Site Servicing and Stormwater Management Report for Site Plan Control Application

ESP Pierre-de-Blois
Auditorium Addition
1310 Chapman Mills Dr.,
Ottawa, Ontario

Prepared for

Conseil des écoles publiques de l'Est de l'Ontario (CEPEO)

LRL File No.: 220512

March 19, 2026

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1 INTRODUCTION

LRL Associates Ltd. (LRL) has been retained by the Conseil des écoles publiques de L'Est de l'Ontario (CEPEO) to prepare a site servicing and stormwater management report in support of their site plan control application for a proposed new auditorium addition & site alterations to the existing Public High School, ESP Pierre-de-Blois, in Barrhaven.

This report aims to review the adequacy of the current site's water, sanitary and stormwater networks, and determine whether any changes / upgrades are required to accommodate the expected increase in demand & flow from the new addition & site changes.

This report is to be read in conjunction with the Site Servicing and Stormwater Management Report prepared for the initial school development, titled "Proposed New Public High School Barrhaven Center" prepared by LRL Engineering dated September 5th, 2019.

This report has been prepared in consideration of the survey carried out by Annis O'Sullivan Vollebekk Ltd. (AOV) in August 2017 and the master servicing study "Harmony Stage 1 Development for Minto Communites" prepared by J.L. Richards & Associates Limited and dated July 2017. Topographical data for the developed high school site has been pulled from high school development site grading as-builts, as prepared by LRL Engineering.

Should there be any discrepancies in the existing infrastructure, which may relate to the site servicing considerations, LRL should be advised in order to review the report recommendations. This report should be read in conjunction with the grading and drainage, site servicing, and stormwater management plans prepared by LRL.

2 SITE DESCRIPTION

The subject property is located within the urban boundary of the City of Ottawa, south of Strandherd Drive and west of Chapman Mills Drive, and has a total area of approximately 4.86 ha.

The site is currently occupied by the recently constructed Pierre-de-Blois High School, a three-storey slab-on-grade institutional building with an approximate footprint of 6,770 m². Site access is provided from Chapman Mills Drive. In addition to the school building, the site includes an internal access roadway, parking areas, playgrounds, a soccer field, and an area reserved for future portable classrooms. Prior to the development of the high school, the property consisted of vacant land.

Any site modifications associated with the proposed auditorium expansion will be designed and constructed by others in accordance with applicable municipal design criteria, while maintaining consistency with the master servicing design for the Harmony Stage 1 development, as

prepared by J.L. Richards & Associates Limited as part of the Harmony Stage 1 Development for Minto Communities, dated July 2017.

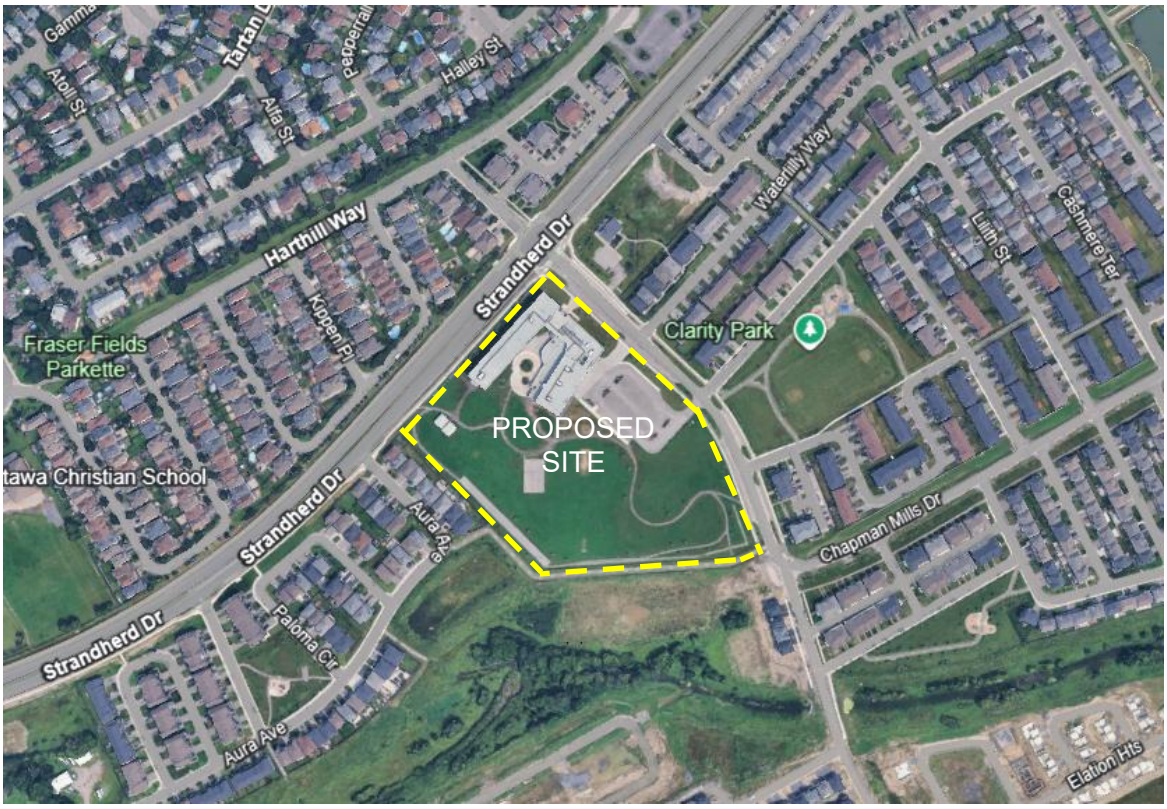


Figure 1 - Aerial view of the location of the proposed development (Google Earth)

3 SCOPE OF WORK

As per applicable guidelines, the scope of work includes the following:

Water services

- Calculate the anticipated domestic water demands under average and peak flow conditions, as well as the fire protection requirements, for the existing school and proposed addition.
- Review adequacy of the current on-site water distribution network based on new calculated water demand & fire flow.

