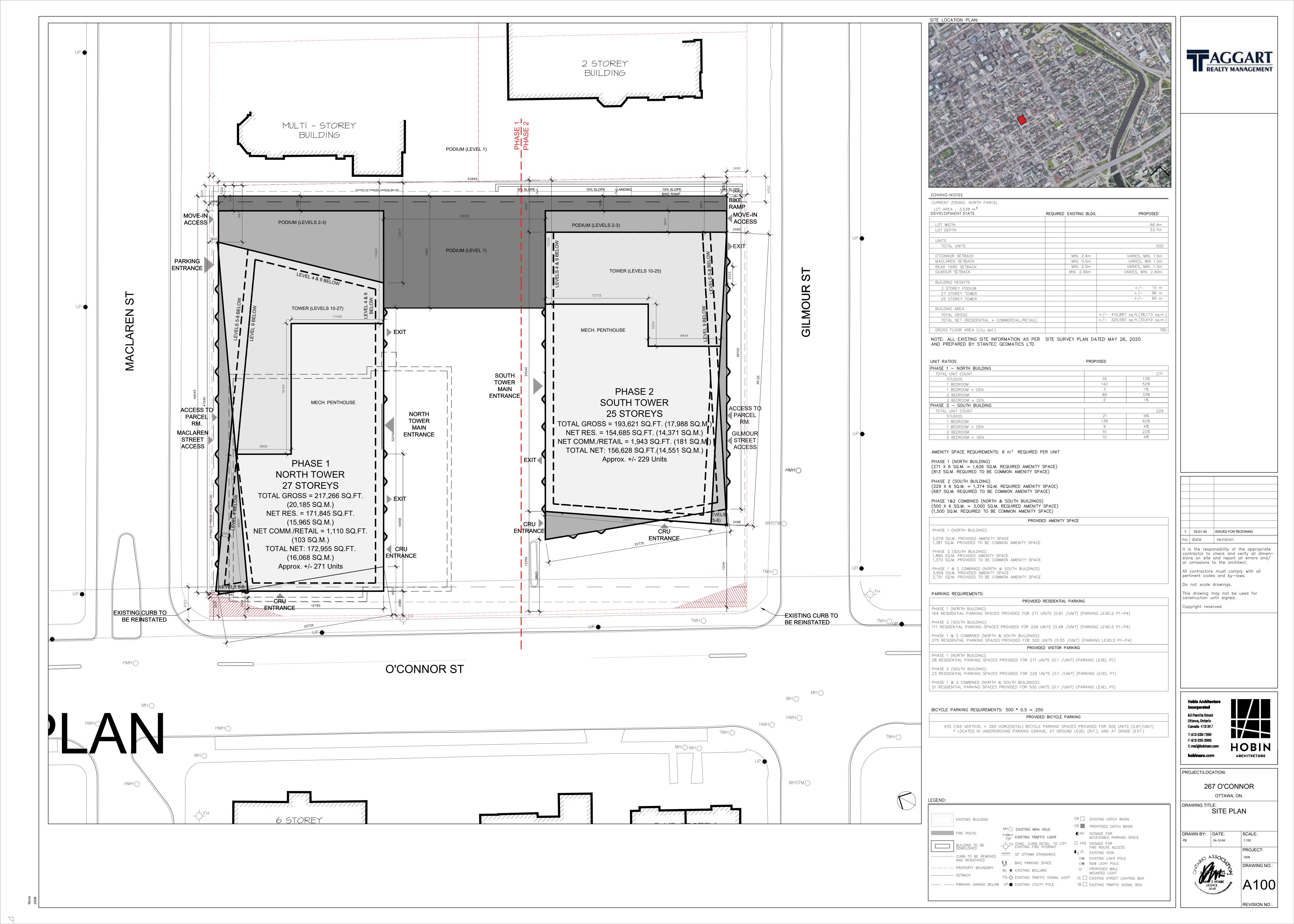
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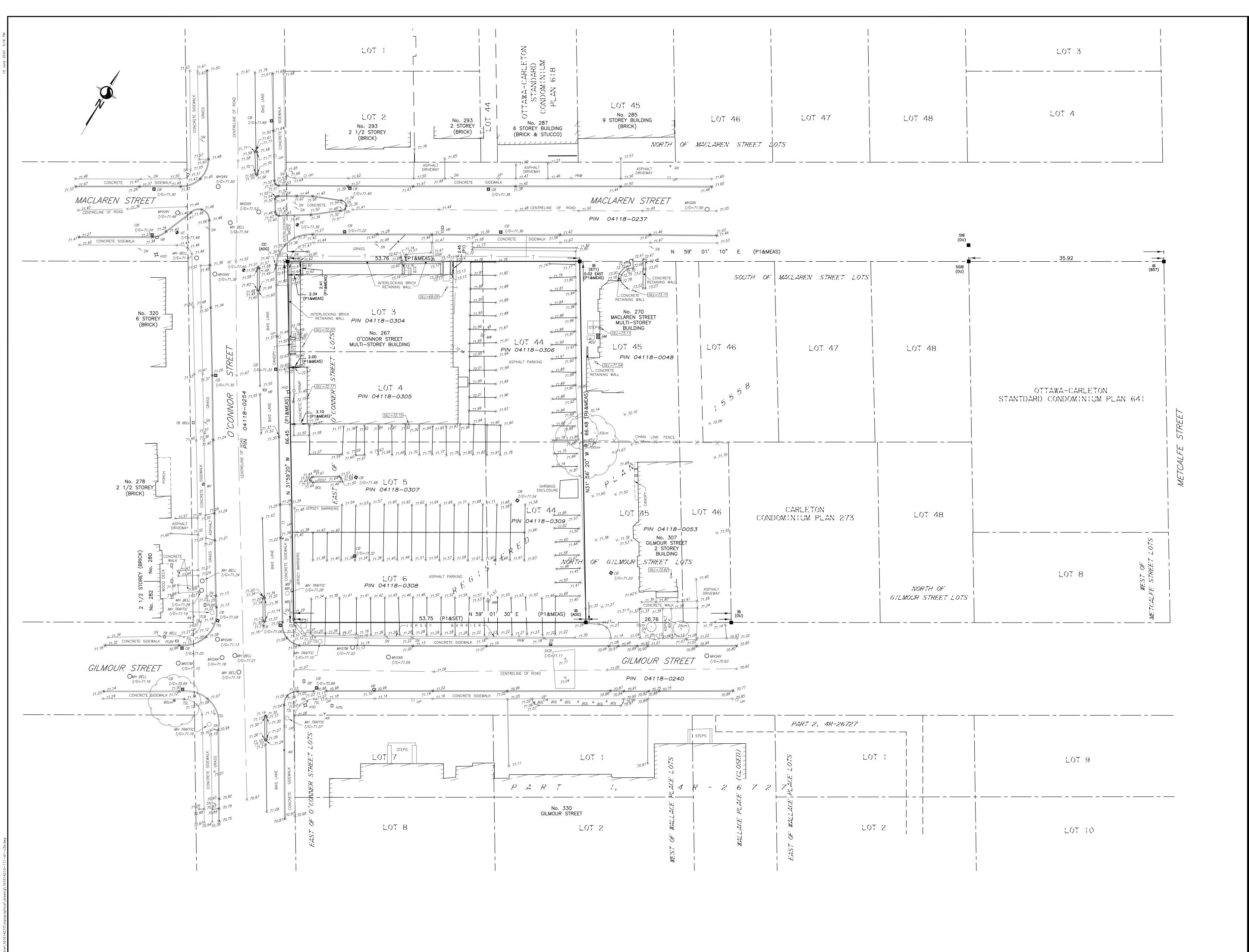
Guy Forget, P.Eng. Senior Water Resources Engineer

Site	Servicing	Report	
267	O'Connor,	Ottawa,	Ontario

Appendix A

Site Plan and Legal Plans







Stantec Geomatics Ltd. 400-1331 Clyde Avenue Ottawa ON Tel. 613.722.4420 www.stantec.com

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TOPOGRAPHIC SKETCH OF LOTS 3, 4, 5 AND 6 (EAST OF O'CONNOR STREET)

(SOUTH OF MACLAREN STREET)

LOT 44

LOT 44

(NORTH OF GILMOUR STREET)

REGISTERED PLAN 15558 CITY OF OTTAWA

METRIC CONVERSION

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

BEARINGS HEREON ARE GRID BEARINGS DERIVED FROM THE CAN-NET VRS NETWORK AND ARE REFERRED TO THE CENTRAL MERIDIAN 76°30' WEST LONGITUDE OF THE 3° MTM ONTARION COORDINATE SYSTEM, NAD83 (ORIGINAL) ZONE 9.

BEARINGS ARE REFERRED TO THE NORTHERLY LIMIT OF GILMOUR STREET AS SHOWN P1, HAVING A BEARING OF N59°01'30"E, A COUNTER-CLOCKWISE ROTATION OF 1°37' WAS APPLIED TO THE BEARING ON P1.

ELEVATION NOTE

ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA ELEVATION=95.230.

LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE AND MUST BE VERIFIED PRIOR TO CONSTRUCTION.

		DENOTES	FOUND MONUMENTS
		DEINOTES "	SET MONUMENTS
IB		II .	IRON BAR
IBØ		II .	ROUND IRON BAR
SIB		II.	
SSIB		II.	STANDARD IRON BAR
		"	SHORT STANDARD IRON BAR
RB		II .	ROCK BAR CUT CROSS
CC		"	
CP		"	CONCRETE PIN
WIT		"	WITNESS
PIN			PROPERTY IDENTIFICATION NUMBER
MEA			MEASURED
PRO)P		PROPORTIONED
OU			ORIGIN UNKNOWN
SG		"	STANTEC GEOMATICS LTD.
Р		"	REGISTERED PLAN 15558
P1		"	PLAN BY FSM DATED SEPTEMBER 19, 20
	ACU	II .	AIR CONDITIONING UNIT
◀	AN	"	ANCHOR
	BOL	II .	BOLLARD
	CB	II .	CATCH BASIN
	SICB	II .	SIDE INLET CB
	GSR	II .	GAS SERVICE REGULATOR
\boxtimes	HM	II .	HYDRO METER
	HTN	II .	HYDRO TRANSFORMER
- - -	HYD	II .	FIRE HYDRANT
	JBX	II .	JUNCTION BOX
0	LS	II .	LIGHT STANDARD
	MB	II .	MAILBOX
\bigcirc	MH	II .	MAINTENANCE HOLE UNIDENTIFIED
$\tilde{\bigcirc}$	MHB	II .	MAINTENANCE HOLE BELL
$\tilde{\bigcirc}$	MHSAN	"	MAINTENANCE HOLE SANITARY
$\tilde{\bigcirc}$	MHSTM	"	MAINTENANCE HOLE STORM
$\tilde{\bigcirc}$	MHT	II .	MAINTENANCE HOLE TRAFFIC
A	MW	"	MONITORING WELL
	PKM	II.	PARKING METER
	PKM PLBX		PULL BOX
-	SN	II .	SIGN
		II .	TERMINAL BOX - BELL
	TB BELL	"	
0	TCB	"	TRAFFIC CONTROL BOX
0	TSL UD		TRAFFIC SIGNAL LIGHT
	UP	"	UTILITY POLE
	VB		VALVE BOX
Θ	VC		VALVE CHAMBER
0	WV		WATER VALVE

TREE DECIDUOUS

UNDERGROUND TELEPHONE UNDERGROUND HYDRO

SURVEYOR'S CERTIFICATE

THE SURVEY WAS COMPLETED ON THE 26th DAY OF MAY, 2020.

BRIAN J. WEBSTER ONTARIO LAND SURVEYOR

RAWN: NJ CHECKED: BW PM: BW FIELD: AW,AS,CK PROJECT No.: 161614210-111

Appendix B

Pre-consultation notes and Email Correspondences

Pre-Application Consultation Meeting Notes

Property Address: 267 O'Connor Street PC2020-0131 TEAMS Meeting, Tuesday June 30, 2020

Attendees:

Simon Deiaco, City of Ottawa Planning (SD)
Christopher Moise, City of Ottawa, Architecture and Urban Design (CM)
MacKenzie Kimm, City of Ottawa, Heritage (MK)
Mark Fraser, City of Ottawa, Engineering (MF)
Miguel Tremblay, Fotenn (MT)
Paul Black, Fotenn (PBk)
Emily McGirr, Tagart (EM)
Lucie Dalrymple, JL Richards (LD)
Guy Forget, JL Richards (GF)
Derek Howe, Taggart (DH)
Jeff Parkes, Taggart (JP)
Patrick Bisson, Hobin Architecture (PB)
Barry Hobin, Hobin Architecture (BH)
Mark Baker, Parsons (MB)
Jack Hanna, Centretown Citizens Community Association (JH)

Regrets:

Subject: 267 O'Connor Street

Meeting notes:

Opening & attendee introduction

- Introduction of meeting attendees
- Overview of proposal: JP summary of past meeting and concept. Previous design was in the early stages of taking control of the property. Looked at a possible phased approach, however the team is now considering a more holistic approach to the site.
- Site has three frontages (O'Connor Street, MacLaren Street and Gilmour Street) the site is just under an acre in area.
- There is some history of the site as a result of the OMB decision and implementing Secondary Plan policies (JP/PBk). Now looking at a concept that is more in line with Landmark Policy Direction. Applications for Official Plan and Zoning Amendments and Site Plan Control would be submitted.
- Two amendment to the OP are being requested. The project proposes a privately owned, publicly assessible space (POPS) versus a publicly owned space. The project is also proposing towers up to 30 storeys in height whereas 27 storeys is the maximum permitted under the Landmark policies. The team would prepare the appropriate studies to support this requested amendment. The existing office building on the site is not a heritage asset; however, the team recognizes the heritage assets in the area that must be considered.

- PB Overview of the design package. Early design concepts shown, no architectural detail to date. Previous massing studies presented that looked at one tower, now at a holistic approach to the site. Two tall towers (30-storeys). North tower, 263 units, south tower 284 units.
- Looking at a range of unit sizes and commercial space at grade. Approximately 4 levels
 of below grade parking with 152 stalls in tower 1 (south) and 148 stalls in tower 2 (north).
 Project development would be phased.
- 5 key drivers and design narratives for the project.
 - Public Realm
 - Street Animation
 - Pedestrian Experience
 - Urban Fabric
 - Built Form
- Pubic realm is approximately 47% of the subject site which includes a portion that is located under a cantilever of the south tower. Looking to establish a design competition for the public space component of the project.

Preliminary comments and questions from staff and agencies, including follow-up actions:

- o Planning (SD)
 - Property is zoned R4T[479] and subject to the Heritage Overlay and Mature Neighbourhoods Overlay by-law provisions. The rationale should include the draft performance standards for the property. An apartment building high-rise is not permitted with the current zoning.
 - Subject site is designated as Mixed-Use Area, Residential on Schedule H1 of the Centretown Secondary Plan.
 - Subject site is designated as Mid-Rise (9 storey) on Schedule H2 of the Centretown Secondary Plan.
 - O'Connor Street is a priority streetscape as per Schedule H3 of the Centretown Secondary Plan. Appropriate street tree planting should be included on the landscape plan.
 - Policy 3.9.5.3A of the Secondary Plan speaks specifically to this property and landmark provisions. Policy 3.9.5.5 is applicable with respect to the Landmark Buildings and outlines specific criteria. Of note, the policy sets out clear direction about the quality of this space and what is to be created.

"Landmark Buildings" are those that make both significant and exceptional contributions to the public realm and overall identity of Centretown. They combine iconic architecture, extraordinary site design and a unique civic or national function to create a distinctive place that invites visitors to experience its qualities. Both the building and its landscape should be appreciated as much for their beauty as for their utility. While Landmark Buildings must respect the form and character of their surroundings, they may depart from the built form parameters established for Centretown, but in this regard they will not set precedents for other development, and to be different they must be special."

- A Section 37 agreement will be required as per the Secondary Plan Landmark provisions.
- Design guidelines for high-rise building will need to be considered (i.e. tower separation).

- Further discussions will be required with respect to a POPS versus a publicly owned space approach as required by the Secondary Plan.
- Applications for Official Plan and Zoning Amendments and Site Plan Control would be required. Submission lists to be provided. Rationale will need to be provided for the proposed increase in height. A full review and response to the applicable Landmark Provisions of the Secondary Plan will also need to form part of the planning rationale.

Urban Design (CM)

- o Topics:
 - POPS vs. Park (to allow for ownership and parking below). The parameters and expectations for this space should be agreed to before it goes out to a design competition;
 - Staff are developing POPs guidelines and this would appear to be a unique arrangement that may not fit into our definition of a POPS;
 - Design competition vs. Special Design Review Panel for Tall Buildings.
 Hitting 30 storeys may trigger some special considerations;
 - Two towers vs. One land mark building opens a broader discussion about how high-rise buildings relate to each other and whether one should be subservient to the other;
 - Not sure the Parliamentary view planes has any bearing on the potential height for this site;
- This proposal runs along one of the City's Design Priority Areas and must attend the City's UDRP panel as per the Secondary Plan policies in lieu of a design competition. We recommend the proposal attend an informal visit (prior to a full submission and is not a public meeting), with the City's UDRP to further discuss and evaluate various scenarios of development for the whole site;
- Please see the Design Brief Terms of Reference provided and consult the City's website for details regarding the UDRP schedule (if applicable).

Engineering (MF)

- Storm water quantity control and criteria, control to a two-year
- Geotech will assess ground water flow as well (see attached e-mail)
- Follow-up questions to be answered regarding servicing options
- Site is located within a combined sewer shed. Needs an ECA direct submission.
- Project will require an RSC.
- Follow-up questions from LD regarding servicing criteria and options in the area.
- GF and LD to follow up with staff on servicing options.
- See additional notes and submission requirements in the follow up email.

Transportation (WD)

Previous comments from earlier consultations have been provided.

 The previous comments submitted for the Forecasting Report are to be addressed, and the TIA Step 3 – Analysis Report is to be submitted for circulation and review.

<u>General</u>

- O'Connor Street is designated as an Arterial road within the City's Official Plan with a ROW protection of 20.0 metres. The ROW limits are to be shown on all the drawings and the offset distance (10.0 metres) to be dimensioned from the existing centerline of pavement.
- Land for a road widening will be taken equally from both sides of a road, measured from the centreline in existence at the time of the widening if required by the City. The centreline is a line running down the middle of a road surface, equidistant from both edges of the pavement. In determining the centreline, paved shoulders, bus lay-bys, auxiliary lanes, turning lanes and other special circumstances are not included in the road surface.
- A 5.0 metres x 5.0 metres sight triangle will be required at the intersection of Gilmour Street and O'Connor Street and is to be shown on all drawings. The traffic signals would need to be relocated into the sight triangle when O'Connor Street is widened.
- All underground and above ground building footprints need to be shown on the plan to confirm the structure does not extend into existing property lines, sight triangles and/or future road widening requirements.
- Existing pavement marking and signing plan is required (prior to start of construction) adjacent to the site to ensure signing and curb side control is reinstated following construction.
- Site planning and streetscape will need to address pedestrian environment to ensure a 2.0 m wide clear ped zone and a street tree canopy to contribute to the quality of the ped environment and mitigate microclimate conditions.
- Parking garage access/egress needs to have the proper transitions and sight lines at the sidewalk approach.
- The concrete sidewalks should be 2.0 metres in width and be continuous and depressed through the proposed access (please refer to the City's sidewalk and curb standard drawing SC7.1).
- The TIA report is to address the parking situation for the existing building during the Phase I construction period, and for both the commercial & residential component.
- The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb and boulevard to City standards.
- For the precast concrete pavers on City's road right-of-way, the developer shall sign a "Maintenance and Liability Agreement" with the City to cover any claims.
- For any planter boxes/trees on the City's road right-of-way, an Encroachment Agreement along with a Maintenance Agreement will be required.
- 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.
- A construction Traffic Management Plan is to be provided for approval by the Senior Engineer, Traffic Management, Transportation Services Dept.

- Parks (SD)
 - Cash-in-lieu of parkland payment will be required.
 - A follow up meeting with staff will be required to discuss the requested amendment to provide a POPS rather than publicly owned space. SD to organise. This is a fundamental issue that needs resolution.
- Heritage (MK)
 - Previous comments from heritage staff still apply.
 - Application for new construction would be required for new construction under the Ontario Heritage Act.
 - There is an ongoing update to the Centretown HCD.
 - A CHIS is required and should be completed as soon as possible in the process to inform the design.
 - Q has a heritage consultant been engaged?
 - Transition will be a component to consider in the design along with materiality.
- Questions and comments from the Community Association representative (JH)
 - Comment, looking for clarification on the comment that the CDP is amenable to 30 storeys. SD – There is specific policy direction for the site at 267 O'Connor in the Centretown Secondary Plan that allows for an increase in height along with the landmark building provisions (if satisfied). The application will have to justify the additional height requested and all other policy amendments.
 - Comment Public spaces, thinks it is a good idea for a design competition.
 Would like residents to be involved in the process.
 - Tall trees shown on the slides, would like to see this achieved.
 - Question articulation at the base and top of the building, can the architect expand on this?
 - BH Would not be opposed to have the public participate in the design competition, has been successful in other projects. Regarding articulation, the project needs to show an appropriate scale at the public realm (similar to the project at Laurier and Friel, see below). Regarding the top, the team is looking at an approach to hide the mechanical penthouse in an attractive manner. Noted an example at the Lansdowne site.



