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Site Servicing Report

267 O'Connor Street

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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 has been prepared as supporting documentation to a joint Official Plan Amendment and Zoning By-Law Amendment (OPA/ZBLA) which will be reviewed by Urban Design review Panel (UDRP). This Report 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 November 2009 Servicing Study Guidelines 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.

A copy of the Site Plan and Legal Plan is included in Appendix A while a copy of the pre-consultation 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 m^2. Under the Zoning By-Law (ZBL), the subject properties are zoned R4T[479].

TRM proposes to develop Twin Condominium Towers as follows:

- The Phase 1 Tower (southern) consists of a 28-storey building (264 units) fronting on Gilmour Street, and
- The Phase 2 Tower (northern) would consist of a 30-storey building (283 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 located within Gilmour Street
- 406mm diameter unlined cast iron watermain located within O'Connor Street
- 305mm diameter PVC watermain located within MacLaren Street

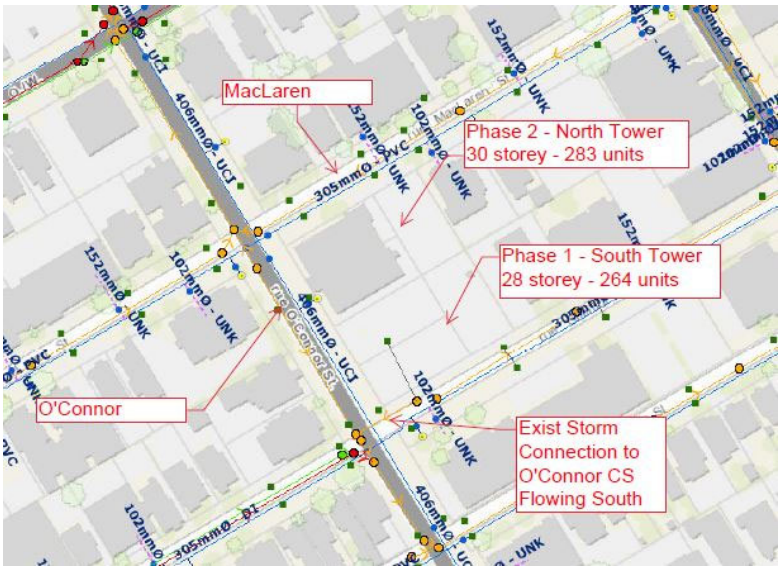
As part of the water distribution system, fire (5) hydrants are in close proximity of the subject site and located: i) east of the existing building along O'Connor, ii) southeast quadrant of the O'Connor and Gilmour Street intersection, and iii) southwest quadrant of the O'Connor Street and MacLaren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

Combined Sewers:

- 450 mm diameter combined sewer located within MacLaren Street (flowing west). This sewer connects to the 500 mm diameter combined sewer on O'Connor Street which flows northerly;
- 300 mm diameter combined sewer 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 combined sewer 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:

1. 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.
2. 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.
3. 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) complete with the following Technical Bulletins;

- ISTB-2012-01;
- ISTDB-2014-01;
- ISTDB-2016-01;
- ISTDB-2018-01;
- ISTDB-2019-01; and
- ISTDB-2019-02;

City of Ottawa Water Distribution Guidelines complete with the following Technical Bulletins:

- ISTDB-2010-02;
- ISTDB-2014-02; and
- ISTDB-2018-02.

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 SSR is presented in Section 4.2 (below).

Once the Site Servicing Report 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. At such time, the City of Ottawa Development Servicing Study Checklist and an Application to the Ministry of the Environment, Conservation and Parks (MECP) will be completed for an Environmental Compliance Approval (ECA).

2.0 WATER SERVICING

2.1 Design Criteria

Headloss calculations were carried out for the proposed Condominium 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 and ISTB-2018-02. 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).

Given the site's usage as a residential high-rise, fire flow requirements within this private property must comply with the Ontario Building Code (OBC), particularly to Section A-3.2.5.7 of the OBC, which reads as follows:

> "The water supply requirements for interior fire suppression systems such as sprinkler systems and standpipe and hose systems are contained in other standards, NFPA Standard 13".

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 S1 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 the Owner and shown on the Site Plan (Appendix A). For the Southern Tower (Phase 1), a total of 264 units are proposed consisting of 156 x 1-bedroom and 60 x 2-bedrooms. For the Northern Tower (Phase 2), a total of 283 units are proposed consisting of 194 x 1-bedroom and 67 x 2-bedrooms.

Based on densities of 1.4 (1-bedroom) and 2.1 (2-bedroom) persons per unit (Table 4.1 of the ODG – Water Distribution), total populations of 412 and 444 were calculated for Southern (Phase 1) and Northern (Phase 2) Towers, respectively (refer to Appendix D1 for detailed calculations). Given that the theoretical populations 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's (MOE) publication entitled "Design Guidelines for Drinking-Water Systems, 2008" herein referred as the MOE Design Guidelines.

Table 1 summarizes the overall water demands for 267 O'Connor, which were calculated based on theoretical unit rate of 280 L/cap/day. The calculated demands were based on populations of 412 and 444 using the recommended peaking factors of the MOE 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. Although water servicing consists of twin 200 mm diameter water laterals for each Tower (Drawing S1), 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 1) and Northern (Phase 2) Towers.

Table 1: Theoretical Water Demands

Demand Scenario	Water Demand (L/s)		
	Southern Tower (Phase 1)	Northern Tower (Phase 2)	Combined (Phases 1 &2)
Average Day	1.34	1.44	2.78
Maximum Day	4.21	4.35	8.56
Peak Hour	6.31	6.53	12.84
Minimum Hour	0.37	0.43	0.80

Hydraulic boundary conditions were obtained from the City (Appendix D2) based on the above-noted domestic demands and fire flows estimated by the FUS method (discussed in Section 2.4).

2.4 Fire Flow Requirements

Various guidelines are used throughout North America to establish fire flow requirements for different types of buildings. The following two (2) Guidelines speaks about the required fire flow (RFF):

Private Sites:

The RFF within private sites shall be calculated based on the Ontario Building Code (OBC), which in turn, is based on NFPA 13 when the building is to be equipped by a fire suppression system and that there are no on-site hydrants proposed (supply via watermain service laterals).

Based on NFPA's Table 11.2.2.1 (Water Supply Requirements for Pipe Schedule Sprinkler Systems) and Table 11.2.3.1.2 (Hose Stream Allowance and Water Supply Duration Requirements for Hydraulically Calculated Systems), the RFF within the property for ordinary hazard shall be 4,150 L/min (69.2 L/s), which is to be made up of i) 3,200 L/min (53.3 L/s) for the fire suppression system, and ii) 950 L/min (15.8 L/s) for the total combined hose allowance (refer to Appendix D3).

Municipal Right-Of-Way (ROW):

The RFF along the City of Ottawa ROW must comply with the Guidelines entitled "Water Supply for Public Fire Protection (1999)" developed by the Fire Underwriters Survey (FUS) as well as Technical Bulletins TB-2014-02 and TB-2018-02. Based on these documents, the RFF along the ROW was estimated at 23,000 L/min (383 L/s) and 20,000 L/s (333 L/s) for the Southern (Phase 1) and Northern Tower (Phase 2), respectively (refer to Appendix D3).

The supply characteristics provided by the City of Ottawa via boundary conditions (refer to Section 2.6) was calculated by the City using the RFF (FUS) noted above for the Southern and Northern Towers. However, given that no on-site hydrants are proposed but only watermain service laterals to the mechanical room of each of the sprinklered buildings, the targeted RFF for this private property was set to 4,150 L/min (69.2 L/s) as per NFPA 13. As a result, the headloss for both Towers was calculated accordingly. Consequently, the boundary conditions provided by the City (Section 2.6) is more conservative as it reflects supply to achieve the RFF as per FUS and Technical Bulletins TB-2014-02 and TB-2018-02.

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 S1) at the back of the Report. The proposed water servicing for 267 O'Connor consists of the following:

Southern Tower (Phase 1)

- Water supply to the Southern Tower (Phase 1) 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 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 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 fire suppression system and standpipe. 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 house allowance.

- The siamese connection will be located near the southwest corner of the Southern Tower, off of Gilmour Street in close 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 2)

- Water supply to the Northern Tower (Phase 2) 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 2). 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 and standpipe. 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 house allowance.

- The siamese connection will be located at the north face of the Northern Tower, off MacLaren Street in close 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 (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
MXDY + FF (Southern – Phase 1)	N/A	107.7	106.5
MXDY + FF (Northern – Phase 2)	107.7	108.0	N/A

2.7 Headloss Calculations

The proposed servicing as presented on Drawing S1 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 ±8.1 m for the Phase 1 Tower (Southern) and ±6.6 m for the Phase 2 Tower (Northern) in length (Drawing S1). 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

Southern Tower (Phase 1)

The headloss was calculated along one of the proposed twin 200 mm diameter water service laterals (Appendix D4), from the existing Gilmour Street 300 mm diameter watermain to the Southern Tower. Based on a total peak hour demand of 6.31 L/s, a headloss of 0.003 m in total was estimated. When this headloss is subtracted from the Gilmour Street supply HGL of 106.8 m, a residual HGL of 106.797 m was calculated at the building face which represents a pressure of 347 kPa (50.5 psi). Consequently, the calculated pressure exceeds the minimum pressure constraint of 275 kPa (40 psi) assuming that all of the peak demand is drawn from one of the twin 200 mm diameter watermains. It should be noted that given the height of the Southern Tower (28 storey), a booster pump is to be sized by the Owner's mechanical engineer to deliver the domestic demands to the users.

Northern Tower (Phase 2)

The headloss was calculated along one of the proposed twin 200 mm diameter water service laterals (Appendix D4), from the existing MacLaren Street 305 mm diameter watermain to the Northern Tower. Based on a total peak hour demand of 6.53 L/s, a headloss of 0.0026 m in total was estimated. When this headloss is subtracted from the MacLaren Street supply HGL of 106.9 m, a residual HGL of 106.897 m was calculated at

the building face, which represents a pressure of 346 kPa (50.5 psi). Consequently, the calculated pressure exceeds the minimum pressure constraint of 275 kPa (40 psi) assuming that all of the peak demand is drawn from one of the twin 200 mm diameter watermains. It should be noted that given the height of the Northern Tower (30 storey), a booster pump is to be sized by the Owner's mechanical engineer to deliver the domestic demands to the users.

2.7.2 Maximum Day Demand plus Fire Flow

Southern Tower (Phase 1)

The headloss was calculated under a maximum day of 4.21 L/s combined to a fire flow (69.2 L/s) to demonstrate that one of the proposed twin 200 mm diameter watermains can deliver the flows to the Southern Tower (Appendix D4). Based on the combined demand of 73.41 L/s (4.21 L/s + 69.20 L/s), this overall demand will generate a headloss of 0.2842 m on one of the twin 200 mm diameter watermains. When this headloss is subtracted from the Gilmour Street supply HGL of 106.5 m, a residual HGL of 106.216 m was calculated at the building face, which represents a pressure of 343 kPa (49.8 psi). Consequently, the minimum pressure constraint of 140 kPa (20 psi) is met by one of the proposed twin 200 mm diameter watermains. From that point, a fire pump is to be sized by the Owner's mechanical engineer to supply the domestic demands and flows to the fire suppression system.

Northern Tower (Phase 2)

The headloss was calculated under a maximum day of 4.35 L/s combined to a fire flow (69.2 L/s) to demonstrate that one of the proposed twin 200 mm diameter watermains can deliver the flows to the Northern Tower (Appendix D4). Based on the combined demand of 73.55 L/s (4.35 L/s + 69.20 L/s), this overall demand will generate a headloss of 0.2324 m on one of the twin 200 mm diameter watermains. When this headloss is subtracted from the MacLaren Street supply HGL of 107.7 m, a residual HGL of 107.468 m was calculated at the building face, which represents a pressure of 352 kPa (51.0 psi). Consequently, the minimum pressure constraint of 140 kPa (20 psi) is met by one of the proposed twin 200 mm diameter watermains. From that point, a fire pump is to be sized by the Owner's mechanical engineer to supply the domestic demands and flows to the fire suppression system.

2.7.3 Maximum HGL

The OBC requires that a high-pressure check (maximum HGL) be performed on the proposed system to ensure that the maximum pressure constraint of 552 kPa (80 psi) of the Ontario Code & Guide for Plumbing is not exceeded.

Southern Tower

To verify the maximum HGL criterion, a minimum hour demand of 0.37 L/s was used based on peaking factor of 0.27 for the Southern Tower, in accordance with Table 3-3 of the MOE Design Guidelines.

Based on the HGL of 115.0 m (at the Gilmour Street 300 mm diameter watermain), the pressure at the Southern Tower is 43.6 m (115.0 m – 71.4 m) based on a calculated headloss of 0.000016 m, which corresponds to a pressure of 428 kPa (62.1 psi). Consequently, the calculated pressure does not exceed the OBC maximum pressure constraint of 552 kPa and the installation of a pressure reducing valve (PRV) in the mechanical room is not warranted.

Northern Tower

To verify the maximum HGL criterion, a minimum hour demand of 0.43 L/s was used based on peaking factor of 0.30 for the Northern Tower, in accordance with Table 3-3 of the MOE Design Guidelines.

Based on the HGL of 115.0 m (at the MacLaren Street 300 mm diameter watermain), the pressure at the Northern Tower is 43.4 m (115.0 m – 71.6 m) based on a calculated headloss of 0.000017 m, which corresponds to a pressure of 426 kPa (62.0 psi). Consequently, the calculated pressure does not exceed the OBC maximum pressure constraint of 552 kPa and the installation of a pressure reducing valve (PRV) in the mechanical room is not warranted.

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 S1), 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 1 Tower and Phase 2 Tower to the Gilmour Street and MacLaren Street combined sewers, respectively (refer to Drawing S1 - Site Servicing).

3.2 Design Criteria

The proposed sanitary services for 267 O'Connor Street was 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.

Table 3: Wastewater Servicing Design Criteria

Design Criteria	Design Value	Reference
Residential average flow	280 L per capita/day	ISTB-2018-01
Residential peaking factor	Harmon Formula x 0.8	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) 0.28 L/s/ha (wet I/I)	0.33 L/s/ha	ISTB-2018-01
Minimum velocity	0.6 m/s	OSDG Section 6.1.2.2
Maximum velocity	3.0 m/s	OSDG Section 6.1.2.2
Manning Roughness Coefficient (for smooth wall pipes)	0.013	OSDG Section 6.1.8.2
Minimum allowable slopes	Varies	OSDG Table 6.2, Section 6.1.2.2

3.3 Theoretical Sanitary Peak Flow and Proposed Sanitary Servicing

Wastewater flows from the Southern and Northern Towers will discharged into the municipal systems via individuals sanitary service laterals. Wastewater flows from the Southern Tower will discharged into the Gilmour Street 300 mm diameter combined sewer while flows from the Northern Tower will discharged 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 and populations of 412 (Southern Tower) and 444 (Northern Tower) as per the design parameters listed in the above Table 3.

Peak wastewater flows of 4.62 L/s and 4.96 L/s were calculated for the Southern and Northern 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 412 (Southern) and 444 (Northern);
iii) Peaking factors of 3.413 and 3.400, calculated in accordance with the Harmon formula for the Southern and Northern Towers, respectively;

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 of 4.62 L/s and 4.96 L/s. Once added, total peak wastewater flows of 4.71 L/s and 5.05 L/s were calculated for the Southern Tower (Phase 1) and Northern Tower (Phase 2), respectively.

Proposed Sanitary Service Lateral Sizing

To accommodate the above design flow targets of 4.71 L/s and 5.05 L/s, the following is proposed:

- For the Phase 1 Tower, it is proposed to re-use the existing Gilmour Street 300 mm diameter combined sewer as depicted on Drawing S1. 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 2 Tower to MacLaren Street as shown on Drawing S1.

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 S1) 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 Twin 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 1) will discharge to the Gilmour Street 300 mm diameter combined sewer while runoff from the Northern Tower (Phase 2) 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 SSR 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 1 tower (wastewater & storm) will be the existing 300 mm diameter combined sewer on Gilmour Street, while the outlet for the Phase 2 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.
- 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 (m^2)**	**C-Factor**
Area tributary to Gilmour Street		
Parking area	2,205.77	0.90
TOTAL:	**2,205.77**	**0.90**
Surface Details	**Area (m^2)**	**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 m^2 is tributary to Gilmour Street while ±1,327 m^2 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 calculations have shown that the Tc for both outlets was well below 10 minutes given the short and efficient flow paths (i.e., parking sloping and short sections of sewers). Consequently, a Tc of 10 minutes has been used for both outlets. 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 (m^2)	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	34.6	59.3

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 34.6 L/s and 59.3 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 (m^2)	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	4.62	0.085	20.85
Total MacLaren	1,327.19	0.40	15.4	4.96	0.085	10.33

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.
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 20.85 L/s and 10.33 L/s for the Gilmour and MacLaren outlets, respectively. As part of the grading exercise, a number of low points (6) were introduced in the site's grading for areas surrounding the Towers; these low points have labelled as LP1 to LP6 on Drawing DST.

To take advantage of these depressions, inlet control devices (ICDs) are proposed based on the inlet control characteristics shown in the Ponding Area Table (Drawing DST). Given that these restrictors 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. These ICDs will limit all storm contributions in order to meet the allowable peak flow at both outlets.

In tandem to the at grade ICDs, the stormwater management strategy also includes rooftop storage and restrictions. Those two (2) detention methods were adapted to the allowable release rate, site constraints, and proposed grading. It should be noted that this SSR 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 the Owner's mechanical engineer and could potentially be revised upon comments from the City. At that time, stormwater management cistern(s), if deemed appropriate, 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 surface proposed (roof, hard scaped and landscaped), the various surfaces along with the calculated C-Factors have been delineated on Drawing DST (Post-Development Drainage Plan). Buildings and hard scaped areas were assigned a C-Factor of 0.90 while soft scaped areas (landscaped and planters) were set to a conservative C-Factor of 0.60. Based on this approach, the weighted C-Factors calculated for the at-grade areas (Areas 2-4, and Areas 6-9) have been found to vary between 0.69 to 0.90 (refer to Drawing DST). All areas depicted on Drawing DST are controlled by means of restrictors except for two (2) small areas; Area 1 (16.5 m^2) and Area 8 (37.4 m^2), which are at-grade surfaces and abutting the roadways. Given that Areas 1 & 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 DST follows:

Area 1: Small strip of land (16.4 m^2) that is proposed to sheet flow uncontrolled towards Maclaren Street. This flow was accounted as uncontrolled flow in the stormwater management assessment.

Area 2: At grade Low Point Area denoted as A2-LP1 (210.6 m^2) on the Ponding Area Table, having the ponding characteristics and ICD rate shown on

Drawing DST. This area consists of hard scaped and landscaped areas, with a weighted runoff coefficient of 0.72.

Area 3: At grade Low Point Area denoted as A3-LP2 (206.9 m^2) on the Ponding Area Table, having the ponding characteristics and ICD rate shown on Drawing DST. This area consists of hard scaped and landscaped areas, with a weighted runoff coefficient of 0.69.

Area 4: At grade Low Point Area denoted as A4-LP3 (278.6 m^2) on the Ponding Area Table, having the ponding characteristics and ICD rate shown on Drawing DST. This area consists of hard scaped and landscaped areas, with a weighted runoff coefficient of 0.82.

Area 5: Area 5 is the Phase 2 Tower, with a footprint of 940.9 m^2. Additional details regarding storage volume and release rate is shown below.

Area 6: At grade Low Point Area denoted as A6-LP4 (752.9 m^2) on the Ponding Area Table, having the ponding characteristics and ICD rate shown on Drawing DST. This area consists of hard scaped and landscaped areas, with a weighted runoff coefficient of 0.79.

Area 7: At grade Low Point Area denoted as A7-LP6 (111.3 m^2) on the Ponding Area Table, having the ponding characteristics and ICD rate shown on Drawing DST. This area consists of hard scaped and landscaped areas, with a weighted runoff coefficient of 0.71.

Area 8: Strip of land (37.4 m^2) representing the entrance to the building. This strip of land sheet flows uncontrolled towards the inside of the building where it will be captured by a trench drain at the entrance. This flow was accounted as uncontrolled flow in the stormwater management assessment.

Area 9: At grade Low Point Area denoted as A9-LP5 (108.1 m^2) on the Ponding Area Table, having the ponding characteristics and ICD rate shown on Drawing DST. This area consists of hard scaped and landscaped areas, with a weighted runoff coefficient of 0.68.

Area 10: Area 10 is the Phase 1 Tower, with a footprint of 909.9 m^2. Additional details regarding storage volume and release rate is shown below.

Rooftop Servicing (Areas 5 and 10):

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 81.9 m^3 and 84.68 m^3 and for the and Phase 1 Tower (Area 10) and Phase 2 Tower (Area 5), 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) 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 and including the climate change event (CCE). 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 at-grade detention areas, the Modified Rational Method (MRM) was used. Given that the proposed stormwater management strategy did not include at this time an internal cistern, the MRM calculation was carried out assuming the full design flow (100%) for each of the areas.

Stormwater Management Assessment

An evaluation of the stormwater management system design was carried out under both the 1:100-year and CCE storms 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) with release rates ranging between 1.90 L/s (Area 2) to 4.25 L/s (Area 6) as noted in the Ponding Area Table (Drawing DST).

Ponding volumes provided by grading (Drawing G1) range between 1.0 m^3 (Areas 7 & 9) to 19.98 m^3 (Area 6), which have also been included in the Ponding Area Volume Table on Drawing DST.

Other details for each area have been summarized in the Ponding Area Table (Drawing DST), including the proposed ICD capture rates, maximum static ponding depth and elevation, maximum static volume, as well as the calculated ponding depth and hydraulic grade line (HGL) estimated by the MRM under the 1:100-year storm and climate change event (CCE).

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

Table 8: Stormwater Management Assessment (Phase 1)

Area No.	Static Depth	Max Static Volume (m3)	ICD Flow Flow (L/s) 100 yr	Unc Flow (L/s) 100 yr	Volume (m3) Used	Calculated 100 yr Depth (m)	1:100 yr HGL	CCE HGL
Gilmour Street outlet								
A2/LP1	0.22	3.81	1.90		3.79	0.219	71.669	71.672
A3/LP2	0.16	2.37	3.20		2.33	0.157	71.507	71.517
A4/LP3	0.2	2.99	4.20		2.94	0.197	71.497	71.508
A6/LP4	0.25	19.98	4.25		19.75	0.247	71.247	71.262
Area 8	N/A	N/A	Unc	1.50	N/A	N/A	N/A	N/A
A9/LP5	0.21	1.00	2.00		0.99	0.208	71.408	71.414
Area 10	0.15	81.89	3.78		32.34	N/A	N/A	N/A
			1:100 year Flows:	20.83				
			Criteria:	20.85				

Note that the "N/A" shown above for Area 10 relates to the unknown configuration of the rooftop, therefore, the ponding depth is unknown and irrelevant provided that its design meet the requirements and targets described above. Similarly, a "N/A" is also shown for Area 8 as this area flows towards the inside of the building where it will be captured by a trench drain. Therefore, depth of flow along this steep slope is irrelevant. The sum of all 1:100-year flows (ICD plus uncontrolled) is estimated at 20.83 L/s which is less than the allowable peak flow of 20.85 L/s. Hence, the storm discharge criterion is met.

