

**Site Servicing and Stormwater  
Management Brief – 851  
Richmond Road, Ottawa, ON**

File: 160401329/83



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March 29, 2018

Revision Record							
Revision	Description	Prepared By		Checked By		Approved By	
0	1 <sup>st</sup> submission	A. Paerez	10/03/2017	S. Gillis	10/04/2017	A. Paerez	10/06/2017
1	2 <sup>nd</sup> submission	N. Cody	27/03/2018	S.Gillis	27/03/2018	P.Moroz	27/03/2018

## Sign-off Sheet

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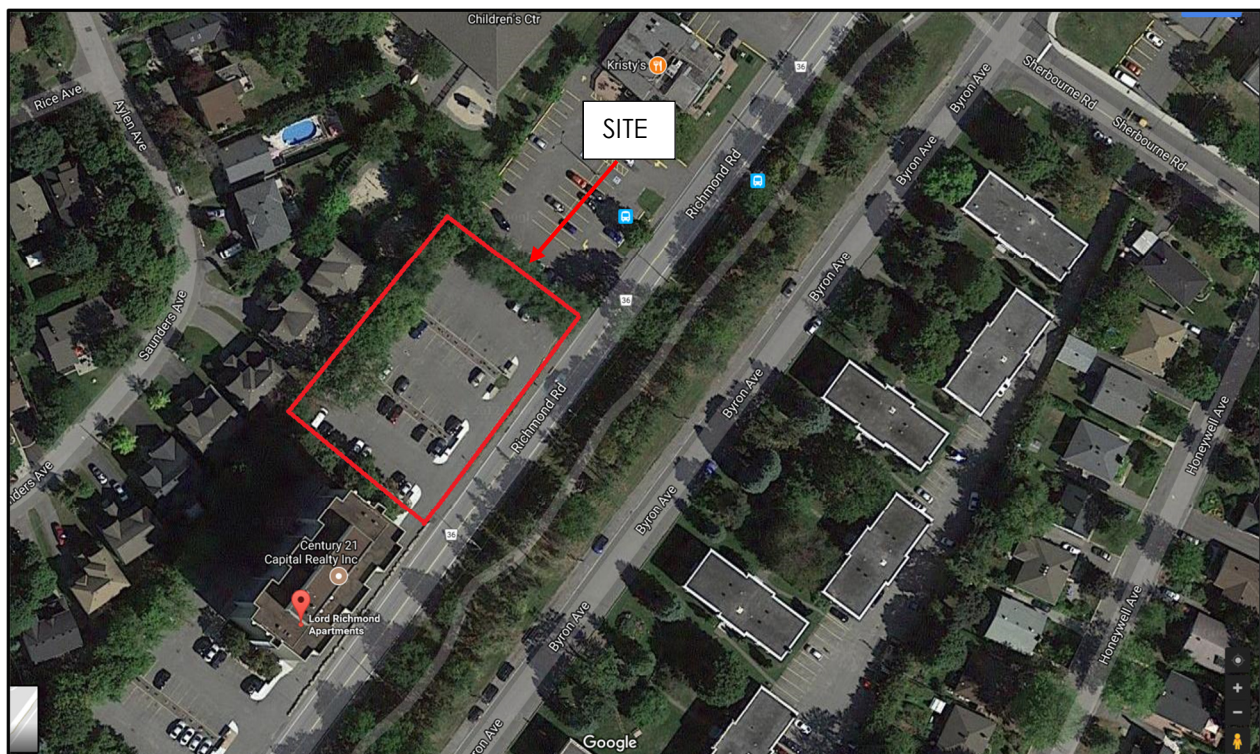
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## 1.0 INTRODUCTION AND OBJECTIVE

Stantec Consulting Ltd. has been retained by Homestead Lands Holding Ltd. to prepare the following site servicing and stormwater management (SWM) brief to satisfy the City of Ottawa Site Plan Control Application process. The site is located on 851 Richmond Road, west of the intersection of Byron Avenue and Sherbourne Road and south-west of the intersection of Richmond Road and Cleary Avenue in the city of Ottawa (see **Figure 1** below).

The site proposed for re-development measures 0.31 ha, while the existing developed site area to the southwest measures 0.28 ha, for an overall area of 0.59 ha. The proposed site area is currently occupied by parking areas and a small vegetated strip. The proposed development consists of an eleven-storey residential building with 122 units, underground parking and associated access and servicing infrastructure.

**Figure 1: Site Location**



## 1.1 OBJECTIVE

This site servicing and SWM brief has been prepared to present a servicing scheme that is free of conflicts and which utilizes the existing infrastructure as obtained from available as-built drawings and in consultation with City of Ottawa staff. Infrastructure requirements for water supply, sanitary and storm sewer services are presented in this report.



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Criteria and constraints provided by the City of Ottawa have been used as a basis for the conceptual servicing design of the proposed development. Specific elements and potential development constraints to be addressed are as follows:

- Prepare a preliminary grading plan in accordance with the proposed site plan and existing grades.
- Storm Sewer Servicing
  - Define major and minor conveyance systems in conjunction with the preliminary grade control plan
  - Determine the stormwater management storage requirements to meet the allowable release rate for the site
  - Coordinate with mechanical engineer and architect to provide an underground cistern and sump pump system to meet SWM requirements
  - Coordinate with mechanical engineer to convey external storm runoff from the adjacent development through the proposed building plumbing system
  - Coordinate with the mechanical engineer to install an oil/grit separator (OGS) within the underground parking to provide 'Enhanced' quality treatment (80% TSS removal) of runoff from the proposed development area
  - Define and size the proposed storm sewer laterals that will be connected to the existing 375 mm diameter CSP located in the back (i.e. north corner) of the site
- Wastewater Servicing
  - Define and size the sanitary service laterals which will be connected to the existing 225 mm diameter on Richmond Road
- Water Servicing
  - Estimate water demands to characterize the proposed feed for the proposed development which will be serviced from the existing 203 mm diameter watermain on Richmond Road.
  - Watermain servicing for the development is to be able to provide average day and maximum day (including peak hour) demands (i.e. non-emergency conditions) at pressures within the acceptable range of 50 to 80 psi (345 to 552 kPa)
  - Under fire flow (emergency) conditions, the water distribution system is to maintain a minimum pressure greater than 20 psi (140 kPa)

The accompanying drawings included in the back of this report illustrate the preliminary internal servicing scheme for the site.

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## **1.2 PREVIOUS SUBMISSIONS**

The 1<sup>st</sup> submission of this report was completed on 10 Jun 2017 and was sent for comments to the City of Ottawa. Comments from the City were received 14 Dec 2017. The comments letter and Stantec's response to the comments pertinent to this report are contained in Appendix H – Correspondence.

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## **2.0 REFERENCES**

The following background studies have been referenced during the preliminary servicing design of the proposed site:

- *Assessment of Adequacy of Public Services for OCEF Corp 809 Richmond Road*, David Schaeffer Engineering Ltd., April 2016
- *City of Ottawa Design Guidelines – Water Distribution*, City of Ottawa, July 2010
- *City of Ottawa Sewer Design Guidelines*, City of Ottawa, October 2012
- *Technical Bulletin ISDTB-2014-01*, City of Ottawa, February 2014
- *Technical Bulletin ISTB-2018-01*, City of Ottawa, March 21, 2018
- *Technical Bulletin ISTB-2018-02*, City of Ottawa, March 21, 2018
- *Technical Bulletin ISTB-2018-03*, City of Ottawa, March 21, 2018
- *Technical Bulletin PIETB -2016-01*, City of Ottawa, September 6, 2016
- *Geotechnical Investigation Proposed Multi-Storey Building 851 Richmond Road – Ottawa*, Paterson Group, October 3, 2017
- *Stormwater Management Report, River Parkway Preschool Centre, 40 Cleary Avenue*, City of Ottawa, J.L. Richards & Associates Limited, Revised January 2007

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## 3.0 WATER DISTRIBUTION

The proposed building is located in Pressure Zone 1W of the City of Ottawa's Water Distribution System. The proposed development will be serviced through the existing 203 mm diameter watermain on Richmond Road as shown on the Conceptual Site Plan (see **Drawing SSP-1**).

The proposed eleven-storey building is to be a high-rise residential building with a mix of one-bedroom and two-bedroom apartments for a total of 122 units, and underground parking. The building is to have a total floor space of approximately 12,479 m<sup>2</sup> (1.25 ha) above grade.

Water demands were calculated using the City of Ottawa Water Distribution Guidelines (July, 2010) to determine the typical operating pressures to be expected at the building (see detailed calculations in **Appendix A**). A daily rate of 350 L/cap/day has been applied for the population of the proposed site. The average daily (AVDY) residential demand was estimated for an occupancy of 1.4 persons per unit for a one-bedroom apartment and 2.1 persons per unit for a two-bedroom apartment. Maximum day (MXDY) residential demand was determined by multiplying the AVDY demand by a factor of 2.5 and peak hourly (PKHR) residential demand was determined by multiplying the MXDY demand by a factor of 2.2. The estimated demands are summarized in **Table 1**.

**Table 1: Estimated Water Demands**

	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Residential	221	0.90	2.24	4.92

1. Residential population based on 72 two-bedroom apartments and 50 one-bedroom apartments.

The fire flow requirement was calculated in accordance with Fire Underwriters Survey (FUS) and determined to be approximately 5,000 L/min (83 L/s). This estimate is based on a non-combustible construction building with a two-hour fire separation considered between each floor per requirements for buildings over six-storeys per Ontario Building Code. Additionally, it is anticipated that all buildings will be sprinklered, with final sprinkler design to conform to NFPA 13 (see detailed calculations in **Appendix A**).

The boundary conditions listed below were provided by the City of Ottawa on June 28, 2017 for the estimated water demands shown in **Table 1**.

Minimum HGL = 108.6 m

Maximum HGL = 116.2 m

MXDY (2.3L/s) + Fire Flow (83 L/s) = 99.0 m

The desired normal operating objective pressure range as per the City of Ottawa 2010 Water Distribution Design Guidelines is 345 kPa (50 psi) to 552kPa (80 psi) and no less than 276kPa (40 psi) at ground elevation. Furthermore, the maximum pressure at any point in the water



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distribution should not exceed 100 psi as per the Ontario Building/Plumbing Code; pressure reducing measures are required to service areas where pressures greater than 552kPa (80 psi) are anticipated.

The ground elevation along Richmond Road where the proposed building is to be connected is approximately 65.92 m. With respect to the peak hour flow conditions, the resulting boundary condition HGL of 108.6 m corresponds to a peak hour pressure of 418kPa (61 psi). Since the proposed building is an 11-storey building, an additional 34 kPa (5 psi) for every additional storey over two storeys is required to account for the change in elevation head and additional headloss. Given that the lowest pressure is expected to be 418 kPa (61 psi) at ground level, the resultant equivalent pressure at the 11<sup>th</sup> floor will be approximately 110 kPa (16 psi) and below the City's objective pressures. As a result, a pump will be required to maintain an acceptable level of service on the higher floors.

With respect to the maximum pressure during basic day demands, the resulting boundary condition HGL of 116.2 m corresponds to a pressure of 493 kPa (71 psi). The value is within the normal operating pressure range as per MOECC and City of Ottawa design guidelines.

In regards to available fire flow, boundary conditions provided by the City confirm that a flow rate of 5,000 L/min (83 L/s) would have a residual pressure of 324kPa (47 psi). The fire flow rate should be achievable within the watermain at this proposed location while maintaining a residual pressure of 138kPa (20 psi).

In conclusion, based on the boundary conditions provided, the 203 mm diameter watermain on Richmond Road provides adequate fire flow capacity as per the Fire Underwriters Survey. In order to meet the City water supply objective that limits a single feed to 50 m<sup>3</sup>/d during basic day demands, dual connection to the existing 203 mm diameter watermain on Richmond Road is required to service the proposed building. The service connection will be capable of providing anticipated demands to the lower storeys but will require a booster pump to maintain pressures of 276 kPa (40 psi) for floors 7 to 11.

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## 4.0 SANITARY SEWER

As illustrated on **Drawing SSP-1**, sanitary servicing for the proposed development will be provided through a proposed 200 mm diameter service lateral connecting to the existing 225 mm diameter sanitary sewer running east on Richmond Road which ultimately discharges into an existing 1500 mm diameter sanitary trunk sewer at the intersection of Richmond Road and Sherbourne Road.

The proposed 0.31 ha re-development area will consist of 50 one-bedroom apartments, 72 two-bedroom apartments, underground parking, and associated access infrastructure. The anticipated wastewater peak flow generated from the proposed development is summarized in **Table 2** below while a sanitary sewer design sheet is included in **Appendix C**.

**Table 2: Estimated Wastewater Peak Flow**

Residential Units				Infiltration Flow (L/s)	Total Peak Flow (L/s)
# of Units	Population	Peak Factor	Peak Flow (L/s)		
122	221	4.0	2.87	0.08	2.95

1. Average residential flow based on 280 L/p/day
2. Peak factor for residential units calculated using Harmon's formula
3. Apartment population estimated based on 1.4 persons/unit for one-bedroom apartments and 2.1 persons/unit for two-bedroom apartments
4. Infiltration flow based on 0.33 L/s/ha.
5. Figures may not exactly sum due to rounding

An analysis of the existing 225 mm diameter sanitary sewer on Richmond Road was completed in DSEL's Assessment of Adequacy of Public Services – 809 Richmond Road in April 2016 to estimate the available capacity within the sewer. The analysis concluded that the existing sanitary sewer had additional capacity for 42.6 L/s, and that the proposed development on 809 Richmond Road would generate 7.44 L/s of peak wet weather flow. As a result, the residual capacity of 35.2 L/s in the existing sewer will be sufficient to accommodate the proposed development's rate of 2.9 L/s.

Detailed sanitary sewage calculations are included in **Appendix C**. A backflow preventer will be required for the proposed building in accordance with the Ottawa sewer design guide, and will be coordinated with building mechanical engineers.

All underground parking drains should be connected to the internal building plumbing. A sump pump will be required to drain the underground parking levels to the existing sanitary sewer on Richmond Road.

Sanitary Sewer  
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## **4.1 SANITARY SEWER DESIGN CRITERIA**

As outlined in the City of Ottawa Sewer Design Guidelines and the MOECC's Design Guidelines for Sewage Works, the following criteria were used to calculate estimated wastewater flow rates and to size the sanitary sewer lateral:

- Minimum Velocity – 0.6 m/s (0.8 m/s for upstream sections)
- Maximum Velocity – 3.0 m/s
- Manning roughness coefficient for all smooth wall pipes – 0.013
- 1.4 persons/one-bedroom apartment
- 2.1 persons/two-bedroom apartment
- Harmon's Formula for Peak Factor – Max = 4.0
- Extraneous Flow Allowance – 0.33 L/s/ha (conservative value)
- Manhole Spacing – 120 m
- Minimum Cover – 2.5 m

## **5.0 STORMWATER MANAGEMENT**

### **5.1 OBJECTIVES**

The objective of this stormwater management plan is to determine the measures necessary to control the quantity of stormwater released from the proposed development to the required levels and to provide sufficient detail for approval and construction.

### **5.2 EXISTING CONDITIONS**

The site is currently paved consisting of parking areas for the existing 11-storey building immediately to the southwest. The existing parking areas sheet drain towards three existing catchbasins connected to a storm sewer system that conveys runoff from the adjacent development to the south and discharges into an existing 375 mm diameter CSP that discharges into an existing ditch in the existing Children's Centre to the north (see **Drawing EX-1**). The existing ditch is approximately 15 m long and discharges into an existing ditch inlet catchbasin connected to a 525 mm diameter storm sewer that ultimately directs runoff to the Ottawa River. Based on visual observations during a recent site visit, there are no visible inlet controls installed in the existing catchbasins.

As part of the proposed development, it is required that runoff from the existing development to the south be pumped on a temporary basis during construction across to the existing 375 mm diameter storm outlet and that it be conveyed through the proposed building plumbing system to the outlet after development.

#### **5.2.1 Existing Drainage Outlet Rate**

The majority of surface drainage from the 851 Richmond Road site drains to the rear of the property and discharges to sewers within an adjacent development at 40 Cleary Avenue. The on-site sewer for 40 Cleary Avenue discharge to the municipal sewer on Cleary Avenue and ultimately to the Ottawa River. As part of the site plan control application for 40 Cleary Avenue, a Stormwater Management Report was prepared by J.L. Richards and Associates in 2008. The report as it's been made available has been included in Appendix D. The report indicates that 100yr flow from the 851 Richmond Road site will be accommodated in their downstream sewer system. Although the report has accommodated 100yr flow, the city has now imposed a maximum predevelopment flow discharge from the proposed 851 Richmond Road development which equates to 52.3l/sec and is far below the flows anticipated in the downstream system.

### **5.3 SWM CRITERIA AND CONSTRAINTS**

The stormwater management criteria for the proposed site are based on City of Ottawa Sewer Design Guidelines (2012) and on consultation with City of Ottawa Staff. The following summarizes the criteria used in the preparation of this stormwater management plan:

- All stormwater runoff from the proposed development up to and including the 100-year event to be stored on site and released into the minor system at a maximum rate equivalent to the 2-year storm with a runoff coefficient (C) equal to 0.5
- Maximum 100-year water depth of 0.35 m in parking and access areas
- Provide adequate emergency overflow conveyance (overland flow route) off-site
- Provide a storm outlet for the existing development to the south
- Size the storm lateral to convey the 2-year storm event, assuming only roof controls are imposed (i.e. provide capacity for system without inlet control devices (ICDs) installed)
- Size storm sewers using an inlet time of concentration (T<sub>c</sub>) of 10 minutes
- Post-development runoff coefficient (C) value based on proposed impervious areas as per site plan drawing (see **Appendix B**)

### **5.4 STORMWATER MANAGEMENT DESIGN**

The proposed 0.31 ha re-development area consists of an eleven-storey residential building, underground parking, access and landscaped areas, and associated servicing infrastructure. The overall imperviousness of the site is 70% (C = 0.69).

It is proposed to direct stormwater runoff from the proposed development and the existing development in the south to the current site outlet through the existing 375 mm diameter CSP. Runoff from the existing development in the south will be conveyed through via a storm sewer to the site outlet. A combination of roof storage, catchbasin ICDs, a cistern and a sump pump located in the underground parking are proposed to restrict post-development peak flows from the proposed re-development area to the allowable release rate which is equivalent to the 2-year runoff with a C of 0.5. Similarly, it is proposed to install an oil and grit separator just outside the underground parking structure to provide the required 80% TSS removal from runoff from the proposed development. A sump pump is required to discharge the foundation drain. The conceptual site plan and existing storm sewer infrastructure are shown on **Drawing SSP-1**.

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### 5.4.1 Design Methodology

The intent of the stormwater management plan presented herein is to mitigate any negative impact that the proposed development could have on the existing drainage and storm sewer infrastructure, while providing adequate capacity to service the existing and proposed building, parking and access areas. The proposed stormwater management plan is designed to detain runoff on the rooftop, existing surfaces, and in the subsurface to ensure that peak flows after construction from the proposed re-development area will not exceed the target release rate for the site, and to provide a stormwater outlet for the existing development to the south.

A small portion of the site fronting Richmond Road could not be graded to enter the building's internal plumbing system and as such it will sheet drain uncontrolled (see catchment EXT-1). Runoff from this uncontrolled area is included in the overall site discharge calculations.

### 5.4.2 Water Quantity Control

The Modified Rational Method was used to assess the quantity and volume of runoff generated during post development conditions. The site was subdivided into subcatchments (subareas) tributary to storm sewer inlets, as defined by the location of catchbasins / inlet grates, and used in the storm sewer design (see **Appendix D**). A summary of subareas and runoff coefficients is provided in **Appendix D**, and **Drawing SD-1** indicates the stormwater management subcatchments.

### 5.4.3 Allowable Release Rate

Site discharge rates up to the 100-year storm event are to be restricted to the 2-year storm event with a runoff coefficient, 'C' value, of 0.50 as outlined below in Table 3. The overall site (existing and proposed sites) measure 0.59 ha, however the area discharging to Richmond Road is excluded (EXT-1 - 0.10 ha) therefore the remaining area measures 0.49 ha.

**Table 3: Target Release Rate**

Rational Method 'C'	Area (ha)	Time of Concentration (min)	Q <sub>Target</sub> (L/s)
0.50	0.49	10	52.3

### 5.4.4 Storage Requirements

The site requires quantity control measures to meet the stormwater release criteria. It is proposed that restricted release rooftop drains be used to reduce the peak outflow from the site. Additionally, a subsurface storage tank is proposed to reduce peak outflows from all proposed site areas connected to the internal plumbing system of the building to meet the site target discharge rate. **Drawing SD-1** indicates the design release rate from the rooftop and the underground storage system. Stormwater management calculations are provided in **Appendix D**.

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#### **5.4.4.1 Rooftop Storage**

It is proposed to retain stormwater on the rooftops of the proposed and existing buildings by installing restricted flow roof drains. The following calculations assume the roofs will be equipped with standard Watts Model R1100 Accuflow Roof Drains fully open. The existing rooftop will need to be retrofitted with the proposed drains if they are not already installed. If this is the case, a structural engineer should be consulted to account for ponded water loads and it ensure that the roof membrane is sufficiently sealed to avoid ingress of ponded water and other detrimental effects.

Watts “Accuflow” roof drain data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. It should be noted that the “Accuflow” roof drain has been used as an example only and that other products may be specified for use, provided that the roof release rate is restricted to match the maximum rate of release indicated in the tables below and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater.

**Table 4** and **Table 5** provide details regarding the retention of stormwater on the proposed rooftop during the 2 and 100-year storm events. Refer to **Appendix D** for details.

**Table 4: Peak Controlled (Rooftop) 2-Year Release Rate**

Area ID	Area (ha)	Head (m)	Q <sub>release</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
BLDG	0.110	0.11	5.7	16.7

**Table 5: Peak Controlled (Rooftop) 100-Year Release Rate**

Area ID	Area (ha)	Head (m)	Q <sub>release</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
BLDG	0.110	0.15	7.5	37.3

**Table 4** and **Table 7** provide details regarding the retention of stormwater on the existing rooftop during the 2 and 100-year storm events. Refer to **Appendix D** for details.

**Table 6: Peak Controlled (Rooftop) 2-Year Release Rate**

Area ID	Area (ha)	Head (m)	Q <sub>release</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
EX-BLDG	0.007	0.10	3.6	6.6

**Table 7: Peak Controlled (Rooftop) 100-Year Release Rate**

Area ID	Area (ha)	Head (m)	Q <sub>release</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
EX-BLDG	0.007	0.15	5.5	22.3

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### 5.4.4.2 Subsurface Storage

In addition to rooftop storage, it is proposed to detain stormwater within a 20 m<sup>3</sup> cistern below grade with a maximum controlled release rate of 22.8 L/s to the gravity service provided. Note, this does not include discharge from the roof leaders. The modified rational method was used to determine the peak volume requirement for the cistern. Where possible, site drainage areas are captured into the building plumbing directed to the cistern for additional control.

**Table 8** and **Table 9** summarize the flow rates and storage from the cistern for the 2 and 100 year events respectively.

**Table 8: Peak Controlled (Tributary) 2-Year Release Rate**

Area ID	Area (ha)	Runoff 'C'	Q <sub>release</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
RAMP, L201A, L202A	0.13	0.66	22.8	0.0

**Table 9: Peak Controlled (Tributary) 100-Year Release Rate**

Area ID	Area (ha)	Runoff 'C'	Q <sub>release</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
RAMP, L201A, L202A	0.13	0.83	22.8	18.2

### 5.4.4.3 Surface Storage

The catchbasins in the existing developed site to the southwest will be removed and replaced with two new catchbasins – CB204 and CB203. These structures will be outfitted with inlet control structures to limit release rates and to create ponding on the surface.

Table 10 and Table 11 summarize the flow rates and storage from the cistern for the 2 and 100 year events respectively.

**Table 10: Peak Controlled (Tributary) 2-Year Release Rate**

Area ID	Area (ha)	Runoff 'C'	Structure	ICD	Q <sub>release</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
L204A	0.07	0.81	CB 204	IPEX TEMPEST LMF 70	5.5	4.0
L203A	0.10	0.75	CB 203	IPEX TEMPEST LMF 95	10.2	3.5

**Table 11: Peak Controlled (Tributary) 100-Year Release Rate**

Area ID	Area (ha)	Runoff 'C'	Structure	ICD	Q <sub>release</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
L204A	0.07	1.00	CB 204	IPEX TEMPEST LMF 70	5.5	22.3
L203A	0.10	0.94	CB 203	IPEX TEMPEST LMF 95	10.2	25.3

#### 5.4.5 Uncontrolled Area

A small portion of the site fronting Richmond Road (see area UNC-1 on **Drawing SD-1**) could not be graded to enter the building's internal plumbing system and as such it will sheet drain uncontrolled. **Table 12** and **Table 13** summarize the 2 and 100-year uncontrolled release rates from the proposed development.

**Table 12: Peak Uncontrolled (Non-tributary) 2-Year Release Rate**

Area ID	Area (ha)	Runoff 'C'	T <sub>c</sub> (min)	Q <sub>release</sub> (L/s)
UNC-1	0.01	0.20	10	0.43

**Table 13: Peak Uncontrolled (Non-tributary) 100-Year Release Rate**

Area ID	Area (ha)	Runoff 'C'	T <sub>c</sub> (min)	Q <sub>release</sub> (L/s)
UNC-1	0.01	0.25	10	1.1

#### 5.4.6 Results

**Table 14** and **Table 15** demonstrate that the proposed stormwater management plan provides adequate attenuation storage to meet the target peak outflow for the site.

**Table 14: Estimated Discharge from Site (2-Year)**

Area Type	Q <sub>release</sub> (L/s)	Target (L/s)
Controlled – Existing Site (L204A, L203A, EX-BLDG)	19.3	<b>52.3</b>
Controlled – Proposed Site (L202A, L201A, RAMP, BLDG)	27.8	
Uncontrolled – (UNC-1)	0.4	
<b>Total</b>	<b>47.5</b>	

Stormwater Management  
March 29, 2018

**Table 15: Estimated Discharge From Site (100-Year)**

Area Type	Q <sub>release</sub> (L/s)	Target (L/s)
Controlled – Existing Site (L204A, L203A, EX-BLDG)	21.1	<b>52.3</b>
Controlled – Proposed Site (L202A, L201A, RAMP, BLDG)	30.2	
Uncontrolled – (UNC-1)	1.1	
<b>Total</b>	<b>52.3</b>	

## 5.5 QUALITY CONTROL

As per correspondence with Rideau Valley Conservation Authority (RVCA) staff, runoff from the proposed development requires 'Enhanced' quality treatment (80% TSS removal) prior to discharge into the site outlet which ultimately directs runoff to the Rideau River.

As a result, it is proposed to install an oil/grit separator (OGS) unit within the underground parking structure to provide the required level of treatment of runoff from the proposed site areas. The PCSWMM for Stormceptor software has been used to provide preliminary sizing. It should be noted that the Stormceptor unit has been used as an example only and that other products may be specified for use, provided that they meet the required level of treatment.

Based on sizing the entire site and an inflow rate to the sotmrceptor of 52.3 L/s, using a treatment for fine particle size distribution, a Stormceptor unit STC750 will provide 81% TSS removal.

Grading and Drainage  
March 29, 2018

## **6.0 GRADING AND DRAINAGE**

The proposed re-development site measures approximately 0.31 ha in area. The site currently sheet drains towards three existing catchbasins. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements and to provide sufficient cover over top of the underground parking garage. Site grading has been established to provide emergency overland flow routes for stormwater management in accordance with City of Ottawa requirements.

The subject site maintains emergency overland flow routes to the existing property to the north as depicted on **Drawings GP-1** and **SD-1**.

Utilities

March 29, 2018

## **7.0 UTILITIES**

All utilities (Hydro Ottawa, Bell Canada, Rogers Ottawa, and Enbridge Gas) have existing plants in the area. The site will be serviced through connection to these existing services. Detailed design of the required utility services will be further investigated as part of the composite utility planning process following design circulation.

Erosion Control During Construction  
March 29, 2018

## **8.0 EROSION CONTROL DURING CONSTRUCTION**

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

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit extent of exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with plastic or synthetic mulches.
6. Provide sediment traps and basins during dewatering.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Plan construction at proper time to avoid flooding.
9. Installation of a mud matt to prevent mud and debris from being transported off site.
10. Installation of a silt fence to prevent sediment runoff.

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

1. Verification that water is not flowing under silt barriers.
2. Clean and change silt traps at catch basins.

Refer to **Drawing EC/DS-1** for the proposed location of silt fences, and other erosion control structures.

Geotechnical Investigation  
March 29, 2018

## **9.0 GEOTECHNICAL INVESTIGATION**

A geotechnical report was prepared by Paterson Group October 2007 (see **Appendix E**). As stated in the geotechnical report, the subsurface profile across the site consists of 60 to 100 mm thickness of asphalt overlying a granular layer. The pavement structure lies atop a fill layer, consisting of brown to grey sand and gravel with trace to some silt and clay that extends to a depth of approximately 1.5 to 2.5 m. A native glacial till deposit was encountered underlying the above-noted fill layers, followed by grey limestone bedrock.

Groundwater levels were measured on June 8, 2017 and were found to range between 2.2 m and 3.7 m.

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium. Infiltration levels are anticipated to be low through the excavation face. The groundwater infiltration will be controllable with open sumps and pumps. A temporary MOECC permit to take water (PTTW) will be required for this project if more than 50,000 L/day are to be pumped during the construction phase. A minimum of four to five months should be allocated for completion of the application and issuance of the permit by the MOECC.

Bedrock removal will be required to complete the two (2) levels of underground parking. The geotechnical report recommended line drilling and controlled blasting to remove the bedrock. The report also recommended that prior to considering blasting operations, the effects on the existing services, buildings and other structures should be addressed.

An alignment of a large diameter watermain runs within an easement along the north property boundary of the subject site. It is expected that the adjacent watermain could be subjected to potential vibrations associated with the bedrock blasting program. To ensure that no detrimental vibrations cause damage to the adjacent watermain, a vibration attenuation trench is recommended for the bedrock along the north excavation face, as well as a vibration monitoring and control program during the blasting and excavation work required for the proposed building excavation (please refer to the Geotechnical report included in **Appendix E** for details).

The geotechnical report also recommended that a perimeter foundation drainage system be provided for the proposed structures. Given that it is expected that insufficient room will be available for exterior backfill, the report suggested that the foundation drainage system could be as follows:

- Bedrock vertical surface (Hoe ram any irregularities and prepare bedrock surface. Shotcrete areas to fill in cavities and smooth out angular features at the bedrock surface);
- Composite drainage layer.



## **SITE SERVICING AND STORMWATER MANAGEMENT BRIEF – 851 RICHMOND ROAD, OTTAWA, ON**

Geotechnical Investigation  
March 29, 2018

It was recommended that the composite drainage system (such as Miradrain G100N, Delta Drain 6000 or equivalent) extend down to the footing level. It was also recommended that 150 mm diameter sleeves at 3 m centres be cast in the footing or at the foundation wall/footing interface to allow the infiltration of water to flow to the interior perimeter drainage pipe. The perimeter drainage pipe and underfloor drainage system should direct water to sump pit(s) within the lower basement area for mechanical evacuation.