Sanitary services

- Calculate the peak flow rates for the existing school and proposed addition.
- Review adequacy of the current on-site sanitary sewer based on new peak flow rates.

Stormwater management

- Calculate roof drain and storage requirements for the new auditorium addition, and determine feasibility of tying them to the exsiting on-site stormwater network
- Review adequacy of the current on-site stormwater network based on changes, including; pipe sizing, flow control, storage requirements and quality treatment based on new tributary drainage areas.

4 WATER SUPPLY AND FIRE PROTECTION

4.1 Existing Water Supply Services

Based on the civil drawing prepared for the school development, municipal as-builts and sewer and watermain mapping; it can be observed the current school building is serviced by an on-site 200mm dia. watermain. The watermain, branching off the north face of the school, follows the existing site parking lot and driveway to connect to the Chapman Mills Dr. 300mm diameter watermain, approximately 240m southeast of the Strandherd / Chapman Mills intersection.

There are currently four (4) municipal fire hydrants located within proximity to the site, along Chapman Mills Drive and within the residential subdivision east of the institutional lot. Two private fire hydrants have been installed on-site, branching off the private 200mm watermain to ensure compliance with OBC, placing a hydrant within 90m of the principal entrances, and within 45m of the building's Fire Department Connection. The hydrants are located just off the southwest corner, and the southwest corners, of the school.

Refer to C401 – Servicing Plan for the existing municipal infrastructure design.

4.2 Water Supply Demand

With the proposed building expansion comes an expected increase in water demand and fire protection requirements. Domestic water demand and fire protection demand requirements for the proposed building, including the new addition, are to be calculated to ensure adequacy of the existing on-site water distribution network.

The institutional water demand, based on the anticipated population, was determined using Table 4.2 of the City of Ottawa *Water Distribution Design Guidelines*. The water supply requirements for the institutional development have been calculated using the following formulas:

Where:
q = average water consumption (L/capita/day)
P = design population (# of students)
M = Peak factor

The existing building including the auditorium expansion is expected to have a student population of 700. *Table 4.2 of the City of Ottawa Water Distribution Design Guidelines* was used to determine the unit rate and peaking factors of the institutional space. A water consumption rate of **70L/student/day**, a Maximum Daily Demand Factor of **1.5** and a Maximum Hourly Demand Factor of **1.8** were used to perform the water demand calculations.

Using the peak factors, the anticipated institutional demands were calculated as follows:

- Average daily domestic water demand is **0.81 L/s,**
- Maximum daily demand is **1.22 L/s,** and
- Maximum hourly demand is **2.19 L/s.**

Per City of Ottawa Technical Bulletin ISTB-2021-03, 4.3.1 developments with a basic day demand greater than 50 m^3/day (0.57L/s) shall be connect with a minimum of two water service connections, separated by an isolation valve to avoid a vulnerable service area. The addition of the auditorium expansion creates daily demand greater than the 0.57L/s requiring the site to install a second watermain connection point with the installation of an isolation valve.

Detailed water demand calculations can be found in Appendix A.

4.3 Fire Flow Requirements

The estimated fire flow for the proposed buildings was calculated in accordance with *ISTB-2018-02,* evaluated in accordance with the Fire Underwriters Survey (FUS) design methodology. The following parameters were provided by the Architect:

- Type of construction – Non-combustible construction (Type II)
- Occupancy type – Limited Combustible
- Sprinkler Protection – None

The estimated fire flow demand was estimated to be **14,000 L/min (233.3 L/s),** see Appendix A for calculation details.

4.4 Boundary Conditions

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand and fire flow calculations, as indicated in the boundary request correspondence included in ***Appendix A*.**

Table 1 below summarizes boundary conditions for the proposed development.

Table 1: Summary of Boundary Conditions

Design Parameter	Anticipated Demand (L/s)	Boundary Conditions @ Chapman Mills Dr (m H2O)	*Residual Pressure (psi)
Average Daily Demand	0.81	153.7	84.7
Max Day + Fire Flow (per FUS)	1.22 + 233.3	141.7	67.6
Peak Hour	2.19	144.9	72.2
**Ground elevation assumed at 94.20m for the proposed connection at Chapman Mills Dr WM*			

As indicated in red in Table 2, residual pressure within the Maximum HGL / Average Daily Demand scenario will exceed the required pressure range stated in the City of Ottawa Design Guidelines – Water Distribution (Section 4.2.2). Refer to ***Appendix C*** for Boundary Conditions.

As on-site pipe pressure losses do not reduce pressure sufficiently to fall within the acceptable range, a pressure reducing valve will need to be installed immediately downstream of the isolation valve in the building. The design and implementation of the pressure reducing valve to be performed by the mechanical engineer, and included within the buildings plumbing design.

Considering the calculated peak water demands and fire flow of the existing building & auditorium, with the addition of the pressure reducing valve, the existing private watermain is considered adequate to accommodate both existing and proposed water and fire flow demands.

4.5 Fire Hydrant Coverage & Aggregate Flow

There are four (4) existing fire hydrants in proximity to the proposed lot, and two (2) private hydrants within the site, that are available to contribute to the required fire flow demands.

Table 2 below summarizes the aggregate fire flow of the contributing hydrants in proximity to the proposed development, and private hydrants based on Table 18.5.4.3 of *ISTB-2018-02*.

Table 2: Fire Protection Summary Table

	Max. Fire Flow Demand (L/min)	Fire Hydrants(s) within 76m	Fire Hydrant(s) within 152m	Fire Hydrant(s) within 305m	Available Combined Fire Flow* (L/min)
Existing Development + Addition	13,000	3	3	0	(3 x 5678) + (3 x 3785) = 28,389

*assuming residual pressure of minimum 20 psi (139.9 kPa)

The total available fire flow from contributing hydrants is equal to **28,389 L/min,** which is sufficient to provide adequate fire flow for the proposed development.

