

# **SITE SERVICING AND STORMWATER MANAGEMENT REPORT**

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**Project Address – 3817 – 3843 Innes Road, Vars**

**Owner/Client:** Bridor Development  
**Address:** 996-B St-Augustin Rd, Embrun ON  
**City file Number:**

**By Blanchard Letendre Engineering Ltd.**  
**Date – October 14, 2020**  
**Our File Reference: 19-184**

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## 1.0 INTRODUCTION

Blanchard Letendre Engineering Ltd. (BLEL) was retained by Bridor Development. to complete their site servicing and stormwater management for the new proposed site located at 3817 – 3843 Innes Road in Ottawa. This report summarized proposed site servicing and stormwater management and should be read in conjunction with the engineering drawings prepare by BLEL. This report and site servicing plan have been prepared based on the site plan proposed by P-Square Concepts and the site survey completed by Annis O’Sullivan Vollebekk. The information contained herein is based on the provided drawings and if there is any discrepancy with the survey or site plan, BLEL should be informed in order to verify the information and complete the changes if required.

## 2.0 SITE PLAN

The proposed site is to be located in Orleans, Ontario. As per the aerial picture in figure 1, the existing site consist of and green space area with four (4) existing building that will be demolished prior to construction. The property located at 3817- 3843 Innes Road, consist of approximately 0.72ha of undeveloped land. The land will be developed with three (3) new residential apartments building and be severed into three separate properties with two (2) shared entrances.



Figure 1- Existing site at 3817 – 3843 Innes Road, Orleans, Ontario

## **3.0 STORM WATER MANAGEMENT**

### **3.1 Existing Site Condition**

The existing site currently has no stormwater management nor storm service connection. The site currently drains uncontrolled towards Innes road where the stormwater generated from the site is captured by the road site catchbasin. The existing property naturally grades towards Innes road away from the residential development on the north and west portion of the property. There is an existing gas station at the east side of the property that is developed at a lower elevation than the existing property. Refer to BL Engineering drawing C400 for the pre-development drainage area and existing grading showing the current drainage of the site.

### **3.2 Proposed Storm Water Management**

The development of the site will consist of adding three (3) new residential apartment building, where two of the buildings will consist of three (3) storeys apartment and the other will be a five (5) storeys apartments. The site will be modified by adding a total of 7268 square meter building (Block A = 2452m<sup>2</sup>; Block B = 2508m<sup>2</sup>; Block C = 2308m<sup>2</sup>) asphalt parking and driving and amenities areas. As the runoff coefficient will increase due to addition of hard surfaces, post-development stormwater quantity and quality will be implemented.

The site stormwater management has been prepared in correlation with the existing site grading. To minimize the fill and site work required, the stormwater management has been developed to follow the existing site grading. As the property naturally drains towards Innes Road, the proposed stormwater management will outlet to City storm sewer on Innes Road. The overland flow route has also been designed to convey the storm runoff towards Innes road.

The stormwater generated by the new hard surfaces will be directed to a series of catchbasins which will capture and convey the water runoff to existing the surrounding ditches. The catchment areas have been delineated as per the proposed grading plan. Refer to Appendix 'A', for the catchment area and runoff coefficient. In order to respect the 5 year pre-development allowable release rate, the outlets will be controlled by undersized 300mm diameter storm pipe which will act as an orifice and limit the flow outletting to City storm sewer on Innes road. By throttling the flow, stormwater retention will be completed with the use of overland ponding and underground storage which was designed to hold the 100 year storm event. Refer to Appendix 'A' for the stormwater flow and storage calculations.

### **3.3 Proposed Storm Water Management**

The pre-development flow of the 5-year storm was calculated using a 5-year storm and a 10-minute time of concentration for the affected area. The pre-development flow of the 100-year storm was calculated using a 100-year storm and a 10-minute time of concentration for the affected area.

From intensity duration curves established for the Ottawa area, the intensity was evaluated at of 104.2 mm/hr for the 5yr predevelopment flow and 178.6mm/hr for the 100-year predevelopment flow. A run-off coefficient of 0.45 was used as per the evaluated, see Appendix ‘A’ – Pre-Development Drainage Area table.

Using the Rational Method and considering the tributary areas of the proposed (see Appendix ‘A’), the pre-development allowable release rate for the site was evaluated at **93.85 L/s**. See also the Storm Sewer Design Sheet in Appendix ‘A’.

$$\begin{aligned}\text{Allowable Release Rate (Q)} &= 2.78CIA \text{ (L/s)} \\ I_s &= 998.071 / (T_c + 6.053)^{0.814} \\ C &= 0.45 \\ I &= 104.2 \text{ mm/hr} \\ T_c &= 10 \text{ min} \\ \text{Total} &= 0.720 \text{ ha} \\ \text{Allowable Release Rate} &= 93.85 \text{ L/s}\end{aligned}$$

### 3.4 Proposed Stormwater Quantity Control

The proposed stormwater management for the site will be achieved primarily through the use of underground pipe storage and overland surface ponding. The grading of the site has been designed to direct the stormwater towards the series of catchbasins connected to the underground stormwater chambers before outleting south into the 1350mm diameter storm city sewer. The proposed underground stormwater chambers and catchbasins are shown on the attached drawings in Appendix ‘E’.