Conclusions  
March 29, 2018

## **10.0 CONCLUSIONS**

### **10.1 WATER SERVICING**

The 203 mm diameter watermain on Richmond Road provides adequate fire flow capacity as per the Fire Underwriters Survey. In order to meet the City water supply objective that limits a single feed to 50 m<sup>3</sup>/d during basic day demands, dual connection to the existing 203 mm diameter watermain on Richmond Road is required to service the proposed building. The service connection will be capable of providing anticipated demands to the lower storeys but will require a booster pump to maintain pressures of 276 kPa (40 psi) for floors 7 to 11.

### **10.2 SANITARY SERVICING**

The proposed sanitary sewer lateral is sufficiently sized to provide gravity drainage for the site. The proposed site will be serviced by a 200 mm diameter service lateral directing wastewater flows to the existing 225 mm dia. Richmond Road sanitary sewer. A backflow preventer will be required for the proposed building in accordance with the Ottawa sewer design guide, and will be coordinated with building mechanical engineers. The proposed sanitary drainage pattern is in accordance with direction from pre-consultation with City of Ottawa staff.

### **10.3 STORMWATER SERVICING**

The proposed stormwater management plan is in compliance with the goals specified through consultation with the City of Ottawa, as well as local standards. Subsurface and rooftop storage is proposed to limit inflow from the site area into the minor system to the required target release rate. An underground cistern and pump will be required to direct controlled release rates from the site to the proposed gravity service connected to the existing 375 mm dia. CSP running north and ultimately discharging into the Cleary Street storm sewer. An oil grit separator will be installed within the underground parking structure to provide 80% TSS removal for runoff generated from the proposed development areas.

### **10.4 GRADING**

Grading for the site has been designed to provide an emergency overland flow route as per City requirements. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing infrastructure. An alignment of a large diameter watermain runs within an easement along the north property boundary of the subject site. It is expected that the adjacent watermain could be subjected to potential vibrations associated with the bedrock blasting program. To ensure that no detrimental vibrations cause damage to the adjacent watermain, a vibration attenuation trench is recommended for the bedrock along the north

Conclusions  
March 29, 2018

excavation face, as well as a vibration monitoring and control program during the blasting and excavation work required for the proposed building excavation.

## **10.5 UTILITIES**

All utilities (Hydro Ottawa, Bell Canada, Rogers Ottawa, and Enbridge Gas) have existing plants in the subject area. Exact size, location and routing of utilities will be finalized after design circulation.

## **10.6 APPROVAL / PERMITS**

Ministry of the Environment and Climate Change (MOECC) Environmental Compliance Approvals (ECA) are not expected to be required for the subject site as the site is private and will remain under singular ownership. A Permit to Take Water may be required for pumping requirements for construction of underground parking level. No other approval requirements from other regulatory agencies are anticipated.

## **APPENDICES**

Appendix A Hydraulic Analysis  
March 29, 2018

## **Appendix A   HYDRAULIC ANALYSIS**

**851 Richmond Road - Domestic Water Demand Estimates**

- Based on Roderick Lahey Architect Inc Site plan June 6, 2017

Building ID	Area (m <sup>2</sup> )	Population	Daily Rate of Demand <sup>1</sup>	Avg Day Demand		Max Day Demand		Peak Hour Demand	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Residential	11,424	227.5	350	55.3	0.92	138.2	2.30	304.1	5.07
<b>Total Site :</b>				<b>55.3</b>	<b>0.92</b>	<b>138.2</b>	<b>2.30</b>	<b>304.1</b>	<b>5.07</b>

<sup>1</sup> Water demand criteria used to estimate peak demand rates for residential areas are as follows:

maximum day demand rate = 2.5 x average day demand rate

maximum hour demand rate = 2.2 x maximum day demand rate

**From:** [Balima, Nadege](#)  
**To:** [Rathnasooriya, Thakshika](#)  
**Subject:** RE: Hydraulic Boundary Conditions - 851 Richmond Road  
**Date:** Tuesday, June 27, 2017 3:06:47 PM  
**Attachments:** [image001.gif](#)  
[851 Richmond June 2017.pdf](#)

---

Hi Shika,

I have just received the results of the boundary condition request for the site in subject. Please find them below.

The following are boundary conditions, HGL, for hydraulic analysis at 851 Richmond (zone 1W) assumed to be connected to the 203mm on Richmond (see attached PDF for location).

Minimum HGL = 108.6

Maximum HGL = 116.2m

MaxDay (2.3 L/s) + FireFlow (83 L/s) = 99.0m

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 refer to Guidelines and Technical bulletin ISDTB-2014-02 concerning basic day demands greater than 0.5 L/s.

Please let me know if you have questions.

Regards,

**Nadège Balima, P.Eng., M.P.M., LEED Green Assoc.**

Project Manager, Infrastructure Approvals  
Development Review Services (West)

 613.580.2424 ext. 13477

---

**From:** Rathnasooriya, Thakshika [mailto:Thakshika.Rathnasooriya@stantec.com]  
**Sent:** Tuesday, June 27, 2017 11:33 AM  
**To:** Balima, Nadege <Nadege.Balima@ottawa.ca>  
**Subject:** RE: Hydraulic Boundary Conditions - 851 Richmond Road

Hi Nadege,

Is it possible to have a status update on the hydraulic boundary conditions for this site?

Thank you,

**Shika Rathnasooriya**

Engineering Intern

Stantec

400 - 1331 Clyde Avenue, Ottawa ON K2C 3G4

Phone: (613) 724-4081

[Thakshika.Rathnasooriya@stantec.com](mailto:Thakshika.Rathnasooriya@stantec.com)

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**From:** Balima, Nadege [<mailto:Nadege.Balima@ottawa.ca>]

**Sent:** Friday, June 23, 2017 8:52 AM

**To:** Rathnasooriya, Thakshika <[Thakshika.Rathnasooriya@stantec.com](mailto:Thakshika.Rathnasooriya@stantec.com)>

**Subject:** RE: Hydraulic Boundary Conditions - 851 Richmond Road

Good morning Shika,

I have forwarded your request for processing and will get back to you as soon as I have results.

Thanks,

**Nadège Balima, P.Eng., M.P.M., LEED Green Assoc.**

Project Manager, Infrastructure Approvals

Development Review Services (West)

 613.580.2424 ext. 13477

---

**From:** Rathnasooriya, Thakshika [<mailto:Thakshika.Rathnasooriya@stantec.com>]

**Sent:** Wednesday, June 21, 2017 1:50 PM

**To:** Balima, Nadege <[Nadege.Balima@ottawa.ca](mailto:Nadege.Balima@ottawa.ca)>

**Cc:** Paerez, Ana <[Ana.Paerez@stantec.com](mailto:Ana.Paerez@stantec.com)>

**Subject:** Hydraulic Boundary Conditions - 851 Richmond Road

Hello Nadege,

I am looking for watermain hydraulic boundary conditions for the proposed site at 851 Richmond Road. We anticipate connecting to the existing 200mm watermain on Richmond Road.

Attached are the FUS calculations for the proposed building. The intended land use is residential, for a 11 storey apartment building comprising 132 units with 61 two-bedrooms units and 71 one-bedroom units.

Estimated domestic demands and fire flow requirements for the site are as follows:

Average Day Demand – 0.92L/s

Max Day Demand – 2.30L/s

Peak Hour Demand – 5.07L/s

Fire Flow Requirement per FUS - 83L/s (2 hour fire separation between each floor)

Thanks,

**Shika Rathnasooriya**

Engineering Intern

Stantec

400 - 1331 Clyde Avenue, Ottawa ON K2C 3G4

Phone: (613) 724-4081

[Thakshika.Rathnasooriya@stantec.com](mailto:Thakshika.Rathnasooriya@stantec.com)

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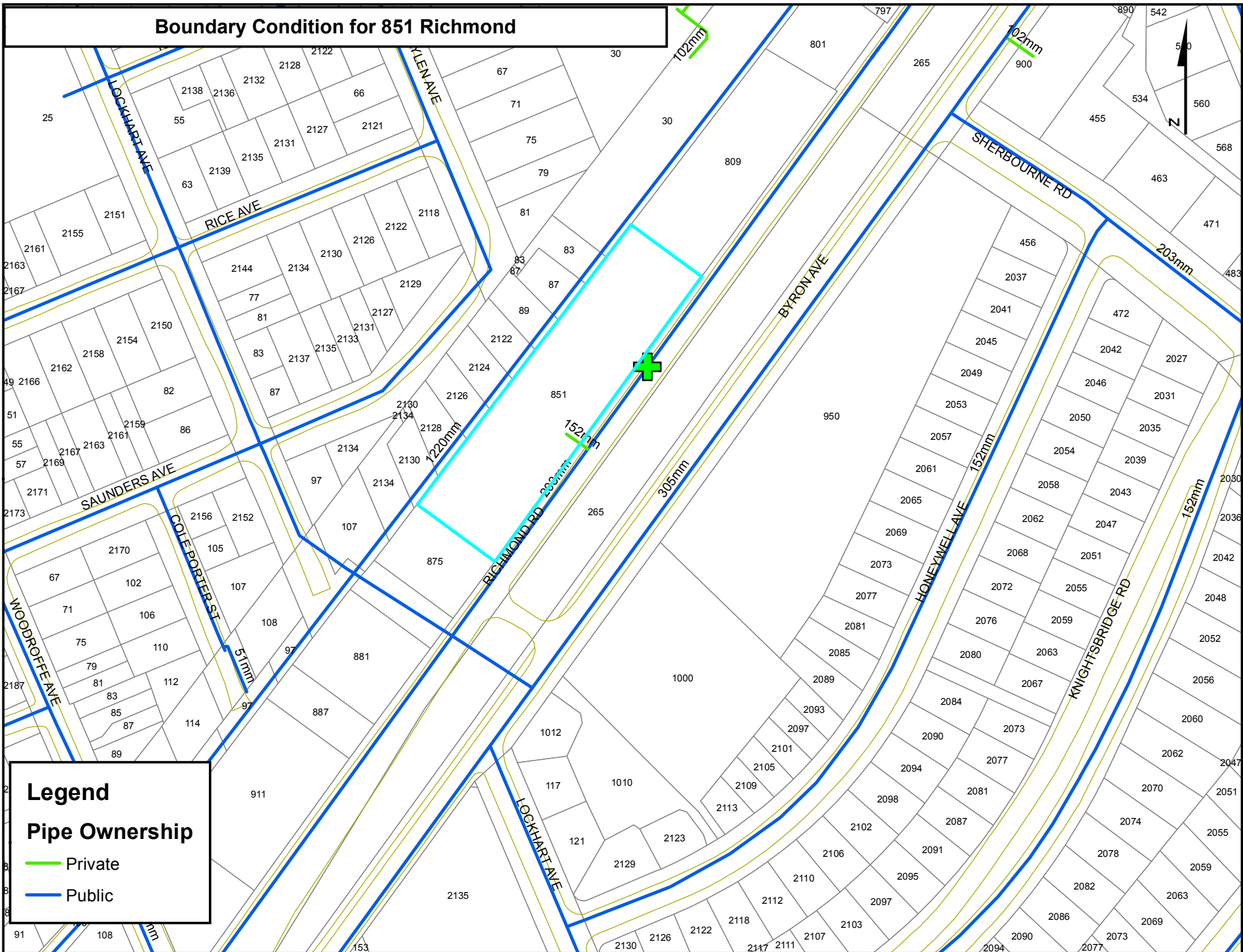
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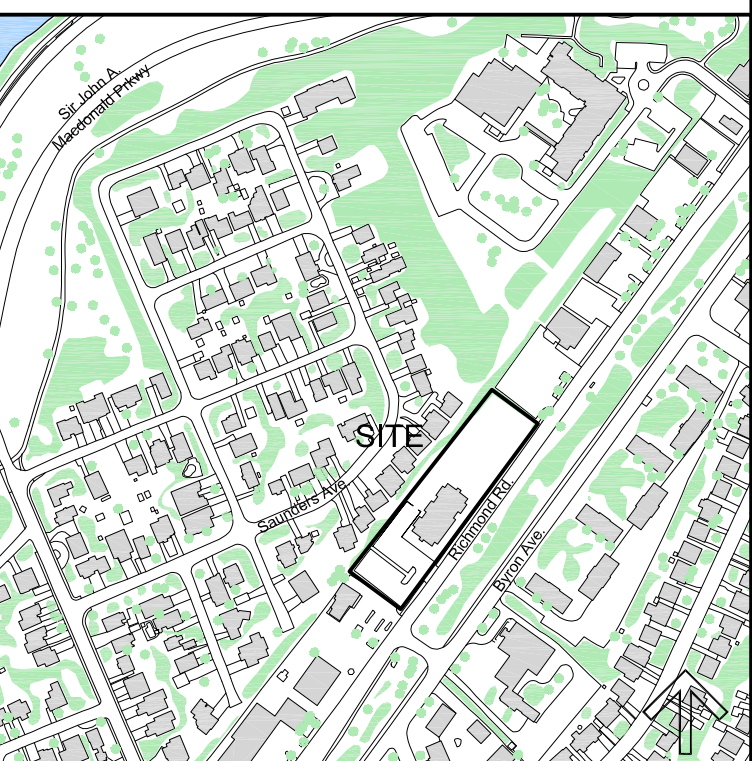
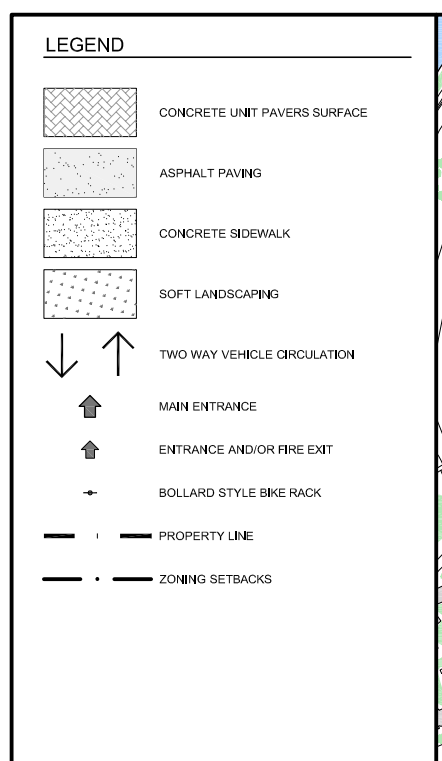
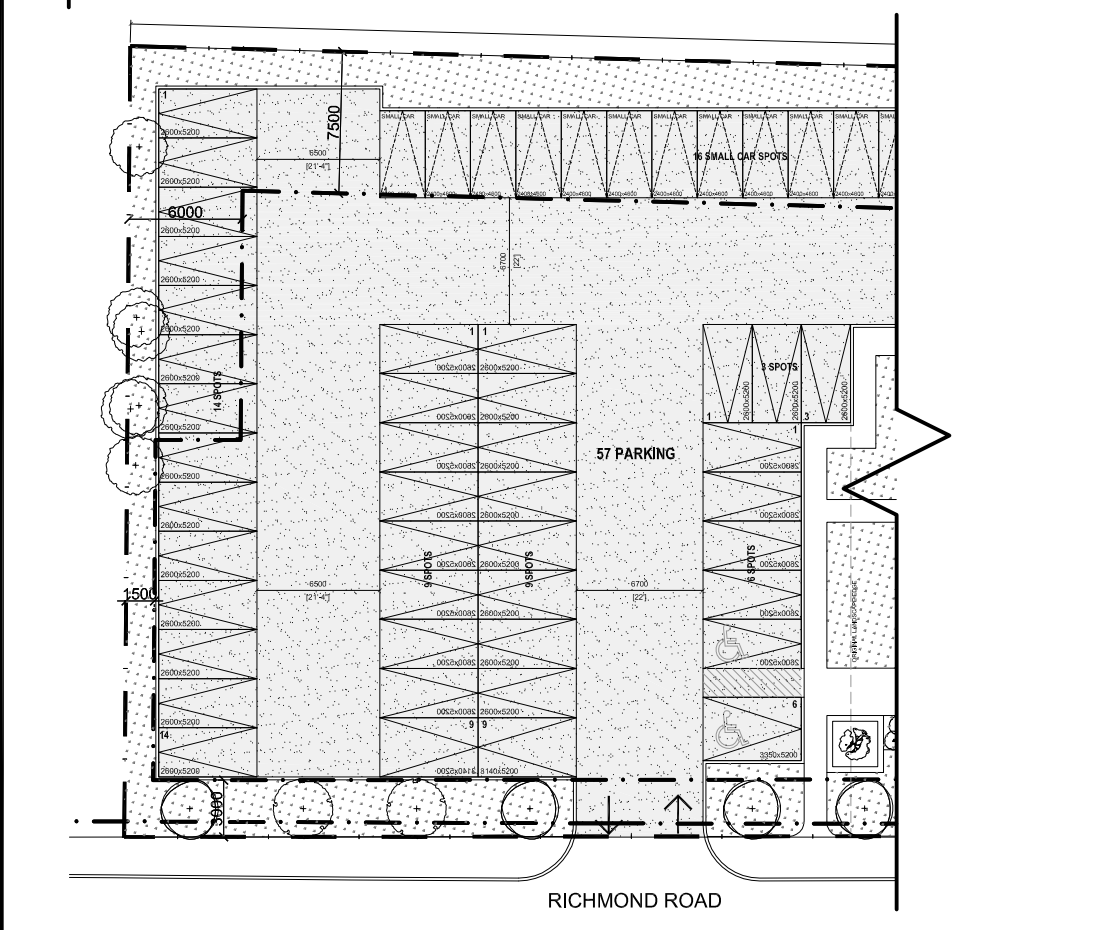
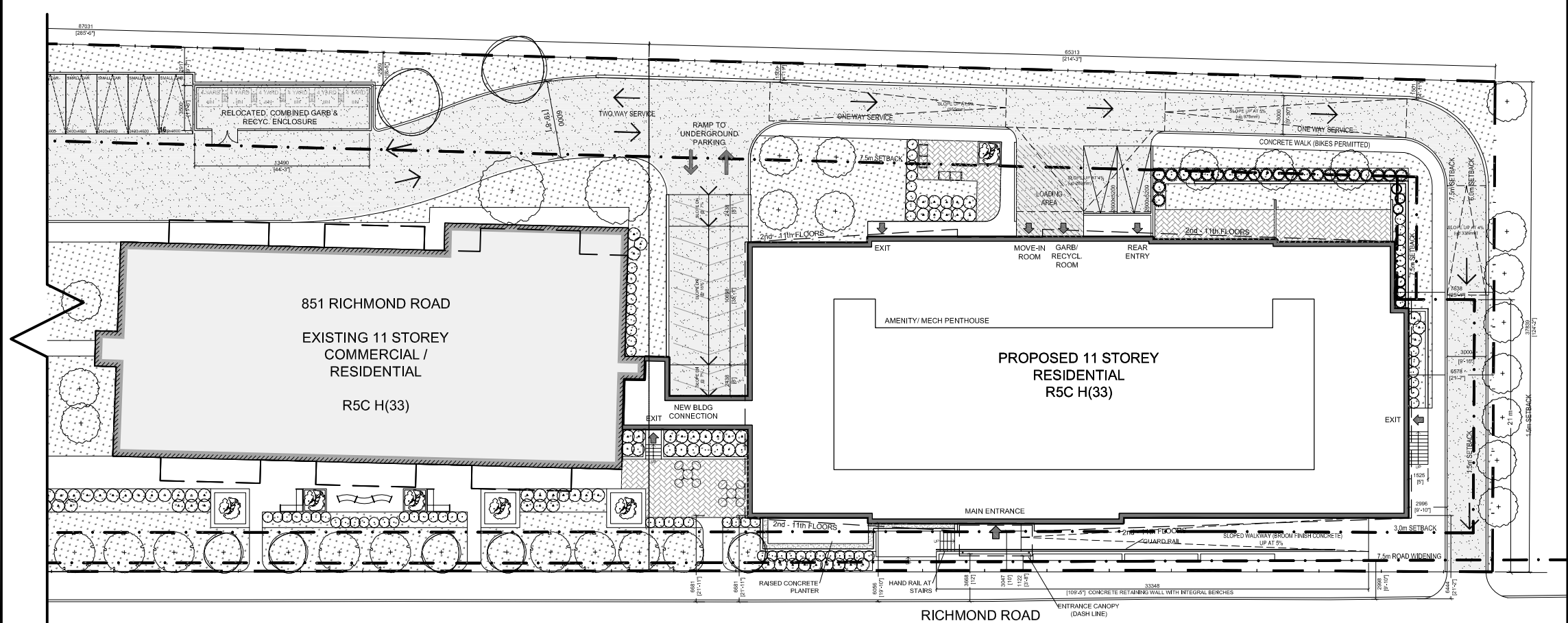
# Boundary Condition for 851 Richmond



Step	Task	Notes						Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Non-Combustible Construction						0.8	-
2	Determine Ground Floor Area of One Unit	-						1134	-
	Determine Number of Adjoining Units	-						1	-
3	Determine Height in Storeys	Does not include floors >50% below grade or open attic space						1	-
4	Determine Required Fire Flow	(F = 220 x C x A <sup>1/2</sup> ). Round to nearest 1000 L/min						-	6000
5	Determine Occupancy Charge	Limited Combustible						-15%	5100
6	Determine Sprinkler Reduction	Conforms to NFPA 13						-30%	~2040
		Standard Water Supply						-10%	
		Not Fully Supervised or N/A						0%	
		% Coverage of Sprinkler System						100%	
7	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	-	-
		North	> 45	21.2	1	0-30	Wood Frame or Non-Combustible	0%	1785
		East	> 45	50.9	0	0-30	Wood Frame or Non-Combustible	0%	
		South	3.1 to 10	21.2	11	> 120	Wood Frame or Non-Combustible	20%	
		West	10.1 to 20	49.9	2	91-120	Wood Frame or Non-Combustible	15%	
8	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min							5000
		Total Required Fire Flow in L/s							83.3
		Required Duration of Fire Flow (hrs)							2.00
		Required Volume of Fire Flow (m³)							600

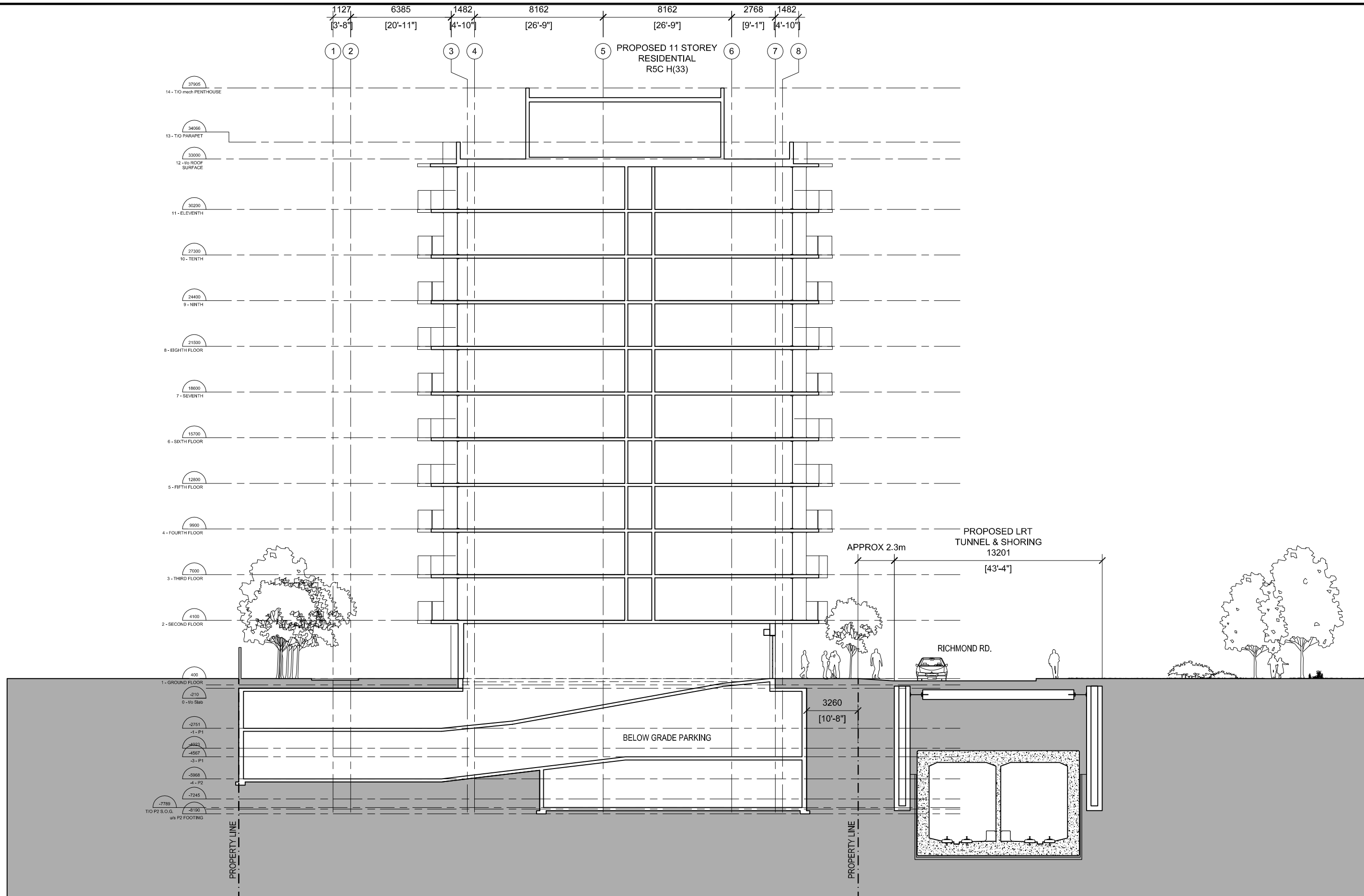
Appendix B Proposed Site Plan  
March 29, 2018

## **Appendix B PROPOSED SITE PLAN**



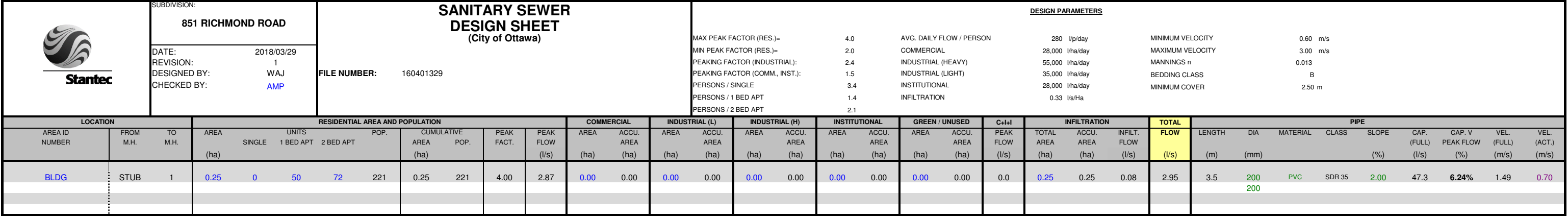
PROJECT INFORMATION			
<b>ZONING</b>			
FULL SITE AREA	R5C H(33)	6,060.28 sq. m. (65,233) sq. ft.	
FULL SITE OPEN AREA	33.9%	2,055 sq. m. (22,127) sq. ft.	
NEW BLDG SITE AREA		2,537 sq. m. (27,316) sq. ft.	
NEW BLDG OPEN AREA	36.3%	920 sq. m. (9,905) sq. ft.	
<b>BUILDING HEIGHT</b>			
RICHMOND ROAD SETBACK		3.0 m	
REAR YARD SETBACK		7.5 m	
INTERIOR YARD SETBACK		1.5 m	
PROJECT STATISTICS			
BUILDING HEIGHT		33.0 m	
AVERAGE MEAN GRADE	(GEOD. ELEV.)	XX.XX	
<b>GROSS BUILDING - AREAS</b>			
(CITY OF OTTAWA'S ZONING DEFINITION)			
PARKING LEVEL (TYPICAL)		2,200 sq. m. (23,688) sq. ft.	
GROUND FLOOR		1,095 sq. m. (11,788) sq. ft.	
TYP. RESID. FLOORS	10 x 1,138 sq. m.	11,380 sq. m. (122,570) sq. ft.	
2nd - 11th FLOOR	10 x (12,257) sq. ft.		
AMENITY/ MECH FLOOR		N/A	
TOTAL AREA (ABOVE GRADE)		12,475 sq. m. (134,279) sq. ft.	
UNIT STATISTICS			
STUDIO - GUEST SUITE		1	
1 BEDROOM - DWELLING UNIT		50	
2 BEDROOM - DWELLING UNIT		72	
TOTAL		123	
<b>AMENITY AREAS</b>			
(CITY OF OTTAWA'S ZONING DEFINITION)			
<b>REQUIRED</b>			
6.0m2/DWELLING UNIT		732 sq. m. (7,879) sq. ft.	
<b>PROVIDED</b>			
EXTERNAL AT GRADE		920 sq. m. (9,905) sq. ft.	
GROUND FLOOR AMENITY		254 sq. m. (2,732) sq. ft.	
BALCONIES		894 sq. m. (9,627) sq. ft.	
TOTAL AMENITY		2,068 sq. m. (22,264) sq. ft.	

