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SITE SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

1642 MERIVALE ROAD – PHASE 1
FIRST CAPITAL ASSET MANAGEMENT

CITY OF OTTAWA

PROJECT NO.: 19-1084

JUNE 2020 – REV. 1

SITE SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
1642 MERIVALE ROAD – PHASE 1
FIRST CAPITAL ASSET MANAGEMENT

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FOR
1642 MERIVALE ROAD – PHASE 1
FIRST CAPITAL ASSET MANAGEMENT
JUNE 2020 – REV. 1

CITY OF OTTAWA
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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by First Capital to prepare a Site Servicing and Stormwater Management report in support of the application for a Site Plan Control (SPC) at 1642 Merivale Road.

The subject property is located within the City of Ottawa urban boundary, in the College ward. As illustrated in ***Figure 1***, below, the subject property is located Northwest of the Merivale Road and Viewmount Drive intersection. Comprised of a single parcel of land, the total subject property measures approximately ***6.5 ha*** and is zoned Arterial Mainstreet Zone. The proposed Phase 1 development is located at the north corner of the property within approximately ***0.36 ha*** of the total site.

Figure 1: Phase 1 Site Location

The existing site consists of a ***20,368 m²*** shopping center, herein referred to as Merivale Mall, which is to be retained. The existing restaurant located within property is proposed to be relocated as part of the Phase 1 development.

The proposed SPC would allow for the relocation of the existing ***213 m²*** restaurant fronting onto Merivale Road. A copy of the site plan is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient detail to demonstrate that the proposed development is supported by existing municipal services.

1.1 Existing Conditions

The existing site within the Phase 1 limit includes a paved surface parking lot with little vegetation. The elevations range between 89.97 m and 92.86 m with a grade change of approximately 2.9 m from the Northeast to the Southwest corner of the property.

The emergency flow route for the site is directed around the existing mall before spilling to the Viewmount Drive City right-of-way at an approximate elevation of 87.82m as indicated in ***Fig.1*** within ***Appendix D.***

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal right-of-ways:

Merivale Road:

- 305 mm diameter DI watermain;
- 450 mm diameter concrete sanitary sewer, tributary to the Lynwood Collector; and
- 900 mm diameter concrete storm sewer, tributary to the Nepean Creek, which is located approximately 600 m downstream.

Viewmount Drive:

- 203 mm diameter PVC/CI watermain;
- 250 mm diameter PVC sanitary sewer, tributary to the Lynwood Collector;
- 900 mm diameter concrete storm sewer, tributary to the Nepean Creek, which is located approximately 650 m downstream; and
- 375 mm diameter concrete storm sewer outletting to the Nepean Creek Inline Stormwater Pond, which is located approximately 1200 m downstream.

Internal Site:

- 203 mm diameter watermain;
- 250 mm diameter concrete sanitary sewer, tributary to the 450 mm diameter sanitary sewer within Merivale Road which is located approximately 400 m downstream of the Phase 1 site; and

- 600 mm diameter concrete storm sewer, tributary to the 900 mm diameter storm sewer within Merivale Road, which is located approximately 600 m downstream of the Phase 1 site.

1.2 Required Permits / Approvals

The contemplated development will be subject to the site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control.

An Environmental Compliance Approval (ECA) through the Ministry of Environment, Conservation and Parks (MECP) is not anticipated as the contemplated development is a single parcel, does not outlet to a combined sewer and it not zoned or proposed to be industrial; as such, the stormwater management system meets the exemption requirements under O.Reg 525/90.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

The following studies were utilized in the preparation of this report:

- **Ottawa Sewer Design Guidelines**,
  City of Ottawa, *SDG002,* October 2012.
  (City Standards)

  - **Technical Bulletin ISTB-2018-01**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-01*)

  - **Technical Bulletin ISTB-2018-03**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-03*)

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISD-2010-2*)

  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (*ISDTB-2014-02*)

  - **Technical Bulletin ISDTB-2018-02**
    City of Ottawa, March 21, 2018.
    (*ISDTB-2018-02*)

- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* Design Guidelines*)

- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2010 Update.
  (OBC)

- **Geotechnical Investigation (PG4863-1)**
  Paterson Group, May 1, 2019
  (Geotechnical Report)

- **Adequacy of Services -1684 Merivale Road -Phase 2 (18-1084)**
  David Schaeffer Engineering Ltd., April, 2020
  (Phase 2, AES)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 2W2C pressure zone, as shown by the Pressure Zone map included in ***Appendix B***. A local 305 mm diameter watermain exists within the Merivale Road right-of-way, as well as, a 203 mm diameter watermain located within the Viewmount Drive right-of-way. There is an existing 203 mm diameter looped private watermain within the site that services the existing Merivale Mall. The existing looped private watermain connects to both local watermains within Merivale Road and Viewmount Drive.

The estimated existing water demand is summarized in ***Table 1***, below.

Table 1
Summary of Existing Water Demand

Design Parameter	Existing Demand[1] (L/min)
Average Daily Demand	37.1
Max Day	55.7
Peak Hour	100.3

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.

3.2 Water Supply Servicing Design

It is anticipated that the proposed development will be serviced from the existing 203 mm internal watermain. This watermain connects to the existing 203 mm diameter watermain within the Viewmount Drive right-of-way and the existing 305 mm diameter watermain within the Merivale Road right-of-way.

Table 2, below, summarizes the ***Water Supply Guidelines*** employed in the preparation of the preliminary water demand estimate.

Table 2
Water Supply Design Criteria

Design Parameter	Value
Restaurant	125 L/seat/d
Commercial/Amenity Space	2.5 L/m^2/d
Commercial Maximum Daily Demand	1.5 x avg. day
Commercial Maximum Hour Demand	1.8 x max. day
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480 kPa
During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa
Daily average based on Appendix 4-A from **Water Supply Guidelines -Table updated to reflect ISD-2010-2*	

Table 3, below***,*** summarizes the anticipated water supply demand for the proposed development based on the ***Water Supply Guidelines***. Boundary conditions were received as part of the Phase 2 development (Phase 2. The boundary conditions received are considered conservative at this time. Refer to the Phase 2 Adequacy of Services (***Phase 2 AES***) report for further information.

Table 3
Summary of Proposed Water Demand

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)	Boundary Condition[3] (m H_2O / kPa)
Average Daily Demand	39.1	134.2 / 471.4	134.2 / 471.4
Max Day + Fire Flow	58.7 + 3,000 = 3,059	117.0 / 302.6	126.0 / 338.1
Peak Hour	105.7	126.5 / 395.8	126.5 / 395.8

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 86.15 m. See ***Appendix B.***
3) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 91.54 m. See ***Appendix B.***

Fire flow requirements are to be determined in accordance with Local Guidelines (**ISDTB-2018-02**), City of Ottawa ***Water Supply Guidelines***, and the Ontario Building Code.

Using the Technical Bulletin **ISDTB-2018-02** method, a conservative estimation of fire flow had been established. As coordinated with the building architect, the following assumptions were assumed:

- Type of construction – Ordinary Construction;

- Occupancy type – Combustible; and
- Sprinkler Protection – Non-Sprinkler System.

The above assumptions result in an estimated fire flow of approximately ***3,000 L/min***, noting that actual building materials selected will affect the estimated flow. Detailed calculations are included in ***Appendix B***. A certified fire protection system specialist will need to be employed to design the building fire suppression system and confirm the actual fire flow demand.

The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow demand for the demands as indicated by the correspondence in ***Appendix B***. As shown by ***Table 2***, the minimum and maximum pressures fall within the required range identified in ***Table 1***.

Noting that as the water boundary conditions provided are for the Phase 2 development demands which is are greater than the Phase 1 demands the results obtained are conservative. Water boundary conditions will be updated in a subsequent submission.

3.2.1 EPANet Water Modelling

EPANet was utilized to determine the availability of pressures throughout the internal watermain during average day demand, max day plus fire flow, and peak hour demands. The static model determines pressures based on the available head obtained from the boundary conditions provided by the City of Ottawa.

The model utilizes the Hazen-Williams equation to determine pressure drop, while the pipe properties, including friction factors, have been selected in accordance with Table 4.4 of the ***Water Supply Guidelines***. The model was prepared to assess the available pressure to the proposed building for the contemplated demands as well as the pressures the watermain provided the fire hydrant during fire flow conditions.

Table 4, below***,*** summarizes the output reports. Detailed calculations and model schematics for each scenario are included in ***Appendix B***. The model indicates that pressures during average day, max day and peak hour are within the **Water Supply Guidelines** recommended range.

Table 4
Model Simulation Output Summary

Location	Average Day (kPa)	Max Day + Fire Flow (kPa)	Peak Hour (kPa)
3	477.8	315.4	402.3
4	454.7	302.1	379.2
5 (EXISTING MALL)	455.3	326.3	379.7
6 (PHASE 1)	457.4	304.8	381.9
7	469.0	311.3	393.5

3.3 Water Supply Conclusion

The estimated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions. As demonstrated by ***Table 3***, based on the City's model, the municipal system is capable of delivering water within the ***Water Supply Guidelines*** pressure range.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within the Nepean Pullback catchment area, as shown by the City sewer mapping included in ***Appendix C***. An existing 450 mm diameter sanitary sewer exists within the Merivale right-of-way and an existing 250 mm diameter sanitary sewer exists within the Viewmount Drive right-of-way, as indicated in ***Section 1.1*** of this report. The Lynwood Collector is located approximately 600 m downstream from the subject site. A 250mm diameter sanitary sewer exists within the property.

Table 5, below, demonstrates the estimated peak flow from the existing development. See ***Appendix C*** for associated calculations.

Table 5
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	**2.84**
Estimated Peak Dry Weather Flow	**4.09**
Estimated Peak Wet Weather Flow	**5.92**

4.2 Wastewater Design

It is proposed that the Phase 1 development will connect to the internal existing 250 mm diameter sanitary sewer within the property.

Table 6*,* below, summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 6
Wastewater Design Criteria

Design Parameter	Value
Restaurant	125 L/seat/d
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry Weather) 0.28 L/s/ha (Wet Weather) 0.33 L/s/ha (Total)
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 7, below, demonstrates the anticipated peak flow from the contemplated development. See ***Appendix C*** for associated calculations.

Table 7
Summary of Estimated Peak Wastewater Flow – Phase 1

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	**2.84**
Estimated Peak Dry Weather Flow	**4.09**
Estimated Peak Wet Weather Flow	**5.92**

The estimated peak wet weather sanitary flow, based on the site plan provided in ***Drawings/Figures,*** is ***5.92 L/s***, as demonstrated by ***Table 6*** and ***Table 7***.

As the proposed development includes the relocation of the existing restaurant. The resulting total flow from the development is estimated to be unchanged as the proposed Phase 1 restaurant will maintain the existing sanitary outlet. Furthermore, a sanitary analysis is not anticipated to be required.

4.3 Wastewater Servicing Conclusions

The site is tributary to the Nepean Pullback/Lynwood Collector Sanitary sewer. The local sewers have the capacity to convey the flow of the Phase 1 development as the development will outlet to the existing onsite sanitary sewer, consistent with the existing outlet of the restaurant.

The proposed wastewater design conforms to all relevant ***City Standards***.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system and is located within the Ottawa Central sub-watershed. As such, approvals for contemplated developments within this area are under the approval authority of the City of Ottawa.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Ottawa River watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA).

Currently stormwater from 1642 Merivale Road is collected in an on-site storm sewer system and is tributary to Merivale Road storm sewer. Stormwater from the southern parking area is collected via an on-site sewer system that is tributary to Viewmount Drive storm sewer. Overland flow is directed south towards Viewmount Drive.

It was assumed that the existing development contained no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2, 5, and 100-year events are summarized in ***Table 8,*** below:

Table 8
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	99.5
5-year	134.9
100-year	272.0

5.2 Post-development Stormwater Management Target

Based on pre-consultation, City of Ottawa Standards were used to determine stormwater management requirements, where the development is required to:

- Meet an allowable release rate based on the lesser of either the existing calculated Rational Method Coefficient or 0.50, employing the City of Ottawa IDF parameters for a 2-year storm with a time of concentration equal to or greater than 10 minutes;
- Attenuate all storms up to and including the City of Ottawa 100-year design event on site;
- The RVCA was contacted in regards to quality controls onsite. Quality controls are not required for the contemplated development due to the outlet to the Nepean Creek Stormwater Management Facility (Inline Pond); correspondence with the RVCA is included in ***Appendix A***; and

- Convey any external areas tributary to the Phase 1 portion of the development to maintain existing drainage patterns.

Based on the above the allowable release rate for the proposed development is ***67.7 L/s***.

5.3 Proposed Stormwater Management System

It is proposed that the stormwater from the proposed development outlet to the existing internal 600 mm storm sewer within the existing site. Refer to drawing ***SSP-1*** for detail.

Table 9, below***,*** summarizes post-development flow rates.

Table 9
Stormwater Flow Rate Summary – Phase 1

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage (Required)	100-Year Storage (Available)
	(L/s)	(m^3)	(L/s)	(m^3)	(m^3)
Unattenuated Areas (UN1)	10.9	0.0	23.4	0.0	0.0
External Areas (EX3)	4.1	0.0	8.8	0.0	0.0
Attenuated Areas (A1. EX1. EX2)	18.9	66.7	33.6	154.6	159.3
Attenuated Areas (BLDA)	1.0	3.4	1.3	7.5	16.9
Total	**35.0**	**70.1**	**67.1**	**162.1**	**176.1**

It is estimated that approximately ***162.1 m^3*** of storage will be required on site to attenuate flow to the established release rate of ***67.7 L/s***; storage calculations are contained within ***Appendix D***.

In order to achieve the allowable post-development stormwater runoff release rate established in Section 5.2 above, the proposed development will employ rooftop, surface and sub-surface storage.

Drawing ***SWM-1***, located in ***Drawings / Figures***, illustrates the site sub-drainage catchment areas.

The proposed system has been sized to accommodate Phase I only. Runoff from the site will be directed to a catch basin system; approximately ***69.3 m^3*** of storage will be provided by surface ponding and catch basins and another ***90 m3*** of storage will be provided via a Triton S-29 storage system or an approved equivalent. Runoff from the site will be attenuated by a ***108 mm*** diameter ICD or an approved equivalent located on the outlet side of ***CB101*** Detailed calculations are located in ***Appendix D***.

Flow from rooftops will be controlled before discharging to the storm sewer system. Approximately ***7.5 m^3*** of storage will be provided by rooftop storage. The release rate and storage calculations for roof top attenuation were estimated based on Zurn Industries Ltd. design guidelines for Model Z-105-5 Control-Flo Single Notch drains. Other products may

be specified provided that the restricted release rate and sufficient storage is provided to meet or exceed the values in ***Appendix D***.

Quality controls are not required for the contemplated development as the site will be outletting to the Nepean Creek Stormwater Pond. The ***RVCA*** encourages best management practices be integrated where possible.

5.4 Stormwater Servicing Conclusions

In accordance with City of Ottawa ***City Standards***, post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm. The post-development allowable release rate was calculated as ***67.7 L/s***; it is estimated that ***162.1 m^3*** of storage will be required in order to meet the established release rate.

Quality controls are not required for the contemplated development based on the response from the ***RVCA***.

The proposed stormwater design conforms to all relevant ***City Standards*** and Policies for approval.

6.0 UTILITIES

Utility servicing will be coordinated with the individual utility companies prior to site development.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. During construction the extent of erosion losses is exaggerated due to the removal of vegetation and the top layer of soil becoming agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have SILTSACKs or an approved equivalent installed under the grate during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents:

- Limit extent of exposed soils at any given time;
- Re-vegetate exposed areas as soon as possible;
- Minimize the area to be cleared and grubbed;
- Protect exposed slopes with plastic or synthetic mulches;
- Install silt fence to prevent sediment from entering existing ditches;
- No refueling or cleaning of equipment near existing watercourses;
- Provide sediment traps and basins during dewatering;
- Install filter cloth between catch basins and frames;
- Plan construction at proper time to avoid flooding; and
- Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not flowing under silt barriers; and
- Clean and change filter cloth at catch basins.