As the previously installed southwest fire hydrant falls within a 45m radius of the new auditorium entrance, and sufficient aggregate flow is provided by nearby fire hydrants, and the proposed southwest private fire hydrant, no changes are required to the existing fire protection network.

5 SANITARY DRAINAGE

5.1 Existing Sanitary Sewer Services

Based on the civil drawing prepared for the school development, municipal as-builts and sewer and watermain mapping; it can be observed the current school building is serviced by an on-site 250mm dia. sanitary sewer. The sanitary sewer, branching off the east face of the school, follows the existing site parking lot and driveway to connect to a sanitary manhole within the 900mm diameter sanitary sewer located on Chapman Mills Dr., approximately 240m southeast of the Strandherd / Chapman Mills intersection.

5.2 Sanitary Sewer Servicing Design

The peak design sanitary flow for the existing building and the proposed addition was calculated in accordance with Sections 4.4.1.2 (Institutional Flows), 4.4.1.4 (Extraneous Flows), and Appendix 4-A of the City of Ottawa Sewer Design Guidelines. The parameters used to estimate the anticipated institutional sanitary flows include a total site area of 4.86 ha, an institutional peak flow rate of 28,000 L/day, an institutional peak factor of 1.5, and an extraneous flow allowance of 0.33 L/s/ha. Based on these parameters, the total anticipated wet weather sanitary flow was estimated to be **3.96 L/s**.

Table 2: Sanitary Sewer Design Criteria

Design Parameter	Value
Manning roughness coefficient (n)	0.013
Minimum velocity (full)	0.6 m/s
Maximum velocity (full)	3.0 m/s

The existing on-site sanitary sewer consists of a 250 mm diameter pipe with an approximate total length of 120 m and a minimum longitudinal slope of 1.0%. The flow capacity of the existing sewer was calculated to be **59.47 L/s**, with a corresponding flow velocity of **1.21 m/s**. As the anticipated sanitary flow is well below the calculated pipe capacity and the flow velocity falls within the allowable range specified in the City of Ottawa Sewer Design Guidelines, the existing private sanitary sewer is considered adequate to accommodate both existing and proposed sanitary design flows.

Refer to Appendix B for the site sanitary sewer design calculations.

6 STORMWATER MANAGEMENT

6.1 Existing Stormwater Infrastructure

Based on the 2019 civil drawing prepared for the school development, municipal as-builts and sewer and watermain mapping; it can be observed that a private stormwater network had been developed to services the current school building and site. Drainage from the site is captured by a series of roof drains, catch basins, catch basin manholes and perforated subdrains which conveys the stormwater to the existing 1,350mm diameter storm sewer on Chapman Mills Drive.

Stormwater quantity flow control is provided via flow-control roof drains on the existing school rooftop, an undersized 900mm diameter pipe at the site stormwater network outlet, and storage requirements are accommodated via an on-site infiltration gallery.

A Stormwater Management Facility Pond design by J.L. Richards & Associates Limited is located southeast of the subject site at the downstream end of Minto Harmony Community and provides enhanced protection, 80% Total Suspended Solids removal. Hence, no stormwater quality management is required on the site for the addition.

6.2 Proposed Management Concept

The proposed scope of work includes the addition of an auditorium to the existing school, along with several minor modifications to site grading and drainage to accommodate the addition and associated site improvements. Five new roof drains and corresponding roof ponding areas are proposed for the new addition.

Stormwater tributary and catchment areas will be revised to reflect the proposed site changes. As a result of these modifications, the site stormwater management design—including the storm sewer network sizing, quantity control measures, and storage requirements—will be reviewed to confirm its adequacy under the proposed conditions.

6.3 Design Criteria – Water Quantity

Proposed development stormwater management quantity control will remain as constructed following the same criteria as the previous development. All storm events up to and including the 100-year event will continue to be controlled to the 5-year pre-development level. The site major overland flow route has been designed to ensure that storm events beyond the 100-year design storm can be safely conveyed overland towards the Chapman Mills Drive right-of-way. The minor system (storm sewer) within the site is sized to convey the 5-year storm event flows from the site to the municipal storm sewer on Chapman Mills Drive.

The Rational Method was used to calculate the runoff from the development. The Intensity-Duration-Frequency (IDF) curve formulas for the MacDonald-Cartier International Airport, in the city of Ottawa, were used to calculate the peak storm flows for the site.

This site is subject to stormwater management control where the allowable flow for the 5 and 100-year storm events are estimated at 1,055.8 L/s as per the design prepared by J.L. Richards & Associates Limited. The total allowable release rate will be restricted with an undersized pipe at the outlet that will throttle the total allowable release rate to **884L/s** as per J.L. Richards & Associates Limited design sheet. Refer to Appendix D - Supporting Documents.

6.4 Stormwater Quantity Controls

The existing stormwater management quantity control for this development have been accomplished through the use of:

- Existing undersized piping to throttle the flow rate,
- existing Zurn Control-Flo roof drains & roof top water storage,
- existing pipe, maintenance hole and infiltration gallery storage

The existing site storm sewer and stormwater management system are shown on drawing C401 – Servicing Plan within Appendix E of the report.

6.4.1 Rooftop Stormwater Management

In current conditions, the collected stormwater from the previously proposed catchment area WS-15 was regulated using thirty-five (35) one notch Zurn Control-Flo roof drains with a total maximum release rate of **15.11 L/s*m.** With the thirty-five (35) roof drains, the total anticipated flow from the roof drains was **63.47 L/s**, and rooftop ponding could reach a maximum volume of **213 m^3** during the 100-year storm event. The controlled roof water was conveyed to storm manhole MH02 before outletting to Chapman Mills Drive.