CAR PARKING			
<b>REQUIRED</b>			
RESIDENCE	0.5 PER UNIT (12 EXEMPT)	55	
VISITOR	0.1 PER UNIT (12 EXEMPT)	11	
ACCESSIBLE		2	
TOTAL		68	
<b>PROVIDED</b>			
RESIDENCE		165	
VISITOR		11	
ACCESSIBLE		4	
TOTAL		180	
LOCATION OF PARKING			
PROPOSED BUILDING P1 LEVEL		58	
PROPOSED BUILDING P2 LEVEL		63	
PROPOSED BUILDING EXTERIOR AT GRADE		59	
TOTAL		180	
BICYCLE PARKING			
<b>REQUIRED</b>			
RESIDENCE	- 0.5 PER UNIT (122 UNITS)	61	
<b>PROVIDED</b>			
UNDERGROUND		76	
EXTERIOR AT GRADE		0	
TOTAL		76	
STORAGE UNITS			
<b>PROVIDED</b>			
GROUND FLOOR		73	
TOTAL		73	
<b>APPROVED</b> <input type="checkbox"/> <b>REFUSED</b> <input type="checkbox"/>			
<b>THIS</b> ____ <b>DAY OF</b> ____, <b>20</b> ____			
<b>DERRICK MOODIE, MANAGER</b>			
<b>DEVELOPMENT REVIEW WEST</b>			
<b>PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA</b>			



Appendix C Sanitary Sewer Calculations  
March 29, 2018

## **Appendix C SANITARY SEWER CALCULATIONS**



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



Site Area 0.360 ha

Extraneous Flow Allowances

Infiltration / Inflow 0.10 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	126	177
2 Bedroom	2.1	126	265
3 Bedroom	3.1		0
Average	1.8		0
Total Pop			442
Average Domestic Flow			<u>1.79 L/s</u>
Peaking Factor			4.00
Peak Domestic Flow			<u>7.16 L/s</u>

Institutional / Commercial / Industrial Contributions

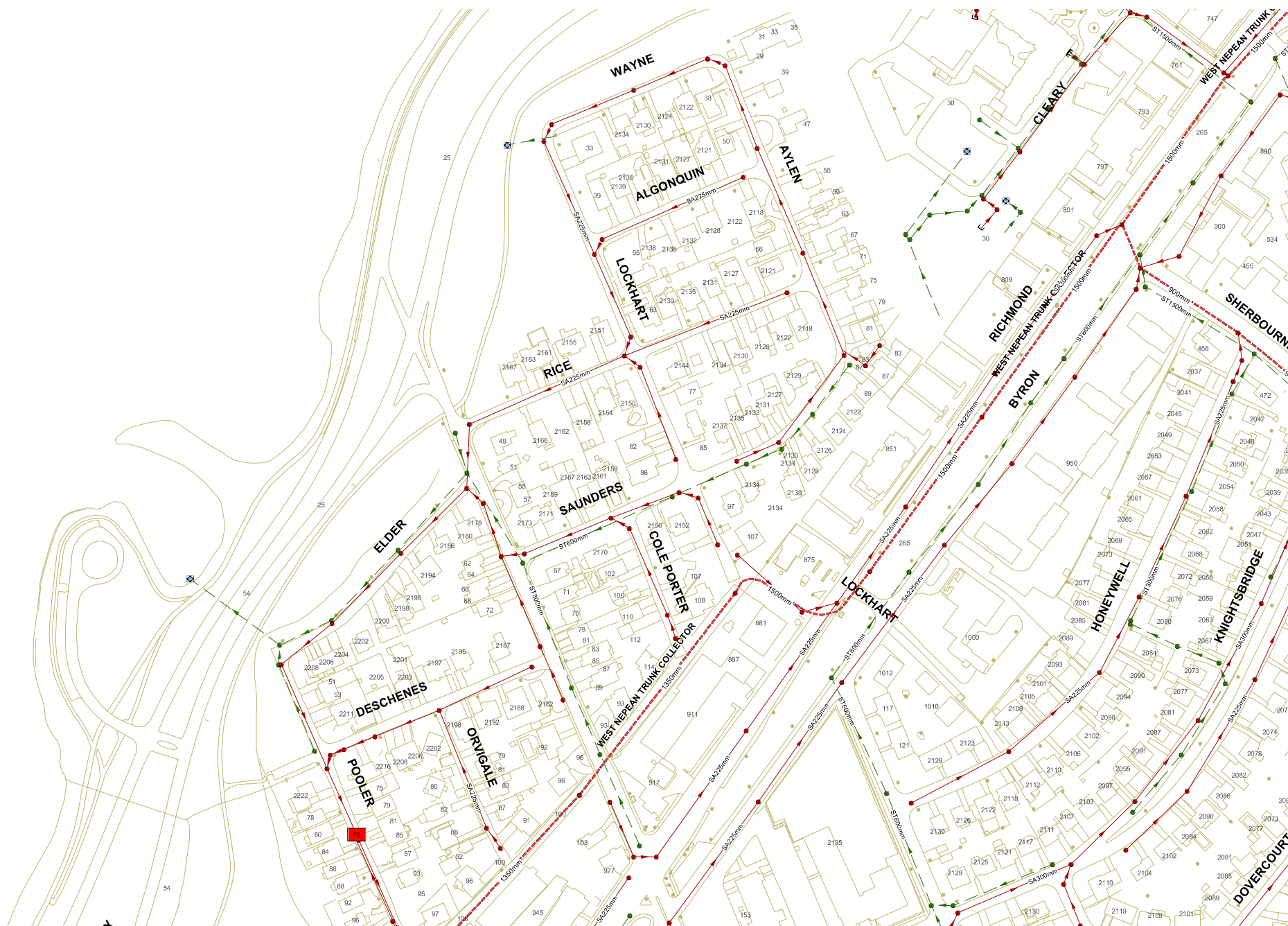
Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m <sup>2</sup> /d	1,048	0.12
Hospitals	900 L/bed/d		0.00
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00
Average I/C/I Flow			<u>0.12</u>
Peak Institutional / Commercial Flow			0.18
Peak Industrial Flow**			0.00
Peak I/C/I Flow			<u>0.18</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	1.91 L/s
Total Estimated Peak Dry Weather Flow Rate	7.34 L/s
Total Estimated Peak Wet Weather Flow Rate	7.44 L/s





[illegible]

## **Appendix D STORMWATER MANAGEMENT CALCULATIONS**



## Stormwater Management Calculations

File No: 160401329  
 Project: 851 RICHMOND ROAD  
 Date: 27-Mar-18

SWM Approach:  
 Post-development to 2-year equivalent with a C=0.50

### Post-Development Site Conditions:

#### Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table								
Sub-catchment Area			Area (ha)	Runoff Coefficient				Overall Runoff Coefficient
Catchment Type	ID / Description		"A"	"C"		"A x C"		
Controlled - Tributary	RAMP, L201A, L202A	Hard	0.085	0.9	0.077	0.0858	0.660	
		Soft	0.045		0.009			
	Subtotal			0.13				
Controlled - Tributary	L204A	Hard	0.061	0.9	0.055	0.0567	0.810	
		Soft	0.009		0.002			
	Subtotal			0.07				
Controlled - Tributary	L203A	Hard	0.079	0.9	0.071	0.075	0.750	
		Soft	0.021		0.004			
	Subtotal			0.1				
Roof	EX-BLDG	Hard	0.070	0.9	0.063	0.063	0.90	
		Soft	0.000		0.000			
	Subtotal			0.07				
Roof	BLDG	Hard	0.110	0.9	0.099	0.099	0.90	
		Soft	0.000		0.000			
	Subtotal			0.11				
Uncontrolled - Non-Tributary	UNC-1	Hard	0.000	0.9	0.000	0.002	0.20	
		Soft	0.010		0.002			
	Subtotal			0.01				
Total			0.490		0.382			
Overall Runoff Coefficient= C:							0.78	

Total Roof Areas	0.110 ha	
Total Tributary Surface Areas (Controlled and Uncontrolled )	0.370 ha	
Total Tributary Area to Outlet	0.480 ha	C = 0.78
Total Uncontrolled Areas (Non-Tributary)	0.010 ha	
Total Site	0.490 ha	

# Stormwater Management Calculations

## Project #160401329, 851 RICHMOND ROAD Modified Rational Method Calculations for Storage

2 yr Intensity City of Ottawa	$I = a/(t + b)^c$	a = 732.951	t (min)	I (mm/hr)
		b = 6.199	10	76.81
		c = 0.81	20	52.03
			30	40.04
			40	32.86
			50	28.04
			60	24.56
			70	21.91
			80	19.83
			90	18.14
			100	16.75
			110	15.57
			120	14.56

### 2 year Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet  
Area (ha): 0.4900  
C: 0.50

Typical Time of Concentration

tc (min)	I (2 yr) (mm/hr)	Qtarget (L/s)
10	76.81	52.31

### 2 year Modified Rational Method for Entire Site

Subdrainage Area: RAMP, L201A, L202A Controlled - Tributary  
Area (ha): 0.13  
C: 0.66

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)
10	76.81	18.32	22.84	0.00	0.00
20	52.03	12.41	22.84	0.00	0.00
30	40.04	9.55	22.84	0.00	0.00
40	32.86	7.84	22.84	0.00	0.00
50	28.04	6.69	22.84	0.00	0.00
60	24.56	5.86	22.84	0.00	0.00
70	21.91	5.23	22.84	0.00	0.00
80	19.83	4.73	22.84	0.00	0.00
90	18.14	4.33	22.84	0.00	0.00
100	16.75	3.99	22.84	0.00	0.00
110	15.57	3.71	22.84	0.00	0.00
120	14.56	3.47	22.84	0.00	0.00

Storage: Subsurface storage cistern  
Flows pumped from cistern to STM 100

	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Level	22.84	0.00	18.24	OK

Subdrainage Area: L204A Controlled - Tributary  
Area (ha): 0.07  
C: 0.81

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)
10	76.81	12.11	5.52	6.59	3.95
20	52.03	8.20	5.52	2.68	3.22
30	40.04	6.31	5.52	0.79	1.43
40	32.86	5.18	5.52	0.00	0.00
50	28.04	4.42	5.52	0.00	0.00
60	24.56	3.87	5.52	0.00	0.00
70	21.91	3.45	5.52	0.00	0.00
80	19.83	3.13	5.52	0.00	0.00
90	18.14	2.86	5.52	0.00	0.00
100	16.75	2.64	5.52	0.00	0.00
110	15.57	2.45	5.52	0.00	0.00
120	14.56	2.30	5.52	0.00	0.00

Storage: Surface Storage Above CB

Orifice Diameter: LMF70 mm  
Invert Elevation: 65.29 m  
T/G Elevation: 66.67 m  
Max Ponding Depth: 0.26 m  
Downstream W/L: 64.64 m

Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Level	66.93	1.64	5.52	3.95	23.50 OK

Subdrainage Area: L203A Controlled - Tributary  
Area (ha): 0.10  
C: 0.75

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)
10	76.81	16.01	10.19	5.82	3.49
20	52.03	10.85	10.19	0.66	0.79
30	40.04	8.35	10.19	0.00	0.00
40	32.86	6.85	10.19	0.00	0.00
50	28.04	5.85	10.19	0.00	0.00
60	24.56	5.12	10.19	0.00	0.00
70	21.91	4.57	10.19	0.00	0.00
80	19.83	4.13	10.19	0.00	0.00
90	18.14	3.78	10.19	0.00	0.00
100	16.75	3.49	10.19	0.00	0.00
110	15.57	3.25	10.19	0.00	0.00
120	14.56	3.04	10.19	0.00	0.00

Storage: Surface Storage Above CB

## Project #160401329, 851 RICHMOND ROAD Modified Rational Method Calculations for Storage

100 yr Intensity City of Ottawa	$I = a/(t + b)^c$	a = 1735.688	t (min)	I (mm/hr)
		b = 6.014	10	178.56
		c = 0.820	20	119.95
			30	91.87
			40	75.15
			50	63.95
			60	55.89
			70	49.79
			80	44.99
			90	41.11
			100	37.90
			110	35.20
			120	32.89

### 100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: RAMP, L201A, L202A Controlled - Tributary  
Area (ha): 0.13  
C: 0.83

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)
10	178.56	53.24	22.84	30.40	18.24
20	119.95	35.76	22.84	12.92	15.51
30	91.87	27.39	22.84	4.55	8.19
40	75.15	22.40	22.84	0.00	0.00
50	63.95	19.07	22.84	0.00	0.00
60	55.89	16.67	22.84	0.00	0.00
70	49.79	14.85	22.84	0.00	0.00
80	44.99	13.41	22.84	0.00	0.00
90	41.11	12.26	22.84	0.00	0.00
100	37.90	11.30	22.84	0.00	0.00
110	35.20	10.50	22.84	0.00	0.00
120	32.89	9.81	22.84	0.00	0.00

Storage: Subsurface storage cistern  
Flows pumped from cistern to STM 100

	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	22.84	18.24	18.24	OK

Subdrainage Area: L204A Controlled - Tributary  
Area (ha): 0.07  
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)
10	178.56	34.75	5.52	29.23	17.54
20	119.95	23.94	5.52	17.82	21.39
30	91.87	17.88	5.52	12.36	22.25
40	75.15	14.62	5.52	9.10	21.85
50	63.95	12.45	5.52	6.93	20.78
60	55.89	10.88	5.52	5.36	19.29
70	49.79	9.69	5.52	4.17	17.52
80	44.99	8.76	5.52	3.24	15.54
90	41.11	8.00	5.52	2.48	13.40
100	37.90	7.38	5.52	1.86	11.14
110	35.20	6.85	5.52	1.33	8.79
120	32.89	6.40	5.52	0.88	6.36

Storage: Surface Storage Above CB

Orifice Diameter: LMF70  
Invert Elevation: 65.29 m  
T/G Elevation: 66.67 m  
Max Ponding Depth: 0.26 m  
Downstream W/L: 64.64 m

Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	66.93	1.64	5.52	22.25	23.50 OK

Subdrainage Area: L203A Controlled - Tributary  
Area (ha): 0.10  
C: 0.94

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)
10	178.56	46.54	10.19	36.35	21.81
20	119.95	31.26	10.19	21.07	25.29
30	91.87	23.94	10.19	13.75	24.75
40	75.15	19.68	10.19	9.39	22.55
50	63.95	16.67	10.19	6.48	19.43
60	55.89	14.57	10.19	4.38	15.76
70	49.79	12.98	10.19	2.79	11.70
80	44.99	11.73	10.19	1.53	7.37
90	41.11	10.71	10.19	0.52	2.83
100	37.90	9.88	10.19	0.00	0.00
110	35.20	9.17	10.19	0.00	0.00
120	32.89	8.57	10.19	0.00	0.00

Storage: Surface Storage Above CB

# Stormwater Management Calculations

## Project #160401329, 851 RICHMOND ROAD Modified Rational Method Calculations for Storage

Orifice Diameter:	LMF95	mm
Invert Elevation	65.13	m
T/G Elevation	66.51	m
Max Ponding Depth	0.25	m
Downstream W/L	64.64	m

	Stage	Head	Discharge	Vreq	Vavail	Volume
		(m)	(L/s)	(cu. m)	(cu. m)	Check
5-year Water Level	66.76	1.63	10.19	3.49	26.50	OK

Subdrainage Area:	EX-BLDG	Roof	
Area (ha):	0.07	Maximum Storage Depth:	150
C:	0.90		

tc	I (2 yr)	Qactual	Qrelease	Qstored	Vstored	Depth
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m³3)	(mm)
10	76.81	13.45	3.50	9.96	5.97	92.3
20	52.03	9.11	3.63	5.48	6.58	95.9
30	40.04	7.01	3.55	3.46	6.23	93.9
40	32.86	5.76	3.42	2.34	5.62	90.2
50	28.04	4.91	3.26	1.65	4.94	86.2
60	24.56	4.30	3.11	1.19	4.28	82.2
70	21.91	3.84	2.97	0.87	3.64	78.5
80	19.83	3.47	2.84	0.64	3.06	74.9
90	18.14	3.18	2.68	0.50	2.70	70.8
100	16.75	2.93	2.54	0.40	2.37	67.0
110	15.57	2.73	2.41	0.32	2.09	63.7
120	14.56	2.55	2.30	0.25	1.83	60.7

Storage:	Roof Storage
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	Depth	Head	Discharge	Vreq	Vavail	Discharge
	(mm)	(m)	(L/s)	(cu. m)	(cu. m)	Check
5-year Water Level	95.94	0.10	3.63	6.58	24.50	0.14

Subdrainage Area:	BLDG	Roof	
Area (ha):	0.11	Maximum Storage Depth:	150 mm
C:	0.90		

tc	I (2 yr)	Qactual	Qrelease	Qstored	Vstored	Depth
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m³3)	(mm)
10	76.81	21.14	4.74	16.40	9.84	93.8
20	52.03	14.32	4.99	9.33	11.19	98.9
30	40.04	11.02	4.94	6.08	10.94	98.0
40	32.86	9.04	4.80	4.24	10.19	95.1
50	28.04	7.72	4.63	3.09	9.27	91.7
60	24.56	6.76	4.45	2.31	8.32	88.1
70	21.91	6.03	4.27	1.76	7.39	84.6
80	19.83	5.46	4.10	1.36	6.51	81.3
90	18.14	4.99	3.94	1.05	5.67	78.1
100	16.75	4.61	3.79	0.81	4.89	75.2
110	15.57	4.28	3.62	0.67	4.39	71.7
120	14.56	4.01	3.46	0.55	3.96	68.5

Storage:	Roof Storage
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	Depth	Head	Discharge	Vreq	Vavail	Discharge
	(mm)	(m)	(L/s)	(cu. m)	(cu. m)	Check
5-year Water Level	98.91	0.10	4.99	11.19	38.75	0.26

Subdrainage Area:	UNC-1	Uncontrolled - Non-Tributary
Area (ha):	0.01	
C:	0.20	

tc	I (2 yr)	Qactual	Qrelease	Qstored	Vstored
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m³3)
10	76.81	0.43	0.43		
20	52.03	0.29	0.29		
30	40.04	0.22	0.22		
40	32.86	0.18	0.18		
50	28.04	0.16	0.16		
60	24.56	0.14	0.14		
70	21.91	0.12	0.12		
80	19.83	0.11	0.11		
90	18.14	0.10	0.10		
100	16.75	0.09	0.09		
110	15.57	0.09	0.09		
120	14.56	0.08	0.08		

SUMMARY TO OUTLET		Vrequired	Vavailable*
Tributary Area	0.48 ha		
Total 2yr Flow to Sewer	47.04 L/s	25	131 m³
Non-Tributary Area	0.01 ha		
Total 2yr Flow Uncontrolled	0.43 L/s		
Total Area	0.49 ha		
Total 2yr Flow	47.46 L/s		
Target	52.31 L/s		

## Project #160401329, 851 RICHMOND ROAD Modified Rational Method Calculations for Storage

Orifice Diameter:	LMF95	mm
Invert Elevation	65.13	m
T/G Elevation	66.51	m
Max Ponding Depth	0.25	m
Downstream W/L	64.64	m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	66.76	1.63	10.19	25.29	26.50	OK

1.21

<b>Subdrainage Area:</b>	EX-BLDG	Roof
<b>Area (ha):</b>	0.07	Maximum Storage Depth:
<b>C:</b>	1.00	150

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	178.56	34.75	5.06	29.68	17.81	133.8
20	119.95	23.34	5.41	17.94	21.52	142.8
30	91.87	17.88	5.48	12.40	22.32	144.7
40	75.15	14.62	5.45	9.17	22.02	144.0
50	63.95	12.45	5.38	7.07	21.21	142.0
60	55.89	10.88	5.28	5.60	20.15	139.5
70	49.79	9.69	5.17	4.52	18.97	136.6
80	44.99	8.76	5.06	3.70	17.74	133.6
90	41.11	8.00	4.94	3.06	16.50	130.6
100	37.90	7.38	4.83	2.54	15.27	127.6
110	35.20	6.85	4.72	2.13	14.08	124.6
120	32.89	6.40	4.58	1.82	13.09	121.1

Storage:    Roof Storage

Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
100-year Water Level	144.72	0.14	5.48	22.32	24.50	0.41

<b>Subdrainage Area:</b>	BLDG	Roof
<b>Area (ha):</b>	0.11	Maximum Storage Depth:
<b>C:</b>	1.00	150 mm

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	178.56	54.60	6.79	47.81	28.69	134.6
20	119.95	36.68	7.30	29.38	35.26	144.6
30	91.87	28.09	7.45	20.65	37.16	147.6
40	75.15	22.98	7.46	15.52	<b>37.26</b>	147.7
50	63.95	19.56	7.40	12.16	36.48	146.5
60	55.89	17.09	7.30	9.79	35.25	144.6
70	49.79	15.23	7.19	8.04	33.77	142.4
80	44.99	13.76	7.06	6.70	32.15	139.9
90	41.11	12.57	6.93	5.64	30.46	137.3
100	37.90	11.59	6.80	4.79	28.75	134.7
110	35.20	10.76	6.67	4.10	27.05	132.1
120	32.89	10.06	6.54	3.52	25.37	129.5

Storage:    Roof Storage

Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
100-year Water Level	147.71	0.15	7.46	37.26	38.75	0.66

<b>Subdrainage Area:</b>	UNC-1	Uncontrolled - Non-Tributary
<b>Area (ha):</b>	0.01	
<b>C:</b>	0.25	

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)
10	178.56	1.24	1.24		
20	119.95	0.83	0.83		
30	91.87	0.64	0.64		
40	75.15	0.52	0.52		
50	63.95	0.44	0.44		
60	55.89	0.39	0.39		
70	49.79	0.35	0.35		
80	44.99	0.31	0.31		
90	41.11	0.29	0.29		
100	37.90	0.26	0.26		
110	35.20	0.24	0.24		
120	32.89	0.23	0.23		

SUMMARY TO OUTLET

Vrequired    Vavailable\*

<b>Tributary Area</b>	0.48 ha		
<b>Total 100yr Flow to Sewer</b>	51.07 L/s	125	131 m³
<b>Non-Tributary Area</b>	0.01 ha		
<b>Total 100yr Flow Uncontrolled</b>	1.24 L/s		
<b>Total Area</b>	0.49 ha		
<b>Total 100yr Flow</b>	52.31 L/s		
<b>Target</b>	52.31 L/s		

# Roof Drain Design Calculation Sheet

851 RICHMOND ROAD

Roof Drain Design Sheet, Area EX-BLDG

Standard Watts Model R1100 Accuflow Roof Drain

Rating Curve				Volume Estimation				Water Depth (m)
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m)		
						Increment	Accumulated	
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0009	0	0.025	14	0	0	0.025
0.050	0.0006	0.0019	1	0.050	54	1	1	0.050
0.075	0.0009	0.0028	3	0.075	123	2	3	0.075
0.100	0.0013	0.0038	7	0.100	218	4	7	0.100
0.125	0.0016	0.0047	14	0.125	340	7	14	0.125
0.150	0.0019	0.0057	25	0.150	490	10	25	0.150

## Roof Storage Summary

Total Building Area (sq.m)	700	
Assume Available Roof Area (sq.m)	70%	490
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		3
Max. Allowable Depth of Roof Ponding (m)	0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)		25
Estimated 100 Year Drawdown Time (h)		1.4

\* Note: Number of drains can be reduced if multiple-notch drain used.

## Calculation Results

	2yr	100yr	Available
Qresult (cu.m/s)	0.004	0.005	-
Depth (m)	0.096	0.145	0.150
Volume (cu.m)	6.6	22.3	24.5
Draintime (hrs)	0.6	1.4	

# Roof Drain Design Calculation Sheet

851 RICHMOND ROAD

Roof Drain Design Sheet, Area BLDG

Standard Watts Model R1100 Accuflow Roof Drain

Rating Curve				Volume Estimation				Water Depth (m)
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m)		
						Increment	Accumulated	
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0013	0	0.025	22	0	0	0.025
0.050	0.0006	0.0025	1	0.050	86	1	1	0.050
0.075	0.0009	0.0038	5	0.075	194	3	5	0.075
0.100	0.0013	0.0050	11	0.100	344	7	11	0.100
0.125	0.0016	0.0063	22	0.125	538	11	22	0.125
0.150	0.0019	0.0076	39	0.150	775	16	39	0.150

## Rooftop Storage Summary

Total Building Area (sq.m)		1100	
Assume Available Roof Area (sq.m)	70%	775	
Roof Imperviousness		0.99	
Roof Drain Requirement (sq.m/Notch)		232	
Number of Roof Notches*		4	
Max. Allowable Depth of Roof Ponding (m)		0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)		39	
Estimated 100 Year Drawdown Time (h)		1.8	

\* Note: Number of drains can be reduced if multiple-notch drain used.

## Calculation Results

	2yr	100yr	Available
Qresult (cu.m/s)	0.005	0.007	-
Depth (m)	0.099	0.148	0.150
Volume (cu.m)	11.2	37.3	38.8
Draintime (hrs)	0.7	1.8	

## Brief Stormceptor Sizing Report - 851 Richmond Road

Project Information & Location			
<b>Project Name</b>	851 Richmond Road	<b>Project Number</b>	160401329
<b>City</b>	Ottawa	<b>State/ Province</b>	Ontario
<b>Country</b>	Canada	<b>Date</b>	3/27/2018
Designer Information		EOR Information (optional)	
<b>Name</b>	Neal Cody	<b>Name</b>	
<b>Company</b>	Stantec Consulting Ltd.	<b>Company</b>	
<b>Phone #</b>	780-969-3263	<b>Phone #</b>	
<b>Email</b>	neal.cody@stantec.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	851 Richmond Road
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	81
<b>Recommended Stormceptor Model</b>	STC 750

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 300	72
STC 750	81
STC 1000	82
STC 1500	83
STC 2000	86
STC 3000	87
STC 4000	90
STC 5000	90
STC 6000	92
STC 9000	94
STC 10000	94
STC 14000	96
StormceptorMAX	Custom

Sizing Details			
Drainage Area		Water Quality Objective	
Total Area (ha)	0.48	TSS Removal (%)	80.0
Imperviousness %	85.0	Runoff Volume Capture (%)	
Rainfall		Oil Spill Capture Volume (L)	
Station Name	OTTAWA MACDONALD-CARTIER INT'L A	Peak Conveyed Flow Rate (L/s)	51.10
State/Province	Ontario	Water Quality Flow Rate (L/s)	
Station ID #	6000	Up Stream Storage	
Years of Records	37	Storage (ha-m)	Discharge (cms)
Latitude	45°19'N	0.000	0.000
Longitude	75°40'W	Up Stream Flow Diversion	
		Max. Flow to Stormceptor (cms)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

**For Stormceptor Specifications and Drawings Please Visit:**  
<http://www.imbriumsystems.com/technical-specifications>

**STORMWATER MANAGEMENT REPORT  
RIVER PARKWAY PRESCHOOL CENTRE**

**40 CLEARY AVENUE**

**CITY OF OTTAWA**

August 2006  
Revised January 2007

Prepared for:

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Ottawa, Ontario  
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Prepared by:

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JLR 19616-05

**STORMWATER MANAGEMENT REPORT  
RIVER PARKWAY PRESCHOOL CENTRE  
40 CLEARY AVENUE  
CITY OF OTTAWA**

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APPENDIX 'A'	Stormwater Management Calculations, Drainage Area Plan D-ST1 and Ponding Area Plan SWM-1
APPENDIX 'B'	Storm Sewer Design Sheet and Site Servicing Plan S1
APPENDIX 'C'	Hydrovex® Curves

# **STORMWATER MANAGEMENT REPORT RIVER PARKWAY PRESCHOOL CENTRE**

**40 CLEARY AVENUE  
CITY OF OTTAWA**

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## **1.0 INTRODUCTION**

J.L. Richards & Associates Limited has been retained to develop a Site Servicing and Grading Plan for a preschool, known as the River Parkway Preschool Centre (RPPC) that will be situated in the southwest quadrant of the First Unitarian Congregation of Ottawa property at 40 Cleary Avenue. The proposed five classroom preschool will be a one-storey slab on grade structure with a sloped roof, and have an approximate building area of 1070m<sup>2</sup>. The site currently drains to an existing swale located north of the proposed building site.

## **2.0 STORM DESIGN CRITERIA**

The storm flows generated by the development are to be captured and conveyed to the existing 450 mm diameter storm sewer on Cleary Avenue. The City of Ottawa requires that the post-development peak flow rate be controlled to a 5-year flow with a runoff coefficient of 0.4 and a time of concentration of 20 minutes. Based on the City of Ottawa criteria, the post-development peak flow rate was calculated to be 37.5 L/s (refer to Appendix 'A' for Stormwater Management Calculations). There are two areas of the proposed site that will flow unrestricted to an existing swale within the First Unitarian Congregation of Ottawa property. The two unrestricted areas are located at the south side of the proposed building (Sub-Catchment Area A) and the southwest corner of the property (Sub-Catchment Area B); the 100-year unrestricted flows are 12.7 L/s and 6.0 L/s, respectively. The unrestricted flows have been removed from the post-development peak flow rate and, therefore, the allowable release rate to the existing 450 mm diameter storm sewer is 18.8 L/s.

In addition to controlling the flow from the site to the 5-year allowable release rate, the City of Ottawa also requires that the 5-year and 100-year post-development flows be detained on site, with an allowable depth of ponding to a maximum of 150 mm and 300 mm, respectively. To fulfil the storm design criteria, an Inlet Control Device (ICD), combined with on-site storage, has been incorporated into the storm servicing of the site.

### 3.0 PROPOSED STORM SEWER SERVICING

#### 3.1 Water Quantity

The River Parkway Preschool Centre will be developed with a mix of surfaces, including rooftop, parking and play areas, as well as landscaped areas (refer to Appendix 'A' for the Drainage Area Plan D-ST1). As a result, the overall imperviousness of the site will increase under post-development conditions. Stormwater management measures will be employed to ensure that the 1:5 year and 1:100 year peak flows conveyed to the local storm sewer do not exceed the allowable flow rate of 18.8 L/s.

The storm flows generated by this development are to be captured and conveyed by the proposed storm sewers within the parking lot of the Preschool Centre to the existing 450 mm diameter storm sewer on Cleary Avenue (refer to Appendix 'B' for Site Servicing Plan S1). The existing 450 mm diameter storm sewer flows east to an existing 1500 mm diameter storm sewer on Cleary Avenue.

The proposed storm sewers for this site were sized using the Rational Method with an inlet time of 10 minutes. A 5-year unrestricted flow of 50 L/s was calculated (refer to Appendix 'B' for the Storm Sewer Design Sheet). Since this flow exceeds the maximum allowable flow rate of 18.8 L/s, the storm sewer flows will be restricted using an ICD. It is proposed to utilize a Hydrovex® 125 VHV-2 ICD in the downstream catch basin manhole (CB MH3) in order to limit the rate of flow to a maximum allowable release rate of 18.0 L/s, based on a maximum head of 3.15 metres (refer to Appendix 'C' for the Hydrovex® curves).

The site was also designed to accommodate on-site storage to detain the 5-year and 100-year peak flow rates, while releasing to the maximum allowable release rate. The roof of the RPPC will be sloped and, therefore, rooftop storage has not been incorporated into the design. All downspouts outlet to the surface, with the exception of those along the west side of the building which flow to a subsurface rainwater leader and are conveyed by a storm sewer to the controlled system. All on-site storage will be contained within the parking lot, sewers and catch basins. The 5-year and 100-year storage volumes required are 28.1 m<sup>3</sup> and 65.1 m<sup>3</sup>, respectively. The maximum

available 5-year and 100-year storage volumes are 32.2 m<sup>3</sup> and 67.1 m<sup>3</sup>, respectively (refer to Appendix 'A' for the Ponding Plan SWM-1).

There is currently an existing culvert that outlets stormwater from the parking lots of the Lord Richmond apartment building to the southwest quadrant of the First Unitarian Church property. The Lord Richmond stormwater then flows northeast through a series of swales and culverts, within the area of the proposed building, and is ultimately conveyed north along the existing swale. It is proposed to redirect these flows away from the RPPC using a storm sewer and outlet downstream into the existing swale north of the RPPC. The storm sewer that will redirect the stormwater from the Lord Richmond property has been sized for the 100-year storm and a time of concentration of 10 minutes. The storm sewer has also been sized to accommodate the 100-year storm runoff from the adjacent residential development, and Kristy's property located to the west of the site (Sub-Catchment Area B).

The runoff generated by the 100-year storm event on the south side of the building (Sub-Catchment Area A) will flow north along the proposed swale to a storm sewer. This storm sewer has been sized for the 100-year storm event and a time of concentration of 10 minutes. The storm sewer will outlet to an existing swale on the north side of the proposed building. By piping the stormwater runoff via a storm sewer, the First Unitarian Church can continue to utilize the area north of the proposed building for parking.

### **3.2 Erosion and Sedimentation Control Measures**

During construction of the site servicing, appropriate erosion and sediment control measures, as outlined in MNR's "Guidelines on Erosion and Sediment Control for Urban Construction Sites" will be implemented to trap sediment on site. Drawing S1 outlines the proposed sedimentation control measures (refer to Notes 4 and 5).

As a minimum, the following erosion and sedimentation control measures will be provided:

- Supply and install silt fence barrier (per OPSD 219.110) along all property

boundaries prior to construction.

- Filter cloth to be placed under all catch basin and manhole covers for temporary sediment control during construction.
- Supply and install a silt fence barrier to enclose all borrow and stockpile areas resulting from topsoil stripping activities or any excavating activities (i.e., exact location to be determined during construction) associated with the construction of the proposed parking lot and site servicing.

Furthermore, if dewatering and pumping operations become necessary, construction of a detention trap will be carried out to detain groundwater and promote settling of sediments.

#### **4.0 SUMMARY**

Storm servicing for the proposed Preschool Centre consists of an underground storm sewer collection system located in the parking lot and roadway along Cleary Avenue, which conveys flows east to the existing 450 mm diameter storm sewer on Cleary Avenue.

The downstream catch basin will be equipped with a Hydrovex<sup>®</sup> ICD, restricting the flows to a maximum of 18.0 L/s and the runoff generated by the 5-year and 100-year storm events will be stored on site within the parking lot, sewers and catch basins.