8.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by First Capital Asset Management to prepare a Site Servicing and Stormwater Management report in support of the application for a Site Plan Control (SPC) at 1642 Merivale Road – Phase 1. The preceding report outlines the following:

- Based on boundary conditions provided by the City the existing municipal water infrastructure is capable of providing the contemplated development with water within the City's required pressure range;
- Fire flow requirements were estimated to be ***3,000 L/s*** in accordance with Technical Bulletin **ISDTB-2018-02*;***
- The proposed development is anticipated to have a peak wet weather flow of ***5.92 L/s***.
- Based on the City of Ottawa's City Standards the contemplated development will be required to attenuate post development flows to an equivalent release rate of ***67.7 L/s*** for all storms up to and including the 100-year storm event;
- It is proposed that stormwater objectives will be met through a combination of rooftop, surface and subsurface storage. It is estimated that ***162.1 m^3*** of onsite storage will be required to attenuate flow to the established release rate; and
- Stormwater quality controls are not required based on the response from the RVCA.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

19-1084 13/04/2020

4.1 General Content

☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures, EX-1
☒	Plan showing the site and location of all existing services.	Figure 1, EX-1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0, Section 5.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3, Appendix A
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1, EX-1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☐	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	GP-1
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☐	Reference to geotechnical studies and recommendations concerning servicing.	Section 2.1
☐	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	Drawings/Figures

4.2 Development Servicing Report: Water

☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2, Appendix B
☒	Confirmation of adequate domestic supply and pressure	Section 3.2, 3.2.1, 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 3.2, Appendix B
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 3.2, 3.2.1, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Section 3.2, SSP-1
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2, Appendix B
☒	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Section 3.2.1, Appendix B

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 4.2
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1, EX-1
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2, Appendix C
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2, SSP-1
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Section 5.3
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, 5.3, Appendix D
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 5.3
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	Section 5.4
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 8.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

MEMO

Date: December 6, 2018

To / Destinataire	Mary Dickinson, Planner
From / Expéditeur	Julie Candow, Project Manager, Infrastructure Approvals
Subject / Objet	**Pre-Application Consultation** **1642 Merivale Road, Ward 8** *Phase 1 – Relocate existing Harvey's and drive-through, add a 480m2 retail pad with drive-through and create one new access from Merivale Rd.*

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

2. Servicing and site works shall be in accordance with the following documents:

   - Ottawa Sewer Design Guidelines (October 2012)
   - Ottawa Design Guidelines – Water Distribution (2010)
   - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - City of Ottawa Park and Pathway Development Manual (2012)
   - City of Ottawa Accessibility Design Standards (2012)
   - Ottawa Standard Tender Documents (latest version)
   - Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. Stormwater Criteria:

   i. The allowable storm release rate for the subject site is to be based on the following:

      a. The 2-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

      b. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less.

      c. A calculated time of concentration or a minimum equivalent 'Tc' of 10 minutes, whichever is greater.

   ii. Flows to the storm sewer in excess of the 2-year storm release rate, up to and including the 100-year storm event, must be detained on site.

   iii. Consultation with the Rideau Valley Conservation Authority is required to confirm quality control requirements.

5. Deep Services (Storm, Sanitary & Water Supply):

   i. Existing 250mm dia. private, onsite sanitary sewer.

   ii. Existing 600mm and 675mm dia. private, onsite storm sewer adjacent Phase 1 redevelopment area.

   iii. Existing 200mm dia. watermain loop on site c/w nine (9) onsite hydrants.

   iv. Sanitary, storm and water connections to existing onsite infrastructure is preferred (to avoid additional road cuts on Merivale Road). CCTV inspection reports will be required for onsite sanitary sewers and storm sewers, as well as downstream pipe reach of public sanitary sewer and storm sewer mains on Merivale Road, to confirm adequacy of sewer outlets.

6. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

    i. Location of service

    ii. Type of development and the amount of fire flow required (as per FUS, 1999).

    iii. Average daily demand: ___ l/s.

    iv. Maximum daily demand: ___l/s.

    v. Peak hour demand: ___ l/s.

7. An MECP Environmental Compliance Approval (ECA) application is not anticipated to be required for this site. Please contact the Ministry of the Environment, Conservation and Parks, Ottawa District Office to confirm that an ECA will not be required.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x13850 or by email at Julie.Candow@ottaw.ca.

Charlotte Kelly

Subject: FW: 1642 Merivale Road - Quality Control Requirement

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: May 6, 2019 1:17 PM
To: Charlotte Kelly <CKelly@dsel.ca>; Alison Gosling <AGosling@dsel.ca>
Cc: Jamie Batchelor <jamie.batchelor@rvca.ca>
Subject: RE: 1642 Merivale Road - Quality Control Requirement

Hi Charlotte,

The subject lands outlet to Nepean Creek Stormwater Management Facility, (inline pond), as indicated. This facility provides quality control protection (TSS Removal); therefore, no on-site protections are required. It is however encouraged that best management practices be integrated where possible.

Please let me know if you have any questions.

Eric Lalande, MCIP, RPP
Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Monday, May 06, 2019 10:05 AM
To: Charlotte Kelly <CKelly@dsel.ca>
Cc: Alison Gosling <AGosling@dsel.ca>; Eric Lalande <eric.lalande@rvca.ca>
Subject: RE: 1642 Merivale Road - Quality Control Requirement

Good Morning Charlotte,

I am forwarding your inquiry to Eric Lalande as it would fall in his area.

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: Tuesday, April 30, 2019 3:21 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Alison Gosling <AGosling@dsel.ca>
Subject: 1642 Merivale Road - Quality Control Requirement

Good afternoon Jamie,

We wanted to touch base with you regarding a development at 1642 Merivale Road.

The existing site conditions consist of paved surface parking lots and a small restaurant as demonstrated in ***Figure 1,*** below.

The development involves the construction of a 12 storey commercial/residential building, a 6 storey residential building, and additional landscaped areas. In addition, the development proposes to convert above-ground parking areas to an underground parking garage, as shown in the proposed site plan attached. Based on the information available, the development will discharge stormwater to the 450 mm diameter storm sewer within Merivale and will travel approximately ***640 m*** to an outlet within the Nepean Creek and ***1290 m*** to the Nepean Creek Inline Stormwater pond., as shown by ***Figure 2*** below.

We do not anticipate that quality controls will not required as the development proposes to convert an existing parking area to a building and landscaped areas and outlets to a stormwater pond. Can you provide review and provide recommendations?

Please feel free to contact me to discuss.

Figure 1: Existing Site Limits

Figure 2: Distance to Outlet

Please let me know if you require additional information.

Thank-you,

Charlotte Kelly, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

APPENDIX B

Water Supply

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Existing Mall	2.5 $L/m^2/d$	21,398	53.50	37.1	80.2	55.7	144.4	100.3
Restaurant*	125 L/seat/d		0.00	0.0	0.0	0.0	0.0	0.0
	Total I/CI Demand		53.5	37.1	80.2	55.7	144.4	100.3
	Total Demand		**53.5**	**37.1**	**80.2**	**55.7**	**144.4**	**100.3**

* Estimated number of seats at 1seat per $9.3m^2$

First Capital Asset Managment
1642 Merivale Road - Phase 1
Proposed Site Conditions

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	**m^3/d**	**L/min**	**m^3/d**	**L/min**	**m^3/d**	**L/min**
Existing Mall	2.5	$L/m^2/d$	21,398	53.50	37.1	80.2	55.7	144.4	100.3
Restaurant *	125	L/9.3m2/d	213	2.86	2.0	4.3	3.0	7.7	5.4
		Total I/CI Demand		56.4	39.1	84.5	58.7	152.2	105.7
		Total Demand		**56.4**	**39.1**	**84.5**	**58.7**	**152.2**	**105.7**

* Estimated number of seats at 1 seat per 9.3 m2

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	213.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	3210.8	L/min	
	3000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Combustible	0%	
Fire Flow	**3000.0**	**L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered	0%	
Reduction	**0**	**L/min**

4. Increase for Separation Distance

N	>45m	0%	
S	>45m	0%	
E	>45m	0%	
W	20.1m-30m	10%	
	% Increase	**10%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**300.0**	**L/min**

Total Fire Flow

Fire Flow	3300.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section*
	3000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
-Calculations based on Fire Under ``

Boundary Conditions Unit Conversion

Viewmount Drive
Grnd Elev 86.15

	m H_2O	PSI	kPa
Avg. Day	**134.2**	68.4	471.4
Peak Hour	**126.5**	57.4	395.8
Max Day + FF	**117**	43.9	302.6

Merivale Road
Grnd Elev 91.54

	m H_2O	PSI	kPa
Avg. Day	**134.2**	60.7	418.5
Peak Hour	**126.5**	49.7	343.0
Max Day + FF	**126**	49.0	338.1

Minor Loss Coefficients

Fitting	Loss Coefficient
Globe valve, fully open	10
Angle valve, fully open	5
Swing check valve, fully open	2.5
Gate valve, fully open	0.2
Short-radius elbow	0.9
Medium-radius elbow	0.8
Long-radius elbow	0.6
45 degree elbow	0.4
Closed return bend	2.2
Standard tee - flow through run	0.6
Standard tee - flow through branch	1.8
Square Entrance	0.5
Exit	1

*Minor loss coefficients based on EPANET 2 USERS MANUAL, dated September 2000

Pipe Diameter vs. "C" Factor

Pipe Diameter (m)	C-Factor
150	100
200 to 250	110
300 to 600	120
Over 600	130

Node Pressures

Kpa	Pressure (kPa)	Pressure (m H20)
Max	552	56.3
Rec Max	480	49.0
Rec Min	350	35.7
Min	275	28.1

Location	Average Day (kPa)	Max Day + Fire Flow (kPa)	Peak Hour (kPa)
3	477.8	315.4	402.3
4	454.7	302.1	379.2
5	455.3	326.3	379.7
6	457.4	304.8	381.9
7	469.0	311.3	393.5

Charlotte Kelly

To: Candow, Julie
Subject: RE: 18-1084 1643 Merivale Road - Boundary Condition Request

From: Candow, Julie <julie.candow@ottawa.ca>
Sent: April 26, 2019 3:04 PM
To: Charlotte Kelly <CKelly@dsel.ca>
Cc: Robert Freel <RFreel@dsel.ca>
Subject: RE: 18-1084 1643 Merivale Road - Boundary Condition Request

Hi Charlotte,

Please see below boundary conditions for 1643 Merivale Road. The following boundary conditions are based on the assumption that there are no closed valves on the private watermain between Viewmount and Merivale. If there were a closed valve and all the fire flow was drawn from the Viewmount connection, then the resulting HGL would be significantly lower.

The following are boundary conditions, HGL, for hydraulic analysis at 1643 Merivale (zone 2W) assumed to be connected to the 203mm on Viewmount (connection 1) and 305mm on Merivale (connection 2). See attached PDF for location.

Minimum HGL = 126.5m, same at both connections

Maximum HGL = 134.2m, same at both connections

MaxDay + FireFlow (250L/s) = 117.0m, connection 1 on Viewmout

MaxDay + FireFlow (250L/s) = 126.0m, connection 2 on Merivale

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.

Julie Candow, P.Eng.
Project Manager - Infrastructure Approvals

City of Ottawa
Development Review - West Branch
Planning, Infrastructure and Economic Development Department
110 Laurier Ave., 4th Floor East;
Ottawa ON K1P 1J1
Tel: 613-580-2424 x 13850

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: April 23, 2019 2:24 PM
To: Candow, Julie <julie.candow@ottawa.ca>
Cc: Robert Freel <RFreel@dsel.ca>
Subject: 18-1084 1643 Merivale Road - Boundary Condition Request

Good Afternoon Julie,

Per the attached email, would like to request water boundary conditions for 1643 Merivale Road using the following contemplated development demands:

1. Location of Service / Street Number: Merivale Road / Viewmount Drive

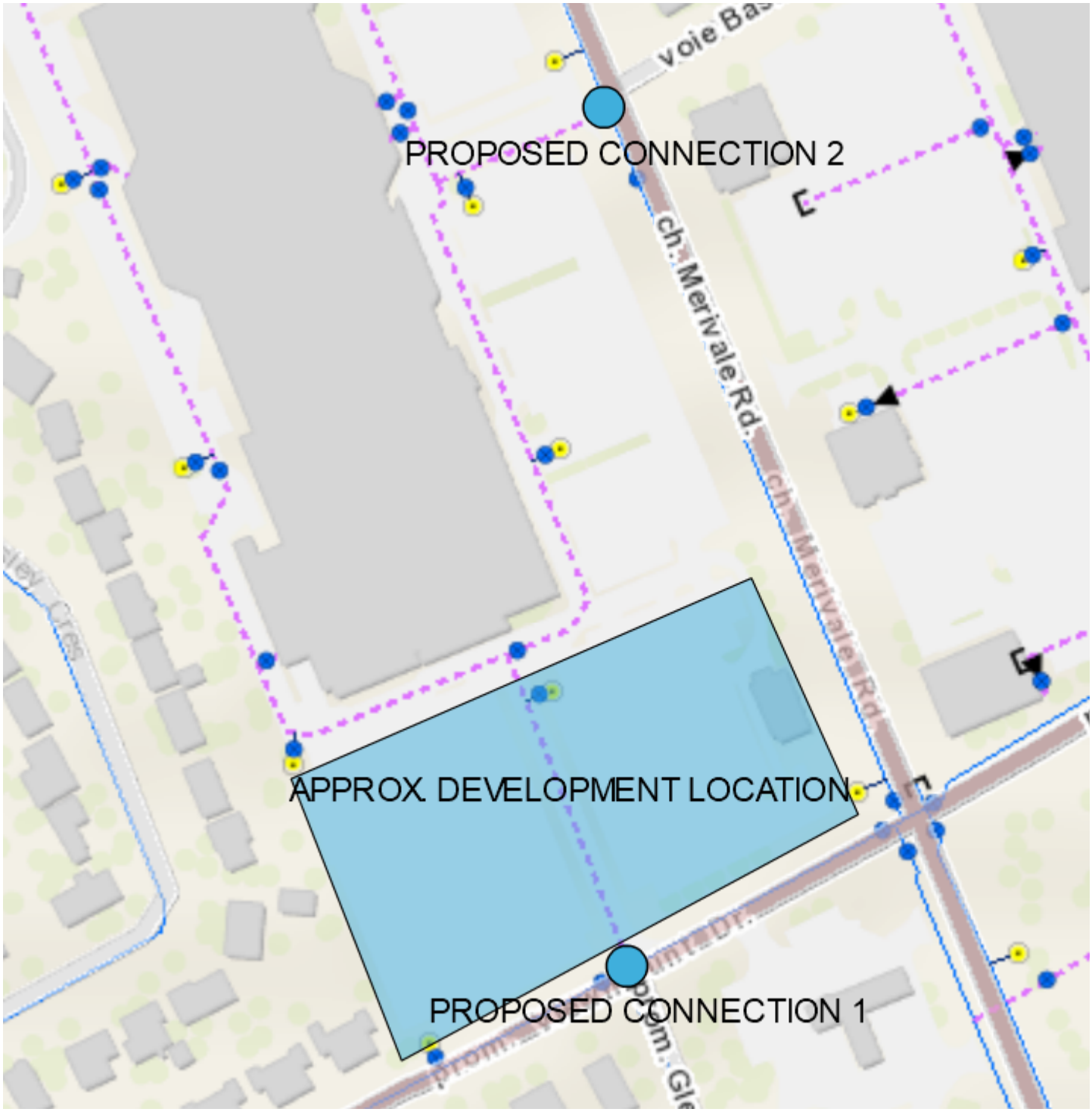
2. Type of development and the amount of fire flow required for the contemplated development:
   - The contemplated development is to consist of two buildings. A commercial/residential use 12-storey tower and a 6-storey residential tower, with 263 and 60 residential units respectively. The 12-storey tower will have approximately 1342m^2 of commercial/amenity space. The 6 storey tower is proposed to have 140m^2 of amenity space. The existing 18665m^2 mall is to remain.
   - It is anticipated that the development will connect to the existing 200mm diameter internal watermain that is serviced from the existing 300 mm diameter watermain within Merivale Road and the existing 200 mm diameter watermain within Viewmount Drive, as shown by the attached map.
   - Based on Technical Bulletin ISTB-2018-02, a maximum fire flow of 15,000 L/min is anticipated for the contemplated development.

3.

Proposed Additional Flow	L/min	L/s
Avg. Daily	115.7	1.93
Max Day	286.8	4.78
Peak Hour	629.4	10.49

Proposed Total Flow (Including Existing Merivale Mall)	L/min	L/s
Avg. Daily	148.1	2.47
Max Day	335.4	5.59
Peak Hour	716.9	11.95

It you have any questions please feel free to contact me.