The rooftop catchment area WS-15 was originally calculated using conservative assumptions to account for potential future additions to the school. With the footprint of the proposed auditorium now confirmed, the calculation has been revisited to reflect the actual footprint of the east addition rather than the previously assumed conservative area. As a result, the WS-15 catchment area has been reduced to 0.677 ha.

The addition of the auditorium necessitates new roof drains to adequately control and manage rooftop stormwater. The proposed rooftop drainage system includes five (5) additional one-notch Zurn Control-Flo roof drains, providing a combined maximum release rate of **15.11 L/s·m**. With a revised total of forty (40) roof drains across the site, the total anticipated discharge from the roof drainage system is **70.72 L/s**. Under the 100-year storm event, rooftop ponding is anticipated to reach a maximum storage volume of **186.04 m^3.**

Controlled roof runoff is conveyed to storm manhole MH02, downstream of the flow control structure, prior to discharging to Chapman Mills Drive.

Detailed rooftop calculations can be found in Appendix C.

6.4.2 Surface Stormwater Management

With the proposed changes to the addition footprint and site, some minor changes have been made to the previous site design's catchment area's / watershed. Table 3, included below, provides a summary of the new catchment areas to be used for the purposes of this report.

Table 3: Post-Development Estimated Areas & Runoff Coefficients

WATERSHED	Total Area (ha)	Weighted Runoff Coefficient (C)
RWS-01 (controlled)	0.074	0.90
WS-02 (controlled)	0.104	0.28
WS-03 (controlled)	0.284	0.76
WS-04 (controlled)	0.228	0.90
RWS-05 (controlled)	0.133	0.36
RWS-06 (controlled)	0.111	0.30
RWS-07 (controlled)	0.175	0.26
WS-08 (controlled)	0.186	0.75
WS-09 (controlled)	0.130	0.88
RWS-10 (controlled)	1.001	0.25
RWS-11 (controlled)	0.942	0.31
WS-12 (controlled)	0.333	0.50
RWS-13 (controlled)	0.325	0.34
WS-14 (controlled)	0.147	0.76
CA-15 (uncontrolled)	0.677	0.90
TOTAL	**4.850**	**0.50**

The surface currently consists of parking and driving area, landscaped area and playground area. Runoff from these catchment areas will be captured through a number of catchbasins and subdrains before being directed to the existing 825mm outlet on Chapman Mills Drive and controlled with the undersized 825mm diameter reinforced concrete pipe. The 825mm pipe is installed at a 0.29% slope, with a full capacity / allowable release rate of **769 L/s**.

In order to control the 100-year storm event with the new catchment areas, while still utilizing the existing flow control system, **253.20m^3** of on-site storage will be required.

Storage is currently being provided by the underground pipes, structures and infiltration gallery. With the revisions to the catchment areas, the existing stormwater network systems will provide the following storage volumes;

- **115.84** m^3 from on-site pipes and maintenance structures and

- **180.31** m^3 from the infiltration gallery.

As the available storage greatly exceeds the required, the existing stormwater management network is sufficient to accommodate the proposed changes in surface runoff, and will not require any modifications for the proposed works.

Refer to C401 – Servicing Plan and Appendix C for stormwater management design details.

7 EROSION AND SEDIMENT CONTROL

During the construction, erosion and sediment controls will be required primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Inlet sediment control devices are also to be provided in any catchbasin and/or manholes on and around the site that may be impacted by the site construction activities. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS 577. Refer to LRL drawing C101 – Erosion and Sediment Control Plan for details.

8 CONCLUSIONS

In accordance with this report objectives, the analyses for the proposed development can be summarized as follows:

Water Service

- The anticipated average daily domestic water demand is **0.81 L/s,** maximum daily demand is **1.22 L/s,** and maximum hourly demand is **2.19 L/s.** This is only represents a minor increase in domestic water demand from the exsiting school.
- With the expansion the basic day demand is greater than 50m^3/day creating a vulnerable service area and therefore requiring a second water service connection.
- The required fire flow was calculated at **233.3 L/s** using the FUS method, same as it was for the existing school.
- Residual site pressures are calculated to be higher then the required 80psi and therefore a pressure reducing valve will be installed.
- Based on the expected water demands, fire flow and fire hydrant layout, it has been concluded the existing on-site watermain is adequate to accommodate the new addition.

Sanitary Service

- The anticipated sanitary flow from the proposed development is **3.96 L/s**.
- Based on the anticipated peak sanitary flow, it has been concluded the existing on-site sanitary sewer will have more than adequate to accommodate the additions flows.

Stormwater Management

- 5 new roof drains will be added to the auditorium rooftop, increasing total rooftop discharge to **70.72 L/s**, and providing a maximum rooftop storage of **186.04 m^3**.
- Some watersheds / catchment areas have been revised to accommodate the new building addition and minor site changes. It has been determined that the current stormwater network has adequate storage & pipe capacity to accommodate the change in catchment runoffs and rooftop discharge, all while keeping the existing flow control system.

9 LIMITATIONS AND USE OF REPORT

The report conclusions are applicable only to this project described in this report. Any changes may require a review by LRL Associates Ltd. to insure compatibility with the recommendations contained in this report. We trust the information presented meets your current requirements. Please do not hesitate to contact us should you have any questions or concerns.

Prepared by:

LRL Associates Ltd.