The proposed site has been graded to outlet overland onto Innes Road on the south side of the property. As the site naturally grades from the north side to the south side, the grades have been adjusted to suit this profile, to minimize the grade raise of the site. All catchment areas were designed to direct the stormwater overland to the south-east corner and to will be conveyed captured through a series of parking catchbasins and landscaping drains with subdrains.

The stormwater generated from site will be discharged to the existing storm sewer on Innes road and be controlled using an undersized pipe which will throttle the flow direct to the municipal sewer. The proposed 300mm diameter pipe will release a total of **93.85 L/s** with a maximum head of 2.38m (HWL = 92.00) during the 100 year event. As the flow will be restricted, 136.70m<sup>3</sup> of stormwater storage will be required for this area. This storage will be provided with underground stormwater chambers and surface ponding. The underground storage has been designed to hold and convey the stormwater water to the sewer on Innes road. The underground chambers will provide 120.9 m<sup>3</sup> where as the remaining will be stored on the parking and driving areas. An additional 30.21m<sup>3</sup> of storage was designed overland which combined with the underground chambers (120.9 m<sup>3</sup> + 30.21m<sup>3</sup> = 151.11 m<sup>3</sup>) can hold more than the minimum required storage. Refer to the underground chambers in Appendix ‘D’.

The three (3) underground parking ramp will be drained with separate catchbasin that will capture and convey the storm water generated from the ramps to the underground chambers. Backflow preventers will be installed in the receiving catchbasins (MHCB03 and MHCB05) to prevent stormwater from ponding in the ramps area. Storage has been provided in each area to store the 100 year event when the underground chambers will fill during storm events greater than the 5 year.

### **3.4.1 Roof Drainage**

The proposed roofs are flat roof with roof drains. Drain and scuppers will be installed to drain the water onto the pavement area.

### **3.4.2 Underground Chambers**

The underground storage chambers have been designed to hold and convey the stormwater generated from the site. The underground chambers have been designed to hold most of the stormwater under the proposed parking/ driving area. The chambers, which have been designed as isolator rows, were designed to also provide some filtration which is favorable for the final site TSS. A total of 120.9 m<sup>3</sup> will be provide by the underground chambers. The chambers will be connected to the proposed manhole catchbasin which will facilitates the maintenance of the chambers. The maintenance of the chambers is to be in accordance with the manufacture. Refer to Appendix “D” for Stormwater Storage Chambers.

## **3.5 Proposed Stormwater Quality Control**

A water quality control requirement of 80% TSS removal was set by the City of Ottawa. In order to meet the requirements, a storm treatment unit will be installed and the downstream end of the system. Using the Stormceptor sizing software, the EF06 was selected. The software generated report has been attached (See Appendix "D").

## **4.0 SANITARY SEWER DESIGN**

### **4.1 Existing Site Conditions**

The existing site is currently being service by a three separate service which services the existing three parcels and are connected to the existing 406mm diameter sanitary on Innes Road. The existing connection will be removed and reinstated with three new connection that will service the new buildings.



## 4.2 Existing Site Conditions

The new residential apartment building, which proposes 33 units for Block A, 31 units for Block B and 33 units for Block C will discharge to the city via three new 150mm diameter sanitary services. The services are to be located on the south face of the buildings and will discharge to the existing 250mm diameter city sewer running along Innes road. The proposed 150mm diameter service will be installed at a minimum of 1.00% slope directly to the city sewer. No monitoring manhole are proposed for these three new connections. Refer to drawing C300 – Site Servicing Plan for the existing and proposed sanitary service.

Based on the City of Ottawa Sanitary Design Guidelines, the sanitary peak loads were evaluated as follow; Block A: **0.88 L/s**, Block B: **0.84L/s** and Block C: **0.88L/s**. As per the City specific design parameters, the sanitary flow was evaluated based on the new building footprint and the total site area for each individual building. Refer to Appendix ‘B’ for the sanitary sewer design calculation and design parameters set by the City of Ottawa.

## 5.0 WATER CONNECTION DESIGN

### 5.1 Existing Site Conditions

The existing site is currently being service by a three separate 19mm diameter water service which services the existing three parcels and are connected to the existing 250mm diameter watermain on Innes Road. The existing connection will be removed and reinstated with three new connection that will service the new buildings. There is currently two (2) city fire hydrant at the front of the property. The two (2) hydrants are located on the south side of Innes Road both within the 90m radius from the building main entrance. Refer to drawing C300 – Site Servicing Plan for the existing and proposed water services and city existing infrastructure.

