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36 Years

City of Ottawa
South Facility Phase A
3505 Prince of Wales Drive, Ottawa, ON

Site Servicing Report

CITY OF OTTAWA
SOUTH FACILITY PHASE A
3505 Prince of Wales Drive, Ottawa, ON

SITE SERVICING REPORT

Prepared by:

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

May 29, 2019

Ref: R-2018-151
Novatech File No. 118048

May 29, 2019

MORIYAMA & TESHIMA ARCHITECTS
109 Murray Street, Unit 3
Ottawa, Ontario
K1N 5M5

Attention: Mr. David Stone

Dear Sir:

Re: Site Servicing Report
City of Ottawa – South Facility Phase A
3505 Prince of Wales Drive, Ottawa, ON
Novatech File No.: 118048

Enclosed is a copy of the Site Servicing Report for the proposed City of Ottawa – South Facility Phase A development located at 3505 Prince of Wales Drive. This report addresses the approach to site servicing and is submitted in support of the site plan control application.

Please contact the undersigned, should you have any questions or require additional information.

Yours truly,

NOVATECH

François Thauvette, P. Eng.
Senior Project Manager

cc: Sharif Sharif (City of Ottawa)
Pauline Dicaire (OPS)
David Landsberg (BPA)

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

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1.0 INTRODUCTION

The City of Ottawa is proposing to construct a new South Facility Phase A (SFPA) to be constructed in two (2) distinct phases (A and B). Novatech has been retained to complete the site servicing and stormwater management design for the SFPA project.

1.1 Purpose

This report addresses the approach to site servicing and drainage and is being submitted in support of the site plan control application. The intent is to provide a site servicing design that will accommodate the proposed SFPA development (Phases A and B) as well as accommodate a possible future development on the southern portion of the property. Given the nature of the proposed development, minimizing disruptions to the operation of the facility during future expansion projects is an important design consideration.

1.2 Location and Site Description

The subject site is located on the vacant portion of a City-owned property. The new facility will be located at 3505 Prince of Wales Drive, between Prince of Wales Drive and Lodge Road, just south of the Carleton Lodge long term care facility (55 Lodge Road), on the west bank of the Rideau River. The area to be developed as part of the SFPA project is approximately 6.35 hectares in size. The legal description of the property is designated as Part of Lots 10 & 11 and Part of the Road Allowance between Lots 10 & 11 (Closed by Unregistered By-Law 38-56), Concession 1 (Rideau Front), Geographic Township of Nepean, City of Ottawa.

Figure 1 – **Aerial Plan** provides an aerial view of the subject site.

1.3 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on June 1, 2018, at which time the client was advised of the general submission requirements. Subsequent meetings were held with the City of Ottawa on September 26, 2018, on November 15, 2018 and on April 16, 2019. Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA). The proposed development will be required to meet an 'Enhanced' Level of Protection for stormwater quality treatment prior to releasing flows from the developed portion of the site.

It is anticipated that a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) will be required for both the proposed on-site sanitary pump station and forcemain and the on-site stormwater management system. A pre-consultation meeting has not been held with the MECP.

1.4 Proposed Development

The proposed SFPA campus will be constructed in two (2) distinct phases (A and B) and includes space for a possible future development on the southern portion of the property. The proposed Phase A works will include the following:

- Phase A building, incl. Mechanical space and Maintenance Wing (~140,000 sq. ft.)
- Phase B shell space (~34,000 sq. ft. to be fit-out and occupied in Phase B)
- Vehicle Garage (~34,000 sq. ft.)
- Parkade (~77,000 sq. ft.)
- Staff Surface Parking Lots (for both Phases A and B)
- Visitor Parking Area

Roadway modifications along Prince of Wales Drive include a new intersection on the north side of the SFPA facility, a new staff only right-in/right-out driveway to the south, the extension of the existing median as well as modifications to the existing roadside ditch on the east side of Prince of Wales Drive. As a result, modifications to the existing driveway entrance to Carleton Lodge will be required to accommodate the proposed development.

Although, the southern portion of the subject site is to remain unchanged, the City of Ottawa may choose to develop it in the future.

1.5 Reference Material

The following reports and studies were prepared and/or reviewed as part of the design process:

[1] The South Campus Site Serviceability Study (V1_5), prepared by Parsons.

[2] The City of Ottawa SFPA – Stormwater Management Report (R-2018-150), prepared by Novatech, dated May 16, 2019.

[3] The Geotechnical Investigation Report (Ref. No. 18111310-4000), prepared by Golder Associates Ltd. in April 2019.

[4] The Geotechnical Investigation Report (Ref. No. 1537295-1000), prepared by Golder Associates Ltd. in May 2017.

[5] City of Ottawa Sewer Design (OSD) Guidelines (October 2012) and subsequent Technical Bulletins (2016-01 & 2018-01).

2.0 SITE SERVICING

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply and to ensure that appropriate fire protection is provided for the proposed development. The servicing criteria, the expected sewage flows, and water demands are to conform to the requirements of the City of Ottawa municipal design guidelines for sewer and water distribution systems. Refer to the subsequent sections of the report and to the enclosed plans for further details.

The City of Ottawa Servicing Study Guidelines for Development Applications requires that a Development Servicing Study Checklist be included to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. A completed checklist is enclosed in **Appendix B** of the report.

2.1 Sanitary Sewage

The proposed SFPA development will be serviced by an on-site sanitary sewage system comprising of 200mm dia. sanitary sewers, a 2400mm dia. private sanitary pump station and a 75mm dia. outlet forcemain. Due to the existing topography of the site, a gravity sewer outlet will not be possible. The sanitary sewage system will be sized to service both Phases A and B and will be deep enough to service a possible future development to the south. Based on discussions with the client, directing sanitary sewage flows to the existing Carleton Lodge sanitary pump station is not a viable option.

Sanitary sewage from the proposed building and parking garages will be directed to the sanitary pump station via a gravity service and sewer system. The sanitary building service will exit on the east side of the building to minimize the length of the sewer to the pump station. The pump station will be located near the northeast building corner to minimize its depth. Installing the sanitary pump on the west side of the building, closer to Prince of Wales Drive, would increase the depth of the pump station by as much as five (5) metres, thus significantly increasing costs.

The sanitary forcemain will convey the sewage uphill to the municipal sanitary sewer in Willow Creek Circle, located on the west side of Prince of Wales. As stated in the Parsons Serviceability Study[1] the South Nepean Trunk Collector runs along Prince of Wales Drive, west of the subject site. The existing 1350mm dia. Trunk Sewer collects sewage from Carleton Lodge and the residential development on the west side of Prince of Wales Drive, including Willow Creek Circle.

Although nothing is known about the possible future development of the southern portion of the property, a possible sewer alignment is shown on plan C-100.

The City of Ottawa design criteria were used to calculate the theoretical sanitary flows for the proposed development. The following design criteria were taken from Section 4 – 'Sanitary Sewer Systems' and Appendix 4-A - 'Daily Sewage Flow for Various Types of Establishments' of the City of Ottawa Sewer Design Guidelines:

- Average Daily Sewage Flow (office use only): 75 L/person/day
- Average Daily Sewage Flow (office use incl. showers): 125 L/person/day
- Average Daily Sewage Flow (K9 unit): 75 L/dog enclosure/day
- Average Daily Sewage Flow (Hand-wash vehicles): 200 L/car/day
- Peaking Factor = 1.5
- Infiltration Allowance: 0.33 L/s/ha x 6.35 ha site = 2.1 L/s

Table 1 identifies the theoretical sanitary flows for the proposed SFPA development based on the above design criteria.

Table 1: Theoretical Sanitary Flows

Type of Use	Design Population**	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)
Phase A				
Employees (office use only)	260	0.23	1.5	0.34
Employees (office incl. showers)	260	0.38	1.5	0.57
K9 Unit	11	<0.01	1.5	0.01
Hand-washed vehicles	< 20	0.05	1.5	0.07
Phase A – Sub-Total	**-**	**0.67**	1.5	**0.99**
Phase B				
Employees (office use only)	180	0.16	1.5	0.23
Employees (office incl. showers)	180	0.26	1.5	0.39
Phase B – Sub-Total	**-**	**0.42**	1.5	**0.62**
Infiltration (Applied across entire site incl. Future Phase C)				
Infiltration Allowance	**-**	**2.10**	**-**	**2.10**
Phases A and B – Total	**-**	**3.19**	-	**3.71***

*Excludes possible future flows (as no information is currently available)
**Includes a 20% projected increase in staff

The values calculated above are smaller than the values calculated in Parsons Serviceability Study[1], as the design population is significantly smaller than previously anticipated by Parsons. The Parsons report also included Phase 3 flows (now referred to as a possible future development), which are not included in this report. A 200mm dia. sanitary sewer at a minimum slope of 0.5% has a full flow conveyance capacity of 24.2 L/s and will have adequate capacity to convey the theoretical sanitary flows for both Phases A and B. This sewer should also have adequate capacity to convey possible future flows.