BH - Agrees that the street trees are important to the site and will be a design challenge. There have been lessons learned from other projects on how to best create a proper growing medium. Q - Affordable housing piece? DH – Engaged with the ward office regarding the topic of affordability. Any sense on the proportion? DH, working with the CMHC on applying for a housing program they offer.

Submission requirements and fees

Next steps

- Encourage applicant to discuss the proposal with Councillor, community groups and neighbours
- o SD to set up follow up meeting regarding the public space discussion.
- o Jack Hanna, willing to organize a follow up meeting with the Community Association.
- o SD to discuss with UDRP staff on setting up a review team for the project.

Guy Forget

From: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>

Sent: Tuesday, August 25, 2020 4:07 PM

To: Guy Forget
Cc: Mottalib, Abdul

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

Okay thanks.

Please share with me when you will have better understanding with the servicing for this site. As usual every tower will have two service laterals, one for storm service and the other one for sanitary service lateral.

Please note we will also be looking for the foundation drainage and weeping tile connection to the city system.

--

Thanks,

Abdul

Mohammad Abdul Mottalib, P. Eng.

Extension: 27798

From: Guy Forget <gforget@jlrichards.ca>

Sent: August 25, 2020 3:44 PM

To: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca>

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

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Hi.

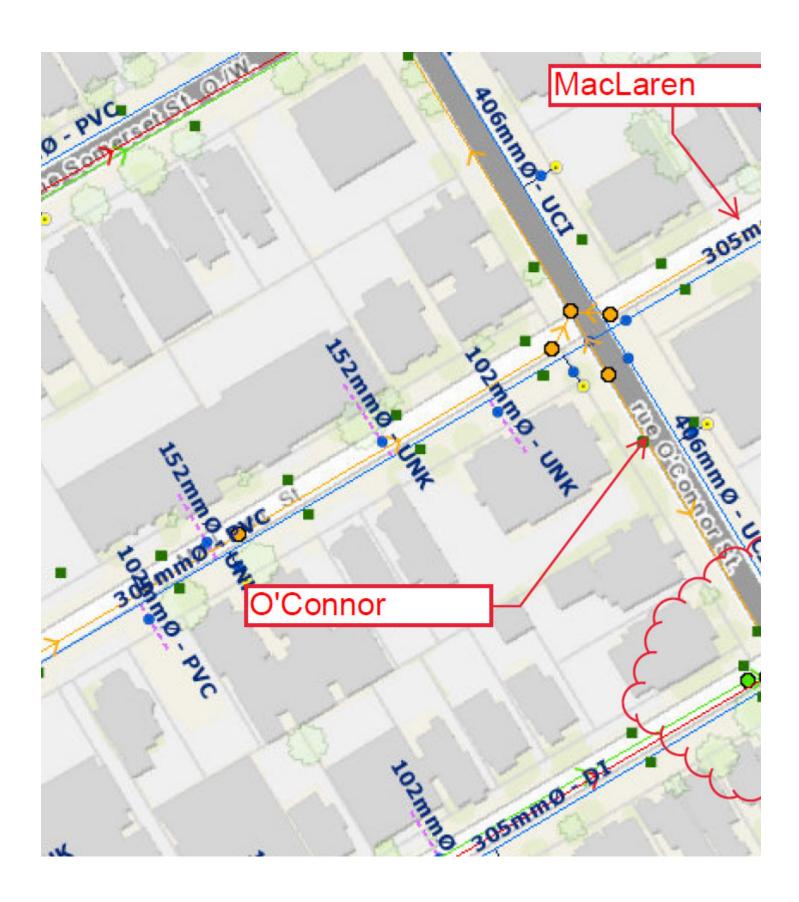
Thanks for the clarifications, the allowable peak flow will be net of the wastewater flows.

In terms of that on-site CB, we have yet move to detailed servicing. However, as per the CB lead connected to O'Connor Street (see the lateral in the cloud below), we intend to keep this service provided that it is good condition.

At this time, we have yet figured out the design for the subject site, however, if this existing sewer lateral is maintained, we intend to only discharge flows to this lateral once it has been controlled by means of ICDs.

Once we have a better understanding of our servicing, we will share it with you to get your opinion.

Guy



J.L. Richards & Associates Limited

700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1

Direct: 343-804-5363





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From: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca>

Sent: Tuesday, August 25, 2020 3:24 PM **To:** Guy Forget <gforget@jlrichards.ca>

Cc: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca >

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

Hi Guy,

For a site that will be connecting into a combine sewer system, C value is always 0.4. Sometimes we change the storm event from 2 year to 5 year depend on the site and its location. In this case, the c value will be 0.4 and the allowable release rate will be 5-year storm event for this site. You must control any storm event above 5 year and up to 100 year including 100year.

Yes, you need to subtract wastewater flow from the allow able release rate to find the net allowable release rate for storm event as the allowable release rate is for the whole site.

In you email you mentioned, one onsite existing CB will be connected on O'Connor combined sewer. Will there be a ICD at the outlet of the onsite CB to restrict the flow?

Could you please provide me a plan so that I can do a quick review of the plan?

--

Thanks,

Abdul

Mohammad Abdul Mottalib, P. Eng.

Extension: 27798

From: Guy Forget <gforget@jlrichards.ca>

Sent: August 25, 2020 2:03 PM

To: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca>

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

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Hi Abdul,

Thank you and the water resources team to have provided guidance with respect to the design criteria for 267 O'Connor.

Can you provide further clarifications as follows:

- Is the 1:5 year allowable peak flow based on the existing condition (i.e., C = 0.9)?
- Is the 1:5 year allowable flow based on the current Tc which is 10 minutes?
- Can we assume that the peak wastewater flows and groundwater flows do not have to be subtracted from the 1:5 year peak flow?

Thanks again.

Guy

Guy Forget, P.Eng., LEED AP Senior Water Resources Engineer

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From: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca>

Sent: Tuesday, August 25, 2020 1:14 PM **To:** Guy Forget <gforget@jlrichards.ca>

Cc: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca >

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

In this case, they are asking for a 5 year release rate and we can allow it because the general area does in fact have a 5 year level of service according to the O'Connor SWM model

__

Thanks,

Abdul

Mohammad Abdul Mottalib, P. Eng.

Extension: 27798

From: Guy Forget <gforget@jlrichards.ca>

Sent: August 20, 2020 6:55 PM

To: Mottalib, Abdul < Abdul.Mottalib@ottawa.ca>

Subject: Re: 267 O'Connor Street - Design Parameters Inquiry

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If you can follow up early next week, that would be great

Thanks

Guy,

I Just got confirmation from the water resources unit that we are okay for you to use a 5-year release rate for this site. Please note this approval is site specific and should not be referenced for other cases.

Guy Forget, P.Eng., LEED®AP
Senior Water Resources Engineer
J.L. Richards & Associates Limited
2013 Winner of Canada's Best Managed Companies program

864 Lady Ellen Place, Ottawa, ON K1Z 5M2 Tel: 613-728-3571 (ext. 1279) - Fax: 613-728-6012 www.ilrichards.ca

Guy Forget, P.Eng., LEED AP Senior Water Resources Engineer

J.L. Richards & Associates Limited 700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1 Direct: 343-804-5363



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From: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca>

Sent: August 20, 2020 5:27 PM

To: Guy Forget <gforget@jlrichards.ca>

Cc: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca>

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

Everyone is crazy busy now. Even though I will give them a call after 2/3 days.

--Thanks.

Abdul

Mohammad Abdul Mottalib, P. Eng.

Extension: 27798

From: Guy Forget <gforget@jlrichards.ca>

Sent: August 20, 2020 4:59 PM

To: Mottalib, Abdul < Abdul.Mottalib@ottawa.ca>

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

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Hi Abdul,

Thanks for coordinating, if this could be made a priority, we would appreciate it.

Just noticed that I forgot to revise one number in the text below the bullets, so here is the new version of the text, with the mark-up in red. Sorry, for the inconvenience:

This message is to request the City's consideration and confirmation of the design parameters for 267 O'Connor Street. Please find attached our spreadsheet calculations for the expected stormwater runoff as well as projected sanitary peak flows for the site. These calculations are summarized below:

Phase 1:

- Estimated Sanitary Peak flow (including infiltration from groundwater): 4.8 L/s;
- 2Yr. Release Rate (assuming C = 0.4): 15.3 L/s
- 5Yr. Release Rate (assuming C = 0.4): 30.5 L/s 20.7 L/s

Phase 1 & 2

- Estimated Sanitary Peak flow (including infiltration from groundwater): 9.4 L/s;
- 2Yr. Release Rate (assuming C = 0.4): 20.7 L/s 30.5 L/s
- 5Yr. Release Rate (assuming C = 0.4): 41.4 L/s

Once the sanitary flow is deducted from the above 2 year peak flow calculations, the allowable release rate would be excessively low. Using the 2 year release rate as the design criteria with a C of 0.4 would lead to a stormwater release rates as low as 10.5 L/s for Phase 1 and 11.3 L/s 21.1 L/s for the ultimate development. Once uncontrolled flows would be further subtracted from these values (as there are always some remaining strips of land along the property lines which are left uncontrolled), the allowable release rates would be closer to zero.

Under the Existing conditions, peak flows generated by the Site is approximately 68.7 L/s, under a 1:2 year storm with the current imperviousness being at a C=0.9 and Tc = 10 mins (calculated). Based on water consumption usage provided by Taggart, the existing sanitary flows are negligible as they are approximately 0.03 l/s based on an 8 hr working day.

Given the above, we ask that the City consider allowing the ultimate development to proceed based on an allowable release rate of no less than the equivalent of a 5 year storm, which would equal 41.40 L/s as a total combined release rate (meaning 32.0 L/s for the storm and 9.4 L/s for the wastewater). This would still allow an improvement to the City's existing combined system, while allowing for a more achievable design. The allowable release rate would be distributed to the current two (2) connections; one existing connection (on-site CB) is to the O'Connor combined system while the second connection is to MacLaren (sanitary/storm flows from the existing building).

We are happy to discuss and develop a solution together with the City.

Best Regards,

Guy

Guy Forget, P.Eng., LEED AP Senior Water Resources Engineer

J.L. Richards & Associates Limited 700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1 Direct: 343-804-5363





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From: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca >

Sent: Thursday, August 20, 2020 4:29 PM **To:** Guy Forget <gforget@jlrichards.ca>

Cc: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca >

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

Hi Guy,

FYI, I just forwarded boundary condition request to the water resources unit.

Thanks, Abdul

Mohammad Abdul Mottalib, P. Eng.

Extension: 27798

From: Guy Forget <gforget@jlrichards.ca>

Sent: August 20, 2020 7:16 AM

To: Mottalib, Abdul < Abdul. Mottalib@ottawa.ca>

Cc: Alexandre Tourigny <a tourigny@jlrichards.ca>; Fraser, Mark <<u>Mark.Fraser@ottawa.ca</u>>; Emily McGirr emily.mcgirr@taggart.ca>; Lucie Dalrymple ldalrymple@jlrichards.ca>

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

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Hope you are doing well.

If you can submit this email and attachments to the Water Resources Group as two of the peak flows previously shown were inadvertently reversed. I have made the corrections below in RED.

Abdul, would it be possible that this request be a priority to the Water Resources Group, as Taggart's sub-consultant Team are using as a submission target the first week of September, therefore our target would be <u>September 4, 2020</u>. Hence, it is critical for the Team to get a response back from the Water Resources Group as soon as possible. Here is our request with the numbers corrected.

This message is to request the City's consideration and confirmation of the design parameters for 267 O'Connor Street. Please find attached our spreadsheet calculations for the expected stormwater runoff as well as projected sanitary peak flows for the site. These calculations are summarized below:

Phase 1:

- Estimated Sanitary Peak flow (including infiltration from groundwater): 4.8 L/s;
- 2Yr. Release Rate (assuming C = 0.4): 15.3 L/s
- 5Yr. Release Rate (assuming C = 0.4): 30.5 L/s 20.7 L/s

Phase 1 & 2

- Estimated Sanitary Peak flow (including infiltration from groundwater): 9.4 L/s;
- 2Yr. Release Rate (assuming C = 0.4): 20.7 L/s 30.5 L/s
- 5Yr. Release Rate (assuming C = 0.4): 41.4 L/s

Once the sanitary flow is deducted from the above 2 year peak flow calculations, the allowable release rate would be excessively low. Using the 2 year release rate as the design criteria with a C of 0.4 would lead to a stormwater release rates as low as 10.5 L/s for Phase 1 and 11.3 L/s for the ultimate development. Once uncontrolled flows would be further subtracted from these values (as there are always some remaining strips of land along the property lines which are left uncontrolled), the allowable release rates would be closer to zero.

Under the Existing conditions, peak flows generated by the Site is approximately 68.7 L/s, under a 1:2 year storm with the current imperviousness being at a C=0.9 and Tc = 10 mins (calculated). Based on water consumption usage provided by Taggart, the existing sanitary flows are negligible as they are approximately 0.03 l/s based on an 8 hr working day.

Given the above, we ask that the City consider allowing the ultimate development to proceed based on an allowable release rate of no less than the equivalent of a 5 year storm, which would equal 41.40 L/s as a total combined release rate (meaning 32.0 L/s for the storm and 9.4 L/s for the wastewater). This would still allow an improvement to the City's existing combined system, while allowing for a more achievable design. The allowable release rate would be distributed to the current two (2) connections; one existing connection (on-site CB) is to the O'Connor combined system while the second connection is to McLaren (sanitary/storm flows from the existing building).

We are happy to discuss and develop a solution together with the City.

Best Regards,

Guy Forget, P.Eng., LEED AP Senior Water Resources Engineer

J.L. Richards & Associates Limited 700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1

Direct: 343-804-5363





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From: Fraser, Mark < Mark.Fraser@ottawa.ca > Sent: Wednesday, August 19, 2020 6:02 PM
To: Alexandre Tourigny <atourigny@jlrichards.ca >

Cc: Guy Forget <<u>gforget@jlrichards.ca</u>>; Mottalib, Abdul <<u>Abdul.Mottalib@ottawa.ca</u>>

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

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Hi Alex,

Sorry, I did not received the below email due to my email address being incorrect.

I have accept another position within the City thus I'm unable to assist in responding to the below email at this time. I will forward the below email on for somebody in DR to be able to assist and provide direction on this pre-consultation file moving forward.

Regards,

Mark Fraser, P.Eng.

Engineer, Infrastructure Projects (T)

Rail Construction Program | Programme de construction du train léger Transportation Services Department | Direction générale des transports City of Ottawa | Ville d'Ottawa 141 Laurier Avenue W. Suite 300 | 141 avenue Laurier O., bureau 300

Ottawa, ON K2P 2P7

Email: Mark.Fraser@ottawa.ca

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^{*}Please consider your environmental responsibility before printing this e-mail

From: Alexandre Tourigny <atourigny@jlrichards.ca>

Sent: August 19, 2020 3:21 PM

To: Fraser, Mark < <u>Mark.Fraser@ottawa.ca</u>>
Cc: Guy Forget < gforget@jlrichards.ca>

Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

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Hi Mark,

Just looking for a status update on when we can expect the following criteria?

Thanks, Alex

Alexandre Tourigny

Civil Engineering Designer

J.L. Richards & Associates Limited 700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1 Direct: 343-803-4522





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From: Alexandre Tourigny

Sent: Tuesday, August 4, 2020 5:08 PM

To: Marc.fraser@ottawa.ca

Cc: Guy Forget <gforget@jlrichards.ca>

Subject: 267 O'Connor Street - Design Parameters Inquiry

Hi Mark,

This message is to request the City's consideration and confirmation of the design parameters for 267 O'Connor Street. Please find attached our spreadsheet calculations for the expected stormwater runoff as well as projected sanitary peak flows for the site. These calculations are summarized below:

Phase 1:

- Estimated Sanitary Peak flow (including infiltration from groundwater): 4.8 L/s;
- 2Yr. Release Rate (assuming C = 0.4): 15.3 L/s
- 5Yr. Release Rate (assuming C = 0.4): 30.5 L/s

Phase 1 & 2

- Estimated Sanitary Peak flow (including infiltration from groundwater): 9.4 L/s;
- 2Yr. Release Rate (assuming C = 0.4): 20.7 L/s
- 5Yr. Release Rate (assuming C = 0.4): 41.4 L/s

Once the sanitary flow is deducted from the above 2 year peak flow calculations, the allowable release rate would be excessively low. Using the 2 year release rate as the design criteria with a C of 0.4 would lead to a stormwater release rates as low as 10.5 L/s for Phase 1 and 11.3 L/s for the ultimate development. Once uncontrolled flows would be further subtracted from these values (as there are always some remaining strips of land along the property lines which are left uncontrolled), the allowable release rates would be closer to zero.

Existing conditions for the site likely generate peak flows of approximately 68.7 l/s, under a 2 year storm with on a C=0.9 and tc = 10 mins. Based on water consumption usage provided by Taggart, the existing sanitary flows are negligible as they are approximately 0.03 l/s based on an 8 hr working day.

Given the above, we ask that the City consider allowing the ultimate development to proceed based on an allowable release rate of no less than the equivalent of a 5 year storm, which would equal 41.40 L/s as a total combined release rate (meaning 32.0 L/s for the storm and 9.4 L/s for the wastewater). This would still allow an improvement to the City's existing combined system, while allowing for a more achievable design.

We are happy to discuss and develop a solution together with the City.