The above ponding elevations under the 1:100-year and CCE shows that the Phase 1 building will be protected during those extreme events. The critical locations for A3/LP2 and A4/LP4 shows the CCE HGL at 71.517, below the lowest planter elevation of 71.60 m (Drawing G1). Hence, the Phase 1 Tower is protected during both the 1:100 year and CCE.

Table 9: Stormwater Management Assessment (Phase 2)

Area No.	Static Depth	Max Static Volume (m3)	ICD Flow Flow (L/s) 100 yr	Unc Flow (L/s) 100 yr	Volume (m3) Used	Calculated 100 yr Depth (m)	1:100 yr HGL	CCE HGL
Gilmour Street outlet								
Area 1	N/A	N/A	N/A	3.65	N/A	0.010	71.460	71.462
Area 5	0.15	84.68	3.78		33.85	N/A	N/A	N/A
A7/LP6	0.25	1.00	3.30		0.37	0.093	71.733	71.880
			1:100 year Flows:	10.73				
			Criteria:	10.80				

Note that the "N/A" shown above for Area 5 relates to the unknown configuration of the rooftop, therefore, the ponding depth is unknown and irrelevant provided that its design meet the requirements and targets described above. The sum of all 1:100-year flows (ICD plus uncontrolled) is estimated at 10.73 L/s which is less than the allowable peak flow of 10.80 L/s. Hence, the storm discharge criterion is met.

The above ponding elevations under the 1:100-year and CCE shows that the Phase 2 building will also be protected during those extreme events. The critical location is A7/L62 shows the CCE HGL at 71.891 which is below the lower planter elevation of 71.90 m. Hence, the Phase 2 Tower is protected during both the 1:100 year and CCE storms.

4.5.2 Water Quality

Storm runoff generated by 267 O'Connor is conveyed to the Gimour 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 Site Servicing 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 (i.e., storage and capacity) will require to be reviewed by the Owner's mechanical engineer. Similarly, the hardscaped restrictors (Drawing DST) as well as the internal piping will require to be designed by the mechanical engineer. As noted in Section 5.5.1, once rezoning has been approved and the stormwater management servicing reviewed by the mechanical engineer, cistern(s) might be introduced in the design to improve the level of service along the hard scaped surfaces.

Desktop calculations (Appendix F2) were carried out to assess the effectiveness of the proposed grading, servicing and stormwater management design under both the 1:100-year and CCE storms. This assessment has demonstrated that the rooftop controls along with the at-grade storage and controls could accommodate the 1:100-year and CCE storms 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 Drawing DST, Site Servicing (Drawing S1), and Grading (Drawing G1) 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 RESC):

- 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 removal and reinstatement measure as well as the erosion control measures (refer to Drawing RESC) 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.

This report has been prepared for the exclusive use of Taggart Realty Management (TRM) for the stated purpose, for the named facility. Its discussions and conclusions are summary in nature and cannot be properly 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 was prepared for the sole benefit and use of TRM and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited.

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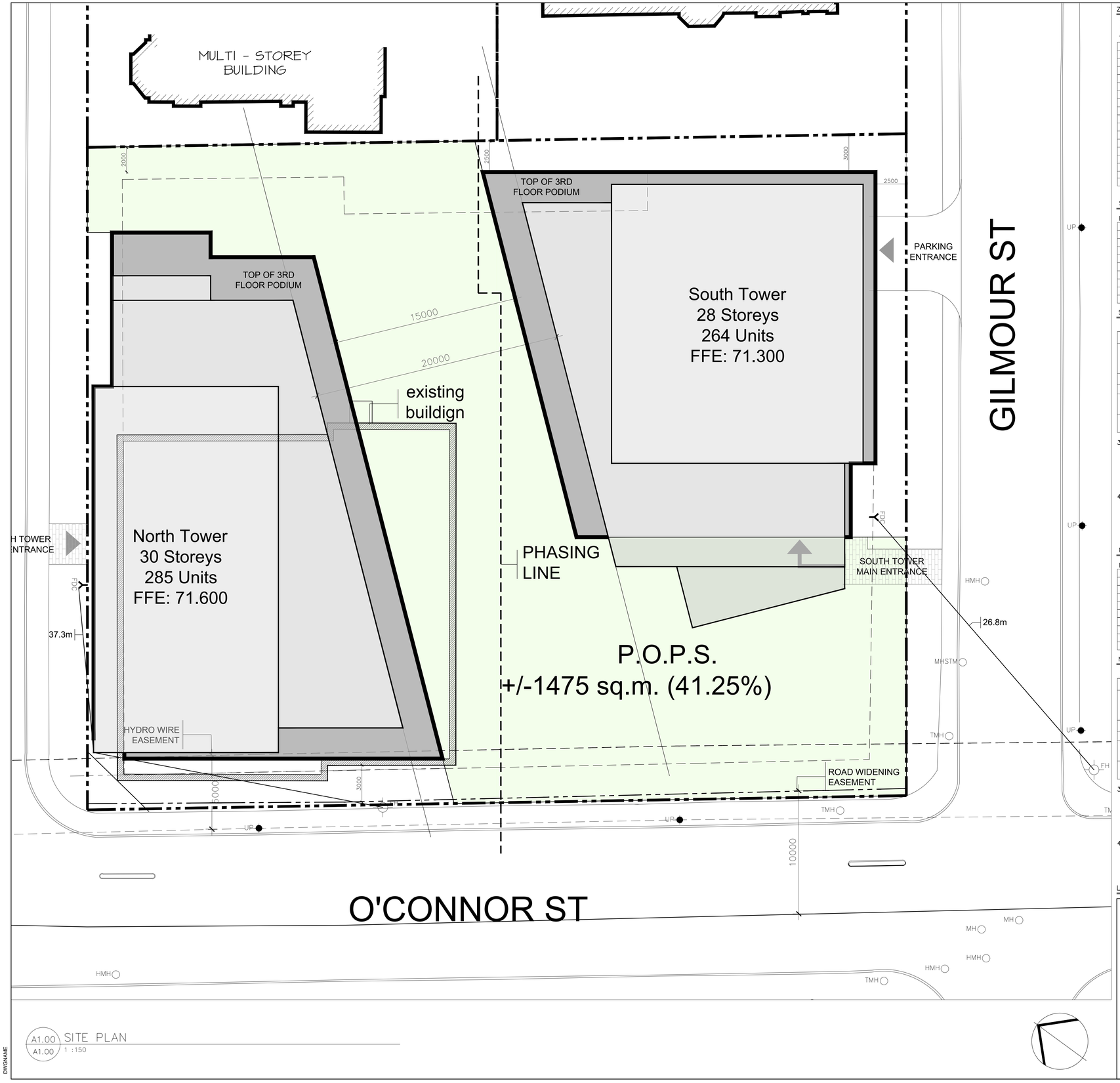
Appendix A

Site Plan and Legal Plans



A1.00 SITE PLAN
A1.00 1 :150

DATE-PLOT
DWGNAME

ZONING NOTES:

CURRENT ZONING: **R4T [479]**
PROPOSED ZONING: **TBD**

TOTAL DEVELOPMENT STATS

	PROPOSED
AREA OF LOT	3,572 m²
LOT WIDTH	66.5 m
LOT DEPTH	54 m
SETBACK ALONG O'CONNOR	3 m
SETBACK ALONG GILMOUR	2 m
SETBACK ALONG MACLAREN	0 m
REAR YARD SETBACK – EAST SIDE	2 m
MAXIMUM HEIGHT	93 m
MAX NUMBER OF STOREYS	30
TOTAL BUILDING AREA	1,656 m²
TOTAL UNITS	549 UNITS
TOTAL PARKING SPACES	346 SPACES
TOTAL TOTAL RES. PARKING SPACES (0.50/UNIT)	291 SPACES
TOTAL TOTAL VISITOR PARKING SPACES (0.1/UNIT)	55 SPACES
TOTAL BICYCLE PARKING SPACES (0.5/UNIT)	XXX SPACES

SOUTH PHASE – DEVELOPMENT STATS

DEVELOPMENT STATS	PROPOSED
NUMBER OF STOREYS	28
MAXIMUM HEIGHT	87 m
TOTAL UNITS	264
TOTAL GROSS FLOOR AREA	226,659 ft²
TOTAL NET/LEASEABLE FLOOR AREA	185,024 ft²
PARKING SPACES PROVIDED (VISITOR + RES.)	176
BICYCLE PARKING SPACES PROVIDED	XXX
STORAGE LOCKERS PROVIDED	XXX

SOUTH PHASE – PARKING REQUIREMENTS

1. REQUIRED PARKING

LAND USE	PROVIDED VEHICLE PARKING
APARTMENT	150 RESIDENTIAL PARKING SPACES PROVIDED FOR 264 UNITS (0.5/UNIT) * LOCATED IN UNDERGROUND PARKING GARAGE AND PARKING PODIUM

2. REQUIRED VISITOR PARKING

LAND USE	PROVIDED VISITOR PARKING
APARTMENT	26 VISITOR PARKING SPACES PROVIDED FOR 264 UNITS * LOCATED IN PARKING GARAGE
TOTAL PARKING PROVIDED FOR PHASE 1	176 TOTAL PARKING PARKING SPACES 176 INTERIOR

3. BICYCLE PARKING
3.1 REQUIRED BICYCLE PARKING SPACES
RESIDENTIAL (0.5 SPACE/UNIT – 132 SPACES REQUIRED)
3.2 PROVIDED BICYCLE PARKING TBD
GROUND 58 spaces + XX EXTERIOR SPACES
P1 LEVEL TBD
P2 LEVEL TBD

4. AMENITY SPACE REQUIREMENTS
REQUIRED AMENITY SPACE 6 m² REQUIRED PER UNIT
264 UNITS X 6 SQ.M. = 1584 SQ.M. TOTAL AMENITY REQUIRED
REQUIRED AMENITY SPACE TO BE COMMON – 792 SQ.M.
PROVIDED COMMON AMENITY SPACE – 792 SQ.M.

NORTH PHASE – DEVELOPMENT STATS

DEVELOPMENT STATS	PROPOSED
NUMBER OF STOREYS	30
MAXIMUM HEIGHT	93 m
TOTAL UNITS	283
TOTAL GROSS FLOOR AREA	241,553 ft²
TOTAL NET/LEASEABLE FLOOR AREA	195,415 ft²
PARKING SPACES PROVIDED (VISITOR + RES.)	170
BICYCLE PARKING SPACES PROVIDED	XXX
STORAGE LOCKERS PROVIDED	XXX

NORTH PHASE – PARKING REQUIREMENTS

1. REQUIRED PARKING

LAND USE	PROVIDED VEHICLE PARKING
APARTMENT	143 RESIDENTIAL PARKING SPACES PROVIDED FOR 285 UNITS (0.5/UNIT) * LOCATED IN UNDERGROUND PARKING GARAGE AND PARKING PODIUM

2. REQUIRED VISITOR PARKING

LAND USE	PROVIDED VISITOR PARKING
APARTMENT	27 VISITOR PARKING SPACES PROVIDED FOR 283 UNITS * LOCATED IN PARKING GARAGE
TOTAL PARKING PROVIDED FOR PHASE 1	170 TOTAL PARKING PARKING SPACES 170 INTERIOR

3. BICYCLE PARKING
3.1 REQUIRED BICYCLE PARKING SPACES
RESIDENTIAL (0.5 SPACE/UNIT – 142 SPACES REQUIRED)
3.2 PROVIDED BICYCLE PARKING TBD
GROUND 68 spaces + XX EXTERIOR SPACES
P1 LEVEL TBD
P2 LEVEL TBD

4. AMENITY SPACE REQUIREMENTS
REQUIRED AMENITY SPACE 6 m² REQUIRED PER UNIT
264 UNITS X 6 SQ.M. = 1698 SQ.M. TOTAL AMENITY REQUIRED
REQUIRED AMENITY SPACE TO BE COMMON – 849 SQ.M.
PROVIDED COMMON AMENITY SPACE – 849 SQ.M.

LEGEND

PROPOSED FIRE ROUTE
EXISTING BUILDING
PROPOSED BUILDING
BUILDING TO BE DEMOLISHED
HMH EXISTING TRAFFIC MAN HOLE
TMH EXISTING TRAFFIC MAN HOLE
MH EXISTING MAN HOLE
TSP EXISTING TRAFFIC LIGHT
FH EXISTING FIRE HYDRANT
CONC. CURB DETAIL, TO CITY OF OTTAWA STANDARDS
BP BIKE PARKING SPACE
EDGE OF SIDEWALK
PROPERTY LINE
SETBACK
DC PROPOSED DEPRESSED CURB DETAIL TO CITY OF OTTAWA STANDARD SC-7
EXTENT OF PRIVATELY OWNED PUBLIC SPACE
CURB TO BE REBUILT
ROLL CURB
UP EXISTING UTILITY POLE
FDC FIRE DEPARTMENT CONNECTION
PTD PARKING TICKET DISPENCER
PDS EXISTING PAY & DISPLAY
BS EXISTING TRANSIT STOP
CB EXISTING CATCH BASIN
CB PROPOSED CATCH BASIN
AS SIGNAGE FOR ACCESSIBLE PARKING SPACE
FRS SIGNAGE FOR FIRE ROUTE ACCESS
S EXISTING SIGN
B EXISTING BOLLARD
EXISTING LIGHT POLE
NEW LIGHT POLE
PROPOSED WALL MOUNTED LIGHT
SL EXISTING STREET LIGHTING BOX
TB EXISTING TRAFFIC SIGNAL BOX

TAGGART REALTY MANAGEMENT

PROJECT TEAM

ARCHITECT
HOBIN ARCHITECTURE
PATRICK BISSON 613.238.7200

OWNERSHIP

PLANING

CIVIL

LANDSCAPE ARCHITECT

TRANSPORTATION

ENVIRONMENTAL

no.	date	revision

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HOBIN ARCHITECTURE

PROJECT/LOCATION:
267 O'CONNOR
267 O'CONNOR

DRAWING TITLE:
SITE PLAN

DRAWN BY:	DATE:	SCALE:
PB	2020-09-28	1:150

PROJECT: 1938

DRAWING NO.: A3-00

REVISION NO.:

DWG 18064

D07-12-19-0186

A1.00 GROUND FLOOR PLAN
A1.00 1 :150

DATE-PLOT
DWGNAME

TAGGART REALTY MANAGEMENT

PROJECT TEAM

ARCHITECT
HOBIN ARCHITECTURE
PATRICK BISSON 613.238.7200

OWNERSHIP

PLANING

CIVIL

LANDSCAPE ARCHITECT

TRANSPORTATION

ENVIRONMENTAL

no.	date	revision

It is the responsibility of the appropriate contractor to check and verify all dimensions on site and report all errors and/or omissions to the architect.

All contractors must comply with all pertinent codes and by-laws.

Do not scale drawings.

This drawing may not be used for construction until signed.

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Canada K1S 3K7
T: 613-238-7200
F: 613-235-2005
E: mail@hobinarc.com
hobinarc.com

HOBIN ARCHITECTURE

PROJECT/LOCATION:
267 O'CONNOR
267 O'CONNOR

DRAWING TITLE:
GROUND FLOOR PLAN

DRAWN BY:	DATE:	SCALE:
	2020-09-28	1:150

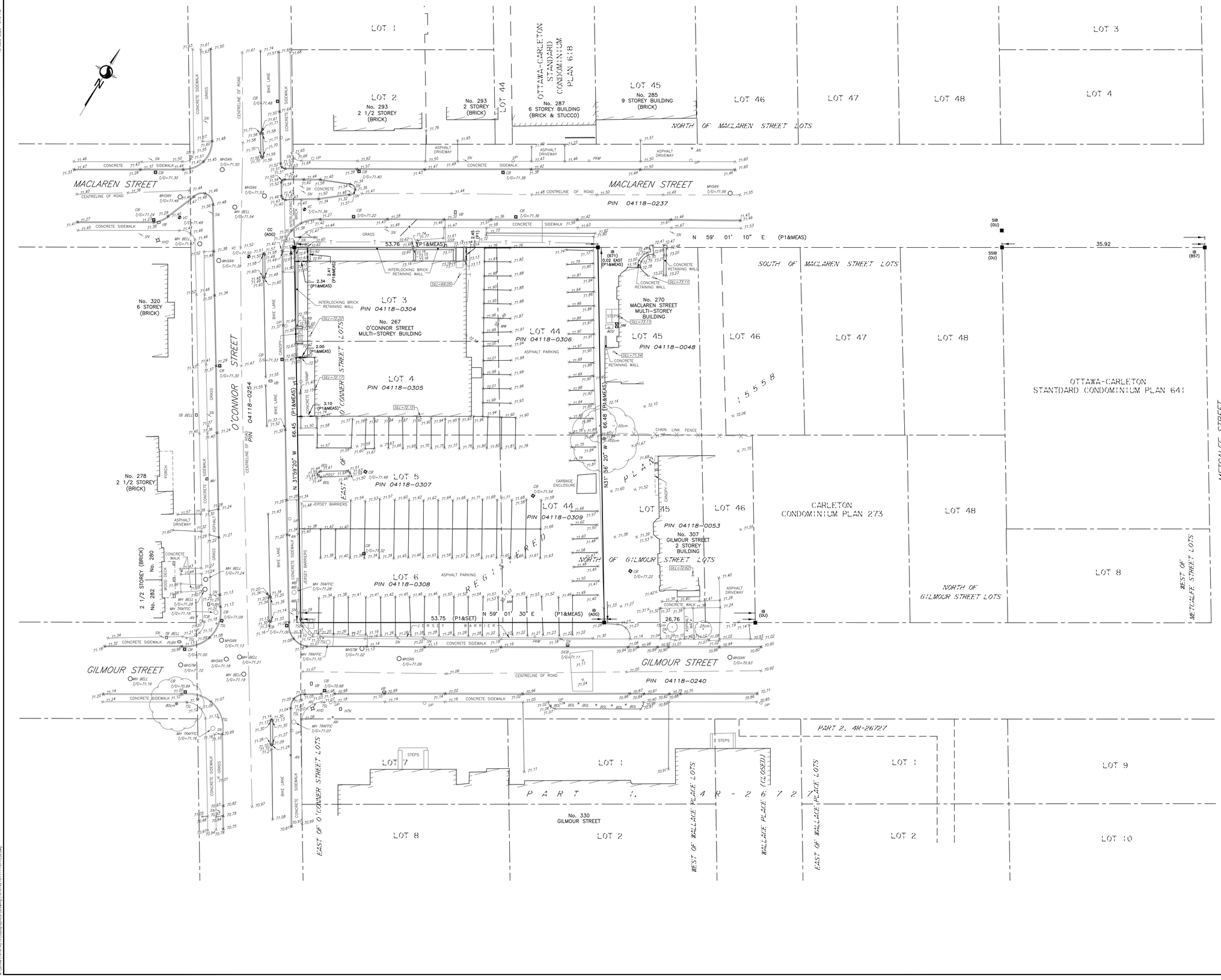
PROJECT: 1938

DRAWING NO.: A3-00

REVISION NO.:

D07-12-19-0186

DWG 18064



Stantec

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

TOPOGRAPHIC SKETCH OF
LOTS 3, 4, 5 AND 6
(EAST OF O'CONNOR STREET)
LOT 44
(SOUTH OF MACLAREN STREET)
AND
LOT 44
(NORTH OF GILMOUR STREET)
REGISTERED PLAN 15558
CITY OF OTTAWA

Scale 1:300

5 0 5 10 15 20 METRES

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

BEARING NOTE
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.

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

LEGEND

■	DENOTES	FOUND MONUMENTS
□	"	SET MONUMENTS
IB	"	IRON BAR
IBØ	"	ROUND IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
RB	"	ROCK BAR
CC	"	CUT CROSS
CP	"	CONCRETE PIN
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
SG	"	STANTEC GEOMATICS LTD.
P	"	REGISTERED PLAN 15558
P1	"	PLAN BY FSM DATED SEPTEMBER 19, 2013
□ ACU	"	AIR CONDITIONING UNIT
◄ AN	"	ANCHOR
● BOL	"	BOLLARD
CB	"	CATCH BASIN
SICB	"	SIDE INLET CB
GSR	"	GAS SERVICE REGULATOR
HM	"	HYDRO METER
HTN	"	HYDRO TRANSFORMER
HYD	"	FIRE HYDRANT
JBX	"	JUNCTION BOX
LS	"	LIGHT STANDARD
MB	"	MAILBOX
MH	"	MAINTENANCE HOLE UNIDENTIFIED
MHB	"	MAINTENANCE HOLE BELL
MHSAN	"	MAINTENANCE HOLE SANITARY
MHSTM	"	MAINTENANCE HOLE STORM
MHT	"	MAINTENANCE HOLE TRAFFIC
MW	"	MONITORING WELL
PKM	"	PARKING METER
PLBX	"	PULL BOX
SN	"	SIGN
□ TB BELL	"	TERMINAL BOX - BELL
TCB	"	TRAFFIC CONTROL BOX
TSL	"	TRAFFIC SIGNAL LIGHT
UP	"	UTILITY POLE
VB	"	VALVE BOX
VC	"	VALVE CHAMBER
WV	"	WATER VALVE
	"	TREE DECIDUOUS

T T T
UNDERGROUND TELEPHONE

P P P
UNDERGROUND HYDRO

HANDRAIL

SURVEYOR'S CERTIFICATE
I CERTIFY THAT :
1. THE SURVEY WAS COMPLETED ON THE 26th DAY OF MAY, 2020.

DATE

BRIAN J. WEBSTER
ONTARIO LAND SURVEYOR

DRAWN: 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:

- 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)
  - 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.

