

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES

FOR

**RIOCAN MANAGEMENT INC.
1309 & 1335 CARLING AVENUE**

CITY OF OTTAWA

PROJECT NO.: 15-793

**MAY 2016 – REV 2
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FOR
1309 & 1335 CARLING AVENUE
RIOCAN MANAGEMENT INC.**

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare an Assessment of Adequacy of Public Services report in support of the application for a Zoning By-law Amendment (ZBLA) and Community Design Plan supporting development at 1309 and 1335 Carling Avenue. RioCAN Management Inc owns and operates the property at 1309 Carling Avenue, while 1335 Carling Avenue is within Colonnade Management interest.

The subject property is located within the City of Ottawa urban boundary, in the Kitchissippi ward. As illustrated in **Figure 1**, the subject property is bounded by highway 417 to the northwest, Carling Avenue to the south and Merivale Road to the east. The subject property measures approximately **3.7 ha** and is zoned Arterial Main Street Use (AM). Approximately 1.1 ha of Hydro lands are located along the northwest property line and extend into a portion of the subject property.

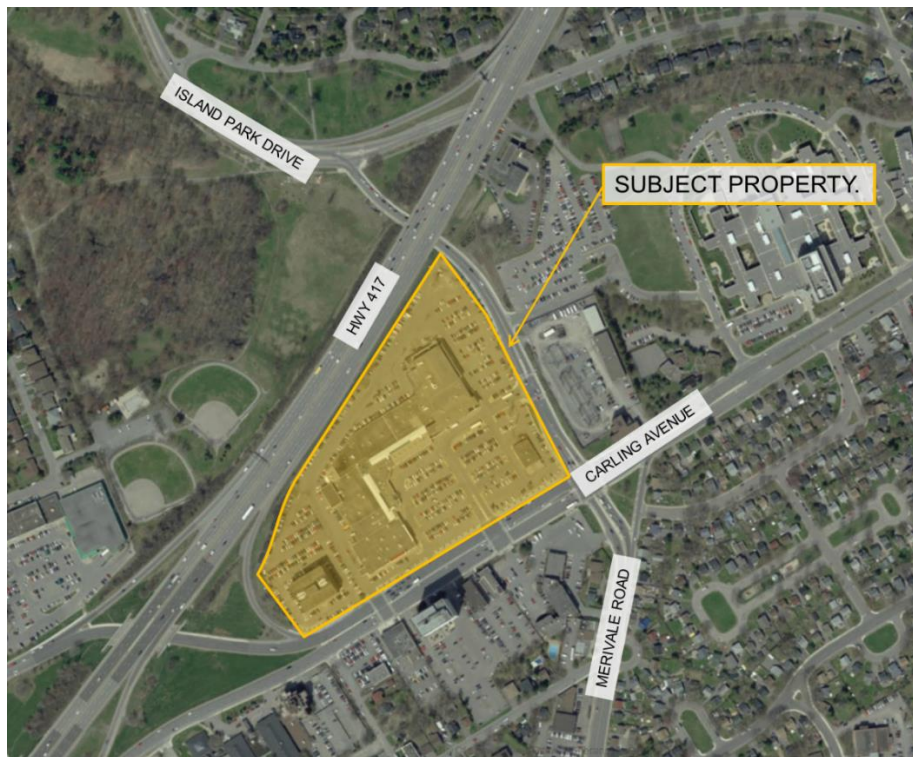


Figure 1: Site Location

The proposed ZBLA would allow for the development of six residential /commercial buildings; the proposed development is contemplated to be completed in three phases with incremental demolition of the existing commercial plaza and standalone restaurant to allow for development as required.

The contemplated development would include approximately **8,942 m²** of ground level retail divided between the five buildings complete with underground parking. The Colonnade phase would include approximately **1,394 m²** of ground level retail and **14,214 m²** of office space. The residential component is comprised of approximately **1183 units** split between each phase. The conceptual site plan is included in **Drawings/Figures** outlines the proposed Phasing and site stats.

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

1.1 Existing Conditions

The existing site is a commercial mall development surrounded predominantly by asphalt parking lots.

It is recommended that locates of existing onsite servicing and utilities is completed prior to detailed design.

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, as shown by ECS-1 in **Drawing/Figures**:

Merivale Road

- 1220 mm diameter concrete lined steel watermain
- 1050 mm diameter concrete sanitary sewer
- 900 mm diameter Cave Creek Collector sanitary sewer
- 375 mm PVC local storm sewer
- 2400 mm x 1500 mm concrete storm tunnel tributary to Ottawa River ~3.8 km downstream
- 2100 mm concrete storm tunnel tributary to Ottawa River ~3.5 km downstream

Carling Avenue

- 1220 mm diameter concrete lined steel watermain
- 406 mm diameter PVC watermain
- 250 mm diameter concrete sanitary sewer
- 900 mm diameter concrete Cave Creek Collector sanitary sewer
- 375 mm diameter concrete storm sewer
- 1800 mm concrete storm tunnel tributary to Ottawa River ~3.8 km downstream
- 2100 mm concrete storm tunnel tributary to Ottawa River ~3.5 km downstream

1.2 Required Permits / Approvals

The proposed development is 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.

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

2.1 Existing Studies, Guidelines, 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)
- **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)
- **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)
- **Water Supply for Public Fire Protection**
Fire Underwriters Survey, 1999.
(FUS)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 2W pressure zone as shown by the Pressure Zone map in **Appendix B**. The site is currently serviced by a 406 mm diameter watermain within the Carling Avenue right-of-way.

The existing site consists of a commercial mall development with an internal looped watermain with two connections to the municipal watermain within Carling Avenue as shown by **ECS-1**.

3.2 Water Supply Servicing Design

The phased redevelopment of the site means that portions of the existing commercial buildings will remain and are contemplated to retain their current connections to the existing internal looped watermain. Phase statistics indicating proposed commercial/retail and retained commercial for each phase is included in **Drawings/Figures**.

It is anticipated that each of the contemplated phases will have independent connections to an internal watermain. With 1335 Carling Avenue having a separate connection, independent of 1309 Carling Avenue.

Table 1 summarizes the **Water Supply Guidelines** employed in the preparation of the preliminary water demand estimate.

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand	3.0 x Average Daily *
Residential Maximum Hourly	4.5 x Average Daily *
Commercial Retail	2.5 L/m ² /d
Commercial Office	75 L/9.3m ² /d
Commercial Maximum Daily Demand	1.5 x avg. day
Commercial Maximum Hour Demand	1.8 x max. day
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa
*Daily average based on Appendix 4-A from Water Supply Guidelines ** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons. -Table updated to reflect ISD-2010-2	

Table 2 and **3** summarizes the anticipated water supply demand and boundary conditions for the proposed development based on the **Water Supply Guidelines**.

Table 2
Water Demand and Boundary Conditions
Proposed Conditions – Connection 1

Phase	Design Parameter	Anticipated Demand ¹ (L/min)	Boundary Condition ² (m H ₂ O / kPa)	
Phase I	Average Daily Demand	112.0	62.3	611.2
	Max Day + Fire Flow	290.9	41,160	@ 140 Kpa
	Peak Hour Demand	450.0	46.3	454.2
Phase II	Average Daily Demand	190.1	62.3	611.2
	Max Day + Fire Flow	447.5	41,160	@ 140 Kpa
	Peak Hour Demand	967.9	46.3	454.2
Phase III	Average Daily Demand	533.2	62.3	611.2
	Max Day + Fire Flow	1317.6	41,160	@ 140 Kpa
	Peak Hour Demand	2889.3	46.3	454.2
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 73.9 m. See Appendix B .				

In accordance with City of Ottawa technical bulletin ISDTB-2014-02, redundant service connections will be required due to an anticipated design flow of greater than 50 m³/day, for each phase.

Table 3
Water Demand and Boundary Conditions
Proposed Conditions – Connection 2

Phase	Design Parameter	Anticipated Demand ¹ (L/min)	Boundary Condition ² (m H ₂ O / kPa)	
Phase I	Average Daily Demand	112.0	61.5	603.3
	Max Day + Fire Flow	290.9	39600	@ 140 Kpa
	Peak Hour Demand	450.0	45.5	446.4
Phase II	Average Daily Demand	190.1	61.5	603.3
	Max Day + Fire Flow	447.5	39600	@ 140 Kpa
	Peak Hour Demand	967.9	45.5	446.4
Phase III	Average Daily Demand	533.2	61.5	603.3
	Max Day + Fire Flow	1317.6	39600	@ 140 Kpa
	Peak Hour Demand	2889.3	45.5	446.4
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 74.7 m. See Appendix B .				

Table 4
Water Demand and Boundary Conditions
Proposed Conditions – Connection 3

Phase	Design Parameter	Anticipated Demand ¹ (L/min)	Boundary Condition ² (m H ₂ O / kPa)	
1335 Carling	Average Daily Demand	615.3	63.1	619.011
	Max Day + Fire Flow	1440.6	40800	@ 140 Kpa
	Peak Hour Demand	3110.8	47.6	466.956
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 74.7 m. See Appendix B .				

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

Using the **FUS** method a conservative estimation of fire flow had been established. The following assumptions were assumed:

- Type of construction - Ordinary Construction
- Occupancy type – Limited Combustibility
- Sprinkler Protection – Supervised Sprinkler System

The above assumptions result in an estimated fire flows as shown in **Table 5** for each Phase, actual building materials selected will affect the estimated flow. A certified fire protection system specialist would need to be employed to design the building fire suppression system and confirm the actual fire flow demand.

Table 5
FUS
Estimated Fire flow Summary

Phase	Anticipated Demand (L/min)
Phase I	13,000
Phase II	20,000
Phase III – West	21,000
Phase III – East	20,000
Phase III - Center	24,000
1335 Carling	15,000

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in the boundary request correspondence included in **Appendix B**.

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**. The minimum and maximum pressures fall within the desired range identified in **Table 1**.

Based on the available fire flow at **140 kPa** provided by the City as shown in **Tables 2, 3, and 4** and the estimated fire flows as summarized by phase in **Table 5**, adequate fire flow is available from the municipal system.

Initial boundary conditions obtained indicate residual pressures that exceed the allowable pressure range as specified in **Table 1** and the **Water Supply Guidelines**; it is therefore recommended that a pressure check be conducted at the completion of construction to determine if pressure controls are required.

3.3 Water Supply Conclusion

Anticipated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions.

The anticipated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions. As demonstrated by **Tables 2, 3, and 4**, based on the City's model, the municipal system is capable of delivering adequate water supply.

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 Cave Creek Collector Sewer catchment area, as shown by the trunk sewer mapping included in **Appendix C**. 1309 and 1335 Carling Avenue is serviced by an existing 250 mm diameter sanitary sewer within Carling Avenue. The 250mm diameter sanitary sewer travels a short distance before connecting to the Cave creek Collector, as shown by **ECS-1**.

The existing site consists of a commercial mall development contributing wastewater to the local sanitary sewer system.

Table 6 summarizes the estimated existing peak flow from the site. See **Appendix C** for associated calculations.

Table 6
Summary of Estimated Existing Peak Wastewater Flow

Design Parameter	Total Flow 1309 Carling (L/s)	Total Flow 1335 Carling (L/s)	Total Flow (L/s)
Estimated Average Dry Weather Flow	1.79	0.66	2.46
Estimated Peak Dry Weather Flow	2.69	1.00	3.68
Estimated Peak Wet Weather Flow	3.74	2.04	5.78

4.2 Wastewater Design

The phased redevelopment of the site means that portions of the existing commercial building will remain and is contemplated to retain its current connections to the existing onsite sanitary sewer. Phase statistics indicating proposed commercial/retail and retained commercial for each phase is included in **Drawings/Figures**.

It is anticipated that each of the contemplated phases will have independent connections to an internal sanitary sewer network. 1335 Carling Avenue will maintain an independent connection to the local 250mm diameter sanitary sewer on Carling Avenue.

Table 7 summarizes the **City Standards** employed in the design of the proposed wastewater sewer system.

Table 7
Wastewater Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Average Daily Demand	350 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Commercial Floor Space	5 L/m ² /d
Commercial Office Space	75 L/9.3m ² /d
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$
Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 8 demonstrates the anticipated peak flow from the proposed development. See **Appendix C** for associated calculations.

Table 8
Summary of Estimated Peak Wastewater Flow

Phase	Design Parameter	Total Flow (L/s)
Phase I	Estimated Average Dry Weather Flow	3.37
	Estimated Peak Dry Weather Flow	8.47
	Estimated Peak Wet Weather Flow	9.52
Phase II	Estimated Average Dry Weather Flow	4.56
	Estimated Peak Dry Weather Flow	13.35
	Estimated Peak Wet Weather Flow	14.39
Phase III	Estimated Average Dry Weather Flow	9.66
	Estimated Peak Dry Weather Flow	32.31
	Estimated Peak Wet Weather Flow	33.35
1335 Carling	Estimated Average Dry Weather Flow	1.69
	Estimated Peak Dry Weather Flow	2.54
	Estimated Peak Wet Weather Flow	3.59
Total	Estimated Peak Wet Weather Flow	36.94

The estimated sanitary flow based on the concept plan provide in **Drawings/Figures** anticipates a total peak wet weather flow of **36.94 L/s**, which results in an increase of **31.16 L/s**.

It is anticipated that a new connection to the Cave Creek Collector sewer will be required to service 1309 Carling Avenue. While, 1335 Carling Avenue will maintain its connection to the existing 250mm diameter sanitary sewer on Carling Avenue.

Due to the proximity of the Cave Creek Collector, the existing capacity will need to be confirmed with the City of Ottawa water resources group. Correspondence with the City indicated that the Crave Creek Collector is currently being evaluated, early estimates for a completed model of this Collector sewer in this area by the water resources group is April/May 2016.

4.3 Wastewater Servicing Conclusions

Due to the proximity of the Cave Creek Collector, the existing capacity will need to be confirmed with the City of Ottawa water resources group. Correspondence with the City indicates the collector sewer is currently being evaluated

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 located within the Ottawa Central sub-watershed. As such, approvals for proposed development 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 having jurisdiction. The subject property is located within the Ottawa River watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in **Appendix A**.

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with the City of Ottawa, where the proposed development has the following requirements:

- Allowable release rate based on a Rational Method Coefficient of 0.50, employing the City of Ottawa IDF parameters for a 5-year storm with a calculated time of concentration.
- External areas will need to be included in the sizing of the stormwater conveyance system, but not attenuated.
- All storms up to and including the City of Ottawa 100-year design event are to be attenuated on site.
- Quality controls are not required for the proposed development due to the site's distance from the outlet; however, opportunities to enhance water quality by use of LIDs is encouraged by the RVCA, correspondence is included in **Appendix A**.

Based on the above, the allowable release rate for 1309 Carling Avenue is **564.0 L/s** for the 5-year event and **745.1 L/s** in the 100-year event. 1335 Carling Avenue is **81.5 L/s** and **85.6 L/s** for the 5 and 100 year events respectively.

5.3 Proposed Stormwater Management System

To meet the stormwater objectives the proposed development may contain a combination of roof top flow attenuation along with surface and subsurface storage.

Tables 9 and 10 summarize the post-development flow rates for 1309 and 1335 Carling Avenue. The following storage requirement estimate assumes that approximately 10% of the development area will be directed to the outlet without flow attenuation. These areas will be compensated for in areas with flow attenuation controls.

Table 9
Stormwater Flow Rate Summary – 1309 Carling Avenue

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m ³)	(L/s)	(m ³)
Unattenuated Areas	103.65	0.0	222.05	0.0
Attenuated Areas	460.67	451.1	523.05	1213.4
Total	564.3	451.09	745.10	1213.4

Table 10
Stormwater Flow Rate Summary – 1335 Carling Avenue

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m ³)	(L/s)	(m ³)
Unattenuated Areas	13.62	0.0	25.94	0.0
Attenuated Areas	67.85	48.5	59.66	157.4
Total	81.5	48.48	85.60	157.4

It is anticipated that approximately **1213 m³** and **157m³** of storage will be required on site to attenuate flow to the established release rates at 1309 and 1335 Carling Avenue respectively; storage calculations are contained within **Appendix D**.

Actual storage volumes will need to be confirmed at the detailed design stage based on a number of factors including grading constraints.