2.2 Proposed Sanitary Pump Station and Forcemain

The proposed pump station and forcemain has been designed for the sanitary demands described in Section 2.1 above. Sewage will be pump by submersible grinder pumps and conveyed by a 75mm dia. forcemain which discharges to the proposed SAN MH 1 in the east boulevard of Willow Creek Circle. Refer to enclosed plans C-100, C-300 and to the following sections of the report for the sanitary pump station and forcemain components and details.

Although no information is known about a possible future development, the sanitary pump station wet well, duplex pumps and forcemain will have adequate capacity to service the possible future development (assuming a peak sanitary flow in the order of 4.5 L/s). If a future development occurs, the sanitary sewage system (incl. the pump station system, pumps, etc.) will have to be reviewed.

2.2.1 Wet Well

The proposed wet well is a 2400mm dia. precast manhole with a duty and standby pump, pump rails, float control, vents, access hatches, and piping as shown on Plan C-300. The operating levels are set as follows:

1) Bottom Wet Well: 80.60m
2) Pump Off: 81.00m.
3) Duty Pump On: 81.20m.
4) HWL: 81.40m
5) Standby pump on: 81.50m.

The bottom of the wet well will be benched to minimize any potential solids buildup. An isolation valve will be installed on the incoming 200mm dia. sewer to allow the wet well to be bypassed during any unscheduled maintenance. No other valves will be located within the wet well.

2.2.2 Sewage Pumps

The wet well will house two submersible grinder sewage pumps, each rated for 4.5 L/s. One pump will be the duty pump and the other will be a standby pump. The duty pump will cycle after each pump cycle. Each pump has been sized for peak flow and has the ability to operate within the range of expected flow/head loss curves. The pumps will be installed with guide rails to allow their removal and replacement without entering the wet well. Refer to **Appendix C** for pump selection calculations.

Pump Model: Myers WG30H, 3HP or approved equivalent

2.2.3 Valve Chamber and Forcemain

A valve chamber will be located downstream of the wet well. The valve chamber will house check valves, isolation valves, and a quick connect bypass connection. The isolation valves will be provided with operating nuts to allow operation from the surface, if required to isolate a pump or check valve for servicing. If bypass pumping is required to service the wet well, a submersible pump and associated hose can be connected to the bypass flange located in the valve chamber. A 75mm dia. forcemain will convey sewage to the municipal sanitary sewer in Willow Creek Circle, via proposed SAN MH 1 in the east boulevard of Willow Creek Circle.

2.2.4 Electrical Supply and Control Panels

The pump station will be powered from the building. The building power includes backup power supply via central backup generator. The pumps will be controlled by outdoor weatherproof electrical panels. A general alarm will be activated by HWL or other pump anomalies. The general alarm will activate an exterior strobe light on the panel as well as send a general alarm back to the building monitoring system.

2.3 Domestic Water

The proposed development will be serviced by extending a new watermain across Prince of Wales Drive and connecting to the existing 200mm dia. municipal watermain in Willow Creek Circle. The proposed 200mm dia. on-site watermain network will be constructed around the new SFPA building and be looped by a second feed/connection to the existing 200mm dia. watermain currently supplying water to the Carleton Lodge. Making the second watermain connection at this location will reduce costs by avoiding an additional crossing of Prince of Wales Drive while providing Carleton Lodge with a redundant water supply.

A total of four (4) private hydrants are being proposed around the SFPA building for fire-fighting purposes. The siamese (fire department) connection will be located near the main entrance on the west side of the building. The water meter will be in the mechanical room inside the building, with an external remote meter near the main building entrance. The proposed Phase A works will include appropriate valving and a watermain stub for possible future development beyond the limit of the south access road. This will minimize disruptions to the facility, should there be a future development on the southern portion of the property.

A hydraulic analysis of the proposed on-site watermain network was completed based on boundary conditions provided by the City of Ottawa. The analysis demonstrates that adequate fire flow will available from the municipal watermain network.

2.3.1 Domestic Water Demands and Fire Flow Requirements

2.3.1.1 Domestic Water Demands

The City of Ottawa design criteria were used to calculate the theoretical water demand for the proposed SFPA development. The following design criteria were taken from Section 4 – 'Water Distribution Systems' of the Ottawa Design Guidelines – Water Distribution and/or from section 2.1 of the report:

- Average Daily Water Demand (office use only): 75 L/person/day
- Average Daily Water Demand (office use incl. showers): 125 L/person/day
- Average Daily Water Demand (K9 unit): 75 L/dog enclosure/day
- Average Daily Water Demand (Hand-wash vehicles): 200 L/car/day
- Maximum Day Demand Peaking Factor = 1.5 x Avg. Day Demand (City Water Table 4.2)
- Peak Hour Demand Peaking Factor = 1.8 x Max. Day Demand (City Water Table 4.2)

The following design criteria were taken from Section 4.2.2 – 'Watermain Pressure and Demand Objectives' of the City of Ottawa Design Guidelines for Water Distribution:

- Normal operating pressures are to range between 345 kPa (50 psi) and 483 kPa (70 psi) under Max Day demands
- Minimum system pressures are to be 276 kPa (40 psi) under Peak Hour demands
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire Flow demands

Table 2 identifies the theoretical domestic water demands for the proposed SFPA development based on the above design criteria.

Table 2: **Theoretical Water Demands**

Type of Use	Design Population	Average Demand (L/s)	Max. Day Demand (L/s)	Peak Hour Demand (L/s)
Phase A				
Employees (office use)	260**	0.23	0.34	0.61
Employees (office incl. showers)	260**	0.38	0.57	1.03
K9 Unit	11	<0.01	0.01	0.02
Hand-washed vehicles	< 20	0.05	0.07	0.14
Phase A – Sub-Total	**-**	**0.67**	**0.99**	**1.80**
Phase B				
Employees (office use)	180**	0.16	0.23	0.41
Employees (office incl. gym)	180**	0.26	0.39	0.70
Phase B – Sub-Total	**-**	**0.42**	**0.62**	**1.11**
Phases A and B – Total	**-**	**1.09**	**1.61**	**2.91***

*Excludes possible future flows (as no information is currently available)
**Includes a 20% projected increase in staff

The approach taken to calculate the values above is generally consistent with the approach taken in Parsons Serviceability Study[1], however the design population is significantly smaller than previously anticipated by Parsons. Max Day and Peak Hour Demands used in the hydraulic model for the Carleton Lodge were taken directly from the Parsons Serviceability Study[1].

2.3.1.2 Water Supply for Fire-Fighting

The proposed SFPA facility will be fully sprinklered and supplied with a fire department (siamese) connection. The siamese connection will be located near the main entrance, on the west side of the building, within 45m of one of the proposed private on-site fire hydrants.

The Fire Underwriters Survey (FUS) was used to estimate fire flow requirements (3,963 USGPM or 250 L/s) for the proposed facility, including the building and garages. Based on information provided by the architect, non-combustible construction materials and a free burning occupancy hazard were used in the calculations. Refer to **Appendix D** for a copy of the FUS fire flow calculations. A multi-hydrant approach to fire-fighting (as shown in the hydraulic modeling results) will be required to supply the fire flow calculated above. This approach is in accordance with the City of Ottawa Technical Bulletin ISTB-2018-02.

The fire flow requirements include both sprinkler system and hose allowances in accordance with the OBC and NFPA 13. The sprinkler systems will be designed by the fire protection (sprinkler) contractor as this process involves detailed hydraulic calculations based on building layout, pipe runs, head losses, fire pump requirements, etc. Fire flow requirements calculated using the FUS method tend to generate higher values when compared to flows being calculated using the OBC and NFPA.

2.3.1.3 Watermain Network Analysis

The anticipated domestic water demands, and fire flow requirements were provided to the City of Ottawa to generate the municipal watermain network boundary conditions. **Table 2.1** summarizes the City's hydraulic analysis results and watermain boundary conditions.