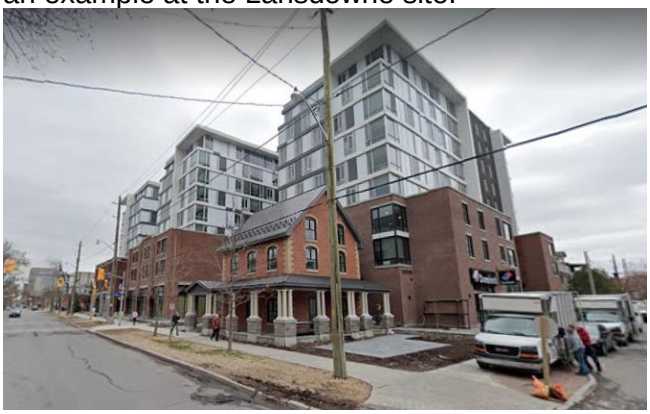
General

- 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
- SD to set up follow up meeting regarding the public space discussion.
- Jack Hanna, willing to organize a follow up meeting with the Community Association.
- 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

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

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

J.L. Richards & Associates Limited is proactively doing our part to protect the wellbeing of our staff and communities while improving our communication technology. ***We are pleased to announce that we have implemented direct phone lines for all of our staff, allowing you to connect with us regardless of whether we are working remotely or in the office.*** *We are dedicated to 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: 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

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

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 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

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.jlrichards.ca

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

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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

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

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 <atourigny@jlrichards.ca>; Fraser, Mark <Mark.Fraser@ottawa.ca>; Emily McGirr <emily.mcgirr@taggart.ca>; Lucie Dalrymple <ldalrymple@jlrichards.ca>
Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

,

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 September 4, 2020. 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

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 <gforget@jlrichards.ca>; Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

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

From: Alexandre Tourigny <atourigny@jlrichards.ca>
Sent: August 19, 2020 3:21 PM
To: Fraser, Mark <Mark.Fraser@ottawa.ca>
Cc: Guy Forget <gforget@jlrichards.ca>
Subject: RE: 267 O'Connor Street - Design Parameters Inquiry

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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'

Appendix C

Background Drawings

E-12-14

E-12-18

E-12-20

E-12-24

SOMERSET STREET WEST

SOMERSET STREET

O'CONNOR STREET

MacCLAREN STREET

MacCLAREN STREET

Metres 5 4 3 2 1 0 5 10 15 20

Metres 20 15 10 5 0 1 2 3 4 5

REVISIONS / RÉVISIONS	DATE	BY
13564 - SOMERSET WEST (NOV 2007) SEWER, WATER, ROAD, UTILITY REVISED	AUG 2008	DC
ROGERS - ROG2207258 (OCT 2002) CONDUIT ADDED TO O'CONNOR @ MACLAREN	AUG 2008	DC
14783 - MacLAREN (NOV 2007) ROAD REVISED @ O'CONNOR	JAN 2010	DC
BELLV39795 - MACLAREN (2010) CHECKED BELL	OCT 2013	ZB
13564 - O'CONNOR - (NOV 2007) SEWER,WATER,ROAD, UTILITIES VERIFIED	OCT 2019	JC
TU5015 - O'CONNOR - (JAN 2018) TRAFFIC UPDATED	OCT 2019	JC
17061 - O'CONNOR - (JAN 2018) TRAFFIC APPLIED	OCT 2019	JC
CITY, ALL EXTERNAL AGENCIES DIGITIZED FROM CITY/UTILITY DATA RECEIVED	MAY 2020	DC

LEGEND

- Water Valve, Valve Chamber, Fire Hydrant
- Sewer Manhole, Catch Basin Manhole
- Catch Basin / Drainage, Wing Wall, Head Wall
- Pole, Pole w/ light, Decorative, Lawn Light
- Power Supply, Panel, Pedestal, Transformer, Tower, Regulator (P/S, PED, GR)
- Amp, Hand Hole, Vault, Gas Valve
- OC Transpo: Bus Shelter-No Power, Energized, Isolated (BUS)
- Streetscape: Planter Box, Grate Square, Eng. Soil (TGS)
- Traffic Connect Box / Disconnect Box, SL Disconnect (TCB, TDB, SDB)
- R.L Hand Hole, R.L. Camera (THH)
- Scada: Hand Hole, Monitoring Panel
- Reducer
- Pipe, Duct, Conduit, Lateral
- Culvert
- Abandoned
- Capped
- Buried Cable
- Property Line
- Install Year (2015)

TELECOM GLOSSARY

A.....Allstream	P.....Primus
AT.....Atria	P2P.....Canadian P2P Fibre
B.....Bell	R.....Rogers
BH.....Birch Hill	S.....Sprint
F.....Fibre Noir	SL.....Street Lighting
G.....Globility	T.....Traffic
GT.....Group Telecom	TO.....Telecom Ottawa
H.....Hydro Ottawa	TU.....Telus
H1.....Hydro One	V.....Videotron
L / L3.....Level 3	Z.....Zayo

GLOSSARY - OTHER

DD.....Dept. of Defence	PED.....Pedestal (owner unknown)
MH.....Manhole (owner unknown)	PW.....Public Works
O/OC.....OCTranspo	UP.....Utility Pole (owner unknown)
SCD.....Scada	

CAUTION/ATTENTION

Although utility locations are established using the best available information, they cannot be guaranteed.
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Planning, Infrastructure and Economic Development Department /
Direction generale de la planification, de l'infrastructure et du developpement economique
100 Constellation Cres., 6th Floor East / 6ème Étage Est, Ottawa, ON K2G 6J8

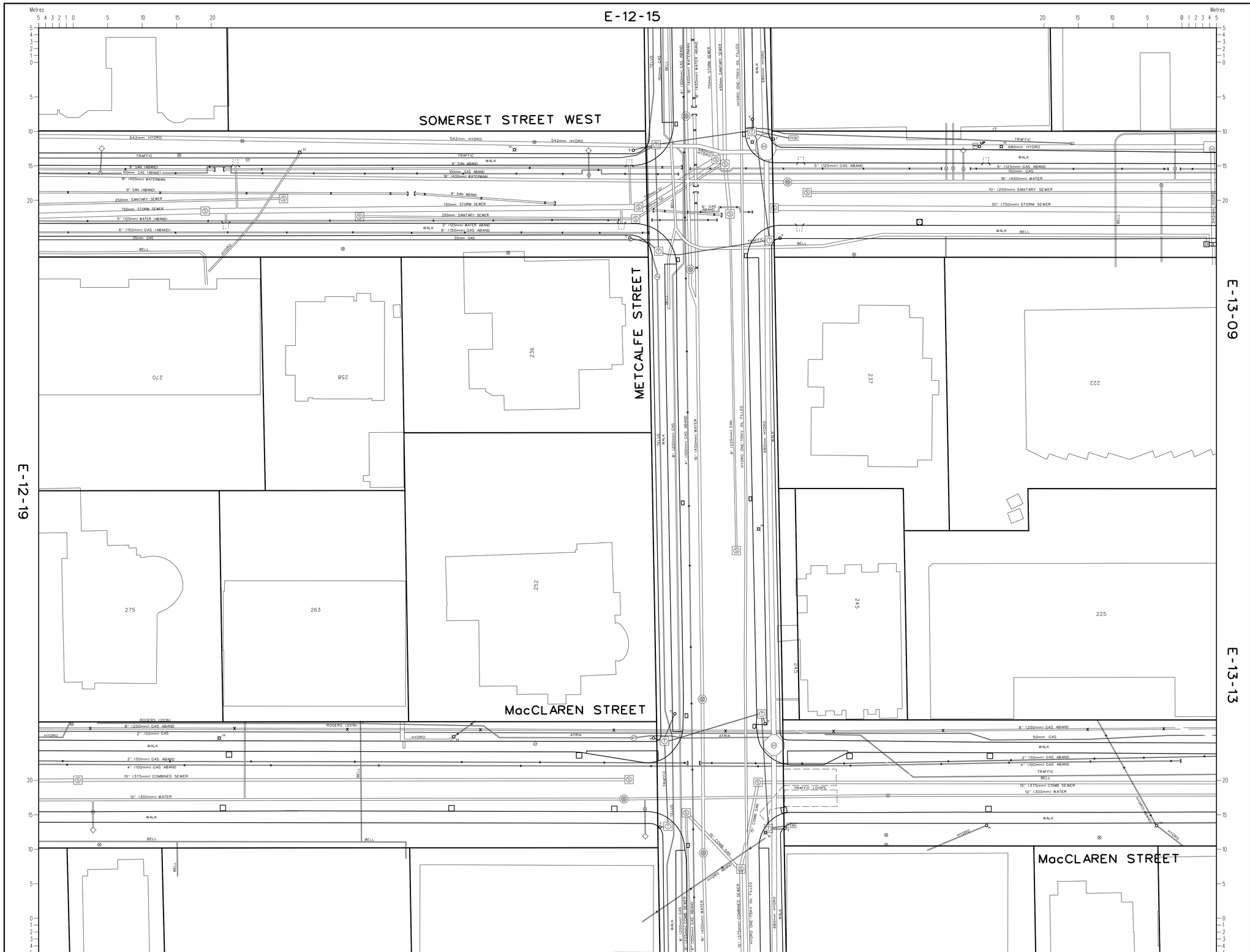
OTTAWA UTILITY COORDINATING COMMITTEE
CENTRAL REGISTRY
COMITÉ DE COORDINATION DES SERVICES PUBLICS D'OTTAWA
ENREGISTREMENT CENTRAL

UTILITY COORDINATING COMMITTEE UCC Ottawa CCSP COMITÉ DE COORDINATION DES SERVICES PUBLICS

PRODUCED BY: GIS & DATA MANAGEMENT BRANCH
INFORMATION CENTRE UNIT

SCALE: 1:250

SHEET NUMBER
E-12-19



REVISIONS / RÉVISIONS	DATE	BY
REDRAWN FROM VOIDED UTILITY PLAN E-12-20	JAN 2010	DC
ATR10030 - MACLAREN (2010) MANHOLE AND CONDUIT ADDED	OCT 2013	ZB
HYDRO 1 - 115kV HIGH VOLTAGE(2016) HYDRO1 -HV OIL FILLED LINE ON LISGAR	DEC 2016	KJ
ROG16TA72 - MACCLAREN (JUNE 2016) ROGERS - CONDUIT ADDED	AUG 2019	B.B.
CITY, ALL EXTERNAL AGENCIES DIGITIZED FROM CITY/UTILITY DATA RECEIVED	MAY 2020	DC

LEGEND

- Water Valve, Valve Chamber, Fire Hydrant
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- Pole, Pole w/ light, Decorative, Lawn Light
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- Amp, Hand Hole, Vault, Gas Valve
- OC Transpo: Bus Shelter-No Power, Energized, Isolated (BUS, BUS, BUS)
- Streetscape: Planter Box, Grate Square, Eng. Soil (TGS)
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- R.L Hand Hole, R.L. Camera (THH)
- Scada: Hand Hole, Monitoring Panel
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SCALE: 1:250

SHEET NUMBER
E-12-20

REVISIONS / RÉVISIONS	DATE	BY
GAS - 60-4367-03 (Sept. 2003) GAS REVISED ON GILMOUR	NOV 2004	DC
12473 - GILMOUR (JAN. 2004) SEWER, ROAD REVISED	FEB 2008	DC
ROG0207259 - ROGERS (OCT 2002) CONDUIT & POWER SUPPLY ADDED TO GILMOUR	FEB 2008	DC
ROG0201191 - ROGERS (OCT 2002) CONDUIT ADDED TO LEWIS	FEB 2008	DC
GTL0201004 - GILMOUR (2002) CONDUIT ADDED	OCT 2013	ZB
BEL09123-BELL (SEP 2010) CONDUIT/PANEL ADDED TO O'CONNOR	JUL 2015	JM
GNE6252-6 - GILMOUR, LEWIS (MARCH 2018) ENBRIDGE GAS MAIN EXTENDED	AUG 2019	B.B.
TUS091 - O'CONNOR - (OCT 2017) TRAFFIC UPDATED	OCT 2019	JC
CITY, ALL EXTERNAL AGENCIES DIGITIZED FROM CITY/UTILITY DATA RECEIVED	MAY 2020	DC

LEGEND

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- R.L Hand Hole, R.L. Camera (THH)
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SCALE: 1:250

SHEET NUMBER
E-12-24

E-12-20

E-12-24

E-13-17

E-12-30

Metres

METCALFE STREET

GILMOUR STREET

WALLACE PLACE

LEWIS STREET

REVISIONS / RÉVISIONS	DATE	BY
12473 - GILMOUR (JAN 2004) SEWER, ROAD REVISED	FEB 2008	DC
TOL04072 - GILMOUR (2004) TELECOM OTTAWA MANHOLE / CONDUIT ADDED	OCT 2013	ZB
HYDRO 1 - 115kV HIGH VOLTAGE(2016) HYDRO1 -HV OIL FILLED LINE ON LISGAR	DEC 2016	KJ
TEL17D518 - METCALFE (JANUARY 2019) TELUS - CONDUIT/HARDWARE ADDED	AUG 2019	BB
CITY, ALL EXTERNAL AGENCIES DIGITIZED FROM CITY/UTILITY DATA RECEIVED	MAY 2020	DC

LEGEND

- Water Valve, Valve Chamber, Fire Hydrant
- Sewer Manhole, Catch Basin Manhole
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INFORMATION CENTRE UNIT

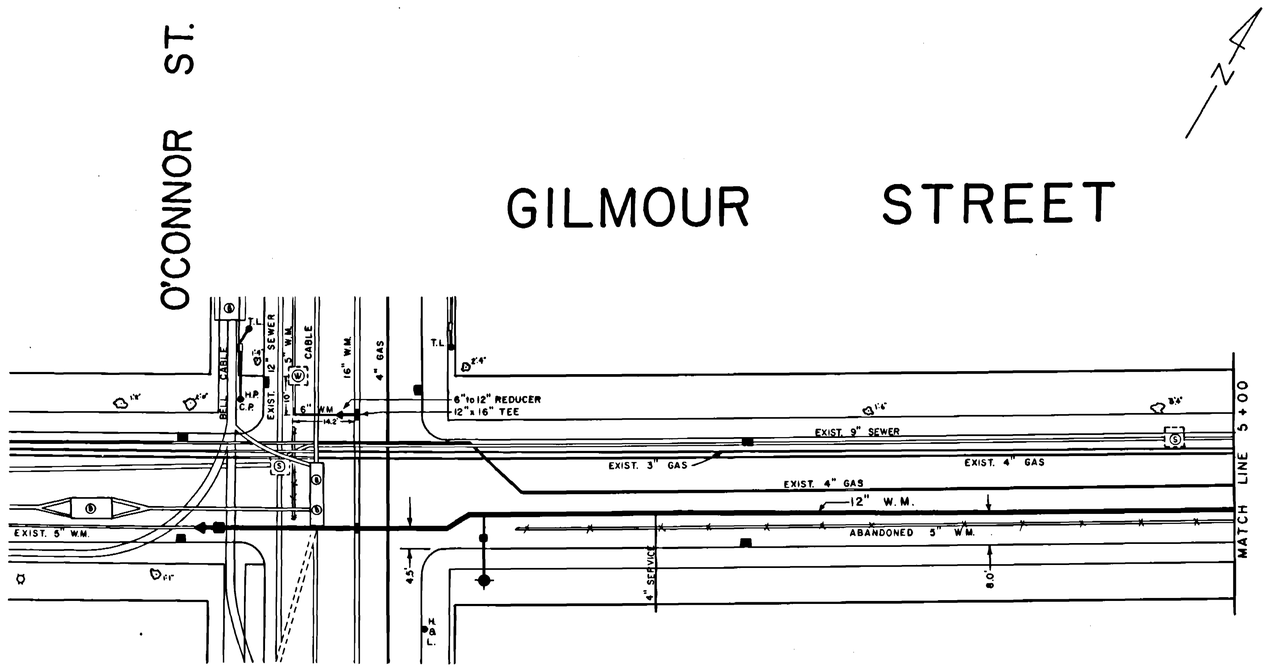
SCALE: 1:250

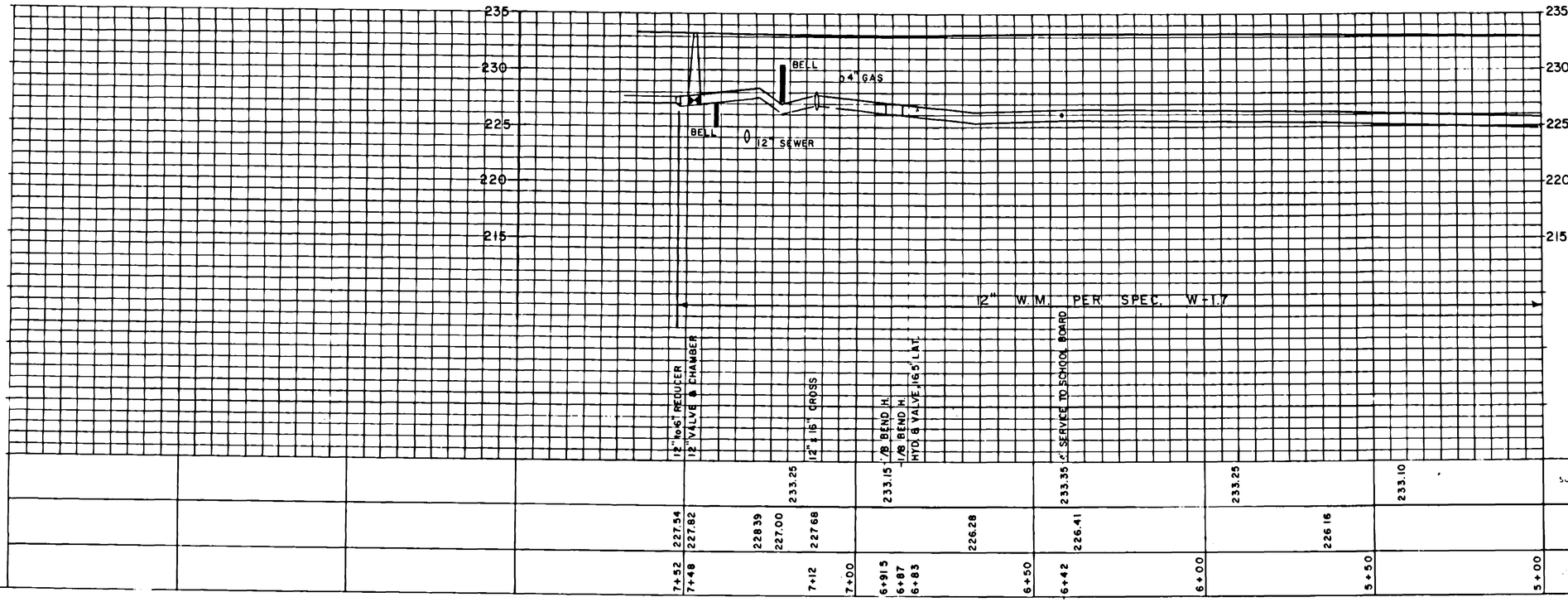
SHEET NUMBER
E-12-25

NOTES

1. ALL UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR IS REQUIRED TO NOTIFY THE UTILITY COMPANIES BEFORE EXCAVATING.

2. AVG. DEPTH TO TOP OF W.M. 7'.





DATE	REVISIONS	DRN	APPR
JAN. 19/77	"AS BUILT" FROM FIELD PRINT AND FIELD BOOK 490.	M.J.W	

HOR. SCALE 0 20 40 60 FEET

VER. SCALE 0 4 8 12 FEET

REGIONAL MUNICIPALITY OF OTTAWA - CARLETON
WORKS DEPARTMENT

GILMOUR ST.
O'CONNOR ST. TO METCALFE ST.
12" W.M.

L. Gohier, P.Eng.	L.L. Larson, P.Eng.	DRAWN BY M.J.W.	CHECKED BY
W.L. KEAY	F.E. AYERS	JUNE/1976	DRAWING NO. 862-P-1 SH. 2 OF 2
		490	

REGISTERED PROFESSIONAL ENGINEER L.L. LARSON PROVINCE OF ONTARIO

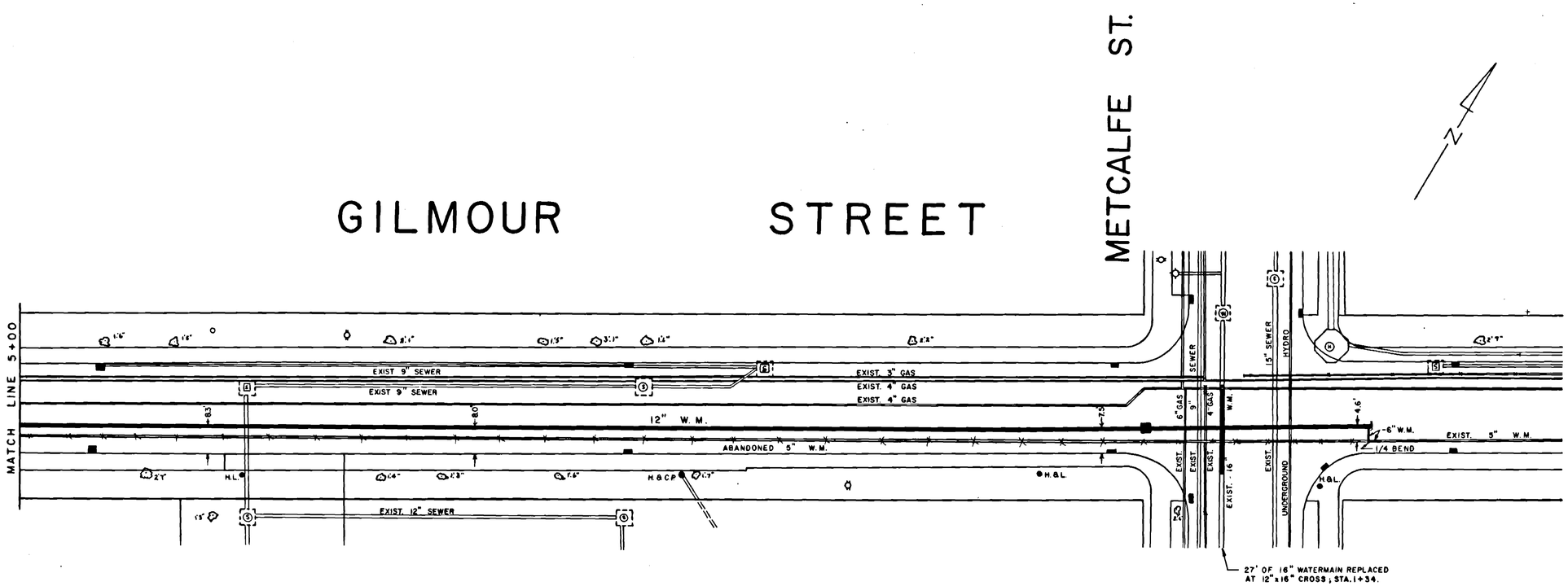
REGISTERED PROFESSIONAL ENGINEER L.F. GOHIER PROVINCE OF ONTARIO

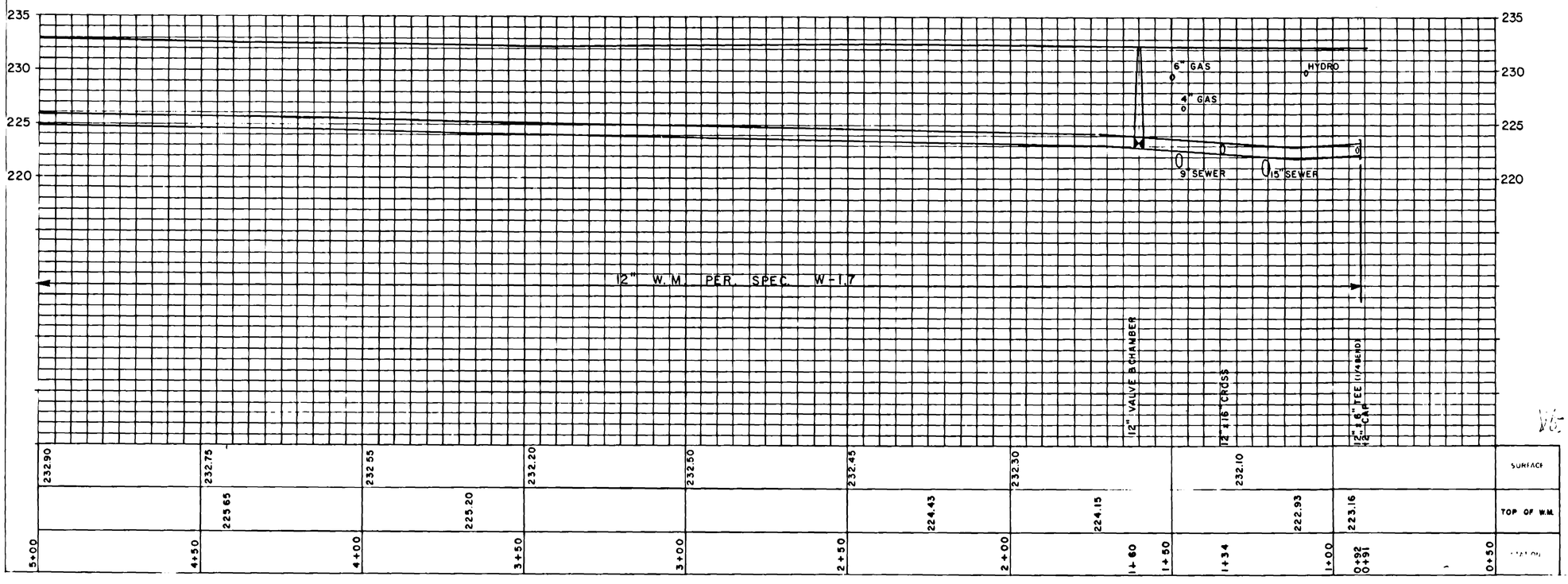
6576

NOTES

1. ALL UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR IS REQUIRED TO NOTIFY THE UTILITY COMPANIES BEFORE EXCALATING.