5.4 Stormwater Servicing Conclusions

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 in accordance with City of Ottawa **City Standards**. The post-development allowable release rate for 1309 Carling Avenue was calculated as **564.0 L/s** for the 5-year event and **745.1 L/s** in the 100-year event. 1335 Carling Avenue is **81.5 L/s** and **85.6 L/s** for the 5 and 100 year events respectively. It is estimated that **1213 m³** and **157m³** of storage will be required on site to attenuate flow to the established release rates at 1309 and 1335 Carling Avenue respectively.

Based on consultation with the RVCA, specific stormwater quality controls will not be required; however, opportunities to improve quality are encouraged.

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

6.0 UTILITIES

An existing Hydro corridor is located along the rear and running through the eastern edge of the property, as shown by Figure 1. Hydro towers and an overhead power line are located within the adjacent hydro properties. Clearances in accordance with the utility having jurisdiction will need to be maintained.

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

8.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained to prepare an Assessment of Adequacy of Public Services report in support of the application for a Zoning By-law Amendment (ZBLA) at 1309 Carling Avenue. 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;
- The FUS method for estimating fire flow indicated a maximum of **24,000 L/min** is required for the contemplated development;
- The contemplated development is anticipated to have a total peak wet weather flow of **36.94 L/s**;
- Due to the proximity of the Cave Creek Collector, the existing capacity will need to be confirmed with the City of Ottawa water resources group.;
- Based on consultation with the City the contemplated development will be required to attenuate post development flows to **564.0 L/s** for the 5-year event and **745.1 L/s** in the 100-year event of all storms up to and including the 100-year storm event at 1309 Carling Avenue, while 1335 Carling Avenue target release rates are **81.5 L/s** and **85.6 L/s** for the 5 and 100 year events respectively;
- It is contemplated that stormwater objectives may be met through storm water retention via roof top, surface and subsurface storage, it is anticipated that **1213 m³** and **157 m³** of onsite storage will be required to attenuate flow to the established release rate above;
- Based on consultation with the RVCA, specific stormwater quality controls will not be required; however, opportunities to improve quality are encouraged;

Prepared by,
David Schaeffer Engineering Ltd.

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Alison J. Gosling.



Per: Adam D. Fobert, P.Eng

APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

15-793

13/05/2016

4.1 General Content		
<input type="checkbox"/>	Executive Summary (for larger reports only).	N/A
<input checked="" type="checkbox"/>	Date and revision number of the report.	Report Cover Sheet
<input checked="" type="checkbox"/>	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
<input checked="" type="checkbox"/>	Plan showing the site and location of all existing services.	Figure 1
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
<input checked="" type="checkbox"/>	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 defensible design criteria.	Section 2.1
<input checked="" type="checkbox"/>	Statement of objectives and servicing criteria.	Section 1.0
<input checked="" type="checkbox"/>	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
<input type="checkbox"/>	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
<input type="checkbox"/>	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.	N/A
<input type="checkbox"/>	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
<input type="checkbox"/>	Proposed phasing of the development, if applicable.	N/A
<input checked="" type="checkbox"/>	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.4
<input checked="" type="checkbox"/>	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	ECS-1
4.2 Development Servicing Report: Water		
<input type="checkbox"/>	Confirm consistency with Master Servicing Study, if available	N/A
<input checked="" type="checkbox"/>	Availability of public infrastructure to service proposed development	Section 3.1
<input checked="" type="checkbox"/>	Identification of system constraints	Section 3.1
<input checked="" type="checkbox"/>	Identify boundary conditions	Section 3.1, 3.2
<input checked="" type="checkbox"/>	Confirmation of adequate domestic supply and pressure	Section 3.3

<input checked="" type="checkbox"/>	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
<input type="checkbox"/>	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
<input type="checkbox"/>	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
<input type="checkbox"/>	Address reliability requirements such as appropriate location of shut-off valves	N/A
<input type="checkbox"/>	Check on the necessity of a pressure zone boundary modification	N/A
<input checked="" type="checkbox"/>	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, 3.3
<input type="checkbox"/>	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.	N/A
<input type="checkbox"/>	Description of off-site required feeder mains, 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
<input checked="" type="checkbox"/>	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
<input type="checkbox"/>	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

<input checked="" type="checkbox"/>	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
<input type="checkbox"/>	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
<input type="checkbox"/>	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
<input checked="" type="checkbox"/>	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
<input type="checkbox"/>	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

<input type="checkbox"/>	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
<input type="checkbox"/>	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
<input type="checkbox"/>	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
<input type="checkbox"/>	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
<input checked="" type="checkbox"/>	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
<input type="checkbox"/>	Set-back from private sewage disposal systems.	N/A
<input type="checkbox"/>	Watercourse and hazard lands setbacks.	N/A
<input checked="" type="checkbox"/>	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
<input type="checkbox"/>	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
<input checked="" type="checkbox"/>	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
<input type="checkbox"/>	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
<input checked="" type="checkbox"/>	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
<input type="checkbox"/>	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
<input type="checkbox"/>	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
<input type="checkbox"/>	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
<input type="checkbox"/>	Identification of potential impacts to receiving watercourses	N/A
<input type="checkbox"/>	Identification of municipal drains and related approval requirements.	N/A

<input checked="" type="checkbox"/>	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
<input type="checkbox"/>	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
<input type="checkbox"/>	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
<input checked="" type="checkbox"/>	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 6.0
<input type="checkbox"/>	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
<input type="checkbox"/>	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

<input checked="" type="checkbox"/>	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 Act. 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
<input type="checkbox"/>	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
<input type="checkbox"/>	Changes to Municipal Drains.	N/A
<input type="checkbox"/>	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

<input checked="" type="checkbox"/>	Clearly stated conclusions and recommendations	Section 7.0
<input type="checkbox"/>	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.	
<input type="checkbox"/>	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

Robert Freel

From: Robertson, Syd <Syd.Robertson@ottawa.ca>
Sent: November-03-15 10:06 AM
To: Robert Freel
Subject: RE: 1309 Carling Ave (Westgate Mall) - Servicing Information
Attachments: 1309 Carling Ave.pdf

Hi Bobby:

Attached please find general information on the sewer and watermain in the vicinity of the subject site. Please provide the total pre & post development sanitary flows (Peak flow + infiltration) from the subject site, which I'll forward to Asset Management, to determine if the adjacent Cave Creek Sanitary Collector has the capacity to accommodate the net increase in sanitary flows.

Thanks,

Syd Robertson, C.E.T.

Project Manager, Infrastructure Approvals

Development Review Services Branch, Urban Outer Core
Planning & Growth Management Department
110 Laurier Ave. W., 4th Floor E
Ottawa, ON K1P 1J1



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☎ 613.580.2424 ext./poste 27916

ottawa.ca/planning / ottawa.ca/urbanisme



From: Robert Freel [mailto:rffree@dsel.ca]
Sent: October 30, 2015 12:34 PM
To: Robertson, Syd
Subject: RE: 1309 Carling Ave (Westgate Mall) - Boundary conditions

Hi Syd,

We were not part of the original pre-consultation meeting for Westgate did you have a letter relating to site servicing? If not let me know and we can discuss.

Thanks,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL

david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.558

cell: (613) 314-7675

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From: Robertson, Syd [<mailto:Syd.Robertson@ottawa.ca>]

Sent: September-24-15 4:15 PM

To: Robert Freel

Subject: 1309 Carling Ave (Westgate Mall) - Boundary conditions

Hi Bobby:

The following are boundary conditions, HGL, for hydraulic analysis at 1309 Carling (zone 2W) assumed to be connected to the 406mm on Carling Ave. (See attached PDF for connection locations)

Connection 1

	Phase 1	Phase 2	Phase 3	Phase 4
Minimum HGL	122.1m	122.0m	121.8m	120.6m
Maximum HGL	137.4m	137.2m	136.7m	136.5m
Available Flow assuming a residual of 20 psi and a ground elevation of 73.9m	697 L/s	695 L/s	693 L/s	686 L/s

The estimated ground elevation is 73.9m, the maximum pressure is estimated to be more than 80 psi for all Phases. A pressure check at completion of construction is recommended to determine if pressure control is required.

Connection 2

	Phase 1	Phase 2	Phase 3	Phase 4
Minimum HGL	122.0m	121.8m	121.6m	120.4m
Maximum HGL	137.3m	137.1m	136.6m	136.5m

Available Flow assuming a residual of 20 psi and a ground elevation of 74.7m	670 L/s	668 L/s	666 L/s	660 L/s
--	---------	---------	---------	---------

The estimated ground elevation is 74.7m, the maximum pressure is estimated to be more than 80 psi for all Phases. A pressure check at completion of construction is recommended to determine if pressure control is required.

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.

Please call me if you have any questions.

Thanks,

Syd Robertson, C.E.T.

Project Manager, Infrastructure Approvals

Development Review Services Branch, Urban Outer Core

Planning & Growth Management Department

110 Laurier Ave. W., 4th Floor E

Ottawa, ON K1P 1J1



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☎ 613.580.2424 ext./poste 27916

ottawa.ca/planning / ottawa.ca/urbanisme

From: Robert Freel [<mailto:rffree@dsel.ca>]

Sent: September 18, 2015 11:46 AM

To: Robertson, Syd

Subject: Westgate Centre - Boundary condition request

Good afternoon Syd,

We would like to request water boundary conditions for Westgate Centre using the following proposed development demands:

1. Location of Service / Street Number: 1309 Carling Avenue

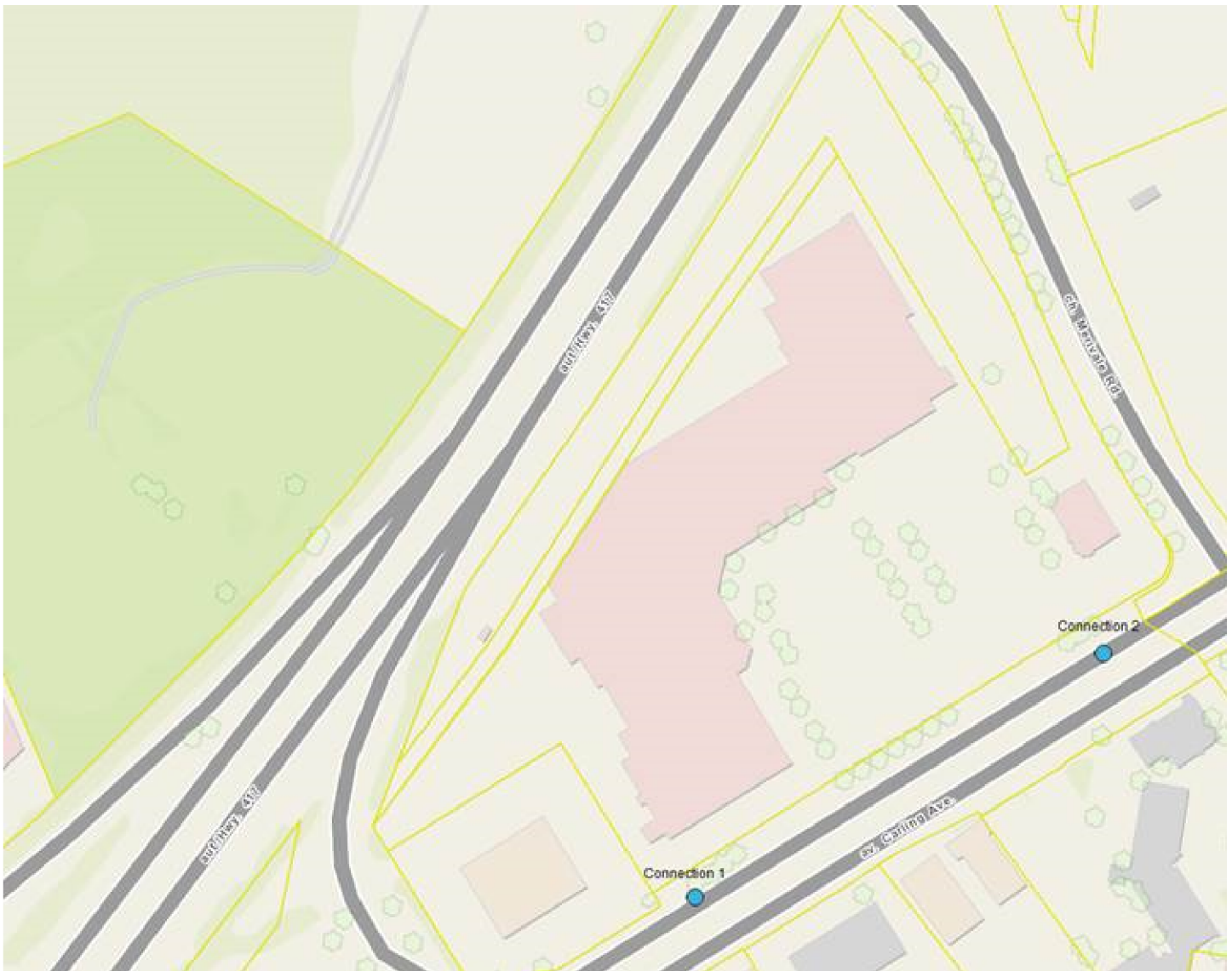
2. Type of development and the amount of fire flow required for the proposed development:

- Proposed Phased development is mixed use residential/commercial. The full build-out proposes 1136 residential units and 8,250 m² of commercial space.
- It is anticipated that the development will have a dual connection to be services from the existing 406 mm diameter watermain within Carling Avenue, as shown by the attached map.
- Fire demand based on FUS will be used to calculate fire demand, sufficient information is unavailable at this time to complete a calculation we would request that the available fire flow at 140 kPa (20 psi) be provided for later comparison.

3.

Phase	I		II		III		IV	
	L/min	L/s	L/min	L/s	L/min	L/s	L/min	L/s
Avg. Daily	114.2	1.9	198.1	3.3	275.9	4.6	511.4	8.5
Max Day	297.5	5.0	465.4	7.8	665.9	11.1	1264.1	21.1
Peak Hour	459.8	7.7	1005.9	16.8	1450.6	24.2	2772.4	46.2

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



Thank you,

Bobby Freel, P.Eng.

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 203
Stittsville, ON K2S 1E9

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Robert Freel

From: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Sent: November-05-15 12:20 PM
To: Robert Freel
Subject: RE: 1309 Carling Avenue - RVCA

Hello Bobby,

Based on the distance to the receiver, the RVCA will not be advising that quality controls for stormwater are required on the site. It is however a large site with a lot of surface parking. Any efforts to reduce the TSS load should be explored and would be supported.