Best Regards,

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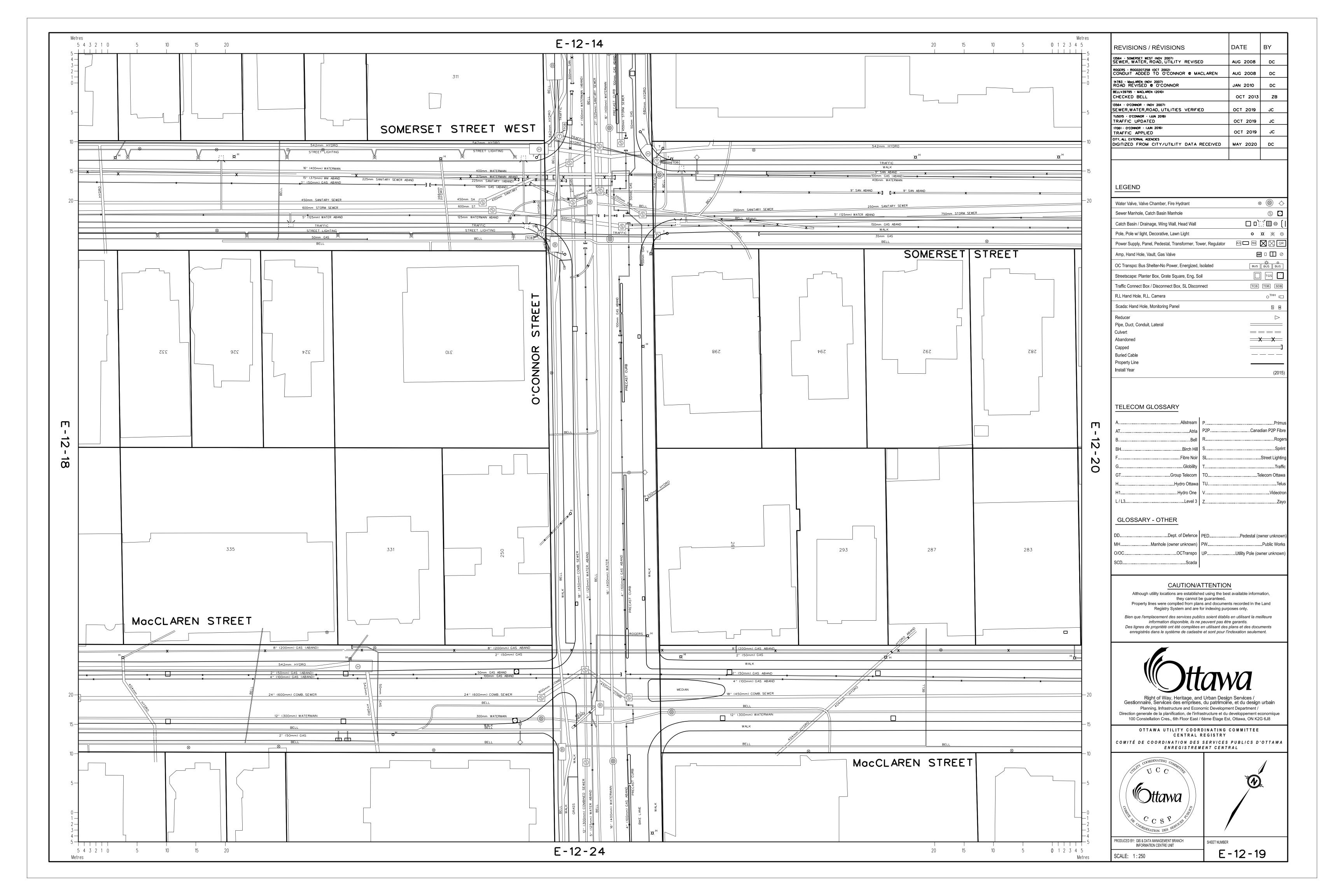
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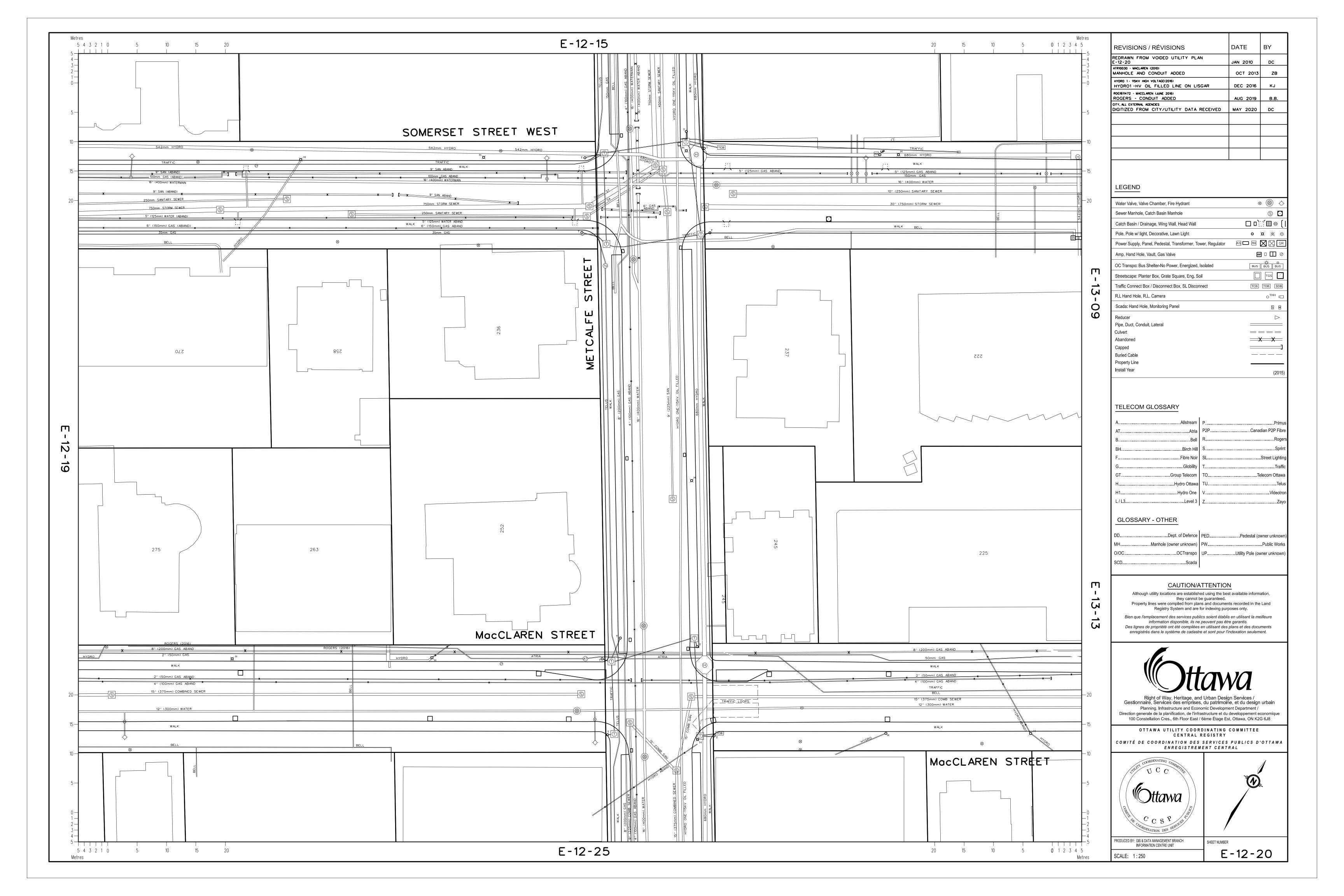
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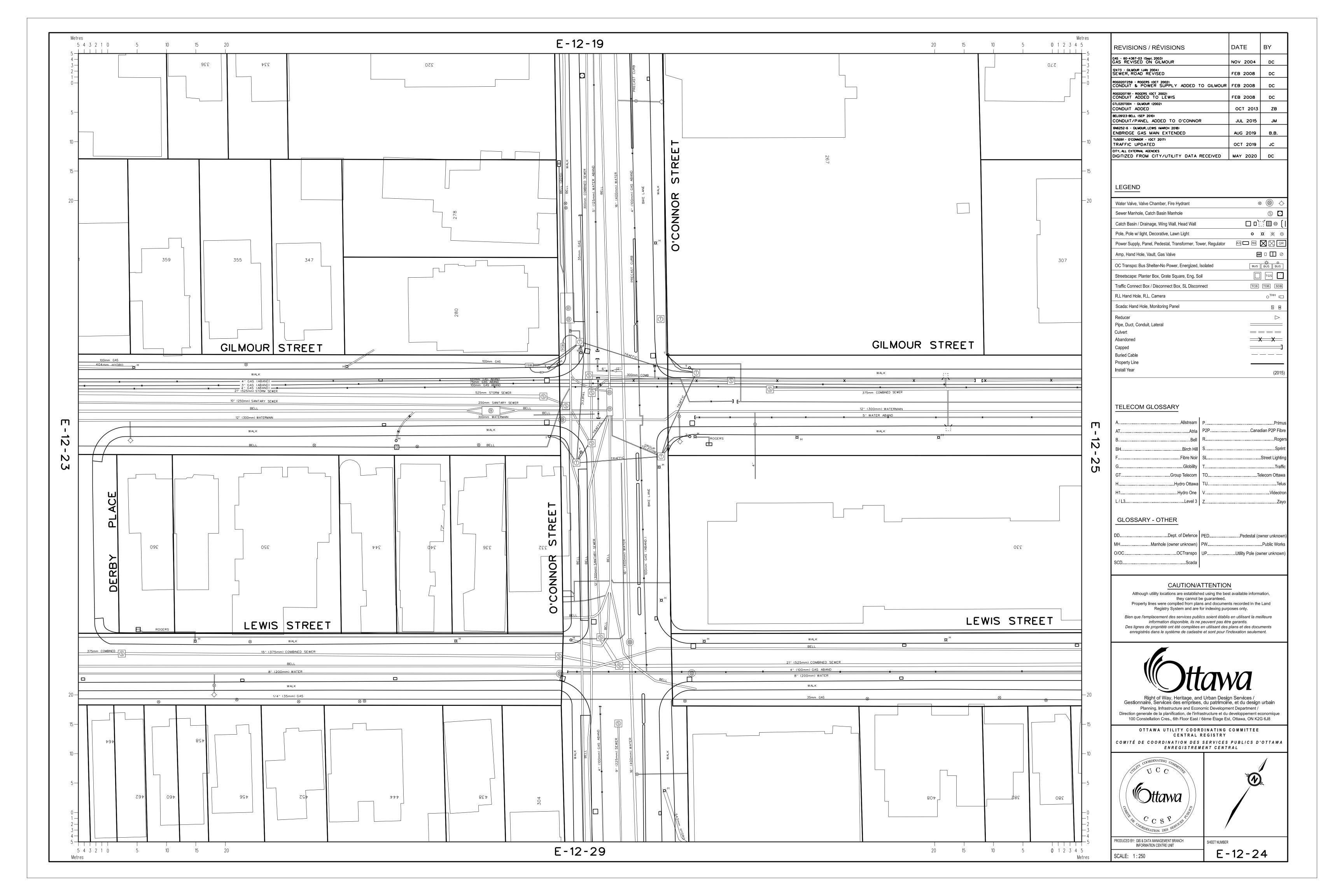
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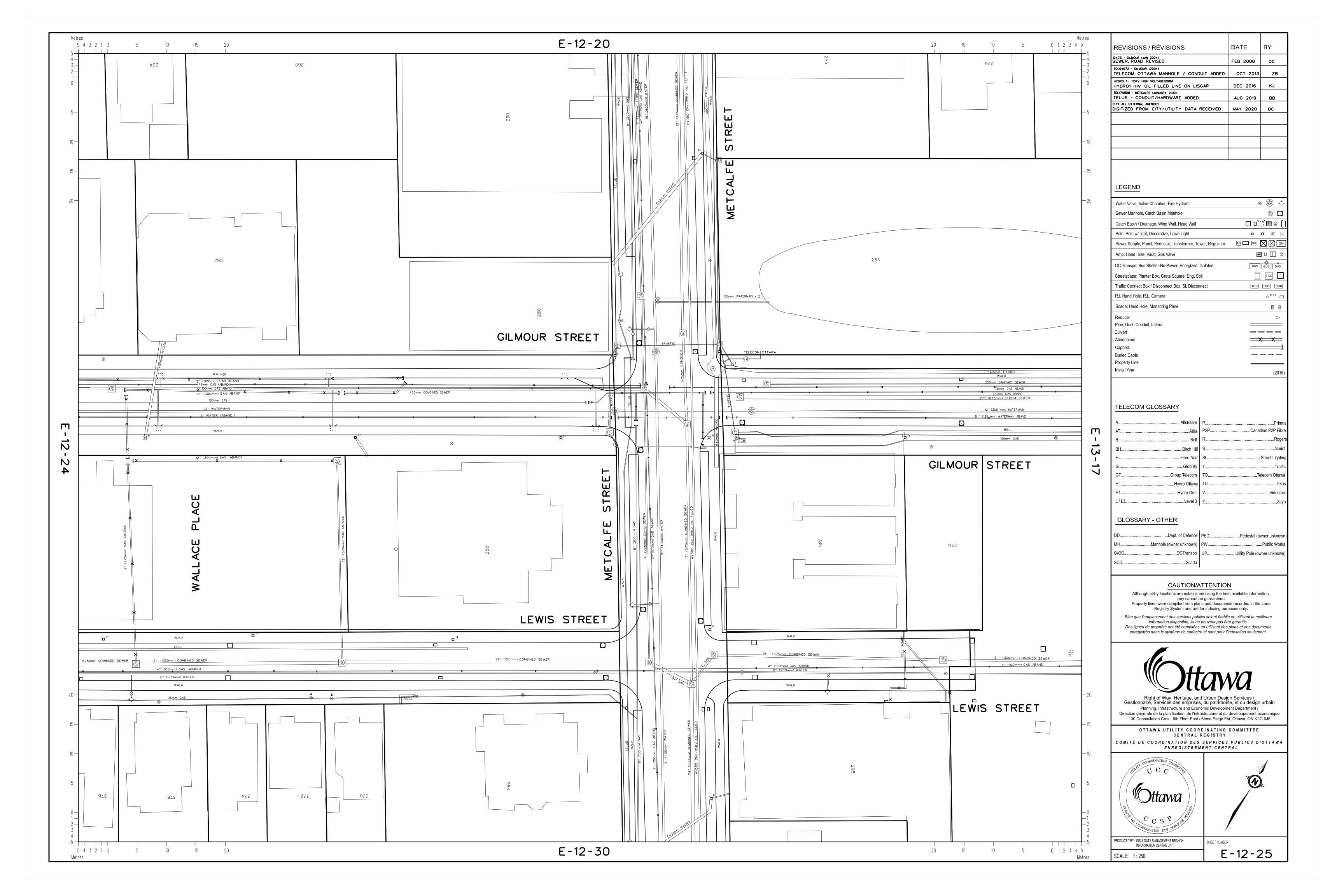
Appendix C