The existing swale passing through the site, which conveys stormwater from the Lord Richmond apartment building parking lot, will be redirected around the proposed building by way of a storm sewer that outlets to an existing swale.

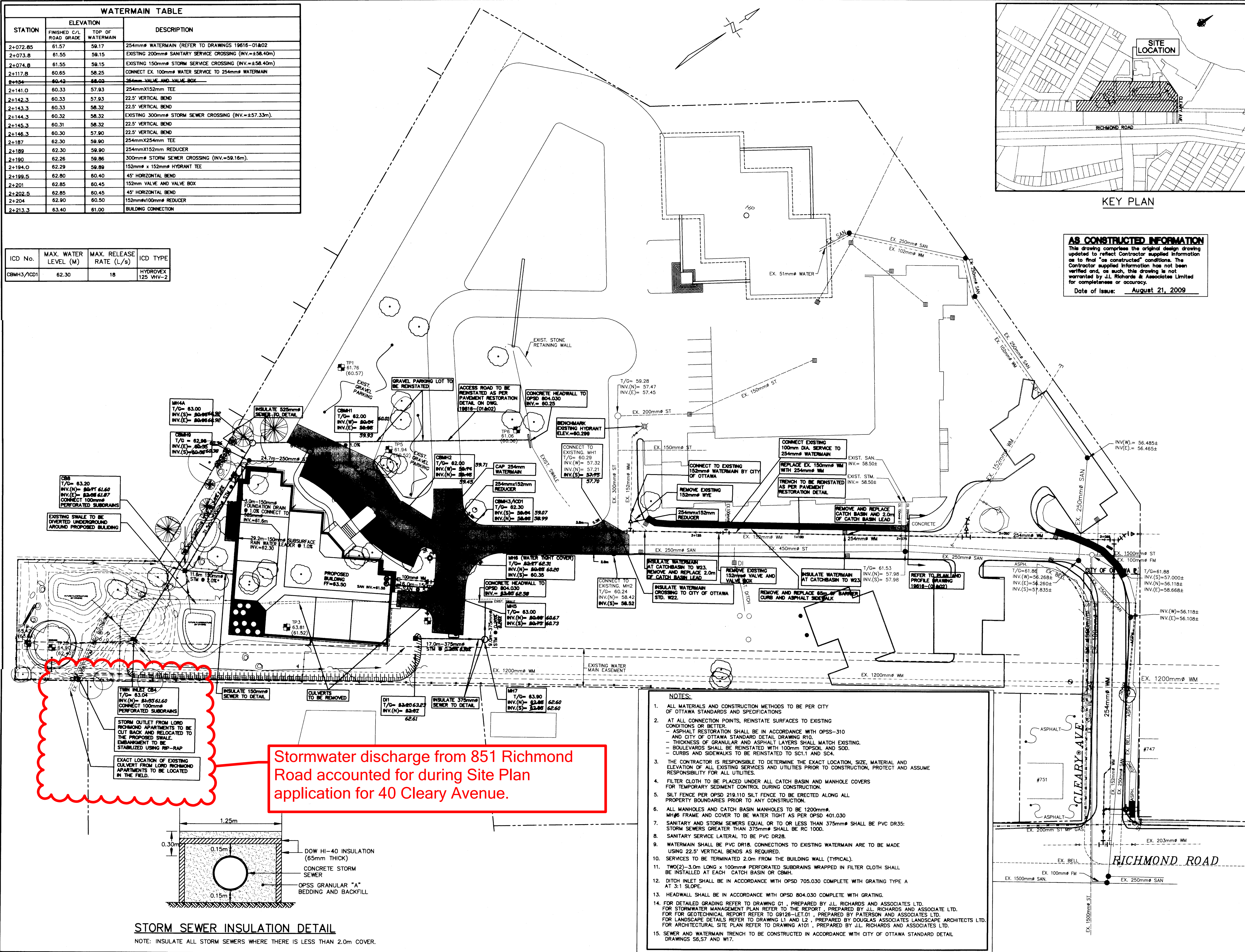
Prepared by: \_\_\_\_\_  
Kim Doyle, P.Eng.

Reviewed by: \_\_\_\_\_

Guy Forget, P.Eng.

WATERMAIN TABLE				
STATION	ELEVATION		DESCRIPTION	
	FINISHED C/L ROAD GRADE	TOP OF WATERMAIN		
2+072.85	61.57	59.17	254mm WATERMAIN (REFER TO DRAWINGS 19616-01&02)	
2+073.8	61.55	59.15	EXISTING 200mm SANITARY SERVICE CROSSING (INV.=±58.40m)	
2+074.8	61.55	59.15	EXISTING 150mm STORM SERVICE CROSSING (INV.=±58.40m)	
2+117.8	60.65	58.25	CONNECT EX. 100mm WATER SERVICE TO 254mm WATERMAIN	
2+124	60.43	58.03	254mm VALVE AND VALVE BOX	
2+141.0	60.33	57.93	254mmX152mm TEE	
2+142.3	60.33	57.93	22.5° VERTICAL BEND	
2+143.3	60.33	58.32	22.5° VERTICAL BEND	
2+144.3	60.32	58.32	EXISTING 300mm STORM SEWER CROSSING (INV.=±57.33m)	
2+145.3	60.31	58.32	22.5° VERTICAL BEND	
2+146.3	60.30	57.90	22.5° VERTICAL BEND	
2+187	62.30	59.90	254mmX254mm TEE	
2+188	62.30	59.90	254mmX152mm REDUCER	
2+190	62.26	59.86	300mm STORM SEWER CROSSING (INV.=59.16m)	
2+194.0	62.29	59.89	152mm x 152mm HYDRANT TEE	
2+199.5	62.80	60.40	45° HORIZONTAL BEND	
2+201	62.85	60.45	152mm VALVE AND VALVE BOX	
2+202.5	62.85	60.45	45° HORIZONTAL BEND	
2+204	62.90	60.50	152mmX100mm REDUCER	
2+213.3	63.40	61.00	BUILDING CONNECTION	

ICD No.	MAX. WATER LEVEL (M)	MAX. RELEASE RATE (L/s)	ICD TYPE
CBMH3/CD1	62.30	18	HYDROVEX 125 WYV-2



### LEGEND

- EXISTING CATCH BASIN
- EXISTING WATERMAIN, VALVE & HYDRANT
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED WATERMAIN VALVE AND VALVE BOX
- PROPOSED WATERMAIN, VALVE & HYDRANT
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED CATCH BASIN & 200mm CB LEAD
- TP4 EX. GROUND ELEVATION ROCK ELEVATION
- 3:1 TERRACING
- PROPOSED 100mm PERFORATED PIPE SUBDRAIN TO DETAIL L9
- PROPOSED SWALE C/W
- PROPERTY LINE
- EXISTING CULVERT
- ROOF DOWNSPOUT
- WATER METER
- REMOTE WATER METER

### ASPHALT PAVEMENT STRUCTURE

- LIGHT DUTY PARKING AREAS
  - 50mm HL3
  - 150mm GRANULAR 'A'
  - 300mm GRANULAR 'B', TYPE II
- HEAVY DUTY ACCESS LANE
  - 40mm HL3
  - 50mm HL8
  - 150mm GRANULAR 'A'
  - 300mm GRANULAR 'B', TYPE II

9	AS CONSTRUCTED INFO ADDED	25/08/09
8	REVISED PER CITY COMMENTS AND ISSUED FOR M.O.E. APPROVAL	25/01/07
7	REVISED PER CITY COMMENTS	23/01/07
6	ISSUED FOR BUILDING PERMIT	12/06/06
5	ISSUED FOR ADDENDUM	11/15/06
4	ISSUED FOR TENDER	11/01/06
3	ISSUED FOR CLIENT REVIEW	10/27/06
2	ISSUED FOR SITE PLAN APPROVAL	15/08/06
1	CLIENT REVIEW	07/04/06
NO.	ISSUE	DATE

SCALE: 1:400

**J.L. Richards**  
ENGINEERS ARCHITECTS PLANNERS

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PROFESSIONAL STAMP

PROJECT NORTH

PROJECT NORTH

PROJECT: **RIVER PARKWAY PRESCHOOL CENTRE 40 CLEARY AVENUE**

Ottawa, Ontario

DRAWING: **SITE SERVING PLAN**

DESIGN: K.D.	DRAWING NO: <b>81</b>
DRAWN: M.F.	
CHECKED: P.D.R.	
CAD FILE: 19616-01	JLR JOB NO: 19616
PLOTTED: OCTOBER 27, 2006	

Appendix E Geotechnical Report  
March 29, 2018

## **Appendix E GEOTECHNICAL REPORT**

**Geotechnical  
Engineering**

**Environmental  
Engineering**

**Hydrogeology**

**Geological  
Engineering**

**Materials Testing**

**Building Science**

**Archaeological Services**

**paterson**group

**Geotechnical Investigation**

Proposed Multi-Storey Building  
851 Richmond Road - Ottawa

Prepared For

Homestead Land Holdings Ltd.

**Paterson Group Inc.**

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October 3, 2017

Report: PG4163-1 Revision 1

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## **Appendices**

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  - Symbols and Terms
  - Analytical Testing Results
- Appendix 2 Figure 1 - Key Plan
  - Figures 2 and 3 - Seismic Shear Wave Velocity Profiles
  - Drawing PG4163-1 - Test Hole Location Plan

## **1.0 Introduction**

Paterson Group (Paterson) was commissioned by Homestead Land Holdings Ltd. (Homestead) to conduct a geotechnical investigation for the proposed multi-storey building to be located at 851 Richmond Road in the City of Ottawa (refer to Figure 1 - Key Plan presented in Appendix 2).

The objective of the investigation was to:

- ☐ Determine the subsoil and groundwater conditions at this site by means of boreholes.
- ☐ Provide geotechnical recommendations for the design of the proposed development including construction considerations which may affect its design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

Investigating the presence or potential presence of contamination on the subject property was not part of the scope of work of this present investigation. A report addressing environmental issues for the subject site was prepared under separate cover.

## **2.0 Proposed Project**

It is our understanding that the proposed project consists of a multi-storey building with two underground parking levels encompassing the majority of the subject site.

## **3.0 Method of Investigation**

### **3.1 Field Investigation**

The field program for our geotechnical investigation was carried out on June 1, 2017. At that time, a total of six (6) boreholes were advanced to a maximum depth of 7.0 m. The borehole locations were determined in the field by Paterson personnel taking into consideration site features and underground services. The locations of the boreholes are shown on Drawing PG4163-1 - Test Hole Location Plan included in Appendix 2.

The boreholes were put down using a track-mounted auger drill rig operated by a two person crew. All fieldwork was conducted under the full-time supervision of personnel from Paterson's geotechnical division under the direction of a senior engineer. The testing procedure consisted of augering and rock coring to the required depths and at the selected locations and sampling the overburden.

#### **Sampling and In Situ Testing**

Soil samples were collected from the boreholes using two different techniques, namely, sampled directly from the auger flights (AU) or collected using a 50 mm diameter split-spoon (SS) sampler. Rock cores (RC) were obtained using 47.6 mm inside diameter coring equipment. All samples were visually inspected and initially classified on site. The auger and split-spoon samples were placed in sealed plastic bags, and rock cores were placed in cardboard boxes. All samples were transported to our laboratory for further examination and classification. The depths at which the auger, split spoon and rock core samples were recovered from the boreholes are shown as AU, SS and RC, respectively, on the Soil Profile and Test Data sheets presented in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples. The SPT results are recorded as "N" values on the Soil Profile and Test Data sheets. The "N" value is the number of blows required to drive the split-spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

The recovery value and a Rock Quality Designation (RQD) value were calculated for each drilled section of bedrock and are presented on the borehole logs. The recovery value is the length of the bedrock sample recovered over the length of the drilled section. The RQD value is the total length of intact rock pieces longer than 100 mm over the length of the core run. The values indicate the bedrock quality.

The subsurface conditions observed in the boreholes were recorded in detail in the field. The soil profiles are presented on the Soil Profile and Test Data sheets in Appendix 1 of this report.

### **Groundwater**

Monitoring wells and flexible standpipes were installed in the boreholes to permit monitoring of the groundwater levels subsequent to the completion of the sampling program.

### **Sample Storage**

All samples will be stored in the laboratory for a period of one month after issuance of this report. They will then be discarded unless we are otherwise directed.

## **3.2 Field Survey**

The borehole locations were determined by Paterson personnel taking into consideration the presence of underground and aboveground services. The location and ground surface elevation at each borehole location was surveyed by Paterson personnel. The ground surface elevation at the borehole locations were surveyed with respect to a temporary benchmark (TBM), consisting of the top of catch basin located within the northeast corner the existing site. A geodetic elevation of 65.24 m was provided for the TBM by Homestead. The borehole locations and ground surface elevation at each borehole location are presented on Drawing PG4163-1 - Test Hole Location Plan in Appendix 2.

## **3.3 Laboratory Testing**

The soil samples and rock cores recovered from the subject site were examined in our laboratory to review the results of the field logging.

## **4.0 Observations**

### **4.1 Surface Conditions**

The subject site is currently occupied by at-grade parking for the adjacent multi-storey residential building to the west. The site is bordered to the north by an easement, which contains a large diameter watermain, followed by residential buildings, to the south by Richmond Road and to the east by at grade parking area. The ground surface across the site is relatively flat and at grade with the neighbouring properties.

### **4.2 Subsurface Profile**

Generally, the subsurface profile encountered at the borehole locations consists of 60 to 100 mm thickness of asphalt overlying a granular layer, consisting of crushed stone with silt and sand with maximum thickness of 230 mm. The pavement structure lies atop a fill layer, consisting of loose to compact, brown to grey sand and gravel with trace to some silt and clay which extends to a depth of approximately 1.5 to 2.5 m. A native glacial till deposit was encountered underlying the abovenoted fill layers followed by a grey limestone bedrock. Generally, the bedrock quality consists of poor quality within the upper 0.5 to 1 m and fair to excellent quality at depth based on the RQD values. The upper portion of the bedrock was noted to consist of a weathered, poor quality bedrock. Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific details of the soil profiles encountered at each test hole location.

Based on available geological mapping, the bedrock in this area mostly consists of limestone with some shaly partings of the Ottawa formation with an overburden drift thickness of less than 5 m depth.

### **4.3 Groundwater**

The measured groundwater levels in the monitoring wells and piezometers at the borehole locations are presented in Table 1. It should be further noted that the groundwater level could vary at the time of construction.

<b>Table 1 - Summary of Groundwater Level Readings</b>				
<b>Test Hole Number</b>	<b>Ground Elevation (m)</b>	<b>Groundwater Levels (m)</b>		<b>Recording Date</b>
		<b>Depth</b>	<b>Elevation</b>	
BH 1	66.03	2.93	63.10	June 8, 2017
BH 2	65.69	2.31	63.38	June 8, 2017
BH 3	65.44	3.72	61.72	June 8, 2017
BH 4	66.05	2.19	63.86	June 8, 2017
BH 5	65.79	3.20	62.59	June 8, 2017
BH 6	65.56	3.35	62.21	June 8, 2017

## **5.0 Discussion**

### **5.1 Geotechnical Assessment**

From a geotechnical perspective, the subject site is adequate for the proposed multi-storey building. The proposed building is expected to be founded on conventional footings placed on clean, surface sounded bedrock.

Bedrock removal will be required to complete the two (2) levels of underground parking. Line drilling and controlled blasting where large quantities of bedrock need to be removed is recommended. The blasting operations should be planned and completed under the guidance of a professional engineer with experience in blasting operations.

An alignment of a large diameter watermain runs within an easement along the north property boundary of the subject site. It is expected that the adjacent watermain could be subjected to potential vibrations associated with the bedrock blasting program. To ensure that no detrimental vibrations cause damage to the adjacent watermain, a vibration attenuation trench is recommended for the bedrock along the north excavation face, as well as a vibration monitoring and control program during the blasting and excavation work required for the proposed building excavation.

The above and other considerations are further discussed in the following sections.

### **5.2 Site Grading and Preparation**

#### **Stripping Depth**

Due to the relatively shallow bedrock depth at the subject site and the anticipated founding level for the proposed building, all existing overburden material will be excavated from within the proposed building footprint. Bedrock removal will be required for the construction of the parking garage levels.

#### **Bedrock Removal**

Based on the bedrock encountered in the area, it is expected that line-drilling in conjunction with hoe-ramming or controlled blasting will be required to remove the bedrock. In areas of weathered bedrock and where only a small quantity of bedrock is to be removed, bedrock removal may be possible by hoe-ramming.

Prior to considering blasting operations, the effects on the existing services, buildings and other structures should be addressed. A pre-blast or construction survey located in proximity of the blasting operations should be conducted prior to commencing construction. The extent of the survey should be determined by the blasting consultant and sufficient to respond to any inquiries/claims related to the blasting operations.

As a general guideline, peak particle velocity (measured at the structures) should not exceed 25 mm/s during the blasting program to reduce the risks of damage to the existing structures.

The blasting operations should be planned and conducted under the supervision of a licensed professional engineer who is an experienced blasting consultant.

Excavation side slopes in sound bedrock could be completed with almost vertical side walls. Where bedrock is of lower quality, the excavation face should be free of any loose rock. An area specific review should be completed by the geotechnical consultant at the time of construction to determine if rock bolting or other remedial measures are required to provide a safe excavation face for areas where low quality bedrock is encountered.

A vibration attenuation trench is recommended to be completed within the bedrock along the north property boundary. The construction of the vibration attenuation trench would require line drilling in a tight pattern on both sides of the proposed 1 m wide trench alignment and within the interior portion of the trench to the design underside of footing elevation. A hoe ram operation would be used to break up the bedrock and remove it from the trench. It is expected that the coreholes for the bedrock blasting program may not be possible within 1 to 2 m of the attenuation trench due to the presence of the drilled holes within the attenuation trench, which can cause an energy loss and blow-out during blasting if connected to the blast source by potential fractures within the bedrock. Therefore, a hoe ramming operation will most likely be required to complete the bedrock removal within the area adjacent to the attenuation trench.

### **Vibration Considerations**

Construction operations could cause vibrations, and possibly, sources of nuisance to the community. Therefore, means to reduce the vibration levels as much as possible should be incorporated in the construction operations to maintain a cooperative environment with the residents.

The following construction equipments could cause vibrations: piling equipment, hoe ram, compactor, dozer, crane, truck traffic, etc. The construction of the shoring system with soldier piles or sheet piling will require these pieces of equipments. Vibrations, caused by blasting or construction operations could cause detrimental vibrations on the adjoining buildings and structures. Therefore, it is recommended that all vibrations be limited.

Two parameters determine the recommended vibration limit, the maximum peak particle velocity and the frequency. For low frequency vibrations, the maximum allowable peak particle velocity is less than that for high frequency vibrations. As a guideline, the peak particle velocity should be less than 15 mm/s between frequencies of 4 to 12 Hz, and 50 mm/s above a frequency of 40 Hz (interpolate between 12 and 40 Hz). These guidelines are for current construction standards. These guidelines are above perceptible human level and, in some cases, could be very disturbing to some people, a pre-construction survey is recommended to minimize the risks of claims during or following the construction of the proposed building.

### **Vibration Monitoring and Control Plan**

To ensure that no disturbance to the existing watermain occurs, a vibration monitoring and control plan (VMCP) is recommended during the excavation program. The purpose of the vibration monitoring and control plan is to provide measures to be implemented by the contractor to manage excavation operations and any other vibration sources during the construction for the proposed development. The VMCP will also provide a guideline for assessing results against the relevant vibration impact assessment criteria and recommendations to meet the required limits.

The monitoring program will incorporate real time results at the existing watermain segment adjacent to the subject site. The monitoring equipment should consist of a tri-axial seismograph, capable of measuring vibration intensities up to 254 mm/s at a frequency response of 2 to 250 Hz. At least two vibration monitoring devices should be placed adjacent to the existing watermain. It is recommended that the vibration monitoring devices be installed at invert level of the existing watermain and periodically inspected during the construction program.

A copy of the geotechnical report, which includes the VMCP should be provided to all parties involved with the construction for review. A meeting between Paterson and site contractor should be conducted prior to any excavation or construction of the subject site to review the following:

- ☐ Review the pre-condition/pre-construction survey;
- ☐ Control measures (i.e vibrations, noise);
- ☐ Monitoring locations;
- ☐ Tracking and reporting of excavation progress, and;
- ☐ Review procedure for exceedances (i.e vibrations, noise), complaints, evaluation and corrective measures.

When an event is triggered, Paterson will review the results and provide any necessary feedback. Otherwise, the vibration results will be summarized in the weekly report. The following table outlines the vibration limits for the adjacent watermain segment.

<b>Table 2 - Structure Vibration Limits for adjacent Watermain Segment</b>			
<b>Dominant Frequency Range (Hz)</b>	<b>Peak Particle Velocity (mm/s)</b>	<b>Event</b>	<b>Description of Event</b>
<10	all	none	no action required
<40	>10	trigger level	Warning e-mail sent to contractor.
<40	≥ 15	exceedance level	Exceedance e-mail and phone call to the contractor. All operations are ceased to review on-site activities.
>40	>15	trigger level	Warning e-mail sent to contractor.
>40	≥ 20	exceedance level	Exceedance e-mail and phone call to the contractor. All operations are ceased to review on-site activities.

The monitoring protocol should include the following information:

**Trigger Level Event**

- ☐ Paterson will review all vibrations over the established warning level, and;
- ☐ Paterson will notify the contractor if any vibration occur due to construction activities and are close to exceedance level.

**Exceedance Level Event**

- ☐ Paterson will notify all the relevant stakeholders via email;
- ☐ Ensure monitors are functioning, and;
- ☐ Issue the vibration exceedance result.

**Fill Placement**

Fill used for grading beneath the building areas should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the proposed building areas should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil can be used as general landscaping fill and beneath parking areas where settlement of the ground surface is of minor concern. In landscaped areas, these materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If these materials are to be used to build up the subgrade level for areas to be paved, they should be compacted in thin lifts to a minimum density of 95% of their respective SPMDD. Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls unless a composite drainage blanket connected to a perimeter drainage system is provided.

## 5.3 Foundation Design

### Bearing Resistance Values

Footings placed on a clean, surface sounded limestone bedrock surface can be designed using a factored bearing resistance value at ultimate limit states (ULS) of **2,500 kPa** incorporating a geotechnical resistance factor of 0.5.

A clean, surface-sounded bedrock bearing surface should be free of loose materials, and have no near surface seams, voids, fissures or open joints which can be detected from surface sounding with a rock hammer.

### Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to a sound bedrock bearing medium when a plane extending down and out from the bottom edge of the footing at a minimum of 1H:6V (or flatter) passes only through sound bedrock or a material of the same or higher capacity as the bedrock, such as concrete. A weathered bedrock bearing medium will require a lateral support zone of 1H:1V (or flatter).

### Settlement

Footings bearing on an acceptable bedrock bearing surface and designed for the bearing resistance values provided herein will be subjected to negligible potential post-construction total and differential settlements.

## 5.4 Design for Earthquakes

A site specific shear wave velocity test was completed by Paterson to accurately determine the applicable seismic site classification for foundation design of the proposed building as presented in Table 4.1.8.4.A of the Ontario Building Code 2012. Two (2) shear wave velocity profiles from our on-site testing are presented in Appendix 2.

### Field Program

The location of the seismic array was chosen to provide adequate coverage of the area. The seismic array testing location is presented in Drawing PG4163-1 - Test Hole Location Plan in Appendix 2.

At the seismic array location, Paterson field personnel placed 18 horizontal 4.5 Hz. geophones mounted to the surface by means of two 75 mm ground spikes attached to the geophone land case. The geophones were spaced at 2 m intervals and connected by a geophone spread cable to a Geode 24 Channel seismograph.

The seismograph was connected to a computer laptop and a hammer trigger switch attached to a 12 pound dead blow hammer. The hammer trigger switch sends a start signal to the seismograph. The hammer is used to strike an I-Beam seated into the ground surface, which creates a polarized shear wave. The hammer shots are repeated between five to ten times at each shot location to improve signal to noise ratio. The shot locations are also completed in forward and reverse directions (i.e.-striking both sides of the I-Beam seated parallel to the geophone array). The shot locations are located at 3, 4.5 and 13.5 m away from the first, 3, 4.5, and 14 m away from the last geophone, and at the center of the seismic array.

The methods of testing completed by Paterson are guided by the standard testing procedures used by the expert seismologists at Carleton University and Geological Survey of Canada (GSC).

### **Data Processing and Interpretation**

Interpretation for the shear wave velocity results were completed by Paterson personnel. Shear wave velocity measurement was made using reflection/refraction methods. The interpretation is performed by recovering arrival times from direct and refracted waves. The interpretation is repeated at each shot location to provide an average shear wave velocity,  $V_{s_{30}}$ , of the upper 30 m profile, immediately below the building's foundation.

Based on the test results, the average overburden seismic shear wave velocity is 248 m/s. Through interpretation, the bedrock has a shear wave velocity of 2,256 m/s. The  $V_{s_{30}}$  was calculated using the standard equation for average shear wave velocity from the Ontario Building Code (OBC) 2012.

The  $V_{s_{30}}$  was calculated using the standard equation for average shear wave velocity calculation from the Ontario Building Code (OBC) 2012, as presented below.

$$V_{s30} = \frac{Depth_{OfInterest}(m)}{\sum \left( \frac{Depth_i(m)}{Vs_i(m/s)} \right)}$$

$$V_{s30} = \frac{30m}{\left( \frac{0.0m}{248m/s} + \frac{30.0m}{2,256m/s} \right)}$$

$$V_{s30} = 2,256m/s$$

Based on the results of the seismic testing, the average shear wave velocity,  $V_{s30}$ , beneath the foundation is 2,256 m/s. Therefore, a **Site Class A** is applicable for design of the proposed buildings, as per Table 4.1.8.4.A of the OBC 2012. The soils underlying the subject site are not susceptible to liquefaction.

## 5.5 Basement Slab

All overburden soil will be removed for the proposed building and the basement floor slab will be founded on a bedrock medium. OPSS Granular A or Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab. It is recommended that the upper 200 mm of sub-slab fill consists of a 19 mm clear crushed stone.

In consideration of the groundwater conditions encountered during the investigation, a subfloor drainage system, consisting of lines of perforated drainage pipe subdrains connected to a positive outlet, should be provided in the clear stone backfill under the lower basement floor.

## 5.6 Basement Wall

It is expected that a portion of the basement walls are to be poured against a composite drainage blanket, which will be placed against the exposed bedrock face. A nominal coefficient of at-rest earth pressure of 0.05 is recommended in conjunction with a dry unit weight of 23.5 kN/m<sup>3</sup> (effective unit weight of 15.5 kN/m<sup>3</sup>). A seismic earth pressure component will not be applicable for the foundation wall, which is to be poured against the bedrock face. It is expected that the seismic earth pressure will be transferred to the underground floor slabs, which should be designed to accommodate these pressures. A hydrostatic groundwater pressure should be added for the portion below the groundwater level.

Undrained conditions are anticipated (i.e. below the groundwater level). Therefore, the applicable effective unit weight of the retained soil should be  $13 \text{ kN/m}^3$ , where applicable. A hydrostatic pressure should be added to the total static earth pressure when calculating the effective unit weight.

Two distinct conditions, static and seismic, should be reviewed for design calculations. The parameters for design calculations for the two conditions are presented below.

### **Static Conditions**

The static horizontal earth pressure ( $p_o$ ) could be calculated with a triangular earth pressure distribution equal to  $K_o \cdot \gamma \cdot H$  where:

$K_o$  = at-rest earth pressure coefficient of the applicable retained soil, 0.5

$\gamma$  = unit weight of fill of the applicable retained soil ( $\text{kN/m}^3$ )

$H$  = height of the wall (m)

An additional pressure with a magnitude equal to  $K_o \cdot q$  and acting on the entire height of the wall should be added to the above diagram for any surcharge loading,  $q$  (kPa), that may be placed at ground surface adjacent to the wall. The surcharge pressure will only be applicable for static analyses and should not be used in conjunction with the seismic loading case.

Actual earth pressures could be higher than the “at-rest” case if care is not exercised during the compaction of the backfill materials to maintain a minimum separation of 0.3 m from the walls with the compaction equipment.

### **Seismic Conditions**

The total seismic force ( $P_{AE}$ ) includes both the earth force component ( $P_o$ ) and the seismic component ( $\Delta P_{AE}$ ).

The seismic earth force ( $\Delta P_{AE}$ ) could be calculated using  $0.375 \cdot a_c \cdot \gamma \cdot H^2/g$  where:

$a_c = (1.45 - a_{\max}/g) a_{\max}$

$\gamma$  = unit weight of fill of the applicable retained soil ( $\text{kN/m}^3$ )

$H$  = height of the wall (m)

$g$  = gravity,  $9.81 \text{ m/s}^2$

The peak ground acceleration, ( $a_{max}$ ), for the Ottawa area is 0.32g according to OBC 2012. The vertical seismic coefficient is assumed to be zero.

The earth force component ( $P_o$ ) under seismic conditions could be calculated using  $P_o = 0.5 K_o \gamma H^2$ , where  $K_o = 0.5$  for the soil conditions presented above.

The total earth force ( $P_{AE}$ ) is considered to act at a height,  $h$  (m), from the base of the wall, where:

$$h = \{P_o \cdot (H/3) + \Delta P_{AE} \cdot (0.6 \cdot H)\} / P_{AE}$$

The earth forces calculated are unfactored. For the ULS case, the earth loads should be factored as live loads, as per OBC 2012.

## 5.7 Pavement Structure

For design purposes, the pavement structure presented in the following tables could be used for the design of car parking areas and access lanes.

<b>Table 3 - Recommended Pavement Structure - Car Only Parking Areas</b>	
<b>Thickness (mm)</b>	<b>Material Description</b>
50	<b>Wear Course</b> - HL 3 or Superpave 12.5 Asphaltic Concrete
150	<b>BASE</b> - OPSS Granular A Crushed Stone
300	<b>SUBBASE</b> - OPSS Granular B Type II
<b>SUBGRADE</b> - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill	

<b>Table 4 - Recommended Pavement Structure - Access Lanes</b>	
<b>Thickness (mm)</b>	<b>Material Description</b>
40	<b>Wear Course</b> - HL3 or Superpave 12.5 Asphaltic Concrete
50	<b>Binder Course</b> - HL8 or Superpave 19.0 Asphaltic Concrete
150	<b>BASE</b> - OPSS Granular A Crushed Stone
400	<b>SUBBASE</b> - OPSS Granular B Type II
<b>SUBGRADE</b> - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated to a competent layer and replaced with OPSS Granular B Type II material. Weak subgrade conditions may be experienced over service trench fill materials. This may require the use of a geotextile, such as Terratrack 200 or equivalent, thicker subbase or other measures that can be recommended at the time of construction as part of the field observation program.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment, noting that excessive compaction can result in subgrade softening.

## **6.0 Design and Construction Precautions**

### **6.1 Foundation Drainage and Backfill**

#### **Foundation Drainage**

It is recommended that a perimeter foundation drainage system be provided for the proposed structures. It is expected that insufficient room is available for exterior backfill. It is suggested that this system could be as follows:

- ☐ Bedrock vertical surface (Hoe ram any irregularities and prepare bedrock surface. Shotcrete areas to fill in cavities and smooth out angular features at the bedrock surface);
- ☐ composite drainage layer

It is recommended that the composite drainage system (such as Miradrain G100N, Delta Drain 6000 or equivalent) extend down to the footing level. It is recommended that 150 mm diameter sleeves at 3 m centres be cast in the footing or at the foundation wall/footing interface to allow the infiltration of water to flow to the interior perimeter drainage pipe. The perimeter drainage pipe and underfloor drainage system should direct water to sump pit(s) within the lower basement area.