2. AVG. DEPTH TO TOP OF W.M. 7'.





DATE	REVISIONS	DRN	APPR
JAN. 4/77	"AS BUILT" FROM FIELD PRINT AND FIELD BOOK 490.	M.J.W.	

HOR. SCALE 0 20 40 60 FEET

VERT. SCALE 0 2 4 6 FEET

REGIONAL MUNICIPALITY OF OTTAWA CARLETON
WORKS DEPARTMENT

GILMOUR ST.
O'CONNOR ST. TO METCALFE ST.
12" W.M.

L.L.Gohier, P.Eng.	L.L.Larson, P.Eng.	DRAWN BY M.J.W.	CHECKED BY
W.L. KEAY	F.E. AYERS	JUNE/1976	862-P-1 SH. 1 OF 2
		490	

REGISTERED PROFESSIONAL ENGINEER L. L. LARSON PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER L. F. GOHIER PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
V. BOUILLANT
2004-02-03
PROVINCE OF ONTARIO

NOTE:
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 responsible for adequate protection from damage.

NO.	REVISIONS	BY	DATE
1	PRELIMINARY UTILITY CIRCULATION	C.B.	4/15/03
2	FINAL UTILITY CIRCULATION	C.B.	5/14/03
3	REVISED UTILITY CIRCULATION	C.B.	7/22/03
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
8	RECORD DRAWING	C.B.	1/14/04

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

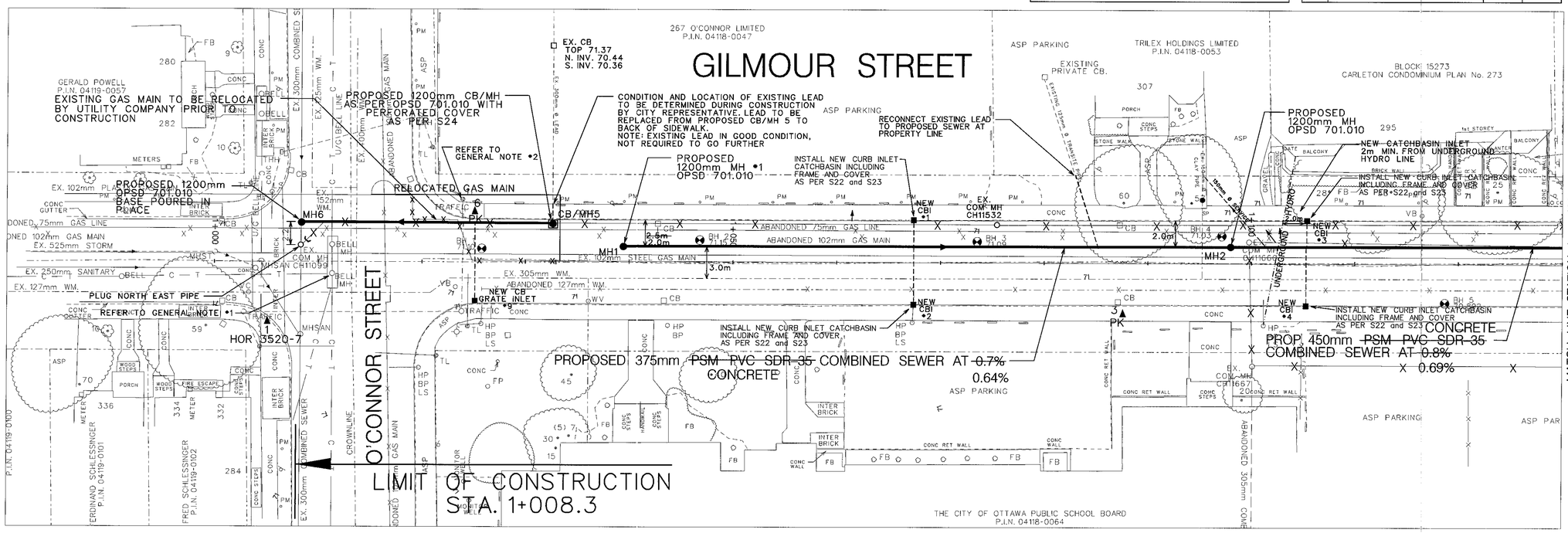
PLAN AND PROFILE
1+000 to 1+130

R. G. HEWITT, P.ENG.
Director Infrastructure Services

W.R. NEWELL, P.ENG.
Manager Construction Services

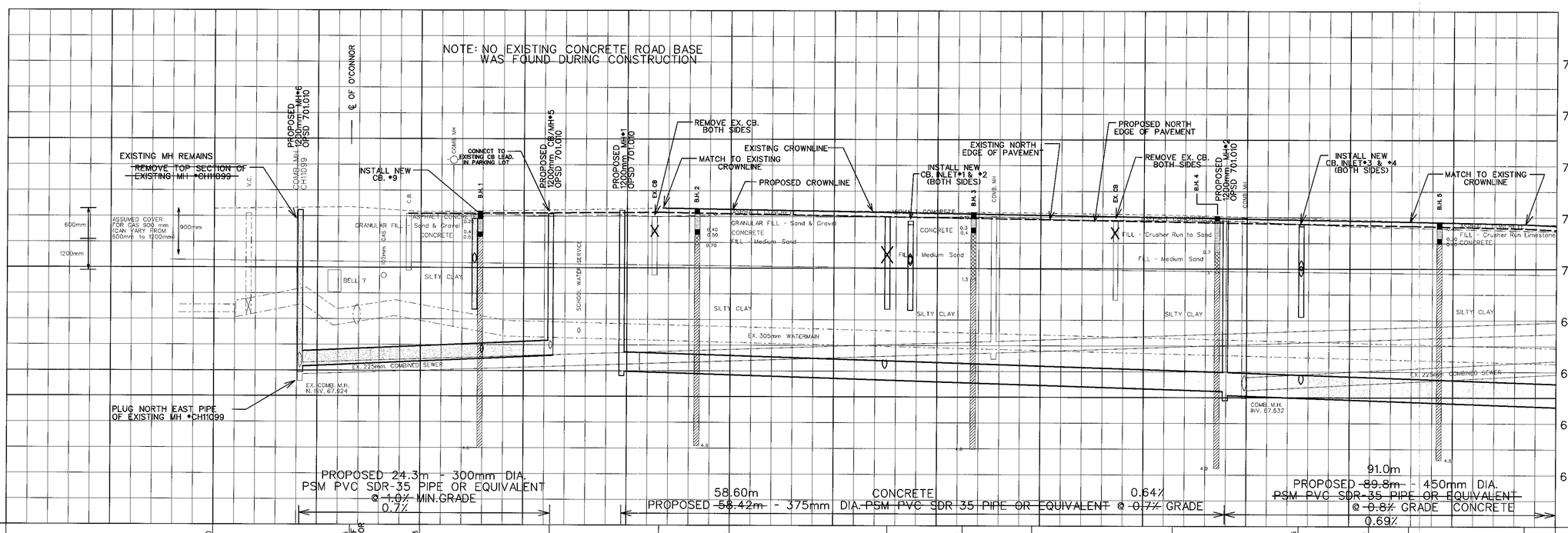
Dwn: C.B. | Chkd: V.B./M.P. | Des: V.B./M.P. | Chkd: V.B.

Ottawa
CONTRACT NO.
ISB03 – 5026
DWG. NO.
5026-3
SHEET 4 OF 7
Date: APRIL 2003
Scale:
VERTICAL 1:50
HORIZONTAL 1:250



CATCH BASIN DATA							
NO.	STATION	OFFSET E/C (m)	TYPE	TYPE		ELEVATION	
				STRUCT.	FRAME & COVER	ROAD GRATE	LEAD INV.
CBI 1	1+ ~~068.0~~ ~~066.2~~	——	CURB INLET	S3, S5	S22, S23	~~70.921~~ ~~71.100~~	70.106
CBI 2	1+ ~~088.0~~ ~~087.1~~	——	CURB INLET	S3, S5	S22, S23	~~70.851~~ ~~70.997~~	70.053
CBI 3	1+ 105.3	——	CURB INLET	S3, S5	S22, S23	~~70.824~~ ~~70.965~~	69.965
CBI 4	1+ 105.2	——	CURB INLET	S3, S5	S22, S23	~~70.868~~ ~~70.757~~	69.857
CBI 5	1+ ~~134.5~~ ~~133.6~~	——	CURB INLET	S3, S5	S22, S23	~~70.720~~ ~~70.716~~	69.818
CBI 6	1+ 135.3	——	CURB INLET	S3, S5	S22, S23	~~70.611~~ ~~70.642~~	69.742
CBI 7	1+ 175.19	——	CURB INLET	S3, S5	S22, S23	~~70.683~~ ~~70.716~~	69.819
CBI 8	1+ 179.4	——	CURB INLET	S3, S5	S22, S23	~~70.529~~ ~~70.562~~	69.662
CB 9	1+ 025.2	0.150	GRATE INLET	S2	S19	~~70.856~~ ~~70.906~~	70.086

CATCH BASIN LEAD DATA						
NO. TO SEWER	SIZE	LENGTH	CLASS	INVERTS		
	(mm)	(m)		UPPER	LOWER	
CBI 1	200	~~2.5~~ 2.3	SDR-35	70.093	68.052	ICD
CBI 2	200	~~5.6~~ 6.0	SDR-35	70.053	68.052	ICD
CBI 3	200	~~2.5~~ 2.3	SDR-35	69.965	67.766	ICD
CBI 4	200	~~5.6~~ 6.0	SDR-35	69.857	67.766	ICD
CBI 5	200	~~2.5~~ 2.2	SDR-35	69.818	67.535	ICD
CBI 6	200	~~5.6~~ 6.8	SDR-35	69.742	67.520	ICD
CBI 7	200	~~2.5~~ 2.1	SDR-35	69.819	67.207	ICD
CBI 8	200	~~5.0~~ 6.8	SDR-35	69.662	67.163	ICD
CBI 9	200	7.7	SDR-35	70.086	68.236	——
PRIVATE CB	300	~~17.0~~ 1.2	SDR-35	70.360	68.327	——
TO CB/MH 5						



MANHOLE DATA						
NO.	STATION	TYPE	TYPE		ELEVATION	
			STRUCT.	FRAME & COVER	TOP	INVERT
MH 1	1+ ~~038.2~~ ~~039.5~~	1200mm	OPSD 701.010	S24	71.121	~~68.025~~ 67.99
MH 2	1+ ~~089.8~~ ~~087.9~~	1200mm	OPSD 701.010	S24	70.944	~~E-67.615~~ E-67.610
						W-67.540
MH 3	1+ ~~187.8~~ 1+ ~~185.2~~	1200mm	OPSD 701.010	S24	70.745	~~66.821~~ 66.91
MH 4	1+ 195.097	~~1800mm~~ 1200mm	~~OPSD 701.012~~ OPSD 701.010	S24	70.446	~~66.638~~ 66.73
CB/MH 5	1+ 132.6	1200mm	OPSD 701.010	S24	71.050	~~N 68.327~~ ~~W 68.172~~ N 68.42 W. 68.29
MH 6	1+ 008.3	1200mm	OPSD 701.010	S24	71.118	~~67.034~~ 68.07

GILMOUR POINT CONTROL ▲

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	5030859.872	367942.861	71.102	HOR 3520-7
2	5030961.801	368090.310	70.781	HOR 3064-1
3	5030903.135	368013.098	70.881	PK
5	5030953.569	368097.074	70.505	PK
6	5030879.354	367954.484	71.145	PK
7	5030938.109	368071.367	70.808	CC

12473

LICENSED PROFESSIONAL ENGINEER
V. BOUILLANT
2004-02-03
PROVINCE OF ONTARIO

NOTE:
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 responsible for adequate protection from damage.

NO.	REVISIONS	BY	DATE
1	PRELIMINARY UTILITY CIRCULATION	C.B.	4/15/03
2	FINAL UTILITY CIRCULATION	C.B.	5/14/03
3	REVISED UTILITY CIRCULATION	C.B.	7/22/03
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
8	RECORD DRAWING	C.B.	1/14/04

REPLACEMENT OF COMBINED SEWER

GILMOUR STREET
FROM O'CONNOR TO METCALFE

PLAN AND PROFILE
1+130 to 1+195

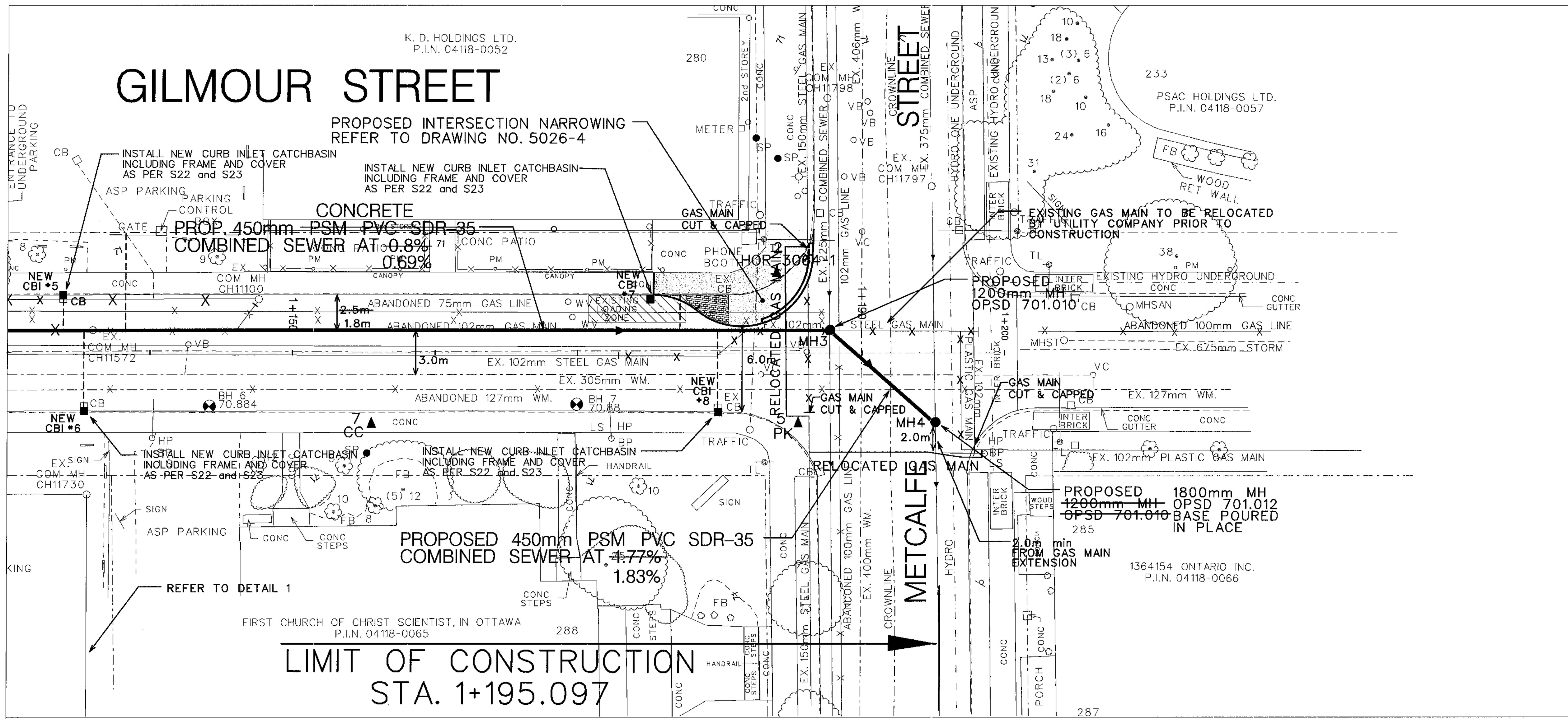
R. G. HEWITT, P.ENG.
Director Infrastructure Services

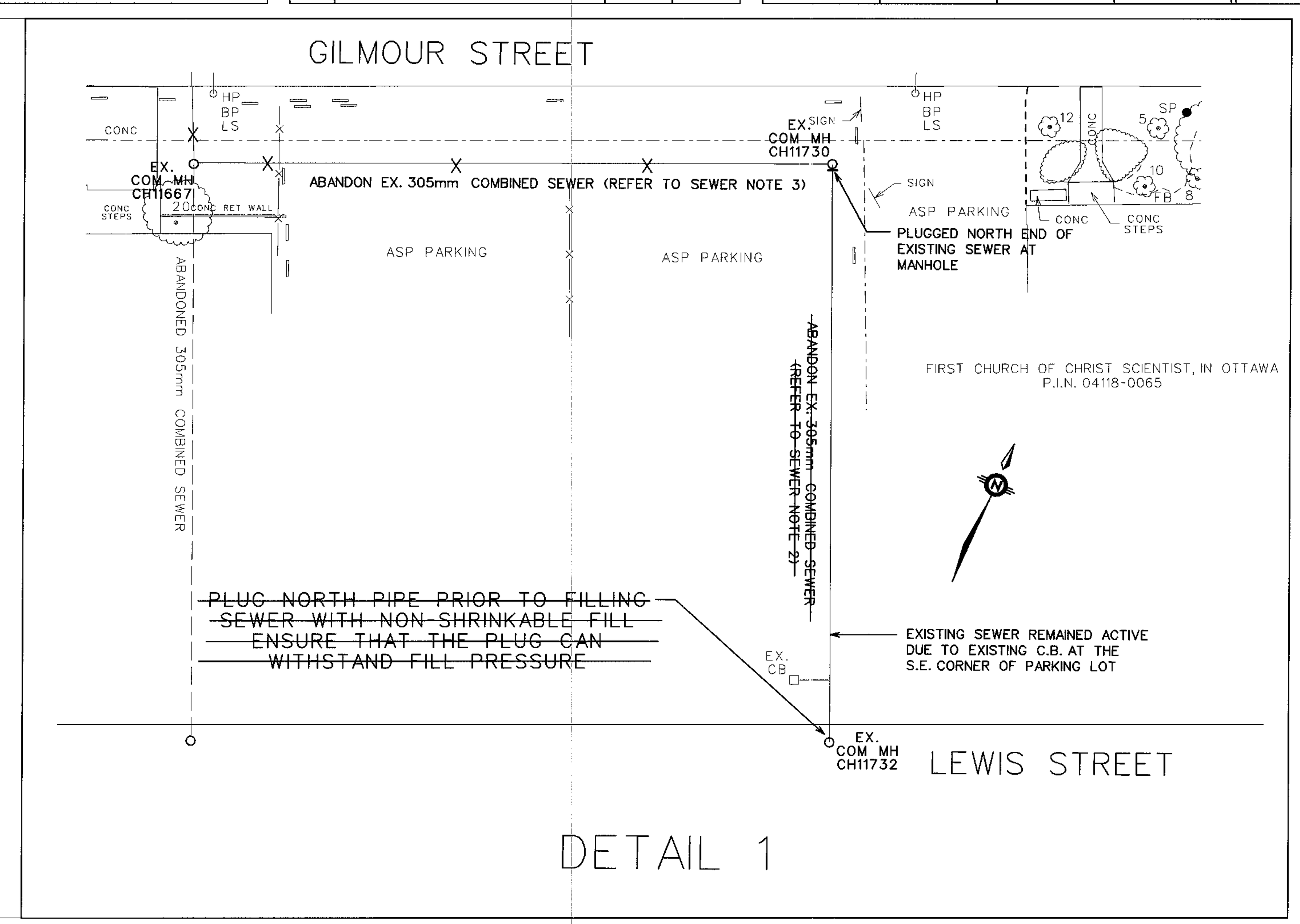
W.R. NEWELL, P.ENG.
Manager Construction Services

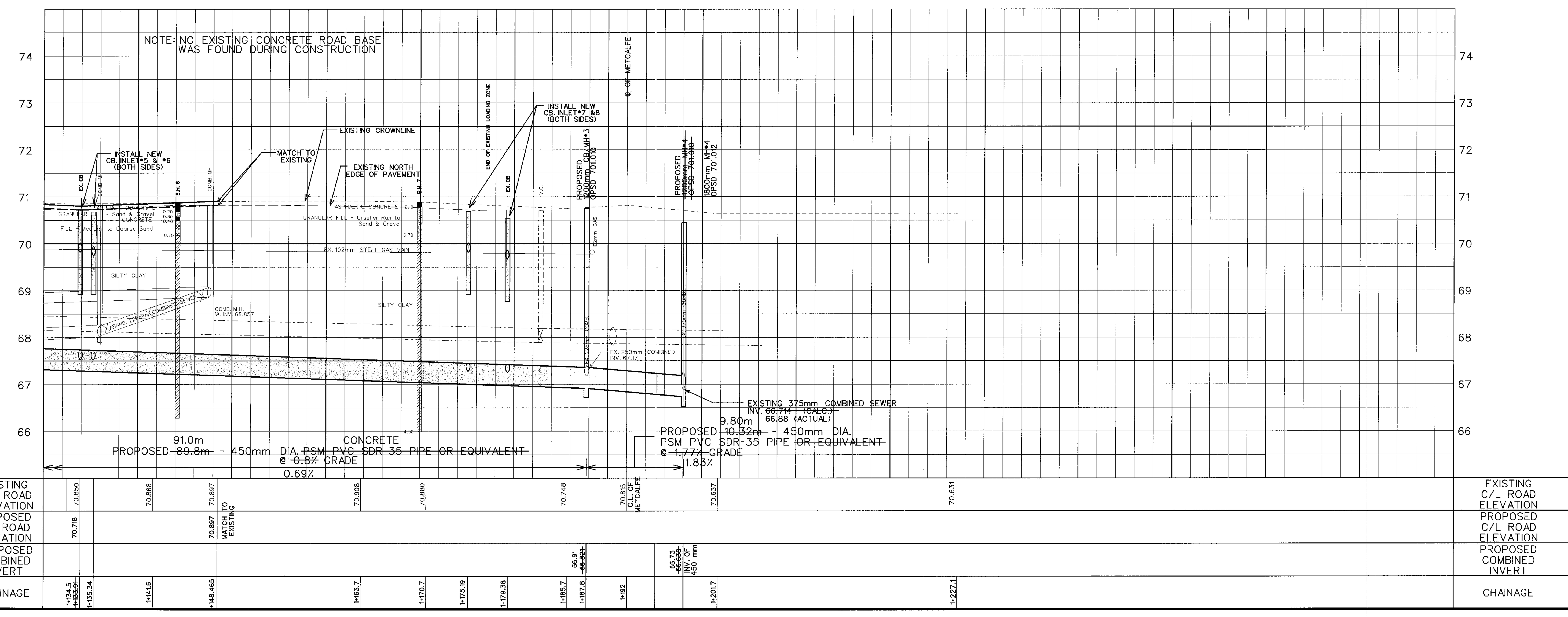
Dwn: C.B. Chkd: V.B./M.P. Des: V.B./M.P. Chkd: V.B.