Jocelyn

Jocelyn Chandler M.Pl. MCIP, RPP
Planner, RVCA

t) 613-692-3571 x1137

f) 613-692-0831

jocelyn.chandler@rvca.ca

www.rvca.ca

mail: Box 599 3889 Rideau Valley Dr., Manotick, ON K4M 1A5

courier: 3889 Rideau Valley Dr., Nepean, ON K2C 3H1

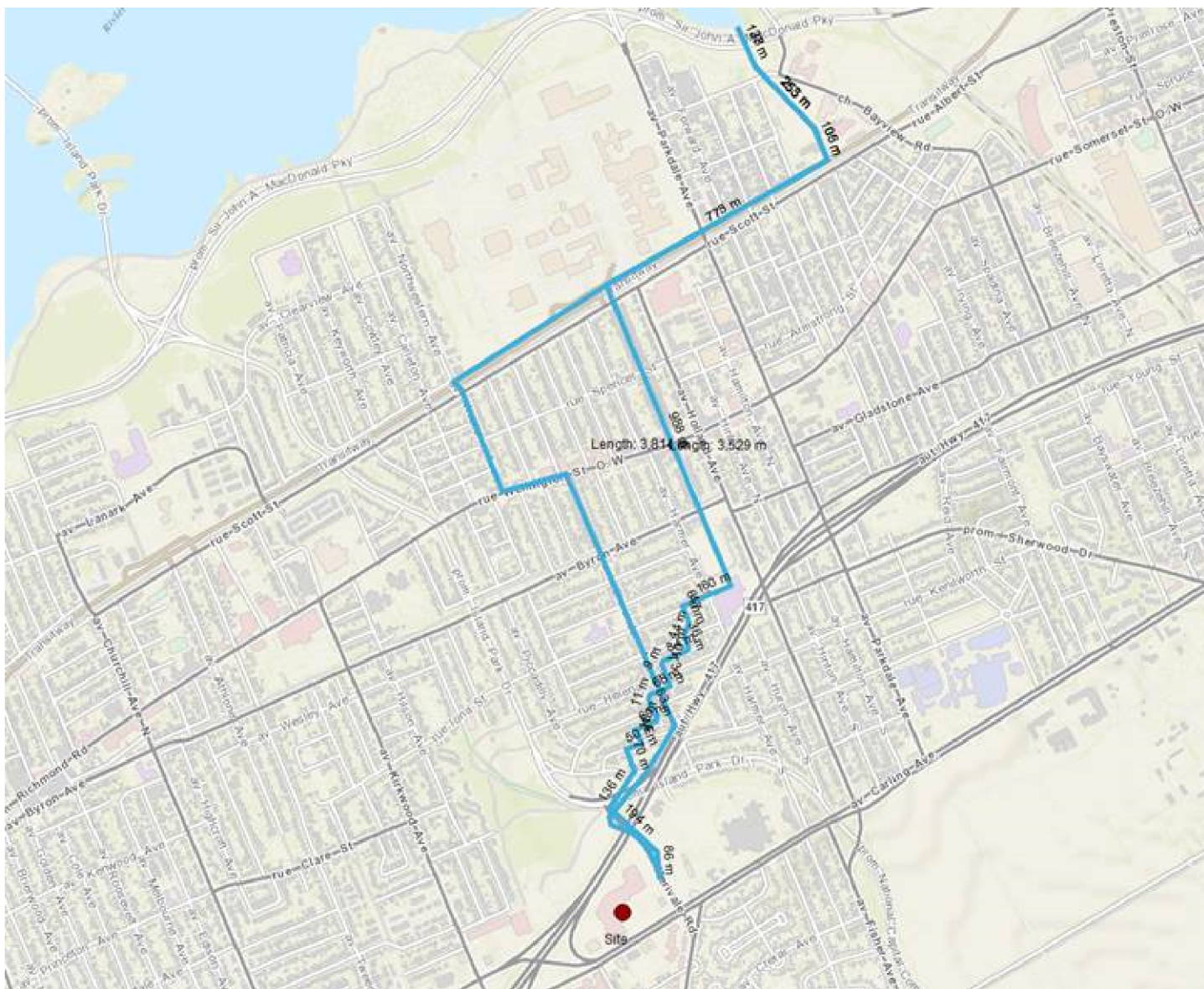
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From: Robert Freel [<mailto:rffreel@dsel.ca>]
Sent: Tuesday, November 03, 2015 2:34 PM
To: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Subject: 1309 Carling Avenue - RVCA

Good afternoon Jocelyn,

We are working to complete some due diligence work on a property at 1309 Carling Avenue. Based on the information available it appears that the existing storm sewers servicing the site travel 3.5 – 3.8 km before discharging to the Ottawa River as shown by the figure below. The contemplated plan involves a phased redevelopment of the commercial property into a residential/commercial mixed-use development.

Can you provide any requirements relating to quality?



Thanks,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL

david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.558

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APPENDIX B

Water Supply

RIOCAN
Westgate Centre

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



Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	0	0.0	0.0	0.0	0.0	0.0	0.0

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	15,484	38.71	26.9	58.1	40.3	104.5	72.6
Office	75 L/9.3m ² /d		0.00	0.0	0.0	0.0	0.0	0.0
Restaurant*	125 L/seat/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			38.7	26.9	58.1	40.3	104.5	72.6
Total Demand			38.7	26.9	58.1	40.3	104.5	72.6

* Estimated number of seats at 1 seat per 9.3m²

RIOCAN
Westgate Centre
Phase I

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



Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	187	337

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	337	118.0	81.9	353.9	245.7	530.8	368.6

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	17,361	43.40	30.1	65.1	45.2	117.2	81.4
Office	75 L/9.3m ² /d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			43.4	30.1	65.1	45.2	117.2	81.4
Total Demand			161.4	112.0	419.0	290.9	648.0	450.0

RIOCAN
Westgate Centre
Phase II

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



Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	371	668

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	668	233.8	162.4	584.5	405.9	1285.9	893.0

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	15,990	39.98	27.8	60.0	41.6	107.9	75.0
Office	75 L/9.3m ² /d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0

Total I/CI Demand	40.0	27.8	60.0	41.6	107.9	75.0
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Total Demand	273.8	190.1	644.5	447.5	1393.8	967.9
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RIOCAN
Westgate Centre
Phase III

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



Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	1183	2130

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	2130	745.5	517.7	1863.8	1294.3	4100.3	2847.4

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	8,942	22.35	15.5	33.5	23.3	60.4	41.9
Office	75 L/9.3m ² /d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			22.4	15.5	33.5	23.3	60.4	41.9
Total Demand			767.9	533.2	1897.3	1317.6	4160.6	2889.3

RIOCAN
Westgate Centre
1335 Carling

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



Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	0	0.0	0.0	0.0	0.0	0.0	0.0

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	1,394	3.49	2.4	5.2	3.6	9.4	6.5
Office	75 L/9.3m ² /d	14,214	114.63	79.6	171.9	119.4	309.5	214.9
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0

Total I/CI Demand	118.1	82.0	177.2	123.0	318.9	221.5
--------------------------	-------	------	-------	-------	-------	-------

Total Demand	118.1	82.0	177.2	123.0	318.9	221.5
---------------------	-------	------	-------	-------	-------	-------

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

**Fire Flow Required****1. Base Requirement**

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

Type of Construction: Ordinary Construction

C 1 Type of Construction Coefficient per FUS Part II, Section 1
A 20500.0 m² Total floor area based on FUS Part II section 1

Fire Flow	31499.2 L/min
	31000.0 L/min rounded to the nearest 1,000 L/min

Adjustments**2. Reduction for Occupancy Type**

Limited Combustible -15%

Fire Flow	26350.0 L/min
------------------	----------------------

3. Reduction for Sprinkler Protection

Sprinklered -50%

Reduction	-13175 L/min
------------------	---------------------

4. Increase for Separation Distance

N >45m	0%
S >45m	0%
E >45m	0%
W >45m	0%

% Increase	0%	value not to exceed 75% per FUS Part II, Section 4
-------------------	-----------	--

Increase	0.0 L/min
-----------------	------------------

Total Fire Flow

Fire Flow	13175.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	13000.0 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 Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999



Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C 1 Type of Construction Coefficient per FUS Part II, Section 1
A 21740.0 m² Total floor area based on FUS Part II section 1

Fire Flow	32437.9 L/min
	32000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	27200.0 L/min
-----------	---------------

3. Reduction for Sprinkler Protection

Sprinklered -50%

Reduction	-13600 L/min
-----------	--------------

4. Increase for Separation Distance

N 10.1m-20m 15%
S >45m 0%
E >45m 0%
W 20.1m-30m 10%

% Increase	25%	value not to exceed 75% per FUS Part II, Section 4
------------	-----	--

Increase	6800.0 L/min
----------	--------------

Total Fire Flow

Fire Flow	20400.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	20000.0 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 Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999



Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C 1 Type of Construction Coefficient per FUS Part II, Section 1
A 20000.0 m² Total floor area based on FUS Part II section 1

Fire Flow	31112.7 L/min
	31000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	26350.0 L/min
-----------	---------------

3. Reduction for Sprinkler Protection

Sprinklered -50%

Reduction	-13175 L/min
-----------	--------------

4. Increase for Separation Distance

N	>45m	0%
S	10.1m-20m	15%
E	10.1m-20m	15%
W	>45m	0%

% Increase	30%	value not to exceed 75% per FUS Part II, Section 4
------------	-----	--

Increase	7905.0 L/min
----------	--------------

Total Fire Flow

Fire Flow	21080.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	21000.0 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 Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999



Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C 1 Type of Construction Coefficient per FUS Part II, Section 1
A 27313.0 m² Total floor area based on FUS Part II section 1

Fire Flow	36358.6 L/min
	36000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	30600.0 L/min
-----------	----------------------

3. Reduction for Sprinkler Protection

Sprinklered -50%

Reduction	-15300 L/min
-----------	---------------------

4. Increase for Separation Distance

N >45m 0%

S >45m 0%

E >45m 0%

W 10.1m-20m 15%

% Increase	15%	value not to exceed 75% per FUS Part II, Section 4
------------	------------	--

Increase	4590.0 L/min
----------	---------------------

Total Fire Flow

Fire Flow	19890.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	20000.0 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 Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999



Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C 1 Type of Construction Coefficient per FUS Part II, Section 1
A 26775.0 m² Total floor area based on FUS Part II section 1

Fire Flow	35998.7 L/min
	36000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	30600.0 L/min
------------------	----------------------

3. Reduction for Sprinkler Protection

Sprinklered -50%

Reduction	-15300 L/min
------------------	---------------------

4. Increase for Separation Distance

N >45m 0%

S >45m 0%

E 10.1m-20m 15%

W 10.1m-20m 15%

% Increase	30%	value not to exceed 75% per FUS Part II, Section 4
-------------------	------------	--

Increase	9180.0 L/min
-----------------	---------------------

Total Fire Flow

Fire Flow	24480.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	24000.0 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 Underwriters Survey - Part II

RIOCAN
Westgate Centre
1335 Carling

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999



Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C 1 Type of Construction Coefficient per FUS Part II, Section 1
A 14632.2 m² Total floor area based on FUS Part II section 1

Fire Flow	26612.0 L/min
	27000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	22950.0 L/min
-----------	---------------

3. Reduction for Sprinkler Protection

Sprinklered -50%

Reduction	-11475 L/min
-----------	--------------

4. Increase for Separation Distance

N >45m 0%

S >45m 0%

E 10.1m-20m 15%

W >45m 0%

% Increase	15%	value not to exceed 75% per FUS Part II, Section 4
------------	-----	--

Increase	3442.5 L/min
----------	--------------

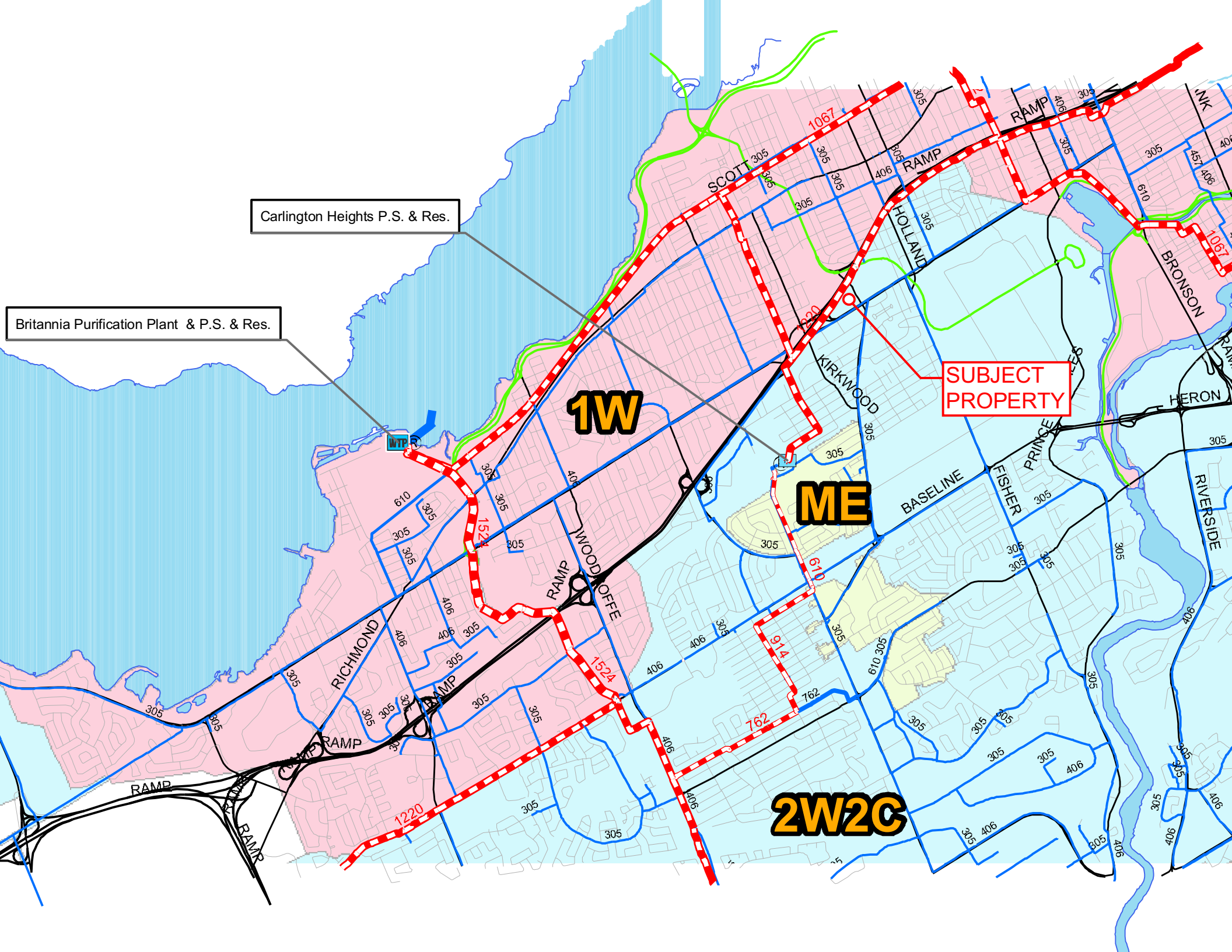
Total Fire Flow

Fire Flow	14917.5 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	15000.0 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 Underwriters Survey - Part II



Alison Gosling

From: Oram, Cody <Cody.Oram@ottawa.ca>
Sent: May-11-16 11:13 AM
To: agosling@dsel.ca
Subject: RE: 1309 Carling Ave (Westgate Mall) & 1335 Carling Ave - Boundary conditions
Attachments: 1309-1355 Carling Dec 2015.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Hi Alison,

The following are boundary conditions, HGL, for hydraulic analysis at 1309 and 1355 Carling (zone 2W) assumed to be connected to the 406mm on Carling Ave. (See attached PDF for connection locations)

1309 Carling

Minimum HGL = 120.2m

Maximum HGL = 136.2m; *the maximum pressure is estimated to be more than 80 psi for all Phases. A pressure check at completion of construction is recommended to determine if pressure control is required.*

Available Flow (connection 1) = 686 L/s assuming a residual of 20 psi and a ground elevation of 73.9m

Available Flow (connection 2) = 660 L/s assuming a residual of 20 psi and a ground elevation of 74.7m

1355 Carling

Minimum HGL = 121.5m

Maximum HGL = 137m; *the maximum pressure is estimated to be more than 80 psi for all Phases. A pressure check at completion of construction is recommended to determine if pressure control is required.*

Available Flow (connection 3) = 680 L/s assuming a residual of 20 psi and a ground elevation of 73.9m

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

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Regards,

Cody Oram, P.Eng.

Project Manager, Development Review
(Urban Services) Outer
Gestionnaire de projets
(Secteur urbain) Extérieur

City of Ottawa | ville d'Ottawa

613.580.2424 ext/poste 13422

Please consider the environment before printing this e-mail.