Table 2.1: Municipal Watermain Boundary Conditions

Municipal Watermain Boundary Condition	City WM Boundary Conditions		Domestic Demand (L/s)	System Pressure Range (PSI)
	Willow Creek Circle WM (Connection #1)	Willow Creek Circle WM (Connection #2)		
Maximum HGL	147.8m	147.8m	1.1	80.5 - 81.8
Peak Hour HGL	145.6m	145.6m	2.9	77.4 - 78.7
Max Day + FF (250 L/s)*	121.3m	123.7m	1.6	42.9 - 47.6

*Described in Section 2.3.1.1

The municipal watermain boundary conditions were then used to analyze the proposed on-site watermain network. The hydraulic model EPANET was used to analyzing the two theoretical conditions:

1) Maximum Day + Fire Flow Demand
2) Peak Hour Demand

A schematic representation of the hydraulic network depicts the node and pipe numbers used in the model. The model indicates that adequate water and system pressures will exist throughout the watermain system under the specified design conditions. **Table 2.2** and **Table 2.3** summarize the hydraulic model results for the on-site network.

Table 2.2: Maximum Day + Fire Flow Demand (250 L/s) Condition

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day Demands: 4.0 at J1 (Carleton Lodge service), 2.0 L/s at J4 (SFPA Building), 2.0 L/s at J10 (Fut. Stub) **Fire Flow Demands:** 70 L/s at J6 (Hyd. 1) 60 L/s at J12 (Hyd. 2) 60 L/s at J15 (Hyd. 3) 60 L/s at J18 (Hyd. 4)	Minimum system pressure of 208.7 kPa (30.2 psi) is available at Node J13 (Hyd. 3)	Maximum system pressure 326.9 kPa (47.4 psi) is available at Node J1 (Carleton Lodge service)

Table 2.3: Peak Hour Demand Condition

Operating Condition	Minimum System Pressure	Maximum System Pressure
Peak Hour Demands: 7.0 at J1 (Carleton Lodge service), 3.0 L/s at J4 (SFPA Building), 3.0 L/s at J10 (Fut. Stub)	Minimum system pressure of 569.7 kPa (82.6 psi) is available at Node J6 (Hyd. 1)	Maximum system pressure 623.6 kPa (90.4 psi) is available at Node J16 (WM near NE building corner)

Max Day and Peak Hour Demands used in the hydraulic model for the Carleton Lodge were taken directly from the Parson's Serviceability Study[1].

Refer to **Appendix D** for domestic water demand calculations, FUS calculations, City of Ottawa boundary conditions, the hydraulic modeling schematic and hydraulic modelling results.

As indicated above, the existing municipal watermain network should have adequate water supply for the proposed development and will provide adequate system pressures for both 'Max Day + Fire Flow' and 'Peak Hour' conditions, however it is anticipated that pressure reducing valves (PRV) will likely be required given the high system pressures (> 80 PSI).

3.0 STORM DRAINAGE AND STORMWATER MANAGEMENT

The proposed stormwater management design will include both on-site stormwater quantity and quality control, prior to releasing flows from the site. Stormwater quantity control will be achieved by the construction of dry ponds and the use of an inlet control device (ICD) within the storm sewer outlet structure. Stormwater quality control will be achieved using a treatment train of grass bottom drainage swales, flat-bottom dry ponds and an oil and grit separator (OGS) type treatment unit.

Post-development flows will be over-controlled to less than the pre-development conditions as described in the City of Ottawa – SFPA Stormwater Management Report[2], prepared by Novatech. The approach to on-site stormwater management is consistent with the approach described in the Parsons Site Serviceability Report[1].

4.0 SITE GRADING

The topography of the existing site drops approximately 6m from Prince of Wales Drive along the western limit of the property to Lodge Road to the east. The proposed grading and drainage design takes advantage of the existing topography by sheet draining runoff from the landscaped areas and internal roadways into grass swales and/or directly into the dry ponds, thus reducing the need to pipe all of the stormwater runoff.

To ensure a presence along Prince of Wales Drive (Scenic Route into Ottawa), the main building floor (Level 1) has been set at an elevation of 90.85m, which is approximately the same elevation as the southbound lanes along this portion of Prince of Wales. The lower floor (Level 0) has been set at an elevation of 85.65m. The proposed 3-storey building will include entrances/exits at both the lower and middle floor levels. Access to the parking garages on the north side of the building will be at the lower (Level 0).

Where possible, the grading design will match into the existing elevations around the perimeter of the site, however the elevations along Prince of Wales will be adjusted slightly to accommodate the proposed site entrances and roadside ditches along Prince of Wales Drive (shown on the RMA drawings). Modifications to the Carleton Lodge entrance will be required to accommodate the proposed development.

On-site grade raise restrictions (~1.0m), due to sensitive clay soils, have been taken into consideration, as described in the Geotechnical Reports[3,4].

As stated above, the elevation of the dry ponds, required as part of the on-site SWM system, have been set approximately 0.2m above the top of the existing site outlet culvert (Culvert No. 6) along Lodge Road.

Refer to the enclosed Grading and Erosion & Sediment Control Plan (C-200) for details.

4.1 Major System Overflow Route

As discussed above, the entire site slopes from west to east, with the main storm outlet being the roadside ditch along Lodge Road, located near the NE corner of the site. In the case of a major rainfall event exceeding the design storms provided for, the stormwater located within the dry ponds will overflow towards the roadside ditch along Lodge Road. As stated above, the top of bank (weir and emergency overflow) along the east side of the north dry pond has been set at an elevation of 83.70m, approximately 0.65m below the top of grate elevations of the low catchbasins on site. The lower level of the proposed building has been set at an elevation of 85.65m, approximately 1.95m above the major system overflow elevation within the NE dry pond. The major system overflow route is shown on the enclosed Grading and Erosion & Sediment Control Plan (C-200).

5.0 GEOTECHNICAL INVESTIGATIONS

Geotechnical Investigation Reports have been prepared by Golder Associates for the proposed project. Refer to the Geotechnical Reports[3,4] for subsurface conditions, construction recommendations and geotechnical inspection requirements.

6.0 EROSION AND SEDIMENT CONTROL

To mitigate erosion and to prevent sediment from entering the storm drainage system, temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the “Guidelines on Erosion and Sediment Control for Urban Construction Sites” (Government of Ontario, May 1987). Details are provided on the Grading and Erosion and Sediment Control Plan (Drawing C-200). This includes the following measures:

- Filter bags / catchbasin inserts (sediment sacks) will be placed under the grates of nearby catchbasins and manholes and they will remain in place until vegetation has been established and construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 along the surrounding construction limits.
- Mud mats will be installed at the site entrances.

- Street sweeping, and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.
- On-site dewatering is to be directed to a sediment trap and/or gravel splash pad and discharged safely to an approved outlet as directed by the engineer.
- Temporary rock flow check dams as per OPSD 219.211 are to be installed as indicated on the plans.

The temporary erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken.

In addition, the following measures will provide permanent erosion and sediment control on site:

- Shallow flat-bottom grass drainage swales and dry ponds.
- Rip-rap will be provided at the storm inlets, outfall and overflow weir per OPSD 810.010.
- A Vortechs type Oil/Grit Separator will be installed to provide water quality control prior to releasing stormwater from the site.

7.0 CONCLUSION

This report has been prepared in support of the site plan control application for the proposed SFPA development in Ottawa.

The conclusions are as follows:

- The proposed development will be serviced by a private on-site sanitary pump station and forcemain. The outlet will be the municipal sanitary sewer in Willow Creek Circle on the west side of Prince of Wales Drive.
- The proposed development will be serviced by a looped 200mm dia. watermain network with connections to the municipal watermain in Willow Creek Circle and the existing 200mm dia. watermain currently supplying water to the Carleton Lodge. On-site hydrants will provide the necessary water for fire-fighting purposes.
- On-site stormwater management, including both stormwater quantity and water quality control measures, will be provided as described in the City of Ottawa – SFPA Stormwater Management Report[2].
- Regular inspection and maintenance of the on-site sanitary sewer system, including the sanitary pump station and controls is recommended to ensure that the sanitary sewage system is clean and operational.
- Regular inspection and maintenance of the on-site watermain network, including the valves and hydrants is recommended to ensure that the system is operational.
- Regular inspection and maintenance of the on-site storm sewer system, including the ICD, OGS treatment unit and dry ponds is recommended to ensure that the storm drainage system is clean and operational.
- Erosion and sediment control measures are to be provided both during construction and on a permanent basis.