Thank-you,

Charlotte Kelly, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

'

'

AVERAGE DAY DEMAND
EPANET INPUT FILE
1642 MERIVALE ROAD

```
[TITLE]


[JUNCTIONS]
;ID                     Elev            Demand          Pattern
 3                      85.49           0                                       ;
 4                      87.85           0                                       ;
 5                      87.79           37.1                                    ;
 6                      87.57           2                                       ;
 7                      86.39           0                                       ;

[RESERVOIRS]
;ID                     Head            Pattern
 1                      134.2                                   ;
 2                      134.2                                   ;

[TANKS]
;ID                     Elevation       InitLevel       MinLevel        MaxLevel
        Diameter        MinVol          VolCurve

[PIPES]
;ID                     Node1                   Node2                   Length
        Diameter        Roughness       MinorLoss       Status
 P1                     1                       3                       40
        200             110             2.2             Open    ;
 P5                     5                       2                       57
        200             110             4.6             Open    ;
 P6                     5                       6                       137
        200             110             1               Open    ;
 P7                     6                       4                       471
        200             110             8.2             Open    ;
 P4                     4                       5                       180
        200             110             2.4             Open    ;
 P2                     3                       7                       34
        200             110             1.2             Open    ;
 P3                     7                       4                       34
        200             110             1.8             Open    ;

[PUMPS]
;ID                     Node1                   Node2                   Parameters

[VALVES]
;ID                     Node1                   Node2                   Diameter
        Type    Setting         MinorLoss

[TAGS]

[DEMANDS]
;Junction               Demand          Pattern                 Category
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;ID                     Status/Setting

[PATTERNS]
;ID                     Multipliers

[CURVES]
;ID                     X-Value         Y-Value

[CONTROLS]

[RULES]

[ENERGY]
 Global Efficiency      75
 Global Price           0
 Demand Charge          0

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;Junction               Coefficient

[QUALITY]
;Node                   InitQual

[SOURCES]
;Node                   Type            Quality         Pattern

[REACTIONS]
;Type           Pipe/Tank               Coefficient


[REACTIONS]
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 Order Tank             1
 Order Wall             1
 Global Bulk            0
 Global Wall            0
 Limiting Potential     0
 Roughness Correlation  0

[MIXING]
;Tank                   Model

[TIMES]
 Duration               0
 Hydraulic Timestep     1:00
 Quality Timestep       0:05
 Pattern Timestep       1:00
 Pattern Start          0:00
 Report Timestep        1:00
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 Report Start           0:00
 Start ClockTime        12 am
 Statistic              None

[REPORT]
 Status                 No
 Summary                No
 Page                   0

[OPTIONS]
 Units                  LPM
 Headloss               H-W
 Specific Gravity       1
 Viscosity              1
 Trials                 40
 Accuracy               0.001
 CHECKFREQ              2
 MAXCHECK               10
 DAMPLIMIT              0
 Unbalanced             Continue 10
 Pattern                1
 Demand Multiplier      1.0
 Emitter Exponent       0.5
 Quality                None mg/L
 Diffusivity            1
 Tolerance              0.01

[COORDINATES]
;Node                   X-Coord                 Y-Coord
 3                      -550.00                 6566.67
 4                      2138.89                 6611.11
 5                      6550.00                 4744.44
 6                      13172.22                5577.78
 7                      605.56                  6611.11
 1                      -1472.22                6577.78
 2                      6594.44                 2544.44

[VERTICES]
;Link                   X-Coord                 Y-Coord
 P7                     13205.56                8966.67
 P7                     12727.78                9300.00
 P7                     2250.00                 9377.78
 P4                     2138.89                 5744.44
 P4                     2416.67                 5233.33
 P4                     6172.22                 5088.89

[LABELS]
;X-Coord           Y-Coord          Label & Anchor Node

[BACKDROP]
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 DIMENSIONS              0.00                    0.00                    10000.00
        10000.00
 UNITS                   None
 FILE
 OFFSET                  0.00                    0.00

[END]
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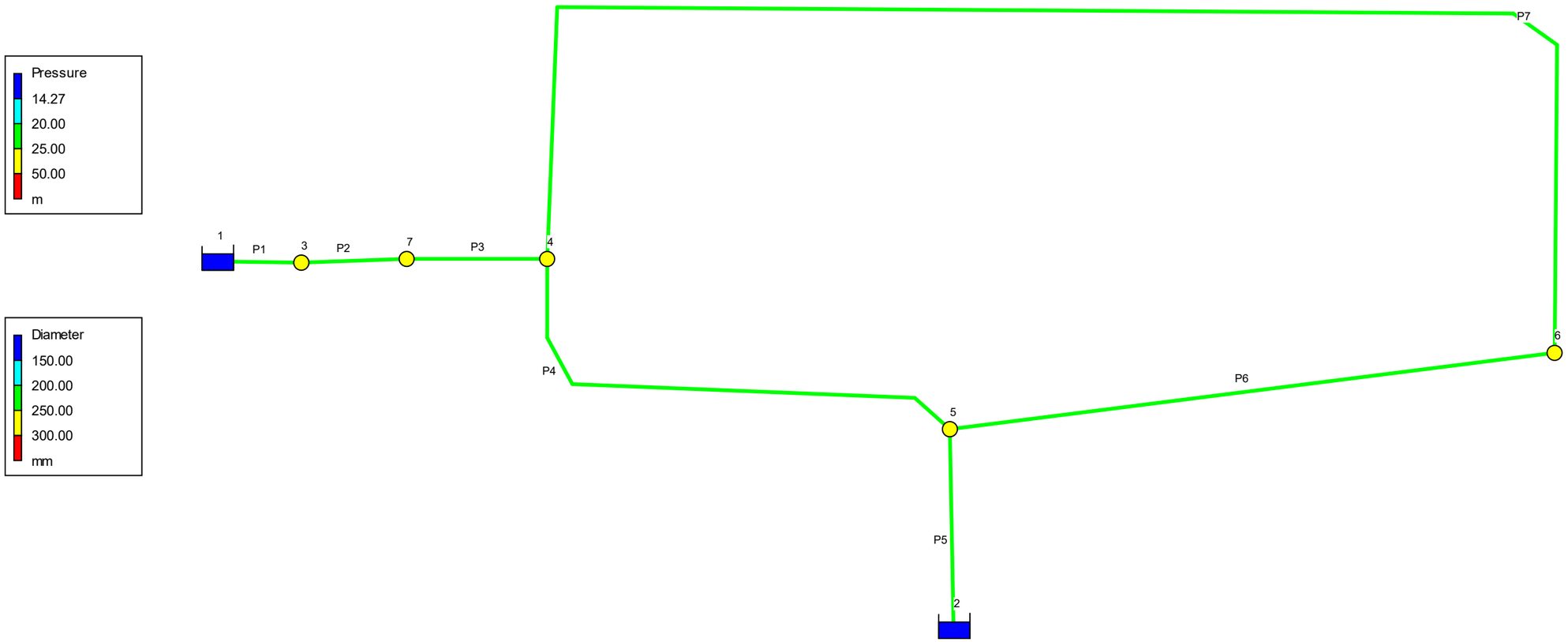
1642 MERIVALE ROAD - AVERAGE DAY DEMAND

Day 1, 12:00 AM



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

Input File: 2020-04-13_merivale-averageday.net
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Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
P1	1	3	40	200
P5	5	2	57	200
P6	5	6	137	200
P7	6	4	471	200
P4	4	5	180	200
P2	3	7	34	200
P3	7	4	34	200

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality	
3	0.00	134.20	48.71	0.00	
4	0.00	134.20	46.35	0.00	
5	37.10	134.20	46.41	0.00	
6	2.00	134.20	46.63	0.00	
7	0.00	134.20	47.81	0.00	
1	-14.22	134.20	0.00	0.00	Reservoir
2	-24.88	134.20	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	VelocityUnit m/s	Headloss m/km	Status
P1	14.22	0.01	0.00	Open
P5	-24.88	0.01	0.00	Open
P6	-3.10	0.00	0.00	Open
P7	-5.10	0.00	0.00	Open
P4	9.12	0.00	0.00	Open
P2	14.22	0.01	0.00	Open
P3	14.22	0.01	0.00	Open

MAX DAY AND FF DEMAND
EPANET INPUT FILE
1642 MERIVALE ROAD

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[TITLE]


[JUNCTIONS]
;ID                     Elev            Demand          Pattern
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 4                      87.85           0                                       ;
 5                      87.79           55.7                                    ;
 6                      87.57           3003                                    ;
 7                      86.39           0                                       ;

[RESERVOIRS]
;ID                     Head            Pattern
 1                      117                                     ;
 2                      126                                     ;

[TANKS]
;ID                     Elevation       InitLevel       MinLevel        MaxLevel
        Diameter        MinVol          VolCurve

[PIPES]
;ID                     Node1                   Node2                   Length
        Diameter        Roughness       MinorLoss       Status
 P1                     1                       3                       40
        200             110             2.2             Open    ;
 P5                     5                       2                       57
        200             110             4.6             Open    ;
 P6                     5                       6                       137
        200             110             1               Open    ;
 P7                     6                       4                       471
        200             110             8.2             Open    ;
 P4                     4                       5                       180
        200             110             2.4             Open    ;
 P2                     3                       7                       34
        200             110             1.2             Open    ;
 P3                     7                       4                       34
        200             110             1.8             Open    ;

[PUMPS]
;ID                     Node1                   Node2                   Parameters

[VALVES]
;ID                     Node1                   Node2                   Diameter
        Type    Setting         MinorLoss

[TAGS]

[DEMANDS]
;Junction               Demand          Pattern                 Category
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;ID                     Status/Setting

[PATTERNS]
;ID                     Multipliers

[CURVES]
;ID                     X-Value         Y-Value

[CONTROLS]

[RULES]

[ENERGY]
 Global Efficiency      75
 Global Price           0
 Demand Charge          0

[EMITTERS]
;Junction               Coefficient

[QUALITY]
;Node                   InitQual

[SOURCES]
;Node                   Type            Quality         Pattern

[REACTIONS]
;Type           Pipe/Tank               Coefficient


[REACTIONS]
 Order Bulk             1
 Order Tank             1
 Order Wall             1
 Global Bulk            0
 Global Wall            0
 Limiting Potential     0
 Roughness Correlation  0

[MIXING]
;Tank                   Model

[TIMES]
 Duration               0
 Hydraulic Timestep     1:00
 Quality Timestep       0:05
 Pattern Timestep       1:00
 Pattern Start          0:00
 Report Timestep        1:00
```
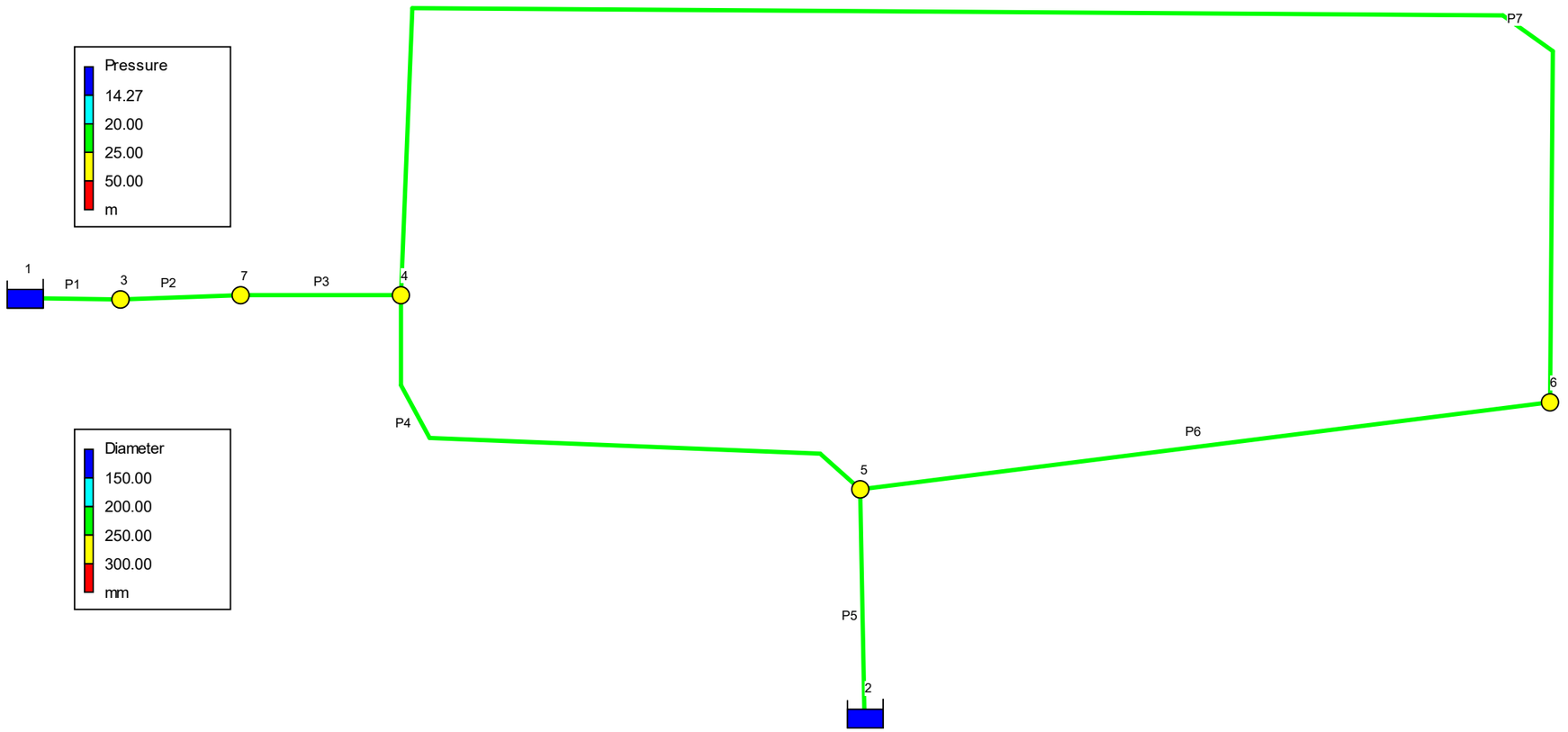

```
 Report Start           0:00
 Start ClockTime        12 am
 Statistic              None

[REPORT]
 Status                 No
 Summary                No
 Page                   0

[OPTIONS]
 Units                  LPM
 Headloss               H-W
 Specific Gravity       1
 Viscosity              1
 Trials                 40
 Accuracy               0.001
 CHECKFREQ              2
 MAXCHECK               10
 DAMPLIMIT              0
 Unbalanced             Continue 10
 Pattern                1
 Demand Multiplier      1.0
 Emitter Exponent       0.5
 Quality                None mg/L
 Diffusivity            1
 Tolerance              0.01

[COORDINATES]
;Node                   X-Coord                 Y-Coord
 3                      -550.00                 6566.67
 4                      2138.89                 6611.11
 5                      6550.00                 4744.44
 6                      13172.22                5577.78
 7                      605.56                  6611.11
 1                      -1472.22                6577.78
 2                      6594.44                 2544.44

[VERTICES]
;Link                   X-Coord                 Y-Coord
 P7                     13205.56                8966.67
 P7                     12727.78                9300.00
 P7                     2250.00                 9377.78
 P4                     2138.89                 5744.44
 P4                     2416.67                 5233.33
 P4                     6172.22                 5088.89

[LABELS]
;X-Coord           Y-Coord          Label & Anchor Node

[BACKDROP]
```

```
 DIMENSIONS              0.00                    0.00                    10000.00
        10000.00
 UNITS                   None
 FILE
 OFFSET                  0.00                    0.00

[END]
```

1642 MERIVALE ROAD - FIRE FLOW AND MAX DAY DEMAND

Day 1, 12:00 AM



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

Input File: 2020-04-13_merivale-fire-flow.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
P1	1	3	40	200
P5	5	2	57	200
P6	5	6	137	200
P7	6	4	471	200
P4	4	5	180	200
P2	3	7	34	200
P3	7	4	34	200

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality	
3	0.00	117.64	32.15	0.00	
4	0.00	118.65	30.80	0.00	
5	55.70	121.05	33.26	0.00	
6	3003.00	118.64	31.07	0.00	
7	0.00	118.12	31.73	0.00	
1	2382.05	117.00	0.00	0.00	Reservoir
2	-5440.75	126.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
P1	-2382.05	1.26	15.88	Open
P5	-5440.75	2.89	86.90	Open
P6	2922.09	1.55	17.54	Open
P7	-80.91	0.04	0.02	Open
P4	-2462.96	1.31	13.29	Open
P2	-2382.05	1.26	14.27	Open
P3	-2382.05	1.26	15.71	Open

PEAK HOUR DEMAND
EPANET INPUT FILE
1642 MERIVALE ROAD

```
[TITLE]


[JUNCTIONS]
;ID                     Elev            Demand          Pattern
 3                      85.49           0                                       ;
 4                      87.85           0                                       ;
 5                      87.79           100.3                                   ;
 6                      87.57           5.4                                     ;
 7                      86.39           0                                       ;

[RESERVOIRS]
;ID                     Head            Pattern
 1                      126.5                                   ;
 2                      126.5                                   ;

[TANKS]
;ID                     Elevation       InitLevel       MinLevel        MaxLevel
        Diameter        MinVol          VolCurve

[PIPES]
;ID                     Node1                   Node2                   Length
        Diameter        Roughness       MinorLoss       Status
 P1                     1                       3                       40
        200             110             2.2             Open    ;
 P5                     5                       2                       57
        200             110             4.6             Open    ;
 P6                     5                       6                       137
        200             110             1               Open    ;
 P7                     6                       4                       471
        200             110             8.2             Open    ;
 P4                     4                       5                       180
        200             110             2.4             Open    ;
 P2                     3                       7                       34
        200             110             1.2             Open    ;
 P3                     7                       4                       34
        200             110             1.8             Open    ;

[PUMPS]
;ID                     Node1                   Node2                   Parameters

[VALVES]
;ID                     Node1                   Node2                   Diameter
        Type    Setting         MinorLoss

[TAGS]

[DEMANDS]
;Junction               Demand          Pattern                 Category
```