From: Alison Gosling [<mailto:agosling@dsel.ca>]

Sent: May 05, 2016 5:02 PM

To: Robertson, Syd

Cc: Robert Freil

Subject: FW: 1309 Carling Ave (Westgate Mall) & 1335 Carling Ave - Boundary conditions

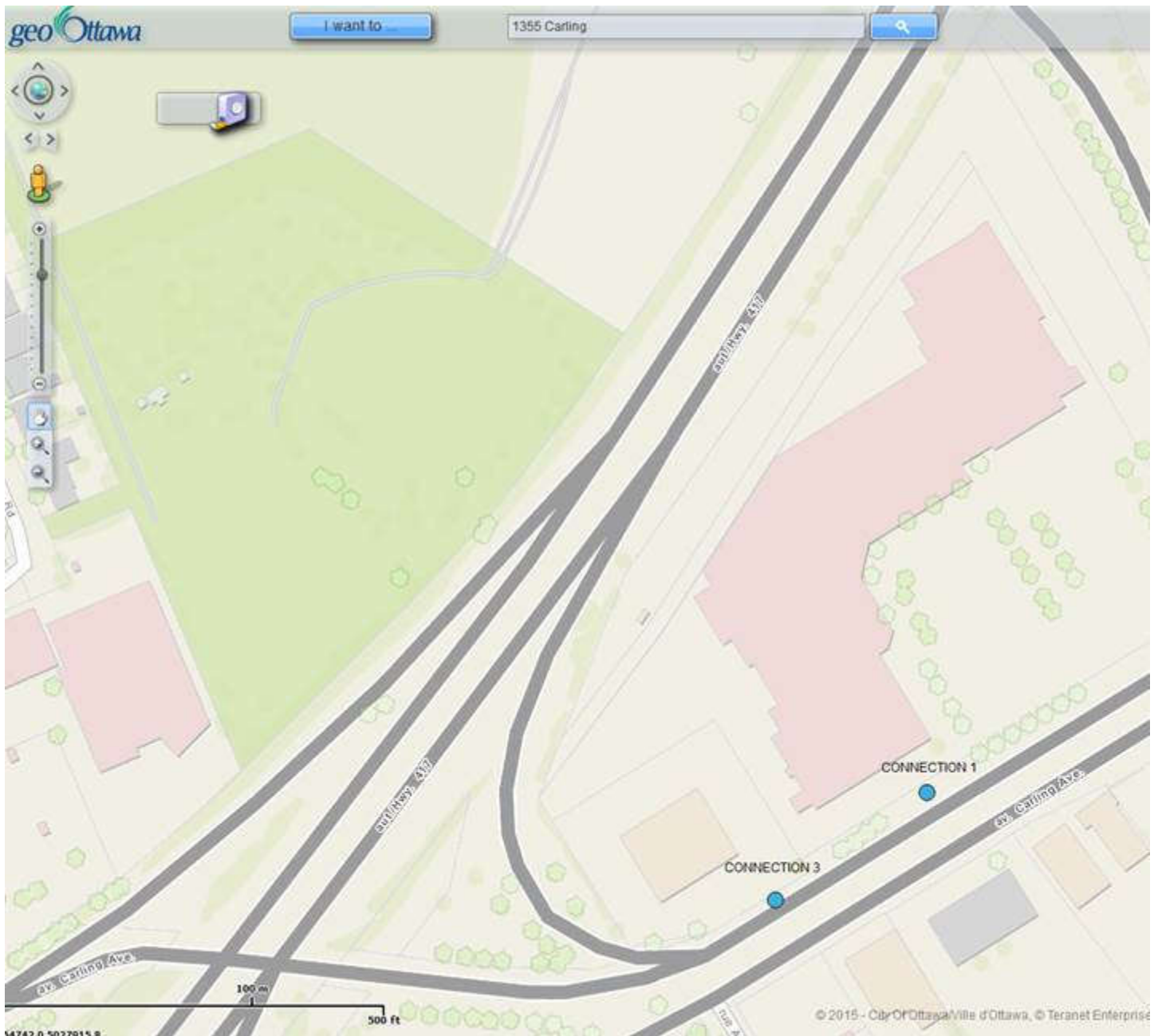
Good afternoon Syd,

We have received an updated site plan for 1309 and 1355 Carling Avenue. Please note that the ultimate number of units and the number of units for each phase has been revised. Can we get updated boundary conditions to reflect the updates.

The demands for each Phase are included below and will remain at connection 1 and 2, the development at 1355 Carling is proposed to have an independent connection at connection 3:

The updated demands are summarized below:

Phase	I		II		III		1335 Carling	
	L/min	L/s	L/min	L/s	L/min	L/s	L/min	L/s
Avg. Daily	112.0	1.87	190.1	3.17	533.2	8.89	82.0	1.37
Max Day	290.9	4.85	447.5	7.46	1317.6	21.96	123.0	2.05
Peak Hour	450.0	7.50	967.9	16.13	2889.3	48.16	221.5	3.69



Please let us know if you have any questions or would like to discuss.

Thank you,

Alison Gosling
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.542

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From: Robertson, Syd [<mailto:Syd.Robertson@ottawa.ca>]
Sent: December-31-15 11:51 AM
To: Robert Freel
Subject: FW: 1309 Carling Ave (Westgate Mall) & 1335 Carling Ave - Boundary conditions

Hi Bobby:

The following are boundary conditions, HGL, for hydraulic analysis at 1309 and 1355 Carling (zone 2W) assumed to be connected to the 406mm on Carling Ave. (See attached PDF for connection locations)

1309 Carling

Minimum HGL = 120.5m

Maximum HGL = 136.4m; *the maximum pressure is estimated to be more than 80 psi for all Phases. A pressure check at completion of construction is recommended to determine if pressure control is required.*

Available Flow (connection 1) = 686 L/s assuming a residual of 20 psi and a ground elevation of 73.9m

Available Flow (connection 2) = 660 L/s assuming a residual of 20 psi and a ground elevation of 74.7m

1355 Carling

Minimum HGL = 121.5m

Maximum HGL = 137m; *the maximum pressure is estimated to be more than 80 psi for all Phases. A pressure check at completion of construction is recommended to determine if pressure control is required.*

Available Flow (connection 3) = 680 L/s assuming a residual of 20 psi and a ground elevation of 73.9m

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.

From: Robert Freel [<mailto:rffree@dssel.ca>]
Sent: December 23, 2015 10:29 AM
To: Robertson, Syd
Subject: RE: 1309 Carling Ave (Westgate Mall) - Boundary conditions

Hi Syd,

To summarize and hopefully clarify;

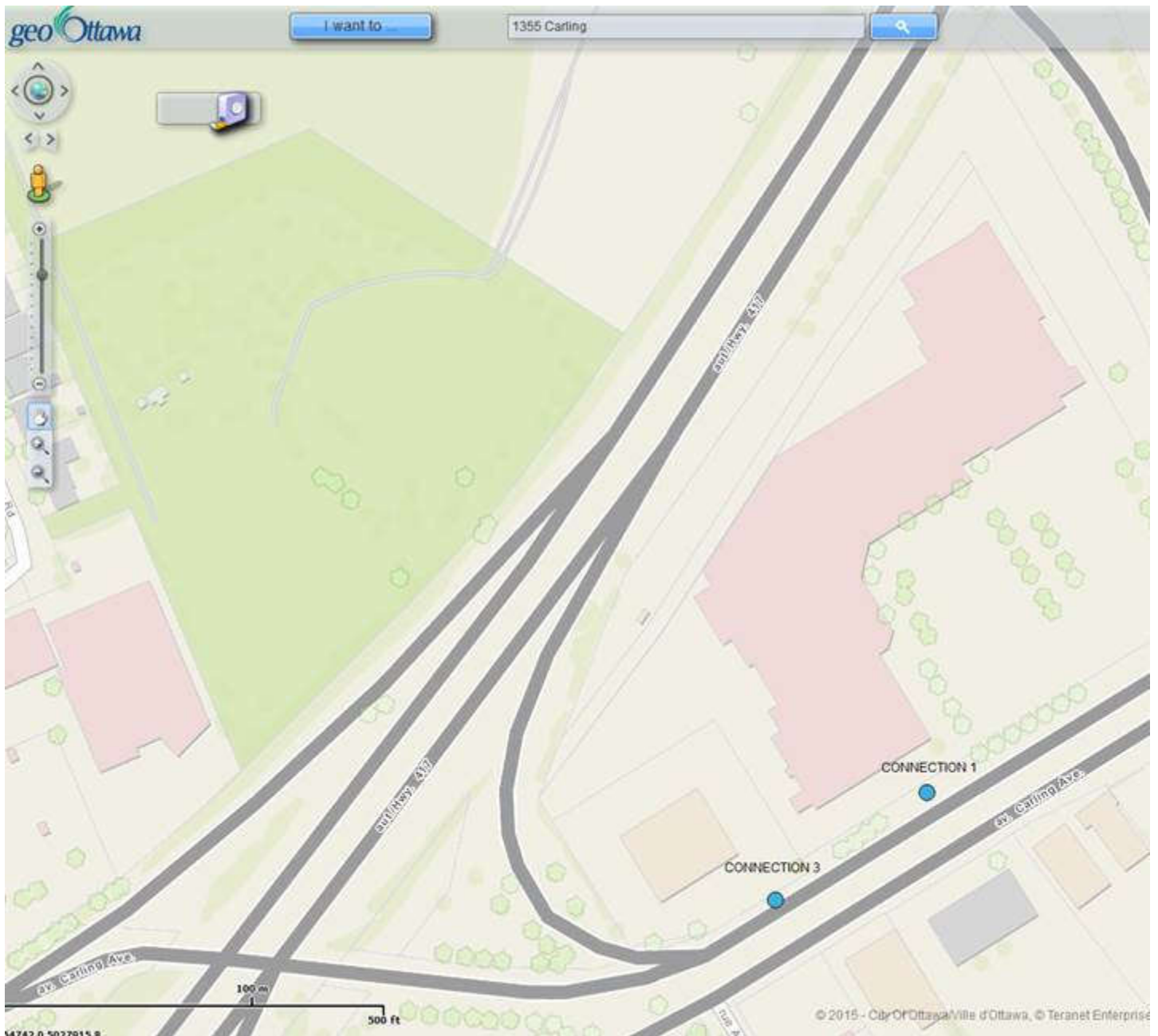
We would like to request boundary conditions using the demands for 1355 Carling below with a third connection point as shown in the attached map. It is anticipated that the development would happen at a point of full buildout of the development at 1309 Carling Ave.

The total follow including all Phases and the lands at 1355 Carling are included below and will remain at connection 1 and 2, the development at 1355 Carling is proposed to have an independent connection at connection 3:

1. Location of Service / Street Number: 1355 Carling Avenue
2. Type of development and the amount of fire flow required for the proposed development:
 - Proposed additional lands are commercial retail and office. The additional lands proposes 1394 m² of commercial retail and 14,214 m² of commercial office space.
 - It is anticipated that the development will have a dual connection to be services from the existing 406 mm diameter watermain within Carling Avenue, as previously proposed.
 - Fire demand based on FUS will be used to calculate fire demand, sufficient information is unavailable at this time to complete a calculation we would request that the available fire flow at 140 kPa (20 psi) be provided for later comparison.

Phase	1309 Carling Ave		1355 Carling Ave	
	L/min	L/s	L/min	L/s
Avg. Daily	511.4	8.5	82.0	1.37
Max Day	1264.1	21.1	123.0	2.05
Peak Hour	2772.4	46.2	221.5	3.69

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



Thank you,

Bobby Freel, P.Eng.

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 203
Stittsville, ON K2S 1E9
phone: (613) 836-0856 ext.258
cell: (613) 314-7675
email: rfreel@DSEL.ca

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From: Robertson, Syd [<mailto:Syd.Robertson@ottawa.ca>]
Sent: December-23-15 9:51 AM
To: Robert Freel
Subject: RE: 1309 Carling Ave (Westgate Mall) - Boundary conditions

Hi Bobby:

Please provide separate water demand data for 1335 Carling Avenue rather than grouping it with the adjacent development.

Thanks,

Syd Robertson, C.E.T.

Project Manager, Infrastructure Approvals

Development Review Services Branch, Urban Outer Core

Planning & Growth Management Department

110 Laurier Ave. W., 4th Floor E

Ottawa, ON K1P 1J1



City of Ottawa | Ville d'Ottawa

☎ 613.580.2424 ext./poste 27916

ottawa.ca/planning / ottawa.ca/urbanisme



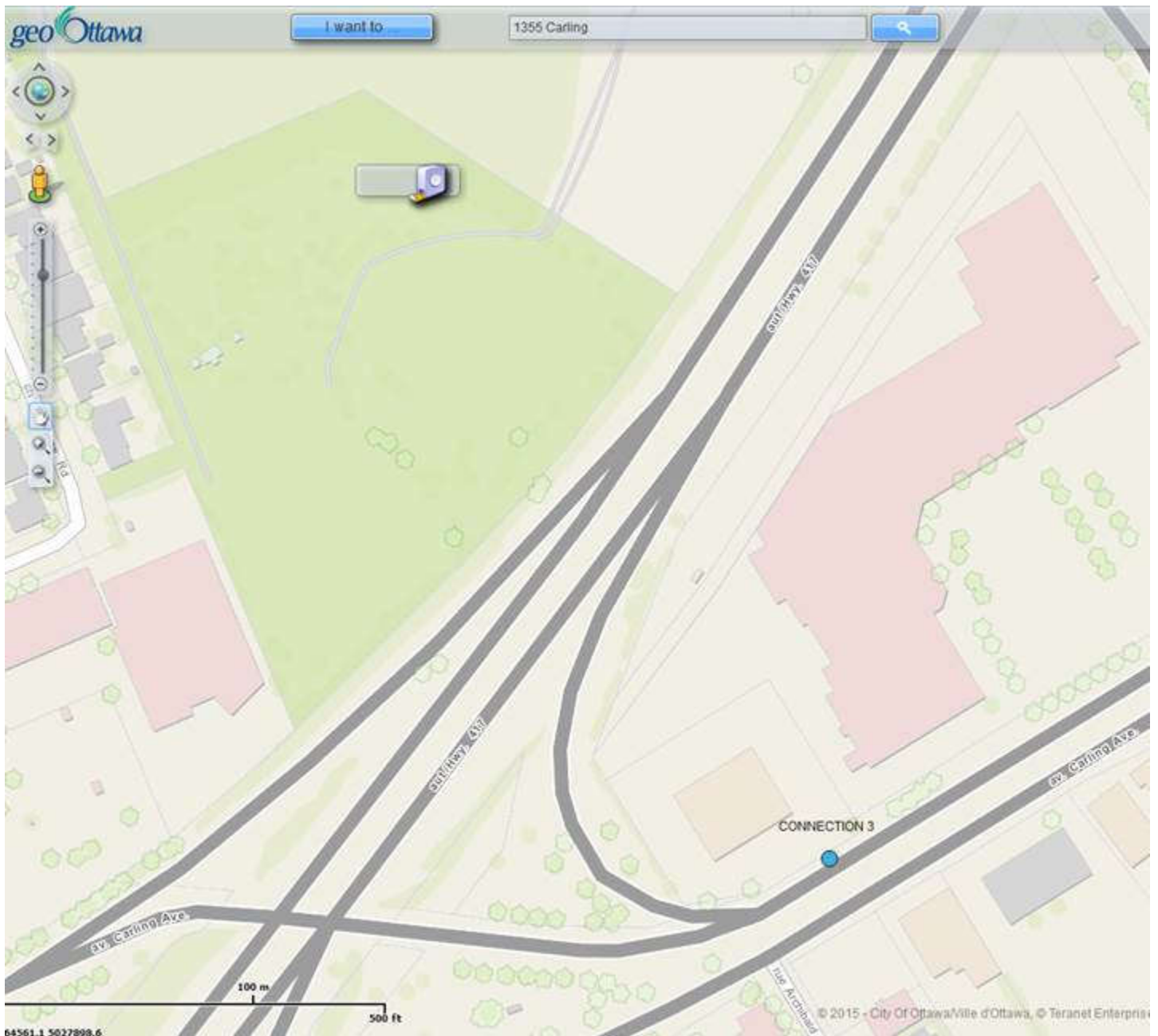
From: Robert Freel [<mailto:rffree@dsel.ca>]
Sent: December 23, 2015 9:30 AM
To: Robertson, Syd
Subject: RE: 1309 Carling Ave (Westgate Mall) - Boundary conditions

Hi Syd,

Our initial understanding was that 1355 Carling would become part of the existing property at 1309 Carling, however we have been informed that it will remain its own property and as a result is intended to retain independent connections to the watermain in Carling Ave.

We would like to request boundary conditions using the demands for 1355 Carling below with a third connection point as shown in the attached map.

Please feel free to give me call to discuss.



Thanks,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL

david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.558
cell: (613) 314-7675
email: rfreel@DSEL.ca

From: Robertson, Syd [<mailto:Syd.Robertson@ottawa.ca>]
Sent: December-21-15 2:54 PM
To: rffree@dsel.ca
Subject: FW: 1309 Carling Ave (Westgate Mall) - Boundary conditions

Hi Bobby:

The following are boundary conditions, HGL, for hydraulic analysis at 1309 and 1355 Carling (zone 2W) assumed to be connected to the 406mm on Carling Ave. (See attached PDF for connection locations)

Minimum HGL = 120.6m

Maximum HGL = 136.2m; *the maximum pressure is estimated to be more than 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.*

Connection 1

Available Flow = 686 L/s assuming a residual of 20 psi and a ground elevation of 73.9m

Connection 2

Available Flow = 660 L/s assuming a residual of 20 psi and a ground elevation of 74.7m

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.