Ottawa

CONTRACT NO. ISB03 – 5026
DWG. NO. 5026–4
SHEET 5 OF 7
Date: APRIL 2003
Scale: VERTICAL 1:50 HORIZONTAL 1:250



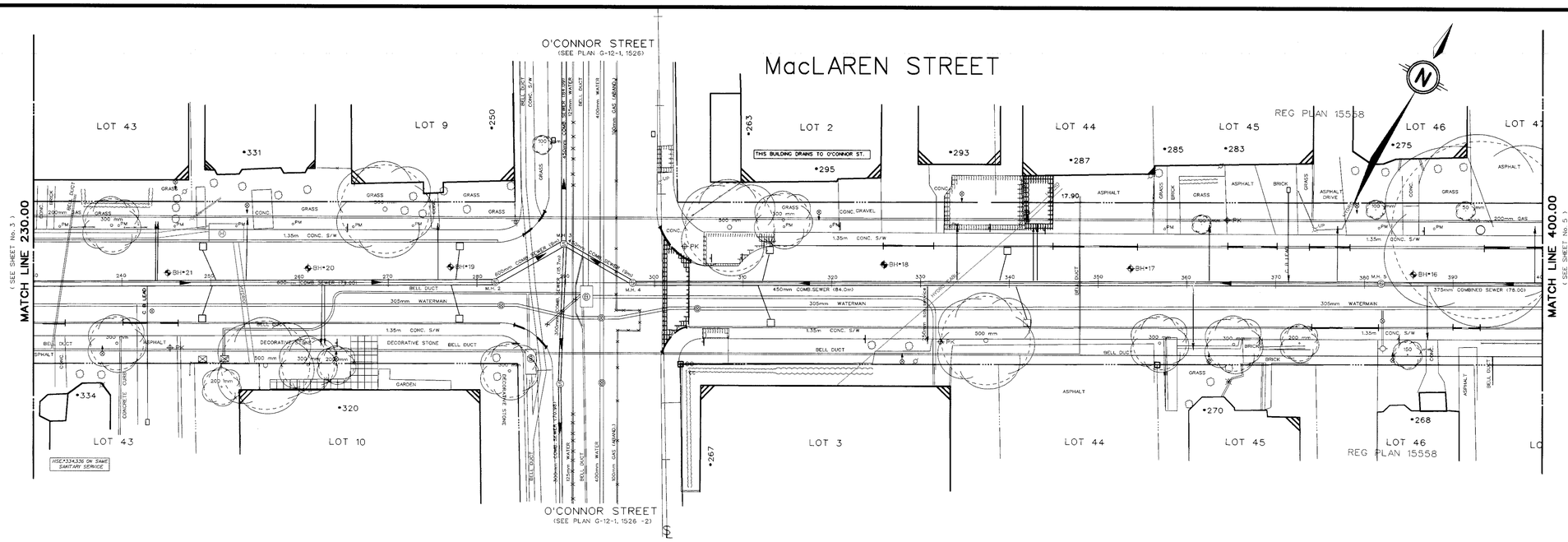


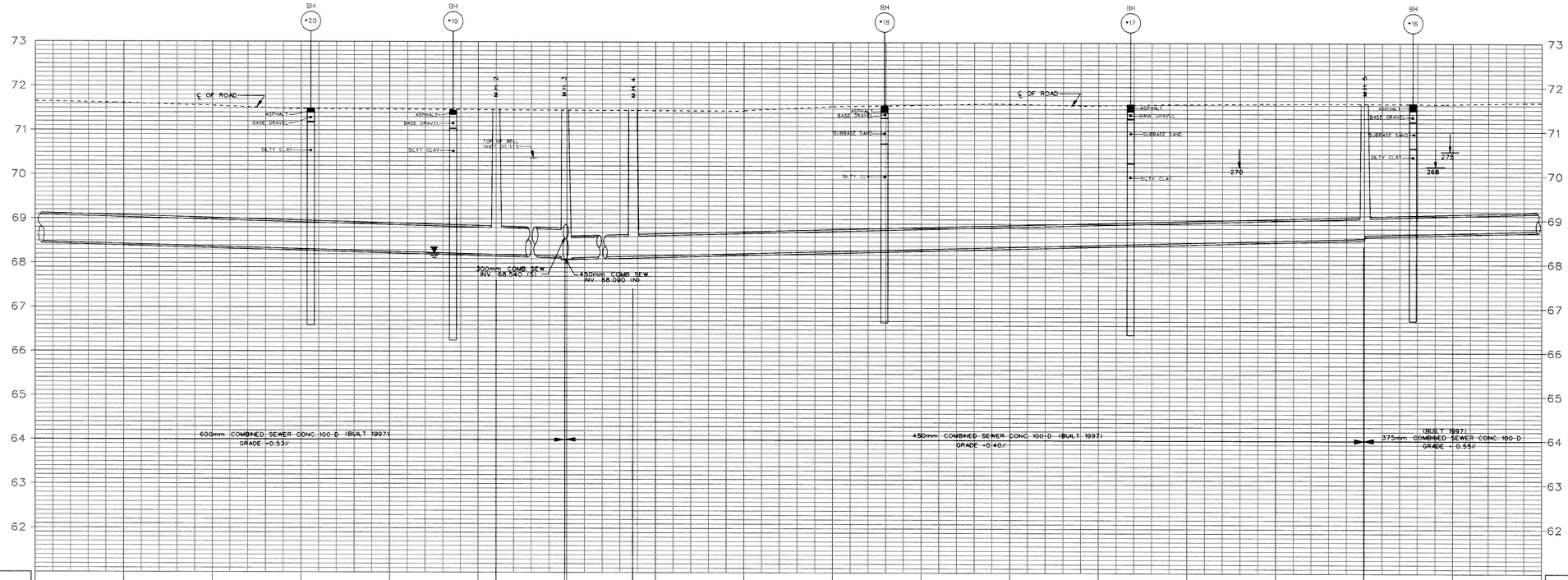


12473


SEE 3015
O'CONNOR
SOMERSET
McLAREN
GILMOUR
LEWIS
WAVERLEY
FRANK
GLADSTONE
21" Sewer
16" Water
9 in PIPE SEWER
12 in PIPE SEWER
HYD
See Plan I-15c
See plan no. 2399
21 in SEWER
9" in SEWER
9 in SEWER
12 in PIPE SEWER
9 in PIPE SEWER
GRADE 1 in 250 or 0.4%
GRADE 1 in 1092 or 0.091%
GRADE 1 in 129 or 0.77%
GRADE 1 in 50 or 2%
GRADE 1 in 215 or 0.47%
GRADE 1 in 648 or 1.54%
110
100
90
0+00
1+00
2+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
11+00
12+00
13+00
14+00
I5c-2

2908 MacLAREN STREET SHT. 4





Elevations		230	240	250	260	270	280	282	289.78	290	297.50	300	310	320	330	340	350	360	370	380	390	400	Elevations
Surface ℄ ROAD		71.547	71.511	71.480	71.459	71.436	71.385						71.444	71.493	71.529	71.531	71.578		71.618		71.613	71.607	Existing ℄ ROAD
North Gutter																							North Gutter
℄ Road																							℄ Road
South Gutter																							South Gutter
Sewer Type & Diameter								600mmCOMB. 600mmCOMB.		600mmCOMB. 450mmCOMB.		450mmCOMB.								450mmCOMB. 375mmCOMB.			Sewer Type & Diameter
Sewer Inverts								68.196 68.196		68.148 68.113		68.140								68.591 68.666			Sewer Inverts
Stations		230	240	250	260	270	280	282	289.78	290	297.50	300	310	320	330	340	350	360	370	380	390	400	Stations

This drawing was created using Microstation 5.00.95

Revisions:

No.	Date	Description	Drawn By	Approved By

Design:

Designed By: Z.I. RANA	Date	Checked By	Date
Survey Detail By: KEN ROGERS	Date: APRIL 96	Field Checked By	Date: MAY 96
Drafting By: P. DRAPER	Date: APRIL 96	Checked By	Date

Chief Design & Const. Eng.
H. V. Pascoe, P.Eng.

Final Measurements:

Construction Type: COMB. SEWER , WATERMAIN,ROAD, SIDEWALKS	Inspector: P. DRAPER
Work Commenced: JULY 1997	Project Manager: Z.I. RANA
Work Completed: JUNE 1998	Field Book: "
Contractor: TAGGART CONST.	Date
Drafting Revisions: P. DRAPER, C. AMYOT Date 98/04	Checked By

Notes:

- 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 actual rock line was recorded during construction of the existing sewer.
- 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

City of Ville d' **Ottawa**

Department Of Engineering And Works
Engineering Branch
Design And Construction Division
111 SUSSEX DRIVE, SUSSEX PAVILION, 7TH FLOOR, OTTAWA, ONTARIO, K1N 5A1

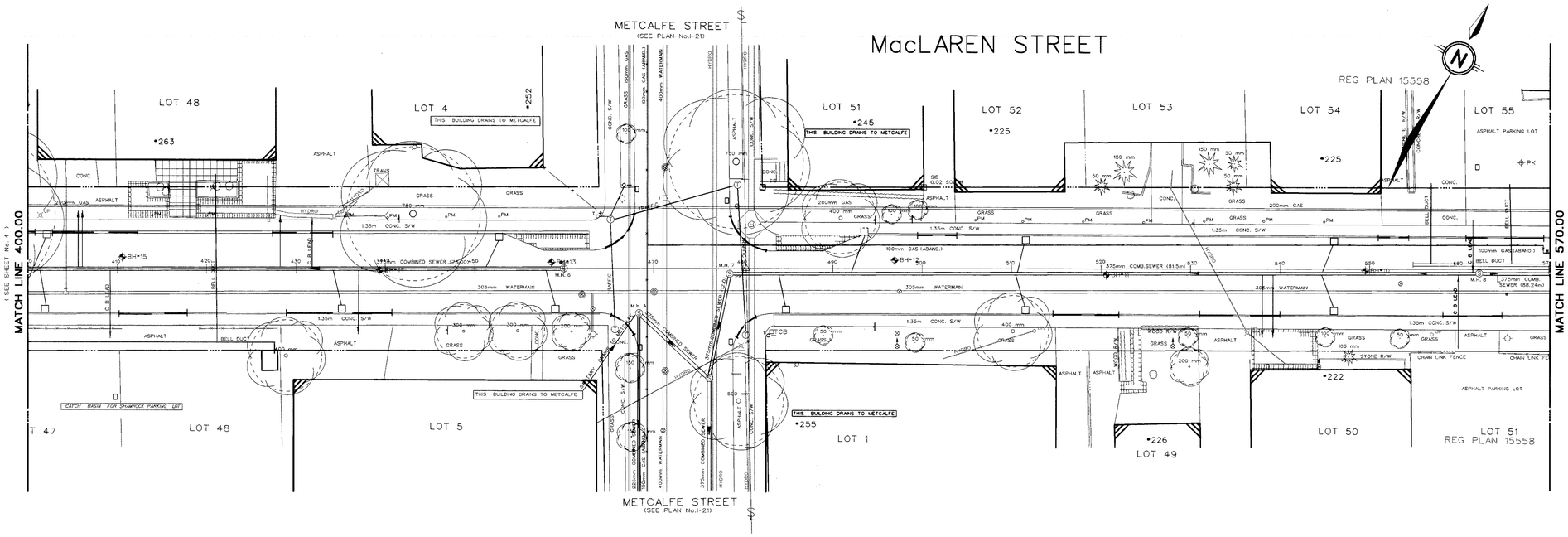
E.M. Robinson, Commissioner	W.R. Cole, P.Eng., Branch Director

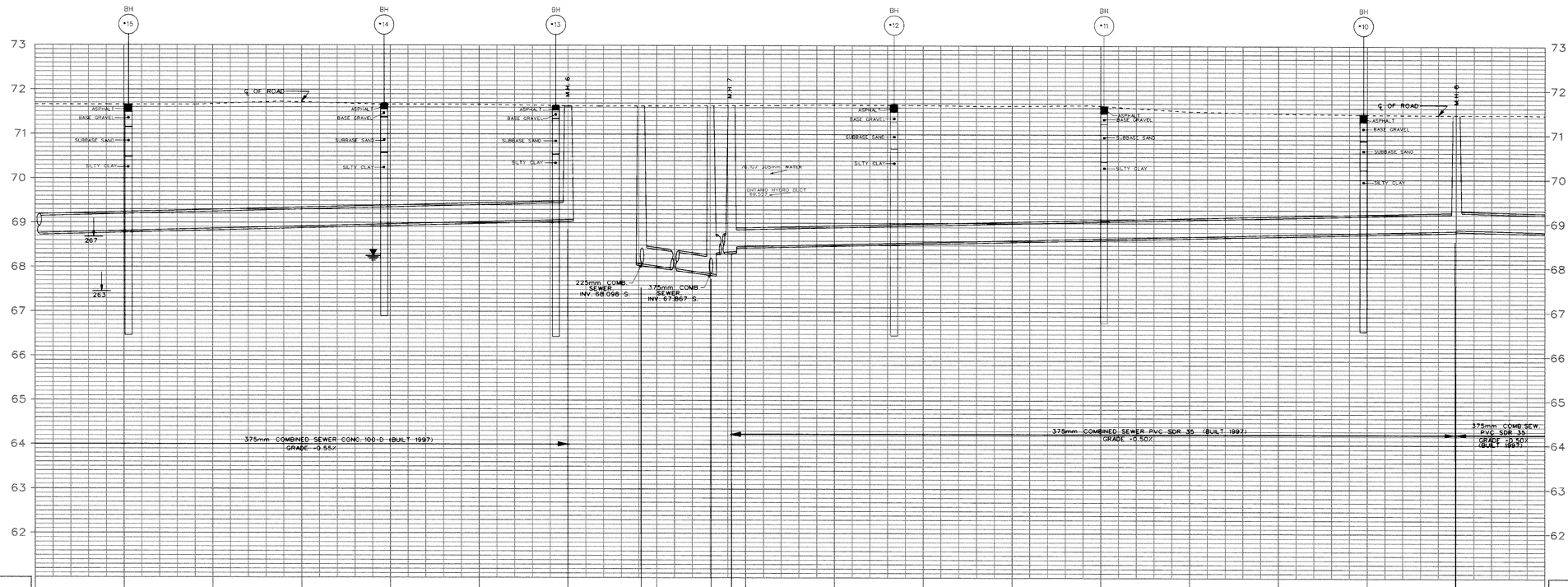
MacLAREN STREET
FROM STA.230.00 TO STA.400.00

Contract No:	Survey Books:	Scales: (See note)	Plan No:
97C2908	2908	HOR. 1:250 VERT. 1:50	2908 Sheet 4 of 10

Filename: 2908s2.dgn
Reference: 2908b.dgn
ottebdr.dgn

2908 MacLAREN STREET SHT.5





Elevations	400	410	420	430	440	450	460	468.30	470	476.28	478.50	480	490	500	510	520	530	540	550	560	570	Elevations
Surface & ROAD	71.607	71.631	71.660	71.677	71.632	71.596						71.657	71.633	71.604	71.567	71.529	71.479	71.445	71.421	71.383	71.354	Existing & ROAD
North Gutter																						North Gutter
& Road																						& Road
South Gutter																						South Gutter
Sewer Type & Diameter							375mmCOMB.	375mmCOMB.		375mmCOMB.	375mmCOMB.	375mmCOMB.								375mmCOMB.	375mmCOMB.	Sewer Type & Diameter
Sewer Inverts							69.089	68.098		67.867	68.334	68.464								68.834	68.871	Sewer Inverts
Stations	400	410	420	430	440	450	460	468.30	470	476.28	478.50	480	490	500	510	520	530	540	550	560	570	Stations

This drawing was created using Microstation 5.00.05

Revisions:

No.	Date	Description	Drawn By	Approved By

Design:

Designed By: Z.I. RANA	Date:	Checked By:	Date:
Survey Detail By: KEN ROGERS	Date: APRIL 96	Field Checked By:	Date: MAY 96
Drafting By: P. DRAPER	Date: APRIL 96	Checked By:	Date:

Chief Design & Const. Eng.
H. V. Pascoe, P.Eng.

Final Measurements:

Construction Type: COMB. SEWER, WATERMAIN, ROAD, SIDEWALKS	Inspector: P. DRAPER
Work Commenced: JULY 1997	Project Manager: Z.I. RANA
Work Completed: JUNE 1998	Field Book #:
Contractor: TAGGART CONST.	Date:
Drafting Revisions: P. DRAPER, C. AMYOT	Date: 98/04 Checked By:

Notes:

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- The actual rock line was recorded during construction of the existing sewer.
- 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

City of Ville d' **Ottawa**

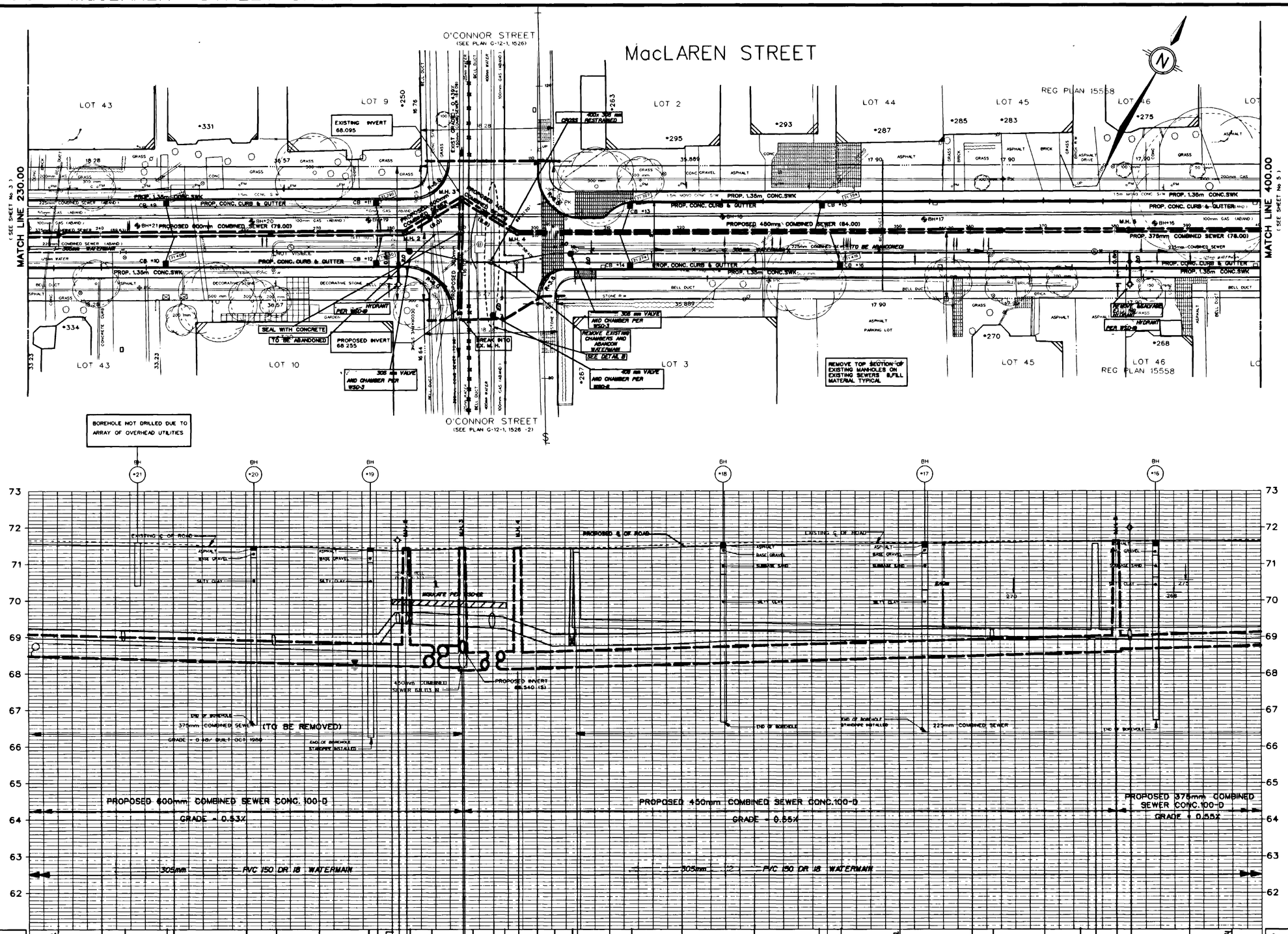
Department Of Engineering And Works
Engineering Branch
Design And Construction Division
111 SUSSEX DRIVE, SUSSEX PAVILION, 7TH FLOOR, OTTAWA, ONTARIO, K1N 5A1

E.M. Robinson, Commissioner | W.R. Cole, P.Eng., Branch Director

MacLAREN STREET
FROM STA. 400.00 TO STA. 570.00

Contract No:	Survey Books:	Scales: (See note)	Plan No:
97C2908	2908	HOR. 1:250 VERT. 1:50	2908 Sheet 5 of 10

Filename: 2908s3.dgn
Reference: 2908b.dgn



Elevations	230	233	240	240.00	250	260	270	278.00	279.78	282.00	287.00	289.78	290	292.29	294	297.50	300	304	306.54	310	319.00	320	330	339.45	340	342.00	350	360	370	375	377.06	380	390	395	400	Stations
Top of Watermain		69.138		69.110																														69.144	
Existing Surface ℄ ROAD			71.612																																
Proposed North Gutter			71.379		71.345		71.495				71.433																								
Proposed ℄ Road			71.491		71.480		71.489				71.433																								
Proposed South Gutter			71.469		71.406		71.389				71.433																								
Sewer Type & Diameter																																			
Sewer Inverts Existing & Proposed																																			
Stations	230	233	240	240.00	250	260	270	278.00	279.78	282.00	287.00	289.78	290	292.29	294	297.50	300	304	306.54	310	319.00	320	330	339.45	340	342.00	350	360	370	375	377.06	380	390	395	400	Stations

Elevations

this drawing was created using Microstation 5.00.95

Revisions:

No	Date	Description	Drawn By	Approved By
1	Feb 99	ASBUILT W/M	MT.	

Design:

Designed By		Date	Checked By		Date
Z. RANA		1997-6-11			
Survey Data By		Date	Field Checked By		Date
KEN ROGERS		APRIL 96	KEN ROGERS		MAY 96
Drafting By		Date	Checked By		Date
P. DRAPER		MAY 96			

LICENCED PROFESSIONAL ENGINEER — R D HOLMES — PROVINCE OF ONTARIO — 11 June 1997 — WATER ONLY

REGISTERED PROFESSIONAL ENGINEER — Z.I.RANA — 1997-6-11 — PROVINCE OF ONTARIO — ROAD AND SEWER

Chief Design & Const Eng
H. V. Pascoe, P.Eng.

Final Measurements:

Construction Type		Inspector	
Work Commenced		Project Manager	
Work Completed		Field Book #	
Contractor		Date	
Drafting Revisions	Date	Checked By	

Notes:

- 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 actual rock line was recorded during construction of the existing sewer.
- 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.