Kyle Herold
Civil Project Manager

Kelly Paradis, PEng, PMP
Senior Manager of Civil Engineering

APPENDIX A

Domestic Water Demand and Fire Flow Calculations & Boundary Conditions

Water Supply Calculations

LRL File No. : 220512-03
Project: Auditorium Addition - ESP Pierre-de-Blois
Location: 1310 Chapman Mills Dr, Ottawa
Date: 2026-03-19
Designed: K. Herold
Checked: K. Paradis
Dwg Reference: C401

Water Demand based on the City of Ottawa Design Guidelines-Water Distribution, 2010

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate (L/student/d)	Student Capacity	Demand (L/d)
Institutional	**70**	**1000**	**70000**

Average Day Demand	**70,000**	**L/d**		**0.810**	**L/s**
Maximum Day Factor	1.5		(Design Guidelines-Water Distribution Table 4.2)		
Maximum Daily Demand	**105,000**	**L/d**		**1.215**	**L/s**
Peak Hour Factor	1.8		(Design Guidelines-Water Distribution Table 4.2)		
Maximum Hour Demand	**189,000**	**L/d**		**2.188**	**L/s**

TOTAL DEMAND				
Average Day Demand	**70,000**	**L/d**	**0.81**	**L/s**
Maximum Daily Demand	**105,000**	**L/d**	**1.22**	**L/s**
Maximum Hour Demand	**189,000**	**L/d**	**2.19**	**L/s**

Water Service Pipe Sizing

Q = VA

Where: V = velocity (m/s)
A = area of pipe (m^2)
Q = flow rate (L/s)

Assuming a maximum velocity of 1.8m/s, the diameter of pipe is calculated as:

Minimum pipe diameter (d) =	$(4Q/\pi V)^{1/2}$	
=	0.039	m
=	39	mm
Proposed pipe diameter (d) =	**50**	mm
=	**2**	Inches

Fire Flow Calculations

LRL File No. 220512-03
Project: Auditorium Addition - ESP Pierre-de-Blois
Location: 1310 Chapman Mills Dr, Ottawa
Date: March 19, 2026
Method: Fire Underwriter's Survey (FUS)
Prepared by: K. Herold

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow
Construction Coefficient (C)								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame Construction (Type V)	1.5	Noncombustible Construction (Type II)	**0.8**		
			Mass Timber Construction (Type IV-A)	0.8				
			Mass Timber Construction (Type IV-B)	0.9				
			Mass Timber Construction (Type IV-C)	1.0				
			Mass Timber Construction (Type IV-D)	1.5				
			Ordinary Construction (Type III)	1.0				
			Noncombustible Construction (Type II)	0.8				
			Fire Resistive Construction (Type I)	0.6				
Floor Area (A)								
2	Total Effective Floor Area					**10,089**	m^2	
3	Obtain fire flow before reductions	Required fire flow (rounded to nearest 1000)	Fire Flow = 220 x C x $A^{0.5}$				L/min	**18,000**
Occupancy and Contents Adjustment								
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Noncombustible	-25%	Limited combustible	**-15%**	L/min	**15,300**
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
Sprinkler Protection								
5	Choose reduction for sprinklers	Sprinkler reduction	Automatic sprinkler protection designed & installed in accordance with NFPA 13	-30%	False	**0%**	L/min	**13,770**
			Water supply is standard for both the system and fire department hose lines	-10%	True	**-10%**		
			Fully supervised system	-10%	False	**0%**		
Exposure Adjustment								
6	Choose separation	Exposure distance	North side	>30m	0%	**0%**	L/min	**13,770**
			East side	>30m	0%			
			South side	>30m	0%			
			West side	>30m	0%			
Net Required Fire Flow								
7	Obtain fire flow and duration		Minimum required fire flow (rounded to nearest 1000)				L/min	**14,000**
			Minimum required fire flow				L/s	**233.3**
			Required duration of fire flow				hr	**3.0**

Pipe Pressure Losses Calculations

LRL File No. 220512-03
Project Auditorium Addition - ESP Pierre-de-Blois
Location: 1310 Chapman Mills Dr, Ottawa
Date 2026-03-19
Designed: K. Herold

Piezometric Head Equation (Derived from Bernoulli's Equation)

$$h = \frac{p}{\gamma} + z$$

Where:

h = HGL (m)
p = Pressure (Pa)
γ = Specific weight (N/m3) = 9810
z = Ground Elevation (m) = 94.2

Water Pressure on Huron Street			
HGL (m)		Pressure	
		kPa	psi
Minimum =	144.9	497.37	72.14
Maximum =	153.7	583.70	84.66
Max. Day + Fire =	141.7	465.98	67.58

Hazen Williams Equation

$$h_f = \frac{10.67 \times Q^{1.85} \times L}{C^{1.85} \times d^{4.87}}$$

Where:

h_f = Head loss over the length of pipe (m)
Q = Volumetric flow rate (m^3/s)
L = Length of pipe (m)
C = Pipe roughness coefficient
d = Pipe diameter (m)

Scenario 1: maximum daily demand

Q (L/s)	1.215
C	110
L (m.)	153.1

I.D. (mm)	250	
V (m/s)	0.02	
h_f (m)	0.00	
Head Loss (psi)	0.00	
Min. Pressure (psi)	72.14	
Max. Pressure (psi)	84.66	
Service Obv. @ Street Connection (m)	91.70	
Service Obv. @ Building Connection (m)	92.00	
Pressure Adjustment (psi)	-0.43	(due to service elev. Diff. from street to building)
Adjusted Min. Pressure (psi)	71.71	(must not be less than 50psi)
Adjusted Max. Pressure (psi)	84.23	(must not be more than 80psi)

Scenario 2: maximum hourly demand

Q (L/s)	2.188	
C	110	
L (m.)	153.1	
I.D. (mm)	200	
V (m/s)	0.07	
h_f (m)	0.01	
Head Loss (psi)	0.01	
Min. Pressure (psi)	72.13	
Max. Pressure (psi)	84.65	
Service Obv. @ Street Connection (m)	91.70	
Service Obv. @ Building Connection (m)	92.00	
Pressure Adjustment (psi)	-0.43	(due to service elev. Diff. from street to building)
Adjusted Min. Pressure (psi)	71.70	(must not be less than 40psi)
Adjusted Max. Pressure (psi)	84.22	(must not be more than 80psi)

APPENDIX B

Sanitary Servicing Calculation Sheet

LRL Associates Ltd.