Syd Robertson, C.E.T.

Project Manager, Infrastructure Approvals
Development Review Services Branch, Urban Outer Core
Planning & Growth Management Department
110 Laurier Ave. W., 4th Floor E
Ottawa, ON K1P 1J1

From: Robert Freel [<mailto:rffree@dsel.ca>]
Sent: December 15, 2015 5:29 PM
To: Robertson, Syd
Subject: RE: 1309 Carling Ave (Westgate Mall) - Boundary conditions

Hi Syd,

The master plan is being expanded to include a property adjacent to the site, the address is 1355 Carling Ave. Can we get a set of boundary conditions that include these lands and the total build out of the existing lands.

The total follow including all Phases and the lands at 1355 Carling are included below, **the development at 1355 Carling is proposed to have independent connections:**

1. Location of Service / Street Number: 1355 Carling Avenue

2. Type of development and the amount of fire flow required for the proposed development:

- Proposed additional lands are commercial retail and office. The additional lands proposes 1394 m² of commercial retail and 14,214 m² of commercial office space.
- It is anticipated that the development will have a dual connection to be services from the existing 406 mm diameter watermain within Carling Avenue, as previously proposed.
- Fire demand based on FUS will be used to calculate fire demand, sufficient information is unavailable at this time to complete a calculation we would request that the available fire flow at 140 kPa (20 psi) be provided for later comparison.

Phase	IV + 1335 Carling	
	L/min	L/s
Avg. Daily	593.4	9.9
Max Day	1387.1	23.1
Peak Hour	2993.9	49.9

Please feel free to give me a call to discuss.

Thanks,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 103
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From: Robertson, Syd [<mailto:Syd.Robertson@ottawa.ca>]
Sent: September-24-15 4:15 PM
To: Robert Freel
Subject: 1309 Carling Ave (Westgate Mall) - Boundary conditions

Hi Bobby:

The following are boundary conditions, HGL, for hydraulic analysis at 1309 Carling (zone 2W) assumed to be connected to the 406mm on Carling Ave. (See attached PDF for connection locations)

Connection 1

	Phase 1	Phase 2	Phase 3	Phase 4
--	---------	---------	---------	---------

Minimum HGL	122.1m	122.0m	121.8m	120.6m
Maximum HGL	137.4m	137.2m	136.7m	136.5m
Available Flow assuming a residual of 20 psi and a ground elevation of 73.9m	697 L/s	695 L/s	693 L/s	686 L/s

The estimated ground elevation is 73.9m, the maximum pressure is estimated to be more than 80 psi for all Phases. A pressure check at completion of construction is recommended to determine if pressure control is required.

Connection 2

	Phase 1	Phase 2	Phase 3	Phase 4
Minimum HGL	122.0m	121.8m	121.6m	120.4m
Maximum HGL	137.3m	137.1m	136.6m	136.5m
Available Flow assuming a residual of 20 psi and a ground elevation of 74.7m	670 L/s	668 L/s	666 L/s	660 L/s

The estimated ground elevation is 74.7m, the maximum pressure is estimated to be more than 80 psi for all Phases. A pressure check at completion of construction is recommended to determine if pressure control is required.

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.

Please call me if you have any questions.

Thanks,

Syd Robertson, C.E.T.

Project Manager, Infrastructure Approvals

Development Review Services Branch, Urban Outer Core

Planning & Growth Management Department

110 Laurier Ave. W., 4th Floor E

Ottawa, ON K1P 1J1

City of Ottawa | Ville d'Ottawa

613.580.2424 ext./poste 27916

ottawa.ca/planning / ottawa.ca/urbanisme

From: Robert Freel [<mailto:rfreel@dsel.ca>]

Sent: September 18, 2015 11:46 AM

To: Robertson, Syd

Subject: Westgate Centre - Boundary condition request

Good afternoon Syd,

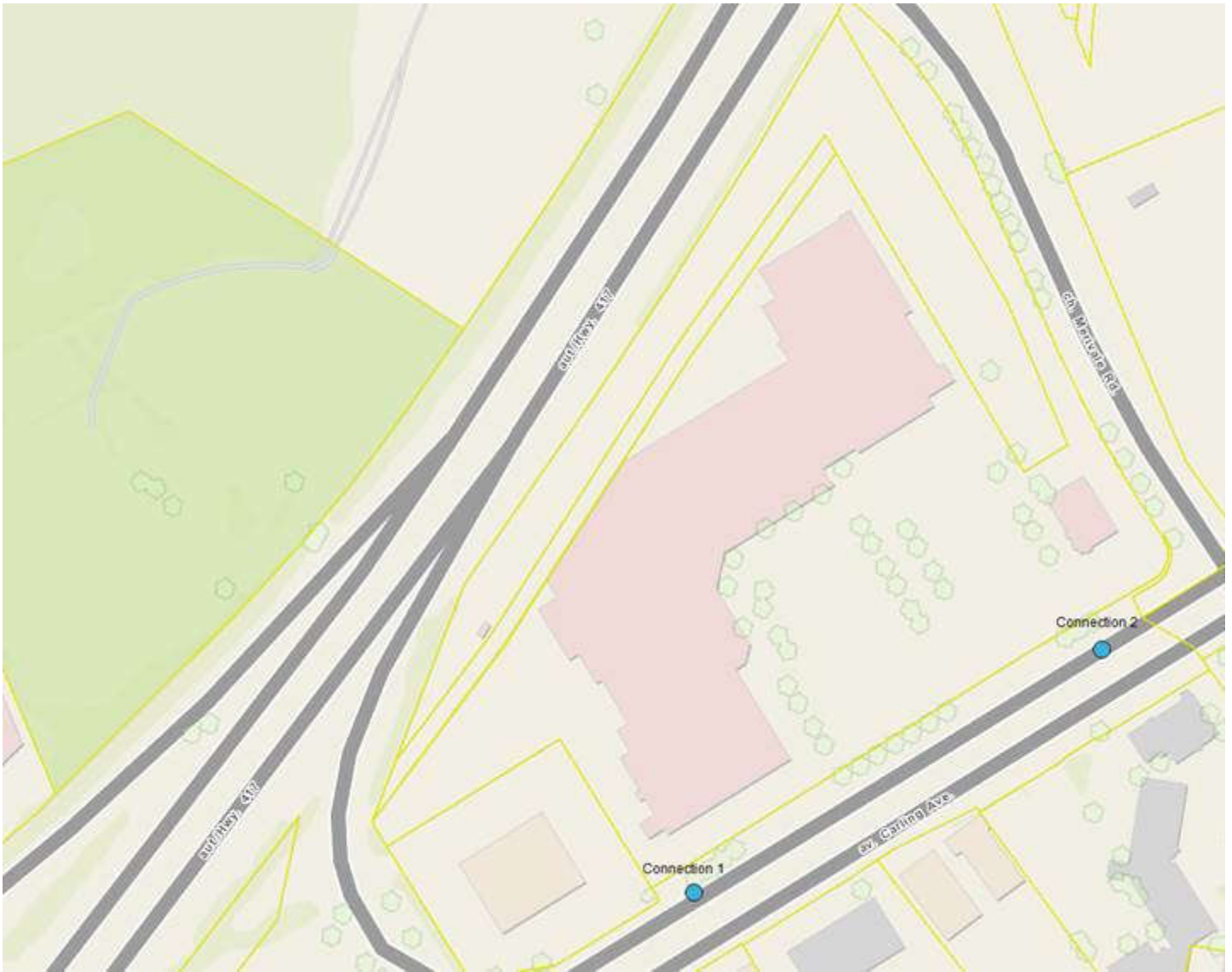
We would like to request water boundary conditions for Westgate Centre using the following proposed development demands:

1. Location of Service / Street Number: 1309 Carling Avenue
2. Type of development and the amount of fire flow required for the proposed development:
 - Proposed Phased development is mixed use residential/commercial. The full build-out proposes 1136 residential units and 8,250 m² of commercial space.
 - It is anticipated that the development will have a dual connection to be services from the existing 406 mm diameter watermain within Carling Avenue, as shown by the attached map.
 - Fire demand based on FUS will be used to calculate fire demand, sufficient information is unavailable at this time to complete a calculation we would request that the available fire flow at 140 kPa (20 psi) be provided for later comparison.

3.

Phase	I		II		III		IV	
	L/min	L/s	L/min	L/s	L/min	L/s	L/min	L/s
Avg. Daily	114.2	1.9	198.1	3.3	275.9	4.6	511.4	8.5
Max Day	297.5	5.0	465.4	7.8	665.9	11.1	1264.1	21.1
Peak Hour	459.8	7.7	1005.9	16.8	1450.6	24.2	2772.4	46.2

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



Thank you,

Bobby Freel, P.Eng.

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 203
Stittsville, ON K2S 1E9
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APPENDIX C

Wastewater Collection

RIOCAN
Westgate Centre

Existing Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004



Site Area 3.740 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.05 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Duplex	2.3		0
Townhouse	2.7		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0
Total Pop			0
Average Domestic Flow			<u>0.00 L/s</u>
Peaking Factor			4
Peak Domestic Flow			<u>0.00 L/s</u>

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m ² /d	15,484	1.79
Hospitals	900 L/bed/d		0.00
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00
Average I/C/I Flow			<u>1.79</u>
Peak Institutional / Commercial Flow			2.69
Peak Industrial Flow**			0.00
Peak I/C/I Flow			<u>2.69</u>

* 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	1.79 L/s
Total Estimated Peak Dry Weather Flow Rate	2.69 L/s
Total Estimated Peak Wet Weather Flow Rate	3.74 L/s

Wastewater Flow - Existing Site Conditions

RIOCAN
Westgate Centre
1335 Carling

Existing Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004



Site Area 3.740 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.05 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Duplex	2.3		0
Townhouse	2.7		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0
Total Pop			0
Average Domestic Flow			<u>0.00 L/s</u>
Peaking Factor			4
Peak Domestic Flow			<u>0.00 L/s</u>

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m ² /d	1,359	0.16
Office space	75 L/9.3m ² /d	5,434	0.51
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00
Average I/C/I Flow			<u>0.66</u>
Peak Institutional / Commercial Flow			1.00
Peak Industrial Flow**			0.00
Peak I/C/I Flow			<u>1.00</u>

* 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	0.66 L/s
Total Estimated Peak Dry Weather Flow Rate	1.00 L/s
Total Estimated Peak Wet Weather Flow Rate	2.04 L/s

Wastewater Flow - Proposed Site Conditions

RIOCAN
Westgate Centre
Phase I

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004



Site Area 3.740 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.05 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	187	337
Total Pop			337

Average Domestic Flow 1.37 L/s

Peaking Factor 4.00

Peak Domestic Flow 5.46 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m ² /d	17,361	2.01
Hospitals	900 L/bed/d		0.00
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00

Average I/C/I Flow 2.01

Peak Institutional / Commercial Flow 3.01

Peak Industrial Flow** 0.00

Peak I/C/I Flow 3.01

* 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	3.37 L/s
Total Estimated Peak Dry Weather Flow Rate	8.47 L/s
Total Estimated Peak Wet Weather Flow Rate	9.52 L/s

Wastewater Flow - Proposed Site Conditions

RIOCAN
Westgate Centre
Phase II

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004



Site Area 3.740 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.05 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	371	668
Total Pop			668

Average Domestic Flow 2.71 L/s

Peaking Factor 3.91

Peak Domestic Flow 10.57 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m ² /d	15,990	1.85
Hospitals	900 L/bed/d		0.00
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00

Average I/C/I Flow 1.85

Peak Institutional / Commercial Flow 2.78

Peak Industrial Flow** 0.00

Peak I/C/I Flow 2.78

* 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	4.56 L/s
Total Estimated Peak Dry Weather Flow Rate	13.35 L/s
Total Estimated Peak Wet Weather Flow Rate	14.39 L/s

Wastewater Flow - Proposed Site Conditions

RIOCAN
Westgate Centre
Phase III

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004



Site Area 3.740 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.05 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	1183	2130
Total Pop			2130

Average Domestic Flow 8.63 L/s

Peaking Factor 3.56

Peak Domestic Flow 30.75 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m ² /d	8,942	1.03
Hospitals	900 L/bed/d		0.00
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00

Average I/C/I Flow 1.03

Peak Institutional / Commercial Flow 1.55

Peak Industrial Flow** 0.00

Peak I/C/I Flow 1.55

* 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	9.66 L/s
Total Estimated Peak Dry Weather Flow Rate	32.31 L/s
Total Estimated Peak Wet Weather Flow Rate	33.35 L/s

Wastewater Flow - Proposed Site Conditions

RIOCAN
Westgate Centre
1335 Carling

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004



Site Area 3.740 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.05 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0
Total Pop			0
Average Domestic Flow			<u>0.00 L/s</u>
Peaking Factor			4.00
Peak Domestic Flow			<u>0.00 L/s</u>

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m ² /d	14,632	1.69
Hospitals	900 L/bed/d		0.00
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00
Average I/C/I Flow			<u>1.69</u>
Peak Institutional / Commercial Flow			2.54
Peak Industrial Flow**			0.00
Peak I/C/I Flow			<u>2.54</u>

* 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	1.69 L/s
Total Estimated Peak Dry Weather Flow Rate	2.54 L/s
Total Estimated Peak Wet Weather Flow Rate	3.59 L/s

**SUBJECT
PROPERTY**

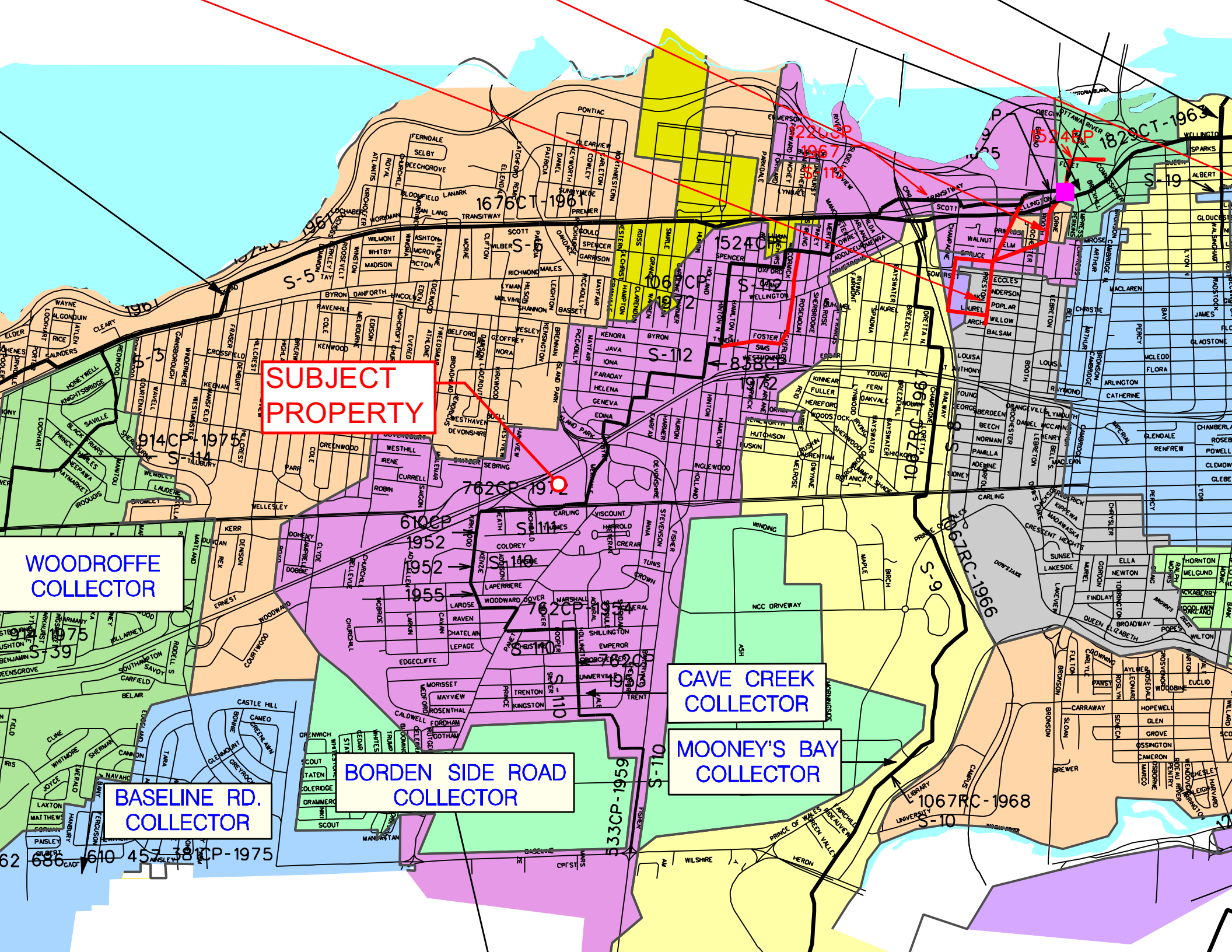
**WOODROFFE
COLLECTOR**

**CAVE CREEK
COLLECTOR**

**MOONEY'S BAY
COLLECTOR**

**BORDEN SIDE ROAD
COLLECTOR**

**BASELINE RD.
COLLECTOR**



APPENDIX D

Stormwater Management

Stormwater Flow - Existing Site Conditions

RIOCAN

Westgate Centre

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



Existing Drainage Characteristics From Internal Site

Area	3.7400 ha
C	0.90 Rational Method runoff coefficient
L	315 m
Up Elev	74.6 m
Dn Elev	74 m
Slope	0.2 %
Tc	20.1 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	51.9	70.0	119.6 mm/hr
Q	484.9	654.7	1242.1 L/s