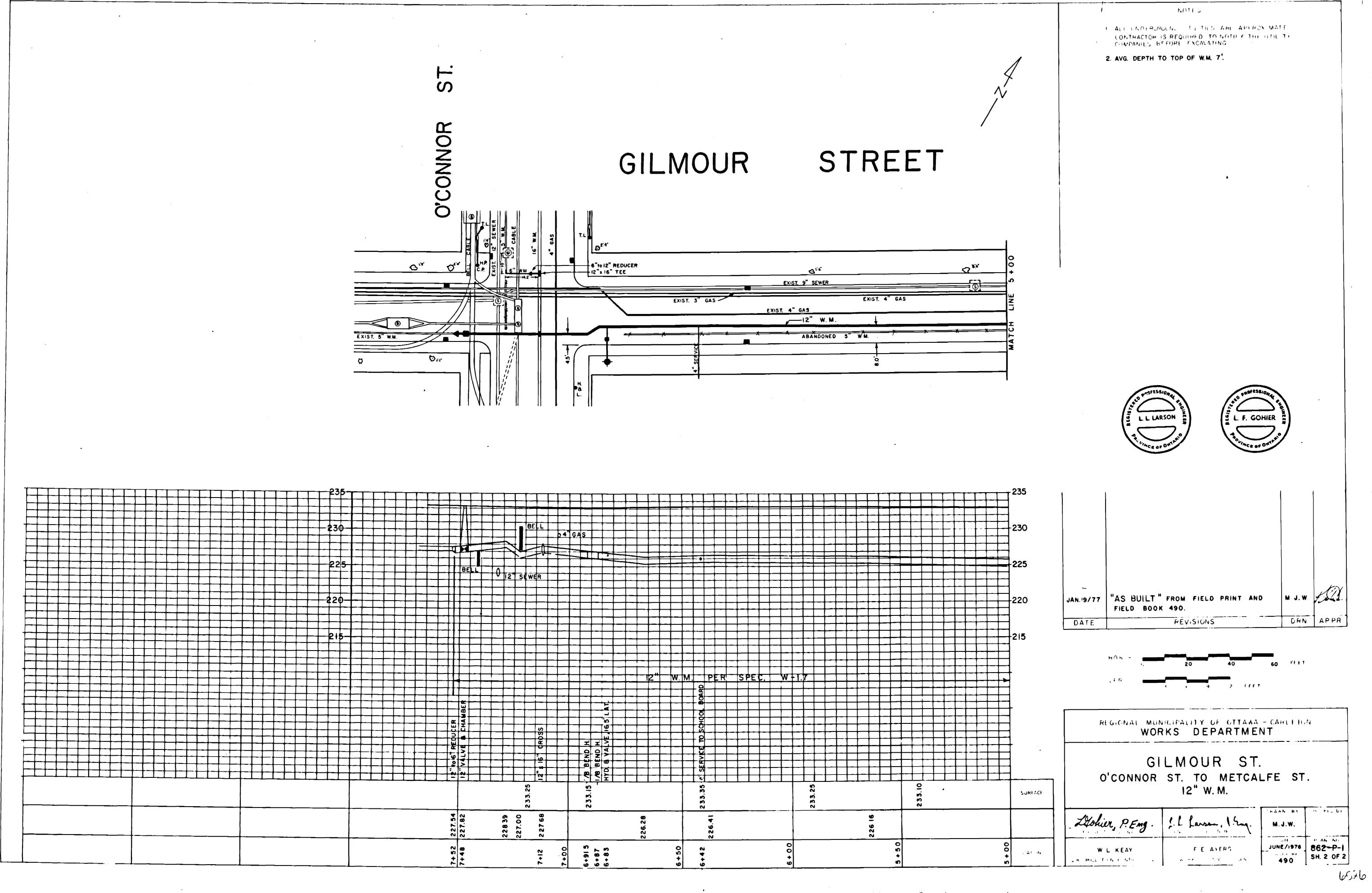
Background Drawings

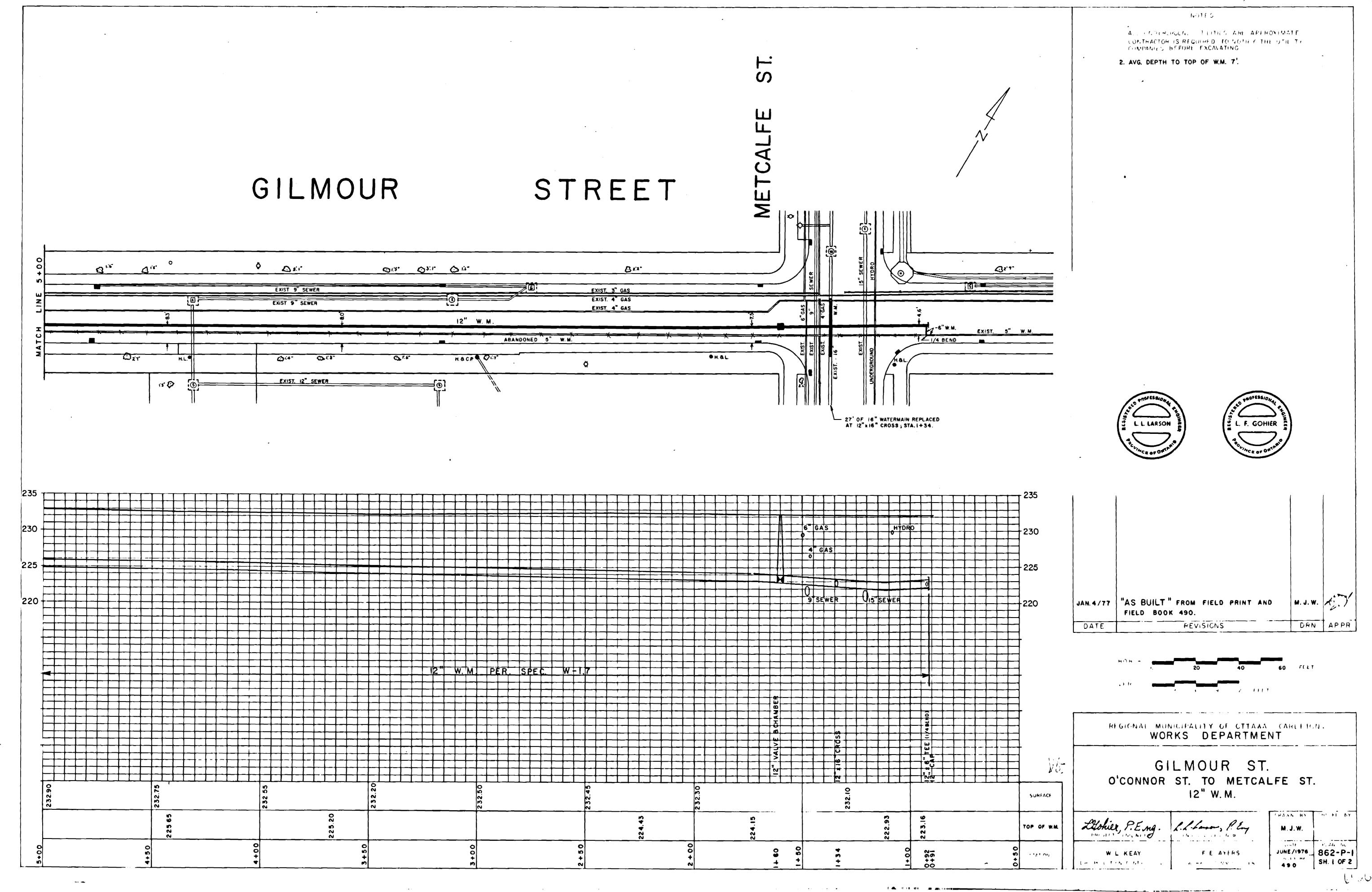


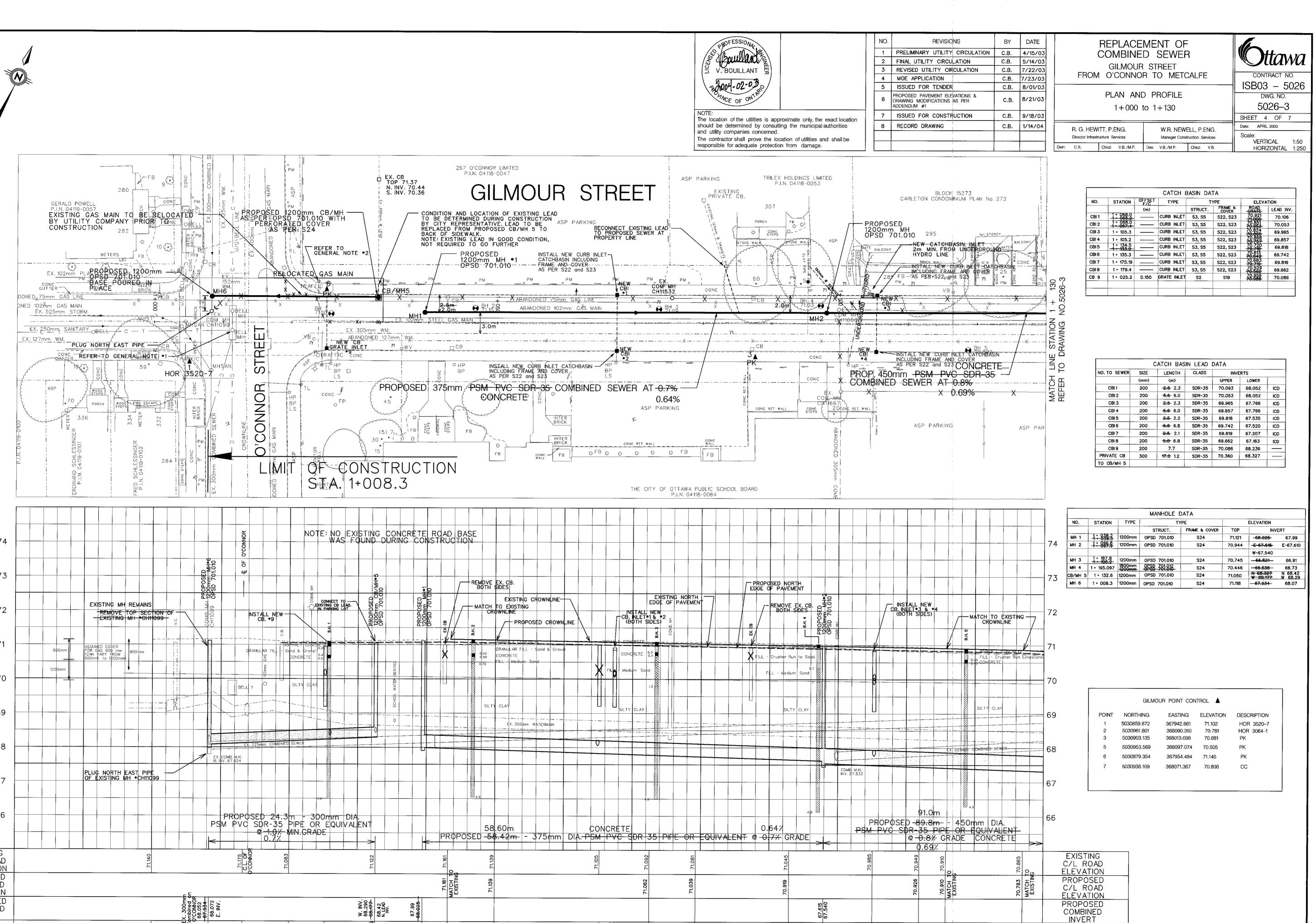




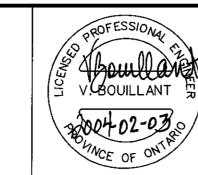








CHAINAGE

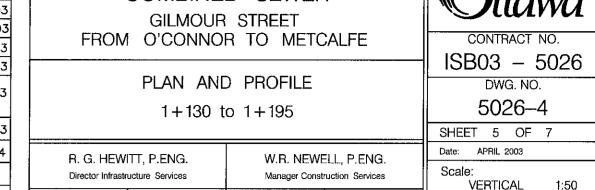


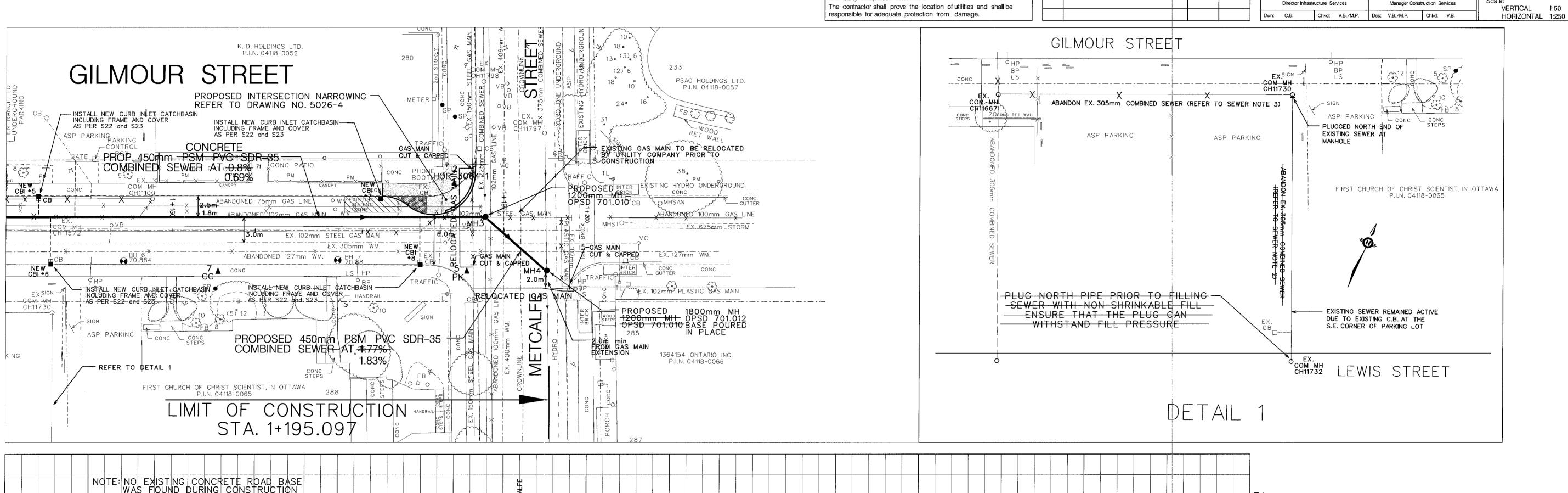
The location of the utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be

	NO.	REVISIONS	·	BY	DATE				
	1	PRELIMINARY UTILITY CIRCULATION	ON	C.B.	4/15/03				
	2	FINAL UTILITY CIRCULATION		C.B.	5/14/03				
	3	REVISED UTILITY CIRCULATION	TY CIRCULATION C.B. 4 CULATION C.B. 5 CIRCULATION C.B. 7 C.B. 7 C.B. 7 C.B. 8 ELEVATIONS & C.B. 8 STRUCTION C.B. 9						
	4	MOE APPLICATION		C.B.	7/23/03				
	5	ISSUED FOR TENDER		C.B.	8/01/03				
	6	PROPOSED PAVEMENT ELEVATIONS & DRAWING MODIFICATIONS AS PER ADDENDUM #1		C.B.	8/21/03				
	7	ISSUED FOR CONSTRUCTION		C.B.	9/18/03				
i	8	RECORD DRAWING		C.B.	1/14/04				

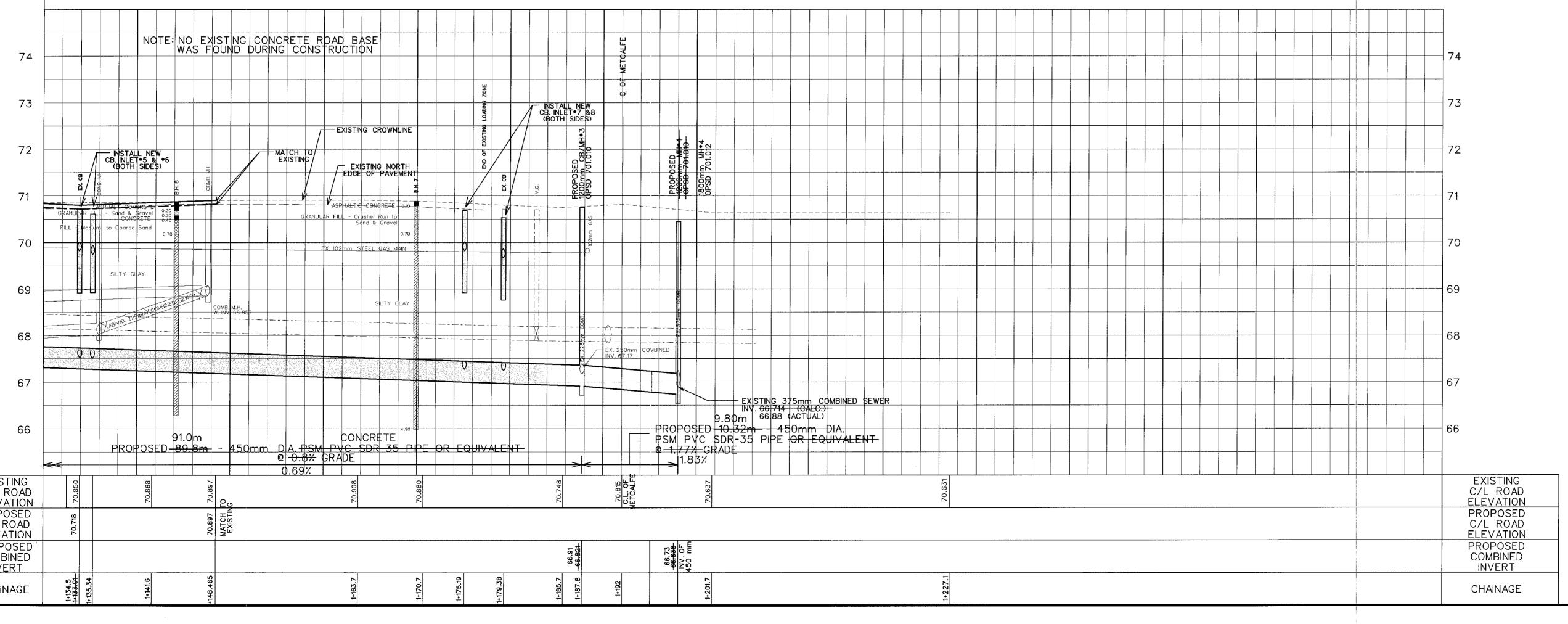
REPLACEMENT OF COMBINED SEWER GILMOUR STREET FROM O'CONNOR TO METCALFE

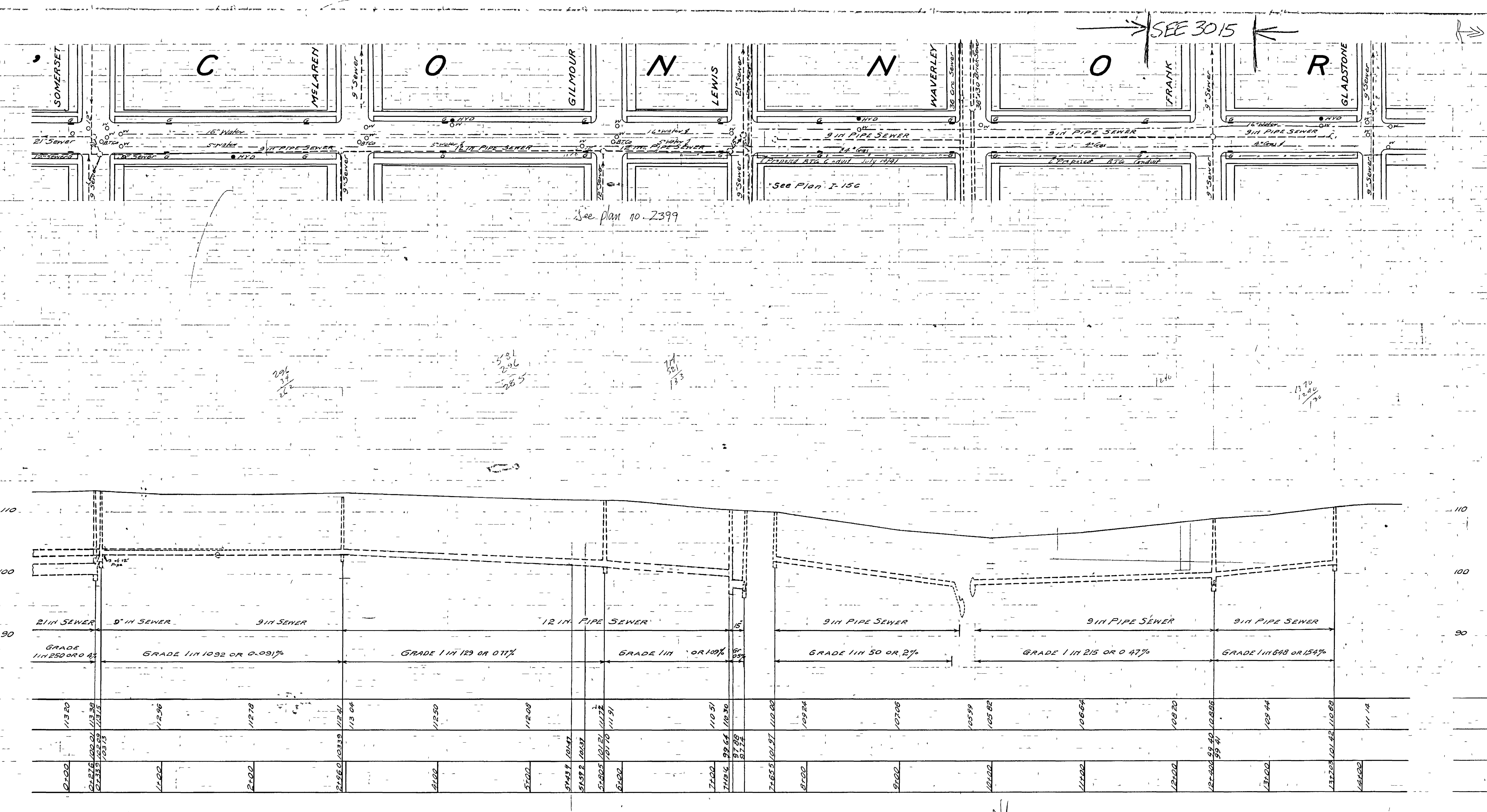
R. G. HEWITT, P.ENG. W.R. NEWELL, P.ENG. Manager Construction Services Director Infrastructure Services Chkd: V.B./M.P. Des: V.B./M.P. Chkd: V.B.





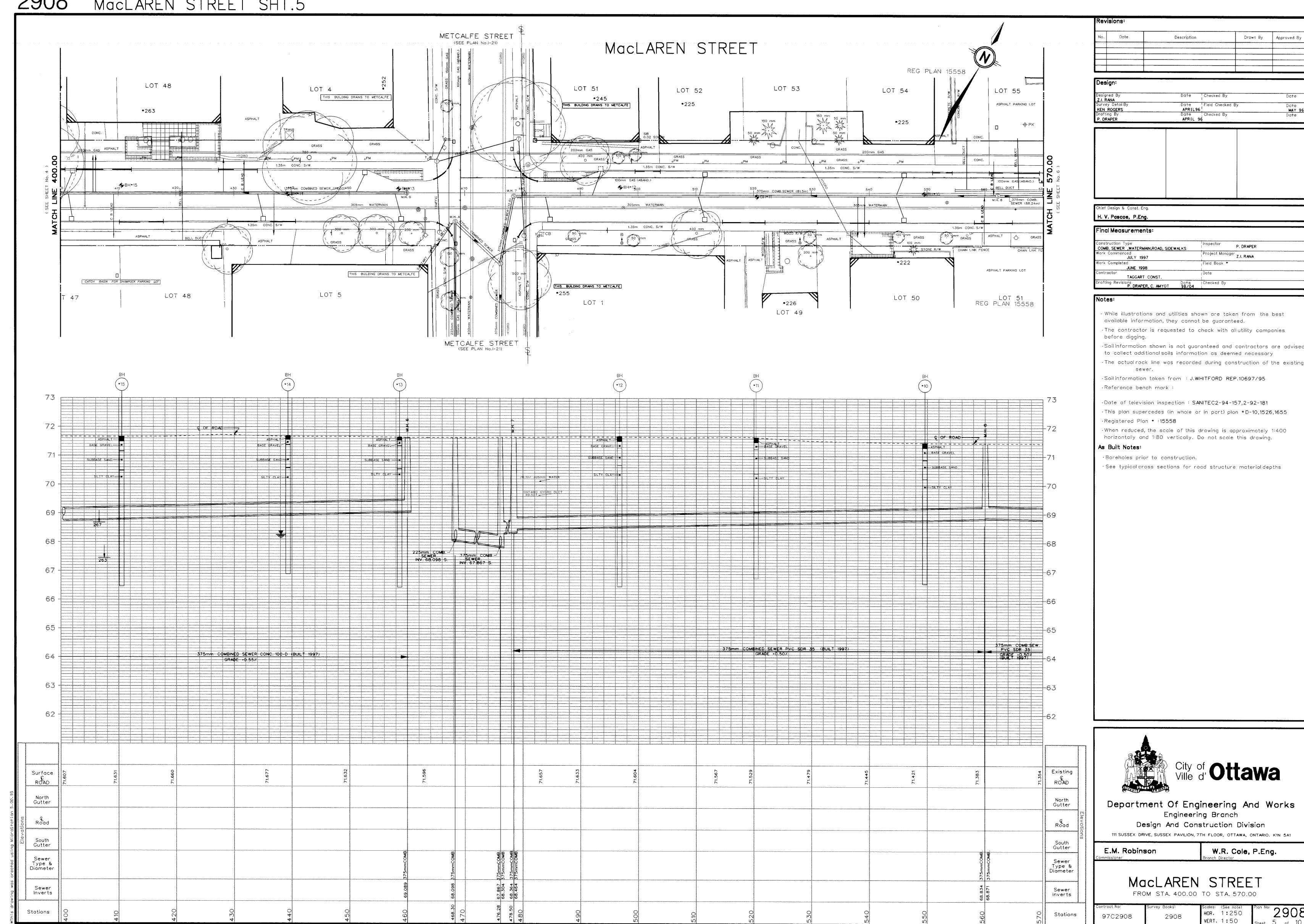
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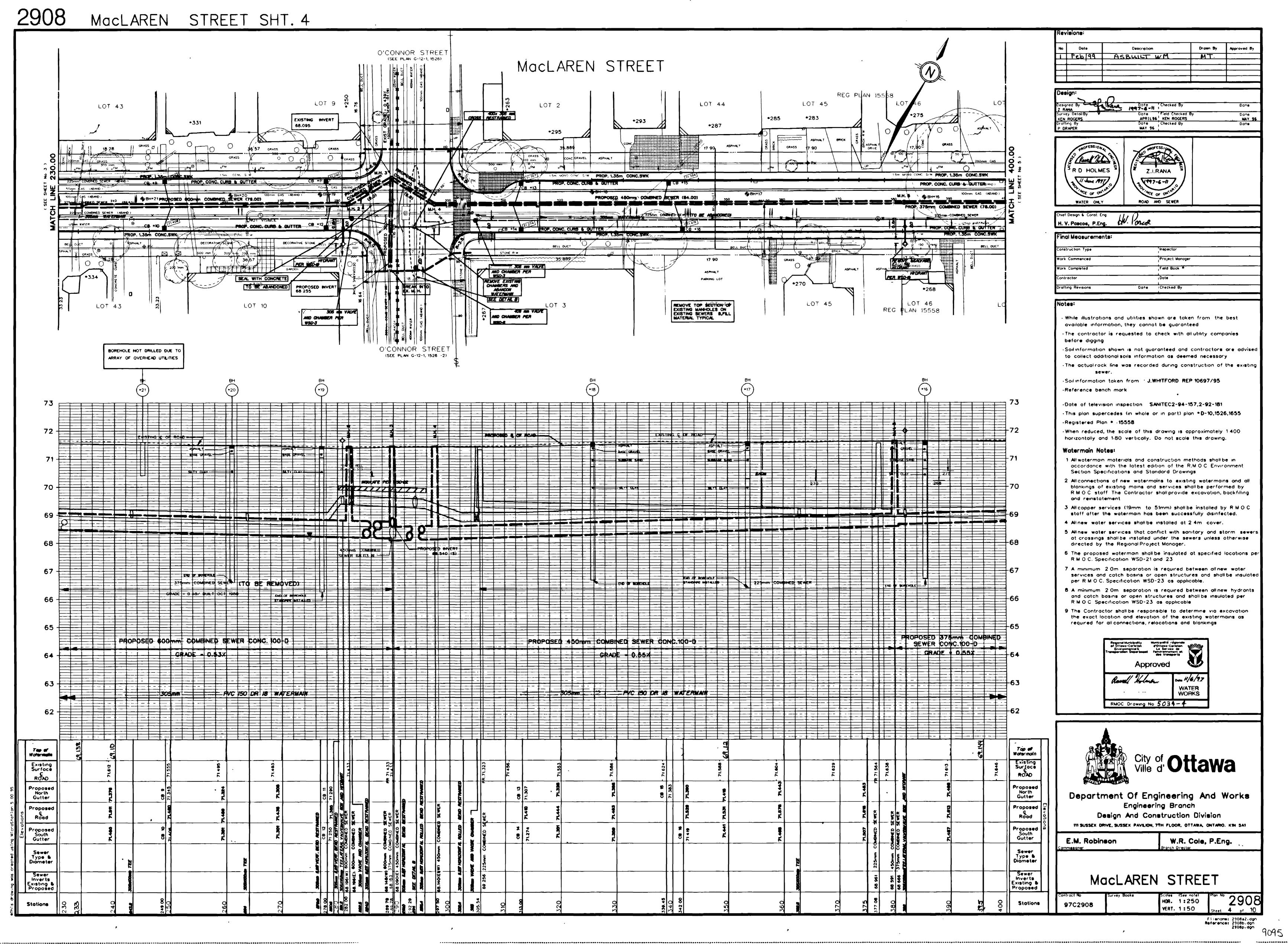