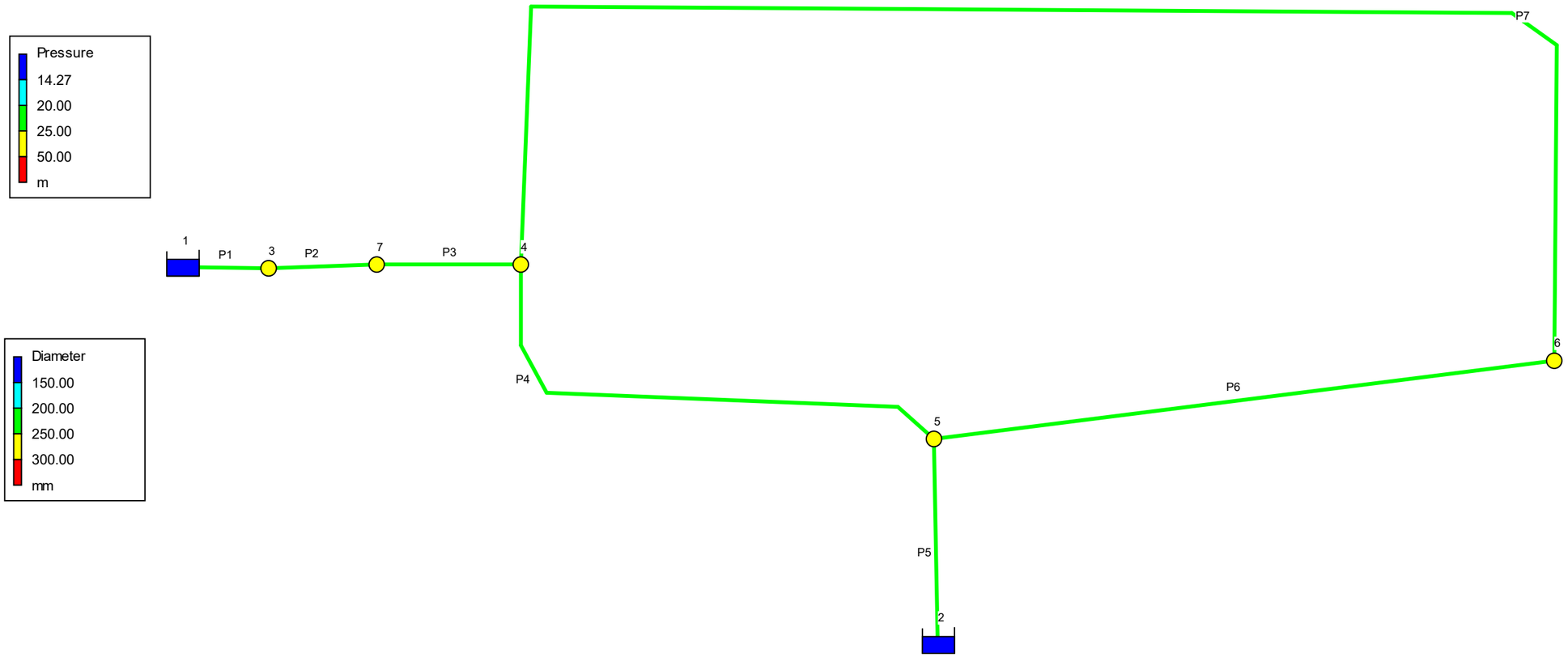
```
[STATUS]
;ID                     Status/Setting

[PATTERNS]
;ID                     Multipliers

[CURVES]
;ID                     X-Value         Y-Value

[CONTROLS]

[RULES]

[ENERGY]
 Global Efficiency      75
 Global Price           0
 Demand Charge          0

[EMITTERS]
;Junction               Coefficient

[QUALITY]
;Node                   InitQual

[SOURCES]
;Node                   Type            Quality         Pattern

[REACTIONS]
;Type           Pipe/Tank               Coefficient


[REACTIONS]
 Order Bulk             1
 Order Tank             1
 Order Wall             1
 Global Bulk            0
 Global Wall            0
 Limiting Potential     0
 Roughness Correlation  0

[MIXING]
;Tank                   Model

[TIMES]
 Duration               0
 Hydraulic Timestep     1:00
 Quality Timestep       0:05
 Pattern Timestep       1:00
 Pattern Start          0:00
 Report Timestep        1:00
```

```
 Report Start           0:00
 Start ClockTime        12 am
 Statistic              None

[REPORT]
 Status                 No
 Summary                No
 Page                   0

[OPTIONS]
 Units                  LPM
 Headloss               H-W
 Specific Gravity       1
 Viscosity              1
 Trials                 40
 Accuracy               0.001
 CHECKFREQ              2
 MAXCHECK               10
 DAMPLIMIT              0
 Unbalanced             Continue 10
 Pattern                1
 Demand Multiplier      1.0
 Emitter Exponent       0.5
 Quality                None mg/L
 Diffusivity            1
 Tolerance              0.01

[COORDINATES]
;Node                   X-Coord                 Y-Coord
 3                      -550.00                 6566.67
 4                      2138.89                 6611.11
 5                      6550.00                 4744.44
 6                      13172.22                5577.78
 7                      605.56                  6611.11
 1                      -1472.22                6577.78
 2                      6594.44                 2544.44

[VERTICES]
;Link                   X-Coord                 Y-Coord
 P7                     13205.56                8966.67
 P7                     12727.78                9300.00
 P7                     2250.00                 9377.78
 P4                     2138.89                 5744.44
 P4                     2416.67                 5233.33
 P4                     6172.22                 5088.89

[LABELS]
;X-Coord           Y-Coord          Label & Anchor Node

[BACKDROP]
```

```
 DIMENSIONS              0.00                    0.00                    10000.00
        10000.00
 UNITS                   None
 FILE
 OFFSET                  0.00                    0.00

[END]
```

1642 MERIVALE ROAD - PEAK HOUR DEMAND

Day 1, 12:00 AM



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

Input File: 2020-04-13_merivale-peak-hour.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
P1	1	3	40	200
P5	5	2	57	200
P6	5	6	137	200
P7	6	4	471	200
P4	4	5	180	200
P2	3	7	34	200
P3	7	4	34	200

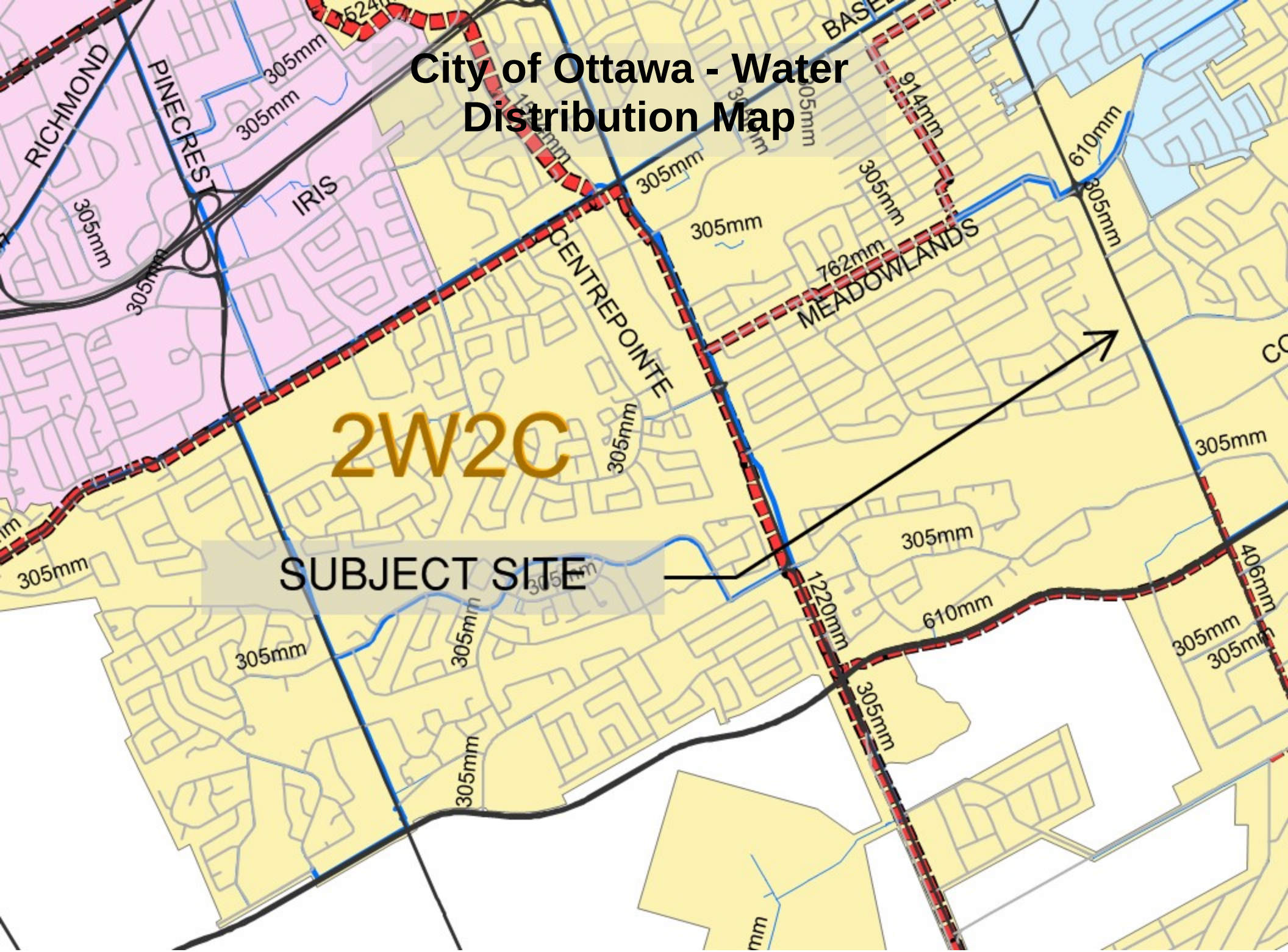
Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality	
3	0.00	126.50	41.01	0.00	
4	0.00	126.50	38.65	0.00	
5	100.30	126.50	38.71	0.00	
6	5.40	126.50	38.93	0.00	
7	0.00	126.50	40.11	0.00	
1	-38.69	126.50	0.00	0.00	Reservoir
2	-67.01	126.50	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
P1	38.69	0.02	0.01	Open
P5	-67.01	0.04	0.02	Open
P6	-8.47	0.00	0.00	Open
P7	-13.87	0.01	0.00	Open
P4	24.82	0.01	0.00	Open
P2	38.69	0.02	0.01	Open
P3	38.69	0.02	0.01	Open

City of Ottawa - Water Distribution Map



APPENDIX C

Wastewater Collection

1642 Merivale Road
Existing Site Conditions - Phase 1

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012
Technical Bulletin ISTB-2018-03 City of Ottawa, March 21, 2018.(ISTB-2018-03)

Site Area 6.536 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.33**	**L/s**
Infiltration / Inflow (Wet)	**1.83**	**L/s**
Infiltration / Inflow (Total)	**2.16**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**	**No. of Units**	**Avg Wastewater (L/s)**
Existing Mall	5 $L/m^2/d$	21,398	2.48
Restaurant	125 L/seat/d	217	0.03
		Average I/C/I Flow	**2.51**
		Peak Institutional / Commercial Flow	3.77
		Peak Industrial Flow**	0.00
		Peak I/C/I Flow	**3.77**

** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**2.84 L/s**
Total Estimated Peak Dry Weather Flow Rate	**4.09 L/s**
Total Estimated Peak Wet Weather Flow Rate	**5.92 L/s**

1642 Merivale Road
Proposed Site Conditions - Phase 1

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012
Technical Bulletin ISTB-2018-03 City of Ottawa, March 21, 2018.(ISTB-2018-03)

Site Area 6.536 **ha**

Extraneous Flow Allowances

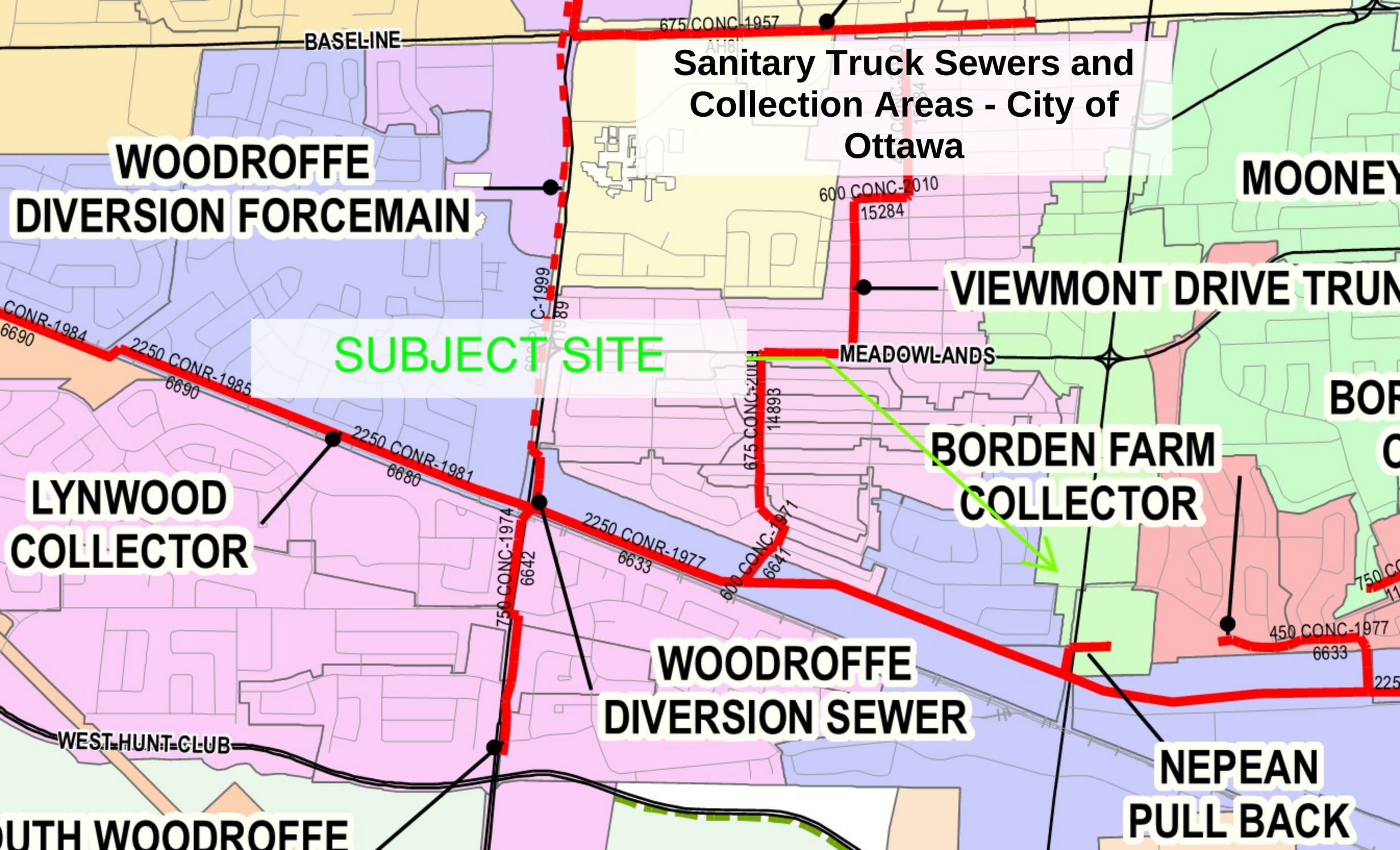
Infiltration / Inflow (Dry)	**0.33 L/s**
Infiltration / Inflow (Wet)	**1.83 L/s**
Infiltration / Inflow (Total)	**2.16 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**	**No. of Units**	**Avg Wastewater (L/s)**
Restaurant	125 L/9.3m2/d	213	0.03
Existing Mall	5 L/m^2/d	21,398	2.48
	Average I/C/I Flow		**2.51**
	Peak Institutional / Commercial Flow		3.76
	Peak Industrial Flow**		0.00
	Peak I/C/I Flow		**3.76**

** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**2.84 L/s**
Total Estimated Peak Dry Weather Flow Rate	**4.09 L/s**
Total Estimated Peak Wet Weather Flow Rate	**5.92 L/s**


Sanitary Truck Sewers and Collection Areas - City of Ottawa
BASELINE
675 CONC-1957
WOODROFFE DIVERSION FORCEMAIN
600 CONC-2010
15284
MOONEY
VIEWMONT DRIVE TRUN
SUBJECT SITE
MEADOWLANDS
CONR-1984
6690
2250 CONR-1985
6690
2250 CONR-1981
6680
675 CONC-1999
14893
675 CONC-2010
BORDEN FARM COLLECTOR
LYNWOOD COLLECTOR
750 CONC-1974
6642
2250 CONR-1977
6633
600 CONC-1971
6641
450 CONC-1977
6633
WOODROFFE DIVERSION SEWER
WEST HUNT CLUB
NEPEAN PULL BACK

APPENDIX D

Stormwater Management

1642 Merivale Road
Existing Site Conditions - Phase 1

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012

Existing Drainage Charateristics From Internal Site

Area	0.586	ha
C	0.85	Rational Method runoff coefficient
L	53.18	m
Up Elev	91.24	m
Dn Elev	89.92	m
Slope	2.5	%
Tc	10.0	min

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}$$

tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

Estimated Peak Flow

	2-year	5-year	100-year	
i	76.8	104.2	178.6	mm/hr
Q	106.3	144.3	290.9	L/s

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012

Estimated Peak Flow (External (EX3))

Area	0.032	ha
C	0.45	Rational Method runoff coefficient
L	12.0	m
Up Elev	92.92	m
Dn Elev	92.12	m
Slope	6.7	%
Tc	10.0	min

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}$$

tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

	2-year	5-year	100-year	
i	76.8	104.2	178.6	mm/hr
Q	3.0	4.1	8.8	L/s

Target Flow Rate

Area (EX1, EX2, U1, A1, BLDGA)	0.555	ha
C	0.50	Rational Method runoff coefficient
Tc	10.0	min

	2-year	
i	76.5	mm/hr
Q	58.9	L/s
Q total	67.7	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Area ID	**UN1**	
Total Area	0.058	ha
C	0.65	Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}^* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	104.2	10.9	10.9	0.0	0.0	178.6	23.4	23.4	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Area ID A1, EX1, EX2