Stormwater Flow - Proposed Site Conditions

RIOCAN

Westgate Centre

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



Target Flow Rate

Area ID	Total Area (ha)	C	t _c (min)	5-year		100-year	
				i (mm/hr)	Q (L/s)	i (mm/hr)	Q (L/s)
A	3.69	0.50	20.0	70.3	360.0	70.3	360.0
EX-1	0.34	0.20	20.0	70.3	13.2	120.0	22.5
EX-2	1.09	0.90	20.0	70.3	191.1	120.0	362.5
Total	5.12				564.3		745.1

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.51 ha
C 0.70 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	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	103.7	103.7	0.0	0.0	178.6	222.0	222.0	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

Total Area 4.60 ha
C 0.90 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	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	104.2	1199.4	460.7	738.8	443.3	178.6	2283.9	523.1	1760.9	1056.5
15	83.6	961.9	460.7	501.2	451.1	142.9	1827.7	523.1	1304.7	1174.2
20	70.3	808.7	460.7	348.0	417.6	120.0	1534.3	523.1	1011.2	1213.4
25	60.9	701.0	460.7	240.3	360.5	103.8	1328.3	523.1	805.2	1207.8
30	53.9	620.8	460.7	160.1	288.2	91.9	1175.1	523.1	652.0	1173.6
35	48.5	558.5	460.7	97.8	205.5	82.6	1056.2	523.1	533.2	1119.7
40	44.2	508.6	460.7	48.0	115.1	75.1	961.2	523.1	438.1	1051.5
45	40.6	467.7	460.7	7.0	19.0	69.1	883.2	523.1	360.2	972.4
50	37.7	433.5	460.7	0.0	0.0	64.0	818.0	523.1	295.0	884.9
55	35.1	404.3	460.7	0.0	0.0	59.6	762.6	523.1	239.6	790.6
60	32.9	379.2	460.7	0.0	0.0	55.9	714.9	523.1	191.9	690.8
65	31.0	357.4	460.7	0.0	0.0	52.6	673.4	523.1	150.3	586.3
70	29.4	338.1	460.7	0.0	0.0	49.8	636.8	523.1	113.8	477.9
75	27.9	321.0	460.7	0.0	0.0	47.3	604.4	523.1	81.4	366.2
80	26.6	305.8	460.7	0.0	0.0	45.0	575.5	523.1	52.4	251.6
85	25.4	292.0	460.7	0.0	0.0	43.0	549.4	523.1	26.4	134.4
90	24.3	279.6	460.7	0.0	0.0	41.1	525.8	523.1	2.8	15.1
95	23.3	268.3	460.7	0.0	0.0	39.4	504.4	523.1	0.0	0.0
100	22.4	257.9	460.7	0.0	0.0	37.9	484.8	523.1	0.0	0.0
105	21.6	248.4	460.7	0.0	0.0	36.5	466.8	523.1	0.0	0.0
110	20.8	239.7	460.7	0.0	0.0	35.2	450.3	523.1	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)

5-year Q _{attenuated}	460.67 L/s	100-year Q _{attenuated}	523.05 L/s
5-year Max. Storage Required	451.1 m ³	100-year Max. Storage Required	1213.4 m ³

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m ³)	100-Year Release Rate (L/s)	100-Year Storage (m ³)
Unattenuated Areas	103.65	0.0	222.05	0.0
Attenuated Areas	460.67	451.1	523.05	1213.4
Total	564.3	451.09	745.10	1213.4

RIOCAN
1335 Carling

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



Existing Drainage Characteristics From Internal Site

Area	0.5230 ha
C	0.90 Rational Method runoff coefficient
L	102.5 m
Up Elev	75.3 m
Dn Elev	74.4 m
Slope	0.9 %
Tc	10.0 min (10min minimum)

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	100.4	136.2	259.4 L/s

Stormwater Flow - Proposed Site Conditions

RIOCAN
1335 Carling Avenue

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



Target Flow Rate

Area ID	Total Area (ha)	C	t _c (min)	5-year		100-year	
				i (mm/hr)	Q (L/s)	i (mm/hr)	Q (L/s)
A	0.52	0.50	10.0	104.2	75.7	104.2	75.7
EX-1	0.10	0.20	10.0	104.2	5.8	178.6	9.9
Total	0.62				81.5		85.6

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.05 ha
C 0.90 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	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	13.6	13.6	0.0	0.0	178.6	25.9	25.9	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

Total Area 0.57 ha
C 0.90 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	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	104.2	148.7	67.8	80.8	48.5	178.6	283.1	59.7	223.4	134.0
15	83.6	119.2	67.8	51.4	46.2	142.9	226.5	59.7	166.9	150.2
20	70.3	100.2	67.8	32.4	38.9	120.0	190.2	59.7	130.5	156.6
25	60.9	86.9	67.8	19.0	28.6	103.8	164.6	59.7	105.0	157.4
30	53.9	76.9	67.8	9.1	16.4	91.9	145.6	59.7	86.0	154.8
35	48.5	69.2	67.8	1.4	2.9	82.6	130.9	59.7	71.2	149.6
40	44.2	63.0	67.8	0.0	0.0	75.1	119.1	59.7	59.5	142.7
45	40.6	58.0	67.8	0.0	0.0	69.1	109.5	59.7	49.8	134.5
50	37.7	53.7	67.8	0.0	0.0	64.0	101.4	59.7	41.7	125.2
55	35.1	50.1	67.8	0.0	0.0	59.6	94.5	59.7	34.9	115.0
60	32.9	47.0	67.8	0.0	0.0	55.9	88.6	59.7	28.9	104.2
65	31.0	44.3	67.8	0.0	0.0	52.6	83.5	59.7	23.8	92.8
70	29.4	41.9	67.8	0.0	0.0	49.8	78.9	59.7	19.3	80.9
75	27.9	39.8	67.8	0.0	0.0	47.3	74.9	59.7	15.2	68.6
80	26.6	37.9	67.8	0.0	0.0	45.0	71.3	59.7	11.7	56.0
85	25.4	36.2	67.8	0.0	0.0	43.0	68.1	59.7	8.4	43.0
90	24.3	34.7	67.8	0.0	0.0	41.1	65.2	59.7	5.5	29.7
95	23.3	33.3	67.8	0.0	0.0	39.4	62.5	59.7	2.9	16.3
100	22.4	32.0	67.8	0.0	0.0	37.9	60.1	59.7	0.4	2.5
105	21.6	30.8	67.8	0.0	0.0	36.5	57.9	59.7	0.0	0.0
110	20.8	29.7	67.8	0.0	0.0	35.2	55.8	59.7	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)

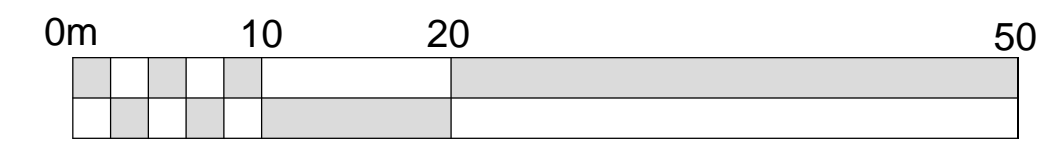
5-year Q _{attenuated}	67.85 L/s	100-year Q _{attenuated}	59.66 L/s
5-year Max. Storage Required	48.5 m ³	100-year Max. Storage Required	157.4 m ³

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m ³)	100-Year Release Rate (L/s)	100-Year Storage (m ³)
Unattenuated Areas	13.62	0.0	25.94	0.0
Attenuated Areas	67.85	48.5	59.66	157.4
Total	81.5	48.48	85.60	157.4

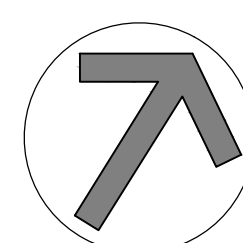
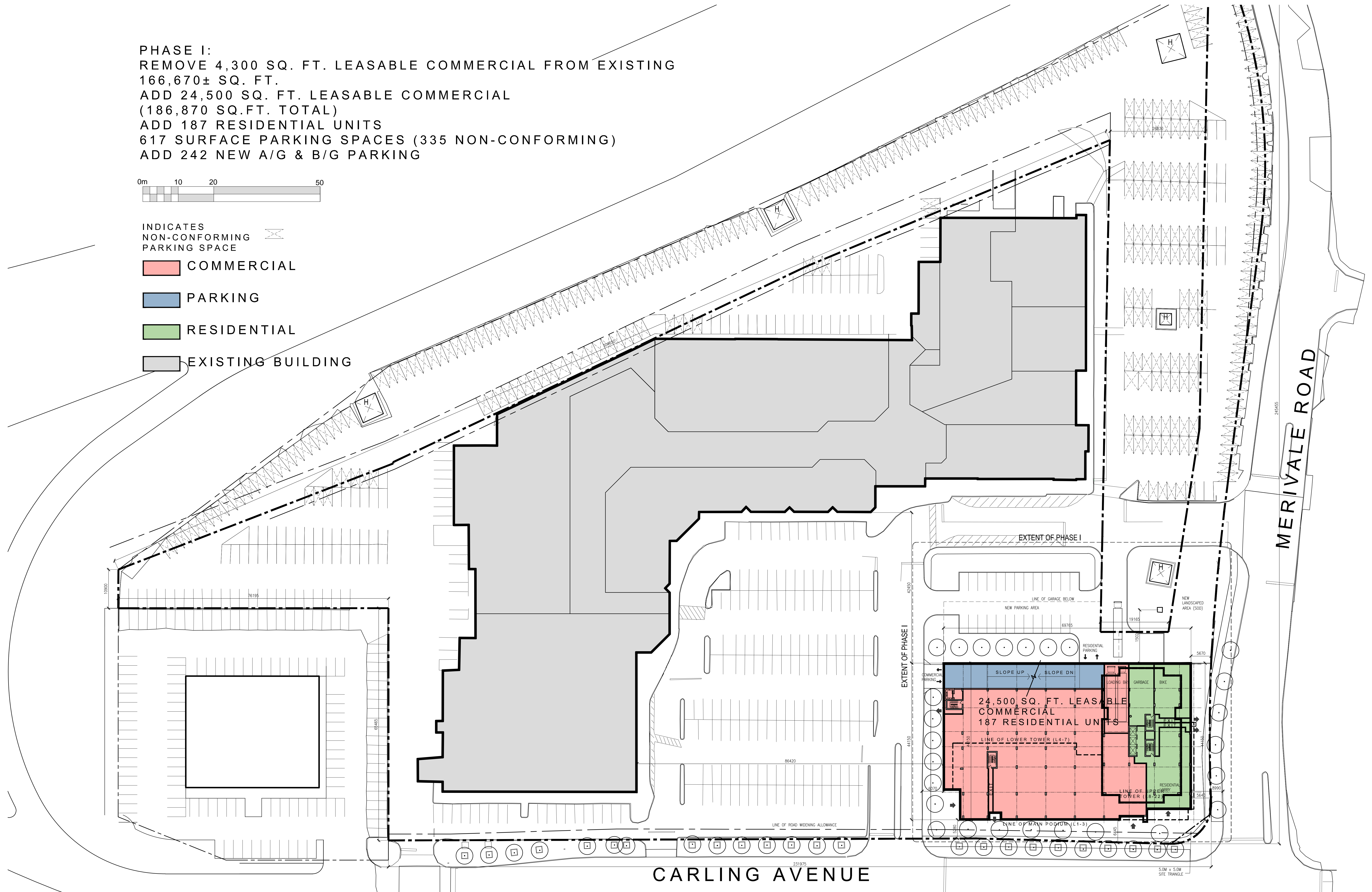
DRAWINGS / FIGURES

PHASE I:
 REMOVE 4,300 SQ. FT. LEASABLE COMMERCIAL FROM EXISTING
 166,670± SQ. FT.
 ADD 24,500 SQ. FT. LEASABLE COMMERCIAL
 (186,870 SQ.FT. TOTAL)
 ADD 187 RESIDENTIAL UNITS
 617 SURFACE PARKING SPACES (335 NON-CONFORMING)
 ADD 242 NEW A/G & B/G PARKING