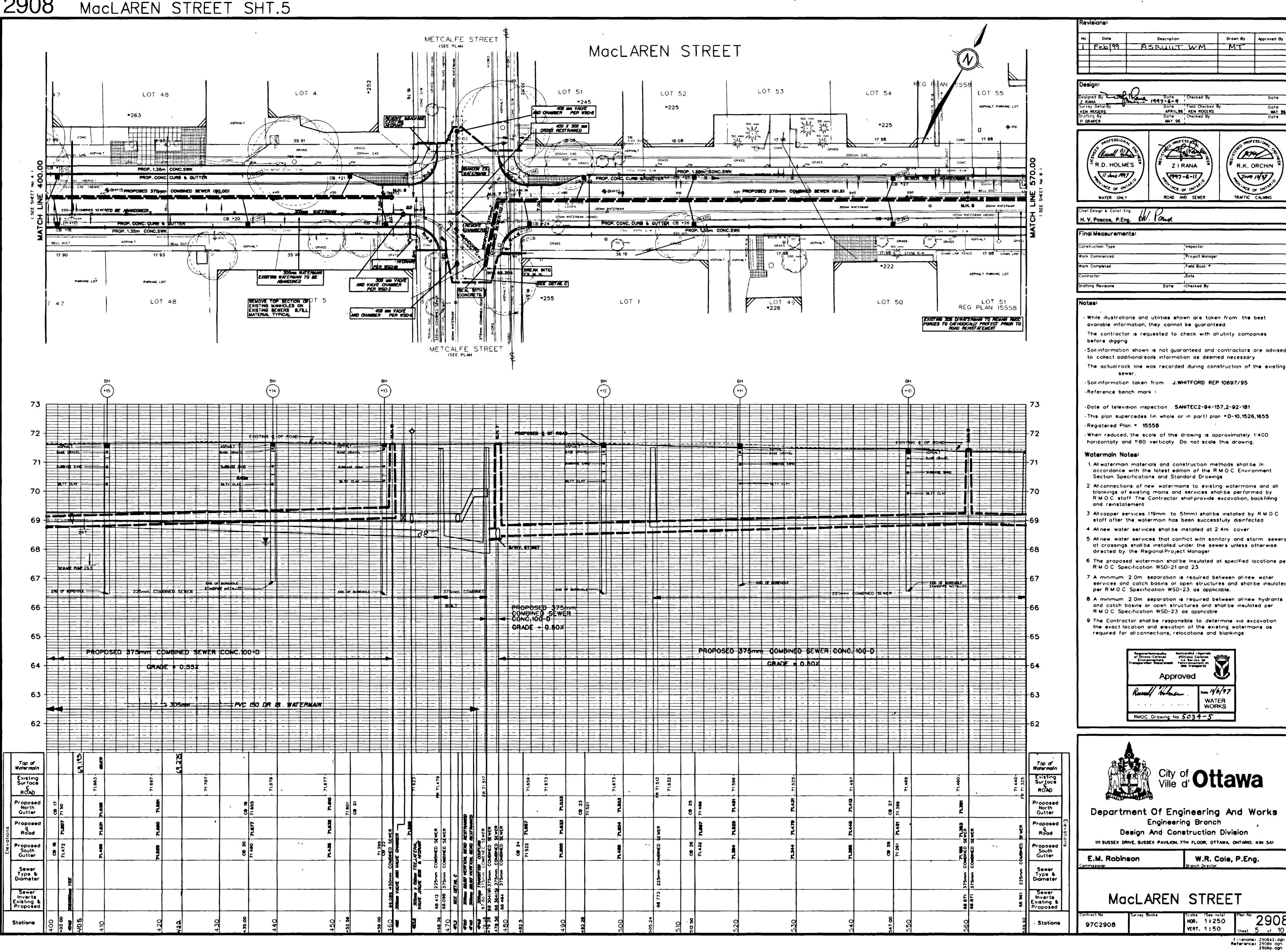


MacLAREN STREET SHT. 4 O'CONNOR STREET (SEE PLAN G-12-1, 1526) Description Drawn By Approved B MacLAREN STREET LOT 4 LOT 45 LOT 43 LOT 44 LOT 2 *283 *285 •293 •287 GRASS 450mm COMB.SEWER (84.0m) H. V. Pascoe, P.Eng. 1.35m CONC. S/W DECORATIVE STONE BELL DUCT Final Measurements: DECORATIVE STONE Construction Type

COMB. SEWER ,WATERMAIN,ROAD, SIDEWALKS Project Manager Z.I. RANA P. DRAPER, C. AMYOT LOT 10 LOT 3 LOT 44 LOT 45 LOT 46 REG PLAN 15558 HSE.*334,336 ON SAME SANITARY SERVICE · While illustrations and utilities shown are taken from the best available information, they cannot be guaranteed. ·The contractor is requested to check with all utility companies before digging. -Soil information shown is not guaranteed and contractors are advised to collect additional soils information as deemed necessary -The actualrock line was recorded during construction of the existing ·Soil information taken from : J.WHITFORD REP.10697/95 -Reference bench mark : -Date of television inspection: SANITEC2-94-157,2-92-181 -This plan supercedes (in whole or in part) plan #D-10,1526,1655 ·Registered Plan * :15558 -When reduced, the scale of this drawing is approximately 1:400 horizontally and 1:80 vertically. Do not scale this drawing. As Built Notes: ·Boreholes prior to construction. · See typical cross sections for road structure material depths Existing Ç ROAD Ç ROAD North Gutter North Gutter Department Of Engineering And Works Engineering Branch Q Road С Road Design And Construction Division 111 SUSSEX DRIVE, SUSSEX PAVILION, 7TH FLOOR, OTTAWA, ONTARIO. KIN 5A1 South Gutt**e**r South Gutter E.M. Robinson W.R. Cole, P.Eng. Sewer Type & Diameter Sewer Type & Diameter MacLAREN STREET Sewer Inverts Sewer inverts FROM STA.230.00 TO STA.400.00 10: 2908 11 10 Scales: (See note)
HOR. 1:250
VERT. 1:50 Stations Stations 2908 97C2908





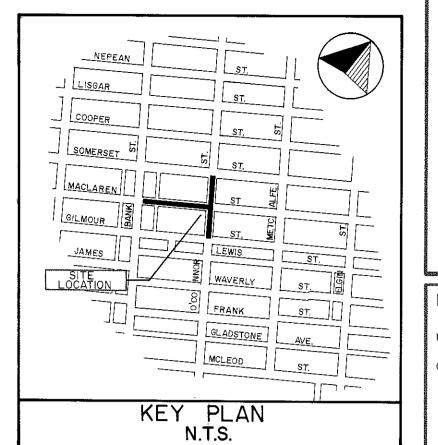


9095 ** ASPHALT SIDEWALK

CONCRETE PRECAST CURBS POST

ASPHALT SIDEWALK

CONCRETE RAMP



City Of Ottawa Department Of Physical Environment Engineering And Surveys Branch

 Utilities shown are taken from best available records. Contractor is requested to check with all utility companies before digging.
 Soil information shown is not guaranteed and contractors are advised to collect additional soils information as deemed necessary.
 Date of survey: June/79 · Reference bench mark: ICS-310 Bank St. opposite Florence St. (Elev. 71.137)

Notes: (Sewer Construction Only)

A minimum of 460 mm vertical clearance to be maintained between sewers and watermains where practical.
Borehole soil descriptions are not based on sieve analysis but on visual inspection only. Except where otherwise noted.
Soil information taken from · Existing sewers constructed in:

· This plan supercedes (in whole or in part) plan no: C-36-C, I-5-C Actual rock line recorded during construction of existing sewer. · Registered plan no.

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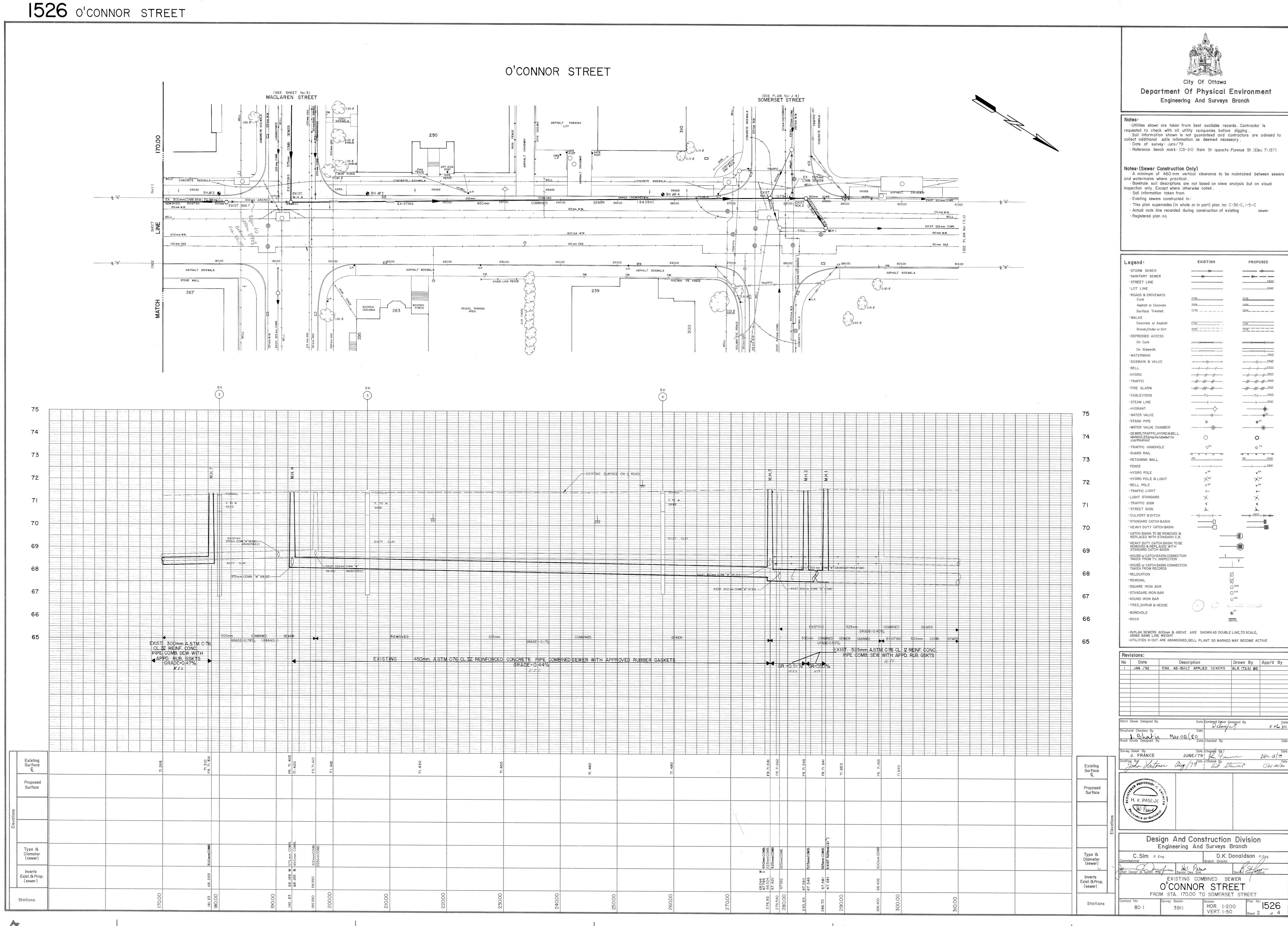
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	1 15 marks.	Mar 05/80		
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Existing Surface E Existing Surface Proposed Surface Proposed Surface Exist. & Prop. (sewer) Stations



**Appendix D1** 

Water Demand Calculations

## Water Demand Calculations 267 O'Connor (JLR 29056-000)

PHASE 1 - Tower (North)

Unit Breakdown	No.	Person Per Unit (Table 4.1)
Studio	35	1.4
1 Bed	142	1.4
1 bed + den	3	1.4
2 bed	89	2.1
2 bed + den	2	2.1
Totla Unit Count =	271	
No. of Studios & 1-bedroom	180	units
Density	1.4	p/p/u
No. Ppl	252	ppl
No. of 2-bedroom	91	units
Density	2.1	p/p/u
No. Ppl	192	ppl
Total Population	444	ppl
Average Day Consumption Rate	280	L/c/d
Average Day Demand	1.44	L/s
Maximum Day Peaking Factor	3.02	x Avg Day (Table 3-3 MOE)
Maximum Day Demand	4.35	L/s
Peak Hour Peaking Factor	4.54	x Avg Day (Table 3-3 MOE)
Peak Hour Demand	6.53	L/s
Minimum Hour Peaking Factor	0.30	x Avg Day (Table 3-1 MOE)
Minimum Hour Demand	0.43	L/s

PHASE 2 - Tower (South)

Unit Breakdown	No.	Person Per Unit (Table 4.1)
Studio	21	1.4
1 Bed	138	1.4
1 bed + den	9	1.4
2 bed	51	2.1
2 bed + den	10	2.1
Totla Unit Count =		2.1
	229	
No. of Studios & 1-bedroom	168	units
Density	1.4	p/p/u
No. Ppl	236	ppl
No. of 2-bedroom	61	units
Density	2.1	p/p/u
No. Ppl	129	ppl
Total Population	365	ppl
Average Day Consumption Rate	280	L/c/d
Average Day Demand	1.18	L/s
Maximum Day Peaking Factor	3.34	x Avg Day (Table 3-1 MOE)
Maximum Day Demand	3.95	L/s
Peak Hour Peaking Factor	5.01	x Avg Day (Table 3-1 MOE)
Peak Hour Demand	5.93	L/s
Minimum Hour Peaking Factor	0.24	x Avg Day (Table 3-1 MOE)
Minimum Hour Demand	0.29	L/s

## **Appendix D2**

Hydraulic Boundary Condition E-Mail

### **Guy Forget**

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: Tuesday, August 11, 2020 1:21 PM

**To:** Annie Williams

Cc: emily.mcgirr@taggart.ca; Lucie Dalrymple; Guy Forget; Alexandre Tourigny; Mottalib, Abdul

Subject: RE: 267 O'Connor Street - Request for Hydraulic Boundary Conditions

**Attachments:** 267 Oconnor August 2020.pdf

**[CAUTION]** This email originated from outside JLR. Do not click links or open attachments unless you recognize the sender and know the content is safe. If in doubt, please forward suspicious emails to Helpdesk.

Hi Annie,

Please find below boundary conditions, HGL, as provided by the Water Resources Unit for hydraulic analysis at **267 O'Connor Street** (zone 1W) assumed to be connected to the 305mm dia. watermain on MacLaren St., 406mm dia. watermain on O'Connor St. and the 305mm dia. watermain on Gilmour St. (see attached PDF for locations).

	MacLaren St. Connection	O'Connor St. Connection	Gilmour St. Connection
Min HGL	106.9m	106.9m	106.8m
Max HGL	115.0m	115.0m	115.0m

#### **Fire Flow Analysis:**

Please note the following analysis assumes the design fire flow is tested at a single node at a time. Furthermore, no future watermains on the subject site was included that could potentially impact the results.

#### **MacLaren St. Connection**

Max Day + FF (333 L/s) = 107.7m

Max Day + FF (383 L/s) = 107.2m

#### O'Connor St. Connection

Max Day + FF (333 L/s) = 108.0m

Max Day + FF (383 L/s) = 107.7m

#### **Gilmour St. Connection**

Max Day + FF (333 L/s) = 107.1m

Max Day + FF (383 L/s) = 106.5m

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

**Disclaimer**: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties

of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Regards,

Mark Fraser, P. Eng.

Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791

Fax: 613-580-2576 Mail: Code 01-14

Email: Mark.Fraser@ottawa.ca

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From: Annie Williams <a williams@jlrichards.ca>

Sent: July 31, 2020 6:04 PM

To: Fraser, Mark < Mark. Fraser@ottawa.ca>

Cc: emily.mcgirr@taggart.ca; Lucie Dalrymple <ldalrymple@jlrichards.ca>; Guy Forget <gforget@jlrichards.ca>;

Alexandre Tourigny <atourigny@jlrichards.ca>

Subject: RE: 267 O'Connor Street - Request for Hydraulic Boundary Conditions

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

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

Hi Mark,

I wanted to add that if no hydrants are proposed on site then NFPA 13 would govern, which would be a 69 L/s fire flow. May we please also receive a 3rd fire flow boundary condition using this value.

Thank you,

Annie

**Annie Williams**, P.Eng. Civil Engineer

J.L. Richards & Associates Limited 700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1

Direct: 343-803-4523





J.L. Richards & Associates Limited is proactively doing our part to protect the wellbeing of our staff and communities at large. Our staff members are working remotely and we remain fully operational, delivering quality services to you through value and commitment, as always. Please reach out to us if you have any questions about your project.

From: Annie Williams

Sent: Friday, July 31, 2020 4:46 PM

To: Fraser, Mark < Mark. Fraser@ottawa.ca >

**Cc:** <a href="mailto:emily.mcgirr@taggart.ca">emily.mcgirr@taggart.ca</a>; Lucie Dalrymple <a href="mailto:ldalrymple@jlrichards.ca">ldalrymple@jlrichards.ca</a>; Guy Forget <a href="mailto:gforget@jlrichards.ca">gforget@jlrichards.ca</a>;

Alexandre Tourigny <a tourigny@jlrichards.ca>

Subject: 267 O'Connor Street - Request for Hydraulic Boundary Conditions

#### Hi Mark,

We are preparing the detailed design of site servicing in support of Taggart's 267 O'Connor Street development located in the downtown area of the City of Ottawa. We request hydraulic water boundary conditions to complete a hydraulic network analysis. The required development details are as follows.

- 1. Two Phases (Phase 1 and 2) of high density residential development Apartment buildings;
- 2. Location of Development: 267 O'Connor Street between intersections with Gilmour Street and MacLaren Street (refer to attached Figure);
- 3. Location of Requested Boundary Conditions: 3 potential water service connection locations: MacLaren, O'Connor and Gilmour Street as shown on the attached Figure.

#### Estimated Water Demands:

Phase ID	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Estimated Fire Flow (L/min)
Phase 1	1.34	4.21	6.31	23,000 (383 L/s)
Phase 2	1.44	4.35	6.53	20,000 (333 L/s)
Total Demand (L/s)	2.78	8.56	12.84	

Estimated Fire Flow of 23,000 L/min (383 L/s) and 20,000 L/min (333 L/s) are calculated in accordance with the Technical Bulletin ISTB-2018-02 (see attached Concept Plan and FUS Fire Flow Calculations).

Please provide boundary conditions at the locations specified in Item No. 3 for Peak Hour, Maximum Day plus Fire Flow (2 values) and Maximum Pressure Check scenarios.

Should you have any questions or require anything further, please do not hesitate to call.

Regards,

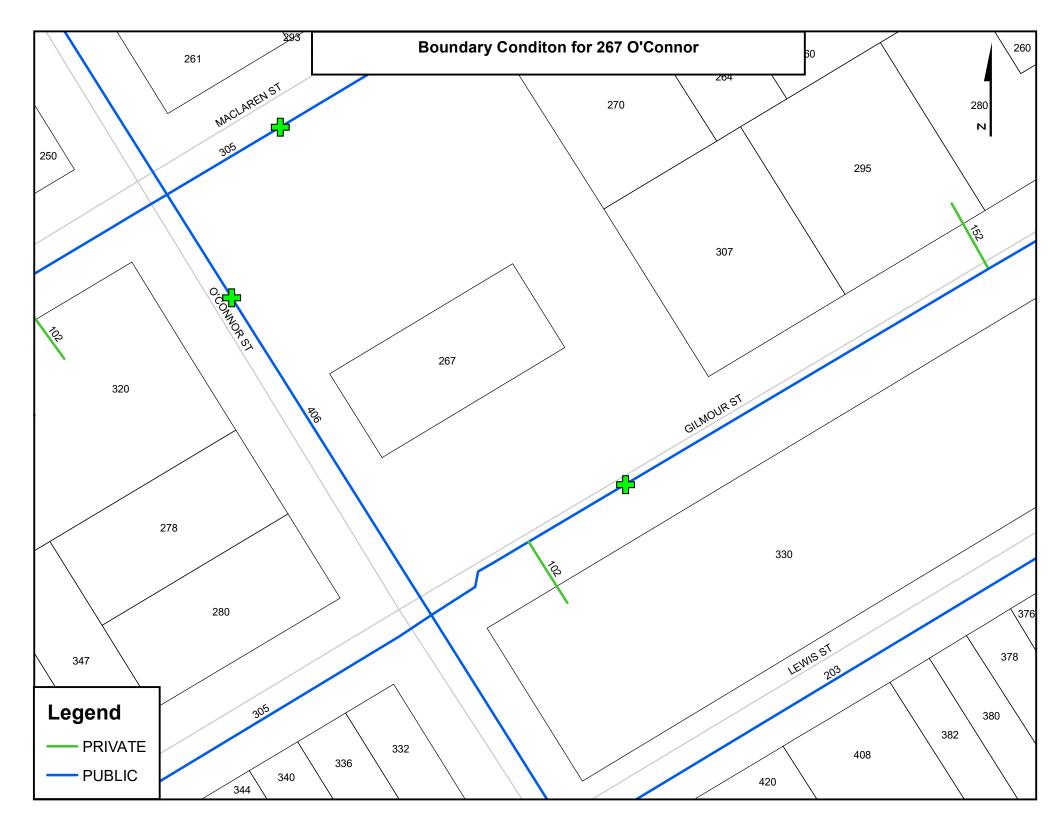
Annie

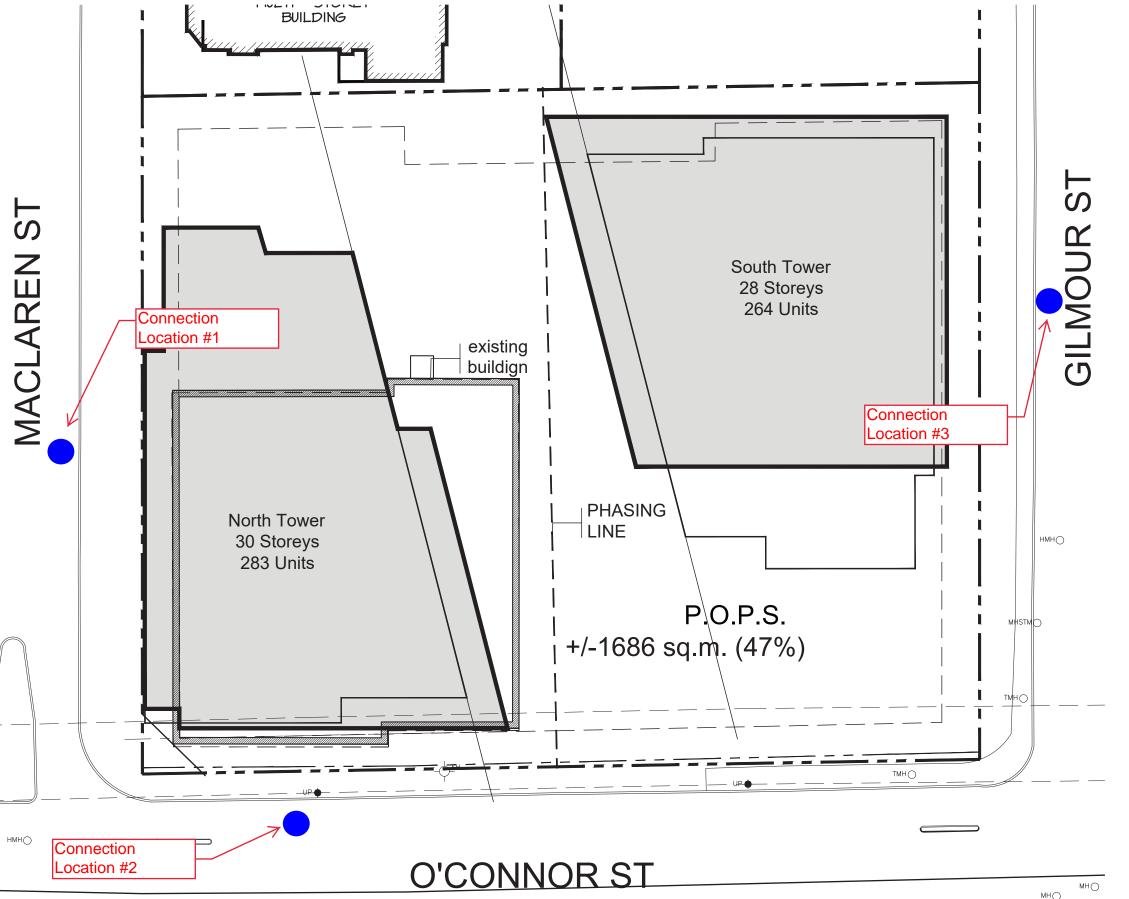
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.