Sanitary Sewer Design Sheet

LRL File No.: 220512-01
Project: Auditorium Addition - ESP Pierre-de-Blois
Location: 1310 Chapman Mills Dr., Ottawa
Designed: K. Herold
Checked: K. Paradis
Date: 2026-01-16
DWG. Reference: C401

Sanitary Design Parameters

Commercial & Institutional Flow = 28000 L/ha/day
Light Industrial Flow = 35000 L/ha/day
Heavy Industrial Flow = 55000 L/ha/day
Maximum Residential Peak Factor = 4.0
Commercial & Institutional Peak Factor = 1.5
Average Daily Flow = 280 L/p/day
Industrial Peak Factor = as per Appendix 4-B
Extraneous Flow = 0.33 L/s/ha

Pipe Design Parameters

Maximum Velocity = 3.00 m/s
Minimum Velocity = 0.60 m/s
Manning's n = 0.013

LOCATION			RESIDENTIAL						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL FLOW, Q	PIPE						
STREET	FROM	TO	AREA	POP.	ACCU. AREA	ACCU. POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FACT.	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW		LENGTH	DIA.	SLOPE	MATERIAL	CAP. Q(FULL)	VEL. V(FULL)	RATIO Q /QFULL
			(Ha)		(Ha)			(L/s)	(Ha)	(Ha)		(Ha)		(Ha)	(Ha)	(L/s)	(Ha)	(Ha)	(L/s)	(L/s)	(m)	(mm)	(%)		(L/s)	(m/s)	
	BLDG	Ex. SAN												4.858		2.36	4.858	4.858	1.60	3.96		250	1.00%	PVC	59.47	1.21	0.07

Notes: Existing inverts and slopes are estimated. They are to be confirmed on-site.

APPENDIX C

Stormwater Management Design Sheets

LRL File No.	220512-01
Project:	Auditorium Addition - ESP Paul-de-Blois
Location:	1310 Chapman Mills Dr, Ottawa
Date:	January 16, 2026
Designed:	K. Herold
Checked:	K. Paradis
Drawing Reference:	C701, C703

Post-Development Catchments

WATERSHED	C = 0.20	C = 0.80	C = 0.90	Total Area (ha)	Combined C
EWS-01	4.850	0.000	0.000	4.850	0.20

Post-Development Catchments (Post-Addition)

WATERSHED	C = 0.20	C = 0.80	C = 0.90	Total Area (ha)	Combined C
RWS-01	0.000	0.000	0.074	0.074	0.90
WS-02	0.092	0.000	0.012	0.104	0.28
WS-03	0.056	0.000	0.228	0.284	0.76
WS-04	0.000	0.000	0.228	0.228	0.90
RWS-05	0.103	0.000	0.030	0.133	0.36
RWS-06	0.095	0.000	0.016	0.111	0.30
RWS-07	0.160	0.000	0.015	0.175	0.26
WS-08	0.041	0.000	0.145	0.186	0.75
WS-09	0.003	0.000	0.127	0.130	0.88
RWS-10	0.934	0.000	0.067	1.001	0.25
RWS-11	0.796	0.000	0.146	0.942	0.31
WS-12	0.190	0.000	0.143	0.333	0.50
RWS-13	0.260	0.000	0.065	0.325	0.34
WS-14	0.030	0.000	0.117	0.147	0.76
RWS-15	0.000	0.000	0.677	0.677	0.90
TOTAL	2.760	0.000	2.090	4.850	0.50

*WS-XX (SAME AS PRE-ADDITION), RWS-XX (REVISED TO ACCOMODATE PROPOSED AUDITORIUM ADDITION + SITE CHANGES)

LRL File No.	220512-01
Project:	Auditorium Addition - ESP Paul-de-Blois
Location:	1310 Chapman Mills Dr, Ottawa
Date:	January 16, 2026
Designed:	K. Herold
Checked:	K. Paradis
Drawing Ref.:	C401

Stormwater Management Design Sheet

STORM - 5 YEAR

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) = $A / (Td + C)^B$
A = Area (ha)
T_c = Time of concentration (min)

Pre-Devlopment Catchments within Development Area

Allowable Release Rate 5 Year Pre-Development Flow Rate

$I_5 =$ **$998.071 / (Td + 6.053)^{0.814}$** **a = 998.071** **b = 0.814** **C = 6.053**

Allowable Release Rate= 884.00 L/s As Per JL Richards, Harmony Stage 1 Report Dated July 2017

Post-development Stormwater Management

					$\sum R_5$	$\sum R_{100}$
	Total Site Area =	**4.850**	ha	**∑R=**	**0.50**	**0.63**
Controlled	WS-01	0.074	ha	R=	0.90	1.00
	WS-02	0.104	ha	R=	0.28	0.35
	WS-03	0.284	ha	R=	0.76	0.95
	WS-04	0.228	ha	R=	0.90	1.00
	WS-05	0.133	ha	R=	0.36	0.45
	WS-06	0.111	ha	R=	0.30	0.38
	WS-07	0.175	ha	R=	0.26	0.33
	WS-08	0.186	ha	R=	0.75	0.93
	WS-09	0.130	ha	R=	0.88	1.00
	WS-10	1.001	ha	R=	0.25	0.31
	WS-11	0.942	ha	R=	0.31	0.39
	WS-12	0.333	ha	R=	0.50	0.63
	WS-13	0.325	ha	R=	0.34	0.43
	WS-14	0.147	ha	R=	0.76	0.95
	Total Flow to Storm Stub =	**4.173**	**ha**	**∑R=**	**0.44**	**0.55**
Roof Top	WS-15 (Controlled Rooftop Area)	0.677	ha	R=	0.90	1.00
	Total Flow to Storm Stub =	**0.677**	**ha**	**∑R=**	**0.90**	**1.00**

Post-development Stormwater Management

$I_{100} =$ **$1735.688 / (Td + 6.014)^{0.820}$** **a = 1735.688** **b = 0.82** **C = 6.014**