#### **Underfloor Drainage**

It is anticipated that underfloor drainage will be required to control water infiltration. For preliminary design purposes, we recommend that 100 or 150 mm in perforated pipes be placed at 6 m centres. The spacing of the underfloor drainage system should be confirmed at the time of completing the excavation when water infiltration can be better assessed.

#### **Foundation Backfill**

Above the bedrock surface, backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a drainage geocomposite, such as Miradrain G100N or Delta Drain 6000, connected to the perimeter foundation drainage system. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

## **6.2 Protection Against Frost Action**

Perimeter footings of heated structures are required to be insulated against the deleterious effect of frost action. A minimum 1.5 m thick soil cover (or equivalent) should be provided in this regard.

A minimum of 2.1 m thick soil cover (or equivalent) should be provided for other exterior unheated footings.

## **6.3 Excavation Side Slopes**

### **Unsupported Excavations**

The side slopes of excavations in the soil and fill overburden materials should be either cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is assumed that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsoil at this site is considered to be mainly Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by "cut and cover" methods and excavations will not be left open for extended periods of time.

## Temporary Shoring

The design and approval of the shoring system will be the responsibility of the shoring contractor and the shoring designer hired by the shoring contractor. It is the responsibility of the shoring contractor to ensure that the temporary shoring is in compliance with safety requirements, designed to avoid any damage to adjacent structures and include dewatering control measures. In the event that subsurface conditions differ from the approved design during the actual installation, it is the responsibility of the shoring contractor to commission the required experts to re-assess the design and implement the required changes. Furthermore, the design of the temporary shoring system should take into consideration, a full hydrostatic condition which can occur during significant precipitation events.

The temporary system could consist of soldier pile and lagging system or interlocking steel sheet piling. Any additional loading due to street traffic, construction equipment, adjacent structures and facilities, etc., should be included to the earth pressures described below. These systems could be cantilevered, anchored or braced. Generally, the shoring systems should be provided with tie-back rock anchors to ensure the stability. The shoring system is recommended to be adequately supported to resist toe failure, if required, by means of rock bolts or extending the piles into the bedrock through pre-augered holes if a soldier pile and lagging system is the preferred method.

The earth pressures acting on the shoring system may be calculated with the following parameters.

<b>Table 5 - Soil Parameters</b>	
<b>Parameters</b>	<b>Values</b>
Active Earth Pressure Coefficient ( $K_a$ )	0.33
Passive Earth Pressure Coefficient ( $K_p$ )	3
At-Rest Earth Pressure Coefficient ( $K_o$ )	0.5
Dry Unit Weight ( $\gamma$ ), kN/m <sup>3</sup>	20
Effective Unit Weight ( $\gamma$ ), kN/m <sup>3</sup>	13

The active earth pressure should be calculated where wall movements are permissible while the at-rest pressure should be calculated if no movement is permissible. The dry unit weight should be calculated above the groundwater level while the effective unit weight should be calculated below the groundwater level.

The hydrostatic groundwater pressure should be included to the earth pressure distribution wherever the effective unit weight are calculated for earth pressures. If the groundwater level is lowered, the dry unit weight for the soil/bedrock should be calculated full weight, with no hydrostatic groundwater pressure component.

For design purposes, the minimum factor of safety of 1.5 should be calculated.

## **6.4 Pipe Bedding and Backfill**

A minimum of 300 mm of OPSS Granular A should be placed for bedding for sewer or water pipes when placed on bedrock subgrade. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to a minimum of 300 mm above the pipe obvert should consist of OPSS Granular A (concrete or PSM PVC pipes) or sand (concrete pipe). The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to a minimum of 95% of the SPMDD.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to reduce the potential differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the SPMDD.

## **6.5 Groundwater Control**

### **Groundwater Control for Building Construction**

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

Infiltration levels are anticipated to be low through the excavation face. The groundwater infiltration will be controllable with open sumps and pumps.

A temporary MOE permit to take water (PTTW) will be required for this project if more than 50,000 L/day are to be pumped during the construction phase. A minimum of four to five months should be allocated for completion of the application and issuance of the permit by the MOE.

## **Long-term Groundwater Control**

Our recommendations for the proposed building's long-term groundwater control are presented in Subsection 6.1. Any groundwater encountered along the building's perimeter or sub-slab drainage system will be directed to the proposed building's cistern/sump pit. Provided the proposed groundwater infiltration control system is properly implemented and approved by the geotechnical consultant at the time of construction, it is expected that groundwater flow will be low (i.e.- less than 50,000 L/day) with peak periods noted after rain events. A more accurate estimate can be provided at the time of construction, once groundwater infiltration levels are observed. It is anticipated that the groundwater flow will be controllable using conventional open sumps.

## **Impacts on Neighbouring Structures**

Based on our observations, a local groundwater lowering is anticipated under short-term conditions due to construction of the proposed building. It should be noted that the extent of any significant groundwater lowering will take place within a limited range of the subject site due to the minimal temporary groundwater lowering.

The neighbouring structures are expected to be founded within native glacial till and/or directly over a bedrock bearing surface. No issues are expected with respect to groundwater lowering that would cause long term damage to adjacent structures surrounding the proposed building.

## **6.6 Winter Construction**

Precautions must be taken if winter construction is considered for this project.

Where excavations are completed in proximity of existing structures which may be adversely affected due to the freezing conditions. In particular, where a shoring system is constructed, the soil behind the shoring system will be subjected to freezing conditions and could result in heaving of the structure(s) placed within or above frozen soil. Provisions should be made in the contract document to protect the walls of the excavations from freezing, if applicable.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the installation of straw, propane heaters and tarpaulins or other suitable means. The base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

Trench excavations and pavement construction are difficult activities to complete during freezing conditions without introducing frost in the subgrade or in the excavation walls and bottoms. Precautions should be considered if such activities are to be completed during freezing conditions. Additional information could be provided, if required.

## **6.7 Corrosion Potential and Sulphate**

The results of the analytical testing show that the sulphate content is less than 0.1%. This result indicates that Type 10 Portland cement (normal cement) would be appropriate for this site. The chloride content and pH of the samples indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of an aggressive corrosive environment.

## 7.0 Recommendations

It is recommended that the following be carried out once the master plan and site development are determined:

- ☐ Review master grading plan from a geotechnical perspective, once available.
- ☐ Observation of all bearing surfaces prior to the placement of concrete.
- ☐ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ☐ Observation of all subgrades prior to placement of backfilling materials.
- ☐ Field density tests to determine the level of compaction achieved.
- ☐ Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon request, following the completion of a satisfactory material testing and observation program by the geotechnical consultant.

## 8.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. We request permission to review the grading plan once available. Also, our recommendations should be reviewed when the drawings and specifications are complete.

The client should be aware that any information pertaining to soils and all test hole logs are furnished as a matter of general information only and test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the test holes.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, we request that we be notified immediately in order to permit reassessment of our recommendations.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Homestead Land Developments or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

**Paterson Group Inc.**

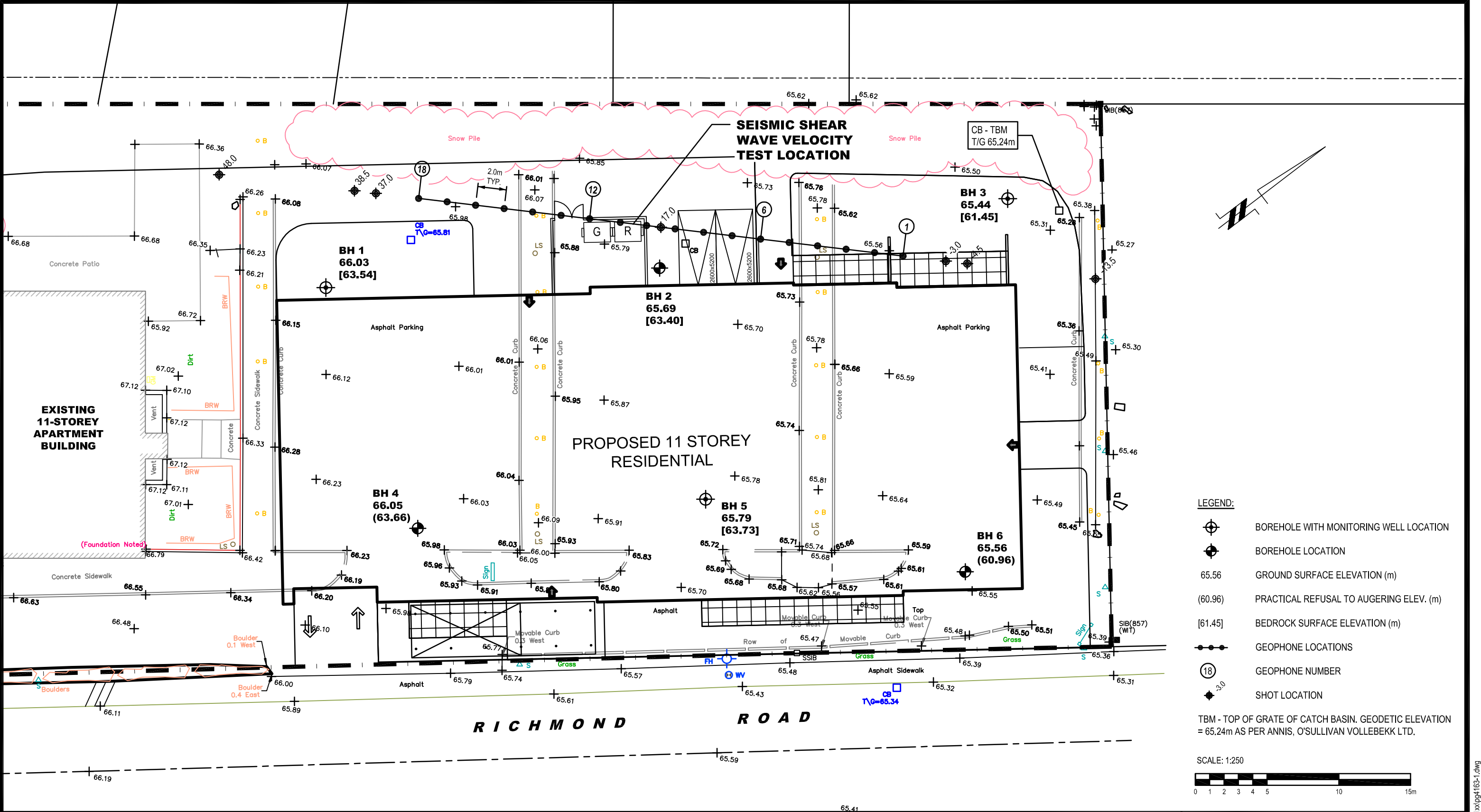
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### Report Distribution:

- ☐ Homestead Land Holdings Ltd. (3 copies)
- ☐ Paterson Group (1 copy)



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HOMESTEAD LAND HOLDINGS  
GEOTECHNICAL INVESTIGATION  
PROP. MULTI-STOREY BUILDING - 851 RICHMOND ROAD

OTTAWA,  
Title:

ONTARIO

TEST HOLE LOCATION PLAN

Scale:	1:250	Date:	06/2017
Drawn by:	MPG	Report No.:	PG4163-1
Checked by:	NC	Dwg. No.:	PG4163-1
Approved by:	DJG	Revision No.:	0

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## **Appendix F CITY OF OTTAWA SERVICING STUDY CHECKLIST**



## Development Servicing Study Checklist

Job#: 160401329

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Executive Summary (for larger reports only).	N/A	-	Introduction
Date and revision number of the report.	Y	-	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y	1.0	
Plan showing the site and location of all existing services.	Y		Existing Conditions Plan
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.	Y		Appendix B
Summary of Pre-consultation Meetings with City and other approval agencies.	N/A		
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.	N/A		
Statement of objectives and servicing criteria.	Y		In each section
Identification of existing and proposed infrastructure available in the immediate area.	Y		In each section
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A		
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	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.	N/A		
Proposed phasing of the development, if applicable.	N/A		
Reference to geotechnical studies and recommendations concerning servicing.		9.0	Report and Appendix
All preliminary and formal site plan submissions should have the following information:			
Metric scale	Y		Appendix G Drawings
North arrow (including construction North)	N/A		Appendix G Drawings
Key plan	Y		Appendix G Drawings
Name and contact information of applicant and property owner	Y		Appendix G Drawings
Property limits including bearings and dimensions	Y		Appendix G Drawings
Existing and proposed structures and parking areas	Y		Appendix G Drawings
Easements, road widening and rights-of-way	Y		Appendix G Drawings
Adjacent street names	Y		Appendix G Drawings
4.2 Water	Addressed (Y/N/NA)	Section	Comments
Confirm consistency with Master Servicing Study, if available	N/A	3.0	
Availability of public infrastructure to service proposed development	Y	3.0	
Identification of system constraints	Y	3.0	
Identify boundary conditions	Y	3.0	
Confirmation of adequate domestic supply and pressure	Y	3.0	

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.		3.0	Appendix A
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.	Y	3.0	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	N/A		
Address reliability requirements such as appropriate location of shut-off valves	N/A		
Check on the necessity of a pressure zone boundary modification.	N/A		
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range		3.0	
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.	Y	3.0	
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.	Y	3.0	
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	3.0	
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A		
<b>4.3 Wastewater</b>	<b>Addressed (Y/N/NA)</b>	<b>Section</b>	<b>Comments</b>
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).	Y	4.0	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A		
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.	Y	4.0	
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)	Y	4.0	Appendix C
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Y	4.0	Appendix C
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	4.0	
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		
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A		

Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A		
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A		
Special considerations such as contamination, corrosive environment etc.	N		
<b>4.4 Stormwater</b>	<b>Addressed (Y/N/NA)</b>	<b>Section</b>	<b>Comments</b>
Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Y	5.0	
Analysis of available capacity in existing public infrastructure.	N		
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Y		Existing Conditions Plan
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.	Y	5.0	Appendix D
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Y	5.0	Appendix D
Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Y	5.0	Appendix D
Set-back from private sewage disposal systems.	N/A		
Watercourse and hazard lands setbacks.	N/A		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N		
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A		
Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Y	5.0	Appendix D
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		
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.	Y	5.0	Appendix D
Any proposed diversion of drainage catchment areas from one outlet to another.	N/A		
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	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.	N/A		
Identification of potential impacts to receiving watercourses	N/A		
Identification of municipal drains and related approval requirements.	N/A		
Descriptions of how the conveyance and storage capacity will be achieved for the development.	Y	5.0	Appendix D
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N		
Inclusion of hydraulic analysis including hydraulic grade line elevations.	N		

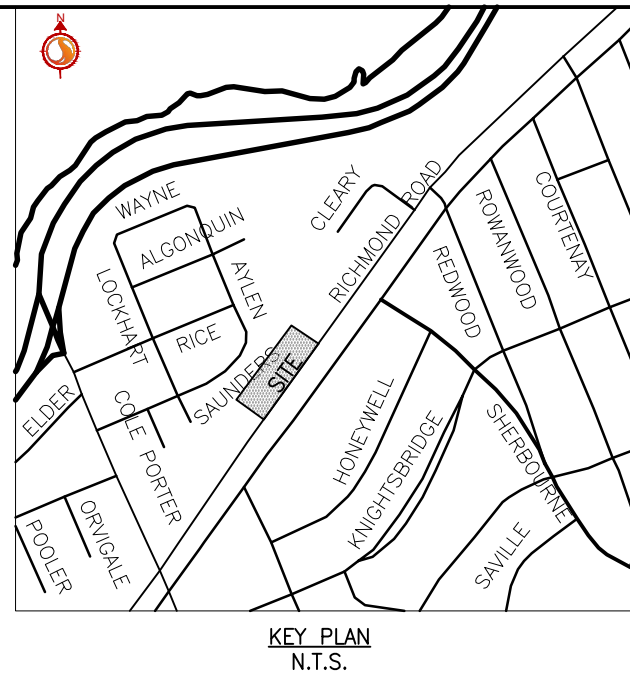
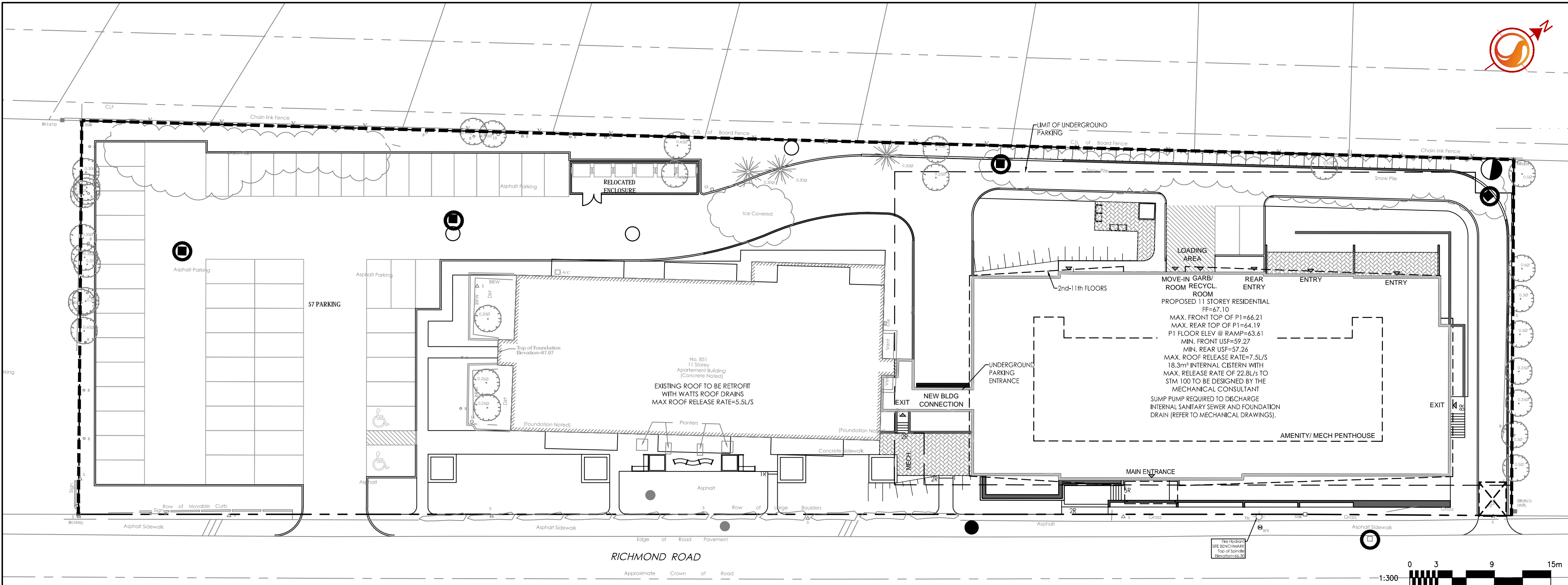
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	5.0	
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A		
Identification of fill constraints related to floodplain and geotechnical investigation.	N/A		
<b>4.5 Approval and Permit Requirements</b>	<b>Addressed (Y/N/NA)</b>	<b>Section</b>	<b>Comments</b>
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.	N/A		
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A		
Changes to Municipal Drains.	N/A		
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A		
<b>4.6 Conclusion</b>	<b>Addressed (Y/N/NA)</b>	<b>Section</b>	<b>Comments</b>
Clearly stated conclusions and recommendations	Y	10.0	
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	Y		Comment Response Letter Included Appendix H
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	Y		

Appendix G Drawings  
March 29, 2018

## **Appendix G DRAWINGS**

\\C:\12184\07\01-40A\active\160401329\_851\_Richmond Road design\drawing\160401329-038.dwg  
2/18/2013 2:12:56 PM By: j.dillon, Warren

ORIGINAL SHEET - ARCH 0



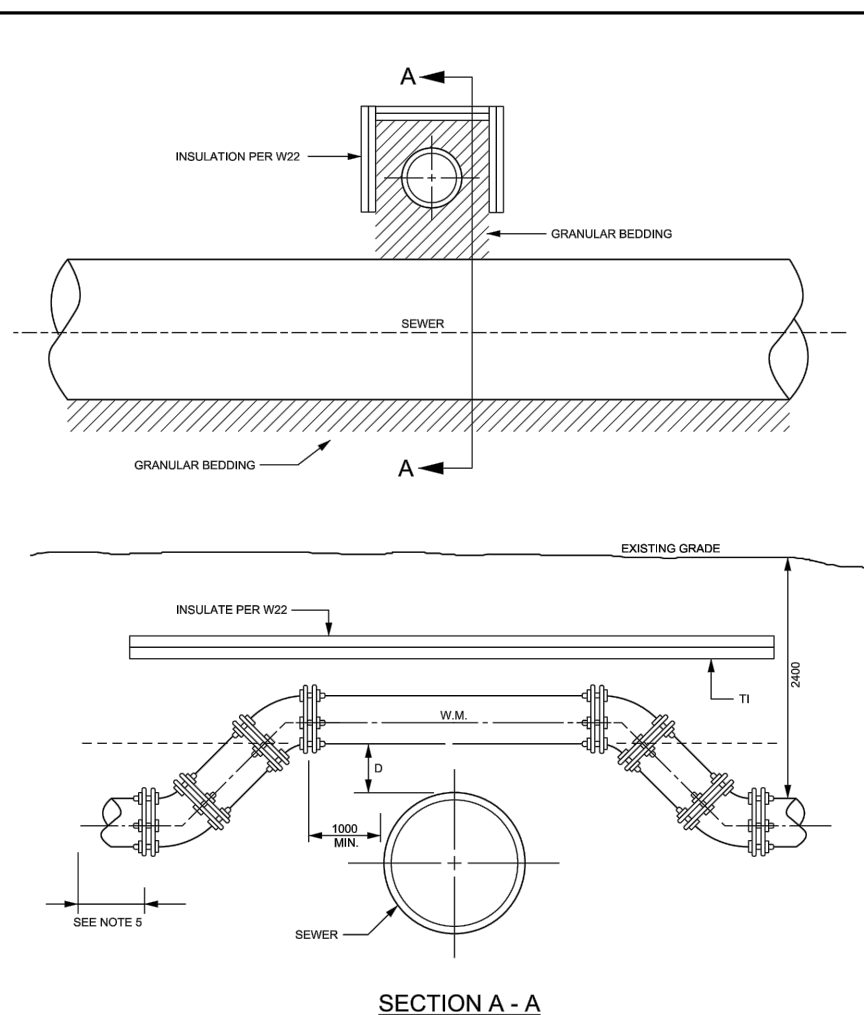
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- Legend
- PROPOSED CATCH-BASIN PROTECTION
  - PROPOSED SILT FENCE BOUNDARY AS PER OPSD 219.110
  - PROPOSED MUD MAT LOCATION

Notes  
Best Management Practices  
CONTRACTOR TO PROVIDE EROSION AND SEDIMENT CONTROLS (BEST MANAGEMENT PRACTICES) DURING CONSTRUCTION OF THIS PROJECT.

EROSION MUST BE MINIMIZED AND SEDIMENTS MUST BE REMOVED FROM CONSTRUCTION SITE RUN-OFF IN ORDER TO PROTECT DOWNSTREAM AREAS. DURING ALL CONSTRUCTION, EROSION AND SEDIMENTATION SHOULD BE CONTROLLED BY THE FOLLOWING TECHNIQUES:

- LIMIT THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
- REVEGETATE EXPOSED AREAS AND SLOPES AS SOON AS POSSIBLE.
- PROTECT EXPOSED SLOPES WITH PLASTIC OR SYNTHETIC MULCHES.
- INSTALL CATCH BASIN INSERTS OR EQUIVALENT IN ALL PROPOSED CATCH BASINS AND CATCH BASIN MANHOLES AND IN ALL EXISTING CATCH BASINS THAT WILL RECEIVE RUN-OFF FROM THE SITE.
- A SILT FENCE SHALL BE INSTALLED AROUND THE PERIMETER OF ALL AND ANY STOCKPILES OF MATERIAL TO BE USED OR REMOVED FROM SITE. (LOCATION TO BE DETERMINED)
- A VISUAL INSPECTION SHALL BE DONE DAILY ON SEDIMENT CONTROL MEASURES AND CLEANED OF ANY ACCUMULATED SILT AS REQUIRED. THE DEPOSITS WILL BE DISPOSED OFF SITE AS PER THE REQUIREMENTS OF THE CONTRACT.
- SEDIMENT CONTROL BARRIERS MAY ONLY BE REMOVED TEMPORARILY WITH APPROVAL OF CONTRACT ADMINISTRATOR TO ACCOMMODATE CONSTRUCTION OPERATIONS. ALL AFFECTED BARRIERS MUST BE REINSTATED AT NIGHT WHEN CONSTRUCTION IS COMPLETED. NO REMOVAL WILL OCCUR IF THERE IS A SIGNIFICANT RAINFALL EVENT ANTICIPATED (>10mm) UNLESS A NEW DEVICE HAS BEEN INSTALLED TO PROTECT EXISTING STORM AND SANITARY SEWER SYSTEMS, OR DOWNSTREAM WATERCOURSES.
- NO REFUELING OR CLEANING OF EQUIPMENT IS PERMITTED NEAR ANY EXISTING WATERWAY.
- CONTRACTOR SHALL REMOVE SEDIMENT CONTROL MEASURES WHEN, IN THE OPINION OF THE CONTRACT ADMINISTRATOR, THE MEASURE(S) IS NO LONGER REQUIRED. NO CONTROL MEASURES SHALL BE PERMANENTLY REMOVED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE CONTRACT ADMINISTRATOR.
- THE CONTRACTOR SHALL PERIODICALLY, OR WHEN REQUESTED BY THE CONTRACT ADMINISTRATOR, CLEAN OUT ACCUMULATED SEDIMENTS AS REQUIRED.
- THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO THE WATERCOURSE. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.

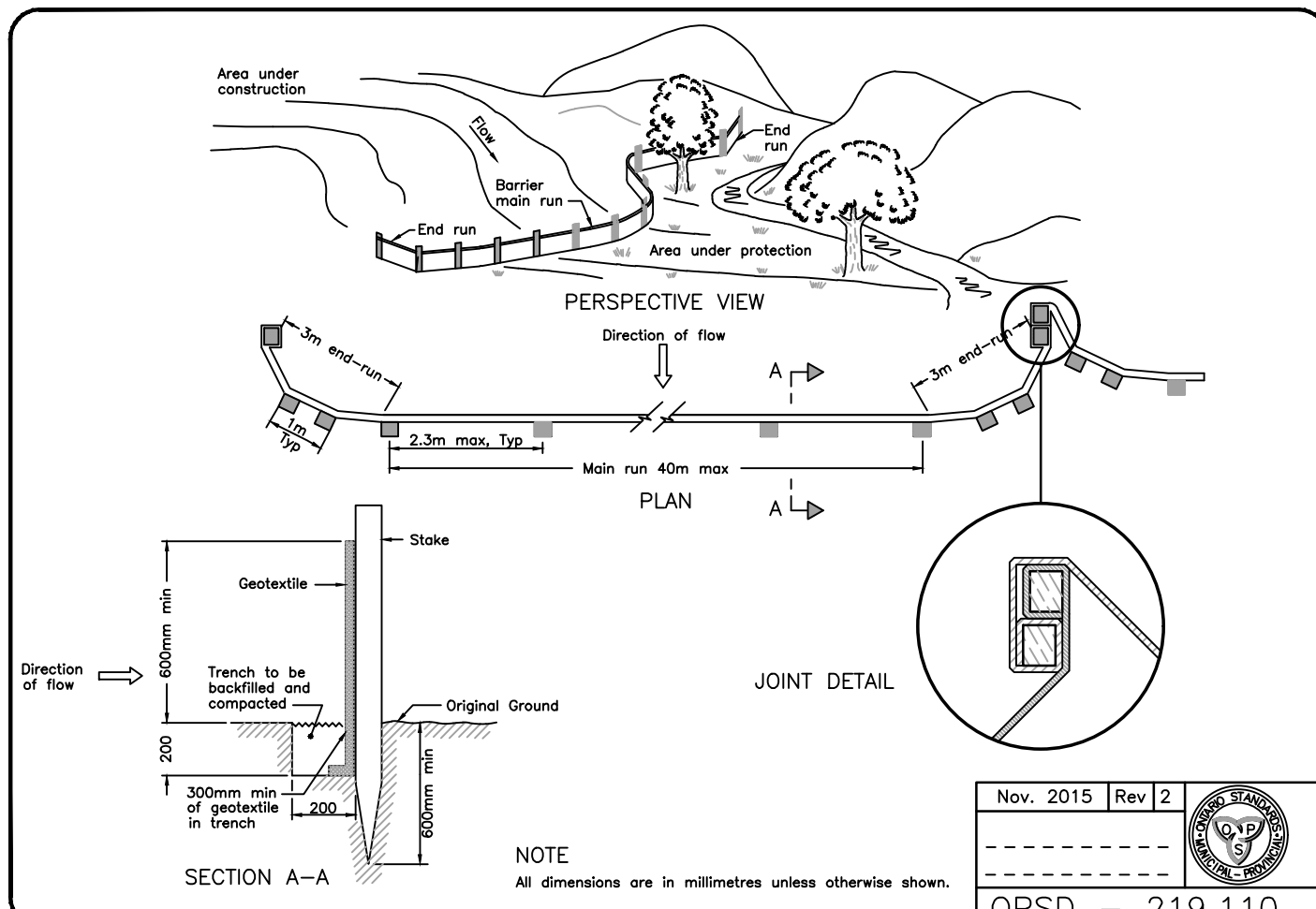


- NOTES:
- FOR WATERMAIN 150mm (60mm) TO 450mm (180mm)
  - BARRIERS TO BARRIERS (SEPARATIONS) SHALL BE 300mm MINIMUM.
  - THRUST BLOCKS FOR MAINS LARGER THAN 450mm (180mm) SHALL BE PER SPECIAL DESIGN.
  - FOR BARRIERS 150mm AND BELOW NORMAL DOWNS, BENTS SHALL BE MAX. 20' 30".
  - CONCRETE FOR THRUST BLOCKS SHALL BE 30 MPa.
  - REFER TO W25 FOR REINFORCED CONCRETE REQUIREMENTS.
  - REFER TO W25.1 AND W25.2 FOR THRUST BLOCK REQUIREMENTS.
  - ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
  - DESIGNED TO MEET THE INTENT OF THE WIDE WATERMAIN DESIGN CRITERIA JUNE 2012.