Watermain Notes:

1. All watermain materials and construction methods shall be in accordance with the latest edition of the R.M.O.C. Environment Section Specifications and Standard Drawings
2. All connections of new watermains to existing watermains and all blankings of existing mains and services shall be performed by R.M.O.C. staff. The Contractor shall provide excavation, backfilling and reinstatement
3. All copper services (19mm to 51mm) shall be installed by R.M.O.C. staff after the watermain has been successfully disinfected.
4. All new water services shall be installed at 2.4m cover.
5. All new water services that conflict with sanitary and storm sewers at crossings shall be installed under the sewers unless otherwise directed by the Regional Project Manager.
6. The proposed watermain shall be insulated at specified locations per R.M.O.C. Specification WSD-21 and 23
7. A minimum 2.0m separation is required between all new water services and catch basins or open structures and shall be insulated per R.M.O.C. Specification WSD-23 as applicable.
8. A minimum 2.0m separation is required between all new hydrants and catch basins or open structures and shall be insulated per R.M.O.C. Specification WSD-23 as applicable
9. The Contractor shall be responsible to determine via excavation the exact location and elevation of the existing watermains as required for all connections, relocations and blankings

Regional Municipality of Ottawa-Carleton Environmental & Transportation Department
Municipalité régionale d'Ottawa-Carleton Le Service de l'environnement et des transports
Approved
Russell Holmes — Date 11/6/97 — WATER WORKS
RMOC Drawing No 5034-4

City of Ville d' Ottawa

Department Of Engineering And Works
Engineering Branch
Design And Construction Division
111 SUSSEX DRIVE, SUSSEX PAVILION, 7TH FLOOR, OTTAWA, ONTARIO, K1N 5A1

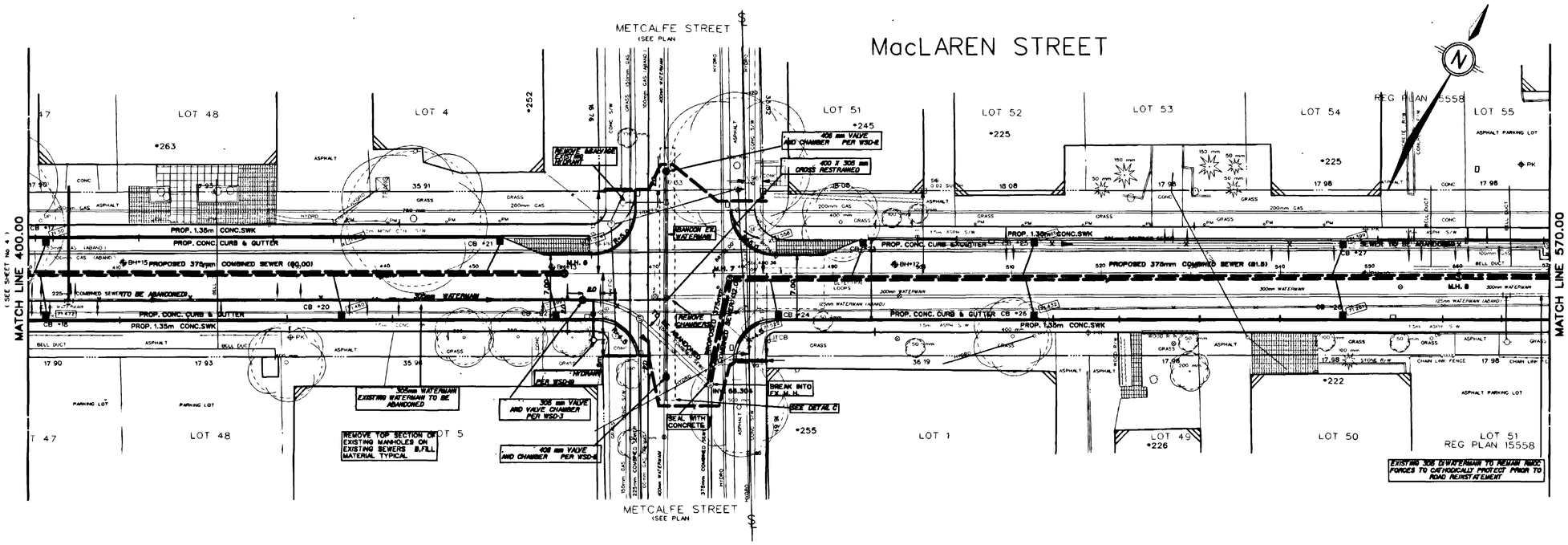
E.M. Robinson	W.R. Cole, P.Eng.
Commissioner	Branch Director

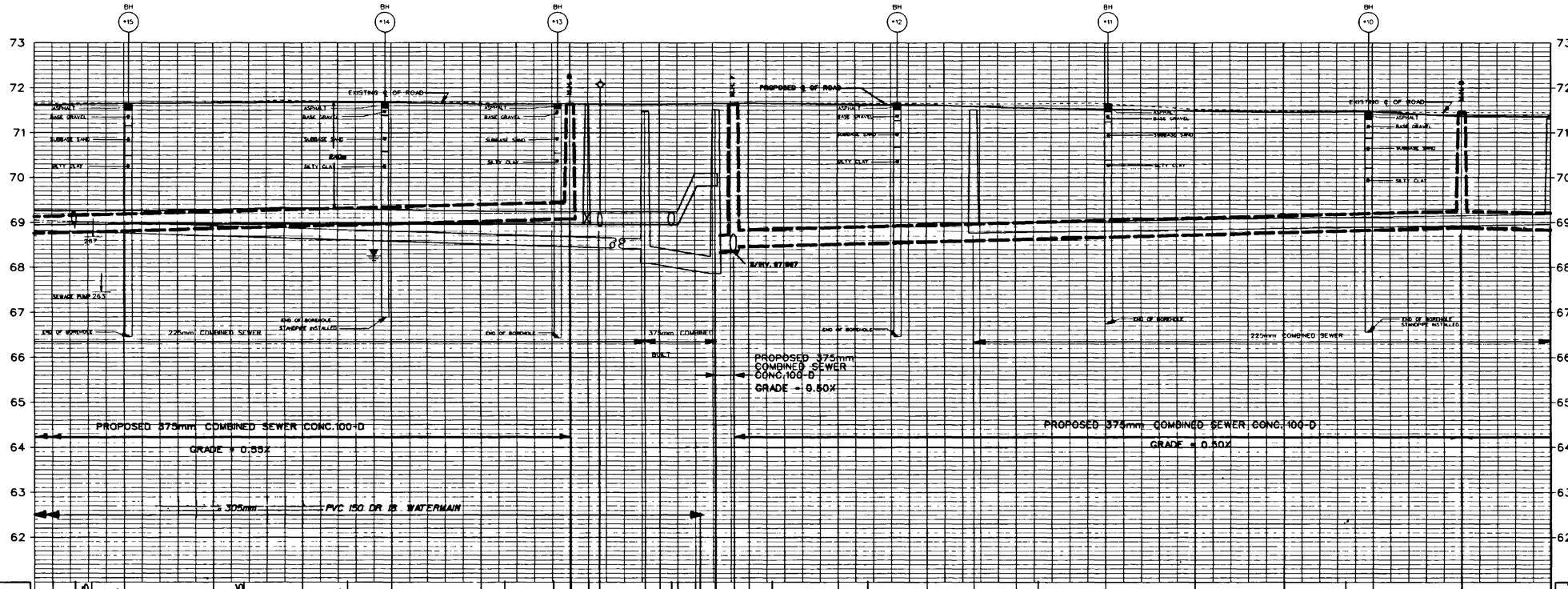
MacLAREN STREET

Contract No	Survey Books	Scales (See note)	Plan No
97C2908		HOR. 1:250 VERT. 1:50	2908
			Sheet 4 of 10

Filename: 2908a2.dgn
Reference: 2908b.dgn
2908p.dgn

2908 MacLAREN STREET SHT.5





Revisions:

No	Date	Description	Drawn By	Approved By
1	Feb 99	ASBUILT W/M	MT	

Design:

Designed By Z IRANA	Date (1997-6-11)	Checked By	Date
Survey Detail By KEN ROGERS	Date APRIL 96	Field Checked By KEN ROGERS	Date MAY 96
Drafting By P. DRAPER	Date MAY 96	Checked By	Date

LICENSED PROFESSIONAL ENGINEER — R.D. HOLMES — 11 June 1997 — PROVINCE OF ONTARIO — WATER ONLY

REGISTERED PROFESSIONAL ENGINEER — Z I RANA — 1997-6-11 — PROVINCE OF ONTARIO — ROAD AND SEWER

REGISTERED PROFESSIONAL ENGINEER — R.K. ORCHIN — June 14/97 — PROVINCE OF ONTARIO — TRAFFIC CALMING

Chief Design & Const Eng
H. V. Pascoe, P.Eng. H.V. Pascoe

Final Measurements:

Construction Type		Inspector	
Work Commenced		Project Manager	
Work Completed		Field Book #	
Contractor		Date	
Drafting Revisions	Date	Checked By	

Notes:

- 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 actual rock line was recorded during construction of the existing sewer.
- 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.

Watermain Notes:

1. All watermain materials and construction methods shall be in accordance with the latest edition of the R M O C Environment Section Specifications and Standard Drawings
2. All connections of new watermains to existing watermains and all blankings of existing mains and services shall be performed by R M O C staff The Contractor shall provide excavation, backfilling and reinstatement
3. All copper services (19mm to 51mm) shall be installed by R M O C staff after the watermain has been successfully disinfected
4. All new water services shall be installed at 2.4m cover
5. All new water services that conflict with sanitary and storm sewers at crossings shall be installed under the sewers unless otherwise directed by the Regional Project Manager
6. The proposed watermain shall be insulated at specified locations per R M O C Specification WSD-21 and 23
7. A minimum 2.0m separation is required between all new water services and catch basins or open structures and shall be insulated per R M O C Specification WSD-23 as applicable.
8. A minimum 2.0m separation is required between all new hydrants and catch basins or open structures and shall be insulated per R M O C Specification WSD-23 as applicable
9. The Contractor shall be responsible to determine via excavation the exact location and elevation of the existing watermains as required for all connections, relocations and blankings

Regional Municipality of Ottawa-Carleton Environmental & Transportation Department
Municipalité régionale d'Ottawa-Carleton Le Service de l'environnement et des transports
Approved
Date 14/6/97
WATER WORKS
RMOC Drawing No 5034-5

City of Ville d' Ottawa

Department Of Engineering And Works
Engineering Branch
Design And Construction Division
111 SUSSEX DRIVE, SUSSEX PAVILION, 7TH FLOOR, OTTAWA, ONTARIO. K1N 5A1

E.M. Robinson, Commissioner — W.R. Cole, P.Eng., Branch Director

MacLAREN STREET

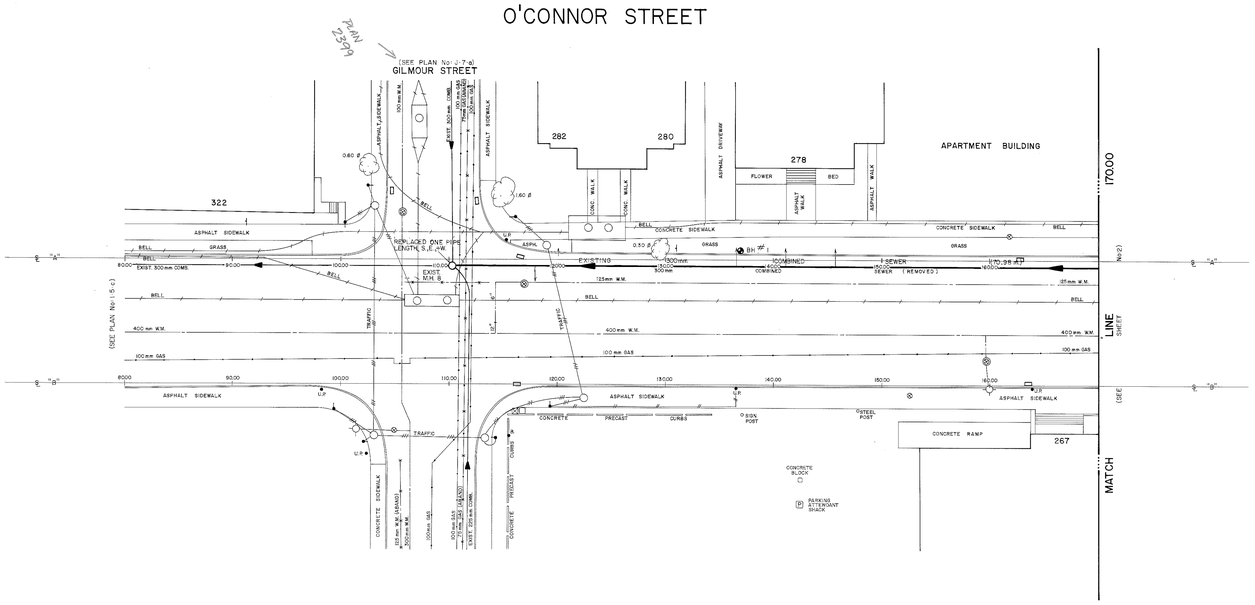
Contract No	Survey Books	Scales (See note)	Plan No
97C2908		HOR. 1:250 VERT. 1:50	2908 Sheet 5 of 10

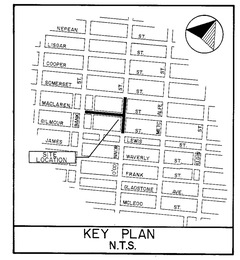
Filename: 2908s3.dgn
Reference: 2908b.dgn
2908p.dgn

This drawing was created using MicroStation 5.00.05

9095

1526 O'CONNOR STREET





City Of Ottawa
Department Of Physical Environment
Engineering And Surveys Branch

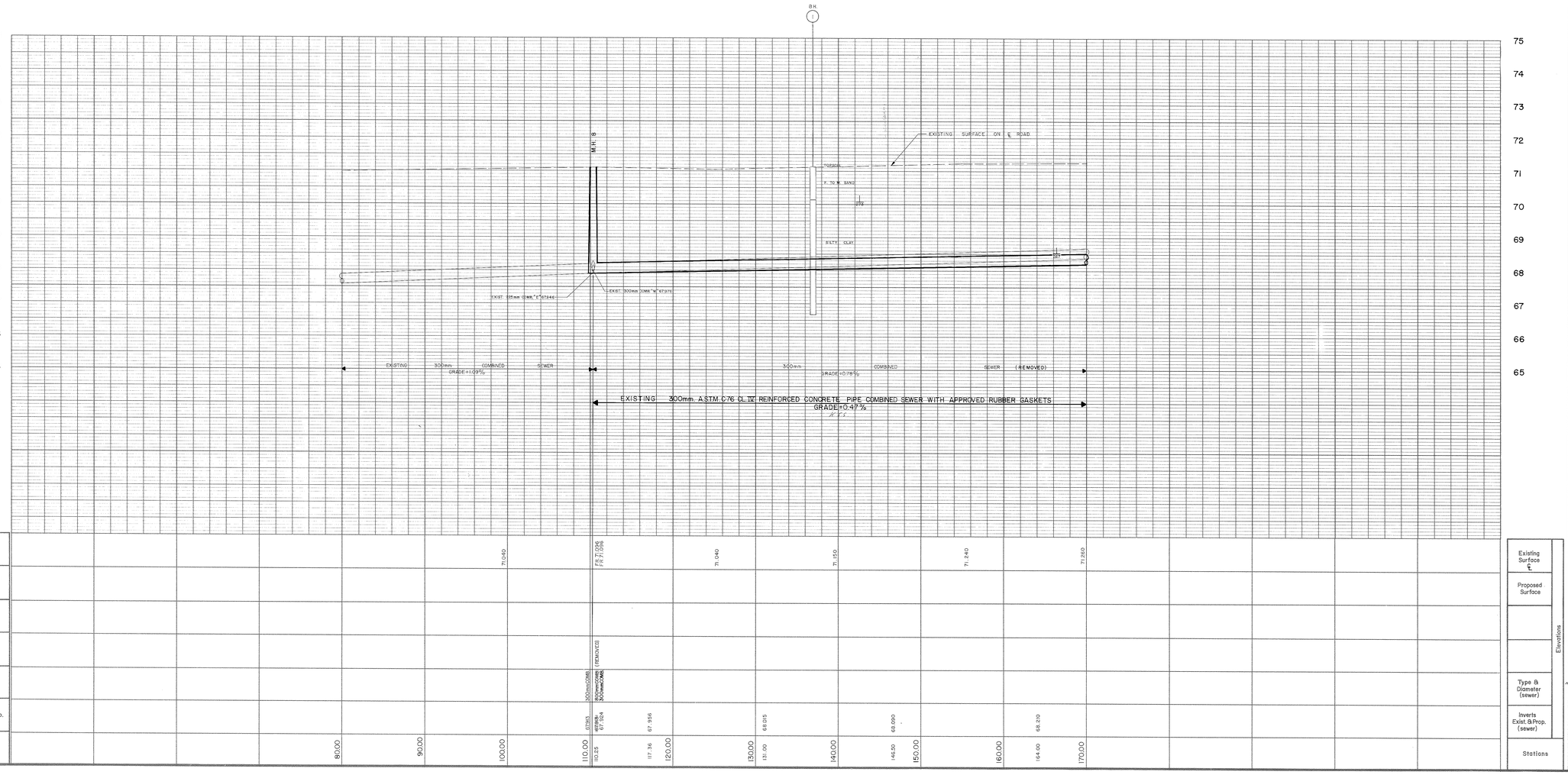
Notes:
- Utilities shown are taken from best available records. Contractor is requested to check with all utility companies before digging.
- Soil information shown is not guaranteed and contractors are advised to collect additional soils information as deemed necessary.
- Date of survey: June/79
- Reference 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.

Legend:

	EXISTING	PROPOSED
STORM SEWER		PROP.
SANITARY SEWER		PROP.
STREET LINE		PROP.
LOT LINE		PROP.
ROADS & DRIVEWAYS		
Curb	TYPE	TYPE
Asphalt or Concrete	TYPE	TYPE
Surface Treated	TYPE	TYPE
WALKS		
Concrete or Asphalt	TYPE	TYPE
Gravel, Cinder or Dirt	TYPE	TYPE
DEPRESSED ACCESS		
On Curb		
On Sidewalk		
WATERMAIN		PROP.
GASMAIN & VALVE		PROP.
BELL		PROP.
HYDRO		PROP.
TRAFFIC		PROP.
FIRE ALARM		PROP.
CABLEVISION	TV	TV PROP.
STEAM LINE	S	S PROP.
HYDRANT		
WATER VALVE		WV
STAND PIPE	SP	SP
WATER VALVE CHAMBER		
SEWER, TRAFFIC, HYDRO & BELL MANHOLES (may be labelled for clarification)		
TRAFFIC HANDHOLE	TH	TH
GUARD RAIL		
RETAINING WALL	RW	RW PROP.
FENCE	X	X PROP.
HYDRO POLE	HP	HP
HYDRO POLE & LIGHT	HP	HP
BELL POLE	BP	BP
TRAFFIC LIGHT		
LIGHT STANDARD		
TRAFFIC SIGN		
STREET SIGN		
CULVERT & DITCH		PROP.
STANDARD CATCH BASIN		
HEAVY DUTY CATCH BASIN		
CATCH BASIN TO BE REMOVED & REPLACED WITH STANDARD C.B.		
HEAVY DUTY CATCH BASIN TO BE REMOVED & REPLACED WITH STANDARD CATCH BASIN		
HOUSE or CATCH BASIN CONNECTION TAKEN FROM T.V. INSPECTION		PROP.
HOUSE or CATCH BASIN CONNECTION TAKEN FROM RECORDS		
RELOCATION		
REMOVAL		
SQUARE IRON BAR	SIB	
STANDARD IRON BAR	SIB	
ROUND IRON BAR	RIB	
TREE, SHRUB & HEDGE		
BOREHOLE	BH	
ROCK	ROCK	

- IN PLAN SEWERS 600mm & ABOVE ARE SHOWN AS DOUBLE LINE, TO SCALE, USING SAME LINE WEIGHT
- UTILITIES X-OUT ARE ABANDONED, BELL PLANT SO MARKED MAY BECOME ACTIVE



Revisions:

No	Date	Description	Drawn By	Appr'd By
1	JAN. / 92	ENG. AS-BUILT APPLIED SEWERS	BR (TES)-VBG	

Storm Sewer Designed By — Date
Combined Sewer Designed By — Date: 5 Mar 80
Structural Checked By — Date
Road Grade Designed By — Date: Mar 05/80 — Checked By — Date
Survey Detail By: J. FRANCE — Date: JUNE/79 — Checked By — Date: DEC 13/77
Drafting: John Labelle Aug/79 — Checked By: Rick Stewart — Date: JAN 24/80

REGISTERED PROFESSIONAL ENGINEER H. V. PASCOE ONTARIO

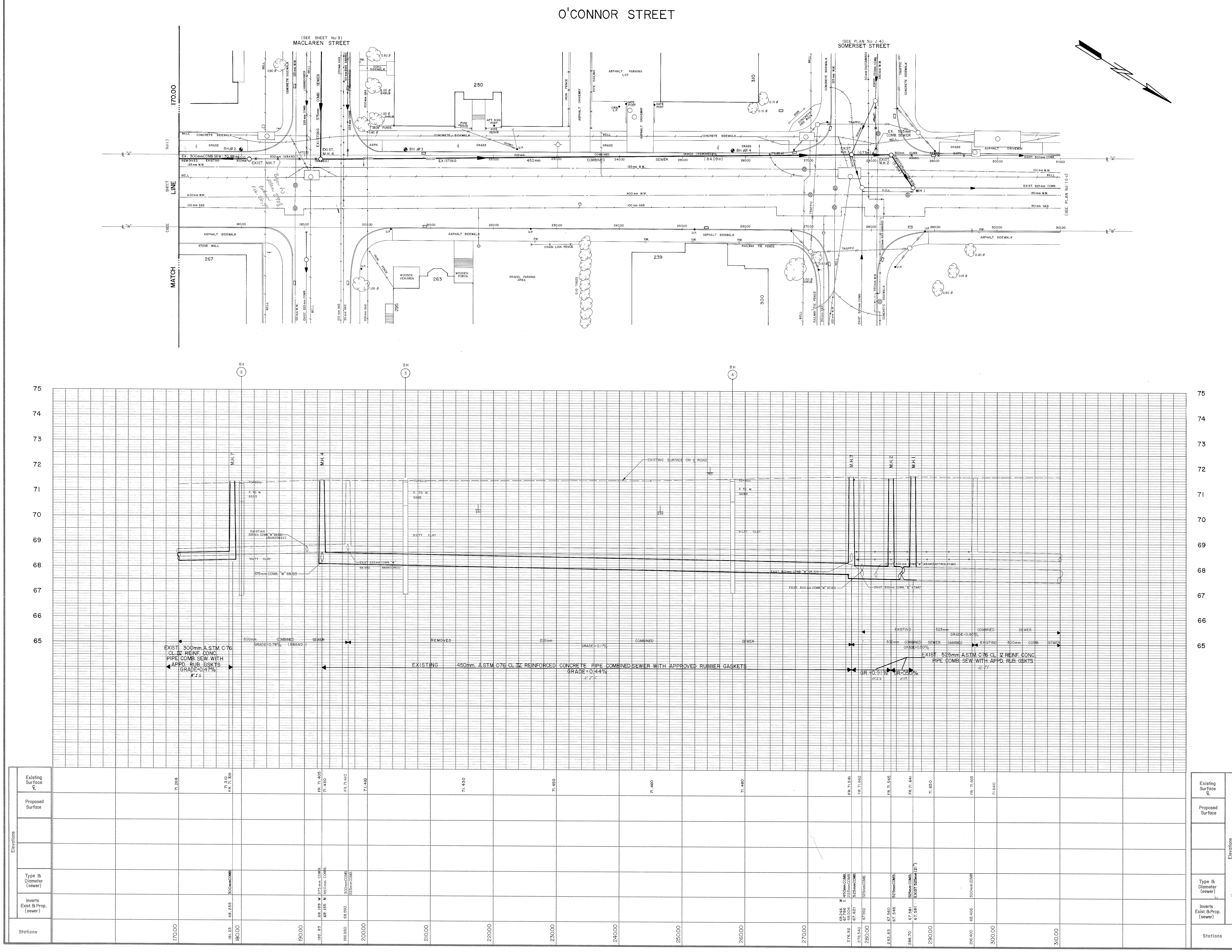
Design And Construction Division
Engineering And Surveys Branch

C. Sim, P. Eng. — Commissioner
D.K. Donaldson, P. Eng. — Branch Director
Chief, Design & Constr. Eng.
H.V. Pascoe — Senior Des. Eng.
Supervising Technologist

EXISTING COMBINED SEWER
O'CONNOR STREET
FROM GILMOUR STREET TO STA. 170.00

Contract No:	Survey Books:	Scales:	Plan No:
80-1	3911	HOR. 1:200 VERT. 1:50	1526

Sheet 1 of 4



City Of Ottawa
Department Of Physical Environment
Engineering And Surveys Branch

Notes:
- 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.