### DEVELOPMENT STATS

#### PHASE 1 TOWER - 28 STOREYS

-TOTAL GROSS FLOOR AREA 226,086 SQ.FT.
-TOTAL NET LEASEABLE AREA 184,345 SQ.FT.
-UNIT COUNT 264 UNITS

PHASE 2 TOWER - 30 STOREYS

-TOTAL GROSS FLOOR AREA -TOTAL NET LEASEABLE AREA -UNIT COUNT

246,453 SQ.FT. 198,869 SQ.FT. 283 UNITS

PROPERTY AREA

- TOTAL GROSS AREA 38,724 SQ.FT. - 40% GROSS AREA 15,490 SQ.FT - P.O.P.S. 18,141 SQ.FT

** 700 SQ.FT. AVERAGE UNIT SIZE

** ASSUME NO UNITS ON GROUND FLOOR

## PARKING STATS (4 LEVELS)

#### PHASE 1 TOWER - 28 STOREYS, 264 UNITS

#### REQUIRED PARKING

- RES. PARKING (0.5 PER UNIT) 132 - VISITOR PARKING (0.1 PER UNIT) 26 - TOTAL PARKING REQUIREMENTS 158

PROVIDED PARKING SPACES(4 LEVELS):

152 (+6 TEMPORARY

142

#### PHASE 2 TOWER - 30 STOREYS, 263 UNITS

RES. PARKING (0.5 PER UNIT)

- VISITOR PARKING (0.1 PER UNIT) 28
- TOTAL PARKING REQUIREMENTS 170
PROVIDED PARKING SPACES(4 LEVELS): 152
TOTAL PARKING REQUIREMENTS: 328

TOTAL PROVIDED PARKING SPACES: 304

## STORAGE LOCKERS (UNDERGROUND)

PHASE 1 TOWER - 28 STOREYS, 264 UNITS

PROVIDED STORAGE LOCKERS(4 LEVELS): 240

PHASE 2 TOWER - 30 STOREYS, 283 UNITS

PROVIDED STORAGE LOCKERS(4 LEVELS): 244

TOTAL STORAGE LOCKERS : 484 LOCKER RATIO / UNIT : 0.88



J.L. RICHARDS & ASSOCIATES LIMITED 7/31/2020

## Water Demand Calculations 267 O'Connor (JLR 29056-001)

PHASE 1 - Tower

Unit Breakdown	No.	Person Per Unit (Table 4.1)
Studio	48	1.4
1 Bed	104	1.4
1 bed + den	52	1.4
2 bed	35	2.1
2 bed + den	25	2.1
Totla Unit Count =	264	
No. of Studios & 1-bedroom	204	units
Density	1.4	p/p/u
No. Ppl	286	ppl
No. of 2-bedroom	60	units
Density	2.1	p/p/u
No. Ppl	126	ppl
Total Population	412	ppl
Average Day Consumption Rate	280	L/c/d
Average Day Demand	1.34	L/s
Maximum Day Peaking Factor	3.15	x Avg Day (Table 3-3 MOE)
Maximum Day Demand	4.21	L/s
Peak Hour Peaking Factor	4.73	x Max Day (Table 3-3 MOE)
Peak Hour Demand	6.31	L/s
Minimum Hour Peaking Factor	0.27	x Avg Day (Table 3-1 MOE)
Minimum Hour Demand	0.37	L/s

PHASE 2 - Tower

No.	Person Per Unit (Table 4.1)
22	1.4
141	1.4
53	1.4
62	2.1
5	2.1
283	
216	units
1.4	p/p/u
303	ppl
67	units
2.1	p/p/u
141	ppl
444	ppl
280	L/c/d
1.44	L/s
3.02	x Avg Day (Table 3-1 MOE)
4.35	L/s
4.54	x Max Day (Table 3-1 MOE)
6.53	L/s
0.30	x Avg Day (Table 3-1 MOE)
0.43	L/s
	22 141 53 62 5 283 216 1.4 303 67 2.1 141 444 280 1.44 3.02 4.35 4.54 6.53 0.30

**Appendix D3** 

Fire Flow Requirements

J.L. RICHARDS & ASSOCIATES LIMITED 2025-01-28

#### **FUS Fire Flow Calculations**

267 O'Connor Street - JLR 29056-000

Step	Parameter V	alue		Note
4	Type of Construction	Non-combustible		<u> </u>
	Coefficient (C)	0.8		
3	Ground Floor Area	6084.79	m ²	North Tower (1 level of full podium included)
:	Height in storeys	1	storeys	Excluding Parking Garage 50% below Grade
	Total Floor Area	6084.79	m ²	
)	Fire Flow Formula	F=220C√A		
	Fire Flow	13729	L/min	
	Rounded Fire Flow	14000	L/min	Flow rounded to nearest 1000 L/min.
	Occupancy Class	Limited Combustible		Residential buildings have a limited combustible occupancy
	Occupancy Charge	-15%		
	Occupancy Increase or	-2100		
	Decrease		<del>_</del> .,.	
	Fire Flow	11900	L/min	No rounding applied.
	Sprinkler Protection	Automatic Fully Supervised		_
	Sprinkler Credit	-50%		_
	Decrease for Sprinkler	-5950	L/min	
	North Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	20.8	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	41.6	m-storeys	
	Separation Distance	2.43	m	_
	North Side Exposure	22%		Based on FUS 2020 exposures table
	Charge	22/0		— Based off 1 03 2020 exposures table
	East Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Non-combustible		
	Length of Exposed Wall:	40.6	m	
	Height of Exposed Wall:	25	storeys	
	Length-Height Factor	1014.5	m-storeys	
	Separation Distance	20.08	m	<u></u>
	East Side Exposure Charge	8%		_
	South Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Non-combustible		
	Length of Exposed Wall:	16.7	m	
	Height of Exposed Wall:	7	storeys	
	Length-Height Factor	117.0	m-storeys	
	Separation Distance	25	m	_
	South Side Exposure	4%		
	Charge	****		_
	West Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	17.1	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	34.2	m-storeys	
	Separation Distance	20.75	m	<u></u>
	West Side Exposure	2%		
	Charge			
	Total Exposure Charge	36%		All seperations exceed 45 m
	Increase for Exposures	4284	L/min	
I	Fire Flow	10234	L/min	
	Rounded Fire Flow	10000	L/min	Flow rounded to nearest 1000 L/min.
	Required Fire Flow (RFF)	10000	L/min	_
		167	L/s	

Fire Underwriters Survey (FUS) Fire Flow Calculations

In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

J.L. RICHARDS & ASSOCIATES LIMITED 2025-01-28

#### **FUS Fire Flow Calculations**

267 O'Connor Street - JLR 29056-000

Step	Parameter V	alue		Note
4	Type of Construction	Non-combustible		<u> </u>
	Coefficient (C)	0.8		
	Ground Floor Area	5878.75	m ²	South Tower (1 level of full podium included)
;	Height in storeys	1	storeys	Excluding Parking Garage 50% below Grade
	Total Floor Area	5878.75	m²	
)	Fire Flow Formula	F=220C√A		
	Fire Flow	13494	L/min	
	Rounded Fire Flow	13000	L/min	Flow rounded to nearest 1000 L/min.
	Occupancy Class	Limited Combustible		Residential buildings have a limited combustible occupancy
	Occupancy Charge	-15%		
	Occupancy Increase or Decrease	-1950		
	Fire Flow	11050	 L/min	No rounding applied.
	Sprinkler Protection	Automatic Fully Supervised		
	Sprinkler Credit	-50%		<del>_</del>
	Decrease for Sprinkler	-5525	L/min	<del>_</del>
	North Side Exposure	5323	-j	
	Exposing Wall:	Non-combustible		
	Exposing Wall:	Wood Frame		
			m	
	Length of Exposed Wall:	24.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	47.9	m-storeys	
	Separation Distance	10.89	m	<u> </u>
	North Side Exposure	12%		Based on FUS 2020 exposures table
	Charge  Fact Side Exposure			_
	East Side Exposure	Non-combustible		
	Exposing Wall:			
	Exposed Wall:	Non-combustible		
	Length of Exposed Wall:	40.8	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	122.4	m-storeys	
	Separation Distance	23.75	m	<u> </u>
	East Side Exposure Charge	4%		<u></u>
	South Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	18.1	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	36.1	m-storeys	
	Separation Distance	34.86	m	
	South Side Exposure	0%	_	_
	Charge	U/0		_
	West Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	40.6	m	
	Height of Exposed Wall:	25	storeys	
	Length-Height Factor	1014.5	m-storeys	
	Separation Distance	20.08	m	
	West Side Exposure	15%		
	Charge			<del>_</del>
	Total Exposure Charge	31%		All seperations exceed 45 m
	Increase for Exposures	3426	L/min	
l	Fire Flow	8951	L/min	
	Rounded Fire Flow	9000	L/min	Flow rounded to nearest 1000 L/min.
	Required Fire Flow (RFF)	9000	L/min	
		150	L/s	

Fire Underwriters Survey (FUS) Fire Flow Calculations

In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

**Appendix D4** 

**Headloss Calculations** 

#### 267 O'Connor Street Condominium Towers Taggart Realty Management 29056-000

#### Boundary Conditions (August 11, 2020 Email from the City):

Water Demand Scenario	MacLaren (m)	O'Connor (m)	Gilmour (m)
Minimum HGL	106.9	106.9	106.8
Maximum HGL	115.0	115.0	115.0
MDD + FF (Southern – Phase 1)	N/A	107.7	106.5
MDD + FF (Northern – Phase 2)	107.7	108.0	N/A

Note: The supply elevations under the maximum day demand plus fire flow estimated by the City based on RFF of 23,000 L/min (Phase 1) and 20,000 L/min (Phase 2)

#### Headloss Calculations (Hazen Williams Equation)

Calculate headloss in a given pipe length based on flows and C value

HL = 10.675 * L * Q^1.852 / ( C^1.856 * D ^4.8704)

Where,

HL = Headloss (m)

- L Length (m)
- Q Flow (m³/s)
- C Hazen Williams "C" D Main Diameter (m)

Water Demand	Flow - Q	Flow - Q	Length	С	D	HeadLoss	HGL (m)	HGL @ Tower	Tower Elevation	Pressure	@ Tower	Requirement	Criteria
Condition	(L/s)	(m ³ /s)	(m)		(m)	(m)	@ BC	(m)	(m)	(m)	(kPa)		Acheived?
Southern Tower (Phase 2)													
Average Day	1.18	0.00118	7.95	110	0.204								
Maximum Day	3.95	0.00395	7.95	110	0.204								
Peak Hour	5.93	0.00593	7.95	110	0.204	0.0024	106.8	106.798	71.4	35.398	347	276	Yes
Maximum HGL	0.29	0.00029	7.95	110	0.204	0.000009	115.0	115.000	71.4	43.600	428	552	Yes
Maximum Day Plus Fire													
(Q = 3.95 L/s + 69.2 L/s)	73.15	0.07315	7.95	110	0.204	0.2517	107.1	106.848	71.4	35.448	348	140	Yes
			-										
Northern Tower (Phase 1)													
Average Day	1.44	0.00144	7.2	110	0.204								
Maximum Day	4.35	0.00435	7.2	110	0.204								
Peak Hour	6.53	0.00653	7.2	110	0.204	0.0026	106.9	106.897	71.6	35.297	346	276	Yes
Maximum HGL	0.43	0.00043	7.2	110	0.204	0.000017	115.0	115.000	71.6	43.400	426	552	Yes
Maximum Day Plus Fire													
(Q = 4.35 L/s + 69.2 L/s)	73.55	0.07355	7.2	110	0.204	0.2303	107.7	107.470	71.6	35.870	352	140	Yes

Domestic Booster Pump & Fire Pump to be designed by the Owner's Mechanical Engineer

**Appendix E** 

**Wastewater Calculations** 

J.L. RICHARDS & ASSOCIATES LIMITED 1/23/2025

Person Per Unit (Table 4.1)

1.4

1.4

2.1

2.1

### **Wastewater Calculations** 267 O'Connor (JLR 29056-001)

0.17862 Ha. No.

138

10

229

4.22 L/s

PHASE 1 - Tower	0.17881	На.
Unit Breakdown	No.	Person Per Unit (Table 4.1)
Studio	35	1.4
1 Bed	142	1.4
1 bed + den	3	1.4
2 bed	89	2.1
2 bed + den	2	2.1
Total Unit Count =	271	
No. of Studios & 1-bedroom	180	units
Density	1.4	p/p/u
No. Ppl	252	ppl
No. of 2-bedroom	91	units
Density	2.1	p/p/u
No. Ppl	192	ppl
Total Population	444	ppl
Theoretical Wastewater Flow	280	L/c/d
Average Wastewater Flow	1.44	L/s
Harmon Peaking Factor	3.400	
Peak Wastewater Flow	4.89	L/s
Commercial/Office Area (ha)	0.02	
Commercial PF =	1	
Peak Flow (Comm) =	0.006	L/s
Dry & Wet I/I (0.33 L/s/ha)	0.06	L/s
Peak WW Flow (L/s)	4.96	L/s

0.17 L/s

0.09 L/s

5.05 L/s

Paterson GW Allowance

GW Allowance (50%) =

Total Peak WW Flow (L/s)

Totia Unit Count =	229	
No. of Studios & 1-bedroom	168	units
Density	1.4	p/p/u
No. Ppl	236	ppl
No. of 2-bedroom	61	units
Density	2.1	p/p/u
No. Ppl	129	ppl
Total Population	365	ppl
Theoretical Wastewater Flow	280	L/c/d
Average Wastewater Flow	1.18	L/s
Harmon Peaking Factor	3.433	
Peak Wastewater Flow	4.06	L/s
Commercial/Office Area (ha)	0.02	
Commercial PF =	1	
Peak Flow (Comm) =	0.006	L/s
Dry & Wet I/I (0.33 L/s/ha)	0.06	L/s
Peak WW Flow (L/s)	4.13	L/s
•		
Paterson GW Allowance	0.17	L/s
GW Allowance (50%) =	0.09	L/s

Total Peak WW Flow (L/s)

PHASE 2 - Tower

Unit Breakdown

Studio 1 Bed

2 bed

1 bed + den

2 bed + den

Totla Unit Count =

PHASES 1 & 2	0.35743	На.
Unit Breakdown	No.	Person Per Unit (Table 4.1)
Studio	56	1.4
1 Bed	280	1.4
1 bed + den	12	1.4
2 bed	140	2.1
2 bed + den	12	2.1
Totla Unit Count =	500	
No. of Studios & 1-bedroom	348	units
Density	1.4	p/p/u
No. Ppl	488	ppl
No. of 2-bedroom	152	units
Density	2.1	p/p/u
No. Ppl	320	ppl
Total Population	808	ppl
Theoretical Wastewater Flow	280	L/c/d
Average Wastewater Flow	2.62	L/s
Harmon Peaking Factor	3.286	
Peak Wastewater Flow	8.61	L/s
Commercial/Office Area (ha)	0.04	
Commercial PF =	1	
Peak Flow (Comm) =	0.013	L/s
Dry & Wet I/I (0.33 L/s/ha)	0.12	L/s
Peak WW Flow (L/s)	8.74	L/s
Paterson GW Allowance	0.17	L/s

0.17 L/s

8.91 L/s

GW Allowance =

Total Peak WW Flow (L/s)

		Number of Units					
	Studio	Studio 1-Bed Bed+Den 2-Bed Bed+Den Tot				Total	
Phase 1:	35	142	3	89	2	271	
Phase 2:	21	138	9	51	10	229	
Phases 1 &2	56	280	12	140	12	500	

## **Appendix F1**

Pre-Development Peak Flow Calculations



# 267 O'Connor Exisitng Peak Flow Calculations

#### Guidance on Approach to Estimate Allowable Peak Flow and SWM Calculations:

- 1 Allowable peak flow shall be estimated based on a 1:5 year intensity and based on a 'C' = 0.4.
- 2 Allowable peak flow estimated using the IDF statistics (per the OSDG) and calculated Tc no less than 10 mins
- 3 The allowable peak flow will reflect the current drainage divide between MacLaren Street and Gilmour Street.
- 4a Outlet for the Phase 1 tower (wastewater & storm) will be the existing 300 mm diameter combined sewer on Gilmour Street
- 4b Outlet for the Phase 2 tower (wastewater & storm) will be 450 mm diameter combined sewer on MacLaren Street.
- 5a Post development flows to be limited to the allowable peak flow for both outlets
- 5b Post development flows to be set once the wastewater peak flow and groundwater flow contributions are subtracted.
- 6 Post-development peak flows shall be controlled the allowable peak flow by means of on-site storage up to the 1:100 year storm.
- 7 SWM calculations to be complted using the Modified Rational Method (MRM) for rooftop and at grade storage within the POPS.
- 8 MRM calculations to estimate cistern storage, if required, to be estimated based on 50% of the peak flow rate per City requirement 9 All storm contributions to combined sewers (MacLaren and Gilmour) to be controlled by means of an inlet control device (ICD) or accounted as uncontrolled.
- 10 The subject property is within a combined area and consists of rooftop and POPS. As such, there is no water quality control requirement.