It is recommended that the proposed site servicing design be approved for implementation.

NOVATECH

Servicing Prepared by:

Stephen Matthews, B.A. (Env.)
Senior Design Technologist

Sanitary Sewage System Prepared by:

Carl Sciuk, P. Eng.
Practice Lead Special Projects

Reviewed by:

François Thauvette, P. Eng.
Senior Project Manager

APPENDIX A

Correspondence

CITY OF OTTAWA MEETING 001 (PRE-CONSULTATION)

Project:	South Campus Phase 1 [redacted]	Date:	June 1, 2018
		Time:	1:30PM
Meeting Location:	Ottawa City Hall – Room 5105	Project No.:	180001

Chaired by: Ian Kennedy

Key Agenda Items: Project Introduction, Public Pre-Consultation, Site Design, Municipal Infrastructure,

Attachments: City of Ottawa Applicant's Study and Plan Identification Checklist.pdf

		Attendance:	Copies to:
City of Ottawa (CO)	Wendy Tse (WT) – Planner II	X	
	Christopher Moise (CM) – Urban Designer & Architect	X	
	Golam Sharif (GS) – Project Manager, Infrastructure Approvals	X	
Client (OPS)	Ian Kennedy (IK) – Senior Project Manager, CPT	X	X
	Carol Roper (CR) – Manager, CPT		X
	Sandra Mclaren (SM) – Inspector / Ops Rep, CPT		X
	Pauline Dicaire (PD) – CPT		X
	Greg Jodouin (GJ) – Public Affairs Consultant		
Prime Consultants (PDT)	Brian Rudy (BR) – Partner-in-Charge		X
	Emmanuelle van Rutten (EvR) – Project Architect		X
	Peter Ortred (PO) – Design Principal / Police Facilities Expert		X
	Elizabeth Goetz (EG) – Project Architect / Police Facilities Expert		X
	David Stone (DS) – Architect	X	x
Sub-Consultants	Jean-Michel Carrière (JC) – Structural Lead (AAR)		X
	Patrick St-Onge (PS) – Mechanical Project Manager (BP)		X
	April Waddell (AW) – Electrical Lead (BP)		X
	Francois Thauvette (FT) – Civil Lead (NOVATECH)	X	X
	Jamie Mckay (JM) – Bldg Science & Sustainability Specialist (MH)		X

LEGEND [redacted]

CO – City of Ottawa
PDT – Project Design Team
CPT – Capital Project Team
MP – Macintosh Perry Traffic Consultants

Note: If the information contained in this report does not agree with your record, or if there are any omissions, please advise us within 48 hours; otherwise we will assume the contents to be correct.

Item No.	Item	Action By	Due Date
1	**GENERAL OVERVIEW OF THE PROJECT & 2017 MASTERPLAN**		
1.1.1	Ian Kennedy (IK) provided overview of CPT work-to-date on generation of [redacted] South Campus Masterplan. Also gave overview of project schedule and key submittal / completion dates.	INFO	
2	**CURRENT PROJECT STATUS**		
1.2.1	David Stone (DS) provided overview of PDT work-to-date, current site plan strategy and anticipated deviations from the 2017 Masterplan, including;	INFO	
1.2.1.1	Use of Lodge Road will be avoided– parking egress shown in Masterplan will not exit to Lodge Road for Phase 1, but rather the Carleton Lodge Access Rd.		
1.2.1.2	Short queing "throat" at new signalized intersection on PoW Dr. in the middle of the site will be expanded, and 4-way intersection shown for internal site circulation will be reconfigured so no stopping is necessary.		
1.2.1.3	Multiple access/egress points on Carleton Lodge access road in short distance of one another will be avoided and/or optimized.		
3	**PROPERTY**		
1.3.1	**Site Severance** City confirmed that if site is not severed, application and studies would have to include entire site, including Carleton Lodge portion and triangular wedge north of Rocky Hill Drive. This would have the greatest impact on the Stormwater Management Plan & the MOECC Environmental Compliance Approval (ECA) application. Recommended to proceed with severance process – CPT to confirm with City Real Estate department (CREO) as final decision rests there.	CPT (IK)	July 4, 18
4	**MUNICIPAL INFRASTRUCTURE**		
1.4.1	Wendy Tse (WT) stated the following;	INFO	
1.4.1.1	No upgrades or resurfacing is planned for Lodge Rd in the foreseeable future. If Lodge Road is to be used by SCP1, upgrades would be the responsibility of [redacted].		
1.4.1.2	Road widening is planned in future. City has initiated a 40m right-of-way in anticipation of this work.		

1.4.1.3	Woodroffe disconnection work is complete and road will not connect to Prince of Wales again in the future.		
1.4.1.4	Servicing will most likely be from existing Carleton Lodge pump house. Will need to determine if capacity is adequate or if upgrade is required.		
5	**SITE DESIGN ISSUES**		
1.5.1	**Public Transportation** PDT/CPT identified that no OC Tranpo service near site – closest bus stop is over 1km away. Discussions to be initiated with OC Transpo by CPT.	CPT (IK)	July 4, 18
1.5.2	**City of Ottawa Comments on 2017 Masterplan Design;**	INFO	
1.5.2.1	Throat length inadequate – recommended to be increased. This will impact siting as setback from road will be increased.		
1.5.2.2	Concern raised over 4-way internal site intersection – distance from road inadequate due to the possibility of traffic stopping here. (See point above)		
1.5.2.3	Concern raised at number of egress points in close proximity on Lodge Road access road.		
1.5.2.4	Questions raised over security of site – planners concerned about fenced perimeter. Suggested that alternative security measures be investigated. (i.e. earth berms, bollards, etc.)		
1.5.2.5	Identified that Prince of Wales is a “Scenic Access Route.” Refer to design guidelines for more information. (Submittal/approvals process not required for this, simply a guideline)		
1.5.2.6	Identified that building should have strong civic presence on Prince of Wales Dr.		
1.5.2.7	Identified concern over quantity of parking – minimizing footprint however possible is preferred, and masking parking areas from both PoW Dr. and the Rideau River is encouraged. Suggested to mask multi-story parking decks with vegetation if possible.		
1.5.2.8	Planners expressed enthusiasm for selected design team, and look forward to seeing subsequent submissions. PDT & CPT were encouraged to return for presentation of schematic design options prior to site plan application. To be confirmed if necessary.		

1.5.3	**Access from Prince of Wales** PDT outlined that current approach will entail a new access point most likely aligned with the old Woodroffe Rd connection. A second access point will most likely entail the use of the existing Carleton Lodge unnamed access road, as [redacted] Fleet parking requires a redundancy in egress points. Traffic analysis and workshop will help determine required distance between intersections, and turning lane/signalization strategy.	INFO	
6	**APPLICATIONS & PROCESS**		
1.6.1	**Studies Required by City** See attached Study and Plan Identification List for all required submittals to the City of Ottawa. Noted that "Cultural Heritage Impact Statement" is no longer required but already completed.	INFO	
7	**PUBLIC PRE-CONSULTATION MEETING**		
1.7.1 1.7.1.1	**Overview of Evening** Ian Kennedy & Greg Jodouin presented overview of Public Pre-Consultation strategy and event planned for June 26th at the Rideau Valley Conservation Authority. Invitation was extended to City of Ottawa staff.	INFO	
1.7.1.2	Planners recommended that due to early stage of process, avoid showing any image of a site plan. Presentation material should be "inspirational", "notional" and "abstract" to generate conversation and discussion.	INFO	
1.7.2	**Statistics** City of Ottawa to provide CPT with statistics & forecasting for Barrhaven growth for use on presentation boards.	CO	June 15, 18

END

NEXT MEETING: TBD

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer to:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	15	1. Site Servicing Plan	2. Assessment of Adequacy of Public Services / Site Servicing Study / Brief	S	6
S	15	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study (update to existing is acceptable)	S	4
	2	5. Composite Utility Plan	6. Groundwater Impact Study		6
	5	7. Servicing Options Report	8. Wellhead Protection Study		6
S	9	9. Transportation Impact Brief	10. Erosion and Sediment Control Plan / Brief	S	6
S	6	11. Storm water Management Report / Brief	12. Hydro geological and Terrain Analysis	S	8
	3	13. Hydraulic Water main Analysis	14. Noise / Vibration Study	S	3
	35/50/55	15. Roadway Modification Design Plan	16. Confederation Line Proximity Study		9

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
	50	17. Draft Plan of Subdivision	18. Plan Showing Layout of Parking Garage		2
	30	19. Draft Plan of Condominium	20. Planning Rationale		3
S	15	21. Site Plan	22. Minimum Distance Separation (MDS)		3
	20	23. Concept Plan Showing Proposed Land Uses and Landscaping	24. Agrology and Soil Capability Study		5
	3	25. Concept Plan Showing Ultimate Use of Land	26. Cultural Heritage Impact Statement	S	3
S	15	27. Landscape Plan	28. Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)	S	3
	2	29. Survey Plan	30. Shadow Analysis		3
S	3	31. Architectural Building Elevation Drawings (dimensioned)	32. Design Brief	S	3
	6	33. Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	5	34. Phase 1 Environmental Site Assessment	35. Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		6
	5	36. Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37. Assessment of Landform Features		7
	4	38. Record of Site Condition	39. Mineral Resource Impact Assessment		4
	10	40. Tree Conservation Report	41. Environmental Impact Statement / Impact Assessment of Endangered Species	S	11
	4	42. Mine Hazard Study / Abandoned Pit or Quarry Study			

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
		43.	44.		