Legend: EXISTING / PROPOSED

- IN PLAN SEWERS 600mm & ABOVE ARE SHOWN AS DOUBLE LINE, TO SCALE, USING SAME LINE WEIGHT.
- UTILITIES X-OUT ARE ABANDONED, BELL PLANT SO MARKED MAY BECOME ACTIVE

Revisions:

No	Date	Description	Drawn By	Appr'd By
1	JAN. /92	ENG. AS-BUILT APPLIED SEWERS	B.L.R. (T.E.S.) BG.	

Storm Sewer Designed By / Date	Combined Sewer Designed By: D. Dwight / Date: 5 Mar. '80
Structural Checked By: I. Bhatia / Date: Mar 05/80	
Road Grade Designed By / Date	Checked By / Date
Survey Detail By: J. FRANCE / Date: JUNE/79	Checked By: J. France / Date: DEC. 13/79
Drafting By: John Latour / Date: Aug./79	Checked By: Kit Stewart / Date: JAN 24/80

REGISTERED PROFESSIONAL ENGINEER — H. V. PASCOE — PROVINCE OF ONTARIO

Design And Construction Division
Engineering And Surveys Branch

C. Sim P. Eng. — Commissioner
D.K. Donaldson P. Eng. — Branch Director
Chief Design & Constr. Eng.
H.V. Pascoe — Senior Des. Eng.
Senior Const. Coord.

EXISTING COMBINED SEWER
O'CONNOR STREET
FROM STA. 170.00 TO SOMERSET STREET

Contract No:	Survey Books:	Scales:	Plan No:
80-1	3911	HOR. 1:200 VERT. 1:50	1526 Sheet 2 of 4

Appendix D1

Water Demand Calculations

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

Unit Breakdown	**No.**	**Person Per Unit (Table 4.1)**
Studio	22	1.4
1 Bed	141	1.4
1 bed + den	53	1.4
2 bed	62	2.1
2 bed + den	5	2.1
Totla Unit Count =	283	
No. of Studios & 1-bedroom	216	units
Density	1.4	p/p/u
No. Ppl	303	ppl
No. of 2-bedroom	67	units
Density	2.1	p/p/u
No. Ppl	141	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 3-1 MOE)
Maximum Day Demand	**4.35**	**L/s**
Peak Hour Peaking Factor	4.54	x Max Day (Table 3-1 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**

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

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

From: Annie Williams <awilliams@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

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
ENGINEERS · ARCHITECTS · PLANNERS

CANADA'S BEST MANAGED COMPANIES

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: emily.mcgirr@taggart.ca; Lucie Dalrymple <ldalrymple@jlrichards.ca>; Guy Forget <gforget@jlrichards.ca>; Alexandre Tourigny <atourigny@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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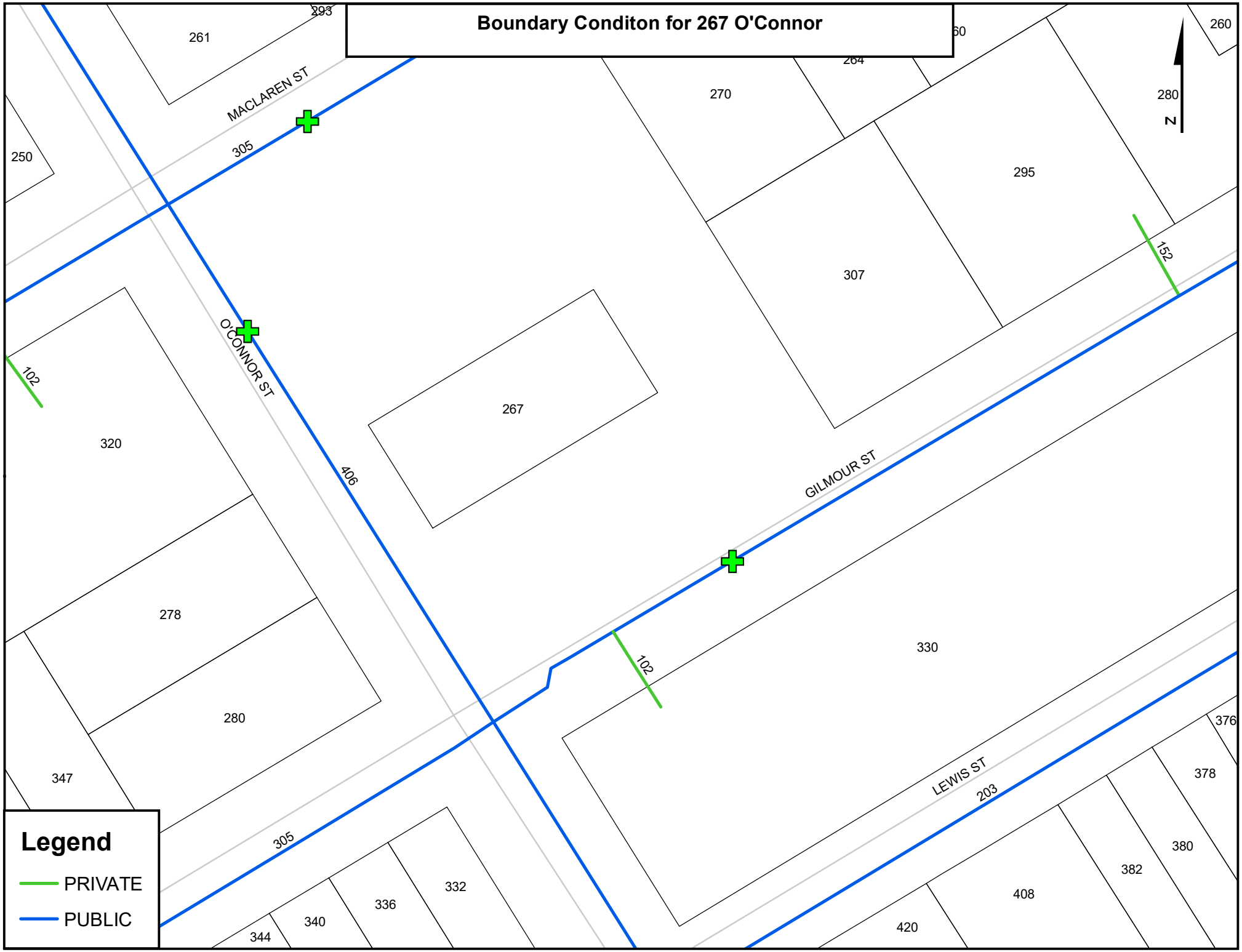
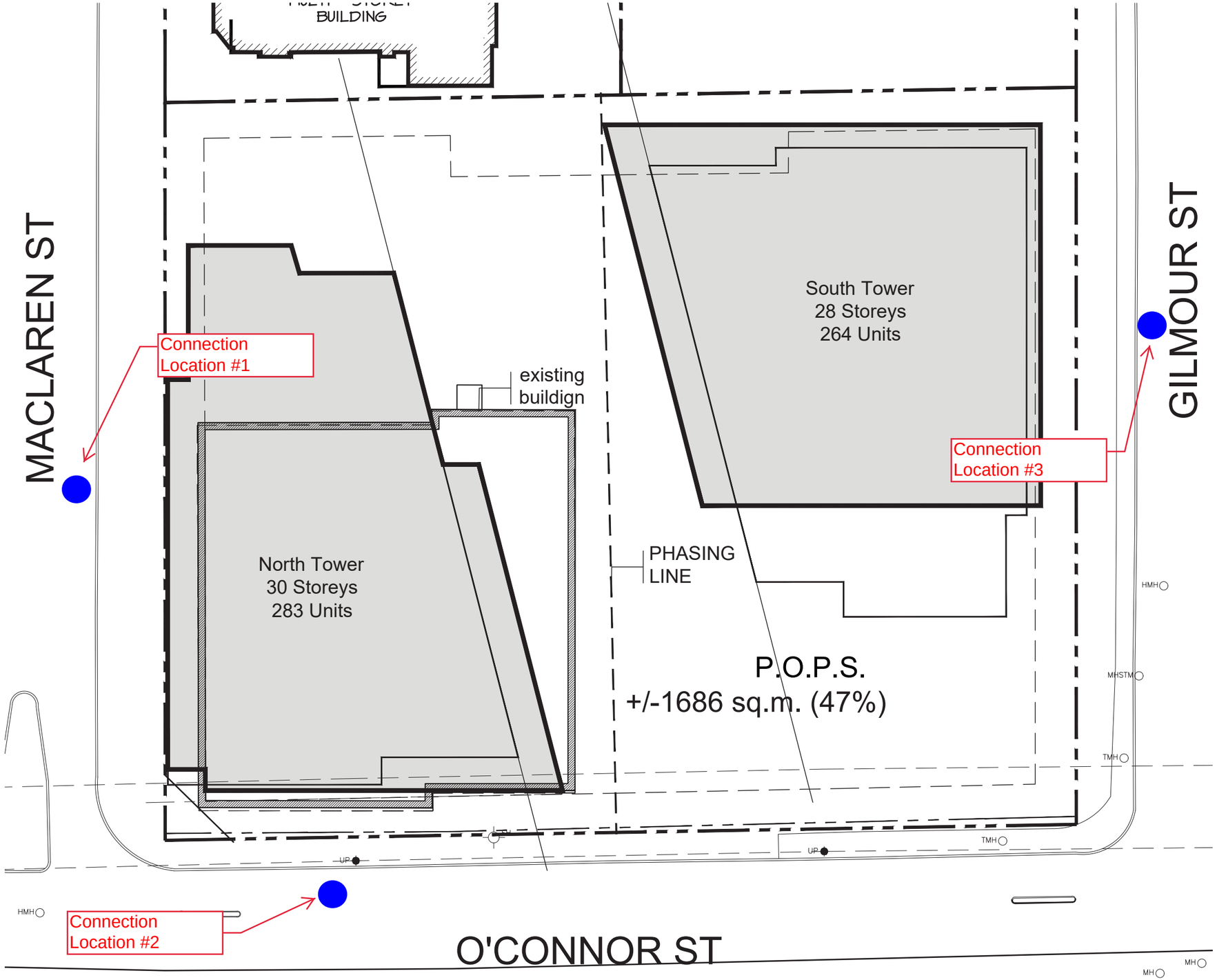
'


Boundary Conditon for 267 O'Connor
MACLAREN ST
O'CONNOR ST
GILMOUR ST
LEWIS ST
261
293
250
305
270
264
260
280
N
295
307
152
102
320
267
406
278
280
330
102
347
305
332
336
340
344
376
378
380
382
408
420
203
Legend
PRIVATE
PUBLIC



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	246,453 SQ.FT.
-TOTAL NET LEASEABLE AREA	198,869 SQ.FT.
-UNIT COUNT	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)

PHASE 2 TOWER - 30 STOREYS, 263 UNITS

- RES. PARKING (0.5 PER UNIT)	142
- 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

HOBIN ARCHITECTURE

267 O'connor

SCHEMATIC PROPOSAL - 2 TOWERS (4 LEVELS OF UNDERGROUND PARKING)

SCALE: 1:300

JULY, 2020

TAGGART REALTY MANAGEMENT

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

Unit Breakdown	**No.**	**Person Per Unit (Table 4.1)**
Studio	22	1.4
1 Bed	141	1.4
1 bed + den	53	1.4
2 bed	62	2.1
2 bed + den	5	2.1
Totla Unit Count =	283	
No. of Studios & 1-bedroom	216	units
Density	1.4	p/p/u
No. Ppl	303	ppl
No. of 2-bedroom	67	units
Density	2.1	p/p/u
No. Ppl	141	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 3-1 MOE)
Maximum Day Demand	**4.35**	**L/s**
Peak Hour Peaking Factor	4.54	x Max Day (Table 3-1 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**

FUS Fire Flow Calculations

267 O'Connor Street - Phase 1 - Commercial Building
(JLR 29056-000)

Step	Parameter	Value		Note
A	Type of Construction	Non-combustible		
	Coefficient (C)	0.8		
B	Ground Floor Area	750	m^2	
C	Height in storeys	28	storeys	Basements are excluded.
	Total Floor Area	21000	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	25505	L/min	
	Rounded Fire Flow	26000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential buildings have a limited combustible occupancy.
	Occupancy Charge	-15%		
	Occupancy Increase or Decrease	-3900		
	Fire Flow	22100	L/min	No rounding applied.
F	Sprinkler Protection	Automatic Fully Supervised		
	Sprinkler Credit	-50%		
	Decrease for Sprinkler	-11050	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	30.0	m-storeys	
	Separation Distance	25	m	
	North Side Exposure Charge	8%		
	East Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	20.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	40.0	m-storeys	
	Separation Distance	10	m	
	East Side Exposure Charge	18%		
	South Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	30	storeys	
	Length-Height Factor	450.0	m-storeys	
	Separation Distance	15	m	
	South Side Exposure Charge	15%		
	West Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	17.0	m	
	Height of Exposed Wall:	6	storeys	
	Length-Height Factor	102.0	m-storeys	
	Separation Distance	20	m	
	West Side Exposure Charge	15%		
	Total Exposure Charge	56%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	12376	L/min	
H	Fire Flow	23426	L/min	
	Rounded Fire Flow	23000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**23000**	**L/min**	The City of Ottawa's cap does not apply since this is a high density residential building.
		383	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

FUS Fire Flow Calculations

267 O'Connor Street - Phase 2 - Commercial Building
(JLR 29056-000)

Step	Parameter	Value		Note
A	Type of Construction	Non-combustible		
	Coefficient (C)	0.8		
B	Ground Floor Area	763	m^2	
C	Height in storeys	30	storeys	Basements are excluded.
	Total Floor Area	22890	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	26628	L/min	
	Rounded Fire Flow	27000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential buildings have a limited combustible occupancy.
	Occupancy Charge	-15%		
	Occupancy Increase or Decrease	-4050		
	Fire Flow	22950	L/min	No rounding applied.
F	Sprinkler Protection	Automatic Fully Supervised		
	Sprinkler Credit	-50%		
	Decrease for Sprinkler	-11475	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	28	storeys	
	Length-Height Factor	420.0	m-storeys	
	Separation Distance	15	m	
	North Side Exposure Charge	15%		
	East Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	30.0	m-storeys	
	Separation Distance	15	m	
	East Side Exposure Charge	12%		
	South Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	30.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	90.0	m-storeys	
	Separation Distance	25	m	
	South Side Exposure Charge	9%		
	West Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	10.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	20.0	m-storeys	
	Separation Distance	50	m	
	West Side Exposure Charge	0%		
	Total Exposure Charge	36%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	8262	L/min	
H	Fire Flow	19737	L/min	
	Rounded Fire Flow	20000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**20000**	**L/min**	The City of Ottawa's cap does not apply since this is a high density residential building.
		333	**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 D3

Fire Flow Requirements

FUS Fire Flow Calculations

267 O'Connor Street - Phase 1 - Commercial Building
(JLR 29056-000)

Step	Parameter	Value		Note
A	Type of Construction	Non-combustible		
	Coefficient (C)	0.8		
B	Ground Floor Area	750	m^2	
C	Height in storeys	28	storeys	Basements are excluded.
	Total Floor Area	21000	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	25505	L/min	
	Rounded Fire Flow	26000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential buildings have a limited combustible occupancy.
	Occupancy Charge	-15%		
	Occupancy Increase or Decrease	-3900		
	Fire Flow	22100	L/min	No rounding applied.
F	Sprinkler Protection	Automatic Fully Supervised		
	Sprinkler Credit	-50%		
	Decrease for Sprinkler	-11050	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	30.0	m-storeys	
	Separation Distance	25	m	
	North Side Exposure Charge	8%		
	East Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	20.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	40.0	m-storeys	
	Separation Distance	10	m	
	East Side Exposure Charge	18%		
	South Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	30	storeys	
	Length-Height Factor	450.0	m-storeys	
	Separation Distance	15	m	
	South Side Exposure Charge	15%		
	West Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	17.0	m	
	Height of Exposed Wall:	6	storeys	
	Length-Height Factor	102.0	m-storeys	
	Separation Distance	20	m	
	West Side Exposure Charge	15%		
	Total Exposure Charge	56%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	12376	L/min	
H	Fire Flow	23426	L/min	
	Rounded Fire Flow	23000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**23000**	**L/min**	The City of Ottawa's cap does not apply since this is a high density residential building.
		383	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

FUS Fire Flow Calculations

267 O'Connor Street - Phase 2 - Commercial Building
(JLR 29056-000)

Step	Parameter	Value		Note
A	Type of Construction	Non-combustible		
	Coefficient (C)	0.8		
B	Ground Floor Area	763	m^2	
C	Height in storeys	30	storeys	Basements are excluded.
	Total Floor Area	22890	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	26628	L/min	
	Rounded Fire Flow	27000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential buildings have a limited combustible occupancy.
	Occupancy Charge	-15%		
	Occupancy Increase or Decrease	-4050		
	Fire Flow	22950	L/min	No rounding applied.
F	Sprinkler Protection	Automatic Fully Supervised		
	Sprinkler Credit	-50%		
	Decrease for Sprinkler	-11475	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	28	storeys	
	Length-Height Factor	420.0	m-storeys	
	Separation Distance	15	m	
	North Side Exposure Charge	15%		
	East Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	30.0	m-storeys	
	Separation Distance	15	m	
	East Side Exposure Charge	12%		
	South Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	30.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	90.0	m-storeys	
	Separation Distance	25	m	
	South Side Exposure Charge	9%		
	West Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	10.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	20.0	m-storeys	
	Separation Distance	50	m	
	West Side Exposure Charge	0%		
	Total Exposure Charge	36%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	8262	L/min	
H	Fire Flow	19737	L/min	
	Rounded Fire Flow	20000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**20000**	**L/min**	The City of Ottawa's cap does not apply since this is a high density residential building.
		333	**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

270 O'Connor Street Condominium Towers
Taggart Realty Management
29056-001.1

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
MXDY + FF (Southern – Phase 1)	N/A	107.7	106.5
MXDY + 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 (m^3/s)
C - Hazen Williams "C"
D - Main Diameter (m)

Water Demand Condition	Flow - Q (L/s)	Flow - Q (m^3/s)	Length (m)	C	D (m)	HeadLoss (m)	HGL (m) @ 200mm WM	HGL @ Tower (m)	Tower Elevation (m)	Pressure @ Tower (m)	Pressure @ Tower (kPa)	Requirement	Criteria Acheived?
Southern Tower (Phase 1)													
Average Day	1.34	0.00134	8.1	110	0.200								
Maximum Day	4.21	0.00421	8.1	110	0.200								
Peak Hour	6.31	0.00631	8.1	110	0.200	0.0030	106.8	106.797	71.4	35.397	347	275	Yes
Maximum HGL	0.37	0.00037	8.1	110	0.200	0.000016	115.0	115.000	71.4	43.600	428	552	Yes
Maximum Day Plus Fire (Q = 4.21 L/s + 69.2 L/s)	73.41	0.07341	8.1	110	0.200	0.2842	106.5	106.216	71.4	34.816	342	140	Yes
Northern Tower (Phase 2)													
Average Day	1.44	0.00144	6.6	110	0.200								
Maximum Day	4.35	0.00435	6.6	110	0.200								
Peak Hour	6.53	0.00653	6.6	110	0.200	0.0026	106.9	106.897	71.6	35.297	346	275	Yes
Maximum HGL	0.43	0.00043	6.6	110	0.200	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	6.6	110	0.200	0.2324	107.7	107.468	71.6	35.868	352	140	Yes

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

Appendix E

Wastewater Calculations

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

PHASE 1 - Tower 0.17881 Ha.

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
Total 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
Theoretical Wastewater Flow	280	L/c/d
Average Wastewater Flow	**1.34**	**L/s**
Harmon Peaking Factor	3.413	
Peak Wastewater Flow	**4.56**	**L/s**
Commercial/Office Area (ha)	0.02	
Commercial PF =	1	
Peak Flow (Comm) =	0.007	L/s
Dry & Wet I/I (0.33 L/s/ha)	0.06	L/s
Peak WW Flow (L/s)	4.62	L/s
Paterson GW Allowance	0.17	L/s
GW Allowance (50%) =	0.09	L/s
Total Peak WW Flow (L/s)	4.71	L/s

PHASE 2 - Tower 0.17862 Ha.