Total Subsurface Storage (m^3) 90.0

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage	Ponding	h_o	delta d	V*	V_{acc}**	$Q_{release}$†	$V_{drawdown}$
	(m)	(m^2)	(m)	(m)	(m^3)	(m^3)	(L/s)	(hr)
Orifice INV	88.36		0.00			0.0	0	0.00
U/G STORAGE INV	88.40		0.04	0.04	30.0	30.0	5.0	1.68
U/G STORAGE S/L	88.86		0.50	0.46	30.0	60.0	17.4	0.96
U/G STORAGE OBV	89.31		0.95	0.46	30.0	90.0	24.2	1.03
T/L	89.92	0.4	1.56	0.61	0.1	90.1	30.9	0.81
0.30m Ponding	90.22	675.1	1.86	0.30	69.2	159.3	33.8	1.31

* V=Incremental storage volume

**V_{acc}=Total surface and sub-surface

† $Q_{release}$ = Release rate calculated from Tempest LMF Curve

Orifice Location **CB101** **Dia** 108

Total Area 0.474 ha

C 0.79 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	5-year					100-year				
t_c	i	Q_{actual}‡	$Q_{release}$	Q_{stored}	V_{stored}	i	Q_{actual}‡	$Q_{release}$	Q_{stored}	V_{stored}
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
5	141.2	146.6	18.9	127.6	38.3	242.7	315.0	33.6	281.5	84.4
10	104.2	108.2	18.9	89.2	53.5	178.6	231.8	33.6	198.2	118.9
15	83.6	86.8	18.9	67.8	61.0	142.9	185.5	33.6	151.9	136.7
20	70.3	72.9	18.9	54.0	64.8	120.0	155.7	33.6	122.1	146.6
25	60.9	63.2	18.9	44.3	66.4	103.8	134.8	33.6	101.2	151.8
30	53.9	56.0	18.9	37.0	66.7	91.9	119.2	33.6	85.7	154.2
35	48.5	50.4	18.9	31.4	66.0	82.6	107.2	33.6	73.6	154.6
40	44.2	45.9	18.9	26.9	64.6	75.1	97.5	33.6	64.0	153.5
45	40.6	42.2	18.9	23.2	62.7	69.1	89.6	33.6	56.1	151.4
50	37.7	39.1	18.9	20.1	60.4	64.0	83.0	33.6	49.4	148.3
55	35.1	36.5	18.9	17.5	57.8	59.6	77.4	33.6	43.8	144.6
60	32.9	34.2	18.9	15.3	54.9	55.9	72.5	33.6	39.0	140.3
65	31.0	32.2	18.9	13.3	51.8	52.6	68.3	33.6	34.8	135.6
70	29.4	30.5	18.9	11.5	48.5	49.8	64.6	33.6	31.1	130.5
75	27.9	29.0	18.9	10.0	45.0	47.3	61.3	33.6	27.8	125.0
80	26.6	27.6	18.9	8.6	41.4	45.0	58.4	33.6	24.8	119.2
85	25.4	26.3	18.9	7.4	37.7	43.0	55.8	33.6	22.2	113.2
90	24.3	25.2	18.9	6.3	33.9	41.1	53.4	33.6	19.8	106.9
95	23.3	24.2	18.9	5.3	29.9	39.4	51.2	33.6	17.6	100.4
100	22.4	23.3	18.9	4.3	25.9	37.9	49.2	33.6	15.6	93.8
105	21.6	22.4	18.9	3.5	21.8	36.5	47.4	33.6	13.8	87.0

5-year $Q_{attenuated}$ **18.95 L/s**

5-year Max. Storage Required **66.7 m^3**

Est. 5-year Storage Elevation **88.96 m**

100-year $Q_{attenuated}$ **33.57 L/s**

100-year Max. Storage Required **154.6 m^3**

Est. 100-year Storage Elevation **90.20 m**

Building ID	**BLDG A**		
Roof Area	0.021	ha	
Avail Storage Area	0.020		
C	0.90	Rational Method runoff coefficient	*Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*
t_c	10	min, tc at outlet without restriction	

Estimated Number of Roof Drains		
Building Length	20	
Building Width	12	
Number of Drains	1	
m^2 / Drain	202.4	max 232.25m^2/notch as recommended by Zurn for Ottawa

Roof Top Rating Curve per Zurn Model Z-105-5

d	A	V_{acc}	V_{avail}	Q_{notch}	Q_{roof}	$V_{drawdown}$
(m)	(m^2)	(m^3)	(m^3)	(L/s)	(L/s)	(hr)
0.000	0	0.0	0.0	0.00	0.00	0.00
0.025	12.6	0.1	0.1	0.32	0.32	0.09
0.050	50.6	0.7	0.8	0.63	0.63	0.42
0.075	113.8	2.0	2.8	0.95	0.95	1.01
0.100	202.4	3.9	6.7	1.26	1.26	1.86
0.125	202.4	5.1	11.8	1.58	1.58	2.75
0.150	202.4	5.1	16.9	1.89	1.89	3.50

* Assumes one notch opening per drain, assumes maximum slope of 10cm. Each notch estimates a maximum flow rate of 10 GPM (US) (37.8 L/min) per Manufacturer Specifcations (Z105).

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
5	141.2	7.5	1.0	6.5	2.0	242.7	14.4	1.3	13.1	3.9
10	104.2	5.5	1.0	4.6	2.7	178.6	10.6	1.3	9.3	5.6
15	83.6	4.4	1.0	3.5	3.1	142.9	8.5	1.3	7.1	6.4
20	70.3	3.7	1.0	2.8	3.3	120.0	7.1	1.3	5.8	6.9
25	60.9	3.2	1.0	2.3	3.4	103.8	6.1	1.3	4.8	7.3
30	53.9	2.9	1.0	1.9	3.4	91.9	5.4	1.3	4.1	7.4
35	48.5	2.6	1.0	1.6	3.3	82.6	4.9	1.3	3.6	7.5
40	44.2	2.4	1.0	1.4	3.3	75.1	4.4	1.3	3.1	7.5
45	40.6	2.2	1.0	1.2	3.2	69.1	4.1	1.3	2.8	7.5
50	37.7	2.0	1.0	1.0	3.1	64.0	3.8	1.3	2.5	7.4
55	35.1	1.9	1.0	0.9	2.9	59.6	3.5	1.3	2.2	7.3
60	32.9	1.8	1.0	0.8	2.8	55.9	3.3	1.3	2.0	7.2
65	31.0	1.7	1.0	0.7	2.6	52.6	3.1	1.3	1.8	7.0
70	29.4	1.6	1.0	0.6	2.4	49.8	2.9	1.3	1.6	6.9
75	27.9	1.5	1.0	0.5	2.2	47.3	2.8	1.3	1.5	6.7
80	26.6	1.4	1.0	0.4	2.0	45.0	2.7	1.3	1.4	6.5
85	25.4	1.4	1.0	0.4	1.8	43.0	2.5	1.3	1.2	6.3
90	24.3	1.3	1.0	0.3	1.6	41.1	2.4	1.3	1.1	6.1
95	23.3	1.2	1.0	0.3	1.4	39.4	2.3	1.3	1.0	5.8
100	22.4	1.2	1.0	0.2	1.2	37.9	2.2	1.3	0.9	5.6
105	21.6	1.1	1.0	0.2	1.0	36.5	2.2	1.3	0.9	5.4

5-year Q_{roof}	**0.99**	**L/s**	**100-year Q_{roof}**	**1.31**	**L/s**
5-year Max. Storage Required	**3.4**	**m^3**	**100-year Max. Storage Required**	**7.5**	**m^3**
5-year Storage Depth	**0.078**	**m**	**100-year Storage Depth**	**0.104**	**m**
5-year Estimated Drawdown Time	**1.13**	**hr**	**)0-year Estimated Drawdown Time**	**2.00**	**hr**

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Required Storage (m^3)	100-Year Release Rate (L/s)	100-Year Required Storage (m^3)	100-Year Available Storage (m^3)
Unattenuated Areas (UN1)	10.9	0.0	23.4	0.0	0.0
External Areas (EX3)	4.1	0.0	8.8	0.0	0.0
Attenuated Areas (A1. EX1. EX2)	18.9	66.7	33.6	154.6	159.3
Attenuated Areas (BLDA)	1.0	3.4	1.3	7.5	16.9
Total	**35.0**	**70.1**	**67.1**	**162.1**	**176.1**

Parameters

Units: Metric

Storage Volume: 85 Cu m

Chamber Selection: S-29

Header Row Position: Left

Fill Over Embedment Stone: 300 mm

Controlled By: width 11 m

Embedment Stone mm:

Over: 150 Under: 150 Porosity: 0.4

Min 150mm over and under

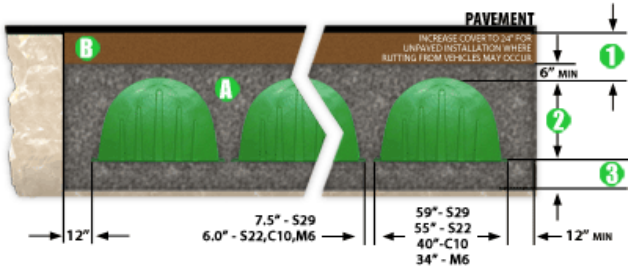
Double Stacked

Double Stacked?: No

Stone Between: 12

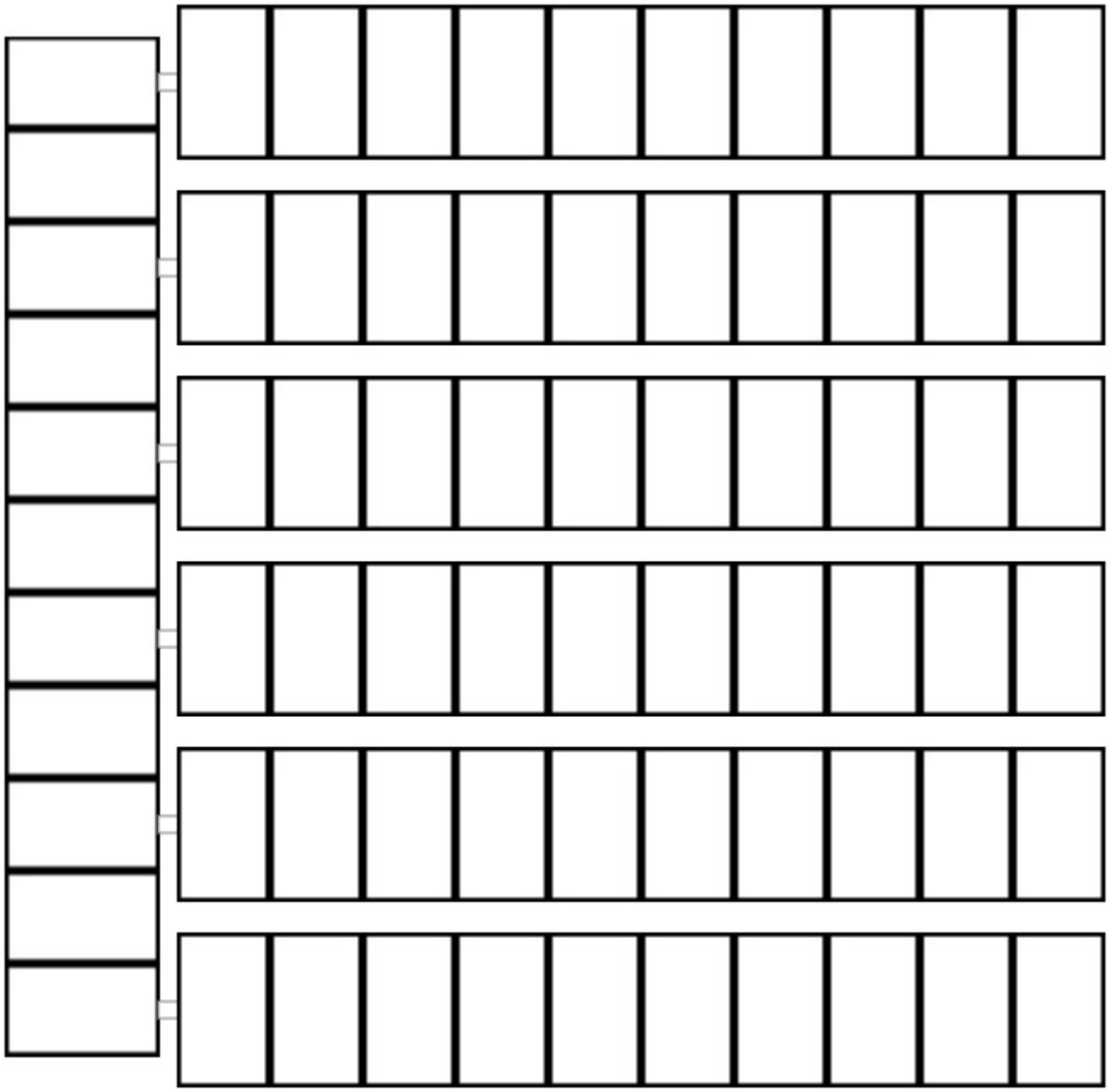
Note: After making an input change you must hit calculate to update the Field Diagram and Project Results.
* The image generation will not save if using MicroSoft Edge

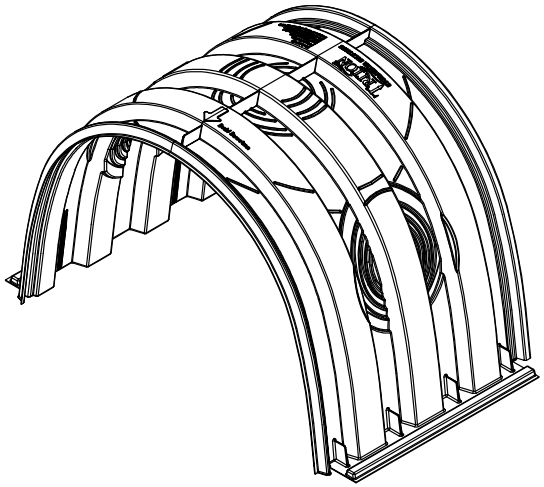
Project Results



1	Total Cover Over Chambers: 451 mm
2	Height Of Chamber: 915 mm
3	Embedment Stone Under Chambers: 151 mm
A	Volume of Embedment Stone Required: 88 Cu. m
B	Volume of Fill Material Required: 36 Cu. m
	Total Storage Provided: 91 Cu. m
	Type Of Chambers: S-29
	# Of Chambers Required: 71
	# Of End Caps Required: 14
	Required Bed Size: 118 Sq. m
	Volume of Excavation: 144 Cu. m
	* Area of Filter Fabric: 171 Sq. m
	# of Chambers Long: 10
	# of rows: 6
	Actual Trench Length: 11.17 m
	Actual Trench Width: 10.55 m

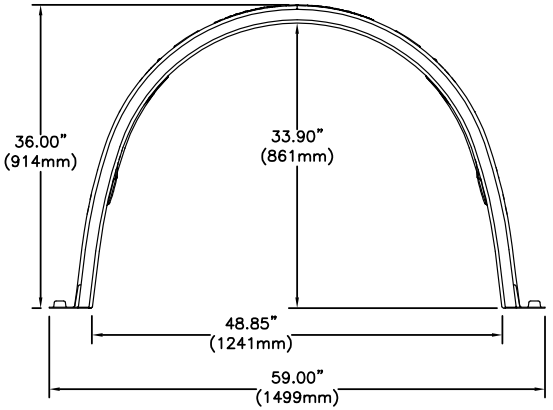
* Filter Fabric quantity for Fabric on Top and Sides of System Only, does not include overlap

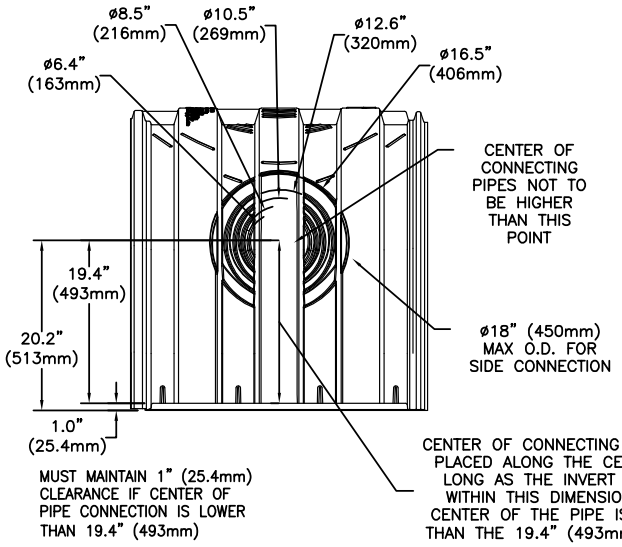


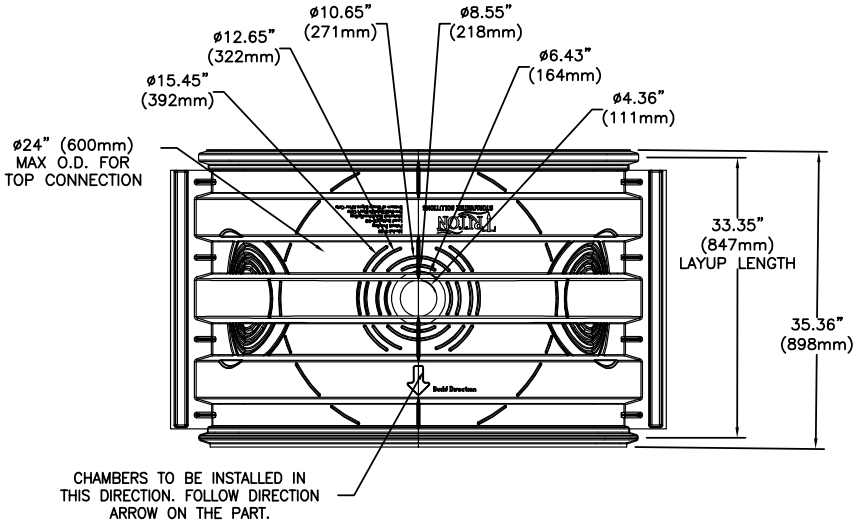


S-29 CHAMBER SPECS	
NOMINAL DIMENSIONS (LAYUP LENGTH X WIDTH X HEIGHT)	33.35" X 59.00" X 36.00" (847mm X 1499mm X 914mm)
BARE CHAMBER STORAGE	27.35 CUBIC FEET (0.774 CUBIC METERS)
*MIN INSTALLED STORAGE	41.05 CUBIC FEET (1.162 CUBIC METERS)
CHAMBER WEIGHT	32 lbs (14.515 kg)
STORAGE PER LINEAR FOOT WITHOUT STONE	9.84 CUBIC FEET (0.279 CUBIC METERS)
STORAGE PER LINEAR FOOT WITH STONE	14.77 CUBIC FEET (0.418 CUBIC METERS)
*ASSUMING A MIN OF 6" (152mm) STONE ABOVE AND BELOW AND 7.5" (191mm) BETWEEN ROWS WITH 40% STONE POROSITY (DOES NOT INCLUDE 12" (305mm) PERIMETER STONE VOLUME)	

NOTE: S-29 CHAMBER DETAILS TESTED AND RATED FOR H-30 LOAD CONDITIONS WITH 18" (457mm) OF COVER AND NO PAVEMENT.