### 5.2 Proposed Domestic Water Service

The new residential apartment buildings water services were sized based on the City of Ottawa Design Guidelines and the AWWA Standards. Based on the number of fixtures proposed and on the average water demand for residential developments the daily water consumption was evaluated for the proposed building. As per the city guidelines, the average water demand per person of is **350L/c/d** was applied to the population of the new building. The daily and hourly peak factor of **2.5** and **2.2** respectively were applied to the water demand as stated in the City of Ottawa guideline. By using the average demand and peaking factors, the daily water demand for the new buildings were evaluated as follow:



	BLOCK A	BLOCK B	BLOCK C	UNITS
Average Water Demand =	17640.00	16660.00	17640.00	L/d
Maximum Daily =	44100.00	41650.00	44100.00	L/d
Maximum Hourly =	97020.00	91630.00	97020.00	L/d
Total Domestic Flow =	1.12	1.06	1.12	L/s
Total Fire Flow =	80.00	81.67	80.00	L/s

Refer to Appendix ‘C’ for the water flow calculation sheet.

### 5.3 Proposed Fire Demand

As the new residential buildings will have a sprinkler system, the new services were sized to supply the fire flow. Based on the Ontario building code calculations, the water flow was evaluated at **80.00L/s** for Block A and Block C and **81.67L/s** for Block B (refer to above table). Refer to Appendix ‘C’ for the fire flow calculation sheet.

The proposed buildings will be serviced with three (3) new 150mm water service which will connect to the existing 405mm diameter watermain on Innes Road. The new services will be installed at the south elevation of the new buildings and be placed in the same trench as the other services.

### 5.4 Water Capacity Comments

The boundary conditions and HGL for hydraulic analysis for 3817 Innes was obtained from the city. See attached copy in Appendix ‘E’. From the boundary conditions, the minimum HGL was evaluated at 130.3 m for the water main elevation at 91.6m and a maximum pressure estimate of 55.1 psi.

## 6.0 EROSION AND SEDIMENT CONTROL

During the construction, sediment and erosion protect will be implemented around the property to prevent any sediments from leaching off site. The construction and maintenance of the sediment controls must comply with the Ontario Provision Standard Specification OPSS 577. Refer to drawing C100 – Erosion and Sediment Control for the perimeter fence proposed.

## 7.0 CONCLUSION AND LIMITATION OF REPORT

### 7.1 Stormwater Management

The stormwater management proposed for the site will maintain the site to its pre-development release rate conditions and meet the requirements from the City of Ottawa. The post development release rate will be maintained to its pre-development rate of **93.85 L/s** thought undersizing the

outlet to the sewer main on Innes Road. Stormwater quantity control will be achieved with 120.90m<sup>3</sup> underground chamber and 30.21 m<sup>3</sup> overland. The stormwater quality control will be met through the use of a stormwater treatment unit and isolator rows in the underground chambers.

## 7.2 Sanitary Service

The current site will be serviced with three new 150mm sanitary connection onto Innes Road. The estimated sanitary flow of; Block A: **0.88 L/s**, Block B: **0.84L/s** and Block C: **0.88L/s**, for the new connections will be directed to the existing sanitary sewer along Innes Road.

## 7.3 Water Service

Currently the existing buildings on site are serviced with an existing 19mm diameter water service that will be replaced with three (3) new 150mm diameter water services to connected to the existing 406mm diameter main on Innes Road. The existing connections will be all be replaced with new 150mm water services. The water demand for the building was evaluated at: Block A: **1.12 L/s**, Block B: **1.06L/s** and Block C: **1.12L/s** and the fire flow demand at Block A: **80.00 L/s**, Block B: **81.67 L/s** and Block C: **80.00L/s**. Sprinkler system is proposed for the site. There is also two (2) fire located around the property within 90m from every entrance doors.

## 8.0 LIMITATION

This report was prepared for **Bridor Developement.**, and is only applicable for the property at 3817 – 3843 Innes Road, Ottawa.

Any changes to the existing site may require a review by Blanchard Letendre engineering Ltd. to ensure all information is consistent with the proposed design.

Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely Yours,



Guillaume Brunet, P. Eng.

A handwritten signature in blue ink, appearing to read "Benjamin Falconer".

Benjamin Falconer, E.I.T.

# APPENDIX “A”

## Stormwater Management Design

# APPENDIX “B”

## Sanitary Design

# APPENDIX “C”

## Watermain Design

# APPENDIX “D”

## Underground Chambers & Stormwater Treatment Unit

# APPENDIX “E”

## Boundary Conditions



# APPENDIX “F”

## Engineering Drawings