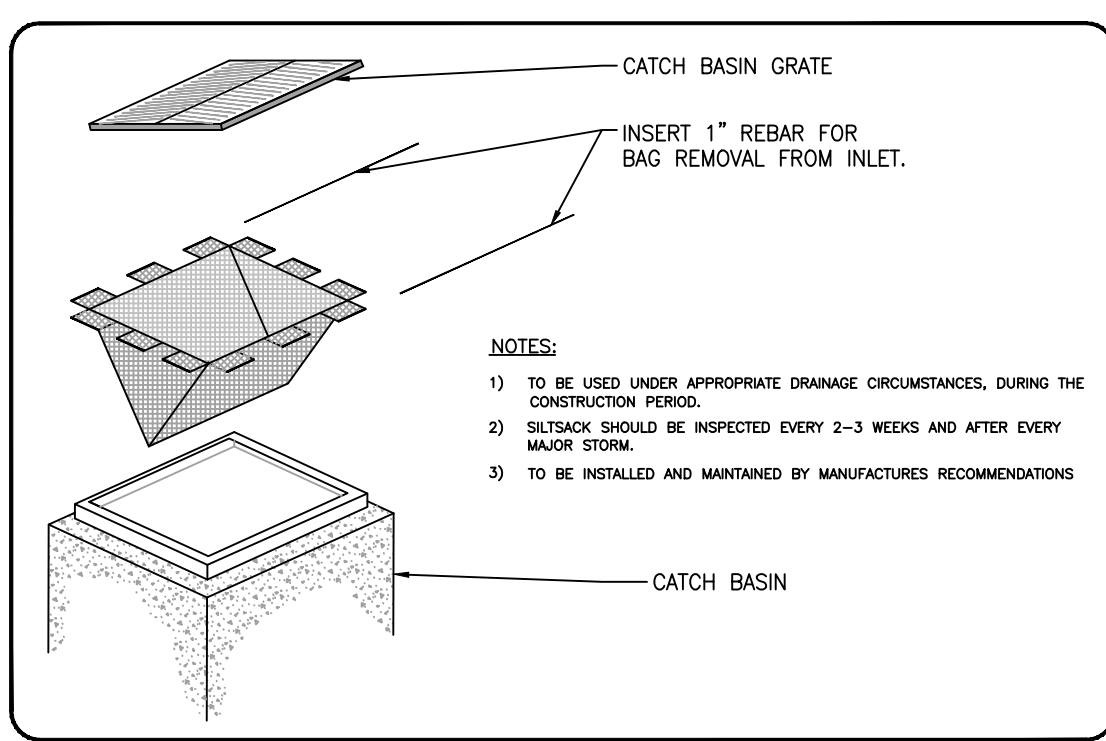


WATERMAIN CROSSING  
OVER SEWER

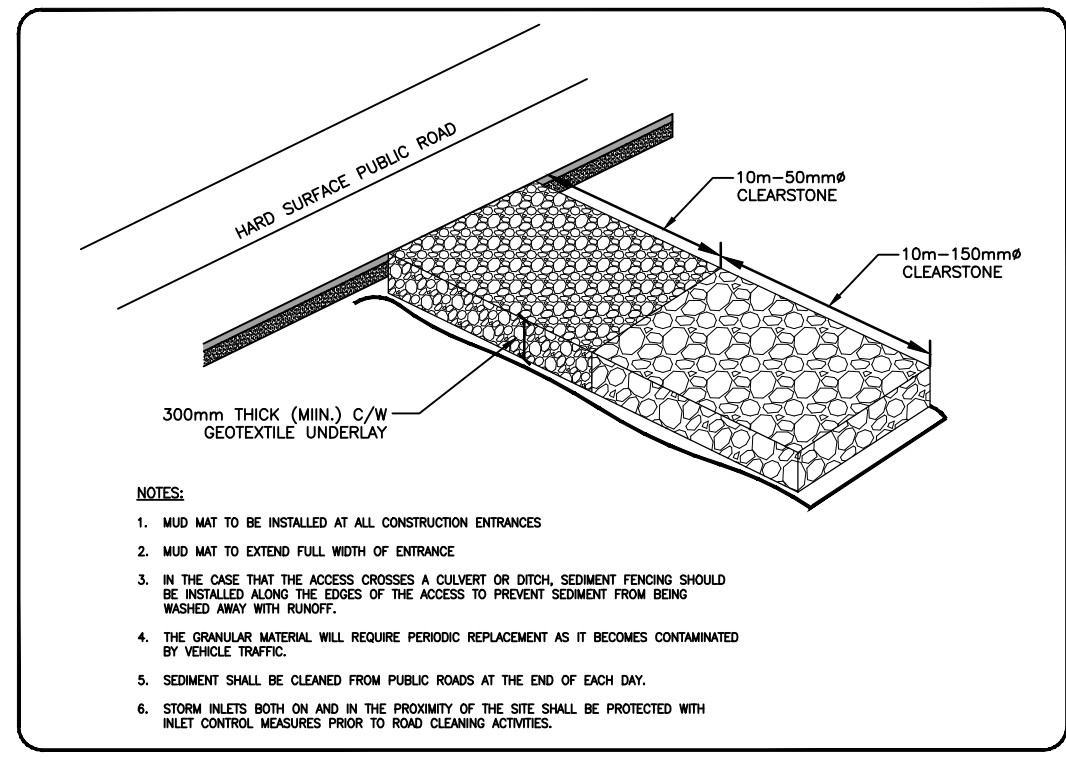
DATE: MAY 2001  
DATE: MARCH 2013  
DWG. NO.: W25.2



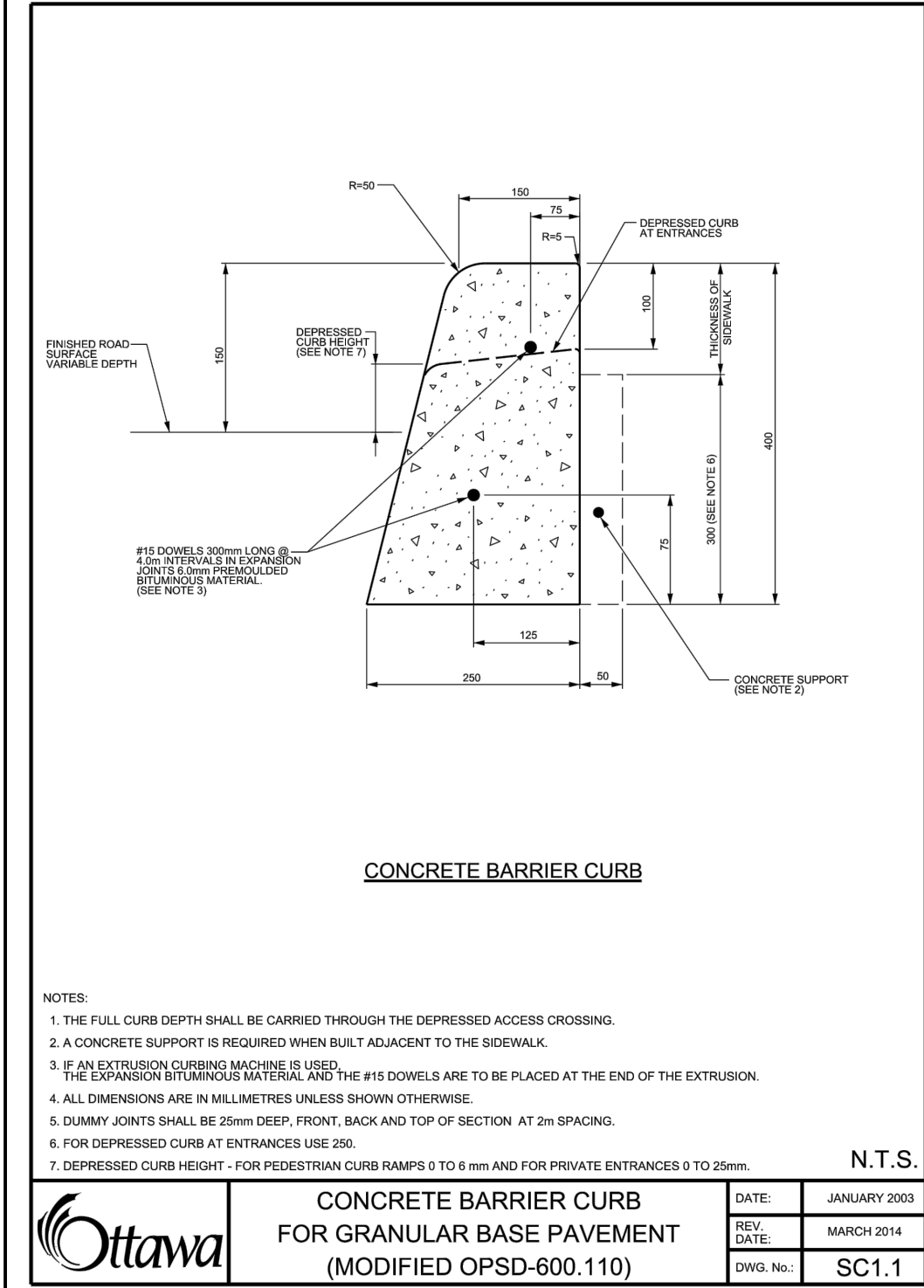
LIGHT DUTY SILT FENCE BARRIER  
SCALE: N.T.S.



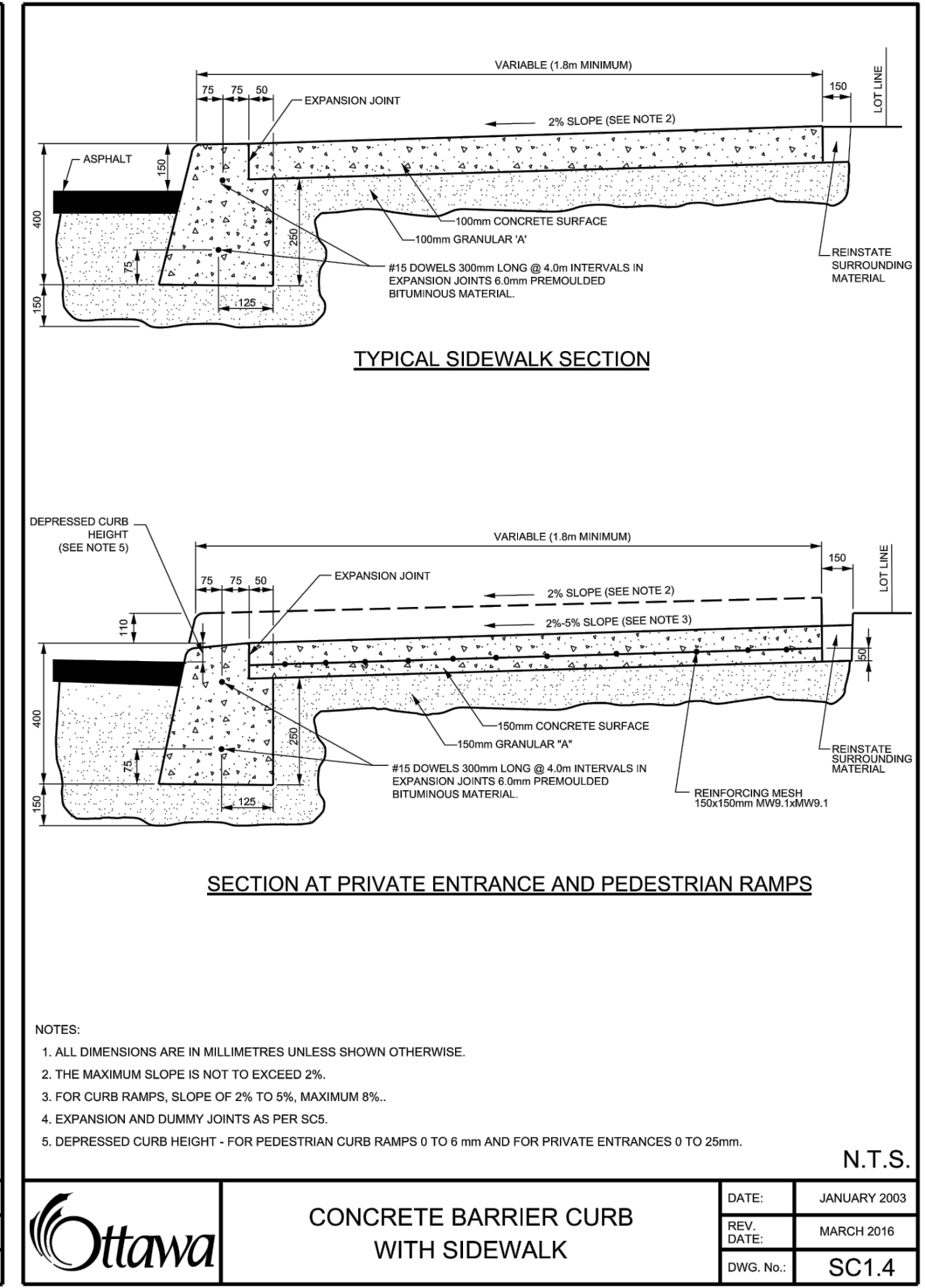
CATCH BASIN PROTECTION DETAIL-TERRAFIX SILT SACK  
SCALE: N.T.S.



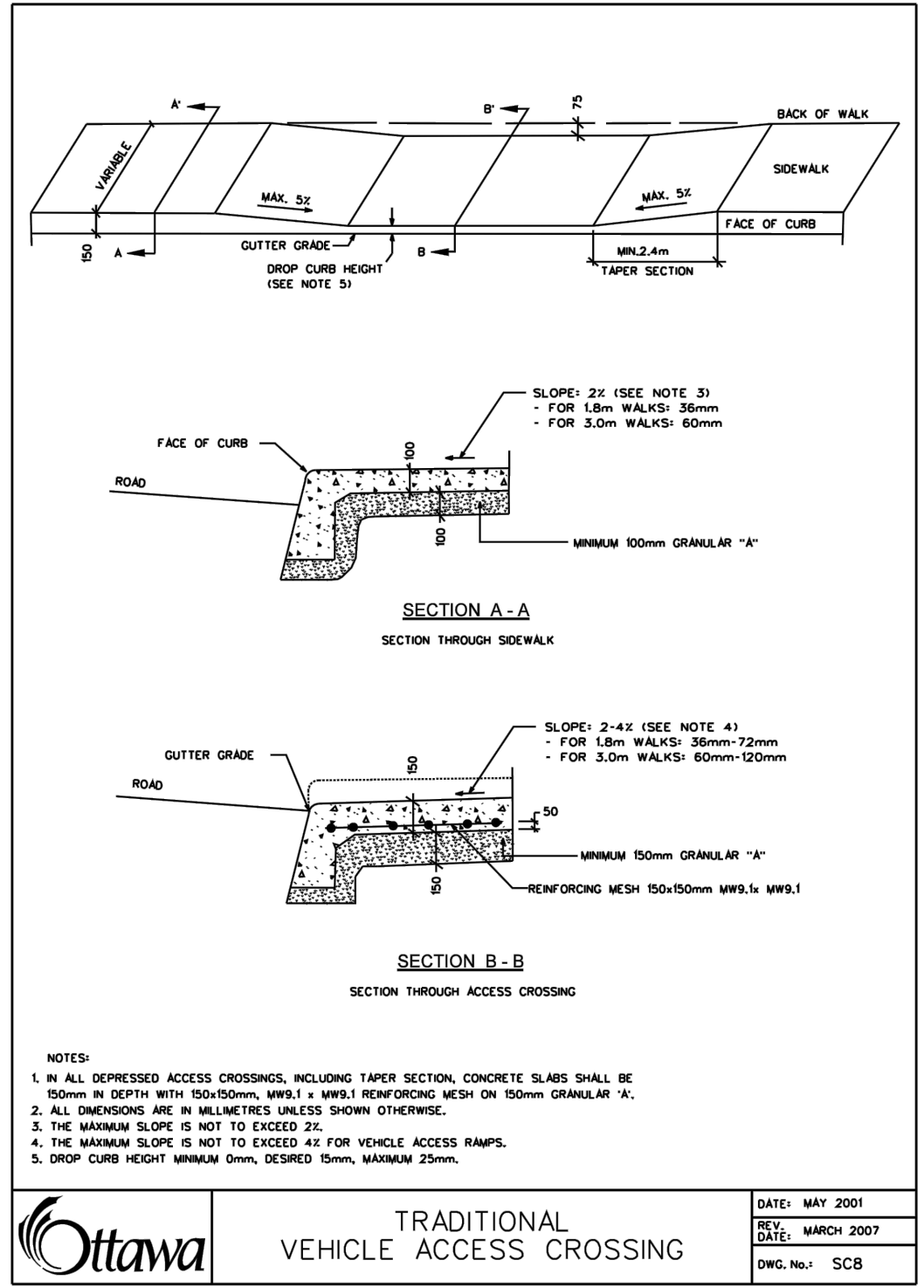
MUD MAT ENTRANCE DETAIL  
SCALE: 1:1



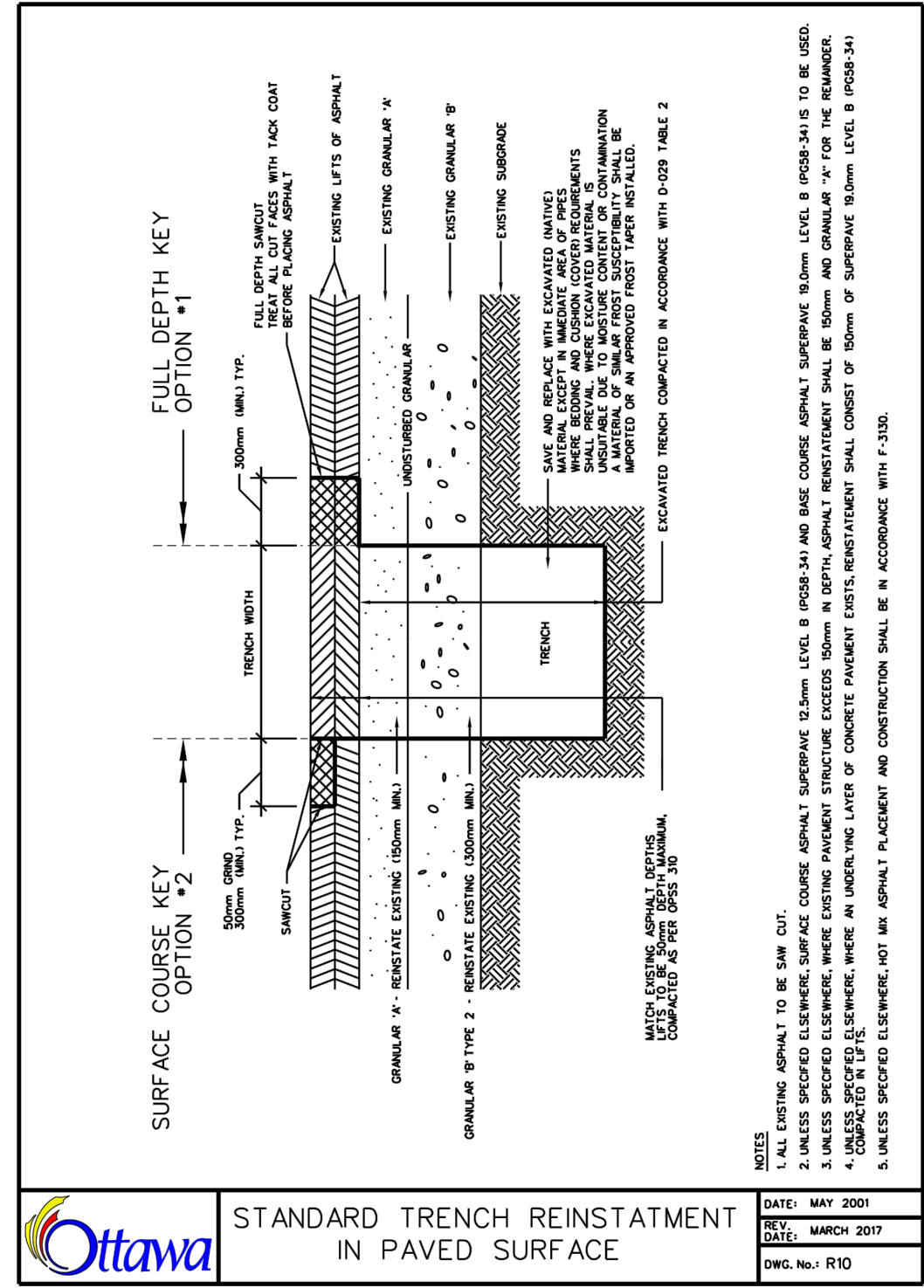
CONCRETE BARRIER CURB  
FOR GRANULAR BASE PAVEMENT  
(MODIFIED OPSD-600.110)



CONCRETE BARRIER CURB  
WITH SIDEWALK



TRADITIONAL  
VEHICLE ACCESS CROSSING



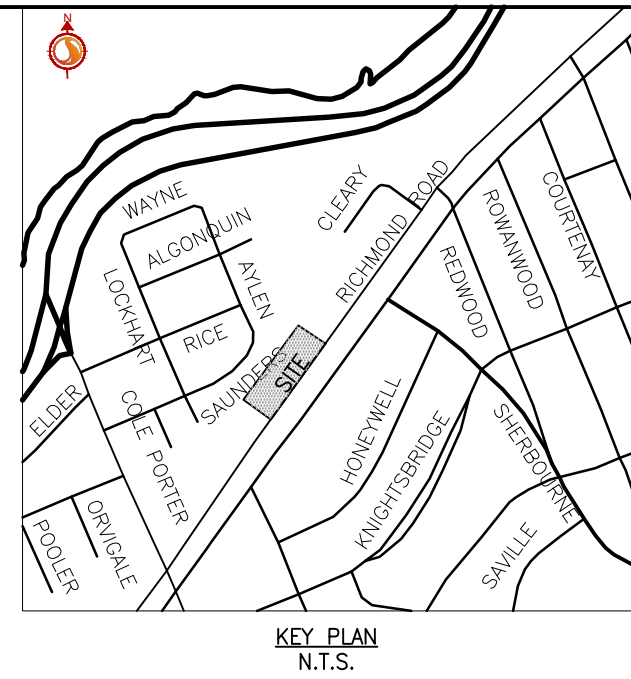
STANDARD TRENCH REINSTATEMENT  
IN PAVED SURFACE

Client/Project  
HOMESTEAD LAND HOLDINGS LIMITED  
851 RICHMOND ROAD  
OTTAWA, ON  
Title  
EROSION CONTROL PLAN  
AND DETAIL SHEET

Project No. 160401329  
Scale AS SHOWN  
Drawing No. Sheet Revision

EC/DS-1 4of 7 2

D07-12-17-0135



**Stantec**

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#### Legend

- EXISTING WATERMAIN
- EXISTING VALVE AND VALVE BOX
- EXISTING FIRE HYDRANT
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING CATCHBASIN
- B, C, G, H
- EXISTING BELL, CABLE, HAS, HYDRO
- REMOVALS
- PROPERTY LINE

#### Notes

2	REVISED AS PER CITY COMMENTS	WAJ	SGG	18.03.29
1	ISSUED FOR FIRST SUBMISSION	WAJ	SGG	17.10.05
Revision		By	Appd.	YY.MM.DD
File Name: 160401329-D8		WAJ	SGG	17.06.14
Permit-Seal		Dwn.	Chkd.	Dsgn.

#### Client/Project

HOMESTEAD LAND HOLDINGS LIMITED

851 RICHMOND ROAD

OTTAWA, ON

#### Title

EXISTING CONDITIONS AND  
REMOVALS PLAN

Project No.

160401329

Drawing No.

EX-1

Scale

0 2.5 7.5 12.5m

Sheet

1 of 7

Revision

2

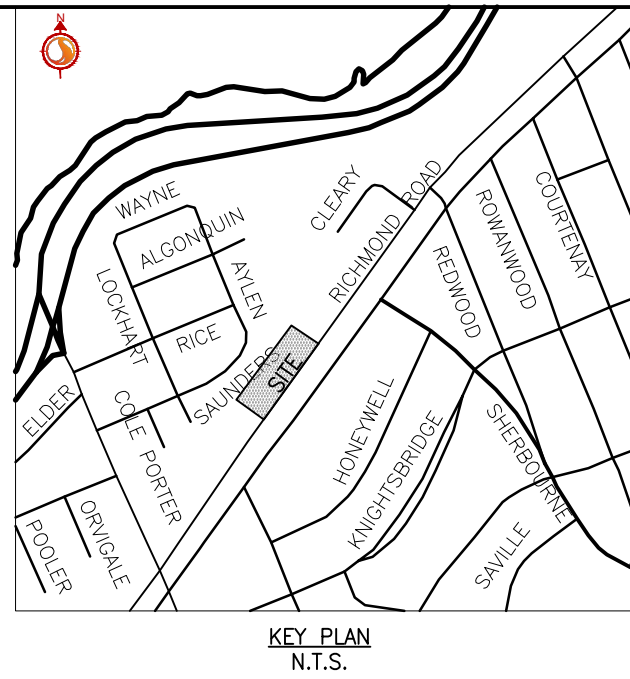
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2018/03/29 12:06 PM By: johnson, Warren

ORIGINAL SHEET - ARCH D

GRADING

- ALL GRANULAR BASE & SUB BASE COURSE MATERIALS SHALL BE COMPACTED TO 98% STANDARD PROCTOR MAX. DRY DENSITY.
- SUB-EXCAVATE SOFT AREAS & FILL WITH GRANULAR 'B' COMPACTED IN 0.15m LAYERS.
- ALL DISTURBED GRASSED AREAS SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER WITH SOD ON MIN. 100mm TOPSOIL. THE RELOCATION OF TREES AND SHRUBS SHALL BE SUBJECT TO APPROVAL BY THE PROJECT LANDSCAPE ARCHITECT OR ENGINEER.
- 100 YEAR PONDING DEPTH TO BE 0.35m (MAXIMUM).
- EMBANKMENTS TO BE SLOPED AT MIN. 3:1, UNLESS OTHERWISE SPECIFIED.
- ALL ROOF DRAINS TO DISCHARGE TO THE INTERNAL PLUMBING AND SHALL NOT BE DIRECTED TO THE STORM SEWER, OR THE BUILDING FOUNDATION DRAIN.
- ALL RETAINING WALLS GREATER THAN 1.0m IN HEIGHT ARE TO BE DESIGNED, APPROVED, AND STAMPED BY STRUCTURAL ENGINEER.
- FENCES OR RAILINGS ARE REQUIRED FOR RETAINING WALLS GREATER THAN 0.60m IN HEIGHT.
- EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THE SITE.
- ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO TREE CUTTING.
- REFER TO DRAWING ECDS-1 FOR EROSION AND SEDIMENT CONTROL DETAILS.
- ALL TREES ON THE RIGHT-OF-WAY ARE TOO BE MAINTAINED BEFORE AND AFTER CONSTRUCTION AND ALL TREES WITHIN THE PROPERTY TO BE RETAINED SHALL BE PROTECTED AS PER THE MUNICIPAL TREES AND NATURAL AREAS PROTECTION BY-LAWS AND THE URBAN TREES CONSERVATION BY-LAW AS AMENDED FROM TIME TO TIME.
- ALL PROPERTY LINE GRADES ARE TO REMAIN UNALTERED AND ALL ONSITE GRADING AND TERRACING IS TO MATCH EXISTING GRADES AT THE PROPERTY LINES UNLESS OTHERWISE NOTED.
- NO EXCESS DRAINAGE, DURING AND AFTER CONSTRUCTION, IS TO BE DIRECTED TOWARDS NEIGHBOURING PROPERTIES.
- CONTRACTOR TO OBTAIN A ROAD OCCUPANCY PERMIT 48 HOURS PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL ROAD ALLOWANCE IF REQUIRED BY THE MUNICIPALITY. ALL WORK ON THE MUNICIPAL RIGHT OF WAY AND EASEMENTS TO BE INSPECTED BY THE MUNICIPALITY PRIOR TO BACKFILLING.
- PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD R10, AND OPSD 509.010, AND OPSS 310.
- CONCRETE BARRIER CURBS SHALL BE CONSTRUCTED AS PER CITY STANDARD SC1.1
- CONCRETE SIDEWALKS SHALL BE CONSTRUCTED AS PER CITY STANDARDS SC3 AND SC1.4.
- ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS & NECESSARY REPAIRS HAVE BEEN CARRIED OUT TO THE SATISFACTION OF THE CONSULTANT
- PAVEMENT CONSTRUCTION AS PER GEOTECHNICAL INVESTIGATION PG4163-1 PREPARED BY THE PATERSON GROUP INC. DATED OCTOBER 3, 2017.  
CAR PARKING AREAS  
50mm HL-3 OR SUPERPAVE 12.5  
150mm OPSS GRANULAR A BASE  
300mm OPSS GRANULAR B TYPE II  
ACCESS LANES  
40mm HL-3 OR SUPERPAVE 12.5  
50mm HL-8 OR SUPERPAVE 19.0  
150mm OPSS GRANULAR A BASE  
400mm OPSS GRANULAR B TYPE II
- ALL GRANULAR FOR PARKING AREAS SHALL BE COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR MAX. DRY DENSITY (SPMD).