CONCEPTUAL PLAN DISCLAIMER

THIS GENERIC DETAIL DOES NOT ENCOMPASS THE SIZING, FIT, AND APPLICABILITY OF THE TRITON CHAMBER SYSTEM FOR THIS SPECIFIC PROJECT. IT IS THE ULTIMATE RESPONSIBILITY OF THE DESIGN ENGINEER TO ASSURE THAT THE STORMWATER SYSTEM DESIGN IS IN FULL COMPLIANCE WITH ALL APPLICABLE LAWS AND REGUALTIONS. TRITON PRODUCTS MUST BE DESIGNED AND INSTALLED IN ACCORDANCE WITH TRITON'S MINIMUM REQUIREMENTS. TRITON STORMWATER SOLUTIONS DOES NOT APPROVE PLANS, SIZING, OR SYSTEM DESIGNS. THE DESIGN ENGINEER IS RESPONSIBLE FOR ALL DESIGN DECISIONS.

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BRIGHTON, MI 48114
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S-29 CHAMBER DETAIL

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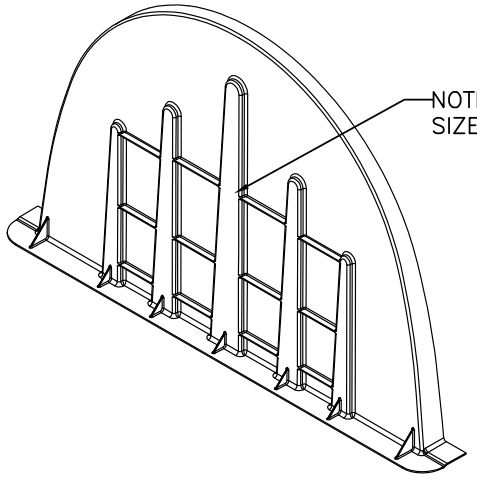
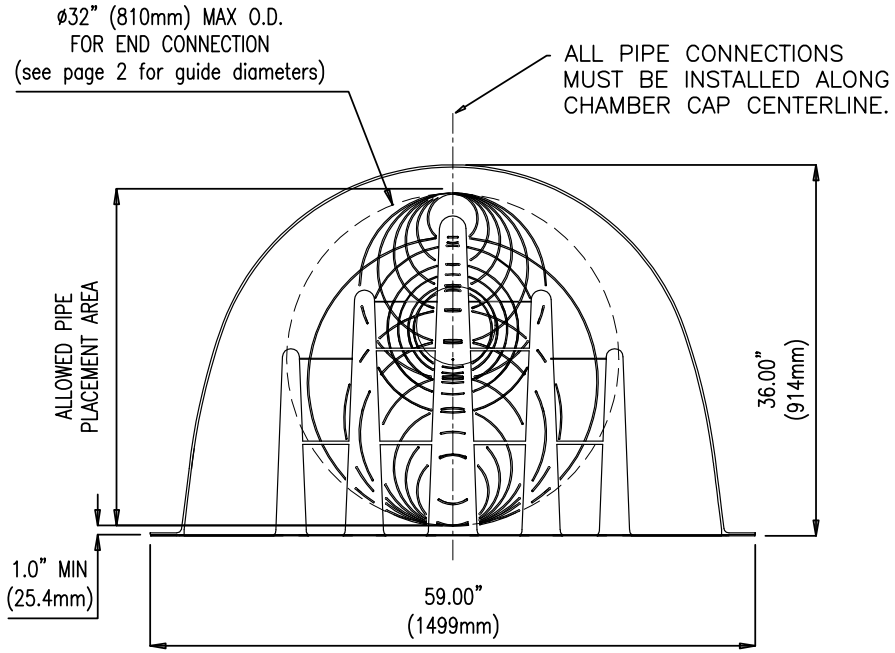
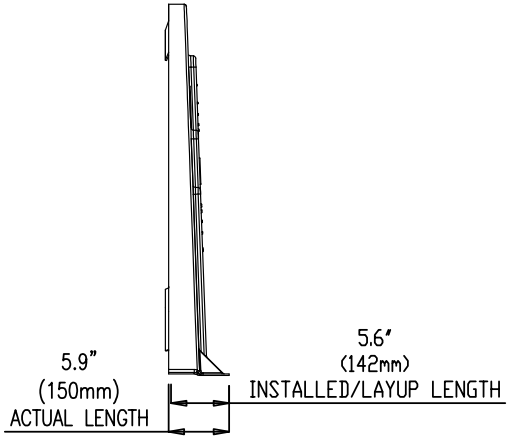
REVISED:
02-26-16 JWM



S-29 END CAP SPECS	
NOMINAL DIMENSIONS (LAYUP LENGTH X WIDTH X HEIGHT)	5.90" X 59.00" X 36.00" (150mm X 1499mm X 914mm)
BARE END CAP STORAGE	1.031 CUBIC FEET (0.029 CUBIC METERS)
*MIN INSTALLED STORAGE	4.98 CUBIC FEET (0.141 CUBIC METERS)
*ASSUMING A MIN OF 6" (152mm) STONE ABOVE AND BELOW AND 7.5" (191mm) BETWEEN ROWS WITH 40% STONE POROSITY (DOES NOT INCLUDE 12" (305mm) PERIMETER STONE VOLUME)	





THE END CAP FITS UP ON THE OUTSIDE OF THE S-29 CHAMBER. REFER TO INSTALLATION MANUAL FOR FURTHER DETAIL.

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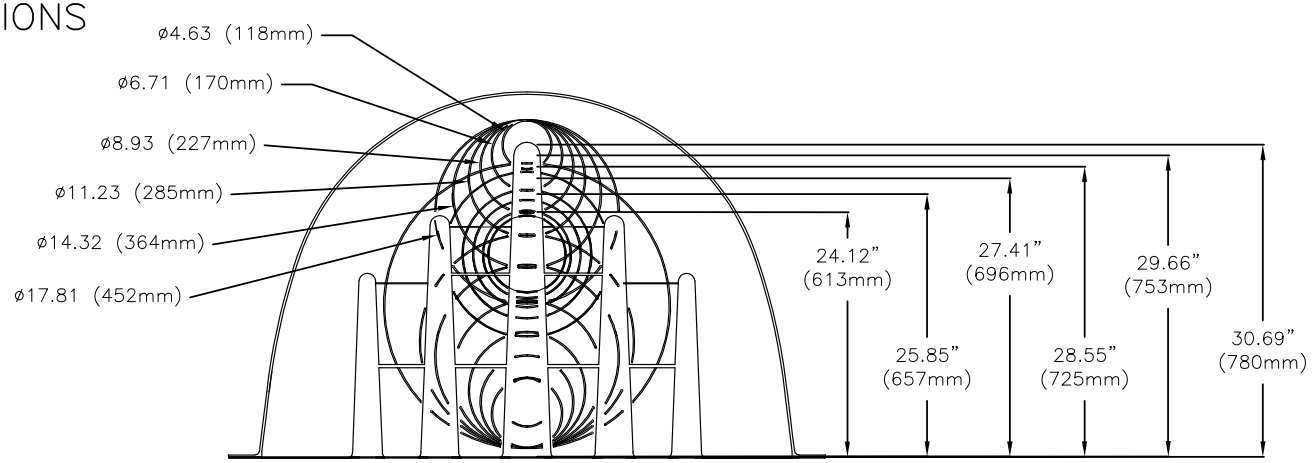
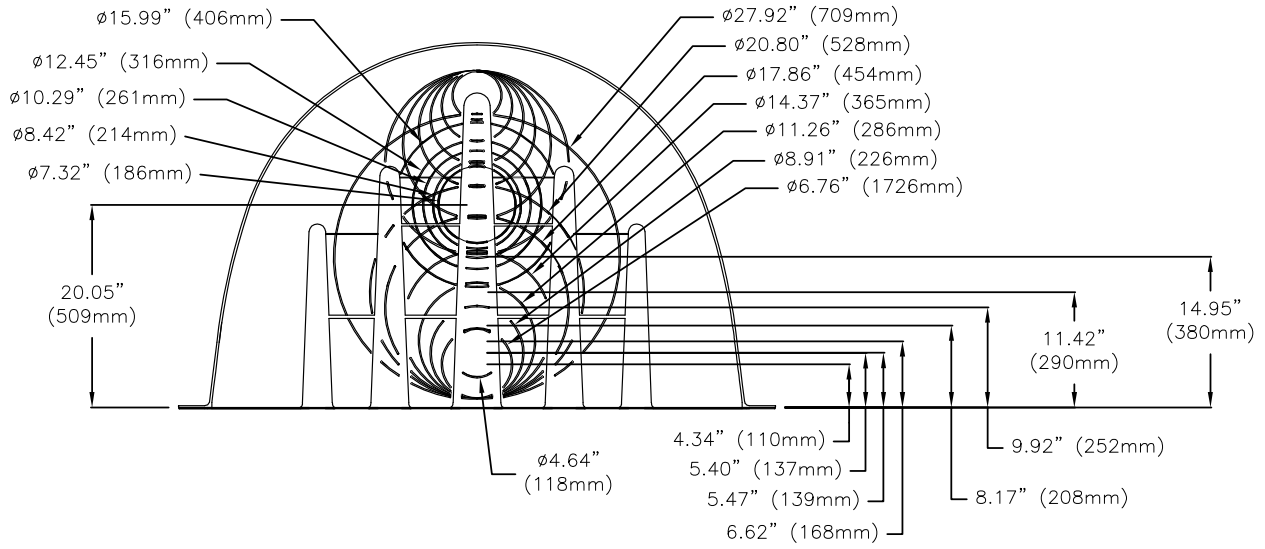
S-29 CHAMBER END CAP DETAIL

S-29 END CAP:
TOP HOLE DIMENSIONS



S-29 END CAP:
CENTER AND BOTTOM HOLE DIMENSIONS



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S-29 CHAMBER END CAP DETAIL

TRITON S-29 PRODUCT SPECIFICATIONS

1.0 General

1.1 Triton chambers are designed to control stormwater runoff. As a subsurface retention or detention system, Triton chambers retain and allow effective infiltration of water into the soil. As a subsurface detention system, Triton chambers detain and allow for the metered flow of water to an outfall.

2.0 Chamber Parameters

2.1 The chamber shall be injection compression molded of a structural grade 1010 green soy resin composite to be inherently resistant to environmental stress cracking (ESCR), creep, and to maintain proper stiffness through temperature ranges of -40 degrees F to 180 degrees F.

2.2 The material property for the chamber and end cap must meet or exceed the following:
Tensile Strength- Ultimate: 21,755 PSI
Tensile Strength-Yield: 17,404 PSI
Tensile Modulus: 1,750-2,240 PSI
Flex Modulus: 1,600 KSI
Flex Yield Strength: 33,100 PSI
Compressive Strength: 30,457,000 PSI
Shear Strength: 11,500 PSI

2.3 The nominal chamber dimensions of the Triton S-29 shall be 36.0 inches tall, 59.0 inches wide and 35.0 inches long. Lay-up length is 33.35”

2.4 The chamber shall have an elliptical curved section profile.

2.5 The chamber shall be open-bottomed.

2.6 The chamber shall incorporate an overlapping corrugation joint system to allow chamber rows to be constructed.

2.7 The nominal storage volume of a Triton S-29 chamber shall be 41.06 cubic feet per chamber when installed per Triton’s typical details. This equates to 2.67 cubic feet of storage/square foot of bed. This does not include perimeter stone.

2.8 The chamber shall have both of its ends open to allow for unimpeded hydraulic flows and visual inspections down a row’s entire length.

2.9 The chamber shall have five corrugations to achieve strengths defined above.

2.10 The chamber shall have five circular and elliptical, indented and raised, surfaces on the top to the chamber for a maximum of 33 inch diameter optional top feed inlets, inspection ports and or clean-out access ports.

2.11 The chamber shall have 5 elliptical, indented, surfaces on either side of the chamber for optional feed inlets, outlets. Capable of accepting pipe O.D. up to 18 inches.

2.12 The chamber shall be analyzed, designed and field tested using AASHTO LRFD bridge design specifications 1. Design live load shall meet or exceed the AASHTO HS30 or a rear axle load of 48,000 pounds. Design shall consider earth and live loads without pavement as appropriate for the minimum of 18” of total cover to a maximum total cover of 50’.

2.13 The chamber shall be manufactured in an ISO 9001:2008 certified facility

2.14 The service life of the product is over 60 years under a constant sustained load of 10,000 PSI which is equal to the H-20 loading condition. Under typical loading conditions the Chamber and End Cap has a useful lifespan of 120 years from date of when manufactured.

2.15 Designed to exceed ASTM F2418, F2787, F2922 standard and AASHTO LRFD Bridge specifications. Validated through independent third party performance testing.

3.0 End Cap Parameters

3.1 The end cap shall be Injection Compression molded of 1010 green soy resin to be inherently resistant to environmental stress cracking (ESCR), creep and to maintain proper stiffness through temperature ranges of -40 degrees F to 180 degrees F.

3.2 The end cap shall be designed to fit over the last corrugation of a chamber, which allows: the capping of each end of the chamber row.

3.3 The end cap shall have six upper saw guides capable of accepting pipe O.D. up to 18.2” Six middle saw guides and eight lower saw guides capable of accepting pipe O.D. up to 28.2” to allow easy cutting for various diameters of pipe that may be used to inlet or outlet the system.

3.4 The end cap shall have excess structural adequacies to allow cutting an orifice of any size at any invert elevation.

3.5 The primary face of an end cap shall have 5 corrugations and be angled outward to resist horizontal loads generated near the edges of beds.

3.6 The end cap shall be manufactured in an ISO 9001:2008 certified facility.

3.7 The service life of the product to be over 60 years under a sustained load of 10,000 PSI which is equal to the H-20 loading condition.

4.0 Installation

4.1 Installation shall be in accordance with the latest Triton Installation manual that can be downloaded from the Triton website: www.tritonsws.com/support/downloads

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S-29 PRODUCT SPECIFICATIONS

TRITON - STANDARD DETAILS

REVISED:
05-25-17 JWM

Zurn Roof Drains

ZURN Control-Flo . . . Today's Successful Answer to More

THE ZURN "CONTROL-FLO CONCEPT"

Originally, Zurn introduced the scientifically- advanced "Control-Flo" drainage principle for dead-level roofs. Today, after thousands of successful applications in modern, large dead-level roof areas, Zurn engineers have adapted the comprehensive "Control-Flo" data to **sloped roof** areas.

WHAT IS "CONTROL-FLO"?

It is an advanced method of removing rain water off dead-level or sloped roofs. As contrasted with conventional drainage practices, which attempt to drain off storm water as quickly as it falls on the roof's surface, "Control- Flo" drains the roof at a controlled rate. Excess water accumulates on the roof under controlled conditions... then drains off at a lower rate after a storm abates.

CUTS DRAINAGE COSTS

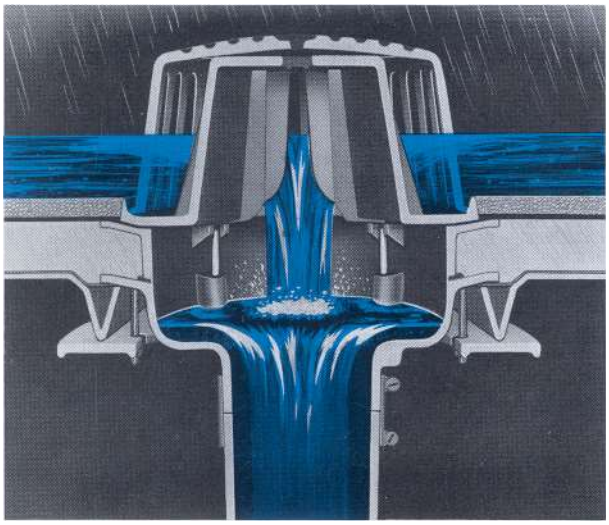
Fewer roof drains, smaller diameter piping, smaller sewer sizes, and lower installation costs are possible with a "Control-Flo" drainage system because roof areas are utilized as temporary storage reservoirs.