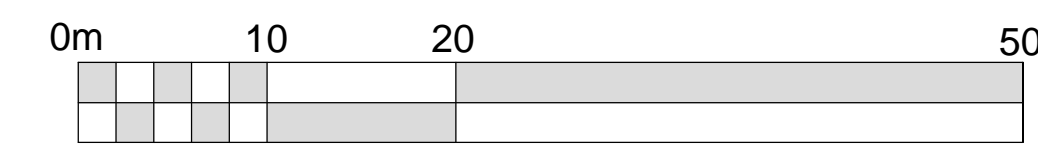


INDICATES
 NON-CONFORMING
 PARKING SPACE

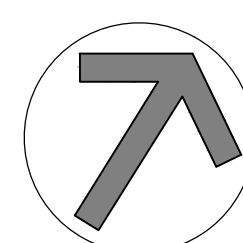
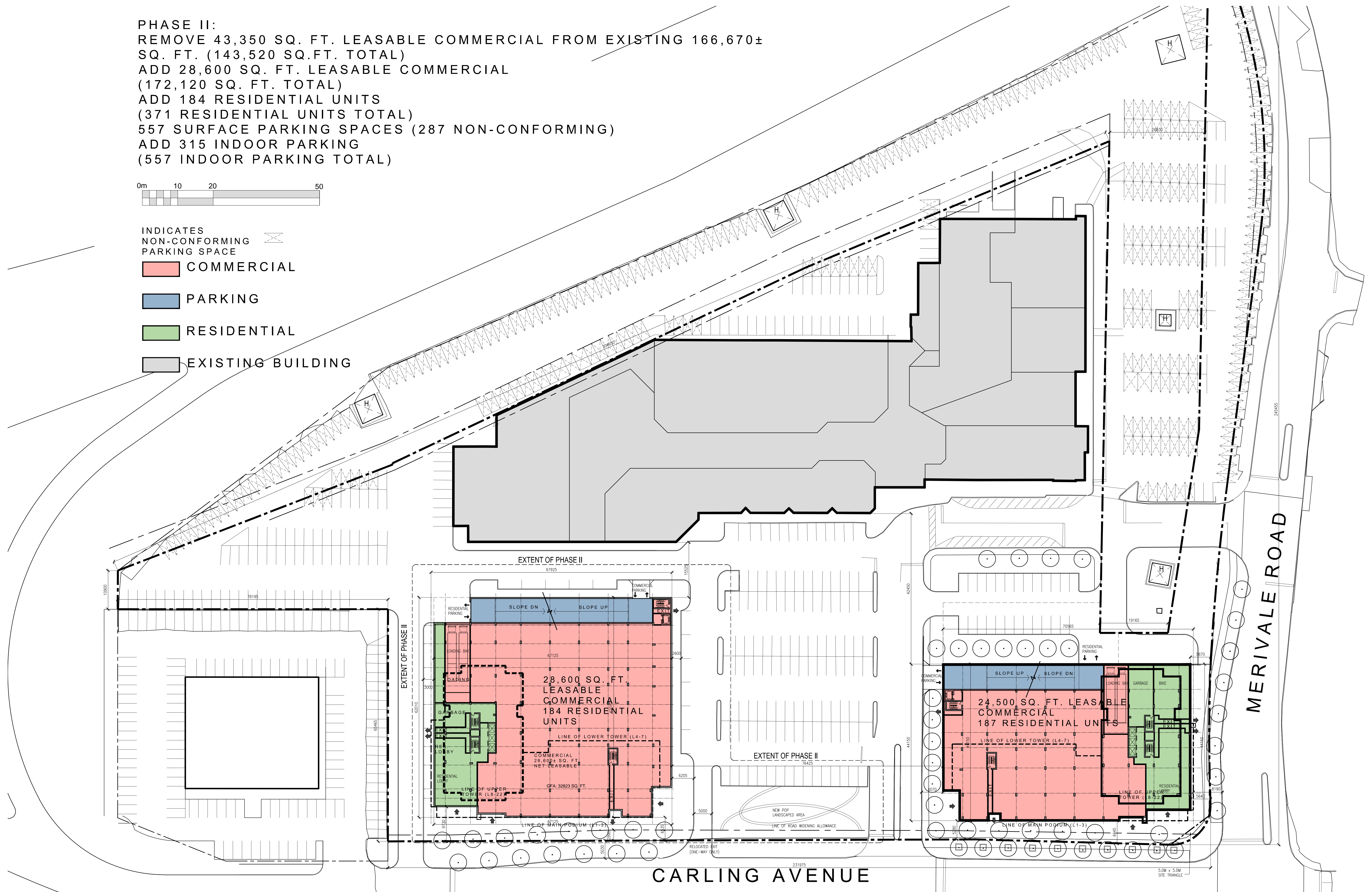
- COMMERCIAL
- PARKING
- RESIDENTIAL
- EXISTING BUILDING



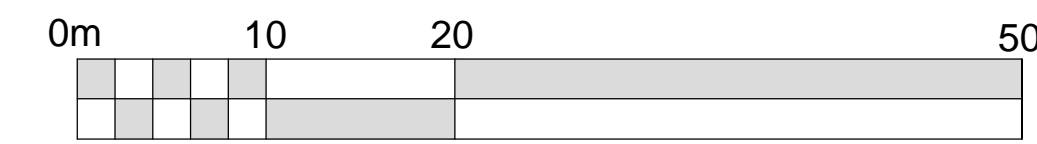
PHASE II:
 REMOVE 43,350 SQ. FT. LEASABLE COMMERCIAL FROM EXISTING 166,670±
 SQ. FT. (143,520 SQ.FT. TOTAL)
 ADD 28,600 SQ. FT. LEASABLE COMMERCIAL
 (172,120 SQ. FT. TOTAL)
 ADD 184 RESIDENTIAL UNITS
 (371 RESIDENTIAL UNITS TOTAL)
 557 SURFACE PARKING SPACES (287 NON-CONFORMING)
 ADD 315 INDOOR PARKING
 (557 INDOOR PARKING TOTAL)



- INDICATES
 NON-CONFORMING
 PARKING SPACE
- COMMERCIAL
- PARKING
- RESIDENTIAL
- EXISTING BUILDING



PHASE III:
 REMOVE 132,460 SQ. FT. LEASABLE COMMERCIAL (0
 SQ.FT. TOTAL)
 ADD 43,250 SQ. FT. LEASABLE COMMERCIAL
 (96,250 SQ. FT. TOTAL)
 ADD 812 RESIDENTIAL UNITS
 (1183 RESIDENTIAL UNITS TOTAL)
 395 SURFACE PARKING SPACES (280
 NON-CONFORMING)
 ADD 361 INDOOR PARKING
 (918 INDOOR PARKING TOTAL)

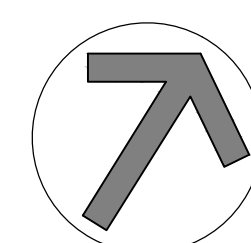
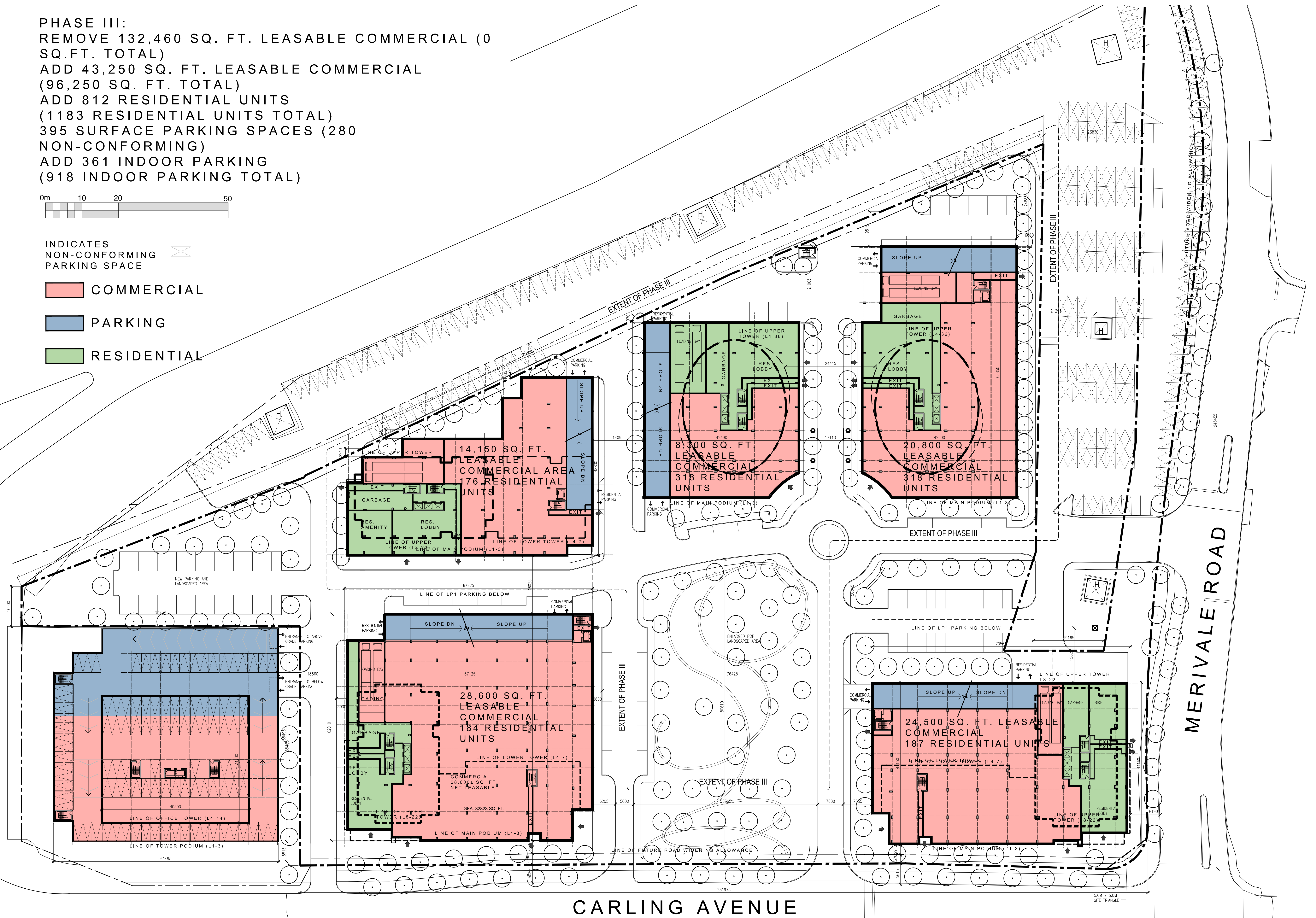


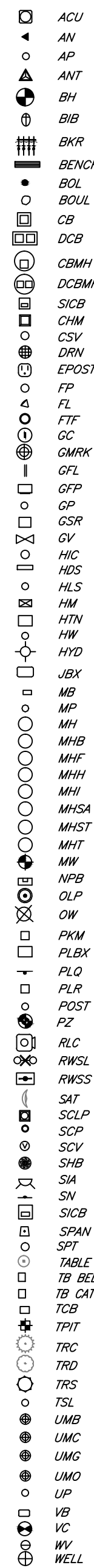
INDICATES
 NON-CONFORMING
 PARKING SPACE

COMMERCIAL

PARKING

RESIDENTIAL

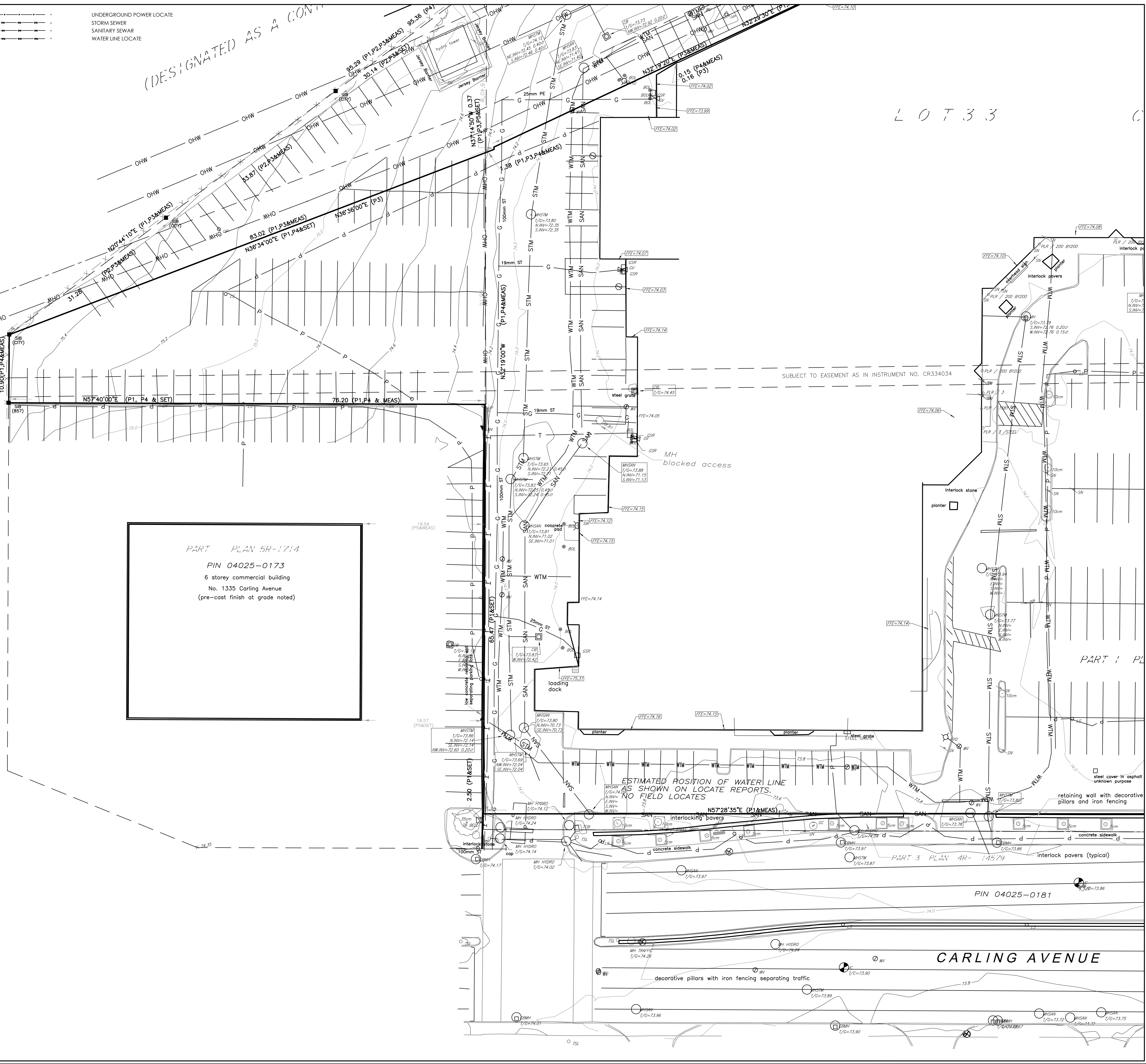




AIR CONDITIONING UNIT
ANCHOR
AIR PUMP
ANTENNA
BOREHOLE
HOSE BIB
BIKE RACK
BENCH
BOLLARD
BOULDER
CATCH BASIN
DOUBLE CB
CB MANHOLE
DOUBLE CB MANHOLE
SIDE INLET CB
CHIMNEY
VALVE CURB STOP
DRAIN
ELECTRICAL OUTLET
FLAG POLE
FLOOD LIGHT
FUEL TANK FILLER CAP
GARBAGE CAN
GAS MARKER
PIPE FLANGE (GAS)
GAS FUEL PUMP
POLE GUYWIRE
GAS SERVICE REGULATOR
GAS VALVE
HICKENBOTTOM
HEADSTONE
LIGHT STANDARD HYDRO
HYDRO METER
HYDRO TRANSFORMER
HAND WELL
FIRE HYDRANT
JUNCTION BOX
MAILBOX
MONITORING PIN
MAINTENANCE HOLE UNIDENTIFIED
MAINTENANCE HOLE BELL
MAINTENANCE HOLE FIBRE OPTIC
MAINTENANCE HOLE HYDRO
MAINTENANCE HOLE INVERT
MAINTENANCE HOLE SANITARY
MAINTENANCE HOLE STORM
MAINTENANCE HOLE TRAFFIC
MONITORING WELL
NEWS PAPER BOX
LIGHT STANDARD ORNAMENTAL
OBSERVATION WELL
PARKING METER
PULL BOX
PLAQUE
PILLAR
POST
PEDIOMETER
RED LIGHT CAMERA
RAILWAY SIGNAL LIGHT
RAILWAY SWITCH STAND
SATELLITE DISH
SCULPTURE
SUMPF/CATCH PIT
SPRINKLER CONTROL VALVE
SPRINKLER HEAD
SIAMSE CONNECTION
SIGN
SIDE INLET CATCHBASIN
SOLAR PANEL
SEPTIC TANK
TABLE
TERMINAL BOX - BELL
TERMINAL BOX - CABLE
TRAFFIC CONTROL BOX
TEST PIT
TREE CONIFEROUS
TREE DECIDUOUS
TREE STUMP
TRAFFIC SIGNAL LIGHT
MARKER BELL UNDERGROUND
MARKER CABLE UNDERGROUND
MARKER GAS UNDERGROUND
MARKER OIL UNDERGROUND
UTILITY POLE
UP
VALVE BOX
VALVE CHAMBER
WATER VALVE
WELL

UNDERGROUND POWER LOCATE
STORM SEWER
SANITARY SEWER
WATER LINE LOCATE

(DESIGNATED AS A CONVEYANCE)



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TOPOGRAPHIC PLAN OF PART OF LOT 33 CONCESSION 1 (OTTAWA FRONT) (GEOGRAPHIC TOWNSHIP OF NEPEAN CITY OF OTTAWA

Scale 1:300
5 0 5 10 15 20 METRES

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

BEARING NOTE
BEARINGS ARE GRID BEARINGS DERIVED FROM THE CAN-NET VRS NETWORK AND ARE REFERRED TO THE CENTRAL MERIDIAN 76°30' WEST LONGITUDE MTM ONTARIO COORDINATES SYSTEM, NAD83 (ORIGINAL) ZONE 9.