Unit Breakdown	No.	Person Per Unit (Table 4.1)
Studio	22	1.4
1 Bed	141	1.4
1 bed + den	53	1.4
2 bed	62	2.1
2 bed + den	5	2.1
Totla Unit Count =	283	
No. of Studios & 1-bedroom	216	units
Density	1.4	p/p/u
No. Ppl	303	ppl
No. of 2-bedroom	67	units
Density	2.1	p/p/u
No. Ppl	141	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
Paterson GW Allowance	0.17	L/s
GW Allowance (50%) =	0.09	L/s
Total Peak WW Flow (L/s)	5.05	L/s

Appendix F1

Pre-Development Peak Flow Calculations

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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 1):

Type of Area	Area (m^2)	C-Factor	C-Factor (Eff)
Parking	2205.77	0.9	0.4
	2205.77	0.9	0.4

Time of Concentration (existing) to Gilmour:

Flow path on asphalt from high point to U/S CB = ±25 m on 2.4% slope
Length of Sewers from U/S CB to O'Connor = ±76 m
Sewer slope = ±1%; V= ±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 min
$Intensity_{(5yr)}$ = 104.19 mm/hr based on a Tc = 10 min

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

Q_{5yr} = 2.78CIA
Q_{5yr} = 2.78 x 0.40 x 104.193 mm/hr x 0.22057 ha
Q_{5yr} = 57.5 L/s

Q_{100yr} = 2.78 x 0.90 x 178.559 mm/hr x 0.13272 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

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

Q_{5yr} = 2.78CIA
Q_{5yr} = 2.78 x 0.40 x 104.193 mm/hr x 0.22057 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 2):

Type of Area		Area (m^2)	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 = ±23 m
Slope = ±0.9%; V= ±0.60 m/s (Uplands Method)

Tc (exist) = (23 m / 0.60 m/s)
Tc (exist) = ±40 secs, or 0.67 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_{5yr} = 2.78CIA
Q_{5yr} = 2.78 x 0.90 x 104.193 mm/hr x 0.13272 ha
Q_{5yr} = 35.6 L/s

Q_{100yr} = 2.78 x 0.90 x 178.559 mm/hr x 0.13272 ha
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 x 0.40 x 104.193 mm/hr x 0.13272 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

Appendix F2

Stormwater Management Calculations & Watts Roof Drain

WATTS®	Adjustable Accutrol Weir Tag: _____	Adjustable Flow Control for Roof Drains

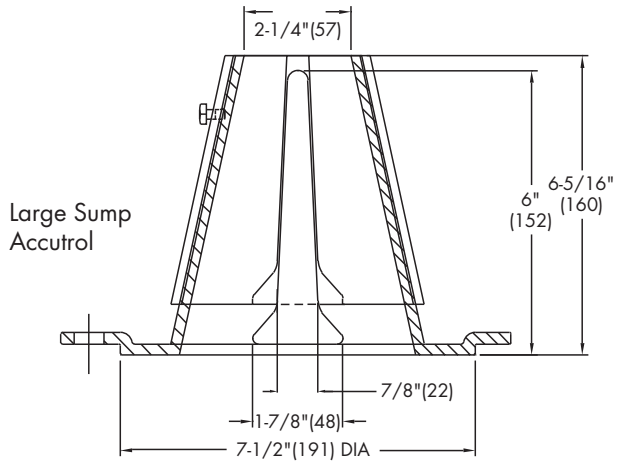
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

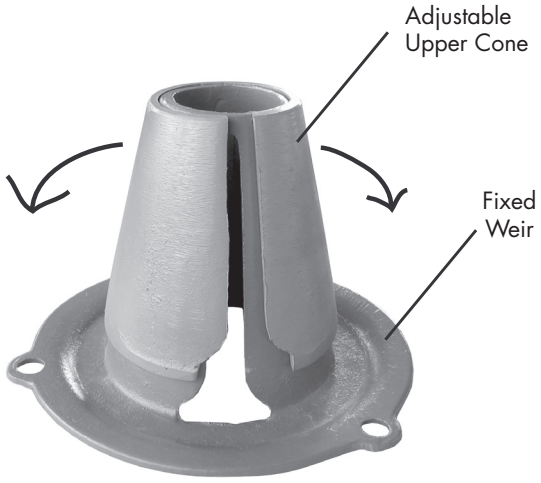
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the 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) x 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

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons 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 1 (Gilmour Street):

Q_{5yr} =	25.6 L/s

Wastewater Contribution (Phase 1 Tower):

Qp	4.62 L/s

Groundwater Contribution:

Qp	0.085 L/s

Allowable Peak Flow - Phase 1 @ Gilmour:

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

Q_{pAllow} = 25.6 L/s - 4.62 L/s - 0.09 L/s

Q_{pAllow} =	20.85 L/s

← Allowable

Allowable Peak Flow Calculation:

Phase 2 (MacLaren Street):

Q_{5yr} =	15.8 L/s

Wastewater Contribution (Phase 2 Tower):

Qp	4.96 L/s

Groundwater Contribution:

Qp	0.085 L/s

Allowable Peak Flow - Phase 2 @ MacLaren:

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

Q_{pAllow} = 15.4 L/s - 4.96 L/s - 0.09 L/s

Q_{pAllow} =	10.80 L/s

← Allowable

Phase 1 - Allocation of Flows

	Area (m^2)	C-Factor
Phase 1 Tower	909.91	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 =	17.07 L/s
Total Flow =	20.85 L/s

Phase 2 - Allocation of Flows

	Area (m^2)	C-Factor
Phase 2 Tower	940.94	0.9

Assuming Watts Ajustable Accutrol Weir
12 weirs x 0.315 L/s/weir = 3.78 L/s

Tower(12)Qp =	3.78 L/s
POPS Qp =	7.02 L/s
Total Flow =	10.80 L/s

Storage Volume Requirement Calculations:

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

i) Limit rooftop flows for Phase 1 Tower (Gilmour) to 3.78 L/s

ii) Limit rooftop flows for Phase 2 Tower (MacLaren) to 3.78 L/s

iii) Limit flows from the POPS and Uncontrolled to MacLaren at 7.02 L/s

iv) Limit flows from the POPS and Uncontrolled to Gilmour at 17.07 L/s

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

Phase 1 (Gilmour Street)

Area No.	Area (m2)	C-Factor	ICD
Area 2	210.58	0.72	1.90
Area 3	206.94	0.69	3.20
Area 4	278.58	0.82	4.20
Area 6	752.90	0.79	4.25
Area 8 (internal building)	37.40	0.81	N/A
Area 9	108.10	0.68	2.00
Area 10 (roof)	909.91	0.90	3.78

SUM of ICDs (Phase 1) =	19.33	L/s
SUM Uncontrolled (area 8) =	1.50	L/s
Total Flow (Phase 1) =	20.83	L/s

Allowable Peak Flow (Phase 1) =	20.85	L/s

Phase 2 (MacLaren Street):

Area No.	Area (m2)	C-Factor	ICD
Area 1	16.38	0.90	N/A
Area 5 (roof)	940.94	0.90	3.78
Area 7	111.25	0.71	3.3

SUM of ICDs (Phase 2) =	7.08	L/s
SUM Uncontrolled (area 1) =	3.65	L/s
Total Flow (Phase 1) =	10.73	L/s

Allowable Peak Flow (Phase 2) =	10.80	L/s

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267 O'Connor

Allowable Peak Flow & SWM Calculations

SWM Calcs (Phase 1 Areas) to Gilmour:

Area 10	
Roof (m2)	909.910
C =	0.90
ICD =	3.78
Storage Volume (m3)	81.89

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp Rooftop ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
20	119.95	27.31	3.78	23.53	28.23	34.13	30.35	36.43	6.83
25	103.85	23.64	3.78	19.86	29.79	29.55	25.77	38.66	5.91
30	91.87	20.91	3.78	17.13	30.84	26.14	22.36	40.25	5.23
35	82.58	18.80	3.78	15.02	31.54	23.50	19.72	41.41	4.70
40	75.15	17.11	3.78	13.33	31.99	21.38	17.60	42.25	4.28
45	69.05	15.72	3.78	11.94	32.24	19.65	15.87	42.85	3.93
50	63.95	14.56	3.78	10.78	32.34	18.20	14.42	43.26	3.64
55	59.62	13.57	3.78	9.79	32.32	16.97	13.19	43.52	3.39
60	55.89	12.72	3.78	8.94	32.20	15.91	12.13	43.65	3.18
65	52.65	11.99	3.78	8.21	32.00	14.98	11.20	43.69	3.00
70	49.79	11.34	3.78	7.56	31.73	14.17	10.39	43.63	2.83
75	47.26	10.76	3.78	6.98	31.40	13.45	9.67	43.50	2.69
80	44.99	10.24	3.78	6.46	31.02	12.80	9.02	43.31	2.56

The following assumptions were made in regard to rooftop storage:

Phase 1 Tower	
Rooftop flow =	3.78 L/s
Roof	909.910 m2
60% storage =	545.946 m2
Vol. @ 6" ponding =	81.9 m3

The SWM Calculations (above) shows rooftop storage volume requirements of 32.24 m3 and 43.69 m3 under the 1:100 year and climate change event (CCE).

Based on the above assumption (60% of rooftop used as storage), sufficient rooftop storage (81.9 m3) will be provided to detain the 1:100 yr and CCE on the rooftop
Hence, the SWM target will, therefore, be met for Area 10. There will not be any overtopping during the 1:100 year nor during the CCE

Area 2	
Pops (m2)	210.580
C =	0.72
ICD =	1.90
Vol @ Area 2 (LP1)	3.81

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
10	178.56	7.53	1.90	5.63	3.38	9.41	7.51	4.50	1.88
15	142.89	6.02	1.90	4.12	3.71	7.53	5.63	5.07	1.51
20	119.95	5.06	1.90	3.16	3.79	6.32	4.42	5.30	1.26
25	103.85	4.38	1.90	2.48	3.72	5.47	3.57	5.36	1.09
30	91.87	3.87	1.90	1.97	3.55	4.84	2.94	5.29	0.97
35	82.58	3.48	1.90	1.58	3.32	4.35	2.45	5.15	0.87
40	75.15	3.17	1.90	1.27	3.04	3.96	2.06	4.94	0.79

Based on the above SWM calculations for Area 2, minimum storage of 3.79 m3 and 5.47 m3 is required to detain the 1:100 yr and CCE, respectively

Based on Drawing DST, the proposed grading provides 3.81 m3 of storage, which exceeds the 1:100 yr storage volume requirements
The SWM target is, therefore, met for the 1:100 year

During the CCE, the difference between the 1:100 year and CCE peak flows will result in an overflow of 1.09 L/s cascading to Gilmour Street from Area 2

Area 3	
Pops (m2)	206.940
C =	0.69
ICD =	3.20
Vol @ Area 3 (LP2)	2.37

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
10	178.56	7.09	3.20	3.89	2.33	8.86	5.66	3.40	1.77
15	142.89	5.67	3.20	2.47	2.22	7.09	3.89	3.50	1.42
20	119.95	4.76	3.20	1.56	1.87	5.95	2.75	3.30	1.19
25	103.85	4.12	3.20	0.92	1.38	5.15	1.95	2.93	1.03
30	91.87	3.65	3.20	0.45	0.80	4.56	1.36	2.45	0.91
35	82.58	3.28	3.20	0.08	0.16	4.10	0.90	1.88	0.82

Based on the above SWM calculations, minimum storage of 2.33 m3 and 3.50 m3 is required to detain the 1:100 yr and CCE, respectively

Based on Drawing DST, the proposed grading provides 2.37 m3 of storage, which exceeds the 1:100 yr storage volume requirements
The SWM target is, therefore, met for the 1:100 year

During the CCE, the difference between the 1:100 year and CCE peak flows will result in an overflow of 1.42 L/s cascading to Gilmour Street from Area 3

Area 4	
Pops (m2)	278.580
C =	0.82
ICD =	4.20
Vol @ Area 4 (LP3)	2.99

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
30	91.87	5.83	4.20	1.63	2.94	7.29	3.09	5.57	1.46
35	82.58	5.24	4.20	1.04	2.19	6.56	2.36	4.95	1.31
40	75.15	4.77	4.20	0.57	1.37	5.97	1.77	4.24	1.19
45	69.05	4.39	4.20	0.19	0.50	5.48	1.28	3.46	1.10
50	63.95	4.06	4.20	N/A	N/A	5.08	0.88	2.63	1.02

Based on the above SWM calculations, minimum storage of 2.94 m3 and 5.57 m3 is required to detain the 1:100 yr and CCE, respectively

Based on Drawing DST, the proposed grading provides 2.99 m3 of storage, which exceeds the 1:100 yr storage volume requirements
The SWM target will, therefore, be met for the 1:100 year

During the CCE, the difference between the 1:100 year and CCE peak flows will result in an overflow of 1.46 L/s cascading to Gilmour Street from Area 4

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Allowable Peak Flow & SWM Calculations

Area 6	
Pops (m2)	752.900
C =	0.79
ICD =	4.25
Vol @ Area 6 (LP4)	19.98

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
10	178.56	29.53	4.25	25.28	15.17	36.91	32.66	19.59	7.38
15	142.89	23.63	4.25	19.38	17.44	29.53	25.28	22.76	5.91
20	119.95	19.83	4.25	15.58	18.70	24.79	20.54	24.65	4.96
25	103.85	17.17	4.25	12.92	19.38	21.46	17.21	25.82	4.29
30	91.87	15.19	4.25	10.94	19.69	18.99	14.74	26.53	3.80
35	82.58	13.65	4.25	9.40	19.75	17.07	12.82	26.92	3.41
40	75.15	12.43	4.25	8.18	19.62	15.53	11.28	27.08	3.11
45	69.05	11.42	4.25	7.17	19.35	14.27	10.02	27.06	2.85
50	63.95	10.57	4.25	6.32	18.97	13.22	8.97	26.91	2.64
55	59.62	9.86	4.25	5.61	18.51	12.32	8.07	26.64	2.46
60	55.89	9.24	4.25	4.99	17.97	11.55	7.30	26.29	2.31
65	52.65	8.71	4.25	4.46	17.38	10.88	6.63	25.86	2.18

Based on the above SWM calculations, minimum storage of 19.75 m3 and 27.08 m3 is required to detain the 1:100 yr and CCE, respectively

Based on Drawing DST, the proposed grading provides 19.98 m3 of storage, which exceeds the 1:100 yr storage volume requirements
The SWM target will, therefore, be met for the 1:100 year

During the CCE, the difference between the 1:100 year and CCE peak flows will result in an overflow of 3.11 L/s cascading to Gilmour Street from Area 6

Area 8	
Pops (m2)	37.400
C =	0.81
ICD =	N/A
No Storage Volume - Conveyed Internally to Building	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
10	178.56	1.50	N/A	N/A	N/A	1.88	N/A	N/A	0.38
15	142.89	1.20	N/A	N/A	N/A	1.50	N/A	N/A	0.30
20	119.95	1.01	N/A	N/A	N/A	1.26	N/A	N/A	0.25
25	103.85	0.87	N/A	N/A	N/A	1.09	N/A	N/A	0.22
30	91.87	0.77	N/A	N/A	N/A	0.97	N/A	N/A	0.19
35	82.58	0.70	N/A	N/A	N/A	0.87	N/A	N/A	0.17
40	75.15	0.63	N/A	N/A	N/A	0.79	N/A	N/A	0.16
45	69.05	0.58	N/A	N/A	N/A	0.73	N/A	N/A	0.15
50	63.95	0.54	N/A	N/A	N/A	0.67	N/A	N/A	0.13

Based on the above SWM calculations, flows of 1.50 L/s and 1.88 L/s will flow in the building and picked up internally by piping

Area 9	
Pops (m2)	108.100
C =	0.68
ICD =	2.00
Vol @ Area 9 (LP5)	1.00

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
10	178.56	3.65	2.00	1.65	0.99	4.56	2.56	1.54	0.91
15	142.89	2.92	2.00	0.92	0.83	3.65	1.65	1.49	0.73
20	119.95	2.45	2.00	0.45	0.54	3.06	1.06	1.28	0.61
25	103.85	2.12	2.00	0.12	0.18	2.65	0.65	0.98	0.53
30	91.87	1.88	2.00	N/A	N/A	2.35	0.35	0.62	0.47
35	82.58	1.69	2.00	N/A	N/A	2.11	0.11	0.23	0.42

Based on the above SWM calculations, minimum storage of 0.99 m3 and 1.54 m3 is required to detain the 1:100 yr and CCE, respectively

Based on Drawing DST, the proposed grading provides 1.00 m3 of storage, which exceeds the 1:100 yr storage volume requirements
The SWM target will, therefore, be met for the 1:100 year

Under the CCE, the difference in peak flows between the CCE and 1:100 year of 0.91 L/s will overflow to Gilmour Street from Area 9

Summary of Areas to Gilmour Street (Phase 1):

Area No.	Area (m2)	C-Factor	ICD Flow 100 yr	Uncontrolled 100 yr Flow
Area 2	210.58	0.72	1.90	
Area 3	206.94	0.69	3.20	
Area 4	278.58	0.82	4.20	
Area 6	752.90	0.79	4.25	
Area 8 (internal building)	37.40	0.81	N/A	1.50
Area 9	108.10	0.68	2.00	
Area 10 (roof)	909.91	0.90	3.78	
			Sum 1:100 year Flows :	20.83

CCE Increased Flow	Overflow Point	Overflow Width
1.09	Area 6	3.0
1.42	Area 6	3.0
1.46	Area 6	3.0
3.11	Area 6	3.0
0.00	N/A	N/A
0.91	Area 9	2.0
0.00	N/A	N/A
7.08	Area 6	
0.91	Area 9	

Conclusion:
The sum of all 100 year flows (ICD and uncontrolled) is 20.85 L/s, which matches the allowable peak flow of 20.85 L/s. The SWM criterion on Gilmour Street is met.

Assessment of Climate Change on Gilmour Street:
Under the CCE, the increased in peak flows between the 1:100 year & CCE, is 7.08 L/s and 0.91 L/s for spill point Area 6 and Area 9, respectively
Based on the weir equation and using spill width of 3.0 m (Area 6) and 2.0 m (Area 9), the depth of flow discharge onto Gilmour is estimated as follows:

Q = Cd x L - ((0.2 x H x D^1.5)); where Cd = 1.87

Area 6: Based on an overflow of 7.08 L/s during the CCE, a flow depth of: 0.012 m was estimated, equivalent to an HGL of: 71.262 m
Area 9: Based on an overflow of 0.91 L/s during the CCE, a flow depth of: 0.004 m was estimated, equivalent to an HGL of: 71.414 m

Based on the above depth of ponding during the CCE, adequate freeboard is provided to the finish floor elevation for the Phase 1 Tower

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Allowable Peak Flow & SWM Calculations

Phase 2 Areas To MacLaren (SWM Calculations):

Area 5	
Roof (m2)	940.940
C =	0.90
ICD =	3.78
Storage Volume (m3)	84.68

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp Rooftop ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
20	119.95	28.24	3.78	24.46	29.35	35.30	31.52	37.82	7.06
25	103.85	24.45	3.78	20.67	31.00	30.56	26.78	40.17	6.11
30	91.87	21.63	3.78	17.85	32.13	27.03	23.25	41.86	5.41
35	82.58	19.44	3.78	15.66	32.89	24.30	20.52	43.09	4.86
40	75.15	17.69	3.78	13.91	33.39	22.11	18.33	44.00	4.42
45	69.05	16.26	3.78	12.48	33.69	20.32	16.54	44.66	4.06
50	63.95	15.06	3.78	11.28	33.83	18.82	15.04	45.12	3.76
55	59.62	14.04	3.78	10.26	33.85	17.55	13.77	45.43	3.51
60	55.89	13.16	3.78	9.38	33.76	16.45	12.67	45.61	3.29
65	52.65	12.39	3.78	8.61	33.60	15.49	11.71	45.68	3.10
70	49.79	11.72	3.78	7.94	33.35	14.65	10.87	45.66	2.93
75	47.26	11.13	3.78	7.35	33.05	13.91	10.13	45.57	2.78
80	44.99	10.59	3.78	6.81	32.70	13.24	9.46	45.41	2.65

The following assumptions were made in regard to rooftop storage:

Phase 2 Tower	
Rooftop flow =	3.78 L/s
Roof	940.940 m2
60% storage =	564.564 m2
Vol. @ 6" ponding =	84.7 m3

The SWM Calculations (above) shows rooftop storage volume requirements of 33.85 m3 and 45.68 m3 under the 1:100 year and climate change event (CCE).

Based on the above assumption (60% of rooftop used as storage), sufficient rooftop storage (84.7 m3) will be provided to detain the 1:100 yr and CCE on the rooftop
Hence, the SWM target will, therefore, be met for Area 5. There will not be any overtopping during the 1:100 year nor during the CCE

Area 1	
Pops (m2)	16.380
C =	0.90
ICD =	N/A
No Storage Volume	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
10	178.56	3.65	N/A	0.00	0.00	4.56	N/A	N/A	0.91
15	142.89	2.92	N/A	0.00	0.00	3.65	N/A	N/A	0.73
20	119.95	2.45	N/A	0.00	0.00	3.06	N/A	N/A	0.61
25	103.85	2.12	N/A	0.00	0.00	2.65	N/A	N/A	0.53
30	91.87	1.88	N/A	0.00	0.00	2.35	N/A	N/A	0.47
35	82.58	1.69	N/A	0.00	0.00	2.11	N/A	N/A	0.42
40	75.15	1.54	N/A	0.00	0.00	1.92	N/A	N/A	0.38
45	69.05	1.41	N/A	0.00	0.00	1.76	N/A	N/A	0.35
50	63.95	1.31	N/A	0.00	0.00	1.63	N/A	N/A	0.33
55	59.62	1.22	N/A	0.00	0.00	1.52	N/A	N/A	0.30
60	55.89	1.14	N/A	0.00	0.00	1.43	N/A	N/A	0.29
65	52.65	1.08	N/A	0.00	0.00	1.34	N/A	N/A	0.27

Based on the above SWM calculations, flows of 3.65 L/s and 4.56 L/s will cascade uncontrolled to MacLaren Street
Under the CCE, the difference in peak flows between the 1:100 year & CCE, is 0.91 L/s which will overflow to Gimour Street from Area 1

Area 7	
Pops (m2)	111.250
C =	0.71
ICD =	3.30
Vol @ Area 7 (LP6)	1.00

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Qp CCE (L/s)	Qp stored (L/s)	Volume CCE Requirement (m^3)	Qp CCE - Qp100yr (L/s)
10	178.56	3.92	3.30	0.62	0.37	4.90	1.60	0.96	0.98
15	142.89	3.14	3.30	N/A	N/A	3.92	0.62	0.56	0.78
20	119.95	2.63	3.30	N/A	N/A	3.29	N/A	N/A	0.66
25	103.85	2.28	3.30	N/A	N/A	2.85	N/A	N/A	0.57
30	91.87	2.02	3.30	N/A	N/A	2.52	N/A	N/A	0.50
35	82.58	1.81	3.30	N/A	N/A	2.27	N/A	N/A	0.45
40	75.15	1.65	3.30	N/A	N/A	2.06	N/A	N/A	0.41
45	69.05	1.52	3.30	N/A	N/A	1.90	N/A	N/A	0.38
50	63.95	1.40	3.30	N/A	N/A	1.76	N/A	N/A	0.35
55	59.62	1.31	3.30	N/A	N/A	1.64	N/A	N/A	0.33
60	55.89	1.23	3.30	N/A	N/A	1.53	N/A	N/A	0.31
65	52.65	1.16	3.30	N/A	N/A	1.45	N/A	N/A	0.29

Based on the above SWM calculations, minimum storage of 0.37 m3 and 0.96 m3 is required to detain the 1:100 yr and CCE, respectively

Based on Drawing DST, the proposed grading provides 1.00 m3 of storage, which exceeds the 1:100 yr and CCE storage volume requirements
The SWM target will, therefore, be met for the 1:100 year and no spillage to MacLaren Street under the CCE

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Allowable Peak Flow & SWM Calculations

Summary of Areas to MacLaren Street (Phase 2):

Area No.	Area (m2)	C-Factor	ICD Flow 100 yr	Uncontrolled 100 yr Flow
Area 1	16.38	0.90	N/A	3.65
Area 5 (roof)	940.94	0.90	3.78	
Area 7	111.25	0.71	3.30	
			Sum 1:100 year Flows :	10.73

CCE Increased Flow	Overflow Point	Overflow Width
0.91	Area 1	31.7
0.00	N/A	N/A
0.98	Area 7	2.0
0.91	Area 1	
0.98	Area 7	

Conclusion:

The sum of all 100 year flows (ICD and uncontrolled) is 10.73 L/s is below the allowable peak flow of 10.80 L/s. The SWM criterion on MacLaren Street is met.

Assessment of Climate Change on MacLaren Street:

Under the CCE, the peak flows of 4.56 L/s was calculated for Area 1
The depth of flow under the CCE was estimated based on the weir equation and using spill width of 31.7 m (Area 1)

Q = Cd x L - ((0.2 x H x D^1.5)); where Cd = 1.87

Area 1: Based on a flow of 4.56 L/s during the CCE, a flow depth of: 0.012 m was estimated, equivalent to an HGL of: 71.462 m

Based on the above depth of ponding during the CCE, adequate freeboard is provided to the finish floor elevation for the Phase 2 tower