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Legend

- ORIGINAL GROUND ELEVATION
- PROPOSED ELEVATION
- PROPOSED LOT CORNER ELEVATION
- EXISTING ELEVATION AT LOT CORNER
- FLOW DIRECTION AND GRADE
- FINISHED FIRST FLOOR ELEVATION
- UNDERSIDE OF FOOTING ELEVATION
- TERRACING 3:1 SLOPE MAXIMUM (UNLESS OTHERWISE SHOWN)
- PROPOSED STORM SEWER MANHOLE
- PROPOSED CATCH BASIN
- DIRECTION OF MAJOR SYSTEM FLOW 2 YR -100 YR
- DIRECTION OF OVERLAND FLOW GREATER THAN 100 YR
- PROPOSED CURB
- PROPOSED DEPRESSED CURB LOCATION
- MAXIMUM PONDING LIMITS
- PROPOSED CONCRETE RETAINING WALL AS PER OPSD 3120.100. RETAINING WALLS GREATER THAN 1.0m IN HEIGHT TO BE DESIGNED BY A STRUCTURAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO. FENCES OR RAILINGS REQUIRED FOR RETAINING WALLS GREATER THAN 0.60m IN HEIGHT.
- PROPERTY LINE
- HEAVY DUTY ASPHALT

Notes

SITE PLAN  
PREPARED BY: RODERICK LAHEY ARCHITECT INC.  
DATED: MARCH 23, 2018  
DRAWINGS: 1  
SITE BENCHMARK  
PROVIDED BY: ANNIS, O'SULLIVAN, VOLLEBECK LTD  
DATED: APRIL 11, 2017  
LOCATION / DESCRIPTION: EXISTING FIRE HYDRANT SOUTH OF PROPOSED SITE - TOP OF SPINDLE = 66.30  
GEOTECHNICAL REPORT  
PREPARED BY: THE PATERSON GROUP INC.  
REPORT NO.: PG4163-1  
DATED: OCTOBER 3, 2017

2	REVISED AS PER CITY COMMENTS	WAJ	SGG	18.03.29	
1	ISSUED FOR FIRST SUBMISSION	WAJ	SGG	17.10.05	
Revision		By	Appd.	YY.MM.DD	
File Name: 160401329-DB		WAJ	SGG	17.06.14	
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project  
HOMESTEAD LAND HOLDINGS LIMITED

851 RICHMOND ROAD

OTTAWA, ON

Title  
GRADING PLAN

Project No.	Scale	0	2.5	7.5	12.5m
160401329	1:250				
Drawing No.	Sheet	Revision			

GP-1 3of 7 2 17519

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2018/03/29 12:06 PM By: johnson, Warren



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1  
0.38 14

SANITARY DRAINAGE AREA ID


POPULATION

SANITARY DRAINAGE AREA ha

 SANITARY DRAINAGE AREA  
 PROPOSED SANITARY SEWER  
 EXISTING SANITARY SEWER



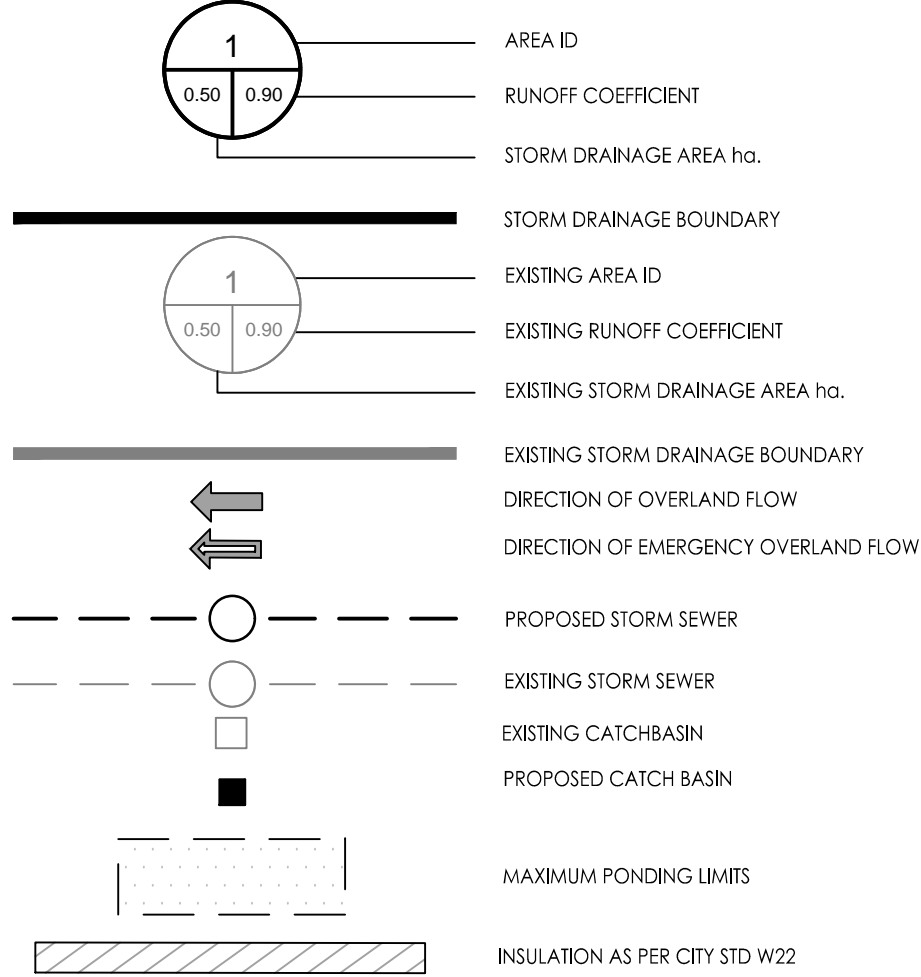
ORIGINAL SHEET - ARCH D

Project No. 160401329	Scale 1:250	
Drawing No.	Sheet	Revision

17519

D07-12-17-0135

### Legend



## Notes

1. INTERNAL CISTERN, OIL GRIT SEPARATOR AND SUMP PUMP TO BE DESIGNED BY THE MECHANICAL CONSULTANT.
2. ESTIMATED 100-YEAR DRAINAGE FROM EXISTING DEVELOPMENT [APPROX. 61 L/S] TO BE PUMPED TO OUTLET DRAINING CONSTRUCTION.
3. RUNOFF FROM PROPOSED BUILDING TO STM 100 TO BE CONTROLLED TO 22.8 L/S THROUGH A CISTERN LOCATED IN THE UNDERGROUND PARKING WITH STORAGE CAPACITY FOR APPROXIMATELY 18.3 m<sup>3</sup> [LOCATION TO BE CONFIRMED BY MECHANICAL CONSULTANT].
4. RUNOFF FROM PROPOSED DEVELOPMENT AREAS TO BE TREATED THROUGH AN OIL/GRIT SEPARATOR SUMP TO PROVIDE 80% TSS REMOVAL FOR A DRAINAGE AREA OF 0.48 HA AT 83% IMPERVIOUSNESS. OIL/GRIT SEPARATOR TO BE LOCATED IN THE UNDERGROUND PARKING [LOCATION TO BE CONFIRMED BY MECHANICAL CONSULTANT].

2	REVISED AS PER CITY COMMENTS	WAJ	SGG	18.03.29
1	ISSUED FOR FIRST SUBMISSION	WAJ	SGG	17.10.05
Revision		By	Appd.	YY.MM.DD
File Name: 160401329-DB		WAJ	SGG	17.06.14
		Dwn.	Chkd.	YY.MM.DD

Permit-Seal

Client/Project

HOMESTEAD LAND HOLDINGS LIMITED

851 RICHMOND ROAD

OTTAWA, ON

Title

# STORM DRAINAGE PLAN

Project No.

160401329

Scale 0 2.5 7.5 12.5m

1:250 

Drawing No.

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Sheet

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Revision

SD-1

6 of 7

2

12.5m  
D07-12-17-0135  
17519

GENERAL NOTES AND SPECIFICATIONS

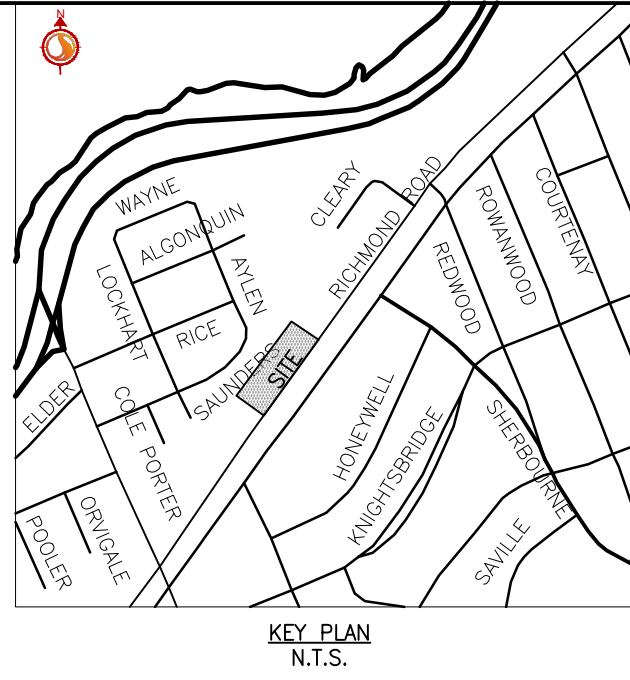
- ALL MATERIALS AND CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH OPS AND CITY OF OTTAWA STANDARD SPECIFICATIONS AND DRAWINGS AND OPSO SUPPLEMENT. ONTARIO PROVINCIAL STANDARDS WILL APPLY WHERE NO CITY STANDARDS ARE AVAILABLE.
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND BEAR COST OF SAME INCLUDING WATER PERMIT AND ASSOCIATED COSTS.
- THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND COORDINATION WITH ALL OTHER CONTRACTORS AND PREVENT CONSTRUCTION CONFLICTS.
- SERVICE AND UTILITY LOCATIONS ARE APPROXIMATE. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING SERVICES AND UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING LOCATES FROM ALL UTILITY COMPANIES TO LOCATE EXISTING UTILITIES PRIOR TO EXCAVATION. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION AND REINSTATEMENT.
- ALL DISTURBED AREAS SHALL BE REINSTATED TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE ENGINEER & THE CITY. PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH OPSD 509.010 AND OPSPS 310.
- ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATION FOR CONSTRUCTION PROJECTS". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
- THE CONTRACTOR SHALL SUBMIT AN EROSION AND SEDIMENTATION CONTROL PLAN WHICH WILL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE PROTECTION FOR RECEIVING STORM SEWERS OR DRAINAGE DURING CONSTRUCTION ACTIVITIES. THIS PLAN SHALL INCLUDE BUT NOT LIMITED TO FILTER CLOTH ON CATCH BASINS, STRAW BALE CHECK DAMS AND SEDIMENT CONTROLS AROUND ALL DISTURBED AREAS. DEWATERING SHALL BE PUMPED INTO SEDIMENT TRAPS.
- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED. DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO ENGINEER.
- THERE WILL BE NO SUBSTITUTION OF MATERIALS UNLESS PRIOR WRITTEN APPROVAL BY THE CONTRACT ADMINISTRATOR AND DIRECTOR OF ENGINEERING HAS BEEN OBTAINED.
- BENCHMARKS: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE SITE BENCHMARK(S) HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON DRAWING GP-1.
- ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL REPORT.
- HERITAGE OPERATIONS UNIT OF THE ONTARIO MINISTRY OF CULTURE TO BE NOTIFIED IF DEEPLY BURIED ARCHEOLOGICAL REMAINS ARE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES.
- THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER 1 (ONE) SET OF AS CONSTRUCTED SITE SERVICING, GRADING, AND SITE ELECTRICAL DWGS.
- SITE SIGNAGE TO BE INSTALLED AS PER ARCHITECTURAL SITE PLAN.

WATER SUPPLY SERVICING

- THE CONTRACTOR SHALL CONSTRUCT WATERMAIN, WATER SERVICES, CONNECTIONS & APPURTENANCES AS PER CITY OF OTTAWA SPECIFICATIONS & SHALL CO-ORDINATE AND PAY ALL RELATED COSTS INCLUDING THE COST OF CONNECTION, INSPECTION & DISINFECTION BY CITY PERSONNEL.
- WATER SERVICE TO BE INSTALLED 1.0M OFF BUILDING FACE. STAND POST TO BE INSTALLED AT PROPERTY LINE AS SHOWN ON DRAWING.
- WATER VALVES TO BE INSTALLED AS PER CITY OF OTTAWA STANDARD W24.
- WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. W17 UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL TO BE SPECIFIED BY PROJECT GEOTECHNICAL CONSULTANT.
- SERVICE CONNECTIONS SHALL BE INSTALLED A MINIMUM OF 2400mm FROM ANY CATCHBASIN, MANHOLE, OR OBJECT THAT MAY CONTRIBUTE TO FREEZING. THERMAL INSULATION SHALL BE INSTALLED ON ALL PROPOSED CBS ON THE WM STREET SIDE WHERE 2400mm SEPARATION CANNOT BE ACHIEVED. (AS PER CITY OF OTTAWA W22 & W23)
- CATHODIC PROTECTION TO BE SUPPLIED ON METALIC FITTINGS AS PER CITY OF OTTAWA W40 AND W42.
- ALL WATERMAIN BENDS, JOINTS, TEES AND PLUGS SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
- WATERMAIN TO HAVE MIN. 2.4m COVER. WHERE WATERMAIN COVER IS LESS THAN 2.4m, INSULATION TO BE SUPPLIED IN ACCORDANCE WITH CITY STANDARD W22.
- WATERMAINS MUST COMPLY WITH MINIMUM HORIZONTAL AND VERTICAL CLEARANCES IN ACCORDANCE WITH LOCAL PROVINCIAL GUIDELINES AND THE APPLICABLE BUILDING AND PLUMBING CODE. WHERE HORIZONTAL SEPARATIONS CANNOT BE ACHIEVED, APPROVAL FROM THE ENGINEER MUST BE OBTAINED AND A MINIMUM 500mm VERTICAL SEPARATION MUST BE MAINTAINED.
- ALL WATERMAINS SHALL BE BACTERIOLOGICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES. ALL CHLORINATED WATER TO BE DISCHARGED AND PRETREATED TO ACCEPTABLE LEVELS PRIOR TO DISCHARGE. ALL DISCHARGED WATER MUST BE CONTROLLED AND TREATED SO AS NOT TO ADVERSELY EFFECT THE ENVIRONMENT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MUNICIPAL AND/OR PROVINCIAL REQUIREMENTS ARE FOLLOWED.
- SERVICE CONNECTION TO EXISTING WATERMAIN SHALL BE IN ACCORDANCE WITH CITY STANDARDS W25.1 AND W50. CITY FORCES TO SUPPLY AND INSTALL THE SERVICE LATERAL UP TO AND INCLUDING THE CURB STOP. CONTRACTOR TO SUPPLY 6.0m OF WATERMAIN BEYOND CURB STOP FOR CITY FORCES TO INSTALL. CONTRACTOR TO INSTALL SWMS, AND HYDROSTATIC TEST PRIVATE WATERMAIN. CITY FORCES TO COMPLETE FLUSHING, DISINFECTION, AND BACTI TESTING OF PRIVATE WATERMAIN.

STORM AND SANITARY SEWERS

- STORM AND SANITARY SEWERS 375mm DIA. OR SMALLER SHALL BE PVC SDR35. SANITARY SEWERS LARGER THAN 375mm SHALL BE CONCRETE CSA A 257.2 CLASS 100-D AS PER OPSD 807.010.
- ALL STORM AND SANITARY SEWER BEDDING SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARDS S6 AND S7, CLASS "B" BEDDING, UNLESS OTHERWISE NOTED. BEDDING SHALL BE COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY.
- STORM AND SANITARY MANHOLES SHALL BE 1200mm DIAMETER IN ACCORDANCE WITH OPSD-701.01 (UNLESS OTHERWISE NOTED) c/w FRAME AND COVER AS PER CITY OF OTTAWA S24 AND S25. ALL STORM MANHOLES WITH SEWERS 900mm DIA SEWERS AND OVER IN SIZE SHALL BE BENCHMARKED. ALL OTHERS SHALL BE COMPLETED WITH 300mm SUMPS AS PER CITY STANDARDS.
- ALL SEWERS CONSTRUCTED WITH GRADES 0.50% OR LESS, TO BE INSTALLED WITH LASER AND CHECKED WITH LEVEL INSTRUMENT PRIOR TO BACKFILLING.
- FOR STORM SEWER INSTALLATION (EXCLUDING CB LEADS) THE MINIMUM DEPTH OF COVER OVER THE CROWN OF THE SEWER IS 2.0m. FOR SANITARY SEWERS THE MINIMUM DEPTH OF COVER IS 2.5m OVER PIPE OBVERT.
- ALL STORM AND SANITARY SERVICES TO BE EQUIPPED WITH APPROVED BACKWATER VALVES.
- STORM AND SANITARY SERVICE LATERALS TO BE SDR 28 INSTALLED AT MIN. 2.0% SLOPE AS PER CITY STD S11.1. SINGLE STORM SERVICES TO BE 150mmØ, SINGLE SANITARY SERVICES TO BE 200mmØ. SERVICES TO BE INSTALLED 1.0m OFF BUILDING FACE.
- CATCH BASINS SHALL BE IN ACCORDANCE WITH CITY STANDARDS c/w FRAME AND GRATE AS PER S19.1 FOR REAR YARDS, AND S2 FOR STREET CBS. PROVIDE 150mm ADJUSTED SPACERS. ALL CATCH BASINS SHALL HAVE SUMPS (600mm DEEP). STREET CATCH BASIN LEADS SHALL BE 200mm DIA/(MIN) PVC SDR 35 AT 1.0% GRADE WHERE NOT OTHERWISE SHOWN ON PLAN. CATCH BASINS WILL BE INSTALLED WITH INLET CONTROL DEVICES (ICD) AS PER ICD SCHEDULE ON STORM DRAINAGE PLAN.
- STREET CATCH BASINS TO BE INSTALLED c/w 150mmØ SUBDRAINS 3m LONG IN FOUR ORTHOGONAL DIRECTIONS OR LONGITUDINALLY WHEN PLACED ALONG A CURB, AND AT AN ELEVATION OF 300mm BELOW SUBGRADE LEVEL.
- GRANULAR "A" SHALL BE PLACED TO A MINIMUM THICKNESS OF 300 mm AROUND ALL STRUCTURES WITHIN PAVEMENT AREA AND COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR DENSITY.
- CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPSPS 410 AND OPSPS 407. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL STORM AND SANITARY SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE CONSULTANT FOR REVIEW.



**Stantec**

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

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Legend

- PROPOSED WATERMAIN
- PROPOSED VALVE AND VALVE BOX
- PROPOSED WATER METER
- PROPOSED REMOTE WATER METER
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED CATCH BASIN
- EXISTING WATERMAIN
- EXISTING VALVE AND VALVE BOX
- EXISTING FIRE HYDRANT
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING CATCHBASIN
- EXISTING BELL, CABLE, HAS, HYDRO
- PROPERTY LINE
- INSULATION AS PER CITY STD W22

Notes

- INTERNAL CISTERN, OIL GRIT SEPARATOR AND SUMP PUMP TO BE DESIGNED BY THE MECHANICAL CONSULTANT.
- ESTIMATED 100-YEAR DRAINAGE FROM EXISTING DEVELOPMENT (APPROX. 61 L/S) TO BE PUMPED TO OUTLET DURING CONSTRUCTION.
- RUNOFF FROM PROPOSED BUILDING TO STM 100 TO BE CONTROLLED TO 22.8 L/S THROUGH A CISTERN LOCATED IN THE UNDERGROUND PARKING WITH STORAGE CAPACITY FOR APPROXIMATELY 18.3 m3 (LOCATION TO BE CONFIRMED BY MECHANICAL CONSULTANT).
- RUNOFF FROM PROPOSED DEVELOPMENT AREAS TO BE TREATED THROUGH AN OIL/GRIT SEPARATOR SIZED TO PROVIDE 80% TS REMOVAL FOR A DRAINAGE AREA OF 0.48 HA AT 85% IMPERVIOUSNESS. OIL/GRIT SEPARATOR TO BE LOCATED IN THE UNDERGROUND PARKING (LOCATION TO BE CONFIRMED BY MECHANICAL CONSULTANT).

**SITE PLAN**  
PREPARED BY: RODERICK LAHEY ARCHITECT INC.  
DATED: MARCH 23, 2018  
DRAWINGS: 1

**SITE BENCHMARK**  
PROVIDED BY: ANNIE O'SULLIVAN, VOLLEBEK LTD  
DATED: APRIL 11, 2017  
LOCATION / DESCRIPTION: EXISTING FIRE HYDRANT SOUTH OF PROPOSED SITE - TOP OF SPINDLE = 66.30

**GEOTECHNICAL REPORT**  
PREPARED BY: THE PATTERSON GROUP INC.  
REPORT NO.: PG4/65-1  
DATED: OCTOBER 3, 2017

2	REVISED AS PER CITY COMMENTS	WAJ	SGG	18.03.29
1	ISSUED FOR FIRST SUBMISSION	WAJ	SGG	17.10.05
Revision		By	Appd.	YY.MM.DD
File Name:	160401329-D8	WAJ	SGG	WAJ
		Dwn.	Chkd.	Dsgn.
				YY.MM.DD

Permit-Seal

Client/Project  
**HOMESTEAD LAND HOLDINGS LIMITED**

**851 RICHMOND ROAD**

**OTTAWA, ON**

Title  
**SITE SERVICING PLAN**

Project No.  
**160401329**

Drawing No.

**SSP-1**

Scale  
0 2.5 7.5 12.5m  
1:250

Sheet

2 of 7

Revision

2

17519

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2018/03/29 12:06 PM By: johnson, Warren

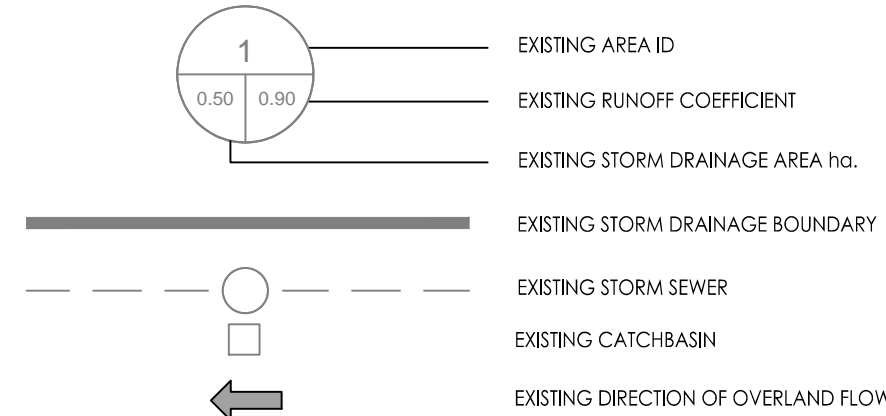
ORIGINAL SHEET - ARCH 0

D07-12-17-01-05

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Legend



Notes

2	REVISED AS PER CITY COMMENTS	WAJ	SGG	18.03.29
1	ISSUED FOR FIRST SUBMISSION	WAJ	SGG	17.10.05
Revision		By	Appd.	YY.MM.DD
File Name: 160401329-D8		WAJ	SGG	17.06.14
Permit-Seal		Dwn.	Chkd.	Dsgn.

Client/Project

HOMESTEAD LAND HOLDINGS LIMITED

851 RICHMOND ROAD

OTTAWA, ON

Title

EXISTING STORM DRAINAGE PLAN

Project No.

160401329

Drawing No.

ESD-1

Scale

0 2.5 7.5 12.5m

Sheet

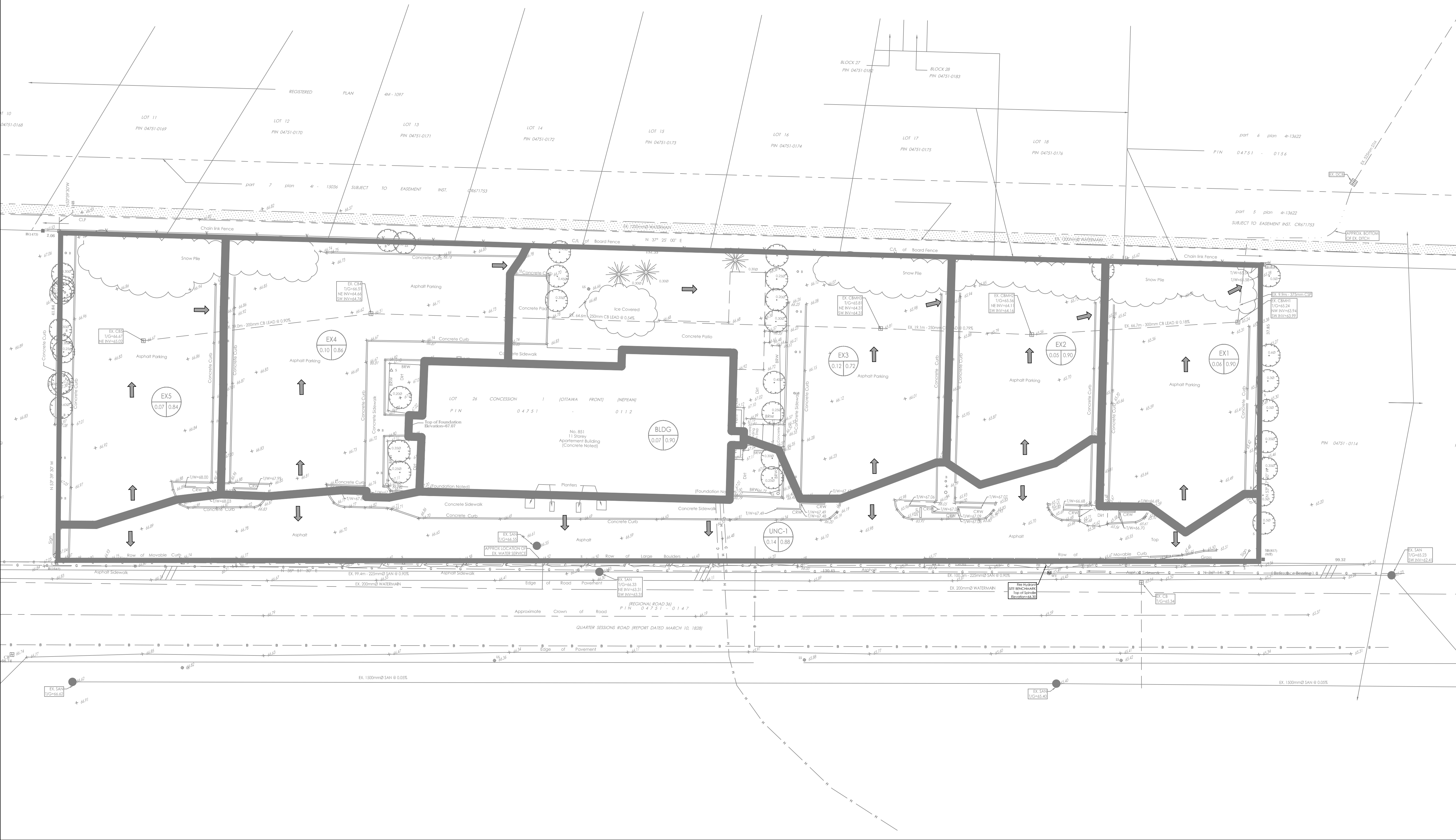
5 of 7

Revision

2

17519

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2018/03/29 11:27 AM By: Johnson, Warren



ORIGINAL SHEET - ARCH D

Appendix H CORRESPONDENCE  
March 29, 2018

## **Appendix H CORRESPONDENCE**



File Number: D07-12-17-0135

December 14, 2017

FOTENN  
223 McLeod Street  
Ottawa, ON K2P 0Z8  
Attn: Stephanie Morris

*Sent via email to [morris@fotenn.com]*

Dear Ms. Morris,

**Re: Site Plan Control Comments – 851 Richmond Road**

The following review comments are provided in response to the submission of the Site Plan Control application (D07-12-17-0135) for 851 Richmond Road. Please coordinate the changes made in response to the comments below across all plans as applicable.

---

**City of Ottawa**

**Planning**

General

1. Please add the file number (D07-12-17-0135) and approval block on all plans, as shown below.

<b>APPROVED</b> <input type="checkbox"/>	<b>REFUSED</b> <input type="checkbox"/>
<b>THIS _____ DAY OF _____, 20____</b>	
<hr/>	
<b>DERRICK MOODIE, MANAGER DEVELOPMENT REVIEW WEST PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA</b>	



2. All plans and drawings should be dimensioned in the metric system instead of imperial measurements.

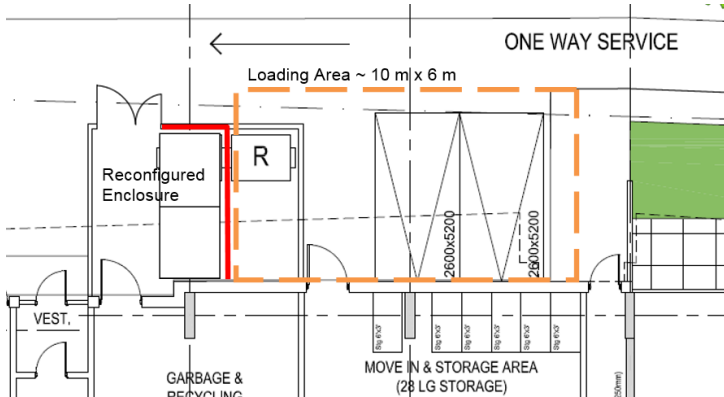
## Site Plan

1. Please include the architect's seal.
2. Please provide a key plan showing the subject site's location on an aerial photograph.
3. Provide the legal description of the subject property, as well as the survey information used for the base plan.
4. Please including a zoning information table which includes all provisions of the R5C H(33) zoning applicable to the site, and the proposed values. This should include, but is not limited to, Parts 2, 4, 5, and 6 of the Zoning By-law. An example is provided below.

ZONING		
EXISTING ZONING	IL [1559] LIGHT INDUSTRIAL	
	REQUIRED	PROPOSED
MIN. FRONT YARD SETBACK	7.5m	15.0m
MIN. REAR YARD SETBACK	7.5m	57.0m
MIN. INTERIOR YARD SETBACK	7.5m	8.2m
MAX. BUILDING HEIGHT	18.0m	±5.1m
MIN. LOT AREA	2,000m <sup>2</sup>	13,507m <sup>2</sup>
MAX LOT COVERAGE	65%	26%
MAX. FLOOR SPACE INDEX	2	2
MIN. WIDTH OF LANDSCAPE AREA		

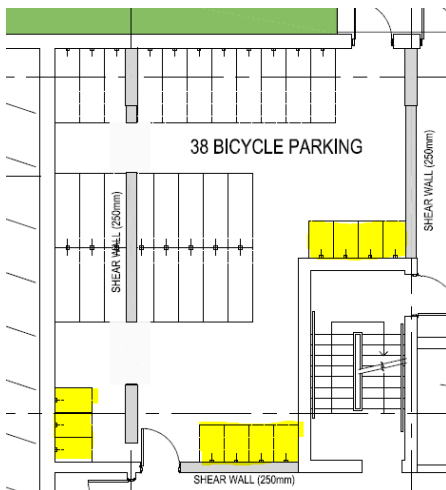
5. Please identify all building entrances; four entrances are not shown on the northern frontage.
6. Please identify the location of the two-way site access on the western portion of the site. As well, please consider providing a landscaped buffer to screen the surface parking lot from Byron Street and to provide a more positive pedestrian experience.
7. Please separate the calculations for resident and visitor parking totals and appropriately label the visitor parking spaces. If visitor parking is to be provided in the underground garage, please explain how secure access will function.
8. Please explain your rationale behind the central one-way access immediately to the west of the parking garage entrance. An additional one-way access is proposed on the eastern edge of the site; please consider removing the centre access and provide additional landscaping.
9. The eastern driveway does not meet the 3 m minimum width required; please remove the bike lane, as it is not necessary within the site.
10. If visitor parking is provided at the surface parking lot, pedestrian connectivity to the new building must be improved. Ensure that a continuous pathway is provided to link the surface lot with the new internal pathways proposed.
11. The covered entry walkway extends too far into the front yard setback. Per s. 65 of the Zoning By-law, the canopy may project 1.5 m into the front yard, but not closer than 0.6 m to the lot line.
12. Please provide a detail drawing of the two proposed garbage enclosures, and show the enclosures on the site plan. Consider adding a roof to the enclosures to screen the garbage and recycling bins.

13. The two parking spaces provided on the northern edge of the building are immediately adjacent to the “Move In & Storage Area.” The two spaces provided are not large enough to accommodate mid-sized moving trucks (7 m length), which may result in the drive aisle being obstructed. Please reconfigure this area to accommodate moving vehicles (sketch provided below).



14. Bicycle parking comments:

- Per s. 100, bicycle parking spaces must be set aside for and used exclusively for that purpose. Therefore, storage lockers cannot be counted towards the bicycle parking total unless they are labelled as such, and dimensioned per s. 111.
- The highlighted bicycle parking spaces do not meet the minimum size required per s. 111. Please correct, and identify what type of racks or locking points will be provided.



- Please provide outdoor bicycle racks for the use of visitors.

15. Please extend the northern concrete walkway to the west and south to the rear entrance.
16. Please delineate the extent of the underground parking garage on the plan.
17. Is any lighting proposed for the pathways at the rear of the building? If so, please identify it on the plan.
18. All depressed curbs must be shown on the Site Plan.
19. Is any fencing proposed along the eastern property line?

## **Urban Design**

### Site Plan/Landscape Plan:

1. Is there adequate soil volumes for the trees proposed above the parking garage at the rear of the site?
2. Entrance to the parking garage – relocate to the rear of side of the building to eliminate the additional crossing of the sidewalk on Richmond Road.
3. What treatment is proposed in front of the surface parking lot that is being retained? Access to this parking lot should be limited to one location with proper access. A landscape buffer should be provided across the frontage of this parking lot in accordance with Zoning By-law standards.
4. Label all hard surface area by material proposed – concrete, asphalt, pavers etc.
5. Why is such a large garbage and recycling area proposed at the rear of the building?
6. Is an enclosure proposed for the garbage for the existing building? If so what is proposed?
7. Is the fenced enclosure required at the rear of the new building as there is a garbage room at grade?

### Elevations / Built Form

1. Clearly define a base, middle and top for the building.
2. Increase the height of the base of the building through external treatment including the second floor.
3. Treatment of balconies should be re-considered. General concern that this building and the existing building can be read as one very long slab building. The approach to balconies may assist in creating two distinct looking buildings.
4. Separation distance between the two buildings is not ideal and does not meet high rise design guidelines. Consideration should be given to increase this distance to the greatest extent possible.
5. The material proposed for the base of the building should be clearly identified on the elevations.