#### **Pre-Development Area Breakdown:**

#### To Gilmour Street combined sewer (Phase 2):

Type of Area	Area (m²)	C-Factor	C-Factor (Eff)
Parking	2205.77	0.9	0.4
<u>-</u>	2205.77	0.9	0.4

#### Time of Concentration (existing) to Gilmour:

Flow path on asphalt from high point to U/S CB =  $\pm 25$  m on 2.4% slope Length of Sewers from U/S CB to O'Connor =  $\pm 76$  m Sewer slope =  $\pm 1\%$ ; V=  $\pm 0.95$  m/s

Tc (exist) = (25 m / 0.90 m/s) + (76 m / 0.95 m/s)Tc (exist) = 108 secs or 1.8 mins, use Tc = 10 minIntensity_(5vr) = 104.19 mm/hr based on a Tc = 10 min

#### Gilmour: Existing Peak Flow Calculations (5 Yr & 100 yr - C-Factor = 0.90)

 $Q_{5vr} = 2.78CIA$ 

 $Q_{5vr} = 2.78 \times 0.40 \times 104.193 \text{ mm/hr} \times 0.22057 \text{ ha}$ 

$Q_{5yr} =$	57.5 L/s

 $Q_{100yr} = 2.78 \times 0.90 \times 178.559 \text{ mm/hr} \times 0.13272 \text{ ha}$ 

$Q_{100yr} =$	98.5 L/s

#### Gilmour: Pre-development peak flows (1:5 yr and 1:100 yr):

Peak Flow (1:5 yr - C-Factor = 0.9)	57.5 L/s
Peak Flow (1:100 yr - C-Factor = 0.9)	98.5 L/s

#### <u>Allowable Peak Flow (5 Yr) Calculations (C-Factor = 0.40)</u>

 $Q_{5yr} = 2.78CIA$ 

 $Q_{5yr} = 2.78 \times 0.40 \times 104.193 \text{ mm/hr} \times 0.22057 \text{ ha}$ 

$Q_{5yr} =$	25.6 L/s

Gilmour: 1:5 year allowable peak flow (C-Factor of 0.40) is:

To Gilmour:	25.6 L/s
-------------	----------

#### **Pre-Development Area Breakdown:**

#### To MacLaren Street combined sewer (Phase 1):

Type of Area	Area (m²)	C-Factor	C-Factor (Eff)
Parking	599.74	0.9	0.4
Building	767.45	0.9	0.4
	1367.19	0.9	0.4

#### **Time of Concentration (exist) to MacLaren:**

Flow path on asphalt from high point to MacLaren ROW =  $\pm 34$  m Slope =  $\pm 0.9\%$ ; V=  $\pm 0.60$  m/s (Uplands Method)

Tc (exist) = (34 m / 0.60 m/s)

Tc (exist) =  $\pm 57$  secs, or 0.94 mins, use Tc = 10 min Intensity_(5yr) = 104.19 mm/hr based on a Tc = 10 min

#### MacLaren: Existing Peak Flow Calculations (5 Yr & 100 yr - C-Factor = 0.90)

 $Q_{5vr} = 2.78CIA$ 

 $Q_{5yr} = 2.78 \times 0.90 \times 104.193 \text{ mm/hr} \times 0.13272 \text{ ha}$ 

	$Q_{5yr} =$	35.6 L/s
--	-------------	----------

 $Q_{100yr} = 2.78 \times 0.90 \times 178.559 \text{ mm/hr} \times 0.13272 \text{ ha}$ 

$\circ$	
$Q_{100yr} =$	61.1 L/s

#### MacLaren: Pre-development peak flows (1:5 yr and 1:100 yr) are:

Peak Flow (1:5 yr - C-Factor = 0.9)	35.6 L/s
Peak Flow (1:100 yr - C-Factor = 0.9)	61.1 L/s

### Allowable Peak Flow (5 Yr) Calculations (C-Factor = 0.40)

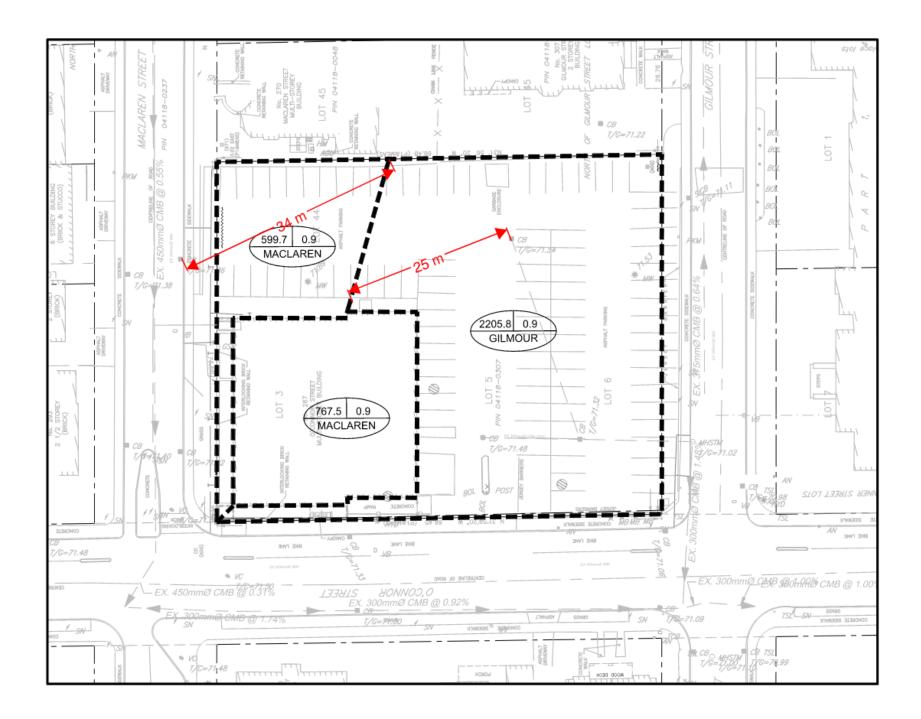
 $Q_{5yr} = 2.78CIA$ 

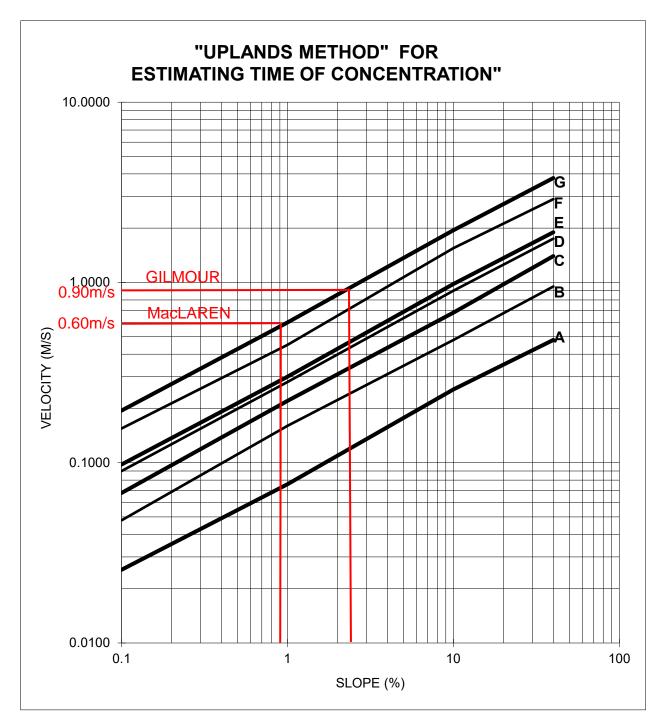
 $Q_{5yr} = 2.78 \times 0.40 \times 104.193 \text{ mm/hr} \times 0.13272 \text{ ha}$ 

$Q_{5yr} =$	15.8 L/s

MacLaren: 1:5 year allowable peak flow (C-Factor of 0.40) is:

To MacLaren: 15.8 L/s





A = Overland Flow: Forest (heavy litter) & hay meadow B = Overland Flow: Woodland, fallow, controur or strip crop

C = Overland Flow: Pasture

D = Overland Flow: Cultivated straight row E = Overland Flow: Nearly bare soil, untilled

F = Grassed waterway

G = Small upland gullies & paved areas (sheet flow)

## **Appendix F2**

Stormwater Management Calculations & Watts Roof Drain



# Adjustable Accutrol Weir

## Adjustable Flow Control for Roof Drains

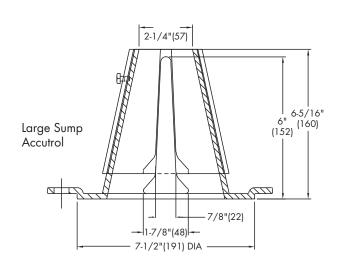
#### ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

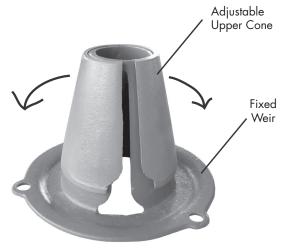
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below. Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

#### **EXAMPLE:**

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3" of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be: [5 gpm (per inch of head)  $\times$  2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weis Onesis s	1"	2"	3"	4"	5"	6"
Weir Opening Exposed		Flow Ro	ate (gall	ons per	minute)	
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Q = 0.315 L/s/drain Weir fully closed at 6" depth

Job Name	Contractor
Job Location	Contractor's P.O. No.
Engineer	Representative

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#### 267 O'Connor Allowable Peak Flow & SWM Calculations

Allowable Peak Flow Calculation: Phase 2 (Gilmour Street):

25.6 L/s

Wastewater Contribution (Phase 2 Tower):

Qp 4.22 L/s

Groundwater Contribution:

Qp 0.085 L/s

Allowable Peak Flow - Phase 2 @ Gilmour:

 $Q_{pAllow} = Q_{p5yr} - Q_{pw/w} - Q_{pgw}$ 

Q_{DAllow} = 25.6 L/s - 4.22 L/s - 0.09 L/s

Q_{pAllow} =

Allowable

Allowable Peak Flow Calculation:

Phase 1 (MacLaren Street):

Wastewater Contribution (Phase 1 Tower):

Qp

Groundwater Contribution:

Qp 0.085 L/s

Allowable Peak Flow - Phase 1 @ MacLaren:

 $Q_{pAllow} = Q_{p5yr} - Q_{pw/w} - Q_{pgw}$ 

 $Q_{pAllow} = 15.4 \text{ L/s} - 5.05 \text{ L/s} - 0.09 \text{ L/s}$ 

Q_{pAllow} = 10.71 L/s

Phase 2 - Allocation of Flows

	Area (m²)	C-Factor
Phase 2 Tower	1193,43	0.9

Assuming Watts Ajustable Accutrol Weir (weir fully closed at 6" depth) 12 weirs x 0.315 L/s/weir = 3.78 L/s

Tower (12) Qp = 3.78 L/s POPS Qp = Total Flow = 17.48 L/s

Phase 1 - Allocation of Flows

	Area (m ² )	C-Factor
Phase 1 Tower	971.22	0.9

Assuming Watts Ajustable Accutrol Weir (weir 3/4 closed at 6" depth) 12 weirs x 0.315 L/s/weir = 3.78 L/s

Allowable

Tower(12)Qp =	3.78 L/s
POPS Qp =	6.93 L/s
Total Flow =	10.71 L/s

#### Storage Volume Requirement Calculations:

Based on the above allowable release rates, SWM servicing must be developed to:

21.26 L/s

- i) Limit rooftop flows for Phase 2 Tower (Gilmour) to 3.78 L/s
- ii) Limit rooftop flows for Phase 1 Tower (MacLaren) to 3.78 L/s
- iii) Limit flows from the POPS and Uncontrolled to MacLaren at 6.93 L/s
- iv) Limit flows from the POPS and Uncontrolled to Gilmour at 17.48 L/s

Based on the above capacities, it is proposed that the following areas drain:

#### Phase 2 (Gilmour Street)

Area No.	Area (m2)	C-Factor	ICD
Areas 4, 5, 6 & 9	1207.91	0.90	13.61
Area 7 (roof)	1193.43	0.90	3.78
Area 8	86.57	0.90	N/A
Area 9	74.54	0.90	N/A

SUM of Roof ICDs (Phase 2) Cistern Release Rate 3.78 L/s 13.61 L/s SUM Uncontrolled (area 8) = 3 87 1/s Total Flow (Phase 2) = 21.26 L/s

#### Phase 1 (MacLaren Street):

Area No.	Area (m2)	C-Factor	ICD
Area 1	56.32	0.90	N/A
Area 2	57.82		N/A
Area 3 (roof)	971.22		3.78

SUM of ICDs (Phase 1) = SUM Uncontrolled (area 1,2) = 5.10 Total Flow (Phase 1) =

Allowable Peak Flow (Phase 2) = 10.71 L/s

#### SWM Calcs (Phase 2 Areas) to Gilmour

Allowable Peak Flow (Phase 2) =

Area 7	
Roof (m2)	1193.430
C =	0.90
ICD =	3.78
Storage Volume (m3)	107.41

Time	Intensity	Qp	Qp	Qp	Max Volume
(min)	1:100 Yr	1:100 Yr	Rooftop ICD	stored	Requirement
, ,	(mm/hr)	(L/s)	(L/s)	(L/s)	(m ³ )
30	91.87	27.43	3.78	23.65	42.57
35	82.58	24.66	3.78	20.88	43.84
40	75.15	22.44	3.78	18.66	44.78
45	69.05	20.62	3.78	16.84	45.46
50	63.95	19.10	3.78	15.32	45.95
55	59.62	17.80	3.78	14.02	46.28
60	55.89	16.69	3.78	12.91	46.48
65	52.65	15.72	3.78	11.94	46.57
70	49.79	14.87	3.78	11.09	46.57
75	47.26	14.11	3.78	10.33	46.49
80	44.99	13.43	3.78	9.65	46.34
85	42.95	12.83	3.78	9.05	46.13
90	41.11	12.28	3.78	8.50	45.88

21.26 L/s

The following assumptions were made in regard to rooftop storage:

Phase 2 Tower

Rooftop flow = Roof 60% storage = 3.78 L/s 1193.430 m2 716.058 m2 Vol. @ 6" ponding = 107.4 m3

The SWM Calculations (above) shows rooftop storage volume requirements of 46.57 m3 under the 1:100 year event.

Based on the above assumption (60% of rooftop used as storage), sufficient rooftop storage will be provided to detain the 1:100 yr on the rooftop Hence, the SWM target will, therefore, be met. There will not be any overtopping during the 1:100 year event



#### 267 O'Connor Allowable Peak Flow & SWM Calculations

Underground Cistern - Storage Calculation		
Areas 4, 5, 6 & 9	1208	
C =	0.9	
Cistern ICD (50% of 13.61 L/s)	6.80	
Storage Volume (m3)	38.17	

Time	Intensity	Qp	Qp	Qp	Max Volume
(min)	1:100 Yr	1:100 Yr	ICD	stored	Requirement
	(mm/hr)	(L/s)	(L/s)	(L/s)	(m ³ )
30	91.87	27.76	6.80	20.96	37.73
35	82.58	24.96	6.80	18.15	38.12
40	75.15	22.71	6.80	15.91	38.17
45	69.05	20.87	6.80	14.06	37.97
50	63.95	19.33	6.80	12.52	37.57
55	59.62	18.02	6.80	11.21	37.01
60	55.89	16.89	6.80	10.09	36.32

The SWM Calculations (above) shows Cistern storage volume requirements of 38.17 m3 under the 1:100 year. The cistern to be equipped with an overflow pipe by the mechanical engineer to convey the events over the 1:100-year peak flow.

Area 8	
Pops (m2)	86.570
C =	0.90
ICD =	N/A
No Storage Volume - Uncontrolle	d

Time	Intensity	Qp	Qp	Qp	Max Volume
(min)	1:100 Yr	1:100 Yr	ICD	stored	Requirement
	(mm/hr)	(L/s)	(L/s)	(L/s)	(m ³ )
10	178.56	3.87	N/A	N/A	N/A
15	142.89	3.10	N/A	N/A	N/A
20	119.95	2.60	N/A	N/A	N/A
25	103.85	2.25	N/A	N/A	N/A
30	91.87	1.99	N/A	N/A	N/A
35	82.58	1.79	N/A	N/A	N/A
40	75.15	1.63	N/A	N/A	N/A
45	69.05	1.50	N/A	N/A	N/A
50	63.95	1.39	N/A	N/A	N/A
55	59.62	1.29	N/A	N/A	N/A
60	55.89	1.21	N/A	N/A	N/A
65	52.65	1.14	N/A	N/A	N/A

Based on the above SWM calculations, flows of 3.87 L/s will sheet flow uncontrolled to Gilmour Street

Summary of Areas to Gilmour Street (Phase 2):

Area No.	Area (m2)	C-Factor	ICD Flow 100 yr	Uncontrolled 100 yr Flow
Areas 4, 5, 6 & 9	1207.91	0.90	13.61	
Area 7 (roof)	1193.43	0.90	3.78	
Area 8	86.57	0.90	N/A	3.87
		Sum 1	:100 year Flows :	21.26

Conclusion:
The sum of all 100 year flows (ICD and uncontrolled) is 21.26 L/s, which matches the allowable peak flow of 21.26 L/s. The SWM criterion on Gilmour Street is met.



#### 267 O'Connor Allowable Peak Flow & SWM Calculations

#### Phase 1 Areas To MacLaren (SWM Calculations):

Area 3	
Roof (m2)	971.220
C =	0.90
ICD =	3.78
Storage Volume (m3)	87.41

Time	Intensity	Qp	Qp	Qp	Max Volume	
(min)	1:100 Yr	1:100 Yr	Rooftop ICD	stored	Requirement	
	(mm/hr)	(L/s)	(L/s)	(L/s)	(m ³ )	
20	119.95	29.15	3.78	25.37	30.44	
25	103.85	25.23	3.78	21.45	32.18	
30	91.87	22.32	3.78	18.54	33.38	
35	82.58	20.07	3.78	16.29	34.20	
40	75.15	18.26	3.78	14.48	34.75	
45	69.05	16.78	3.78	13.00	35.10	
50	63.95	15.54	3.78	11.76	35.28	
55	59.62	14.49	3.78	10.71	35.34	
60	55.89	13.58	3.78	9.80	35.29	
65	52.65	12.79	3.78	9.01	35.15	
70	49.79	12.10	3.78	8.32	34.94	
75	47.26	11.48	3.78	7.70	34.66	
80	44.99	10.93	3.78	7.15	34.33	

The following assumptions were made in regard to rooftop storage:

Rooftop flow = Roof 60% storage =

Vol. @ 6" ponding =

3.78 L/s 971.220 m2 582.732 m2 87.4 m3

The SWM Calculations (above) shows rooftop storage volume requirements of 35.34 m3 under the 1:100 year event.

Based on the above assumption (60% of rooftop used as storage), sufficient rooftop storage (87.4 m3) will be provided to detain the 1:100 yr on the rooftop Hence, the SWM target will, therefore, be met for Area 3. There will not be any overtopping during the 1:100 yearevent

Area 1 Pops (m2)
C =
ICD =
No Storage Volume 56.320 0.90 N/A

Time	Intensity	Qp	Qp	Qp	Max Volume
(min)	1:100 Yr	1:100 Yr	ICD	stored	Requirement
	(mm/hr)	(L/s)	(L/s)	(L/s)	(m ³ )
10	178.56	2.52	N/A	0.00	0.00
15	142.89	2.01	N/A	0.00	0.00
20	119.95	1.69	N/A	0.00	0.00
25	103.85	1.46	N/A	0.00	0.00
30	91.87	1.29	N/A	0.00	0.00
35	82.58	1.16	N/A	0.00	0.00
40	75.15	1.06	N/A	0.00	0.00
45	69.05	0.97	N/A	0.00	0.00
50	63.95	0.90	N/A	0.00	0.00
55	59.62	0.84	N/A	0.00	0.00
60	55.89	0.79	N/A	0.00	0.00
65	52.65	0.74	N/A	0.00	0.00

Based on the above SWM calculations, flows of 2.52 L/s will sheet flow uncontrolled to MacLaren Street

Area 2	
Pops (m2)	57.820
C =	0.90
ICD =	N/A
No Storage Volume	

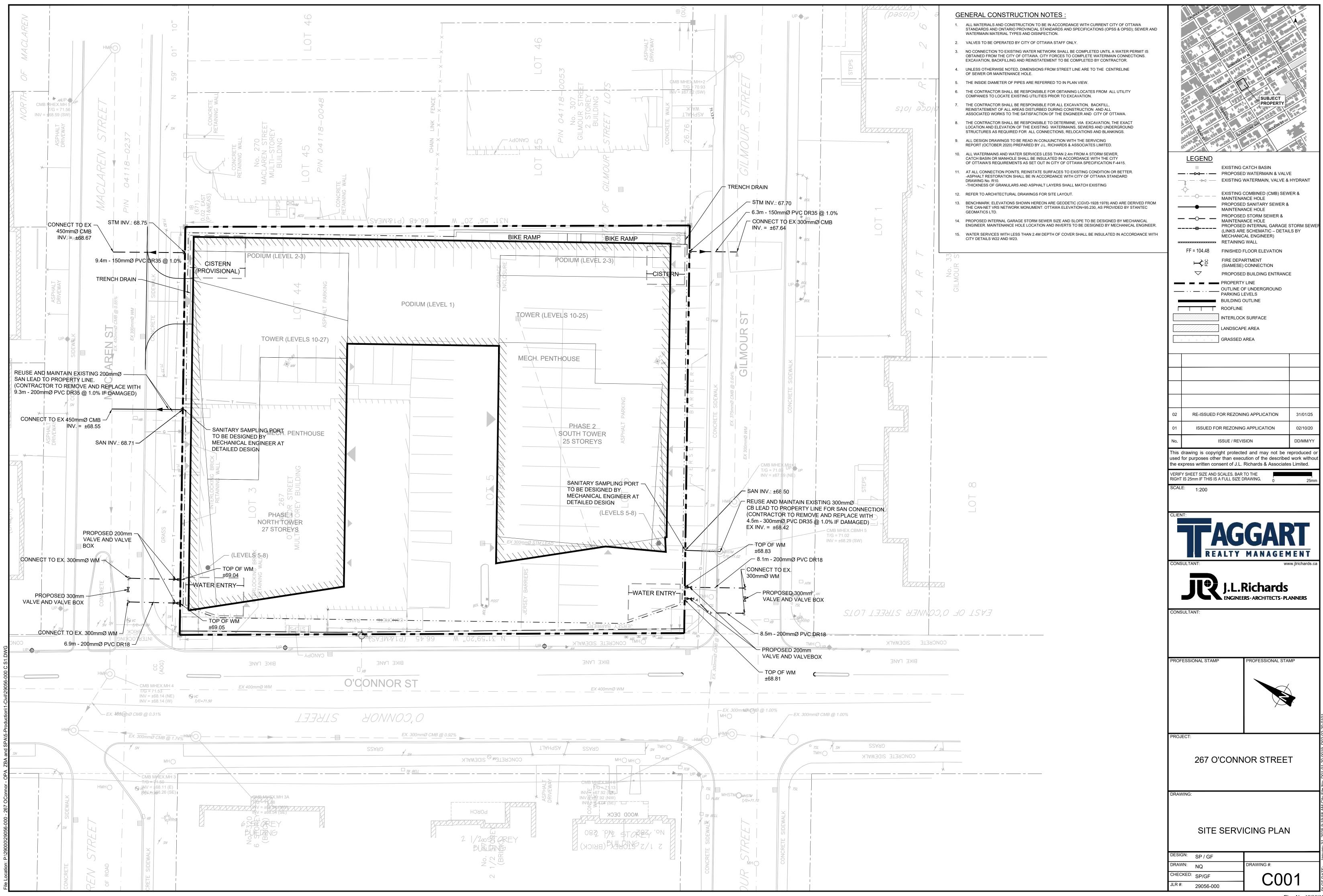
Time	Intensity	Qp	Qp	Qp	Max Volume
(min)	1:100 Yr	1:100 Yr	ICD	stored	Requirement
	(mm/hr)	(L/s)	(L/s)	(L/s)	(m ³ )
10	178.56	2.58	N/A	N/A	N/A
15	142.89	2.07	N/A	N/A	N/A
20	119.95	1.74	N/A	N/A	N/A
25	103.85	1.50	N/A	N/A	N/A
30	91.87	1.33	N/A	N/A	N/A
35	82.58	1.19	N/A	N/A	N/A
40	75.15	1.09	N/A	N/A	N/A
45	69.05	1.00	N/A	N/A	N/A
50	63.95	0.93	N/A	N/A	N/A
55	59.62	0.86	N/A	N/A	N/A
60	55.89	0.81	N/A	N/A	N/A
65	52.65	0.76	N/A	N/A	N/A