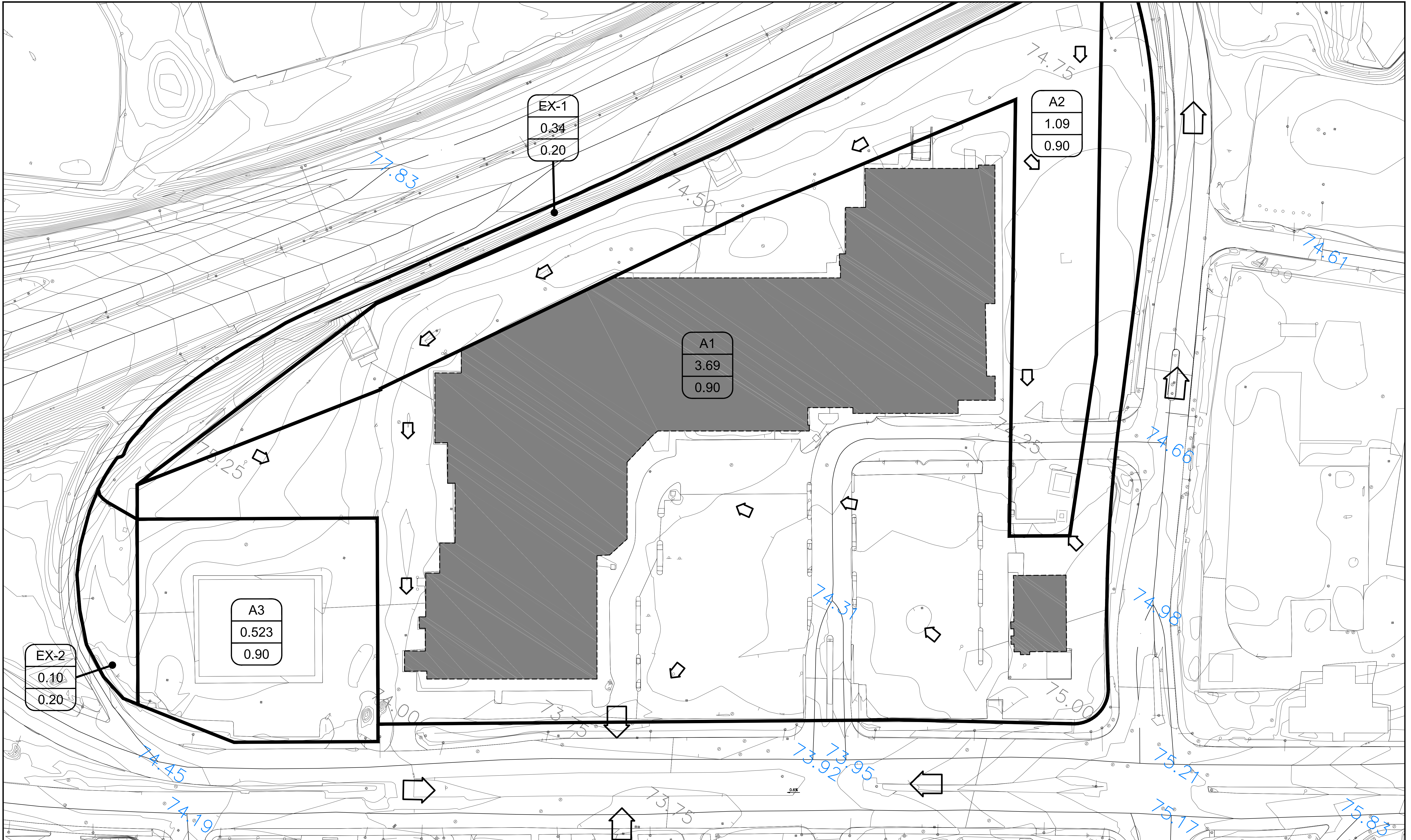
DISTANCES ON THIS PLAN MAY BE CONVERTED TO GROUND DISTANCES BY DIVIDING BY A COMBINED SCALE FACTOR OF 0.9999363.

VERTICAL DATUM NOTE
ELEVATIONS ARE OF GEODETIC ORIGIN AND ARE DERIVED FROM CONTROL MONUMENT 0191968031 HAVING AN ELEVATION OF 83.636.

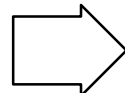

LEGEND	DENOTES	FOUND MONUMENTS
■	SET MONUMENTS	
IB	IRON BAR	
IB2	ROUND IRON BAR	
SIB	STANDARD IRON BAR	
SSIB	SHORT STANDARD IRON BAR	
CC	CUT CROSS	
CP	CONCRETE PIN	
BM	BENCHMARK	
CM	CONCRETE MONUMENT	
HCM	HORIZONTAL CONTROL MONUMENT	
NW	NAIL AND WASHER	
PKN	PK NAIL	
VCN	VERTICAL CONTROL MONUMENT	
WIT	WITNESS	
PIN	PROPERTY IDENTIFICATION NUMBER	
MEAS	MEASURED	
PROP	PROPORTIONED	
OU	ORIGIN UNKNOWN	
SG	STANTEC GEOMATICS LTD.	
P1	PLAN 5R-14579	
P2	PLAN 4R-20932	
P3	PLAN 4R-23454	
P4	PLAN OF SURVEY BY FAIRHALL MOFFETT WOODLAND OLS DATED JANUARY 6, 1987	

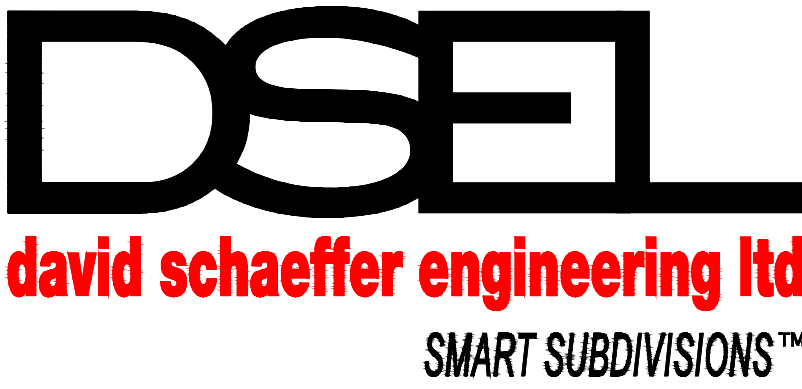
NOTES
UNDERGROUND UTILITY LOCATES PROVIDED BY USL-1 UNDERGROUND SERVICE LOCATORS. THE POSITION OF UNDERGROUND UTILITIES, AS REPRESENTED BY THE USL-1 LOCATES, ARE APPROXIMATE. SEWER LINES ARE SHOWN AS DIRECT CONNECTION FROM CENTRE OF MANHOLE TO CENTRE OF MANHOLE AND DOES NOT TAKE INTO ACCOUNT OFFSET MANHOLE CHAMBERS, IF IN EXISTENCE.

THE END USER IS RESPONSIBLE FOR OBTAINING LOCATES PRIOR TO BREAKING GROUND.



LEGEND:

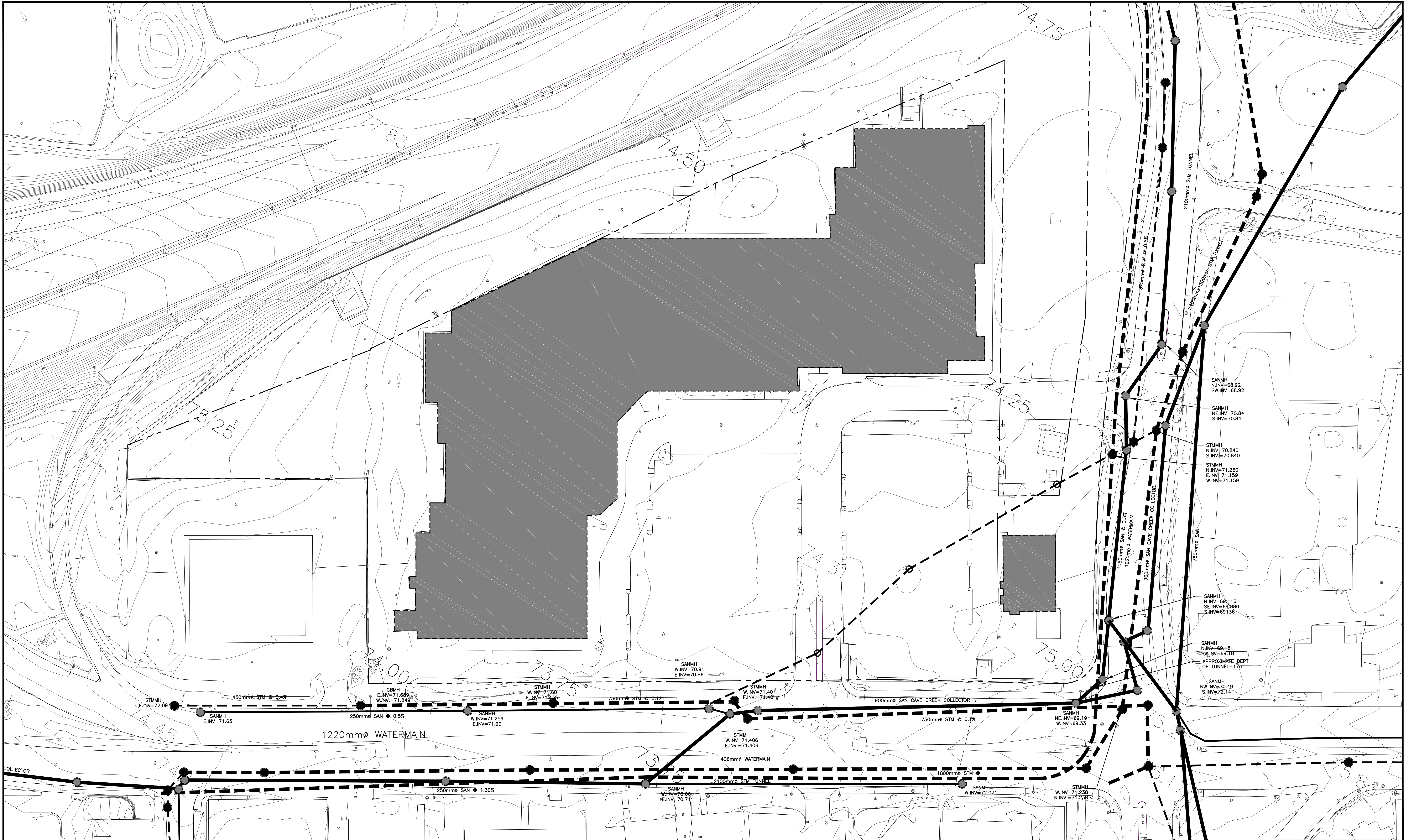
-  EXISTING DRAINAGE PATTERN
-  EXISTING GRADE



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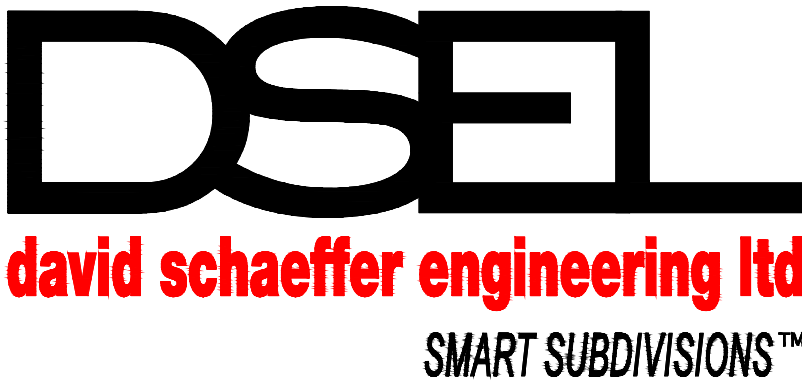
EXISTING CONDITIONS - GRADING
WESTGATE SHOPPING CENTRE
1309 CARLING AVE.

PROJECT No. :	793
SCALE:	1:500
DATE:	MAY 2016
DRAWING No.	ECG-1



LEGEND:

- EXISTING WATERMAIN
- == EXISTING SANITARY SEWER
- - - EXISTING STORM SEWER

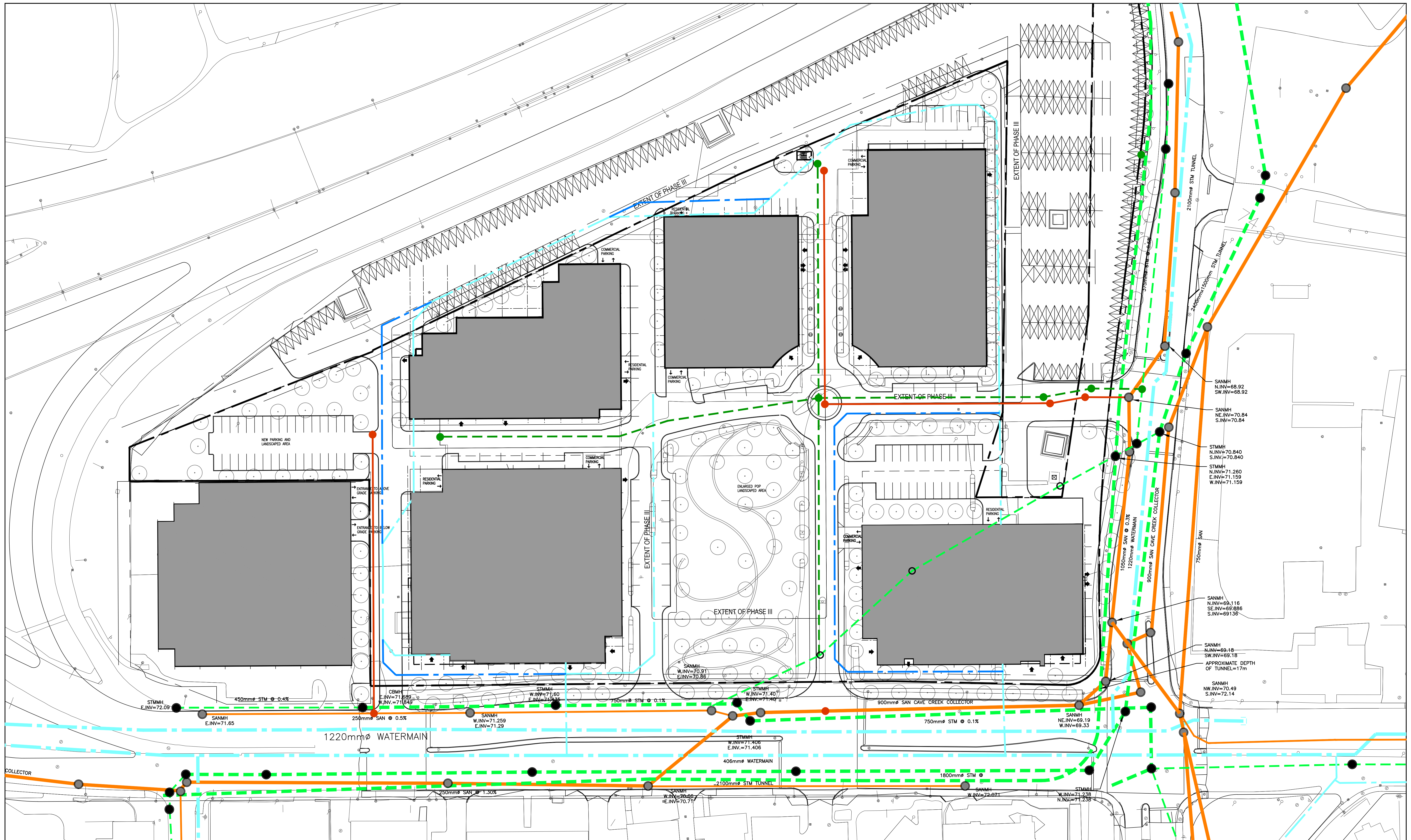


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EXISTING CONDITIONS SERVICING
WESTGATE SHOPPING CENTRE
1309 CARLING AVE.

PROJECT No. :	793
SCALE:	1:500
DATE:	MAY 2016
DRAWING No.	ECS-1

*EXISTING SERVICING INFORMATION BASED ON BEST AVAILABLE AS BUILT AND CITY MAPPING



LEGEND:

	EXISTING WATERMAIN
	EXISTING SANITARY SEWER
	EXISTING STORM SEWER
	FUTURE WATERMAIN
	FUTURE SANITARY SEWER
	FUTURE STORM SEWER

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