## **Urban Design Review Panel**

These are notes taken by City staff during the meeting; formal notes from the Panel will follow.

1. The overall design of the building is very similar to that of the adjacent structure. Please differentiate the proposed development with a unique design.
2. The ground floor appears to be very squat and compressed; please improve the base of the building.
3. Treat each of the four facades in a slightly different manner; the south façade especially needs improvement. Give the slot more emphasis, possibly by aligning the entrance with it.
4. Be careful not to create a pock-marked façade through the use of panelling.
5. The north façade needs to be calmer for the adjacent residents; decrease the visual noise by inseting the balconies.

6. The east façade should include more balconies and glazing.
7. The building should have a defined base, middle, and top. Adjust the treatment of the upper floors to break the boxy massed form.
8. Consider grouping and framing the balconies.
9. Relocate the parking garage entrance to the back of the building, to minimize pedestrian conflicts.
10. Please integrate sustainable design into the building, perhaps with a green roof.

## **Engineering**

### General

1. All exterior light fixtures must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on one of the plans.
2. Is there any easement on this property? If so, please clearly show and label all the easement(s) on all plans. Please provide a copy of the easement document.
3. Please note that additional review fees will be applicable for the 4<sup>th</sup> and subsequent reviews.
4. The City file number for this application is D07-12-17-0135. Please place this number on all drawings (bottom right side –vertically outside the border).
5. The City plan number of this application is 17519. Please place this number on all drawings, horizontally at the bottom right side (Plan No. 17519).
6. Please complete the attached Fire Route Form and send to [Jennifer.Therkelsen@ottawa.ca](mailto:Jennifer.Therkelsen@ottawa.ca) after the fire route has been confirmed by [Allan.Evans@ottawa.ca](mailto:Allan.Evans@ottawa.ca) in order to add the fire route to the By-law. Please cc myself and the file lead as confirm that the form has been submitted.
7. Clearly show the property line on all drawings, on all sides of the property and add the line style in the legend.
8. Please provide a full size drainage area plan for the existing condition for the entire site. On this plan, show the drainage area and runoff coefficient for each sub-catchment area. Also, add the overland flow route arrows on this plan. Provide a detailed composite runoff coefficient (c) calculation for each of the sub-catchment area and include it in the Appendix of the Site Servicing and Stormwater Management Brief. Clearly show and label the stormwater conveyance system outside the property line of this site.
9. Based on the available information, the downstream public stormwater conveyance system was designed and constructed prior to the year 1970 and assumed to be designed to

convey the 2-year flow. Therefore, the runoff from the expansion/redevelopment area must be controlled to the 2-year pre-development condition with  $C=0.5$ .

10. As per discussion with the City Legal services, the owner/applicant has no rights to outlets the stormwater runoff to a private property on the north side, without any easement or legal agreement with the adjacent property owner. In order to outlet and to convey flow through a private land, please obtain an easement and enters into a joint use and maintenance agreement with the adjacent property owner(s).

#### Site Servicing and Stormwater Management Brief

1. Section 4.0; paragraph 3 talks about DSEL's report that analyzed the capacity of the sanitary sewer on Richmond Road. Please include excerpts from this report to show the existing sanitary sewer on Richmond Rd. has additional capacity to receive sanitary flow from the proposed building.
2. Section 5.2, paragraph 1; sentence 2 states that existing 375 mm diameter CSP discharges into an existing ditch in the existing Children's Centre to the north. However, what is shown on drawing no. EX-1 does not agree with the description. Please review and revise. Do you have permission to convey stormwater through the adjacent property on the north (Children's Centre)?
3. Section 5.2, paragraph 1; sentence 3 talks about a 15 m long conveyance ditch. Who owns and maintains this ditch? If the portion of the conveyance system is owned and maintained by a private entity and do not have an agreement with the adjacent property owner, an alternative outlet is required for the proposed development.
4. Section 5.3; the stormwater management criteria that summarized in this section does not quite match the criteria that was given to you by the previous City project manager. Review and revise.
5. Section 5.4; It appears that the proposed oil and grit separator is only providing the quality treatment for the runoff from the proposed development area. Please explain the reason for not providing the quality treatment for the runoff from the existing area in the south? Please consult with the Conservation Authority to confirm whether this approach is acceptable to them.
6. Provide detailed calculations to show how the composite runoff coefficient (C) of the existing site is determined.
7. Section 5.4.4.2; sentence 1 states that it is proposed to detain stormwater within a 20 m<sup>3</sup> cistern below grade with a maximum controlled release rate of 29.7 L/s to the gravity service provided. It is not clear how you are controlling this release rate. Please elaborate.
8. Section 5.4.4 talks about rooftop storage and subsurface (cistern) storage. However, there is no discussion about surface storage provided on the north and west side of the proposed building as shown on the Grading Plan. Please review and revise.
9. Please provide stormwater management for the entire site, not just the expansion area (.31 ha).

#### Site Servicing Plan

1. There are 2 proposed catch basins (CB 201 & CB 202) shown west of the proposed building. However, there are no catch basin leads shown on the plan to convey the stormwater captured by the CBs. Review and revise.

2. Please show the storm sewers that conveys stormwater from the underground cistern to the outlet.

#### Storm Drainage Plan

1. Is there a reason for redirecting the minor flow from the south of the property to the internal plumbing of the proposed building?
2. A drainage area shown at the north-west corner of the property does not have an identification no., drainage area nor runoff coefficient. Please provide.
3. Drainage area of the ramp shown as 0.00. Please review and revise.

#### Grading Plan

1. Provide at least 0.3 m freeboard between the high point at the underground parking entrance and the gutter elevation at the north side of Richmond Road to prevent the gutter flow from entering the parking garage.
2. It is not clear whether the large flow arrows shown on the plan and in the legend represents major overland flow route or not. Since the post-development runoff for the 1:100year storm event will be controlled to the calculated allowable release rate, no major overland flow route is required for the expansion area; only emergency overland flow route is required. Therefore, please revise the text associated with the large flow arrow shown in the legend. Major overland flow route is only required for the existing building and the surrounding area (outside the expansion area).
3. There are two pavement designs (car parking areas and local roads) shown on this plan. Clearly delineate these 2 areas with different hatchings.

### **Transportation**

#### Traffic Engineering

1. The volumes used in the analysis do not reflect current conditions. WB volumes appear statistically low and SB left turn volumes statistically high (PM count). Although not demonstrated in the Synchro Analysis, the WB queues from Richmond Road /Woodroffe Avenue may block the site access during PM peak periods. This should be reviewed and documented.
2. Richmond Road corridor will be redesigned as part of Stage 2 LRT and traffic conditions will be significantly changed.

#### Street Lighting

1. No comments with initial Transportation Brief and Site Plan for this circulation. Street Lighting reserves the right to make future comments based on subsequent submissions.
2. Future considerations are as follows:
3. If there are any proposed changes to the existing roadway geometry, the City of Ottawa Street Light Asset Management Group is required to provide a full street light design. Upon completion of proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed street light design and coordination with the Street Light maintenance provider and all necessary parties. Be advised that the

applicant will be 100% responsible for all costs associated with any Street Light design because of the roadway geometry change.

4. Existing underground streetlight plant at this location. Street light plant must be maintained and protected at all times. Please maintain a minimum of 0.6 m horizontal and 0.3 m vertical clearance from existing street light underground plant. Please maintain a minimum 1.5 m horizontal clearance from all existing street light surface features.
5. Alterations and/or repairs are required where the existing street light plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction process. All street light plant alterations and/or repairs must be performed by the City of Ottawa's Street Light maintenance provider.
6. Be advised that the applicant will be 100% responsible for all costs associated with any relocations/modifications to the existing street light plant.
7. Please contact Ontario One Call for locates prior to excavation.
8. Please contact Iain Brock who can be reached at 613-580-2424 extension 15885.

#### Transportation Engineering Services

1. A site in a Transit Oriented Development (TOD) area is an excellent candidate for submission of the new multi-modal TIA guidelines.
2. Although Richmond Road is a spine route, the report does not propose any cycling infrastructure upgrades for the frontage. In addition, with the planned reconstruction of Richmond Road in this area following construction of the LRT Stage 2 works, the north side will include cycle tracks. This should be documented in the report and there may be some resulting impact along the site frontage and across the accesses.
3. The mode shares used in the report are not appropriate for a TOD area. Future mode shares should include 65% transit use. The 1.5% growth rate used for the trip generation growth rate should be explained in detail.
4. There is a ROW protection on Richmond Road.
5. The two-way underground garage access must be 6.7m wide.

#### Development Review – Transportation Engineering Services

1. Show the line work (sidewalk, curbs, pavement markings etc) for Richmond Road.
2. Show curb radii.
3. Show all lane widths, including the bike lane, and sidewalk widths.
4. The entrance to the parking garage and the lane between the two buildings in in contravention of the Private Approach By-law; requires a minimum of 9 m between any two way vehiclur acces and a one away access. Section 25 (f).
5. The site plan shows two one-way entrance in for the surface lot; how do the cars get out?
6. The garbage facilities at the back of the proposed building will need to conform to Part 4 – Parking, Queuing and Loading Provisions of the Zoning By-law Table 113B for aisle width of loading spaces at 90 degrees (9m).
7. It should be demonstrated how the site plan will work with the LRT Stage 2 works.

8. Other developments – a 14-story development is being proposed at 929 Richmond Rd, this should be considered.
9. Is a separated EB turning lanes required to accommodate the traffic into this site from Richmond?

#### Noise & Vibration

1. Section 7.0 and 7.3 last paragraphs - These two paragraphs must be revised; they refer to “minimizing the amount of noise on any Outdoor Living Area” and “It is not anticipated that earth berms or sound barriers will be required for this development”. It is stated in sections 2.0 and 7.1 that there are no dedicated Outdoor Living Area, therefore the two previous statements should not be included. Earth berms or sound barriers are only to mitigate noise for Outdoor Living Areas.
2. Will there be any exposed mechanical equipment on this building? Is there any exposed mechanical equipment in the vicinity that may affect the tenants of this building? If so, then a stationary noise analysis is required. Otherwise the section about Stationary Noise in section 3.0 should be removed.
3. Stamson Calculations and Table 10 – Please clarify what the 10m barrier is.
4. Provide a map that displays the distances and angle between the receivers and the sources.

#### **Forestry**

1. A tree permit is needed prior to tree removal; one will be provided once the submitted tree-related materials are approved.
2. A plan is required that links the tree numbers in the tree inventory report to the site – we need to know where each tree is. Please indicate on the plan which trees are to be removed and which are to be retained.
3. The submitted materials must also account for any trees on neighboring properties that have a critical root zone extending onto the development area.
4. All City-owned trees must be identified.
5. Tree protection fencing must be shown around all retained trees that are close to the area that is being developed.

#### **Building Code Services**

1. The maximum distance a fire hydrant is permitted to be from the building's fire department connection is 45 metres, and shall be along an unobstructed path of travel, as per Article 3.2.5.16. via 3.2.5.5., of the Ontario Building Code. Unfortunately, BCSB was unable to identify the location of the fire department connection, in order to verify the design as being O.B.C. compliant in this regard.
2. Note: as indicated on the provided site plan, the existing building at 851 Richmond is shown on the new site plan to have the access lane in front of the building removed for road widening and so on. Please ensure that the Fire Department Connection (F.D.C.) located at on the west end at the south portion of the wall is still in compliance with the O.B.C. for fire

access routes and unobstructed path of travel for the firefighters from the hydrant to the F.D.C.

3. Please be aware that as shown on the drawings submitted for Site Plan Control Approval, the location of the building on-site may require shoring during the construction stage and possibly permanent encroachment consent. If so, please contact The ROW Permit Office (Right Of Way) at 613-580-2424 x16000 to enquire/obtain a temporary and/or permanent encroachment letter as the shoring is to be adjacent to city property.

### **Waste Collection Services**

1. Please dimension the garbage room.
2. A 6-meter access way is required for waste collection vehicles, or containers will have to be pulled to the closest accessible area.
3. This location will get City container service; the following containers are required:
  - Garbage: 4 x 4 yard bins
  - Fibre: 1 x 4 yard bin
  - Glass metal plastic: 1 x 2 yard bin
  - Organics: 2 x 240L carts

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### **External Agencies**

#### **Ottawa Catholic School Board**

1. The Ottawa Catholic School Board has no objection to the proposed site plan control proposal for the property located at 851 Richmond Road.

#### **Hydro Ottawa**

1. The Owner is advised that there is medium voltage underground infrastructure along the South/East side of the property.
  - a. Prior to the commencement of any excavation, the Owner shall arrange for an underground cable locate by contacting Ontario One Call at 1-800-400-2255, not less than seven (7) working days prior to excavating. There shall be no mechanical excavation within one and a half meters (1.5m) of any Hydro Ottawa underground plant unless the exact position of plant is determined by hand digging methods.
  - b. The Owner shall inform Hydro Ottawa of any acute shock construction process or rubbelization to be used during construction, and apply Hydro Ottawa's work procedure UDS0022 "Protecting Electrical Distribution Plant & Support Structures from Vibrations Caused by Construction Activity" which can be found at <https://hydroottawa.com/accounts-and-billing/contractors-and-developers/guide/miscellaneous>.

- c. The Owner shall not use steel curb and sidewalk form support pins in the vicinity of Hydro Ottawa underground plant for electrical safety.
2. The Owner shall be responsible for all costs for feasible relocations, protection or encasement of any existing Hydro Ottawa plant.
3. The Owner shall ensure that any landscaping or surface finishing does not encroach into existing or proposed Hydro Ottawa overhead or underground assets or easement. When proposing to plant trees in proximity of existing power lines, the Owner shall refer to Hydro Ottawa's free publication "Tree Planting Advice" which can be found at <https://hydroottawa.com/outages/safety/safety-outside/planting-trees>. The shrub or tree location and expected growth must be considered. If any Hydro Ottawa related activity requires the trimming, cutting or removal of vegetation, or removal of other landscaping or surface finishing, the activity and the re-instatement shall be at the owner's expense.
4. The Owner shall be responsible for servicing the buildings within the property. Only one service entrance per property shall be permitted.
5. The Owner shall convey, at their cost, all required easements as determined by Hydro Ottawa.
6. The Owner shall contact Hydro Ottawa to discuss electrical servicing for the property. By Hydro Ottawa commenting on this proposal, Hydro Ottawa has not committed to, or approved the electrical servicing of the proposed development.
7. The Owner shall enter an Installation and Service agreement with Hydro Ottawa.
8. The Owner shall comply with Hydro Ottawa's Conditions of Service and thus should be consulted for the servicing terms. The document, including referenced standards, guidelines and drawings, may be found at <http://www.hydroottawa.com/residential/rates-and-conditions/conditions-of-service/>. The Owner should consult Hydro Ottawa prior to commencing engineering designs to ensure compliance with these documents.
9. Hydro Ottawa reserves the right to raise conditions throughout the development of this proposal should the revisions contain non-conformances with, for example, Hydro Ottawa's Conditions of Service or Standards. To ensure the best outcome, Hydro Ottawa welcomes an early discussion on the proposal.
10. For details on electrical servicing, please contact [Design&Construction@hydroottawa.com](mailto:Design&Construction@hydroottawa.com).

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Please provide a resubmission that addresses each of the comments or issues. Ten copies of all plans and studies are required. A cover letter must be included that states how each of the comments are addressed on the resubmission. All addenda or revisions to any studies, or drawings, shall be accompanied by a \*.pdf copy (either by CD or USB). Engineering questions can be answered by Santhosh Kuruvilla at [Santhosh.Kuruvilla@ottawa.ca](mailto:Santhosh.Kuruvilla@ottawa.ca) or at 613-580-2424 ext. 27599. Please contact Laurel McCreight at [Laurel.McCreight@ottawa.ca](mailto:Laurel.McCreight@ottawa.ca) or at 613-580-2424 ext. 16587 if you have any other questions.



Ben Crooks  
Planning Assistant  
Development Review West



## APPLICATION FOR A FIRE ROUTE DESIGNATION

### Property Location

*Municipal or Lot No.*

*Street*

*City*

*Occupancy*

*Classification or Use of Building(s)*

*Identifying Name of Building(s)/Condominium/Shopping Centre*

### Reason for Application

☐ Fire Chief's Orders

☐ Property Owner/Agent's request

### Identification

Details	Applicant/Agent	Property Owner
Name		
Street		
Apt. No.		
City		
Postal Code		
Phone (Business)		
Fax		

All of the statements and representations contained in the attached documents filed in support of this application shall be deemed part of this application for all purposes. Fire route plan details must comply with the specific requirements of the Ontario Building Code and the Fire Route Plan Requirements document provided by the City of Ottawa.

### Declaration

I, the undersigned \_\_\_\_\_ am the, ☐ property owner, ☐ authorized agent of the property named in the above application, and I certify the truth of all statements or representations contained herein. I understand that the designation of the proposed fire route shall not be deemed a waiver of any of the provisions of any City of Ottawa by-law or Provincial legislation, notwithstanding including in or omitted from the plans or other material filed in support of or in connection with the above application.

\_\_\_\_\_  
*Signature of Owner or Authorized Agent*

Sworn before me in the \_\_\_\_\_ of \_\_\_\_\_ in the Province of Ontario, this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_.

\_\_\_\_\_  
*Notary Public/Commissioner for Oaths*

### Office Use

Date Application Received: \_\_\_\_\_  
dd/mm/yy

Plan circulated for internal comment: \_\_\_\_\_ Requested Return Date: \_\_\_\_\_  
dd/mm/yy dd/mm/yy

By-law sent for approval: \_\_\_\_\_ Council approved date: \_\_\_\_\_  
dd/mm/yy dd/mm/yy

By-law No.: \_\_\_\_\_ Applicant informed of fire route approval \_\_\_\_\_  
dd/mm/yy





March 28, 2018  
File: 160401329

Attention: **Ben Crooks/Santhosh Kuruvilla**  
City of Ottawa  
110 Laurier Ave. W., 4<sup>th</sup> floor  
Ottawa, Ontario  
K1P 1J1

Dear Santhosh,

Reference: **D07-12-17-0135 1st Submission Engineering Review Comments, Site Plan Control-851 Richmond Road**

The following summarizes Stantec's response to comments as received from the City of Ottawa for the 1st Submission Engineering Review Comments, dated December 14, 2017:

## **Engineering**

### **General**

1. All exterior light fixtures must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on one of the plans.

**Response: Site lighting plan has been revised accordingly**

2. Is there any easement on this property? If so, please clearly show and label all the easement(s) on all plans. Please provide a copy of the easement document.

**Response: There are no easements on the property.**



**Reference: 1<sup>st</sup> Submission Response – 851 Richmond Road**

3. Please note that additional review fees will be applicable for the 4<sup>th</sup> and subsequent reviews.

**Response: Noted**

4. The City file number for this application is D07-12-17-0135. Please place this number on all drawings (bottom right side –vertically outside the border).

**Response: City file number included on all drawings.**

5. The City plan number of this application is 17519. Please place this number on all drawings, horizontally at the bottom right side (Plan No. 17519).

**Response: City Plan number included on all drawings.**

6. Please complete the attached Fire Route Form and send to [Jennifer.Therkelsen@ottawa.ca](mailto:Jennifer.Therkelsen@ottawa.ca) after the fire route has been confirmed by [Allan.Evans@ottawa.ca](mailto:Allan.Evans@ottawa.ca) in order to add the fire route to the By-law. Please cc myself and the file lead as confirm that the form has been submitted.

**Response: The form has been submitted to the City on February 20, 2018**

7. Clearly show the property line on all drawings, on all sides of the property and add the line style in the legend.

**Response: Property line included on plan and labeled in legend.**

8. Please provide a full size drainage area plan for the existing condition for the entire site. On this plan, show the drainage area and runoff coefficient for each sub-catchment area. Also, add the overland flow route arrows on this plan. Provide a detailed composite runoff coefficient (c) calculation for each of the sub-catchment area and include it in the Appendix of the Site Servicing and Stormwater Management Brief. Clearly show and label the stormwater conveyance system outside the property line of this site.

**Response: full side drainage area plan of existing conditions provided with this submission, including flow routes. C values have been calculated and confirmed by Stantec based on ratio of hard surface vs soft surface for each area.**

9. Based on the available information, the downstream public stormwater conveyance system was designed and constructed prior to the year 1970 and assumed to be designed to convey the 2-year flow. Therefore, the runoff from the



**Reference: 1<sup>st</sup> Submission Response – 851 Richmond Road**

expansion/redevelopment area must be controlled to the 2-year pre-development condition with  $C=0.5$ .

Response: Calculations have been revised to control to 2yr predevelopment level with Capped  $C = 0.5$ . Note that the current site C value is 0.85 for area tributary to the existing rear outlet. As a result of the Capped C-value of 0.5 there will be approximately 40% less flow to the existing outlet under post development conditions.

10. As per discussion with the City Legal services, the owner/applicant has no rights to outlets the stormwater runoff to a private property on the north side, without any easement or legal agreement with the adjacent property owner. In order to outlet and to convey flow through a private land, please obtain an easement and enters into a joint use and maintenance agreement with the adjacent property owner(s).

Response: Following 1<sup>st</sup> submission, additional plans and reports have been provided by J.L. Richards for the 40 Cleary Avenue Preschool Site which was approved by the City in 2008/2009. The reports indicate that 100yr outflow drainage for the 851 Richmond Road site was accounted for in the 2008 analysis and was reviewed and approved by the City. Excerpts from information made available from J.L.Richards have been included in Appendix D. J.L. Richards was however, not able to locate the storm drainage plan or the supporting SWM calculations so the exact release rate provided for 851 Richmond Road is not known. A request for additional information has been made to the City but the drainage area plans associated with the application have not been made available. We again request the city provide the drainage plans for this previous application at 40 Cleary Avenue so that the downstream target can be confirmed which we expect would be well above the capped C-value 2yr predevelopment rate.

**Site Servicing and Stormwater Management Brief**

1. Section 4.0; paragraph 3 talks about DSEL's report that analyzed the capacity of the sanitary sewer on Richmond Road. Please include excerpts from this report to show the existing sanitary sewer on Richmond Rd. has additional capacity to receive sanitary flow from the proposed building.

Response: Excerpts from DSEL report included in Sanitary Appendix C

2. Section 5.2, paragraph 1; sentence 2 states that existing 375 mm diameter CSP discharges into an existing ditch in the existing Children's Centre to the north.



**Reference: 1<sup>st</sup> Submission Response – 851 Richmond Road**

However, what is shown on drawing no. EX-1 does not agree with the description. Please review and revise. Do you have permission to convey stormwater through the adjacent property on the north (Children's Centre)?

**Response:** See response #10 from general comments. Storm drainage was accounted for during development of the 40 Cleary Avenue site which was reviewed and approved by the City.

3. Section 5.2, paragraph 1; sentence 3 talks about a 15 m long conveyance ditch. Who owns and maintains this ditch? If the portion of the conveyance system is owned and maintained by a private entity and do not have an agreement with the adjacent property owner, an alternative outlet is required for the proposed development.

**Response:** There is no alternative outlet for the site. The site drainage flowing to 40 Cleary Avenue was included as part of their 2008/2009 site plan application.

4. Section 5.3; the stormwater management criteria that summarized in this section does not quite match the criteria that was given to you by the previous City project manager. Review and revise.

**Response:** Section revised to 2yr level of service.

5. Section 5.4; It appears that the proposed oil and grit separator is only providing the quality treatment for the runoff from the proposed development area. Please explain the reason for not providing the quality treatment for the runoff from the existing area in the south? Please consult with the Conservation Authority to confirm whether this approach is acceptable to them.

**Response:** OGS unit resized to provide quality control for the existing parking area as well as the proposed apartment development area.

6. Provide detailed calculations to show how the composite runoff coefficient (C) of the existing site is determined.

**Response:** C values have been calculated based on ratio of hard vs soft surface and have been confirmed by Stantec.

7. Section 5.4.4.2; sentence 1 states that it is proposed to detain stormwater within a 20 m<sup>3</sup> cistern below grade with a maximum controlled release rate of 29.7 L/s to the gravity service provided. It is not clear how you are controlling this release rate. Please elaborate.



**Reference: 1<sup>st</sup> Submission Response – 851 Richmond Road**

**Response:** The internal cistern will be designed by the mechanical consultant with a pump designed to discharge to a controlled release rate as specified in the Stantec report.

8. Section 5.4.4 talks about rooftop storage and subsurface (cistern) storage. However, there is no discussion about surface storage provided on the north and west side of the proposed building as shown on the Grading Plan. Please review and revise.

**Response:** Storm drainage for these areas will be directed via catchbasin/floor drains to the internal cistern without the use of parking lot storage.

9. Please provide stormwater management for the entire site, not just the expansion area (.31 ha).

**Response:** Stormwater management has been provided for the entire drainage area to the 40 Cleary Avenue outlet. Note that due to the City requirement for a capped C-value the post development discharge for the site will be approximately 40% less under post development vs pre-development conditions.

**Site Servicing Plan**

1. There are 2 proposed catch basins (CB 201 & CB 202) shown west of the proposed building. However, there are no catch basin leads shown on the plan to convey the stormwater captured by the CBs. Review and revise.

**Response:** The proposed CB's are directly above the 1st level of underground parking and will outlet internally to the proposed cistern. Discharge from the proposed catchbasin/floor drains will be coordinated with the mechanical consultant.

2. Please show the storm sewers that conveys stormwater from the underground cistern to the outlet.

**Response:** Outlet now shown from external OGS unit.

**Storm Drainage Plan**



**Reference: 1<sup>st</sup> Submission Response – 851 Richmond Road**

1. Is there a reason for redirecting the minor flow from the south of the property to the internal plumbing of the proposed building?

**Response:** Minor flows from the existing parking now directed to external storm sewer. All other flows directed to internal cistern to allow for controlling of flows to meet required release rate.

2. A drainage area shown at the north-west corner of the property does not have an identification no., drainage area nor runoff coefficient. Please provide.

**Response:** Revised.

3. Drainage area of the ramp shown as 0.00. Please review and revise.

**Response:** Revised.

**Grading Plan**

1. Provide at least 0.3 m freeboard between the high point at the underground parking entrance and the gutter elevation at the north side of Richmond Road to prevent the gutter flow from entering the parking garage.

**Response:** Entrance ramp previously located along Richmond Road now moved to rear of building.

2. It is not clear whether the large flow arrows shown on the plan and in the legend represents major overland flow route or not. Since the post-development runoff for the 1:100year storm event will be controlled to the calculated allowable release rate, no major overland flow route is required for the expansion area; only emergency overland flow route is required. Therefore, please revise the text associated with the large flow arrow shown in the legend. Major overland flow route is only required for the existing building and the surrounding area (outside the expansion area).

**Response:** Revised on plan and legend.

3. There are two pavement designs (car parking areas and local roads) shown on this plan. Clearly delineate these 2 areas with different hatchings.

**4. Response:** Areas delineated on proposed grading plan and shown on Legend.



March 28, 2018  
851 Richmond Road  
Page 7 of 7

**Reference: 1<sup>st</sup> Submission Response – 851 Richmond Road**

Regards,

**STANTEC CONSULTING LTD.**

Sheridan Gillis  
Project Manager Urban Land Engineering  
Phone: 613-725-5551  
Sheridan.Gillis@stantec.com

Neal Cody, P.Eng.  
Water Resources Engineer  
Phone: 780-969-3263  
Neal.Cody@stantec.com

w:\active\160401329\_851 richmond road\design\correspondence\city of ottawa\1st submission  
response letter\2018-03-28\_eng 1st submission comments response.docx

**From:** [Lucie Dalrymple](#)  
**To:** [Gillis, Sheridan](#)  
**Cc:** [Moroz, Peter](#); [Marsh Frère](#); [Guy Forget](#)  
**Subject:** RE: River Parkway Preschool - 40 Cleary Avenue  
**Date:** Wednesday, March 28, 2018 9:07:32 AM  
**Attachments:** [image001.png](#)  
[JLR\\_sig\\_logo\\_715c24bf-568b-46ae-8040-22d550fc23e3.png](#)  
[plan01.tif](#)  
[19616-05 SWM Plan RiverParkwayPreschoolCentre ClearyAve rev jan 07 \(2\).pdf](#)  
[Sheet\\_0003.PDF](#)  
[Sheet\\_0004.PDF](#)  
[Sheet\\_0001.PDF](#)  
[Sheet\\_0002.PDF](#)

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Hi Sheridan,

Please find attached the following PDF copies of the documents we had on file:

- JLR 19616 - SWM Report, dated January 2007
- JLR 19616 - Dwg S1, Rev.9: 25/08/09
- JLR 19616 – Dwg G1, Rev.8: 25/08/09
- JLR 19616 – Dwg 01, Rev.9: 25/08/09
- JLR 19616 – Dwg 02, Rev.9: 25/08/09

Note that we did not find a complete copy of the report and that the drawings attached do not seem to form a complete set of drawings. Please also note that the building footprint displayed on the drawings may not be in this exact location in the field due to on-site constraints encountered during construction.

*As requested, we have attached the electronic files for the aforementioned project.*

*J.L. Richards & Associates Limited (JLR) is providing the files in the spirit of project cooperation but only under the following conditions. Your use of these files will acknowledge your unqualified acceptance of the following conditions of use:*

- 1. The report and drawing files contain proprietary information and are the copyright property of J.L. Richards & Associates Limited.*
- 2. You agree to protect this data from unauthorized use by third parties.*
- 3. This is a one-time authorization and does not convey any agreement for any subsequent use.*
- 4. The report and drawing files were prepared for the purpose of design and administration of the JLR project and specifically were not prepared in anticipation of your stated use.*
- 5. All title blocks, professional seals or other references to the designers are to be fully removed prior to use, alteration or reprinting.*
- 6. It is acknowledged that modified and/or omitted information can result where fully compatible hardware/software are not used and/or where the files are not properly understood or manipulated. Changes to files may also occur with translation to other software packages and/or more or less current versions of the same software.*
- 7. The report and drawings are provided “as is” and at your request and for your convenience. You, at your sole discretion and expense, are responsible for verifying their accuracy and suitability for your purposes. J.L. Richards & Associates Limited cannot and does not accept responsibility for their subsequent use. Neither you, your subtrades, nor any third party, have any right of reliance on these files.*

Regards,

Lucie

**Lucie Dalrymple, P.Eng.**  
Associate  
Senior Civil Engineer

J.L. Richards & Associates Limited  
864 Lady Ellen Place, Ottawa, ON K1Z 5M2  
Tel: 613-728-3571 Fax: 613-728-6012



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**From:** Gillis, Sheridan [mailto:Sheridan.Gillis@stantec.com]  
**Sent:** March 26, 2018 3:53 PM  
**To:** Lucie Dalrymple  
**Cc:** Moroz, Peter  
**Subject:** River Parkway Preschool - 40 Cleary Avenue

Hi Lucy,

I'm not sure if you're the best person to be asking but I'm looking for a SWM report (or servicing/swm) for a pre-school at 40 Cleary Avenue which J.L. Richards prepared in 2007 (sorry you're our primary go-to for all things J.L.Richards). I've included the Site Servicing Plan for the site for reference. We're in the process of preparing a report for the Lord Richmond Apartments which drains to the southwest corner of the preschool and want to make sure we're matching any targets that had previously been set.

If you have any questions feel free to call,  
Thank you,

**Sheridan Gillis**

Project Manager, Urban Land Engineering  
Stantec  
400 - 1331 Clyde Avenue Ottawa ON K2C 3G4  
Phone: (613) 725-5551

Mobile: (613) 799-1363  
[sheridan.gillis@stantec.com](mailto:sheridan.gillis@stantec.com)



Design with community in mind