Meeting Date: May 9, 2017

Application Type: *Site Plan Control*

File Lead (Assigned Planner): Mary Ellen Wood

Infrastructure Approvals Project Manager: James Hall

Site Address (Municipal Address): 55 Lodge Rd

*Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5☐

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning and Growth Management Department will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning and Growth Management Department.

APPENDIX B

Development Servicing Study Checklist

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

N/A ☐ Executive Summary (for larger reports only).

☑ Date and revision number of the report.

☑ Location map and plan showing municipal address, boundary, and layout of proposed development.

☑ Plan showing the site and location of all existing services.

☑ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.

☑ Summary of Pre-consultation Meetings with City and other approval agencies.

☑ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.

☑ Statement of objectives and servicing criteria.

☑ Identification of existing and proposed infrastructure available in the immediate area.

☑ 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).

☑ 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 ☐ 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.

☑ Proposed phasing of the development, if applicable.

☑ Reference to geotechnical studies and recommendations concerning servicing.

☑ 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

4.2 Development Servicing Report: Water

☑ Confirm consistency with Master Servicing Study, if available

☑ Availability of public infrastructure to service proposed development

☑ Identification of system constraints

☑ Identify boundary conditions

☑ Confirmation of adequate domestic supply and pressure

☑ 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.

☑ 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.

☑ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

☑ Address reliability requirements such as appropriate location of shut-off valves

N/A ☐ Check on the necessity of a pressure zone boundary modification.

☑ 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

☑ 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 ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

☑ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

☑ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

☑ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).

☑ Confirm consistency with Master Servicing Study and/or justifications for deviations.

☑ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.

N/A ☐ Description of existing sanitary sewer available for discharge of wastewater from proposed development.

N/A ☐ 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)

N/A ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.

☑ Description of proposed sewer network including sewers, pumping stations, and forcemains.

N/A ☐ 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).

☑ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.

☑ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.

N/A ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.

☑ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

☑ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)

N/A ☐ Analysis of available capacity in existing public infrastructure.

☑ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

☑ 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.

☑ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

☑ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

N/A ☐ Set-back from private sewage disposal systems.

☑ Watercourse and hazard lands setbacks.

☑ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

☑ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

- [x] Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- [ ] N/A Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- [x] 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.
- [x] Any proposed diversion of drainage catchment areas from one outlet to another.
- [x] Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- [ ] N/A 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.
- [x] Identification of potential impacts to receiving watercourses
- [ ] N/A Identification of municipal drains and related approval requirements.
- [x] Descriptions of how the conveyance and storage capacity will be achieved for the development.
- [x] 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.
- [ ] N/A Inclusion of hydraulic analysis including hydraulic grade line elevations.
- [x] Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- [ ] N/A 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.
- [x] Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

NOTED ☐ 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.

NOTED ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

N/A ☐ Changes to Municipal Drains.

N/A ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

☑ Clearly stated conclusions and recommendations

TBD ☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

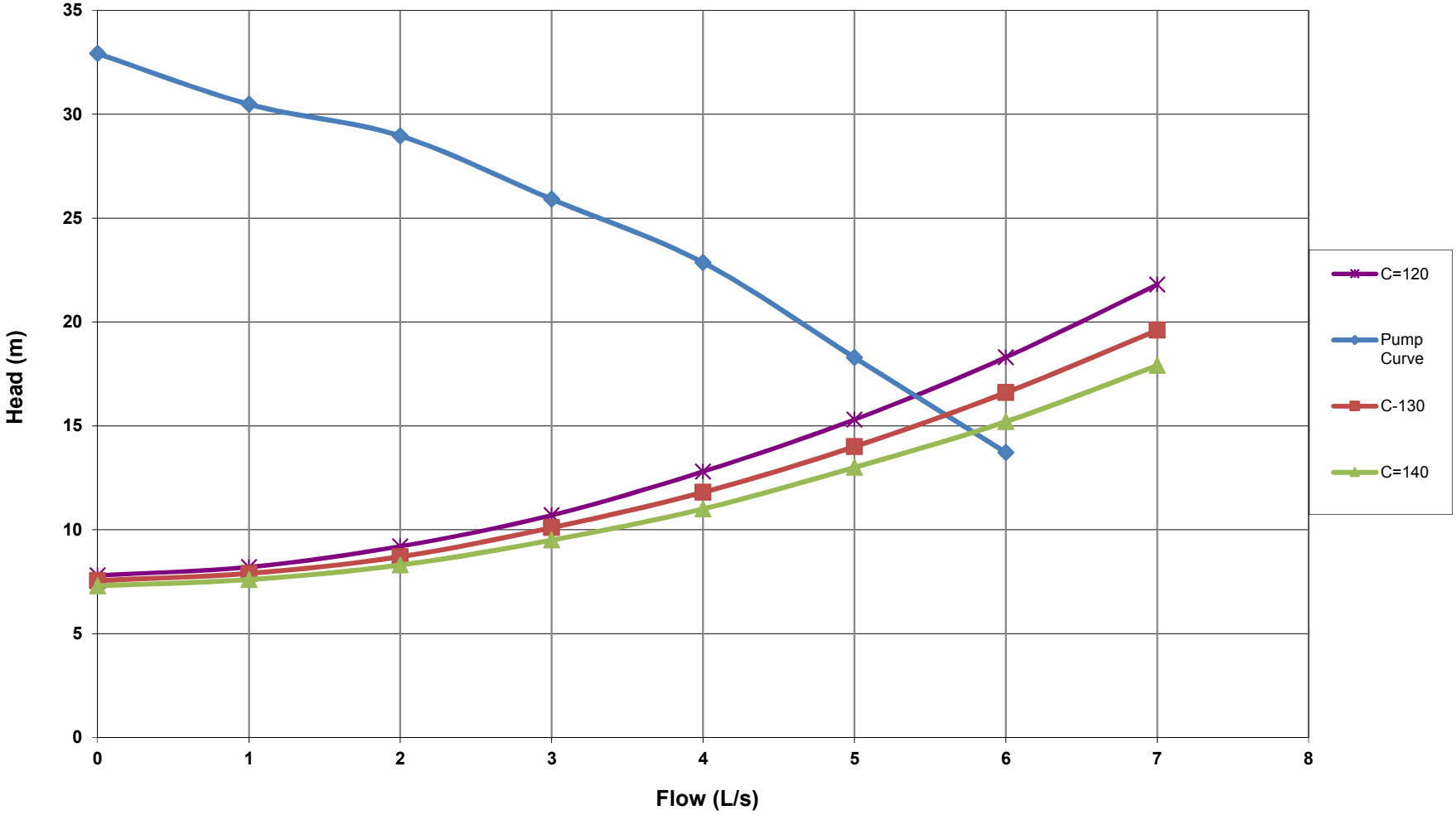
☑ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX C

Sanitary Pump Station Pump System Curve and Sanitary Forcemain Headloss Calculations

Novatech File: 118048
May 2019

PUMP SYSTEM CURVE



Novatech File: 118048
Date: May 17, 2018

FORCEMAIN HEAD LOSS CALCULATION

NOVATECH ENGINEERING CONSULTANTS LTD.