		Rooftop Storage			Overland Storage					
Time (min)	**Intensity (mm/hr)**	**Controlled Runoff (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Controlled Runoff** (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Uncontrolled Runoff (L/s)**	**Total Release Rate (L/s)**	**Height on Roof (m)**
10	178.6	336.06	165	60.44	1192.00	253	770.0	0.00	830	0.098
20	120.0	225.75	186	70.72	830.86	73	770.0	0.00	841	0.110
30	91.9	172.90	181	72.53	654.72	0	770.0	0.00	843	0.107
40	75.1	141.43	167	71.93	548.14	0	770.0	0.00	842	0.099
50	64.0	120.37	151	70.12	475.40	0	770.0	0.00	840	0.089
60	55.9	105.20	139	66.49	420.70	0	770.0	0.00	836	0.082
70	49.8	93.71	127	63.47	378.99	0	770.0	0.00	833	0.075
80	45.0	84.68	116	60.44	345.56	0	770.0	0.00	830	0.069
90	41.1	77.37	108	57.42	317.95	0	770.0	0.00	827	0.064
100	37.9	71.34	102	54.40	294.60	0	770.0	0.00	824	0.060
110	35.2	66.25	86	53.19	276.27	0	770.0	0.00	823	0.051
120	32.9	61.91	80	50.77	259.23	0	770.0	0.00	821	0.047
130	30.9	58.15	105	44.73	240.54	0	770.0	0.00	815	0.062

Infiltration Gallery - 280m

Pipe Storage	13.74	m^3	
Granular Storage	166.6	m^3	40% Void
Total Available Storage =	**180.31**	**m^3**	refer to Drawing C401 for detail

Rooftop Controls

Control-Flo Roof Drain Rate =	136	L/min
Max HWL =	0.150	m
Control-Flo Roof Drain Rate =	15.11	L/s·m
# of roof drains =	40	
Max Roof Storage =	186.0	m^3
Height =	0.110	m
Max Roof Rel. Rate =	70.72	L/s

Onsite Stormwater Retention

Total Storage Required =	**253.20**	**m^3**	
Pipe Storage =	101.37	m^3	refer to Storm Sewer Design Sheet
CB/MH Storage =	14.47	m^3	refer to Storm Sewer Design Sheet
Infiltration Gallery =	180.00	m^3	refer to Drawing C401
Total Available Storage =	**295.84**	**m^3**	

LRL File No.	220512-01
Project:	Auditorium Addition - ESP Paul-de-Blois
Location:	1310 Chapman Mills Dr, Ottawa
Date:	January 16, 2026
Designed:	K. Herold
Checked:	K. Paradis
Drawing Ref.:	C401

Stormwater Management Design Sheet

STORM - 5 YEAR

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) = $A / (Td + C)^B$
A = Area (ha)
T_c = Time of concentration (min)

Pre-Devlopment Catchments within Development Area

Allowable Release Rate 5 Year Pre-Development Flow Rate

$I_5 =$ **998.071 / (Td + 6.053)$^{0.814}$** **a = 998.071** **b = 0.814** **C = 6.053**

Allowable Release Rate= 884.00 L/s As Per JL Richards, Harmony Stage 1 Report Dated July 2017

Post-development Stormwater Management

					$\sum R_5$	$\sum R_{100}$
	Total Site Area =	**4.850**	ha	**∑R=**	**0.50**	**0.63**
Controlled	RWS-01	0.074	ha	R=	0.90	1.00
	WS-02	0.104	ha	R=	0.28	0.35
	WS-03	0.284	ha	R=	0.76	0.95
	WS-04	0.228	ha	R=	0.90	1.00
	RWS-05	0.133	ha	R=	0.36	0.45
	RWS-06	0.111	ha	R=	0.30	0.38
	RWS-07	0.175	ha	R=	0.26	0.33
	WS-08	0.186	ha	R=	0.75	0.93
	WS-09	0.130	ha	R=	0.88	1.00
	RWS-10	1.001	ha	R=	0.25	0.31
	RWS-11	0.942	ha	R=	0.31	0.39
	WS-12	0.333	ha	R=	0.50	0.63
	RWS-13	0.325	ha	R=	0.34	0.43
	WS-14	0.147	ha	R=	0.76	0.95
	Total Flow to Storm Stub =	**4.173**	**ha**	**∑R=**	**0.44**	**0.55**
Roof Top	RWS-15 (Controlled Rooftop Area)	0.677	ha	R=	0.90	1.00
	Total Flow to Storm Stub =	**0.677**	**ha**	**∑R=**	**0.90**	**1.00**

5 Year Stormwater Management Calculations

$I_5 =$ **998.071 / (Td + 6.053)$^{0.814}$** **a = 998.071** **b = 0.814** **C = 6.053**

		Rooftop Storage			Overland Storage					
Time (min)	**Intensity (mm/hr)**	**Controlled Runoff (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Controlled Runoff (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Uncontrolled Runoff (L/s)**	**Total Release Rate (L/s)**	**Height on Roof (m)**
10	104.2	176.49	87	31.43	559.66	0	770.00	0.00	801.43	0.051
20	70.3	119.00	98	37.48	393.63	0	770.00	0.00	807.48	0.058
30	53.9	91.35	96	38.08	311.48	0	770.00	0.00	808.08	0.057
40	44.2	74.84	90	37.48	261.48	0	770.00	0.00	807.48	0.053
50	37.7	63.78	83	36.27	227.16	0	770.00	0.00	806.27	0.049
60	32.9	55.80	75	35.06	202.07	0	770.00	0.00	805.06	0.044
70	29.4	49.75	67	33.85	182.76	0	770.00	0.00	803.85	0.039
80	26.6	44.99	62	32.04	166.70	0	770.00	0.00	802.04	0.037
90	24.3	41.14	56	30.83	153.96	0	770.00	0.00	800.83	0.033
100	22.4	37.95	50	29.62	143.22	0	770.00	0.00	799.62	0.030
110	20.8	35.27	45	28.41	133.97	0	770.00	0.00	798.41	0.027
120	19.5	32.98	42	27.20	125.89	0	770.00	0.00	797.20	0.025
130	18.3	30.99	39	25.99	118.74	0	770.00	0.00	795.99	0.023
260	10.6	17.95	0	22.97	76.70	0	770.00	0.00	792.97	0.000