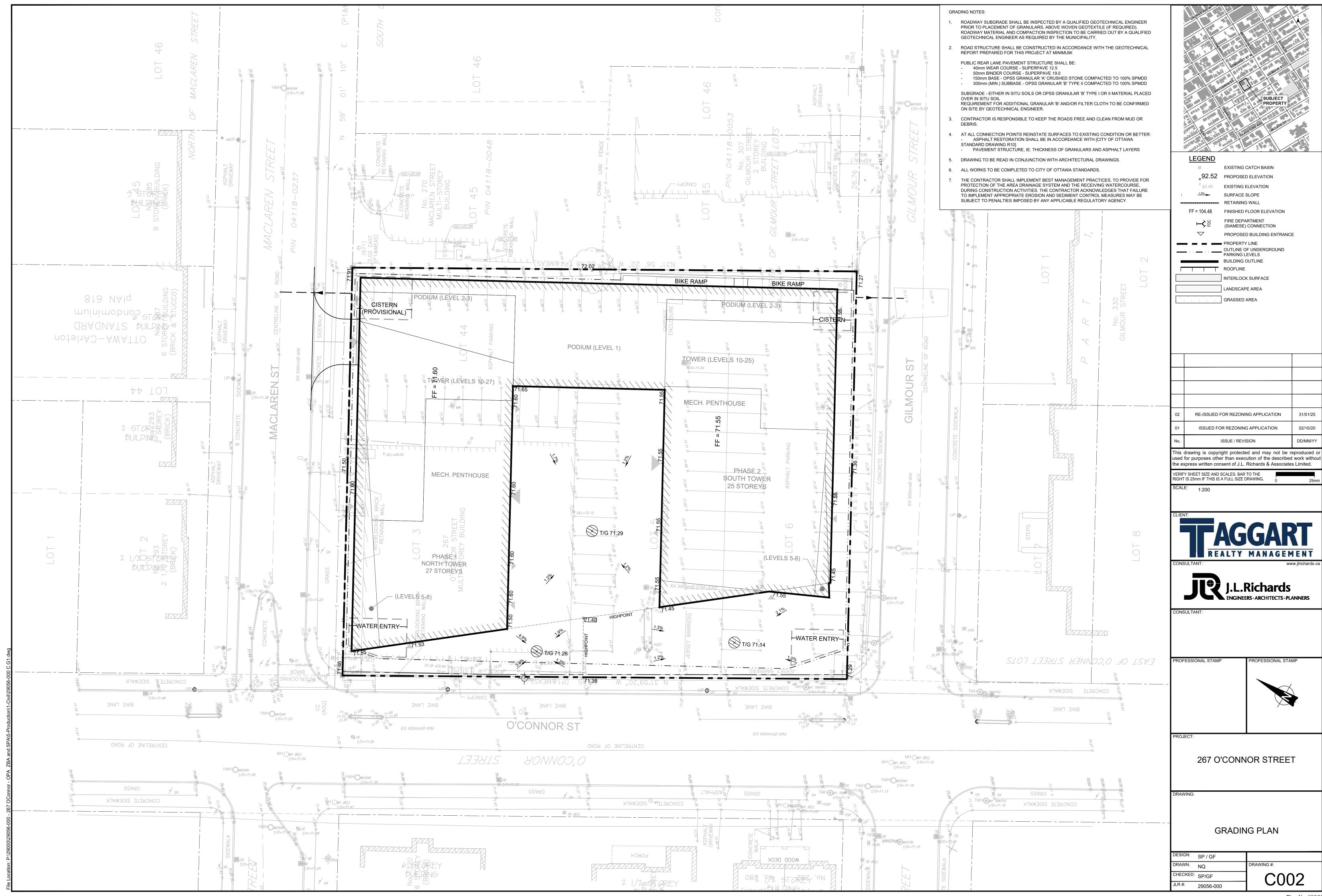
Based on the above SWM calculations, flows of 2.58 L/s will sheet flow uncontrolled to MacLaren Street

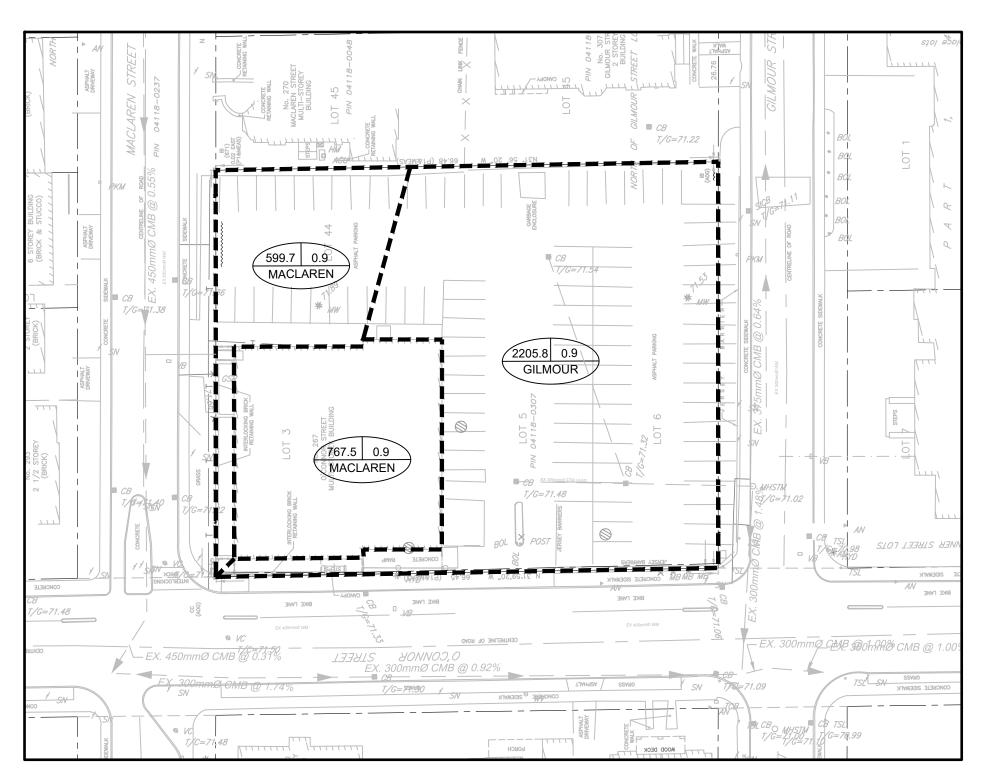
#### Summary of Areas to MacLaren Street (Phase 1):

Area	Area	C-Factor	ICD Flow	Uncontrolled	
No.	(m2)		100 yr	100 yr Flow	
Area 1	56.32	0.90	N/A	2.52	
Area 2	57.82	0.90	N/A	2.58	
Area 3 (roof)	971.22	0.90	3.78		
Sum 1:100 year Flows :					

Conclusion:
The sum of all 100 year flows (ICD and uncontrolled) is 8.88 L/s is below the allowable peak flow of 10.71 L/s. The SWM criterion on MacLaren Street is met.







#### STORMWATER MANAGEMENT REQUIREMENTS:

PRE-DEVELOPMENT PEAK FLOWS (ALLOWABLE PEAK FLOWS) TO BE SET BASED ON RUN-OFF COEFFICIENT OF C=0.40, 1:5 YEAR INTENSITY. WASTEWATER AND GROUNDWATER CONTRIBUTIONS SUBTRACTED FROM ALLOWABLE

TO LIMIT POST-DEVELOPMENT FLOWS TO THE ALLOWABLE RELEASE RATE, THE MECHANICAL ENGINEER SHOULD IMPLEMENT THE FOLLOWING:

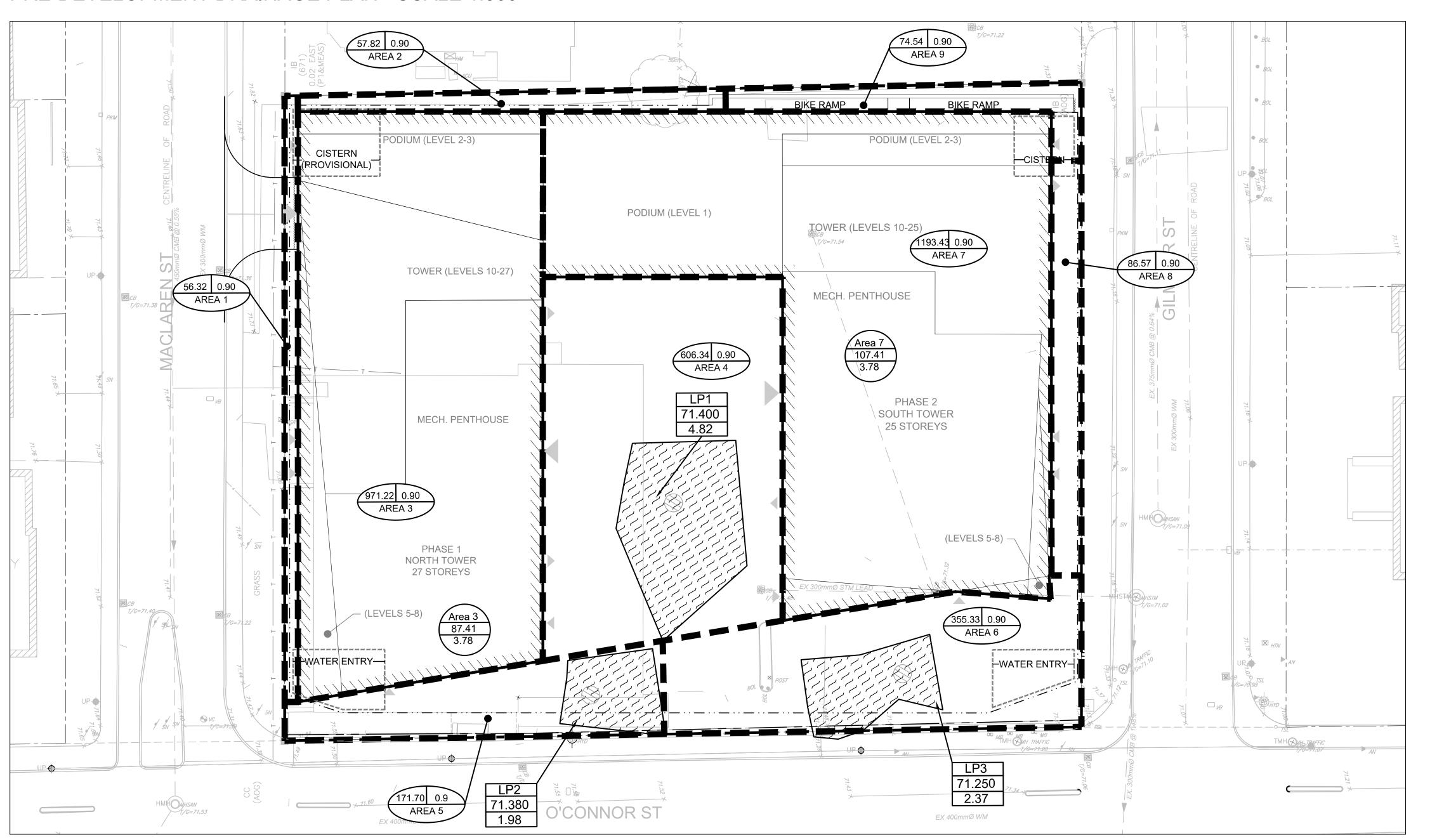
- AT-GRADE CATCH BASINS (4) SHOULD BE DESIGNED TO CONVEY FLOWS TO THE INTERNAL CISTERN FRONTING GILMOUR STREET. CISTERN TO BE SIZED TO STORE 42.57 m³ AND RESTRICTOR TO BE SIZED TO
- ROOFTOP STORAGE IDENTIFIED IN THE PONDING AREA TABLE SHOULD BE INCORPORATED INTO THE ROOFTOP DESIGNS FOR PHASE 1 (87.41 m³) AND PHASE 2 (107.41 m³) TOWERS.
- 3. ROOFTOP FLOWS SHOULD BE LIMITED TO 3.78 L/S FOR EACH TOWER AS IDENTIFIED IN THE PONDING AREA TABLE. ROOFTOP FLOWS MUST BE CONVEYED TO A SURFACE EQUIPPED BY A ROOFTOP RESTRICTOR. THERE SHALL NOT BE ANY OVERTOPPING OF SCUPPERS UNTIL STORAGE IDENTIFIED IN THE PONDING AREA TABLE IS REACHED.

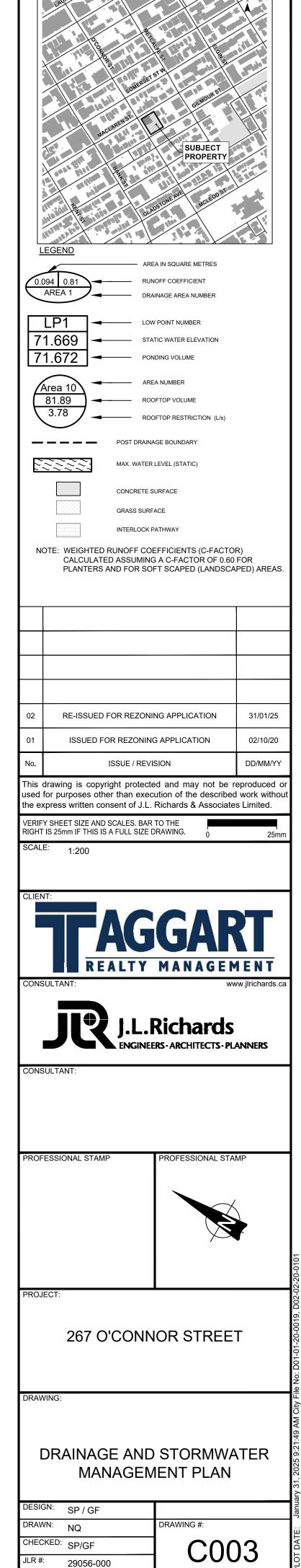
			Max Static	ICD Flow	Unc	Volume	Storage
Area	Area	Static	Surface Volume	Flow (L/s)	Flow (L/s)	(m3)	Туре
No.	(m2)	Depth	(m3)	100 yr	100 yr	Used	
Gilmour Str	eet outlet						
A4/LP1	606.34	0.11	4.82	3.40		9.39	Cistern
A5/LP2	171.70	0.12	1.98	3.40		9.39	Cistern
A6/LP3	355.33	0.11	2.37	3.40		9.39	Cistern
Area 7	1193.43	0.15	107.41	3.78		46.57	Rooftop
Area 8	86.57	N/A	N/A	Unc	3.87	N/A	Uncontrolled
Area 9	74.54	N/A	N/A	3.40		9.39	Cistern
1:100 year Flows (ICD+Unc): 21.26							
Criteria: 21.2			21.26		_		

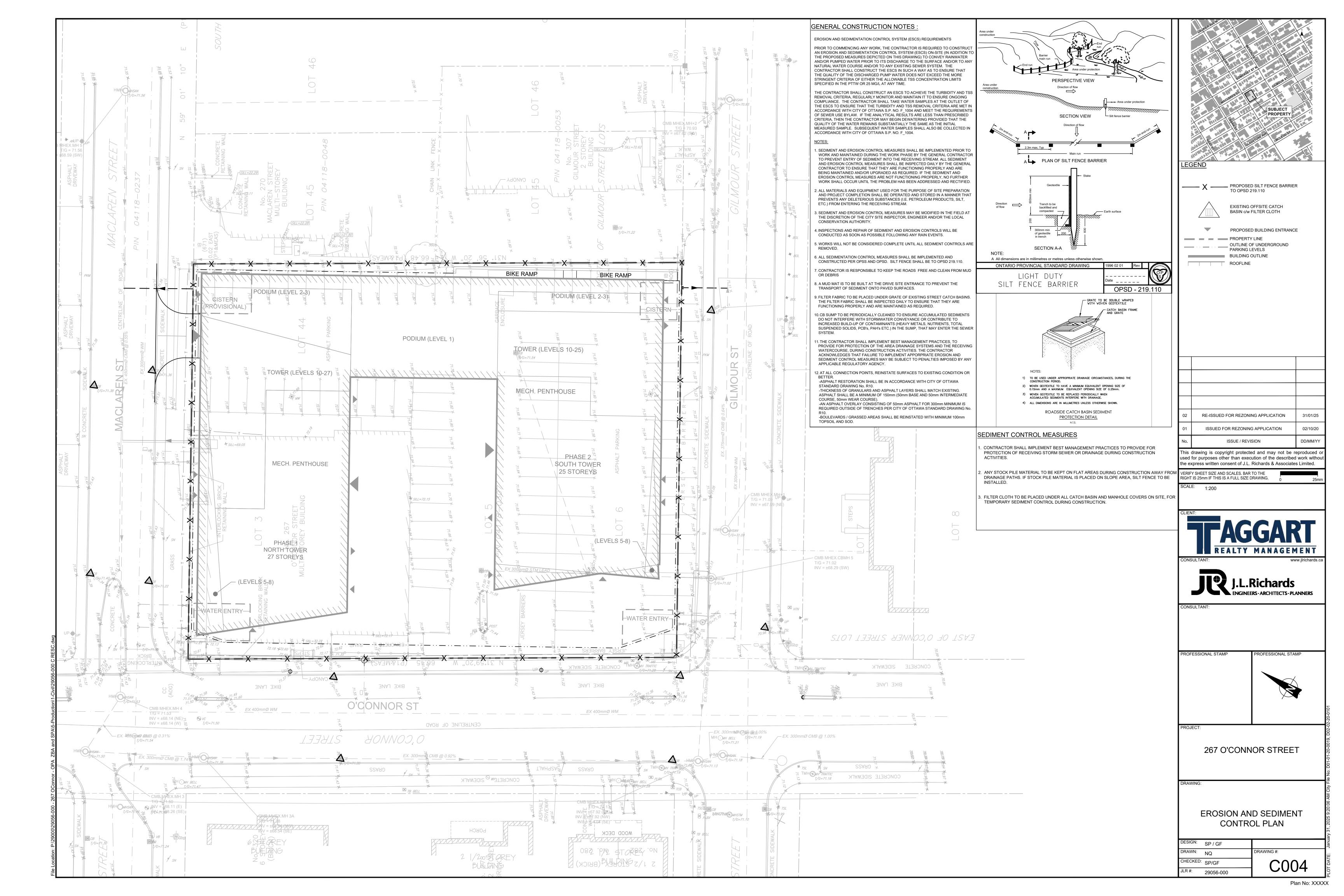
			Max Static	ICD Flow	Unc	Volume	Storage
Area	Area	Static	Volume	Flow (L/s)	Flow (L/s)	(m3)	Туре
No.	(m2)	Depth	(m3)	100 yr	100 yr	Used	
MacLarenS	treet outlet						
Area 1	56.32	N/A	N/A	N/A	2.52	N/A	N/A
Area 2	57.82	N/A	N/A	N/A	2.58	N/A	N/A
Area 3	971.22	0.15	87.41	3.78		35.34	Rooftop
1:100 year Flows (ICD+Unc): 8.88							
Criteria:			10.71				

## PRE-DEVELOPMENT DRAINAGE PLAN - SCALE 1:500

POST-DEVELOPMENT DRAINAGE PLAN - SCALE 1:200







#### Ottawa

343 Preston Street Tower II, Suite 1000 Ottawa ON Canada K1S 1N4 613-728-3571 ottawa@jlrichards.ca

#### Kingston

203-863 Princess Street Kingston ON Canada K7L 5N4 613-544-1424 kingston@jlrichards.ca



#### Sudbury

314 Countryside Drive Sudbury ON Canada P3E 6G2 705-522-8174 sudbury@jlrichards.ca

#### **Timmins**

834 Mountjoy Street S Timmins ON Canada P4N 7C5 705-360-1899 timmins@jlrichards.ca

#### **North Bay**

555-501 Oak Street E North Bay ON Canada P1B 8E3 705-495 7597 northbay@jlrichards.ca

#### Guelph

107-450 Speedvale Ave. West Guelph ON Canada N1H 7Y6 519-763-0713 guelph@jlrichards.ca