Sanitary Pump

C= 120

3.8L/s Now 4.8L/s future

Discharge PIPING **2 " Schedule 40 Pipe** (Pump thru valve chamber) *1.5* ft/s

Flow	ID	C	Head Loss	Length	90 *5.7*	45 *2.6*	T-Run *4*	T-Branch *12*	S-Entr. *10*	S-Red *5*	S-Incr *6*	B-Valve *6*	Gravity *2*	Strainer *1*	V-Head *0.0*	Total
[USGPM]	[inches]	[150]	[ft/1000ft]	[ft]	[#]	[#]	[#]	[#]	[#]	[#]	[#]	[#]	[#]	[1/0]	[1/0]	[ft]
15.85	2.047	140	5.65	30	3	0	1	1	0	0	0	2	0	0	0	
	HEAD LOSSES →			*0.2*	*0.1*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.1*	0.0	0.0	0.0	0.4

Forcemain **3 " DR 17 polypipe** (valve chamber to Manhole) *0.7* ft/s

Flow	ID	C	Head Loss	Length	90 *7.9*	45 *4*	T-Run *6.1*	T-Branch *16.4*	S-Entr. *10*	S-Red *6*	S-Incr *8*	B-Valve *6*	C-Valve *40*	Filter *9*	V-Head *0.0*	Total
[USGPM]	[inches]	[150]	[ft/1000ft]	[ft]	[#]	[#]	[#]	[#]	[#]	[#]	[#]	[#]	[#]	[1/0]	[1/0]	[ft]
15.85	3.042	140	0.82	591	1	4	0	0	0	1	0	0	0	0	1	
	HEAD LOSSES →			*0.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	0.0	0.0	0.5

blank **2 " Schedule 40 Pipe** (Not used) *0.0* ft/s

Flow	ID	C	Head Loss	Length	90 *5.7*	45 *2.6*	T-Run *4*	T-Branch *12*	S-Entr. *10*	S-Red *5*	S-Incr *6*	B-Valve *6*	C-Valve *40*	Filter *3*	V-Head *0.0*	Total
[USGPM]	[inches]	[150]	[ft/1000ft]	[ft]	[#]	[#]	[#]	[#]	[#]	[#]	[#]	[#]	[#]	[1/0]	[1/0]	[ft]
0	2.047	140	0.00	1	1	1	1	1	1	1	1	1	1	0	0	
	HEAD LOSSES →			*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	0.0	0.0	0.0

TOTAL DYNAMIC HEAD LOSSES **0.9** [ft]
ELEVATION CHANGE **7.3** [m]
TDH **7.6** [m]

1 L/s

Flow [L/s]	C=120 Head [m]	C=130 Head [m]	C=140 Head [m]	Pump Curve [m]	ft	gpm
0.00	7.8	7.6	7.3	32.9	108.0	0.0
1.00	8.2	7.9	7.6	30.5	100.0	15.9
2.00	9.2	8.7	8.3	29.0	95.0	31.7
3.00	10.7	10.1	9.5	25.9	85.0	47.6
4.00	12.8	11.8	11.0	22.9	75.0	63.4
5.00	15.3	14.0	13.0	18.3	60.0	79.3
6.00	18.3	16.6	15.2	13.7	45.0	95.1
7.00	21.8	19.6	17.9			

C = Hazen Williams Roughness Coefficient

Pump Myers WG30H
Bottom Wet Well = 80.6 m
Forcemain Discharge Elevation = 88.8 m

	Design El.	Static Head
C=140 WITH HWL	81.5 m	7.30 m
C=130 WITH MEDIAN WL	81.25 m	7.55 m
C=120 WITH LWL	81 m	7.80 m

APPENDIX D

Water Demands, Boundary Conditions, Schematic of the Hydraulic Model, Hydraulic Modelling Results and FUS Calculations

Francois Thauvette

From: Sharif, Sharif <sharif.sharif@ottawa.ca>
Sent: Wednesday, May 8, 2019 10:01 AM
To: Francois Thauvette
Cc: Oram, Cody; Steve Matthews
Subject: RE: OPS - South Campus - Request for WM boundary conditions
Attachments: 3505 Prince of Wales Dr. Connection Location.docx

Good Morning Francois,

Here is the requested boundary condition attached. If you have any question please let me know. Thanks.

Sharif

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: May 07, 2019 8:26 AM
To: Sharif, Sharif <sharif.sharif@ottawa.ca>
Cc: Oram, Cody <Cody.Oram@ottawa.ca>; Steve Matthews <S.Matthews@novatech-eng.com>
Subject: RE: OPS - South Campus - Request for WM boundary conditions

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

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

Hi Sharif,

Any updates from the Water Department regarding the request for boundary conditions? We require this information to finalize our design as we are planning to submit for SPA next week.

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867
The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Francois Thauvette
Sent: Monday, April 29, 2019 10:50 AM
To: Sharif, Sharif <sharif.sharif@ottawa.ca>
Cc: Oram, Cody <Cody.Oram@ottawa.ca>; Steve Matthews <S.Matthews@novatech-eng.com>
Subject: Ottawa Police Service - South Campus - Request for WM boundary conditions

Hi Sharif,

We are sending you this e-mail to request watermain boundary conditions for a proposed looped watermain network to service the proposed Ottawa Police Service (OPS) South Campus. The intent is to connect to the existing 200mm dia. watermain on Willow Creek Circle (west side of Prince of Wales) as well as to the 200mm dia. watermain currently servicing the Carleton Lodge. This will also provide the Carleton Lodge with a redundant water supply. See attached schematic sketch for details.

The anticipated water demands for the proposed Phase 1 and Phase 2 development are as follows:

- Average Day Demand = 1.1 L/s
- Max. Day Demand = 1.6 L/s
- Peak Hour Demand = 2.9 L/s
- Max Daily + Fire Flow = 252 L/s (FUS fire flow of 250 L/s)*

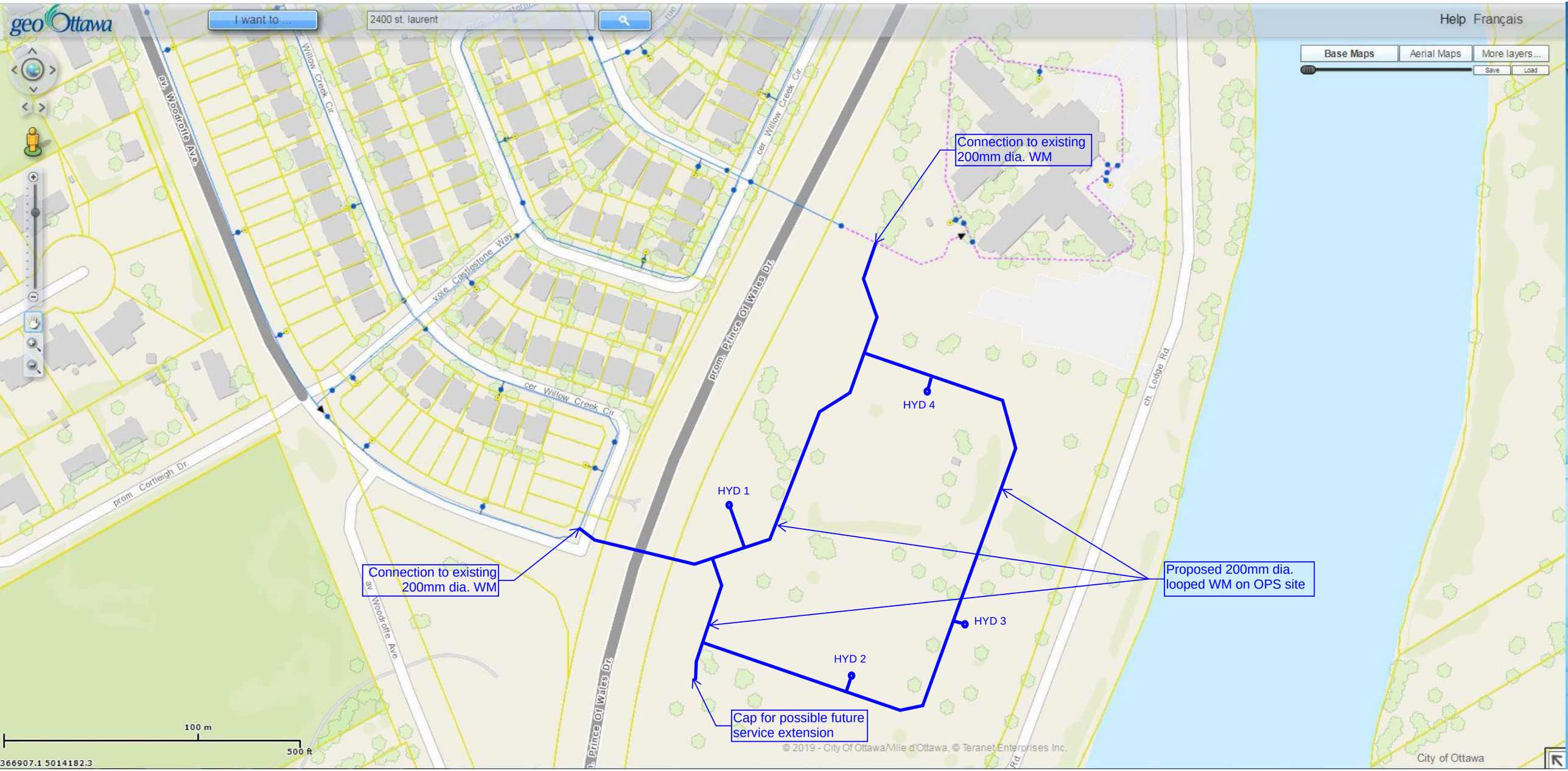
We will be using a multi-hydrant approach to fire-fighting per City of Ottawa Technical Bulletin ISTB-2018-02.