REDUCES PROBABILITY OF STORM DAMAGE

Lightens load on combination sewers by reducing rate of water drain from roof tops during severe storms thereby reducing probability of flooded sewers, and consequent backflow into basements and other low areas.

THANKS TO EXCLUSIVE ZURN "AQUA-WEIR" ACTION

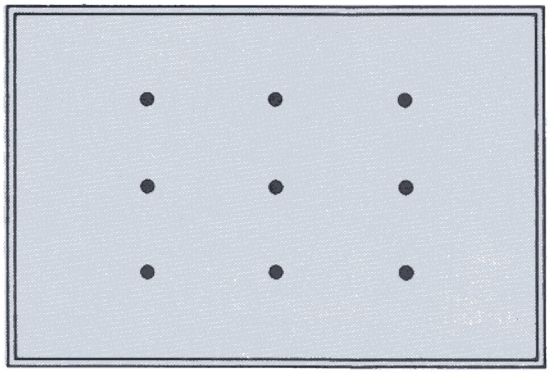
Key to successful "Control-Flo" drainage is a unique, scientifically-designed weir containing accurately calibrated notches with sides formed by parabolic curves which provide flow rates directly proportional to the head. Shape and size of notches are based on pre- determined flow rates, and all factors involved in roof drainage to assure permanent regulation of drainage flow rates for specific geographic locations and rainfall intensities.



DEFINITION

DEAD LEVEL ROOFS

A dead-level roof for purposes of applying the Zurn "Control-Flo" drainage principle is one which has been designed for zero slope across its entire surface.



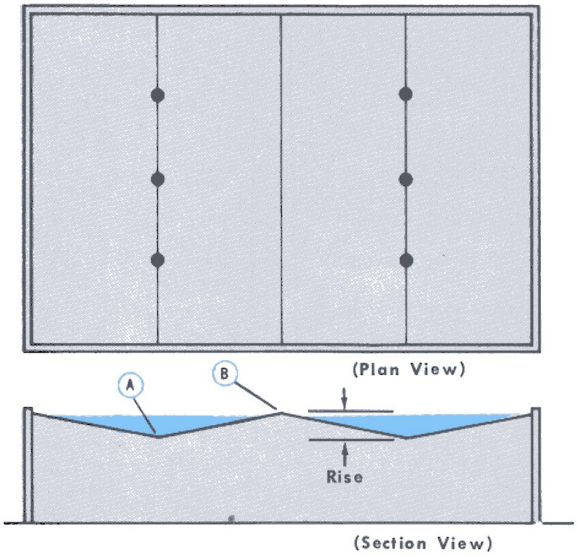
(Plan View)

(Section View)

SLOPED ROOFS

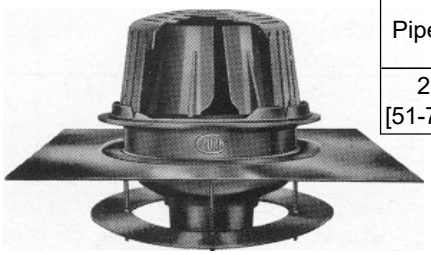
A sloped roof is one designed commonly with a shallow slope. The Zurn "Control-Flo" drainage system can be applied to any slope which results in a total rise up to 6"... and data can be calculated for rises exceeding 6".

The total rise of a roof as calculated for "Control-Flo" application is defined as the vertical increase in height in inches, from the low point or valley of a sloping roof (A) to the top of the sloping section (B). (Example: a roof that slopes 1/8" per foot having a 24-foot span would have a rise of 24 x 1/8 or 3")

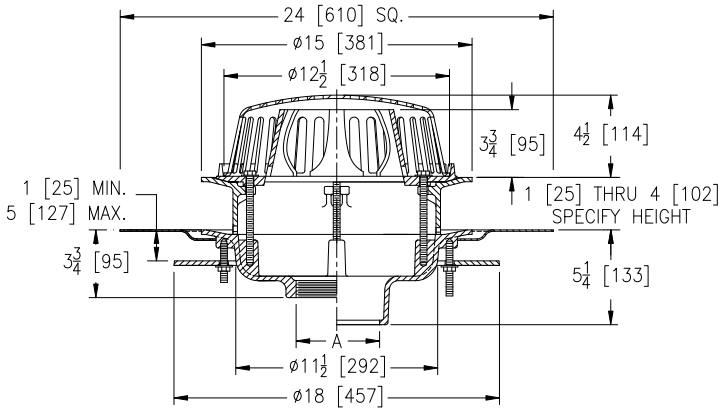


Economical Roof Drainage Installation

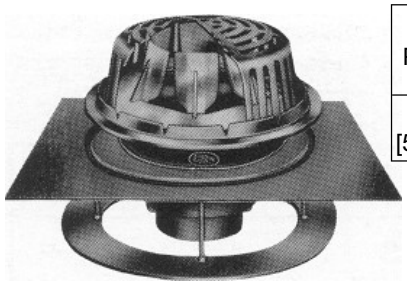
SPECIFICATION DATA



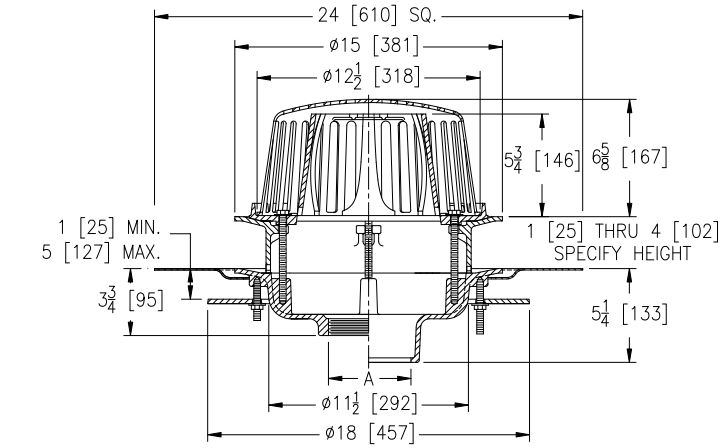
A Pipe Size	Approx. Wt. Lbs. [kg]	Dome Open Area Sq. In. [cm²]
2-3-4 [51-76-102]	56 [25]	103 [665]



ENGINEERING SPECIFICATION: ZURN Z105-C-E-R 15" Diameter "Control-Flo" roof drain for dead-level roof construction, Dura-Coated cast iron body, "Control-Flo" weir shall be linear functioning with integral membrane flashing clamp/gravel guard, static extension, secondary clamping collar with O-ring, Poly-Dome, roof sump receiver and underdeck clamp. All data shall be verified proportional to flow rates.



A Pipe Size	Approx. Wt. Lbs. [kg]	Dome Open Area Sq. In. [cm²]
2-3-4 [51-76-102]	60 [27]	148 [955]



ENGINEERING SPECIFICATION: ZURN Z105-C-E-R-10 "Control-Flo" roof drain for Sloped Roof construction, Dura-Coated cast iron body, "Control-Flo" weir shall be linear functioning with integral membrane flashing clamp/gravel guard and 6 5/8 [168] high Aluminum dome. All data shall be verified proportional to flow rates.

ROOF DESIGN RECOMMENDATIONS

Basic roofing design should incorporate protection that will prevent roof overloading by installing adequate overflow scuppers in parapet walls.

GENERAL RECOMMENDATIONS

On dead-level roofs, our general recommendations are to design for a 3" depth for the 10-year storm. In this case, even the 100-year storm will not result in a maximum depth of 6". A 6" depth represents a roof load of 31.2 pounds per square foot which approximates the 30 pound per square foot factor commonly used in roof design.

NOTE: A more conservative practice used by a few engineers in the past, depending upon other design considerations, has been to design for the 3" depth with the 25, 50, or even 100-year storm . . . and to also lower scuppers to 5" or 4" above roof level. In either case, the final determination rests with the engineering personnel responsible for this phase of the design.

GENERAL RECOMMENDATIONS

On sloping roofs, we again recommend a 3" design depth for the l0-year storm, but by 3" we refer to an equivalent depth of 3". An equivalent depth is the depth of water attained at the drains that results in the same roof stresses as those realized on a dead-level roof. In all cases this equivalent depth is almost equal to that attained by using the same notch area rating for the different rises to 6". With the same depth of water at the drain the roof stresses will decrease with increasing total rise. Therefore, it would be possible to have a depth in excess of 6" at the drain on a sloping roof without exceeding stresses normally encountered in a 6" depth on a dead-level roof. However, it is recommended that scuppers be placed to limit the maximum water depth on any roof to 6" to prevent the over flow of the weirs on the drains and consequent overloading of drain piping.

NOTE: An equivalent depth is that depth of water attained at the drains at the lowest line or valley of the roof with all other conditions such as notch area and rainfall intensity being equal. For Galveston, Texas a notch area of 1800 square feet results in a 3" depth on a **dead-level** roof for a 10-year storm. For the same notch area and a 10-year storm, equivalent depths for a 2", 4", and 6" rise respectively on a **sloped roof** would be 3.4", 3.8", and 4.6". Roof stresses will be approximately equal in all cases.

Control-Flo Drain Selection is Quick and Easy . .

The exclusive Zurn “Selecta-Drain”. Chart (pages 6, 7, 8, 9) tabulates recommended selection data for several hundred localities in the United States. It constitutes your best assurance of sure, safe, economical additional data for your Zurn “Control-Flo” systems for your specific geographical area.

If the “Selecta-Drain” Chart doesn’t not suit your specific design criteria, write directly to Zurn Industries, Inc. Field Service Engineering, Specification Drainage Operations, Erie, Pa for additional date for your locality. Listed below is additional information pertinent to proper engineering of the “Control-Flo” system.

ROOF USED AS TEMPORARY RETENTION

The key to economical “Control-Flo” drainage is the utilization of large roof areas to temporarily store the maximum amount of water without overloading average roofs or creating excessive drain down time during periods of heavy rainfall.

The data shown in the “Selecta-Drain” Chart, which takes all these factors into consideration, represents only one point on a series of curves prepared for each locality and was determined after careful study and research as imparting optimum economy in design.

ROOF LOADING AND RUN-OFF RATES

The values for notch areas selected from the design curves were based on a 3" head on a dead-level roof for the 10-year storm. In low rainfall localities the area per notch was limited to 25,000 square feet to keep the drain down time within reasonable limits. The same area for each respective locality was used for the various roof rises for sloping roofs.

Extensive studies show that stresses due to water load on a sloping roof for any fixed set of conditions are very nearly the same as those on a dead-level roof. A sloping roof tends to concentrate more water in the valleys and increase the water depth at this point. The greater depth around the drain leads to a faster run-off rate, particularly a faster early run-off rate. As a result, the total volume of water stored on the roof is less, and the total load on the sloping roof is less. By using the same area on the sloping roof as on the dead-level roof the increase in roof stresses due to increased water depth in the valleys is offset by the decrease in the total load due to less water stored. The net result is the maximum roof stresses are approximately the same for single span, rise and fixed set of conditions. A fixed set of conditions would be the same notch area, the same frequency storm, and the same locality.

NOTCH FLOW AND WATER DEPTH

The flow through each notch of the “Control-Flo” weir is 10 GPM per inch of head. To compute the depth of water in inches at the drain, obtain the total flow for any fixed set of conditions and locale from the “Selecta-Drain” Chart and divide by 10. For example, for Anniston, Alabama the discharge rates are 30, 35, 39 and 43 GPM for the 10, 25, 50 and 100-year storms respectively on a dead-level roof.

Since the possibility of exceeding 4.3" of water exists only once every 100 years, the drains can be sized to carry 43 GPM per notch and scuppers can be set at a height of 4.3" above the roof to prevent overloading the drains if a worse than 100-year storm occurs. On a similar basis, drain pipe sizes and scupper heights can be selected for various roof slopes and storm frequencies.

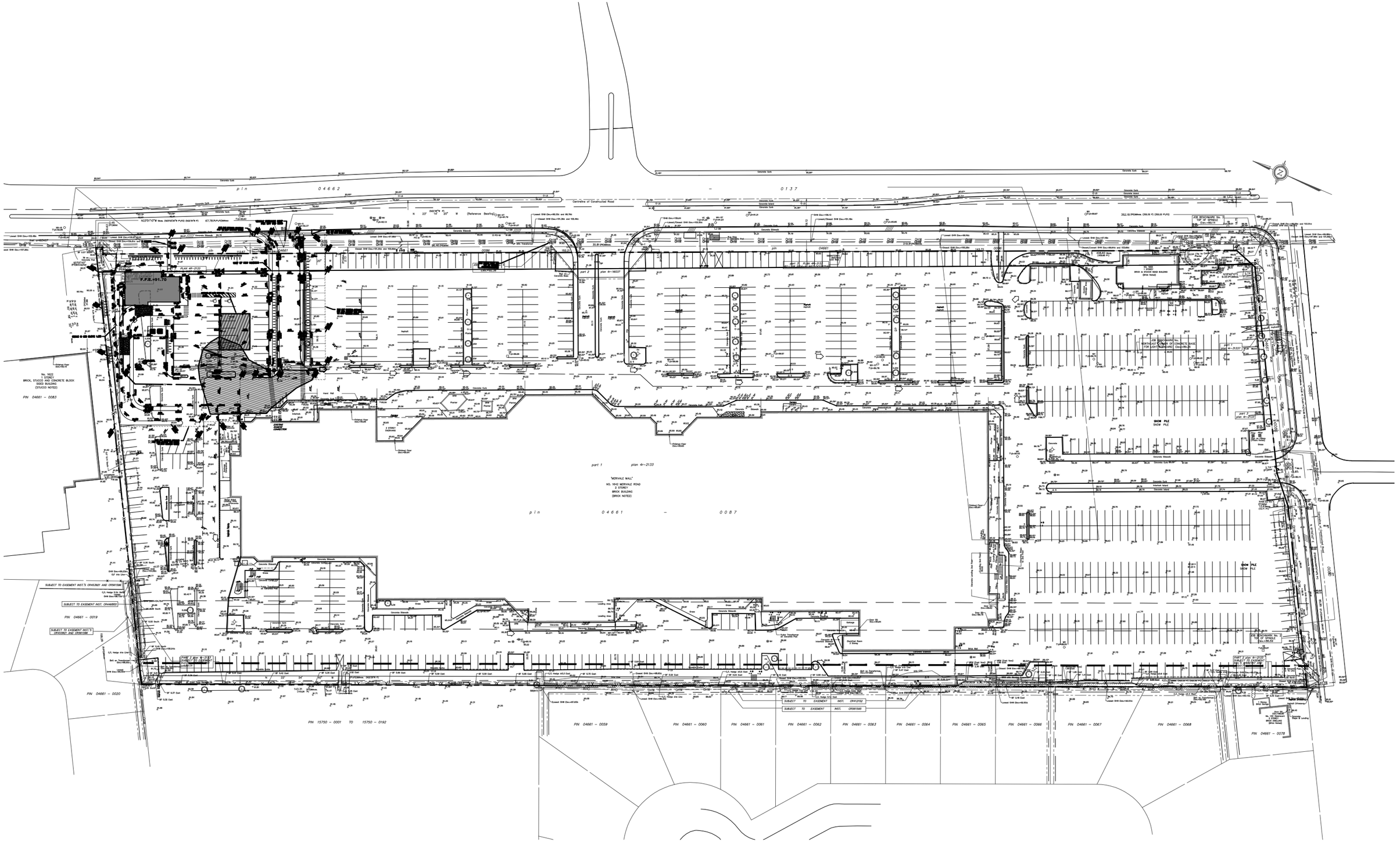
ADDITIONAL NOTCH RATINGS

The “Selecta-Drain” Chart along with Tables I and II enables the engineer to select “Control-Flo” Drains and drain pipe sizes for most applications. The “Selecta-Drain” Chart and Tables I and II are computed for a proportional flow weir that is sized to give a flow of 10 GPM per inch of head. However, this data can be applied to other sizes of proportional flow weirs by simple multiplication or division. For example, if a similar weir that is sized to give a flow of 5 GPM per inch is substituted for the 10 GPM per inch weir, the notch area and discharge in GPM would be divided by two, and this opening would be given a 7’2 notch area rating.

PROPER DRAIN LOCATION

The following good design practice is recommended for selecting the proper number of “Control-Flo” drains for a given area.

On dead-level roofs, drains should be located no further than 50 feet from each edge of the roof to assure good run-off regardless of wind direction. Weir should be flush with roof surface, not recessed.
On sloping roofs, drains should be located in the valleys at a distance no greater than 50 feet from each end of the valleys. Weir should be flush with the valley roof surface, not recessed.
On large roof areas, drains should not be spaced at a distance greater than 200 feet.



DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™

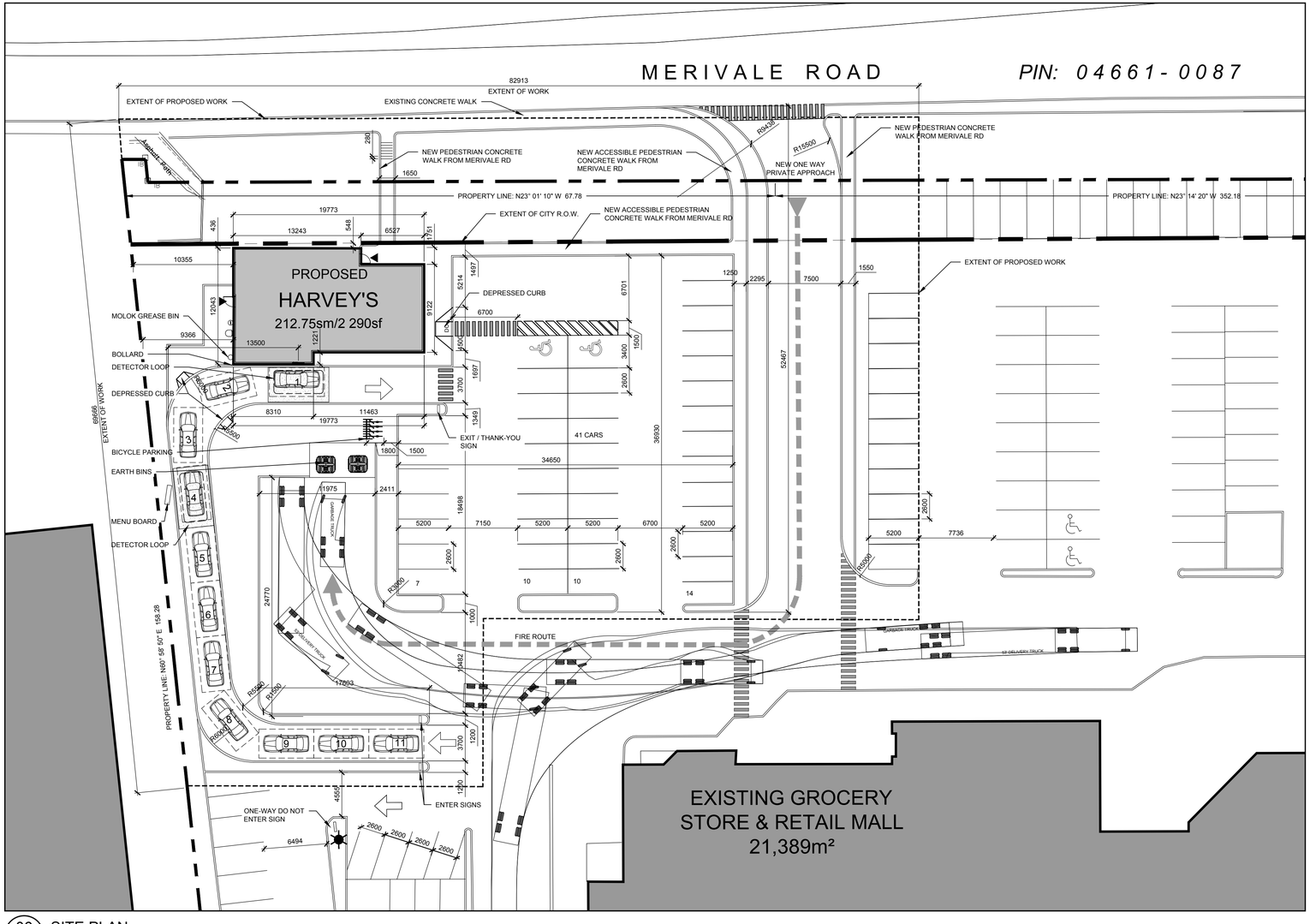
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

EMERGENCY FLOW ROUTE - PHASE 1

PROJ NO.:	19–1084
DRAWN BY:	C.M.K.
DATE:	APRIL 2020
SCALE:	1:1250
FIGURE NO.:	FIG-1

z:\projects\19-1084_first-captital_merivale mall\b_design\b2_drawings\b2-2_main (dsel)\spa-harvey-sub1\2020-04-17_1084_spa_cmk.dwg

DRAWINGS / FIGURES



06 SP-A01 SITE PLAN
SCALE: 1:250

PIN: 04661-0087

DATE: MAY 12, 2020

SITE INFORMATION:
PART OF BLOCK F, REGISTERED PLAN 401392 and PART OF LOT 31
CONCESSION 1 (RIDEAU FRONT), Geographic Township of Nepean
CITY OF OTTAWA

SITE AREA:	65,361sm / 16.2 acres
AREA OF HARVEY'S INTERVENTION	4,410sm/1.1 acres

GROSS FLOOR AREA:

EXISTING RETAIL BUILDING (GROUP E)	21,398sm / 230,326sf
RELOCATED HARVEY'S (GROUP A - DIV. 2)	212.7sm / 2,290sf
TOTAL	21,610.7sm / 232,616sf

ZONING DESIGNATION:	AM10

ZONING PROVISIONS:

MINIMUM LOT AREA:	NO MINIMUM
MINIMUM LOT WIDTH:	NO MINIMUM
MINIMUM FRONT YARD:	NO MINIMUM FOR MIXED USE
MINIMUM CORNER SIDE YARD:	NO MINIMUM FOR MIXED USE
MINIMUM INTERIOR SIDE YARD:	NO MINIMUM
MINIMUM REAR YARD:	7.5m (abutting residential zone)
MINIMUM BUILDING HEIGHT:	WITHIN 10m OF FRONT AND CORNER LOT LINES, MUST BE TWO-STOREY WITH GROUND FLOOR AT 4.5m AND TOTAL 7.5m
MAXIMUM BUILDING HEIGHT:	WITHIN 20m OF R1 11m 20-30m FROM R1 20m OVER 30m FROM R1 30m
MAXIMUM FSI:	NO MAXIMUM

LANDSCAPING:

PARKING AREA	1343.5m²
LANDSCAPING REQUIRED (@15%)	210.5m²
LANDSCAPING PROVIDED	1365.0m²
(INCLUDES 3m BUFFER AT WEST PROPERTY LINE)	

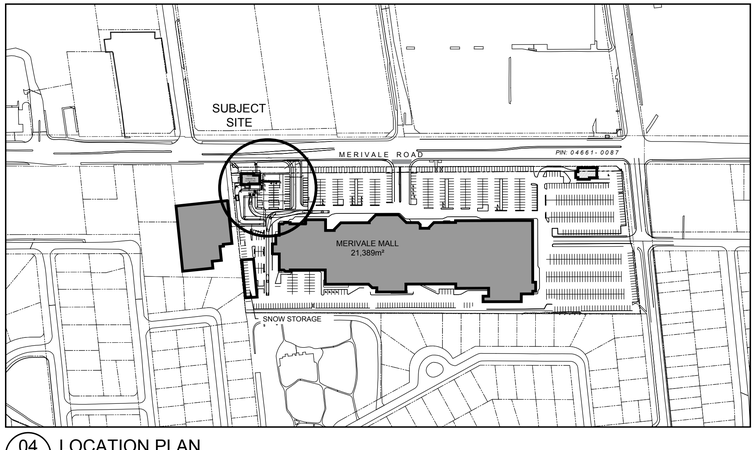
PARKING:

MINIMUM PARKING REQUIRED:	21 (10.0 per 100sm OF GFA)
MAXIMUM PARKING PERMITTED:	N/A
EXISTING PARKING:	
PARKING PROPOSED:	41

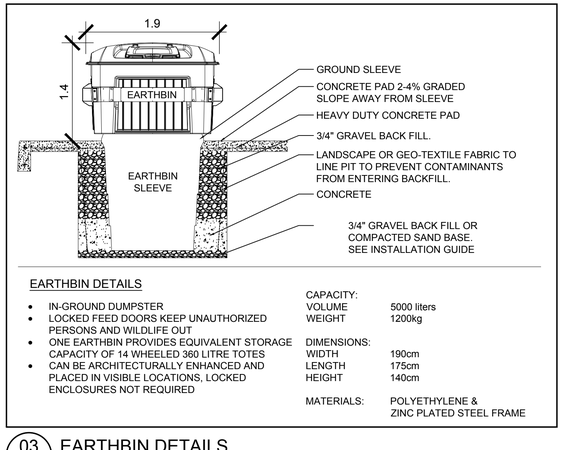
NOTE PARKING IS NOT PERMITTED IN FRONT OR CORNER SIDE YARD

BARRIER FREE PARKING REQUIRED:	01
BARRIER-FREE PARKING PROPOSED:	02
BIKE PARKING REQUIRED (1 per 250sm):	01
BIKE PARKING PROPOSED:	04
LOADING SPACES REQUIRED:	0
LOADING SPACES PROPOSED:	01
DRIVE-THROUGH STACKING:	7 CARS (3mx5.7m) BEFORE ORDER BOARD 4 CARS AT WINDOW

05 SP-A01 SITE AND ZONING INFORMATION
SCALE: N/A



04 SP-A01 LOCATION PLAN
SCALE: N.T.S



EARTHBIN DETAILS

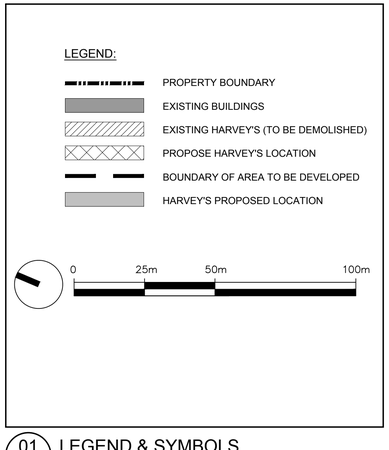
- IN-GROUND DUMPSTER
- LOCKED FEED DOORS KEEP UNAUTHORIZED PERSONS AND WILDLIFE OUT
- ONE EARTHBIN PROVIDES EQUIVALENT STORAGE CAPACITY OF 14 WHEELED 360 LITRE TOTES
- CAN BE ARCHITECTURALLY ENHANCED AND PLACED IN VISIBLE LOCATIONS, LOCKED ENCLOSURES NOT REQUIRED

CAPACITY:	
VOLUME	5000 liters
WEIGHT	1200kg
DIMENSIONS:	
WIDTH	190cm
LENGTH	175cm
HEIGHT	140cm
MATERIALS:	POLYETHYLENE & ZINC PLATED STEEL FRAME

03 SP-A01 EARTHBIN DETAILS
SCALE: N/A

*MBR300-4-S (standard 4 ring) model shown

02 SP-A01 LOCKABLE BIKE RACK
SCALE: N/A



01 SP-A01 LEGEND & SYMBOLS
SCALE: N/A

24 X 36 – PLOT ARCH D

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS

OWNER / APPLICANT:
FIRST CAPITAL
RDC 113, 7600 BOULEVAD VIAU,
MONTREAL QUEBEC, H1S 293
514 787 3225

ARCHITECT:
MCROBIE ARCHITECTS + INTERIOR DESIGNERS
66 QUEEN STREET, OTTAWA, ON. K1P 5C6
613-238-2072

URBAN PLANNER:
FOTENN
396 COOPER ST., SUITE 300
OTTAWA, ON K2P 2H7
613 730 5709

CIVIL ENGINEERS:
DSEL
120 IBER ROAS UNIT 103
STITTSVILLE, ON K2S 1E9
613 836 0856

LANDSCAPE ARCHITECT:
FOTENN
396 COOPER ST., SUITE 300
OTTAWA, ON K2P 2H7
613 730 5709

SURVEYOR:
ANNIS, O'SULLIVAN, VOLLEBKK LTD
396 14 CONCOURSE GATE, SUITE 500
NEPEAN, ON K2E 7SS6
613 727 0850

FIRST CAPITAL

North

Revisions

No.	By	Description	Date
01	KE	ISSUED FOR SPA	13 APR. 2020
02	KE	ISSUED FOR SPA	20 MAY. 2020

Project

MERIVALE MALL
HARVEY'S RELOCATION

1642 MERIVALE ROAD, OTTAWA

Drawing

ZONING INFORMATION, LOCATION PLAN AND SITE PLAN

Scale: AS SHOWN
Stamp
Drawn: KE/JAS
Checked

Project No.: 19-111
Drawing No.: SP-A01
Date: DEC 2019

SURVEYOR'S REAL PROPERTY REPORT

PART 1 Plan of

PART OF BLOCK F
REGISTERED PLAN 401392 and
PART OF LOT 31
CONCESSION 1 (RIDEAU FRONT)
Geographic Township of Nepean
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 300

12 9 6 3 0 6 12 Metres

Metric

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

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 12th day of April, 2019.

April 24, 2019 — Date

E. H. Herweyer
Ontario Land Surveyor

PART 2
THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED: April 24, 2019

ANNIS, O'SULLIVAN, VOLLEBEKK LTD. grants to First Capital Asset Management L.P. ("The Client"), their solicitors, mortgagees, and other related parties, permission to use original, signed, sealed copies of the Surveyor's Real Property Report in transactions involving The Client.

Notes & Legend

	Denotes	
—□—	"	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
CC	"	Cut Cross
CP	"	Concrete Pin
IBø	"	Round Iron Bar
S&W	"	Spike & Washer
SSIB*	"	Short Standard Iron Bar
IB*	"	Iron Bar
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P)	"	Registered Plan 401392
(P1)	"	Plan 4R-2133
(P2)	"	(857) Plan March 22, 1994
(P3)	"	(AOG) Plan September 14, 2011
(P4)	"	Ottawa-Carleton Standard Condominium Plan No. 750
(P5)	"	(1692) Plan December 3, 2003
(P6)	"	Plan 4R-16037
	"	Deciduous Tree
	"	Coniferous Tree
FH	"	Fire Hydrant
WV	"	Water Valve
SP	"	Water Stand Post
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
MH-B	"	Maintenance Hole (Bell Telephone)
MH	"	Maintenance Hole (Unidentified)
VC	"	Valve Chamber (Watermain)
—— OHW ——	"	Overhead Wires
CB	"	Catch Basin
CBI	"	Catch Basin Inlet
GM	"	Gas Meter
HH	"	Handhole
TB-B	"	Bell Terminal Box
TB-T	"	Traffic Terminal Box
TB	"	Unidentified Terminal Box
TSP	"	Traffic Signal Post
B	"	Bollard
S	"	Sign
CLF	"	Chain Link Fence
BF	"	Board Fence
CLF	"	Chain Link Fence
CRW	"	Concrete Retaining Wall
SRW	"	Stone Retaining Wall
WRW	"	Wooden Retaining Wall
TSL	"	Traffic Light
UP	"	Utility Pole
AN	"	Anchor
LS	"	Light Standard
PO-M	"	Metal Pole
Ø	"	Diameter
+ 65.00	"	Location of Elevations
+ 65.00*	"	Top of Concrete Curb Elevation
C/L	"	Centreline
———	"	Property Line
DC	"	Depressed Curb
- - - - -	"	Features obscured by snow and ice/Plotted per City Digital mapping

SITE AREA = 65385 m²

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2086120
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

Bearings are grid, derived from the easterly limit of Part 2 Plan 4R-13037 being N23°14'20"W thereon and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

For bearing comparisons, a rotation of 0°36'20" counter-clockwise was applied to bearings on plan P1, P2

For comparison purposes, bearings shown on Registered Plan 401392 are astronomic bearings.

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

Ontario Land Surveyors
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com

Job No. 17706-19 Merivale T F2 | ig

NOTES

1. CONTRACTOR TO CONTACT BELL TELEPHONE, NEPEAN HYDRO AND OTTAWA GAS FOR AN ACCURATE LOCATION OF UNDERGROUND UTILITIES.
2. BUILDING COORDINATES SUBJECT TO REVISION BY ARCHITECT.
3. COORDINATES FOR SERVICE LOCATIONS SHALL TAKE PRECEDENCE OVER SCALED MEASUREMENTS.
4. CONTRACTOR TO UNCOVER AND VERIFY ALL POSSIBLE CONFLICTS PRIOR TO ANY PIPE LAYING.
5. HYDRANTS TO HAVE 6" LEADS, C.W. VALVE AND VALVE BOX
6. ALL SANITARY SEWER A.C. CL. 2400 OR E.S. CONC. STORM SEWER CLASSES AS SHOWN.
7. THIS DWG. TO BE USED FOR SERVICES ONLY SEE DWG. 75-3979-2 FOR BUILDING & PARKING LOT LAYOUT.
8. LEADS FOR SIAMESE CONNECTIONS TO BE C.W. VALVE & VALVE BOX.
9. THE WATERMAIN SHALL BE INSTALLED WITH 7'-0" COVER.
10. THE EXISTING TREES MAY BE REMOVED AT THE DISCRETION OF THE ARCHITECT.

JAN. 77

No.	DESCRIPTION	DATE
7	GARDEN CENTRE, WATER SERVICE ADDED	16/8/76
6	BLDG. SERVICE INV. CH'D AS PER. MECH. ENG.	30/3/76
5	SIDEWALK REVISED AS PER ARCHITECT	30/3/76
4	BLDG. SERVICE LOCATIONS CH'D AS PER MECH. ENG. (B.F.H.)	17/3/76
3	C.B. LEAD TO WOOLCO DELETED	11/3/76
	SUBMITTED FOR BUILDING PERMIT	27/2/76
2	GENERAL REVISION INCLUDING BUILDING LAYOUT & ADDITION OF WATERMAIN GRADES	16/02/76
1	EXISTING HYDRO & BELL POLES ADDED. ADDED LATERALS TO LOADING BAYS	.C/02/76

REVISIONS

APP'D.

DESIGN D.R.H.
DRAWN A.R.M.
CHECKED

PROJECT: MERIVALE MALL

TITLE: SERVICING PLAN

ARCHITECT: MURRAY & MURRAY
ARCHITECTS & PLANNING CONSULTANTS

J. L. RICHARDS & ASSOCIATES LIMITED
Consulting Engineers & Planners Ottawa Ontario

DATE: OCT. 1975
SCALE: 1" = 50'
DRAWING No.: 75-3979-1
REV. 7