*Based on a non-combustible, 3-storey building with an supervised sprinkler system, per the architectural design. See attached FUS calculation sheet for details.

If possible, please provide boundary conditions before the end of the week.

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867
The information contained in this email message is confidential and is for exclusive use of the addressee.


geoOttawa
I want to ...
2400 st. laurent
Help Français
Base Maps
Aerial Maps
More layers...
Save
Load
av. Woodroffe Ave.
cer. Willow Creek Cir.
voie Castlestone Way
prom. Cortleigh Dr.
prom. Prince Of Wales Dr.
ch. Lodge Rd.
Connection to existing 200mm dia. WM
HYD 4
HYD 1
HYD 3
HYD 2
Proposed 200mm dia. looped WM on OPS site
Cap for possible future service extension
100 m
500 ft
366907.1 5014182.3
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City of Ottawa

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118048
Project Name: Ottawa Police Services - South Campus
Date: 4/29/2019
Input By: S. Matthews
Reviewed By: F. Thauvette

Legend: Input by User; No Information or Input Required

Building Description: 3-Storey Building
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame		1.5	0.8	
		Ordinary construction		1		
		Non-combustible construction	Yes	0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	9063			
		Number of Floors/Storeys	3			
		Protected Openings (1 hr)	No			
		Area of structure considered (m^2)			**22,658**	
	F	**Base fire flow without reductions**				**26,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	15%	**29,900**
		Limited combustible		-15%		
		Combustible		0%		
		Free burning	Yes	15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-14,950**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**0**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**0%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**15,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**250**
				or	USGPM	3,963
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2700

BOUNDARY CONDITIONS

Boundary Conditions For: 3505 Prince of Wales Dr.

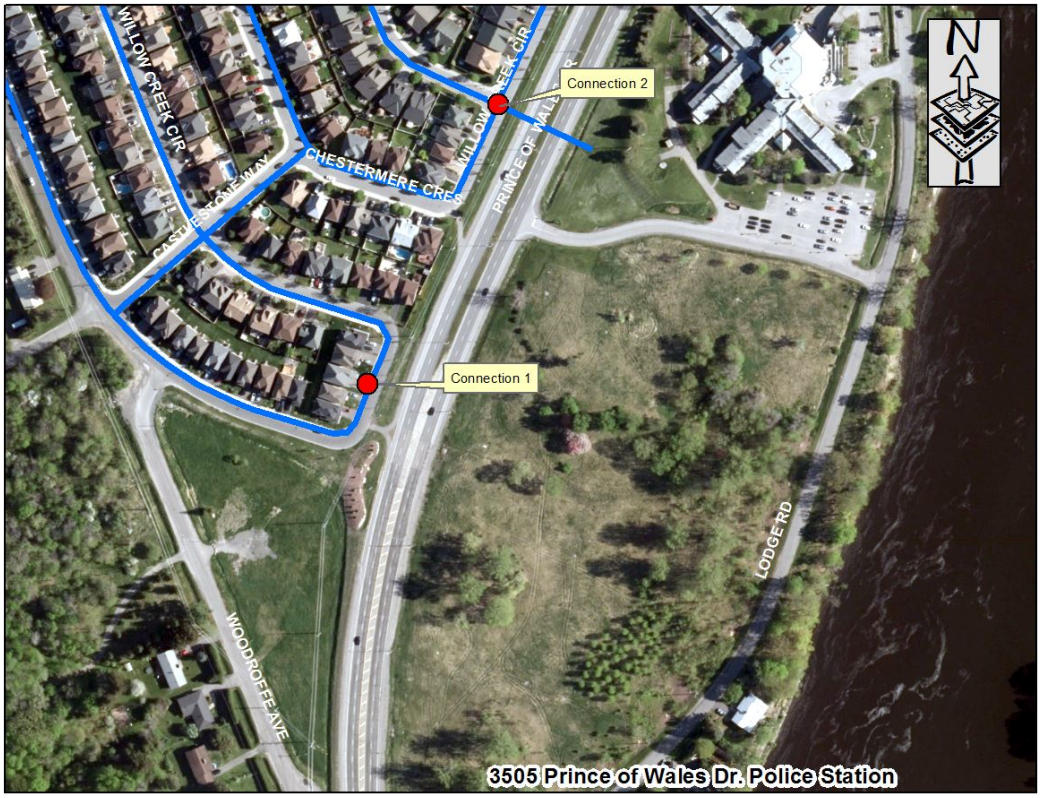
Date of Boundary Conditions: 2019-May-07

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	66.0	1.1
Maximum Daily Demand	96.0	1.6
Peak Hour	174.0	2.9
Fire Flow #1 Demand	15,000	250.0

Number Of Connections: 2

Location:



BOUNDARY CONDITIONS

Results:

Pre-Config

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	157.9	95.0
Peak Hour	142.6	73.3
Max Day Plus Fire (15,000) L/min	113.2	31.6

[1]Elevation: **91.020 m**

Connection #: 2

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	157.9	96.2
Peak Hour	142.6	74.4
Max Day Plus Fire (15,000) L/min	115.5	36.0

[1]Elevation: **90.220 m**

Post-Config

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	80.5
Peak Hour	145.6	77.4
Max Day Plus Fire (15,000) L/min	121.3	42.9

[1]Elevation: **91.020 m**

BOUNDARY CONDITIONS

Connection #: 2

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	81.8
Peak Hour	145.6	78.7
Max Day Plus Fire (15,000) L/min	123.7	47.6

[1]Elevation: **90.220 m**

Notes:

1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:

a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

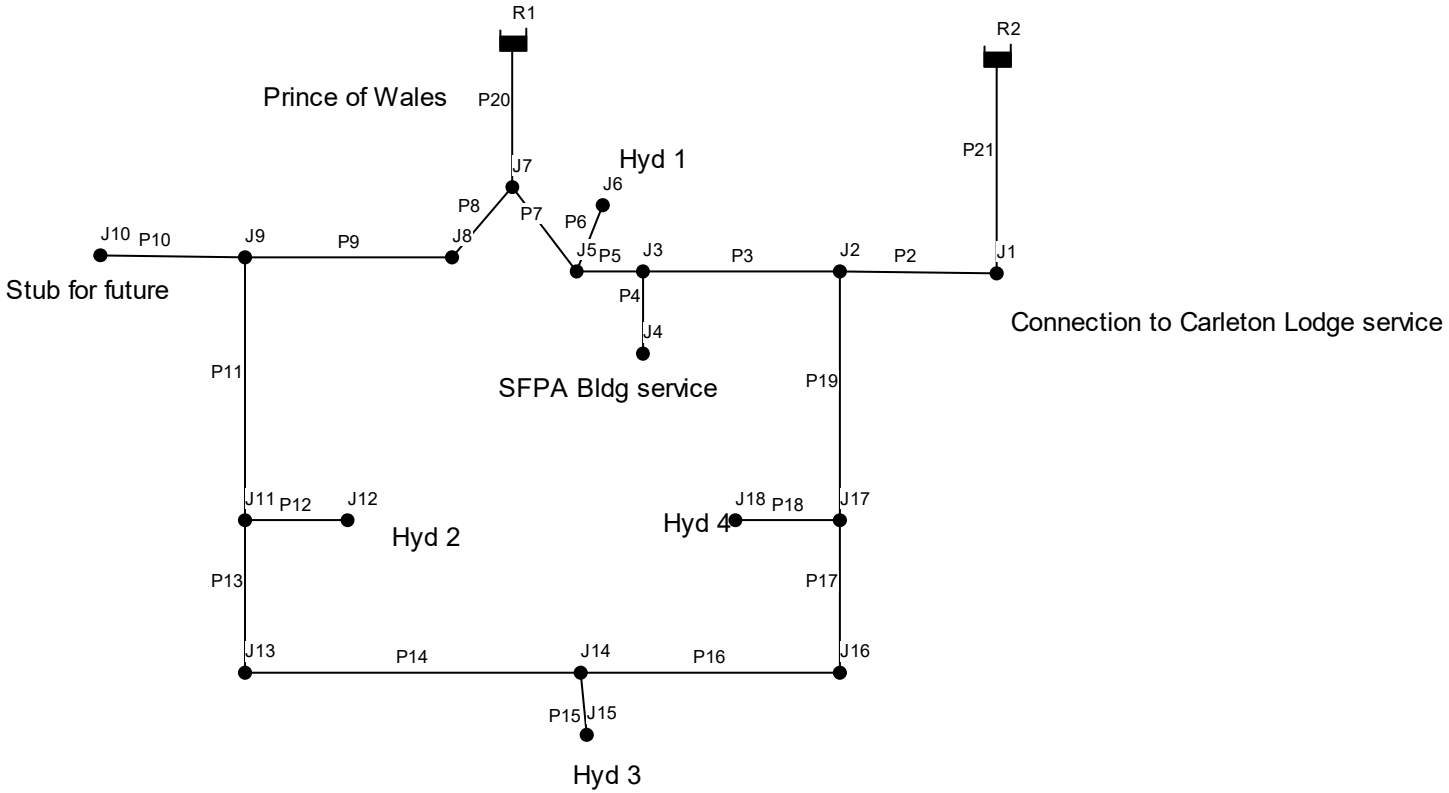
2) Click or tap here to enter text.

3) Click or tap here to enter text.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

City of Ottawa - SFPA Watermain Model Schematic



City of Ottawa - SFPA (Phases 1 & 2)
Max Day + Fire Flow Demand (using 4 hydrants)
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1 (Carleton Lodge service)	83.90	4	117.22	33.32	326.87	47.41
Junc J2	84.95	0	113.62	28.67	281.25	40.79
Junc J3	87.45	0	113.53	26.08	255.84	37.11
Junc J4 (Bldg Service)	90.85	2	113.53	22.68	222.49	32.27
Junc J5	87.50	0	113.51	26.01	255.16	37.01
Junc J6 (Hyd. 1)	87.50	70	110.65	23.15	227.10	32.94
Junc J7	86.00	0	113.9	27.9	273.70	39.70
Junc J8	86.00	0	113.36	27.36	268.40	38.93
Junc J9	86.60	0	111.56	24.96	244.86	35.51
Junc J10 (Fut. Stub)	86.20	2	111.55	25.35	248.68	36.07
Junc J11	83.10	0	107.94	24.84	243.68	35.34
Junc J12 (Hyd. 2)	86.00	60	107.64	21.64	212.29	30.79
Junc J13	82.40	0	107.85	25.45	249.66	36.21
Junc J14	82.65	0	107.71	25.06	245.84	35.66
Junc J15 (Hyd. 3)	86.00	60	107.27	21.27	208.66	30.26
Junc J16	82.00	0	108.6	26.6	260.95	37.85
Junc J17	82.75	0	109.61	26.86	263.50	38.22
Junc J18 (Hyd. 4)	86.00	60	108.81	22.81	223.77	32.45
Resvr R1 (Willow Creek WM)	121.30	-138.13	121.3	0	0.00	0.00
Resvr R2 (Willow Creek WM)	123.70	-119.87	123.7	0	0.00	0.00

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P2	43.4	200	110	115.87	3.69	82.9
Pipe P3	106.4	200	110	10.13	0.32	0.91
Pipe P4 (Bldg Service)	20	200	110	2	0.06	0.04
Pipe P5	22.2	200	110	8.13	0.26	0.6
Pipe P6 9Hyd. Lead)	18.1	150	100	70	3.96	157.91
Pipe P7	14.8	200	110	-61.87	1.97	25.94
Pipe P8	14.1	200	110	76.25	2.43	38.2
Pipe P9	47.2	200	110	76.25	2.43	38.2
Pipe P10	8.8	200	110	2	0.06	0.05
Pipe P11	99.5	200	110	74.25	2.36	36.36
Pipe P12 (Hyd. Lead)	2.5	150	100	60	3.4	118.69
Pipe P13	48.4	200	110	-14.25	0.45	1.71
Pipe P14	83.8	200	110	14.25	0.45	1.71
Pipe P15 (Hyd. Lead)	3.7	150	100	60	3.4	118.69
Pipe P16	59.8	200	110	-45.75	1.46	14.83
Pipe P17	68	200	110	-45.75	1.46	14.83
Pipe P18 (Hyd. Lead)	6.7	150	100	60	3.4	118.69
Pipe P19	57.4	200	110	-105.75	3.37	69.98
Pipe P20	64.5	200	110	-138.13	4.4	114.78
Pipe P21	73.4	200	110	119.87	3.82	88.27

City of Ottawa - SFPA (Phases 1 & 2)
Peak Hour Demand
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1 (Carleton Lodge service)	83.90	7	145.57	61.67	604.98	87.75
Junc J2	84.95	0	145.57	60.62	594.68	86.25
Junc J3	87.45	0	145.57	58.12	570.16	82.69
Junc J4 (Bldg Service)	90.85	3	145.57	54.72	536.80	77.86
Junc J5	87.5	0	145.57	58.07	569.67	82.62
Junc J6 (Hyd. 1)	87.50	0	145.57	58.07	569.67	82.62
Junc J7	86.00	0	145.58	59.58	584.48	84.77
Junc J8	86.00	0	145.57	59.57	584.38	84.76
Junc J9	86.60	0	145.57	58.97	578.50	83.90
Junc J10 (Fut. Stub)	86.20	3	145.57	59.37	582.42	84.47
Junc J11	83.10	0	145.57	62.47	612.83	88.88
Junc J12 (Hyd. 2)	86.00	0	145.57	59.57	584.38	84.76
Junc J13	82.40	0	145.57	63.17	619.70	89.88
Junc J14	82.65	0	145.57	62.92	617.25	89.52
Junc J15 (Hyd. 3)	86.00	0	145.57	59.57	584.38	84.76
Junc J16	82.00	0	145.57	63.57	623.62	90.45
Junc J17	82.75	0	145.57	62.82	616.26	89.38
Junc J18 (Hyd. 4)	86.00	0	145.57	59.57	584.38	84.76
Resvr R1 (Willow Creek WM)	145.60	-6.39	145.6	0	0.00	0.00
Resvr R2 (Willow Creek WM)	145.60	-6.61	145.6	0	0.00	0.00

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P2	43.4	200	110	-0.39	0.01	0
Pipe P3	106.4	200	110	-0.53	0.02	0
Pipe P4 (Bldg Service)	20	200	110	3	0.1	0.1
Pipe P5	22.2	200	110	-3.53	0.11	0.13
Pipe P6 9Hyd. Lead)	18.1	150	100	0	0	0
Pipe P7	14.8	200	110	-3.53	0.11	0.13
Pipe P8	14.1	200	110	2.86	0.09	0.09
Pipe P9	47.2	200	110	2.86	0.09	0.09
Pipe P10	8.8	200	110	3	0.1	0.1
Pipe P11	99.5	200	110	-0.14	0	0
Pipe P12 (Hyd. Lead)	2.5	150	100	0	0	0
Pipe P13	48.4	200	110	0.14	0	0
Pipe P14	83.8	200	110	-0.14	0	0
Pipe P15 (Hyd. Lead)	3.7	150	100	0	0	0
Pipe P16	59.8	200	110	-0.14	0	0
Pipe P17	68	200	110	-0.14	0	0
Pipe P18 (Hyd. Lead)	6.7	150	100	0	0	0
Pipe P19	57.4	200	110	-0.14	0	0
Pipe P20	64.5	200	110	-6.39	0.2	0.39
Pipe P21	73.4	200	110	6.61	0.21	0.41