Onsite Stormwater Retention

Total Storage Required =	**0.00 m^3**	
Pipe Storage =	101.37 m^3	refer to Storm Sewer Design Sheet
CB/MH Storage =	14.47 m^3	refer to Storm Sewer Design Sheet
Infiltration Gallery =	180.00 m^3	refer to Drawing C401
Total Available Storage =	**295.84 m^3**	

Rooftop Controls

Control-Flo Roof Drain Rate =	136	L/min
Max HWL =	0.15	m
Control-Flo Roof Drain Rate =	15.11	L/s·m
# of roof drains =	40	
Max Roof Storage =	97.8	m^3
Height =	0.058	m
Max Roof Rel. Rate =	37.48	L/s

LRL Associates Ltd.
5 year Storm Design Sheet

LRL File No.	220512-01
Project:	Auditorium Addition - ESP Paul-de-Blois
Location:	1310 Chapman Mills Dr, Ottawa
Date:	January 16, 2026
Designed:	K. Herold
Verified:	K. Paradis

Rational Method Q = 2.78CIA

Q = Peak flow in litres per second (L/s)
A = Drainage area in hectares (ha)
C = Runoff coefficient
I = Rainfall intensity (mm/hr)

Storm Design Parameters

Runoff Coefficient (C)	
Grass	0.20
Gravel	0.85
Asphalt / rooftop	0.90

LOCATION			AREA (ha)			FLOW					STORM SEWER							MANHOLE										
WATERSHED / STREET	From MH	To MH	C = 0.20	C = 0.80	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (l/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})	Up Invert (m)	Down Invert (m)	T/G Up Stream (m)	T/G Down Stream	Up Depth obv (m)	Down Depth obv (m)	Up Depth inv (m)	Pipe Storage 100 year (m^3)	Upstream CB/MH Size (m)	Water Depth 100 year (m)	CB/MH Storage 100 year (m^3)
WS-14	CB08	CB07	0.030	0.000	0.117	0.31	0.31	10.00	104.19	32.24	250	PVC	0.50%	66.3	42.0	0.86	1.29	0.77	92.50	92.17	94.00	93.60	1.25	1.18	1.25	3.26	0.60	0.50	0.18
WS-13	CB07	CB06	0.260	0.000	0.065	0.31	0.62	11.29	97.84	60.33	250	PVC	0.50%	54.9	42.0	0.86	1.07	1.43	92.10	91.83	93.60	93.28	1.25	1.20	1.25	2.70	0.60	0.90	0.32
WS-13	CB06	CB05	0.000	0.000	0.000	0.00	0.62	12.36	93.19	57.46	250	PVC	0.50%	59.8	42.0	0.86	1.16	1.37	91.77	91.47	93.28	93.80	1.26	2.08	1.26	2.94	0.60	1.23	0.44
WS-05	CB05	CBMH04	0.103	0.000	0.030	0.13	0.75	13.52	88.66	66.40	300	PVC	0.35%	44.9	57.2	0.81	0.92	1.16	91.44	91.28	93.80	93.50	2.06	1.92	2.06	3.18	1.20	1.56	2.25
WS-02, WS-06	LCB19	CBMH09	0.187	0.000	0.028	0.17	0.17	10.00	104.19	18.16	300	PVC	0.85%	23.6	89.2	1.26	0.31	0.20	92.20	92.00	93.85	93.50	1.35	1.20	1.35	1.67	0.60	0.80	0.29
WS-03	CBMH09	CBMH04	0.056	0.000	0.228	0.60	0.78	10.31	102.57	79.55	375	PVC	0.30%	34.6	96.0	0.87	0.66	0.83	92.00	91.90	93.50	93.50	1.12	1.22	1.12	3.82	1.20	1.00	1.43
WS-04	CBMH04	MH03	0.000	0.000	0.228	0.57	2.09	14.45	85.39	258.38	600	CONC	0.15%	27.3	237.8	0.84	0.54	1.09	91.23	91.19	93.50	93.15	1.67	1.36	1.67	7.72	1.20	1.67	2.40
WS-01	CB26	MH03	0.000	0.000	0.074	0.19	0.19	10.00	104.19	19.29	250	PVC	0.75%	13.9	51.5	1.05	0.22	0.37	91.28	91.18	93.30	93.50	1.77	2.07	1.77	0.68	0.60	1.72	0.62
WS-12	LCB18	LCB17	0.190	0.000	0.143	0.46	0.46	10.00	104.19	48.29	250	SUB PVC	0.35%	86.8	35.2	0.72	2.02	1.37	93.00	92.70	93.75	93.30	0.50	0.35	0.50	0.76	0.60	0.00	0.00
WS-11	LCB17	LCB15	0.796	0.000	0.146	0.81	1.27	12.02	94.62	120.31	300	SUB PVC	0.35%	145.4	57.2	0.81	2.99	2.10	92.67	92.16	93.30	93.30	0.33	0.84	0.33	10.28	0.60	0.33	0.12
WS-10	LCB15	CBMH12	0.934	0.000	0.067	0.69	1.96	15.01	83.52	163.57	300	SUB PVC	0.35%	173.0	57.2	0.81	3.56	2.86	92.13	91.52	93.30	93.50	0.87	1.68	0.87	12.23	0.60	0.87	0.31
	CBMH12	CBMH11	0.000	0.000	0.000	0.00	1.96	18.57	73.54	144.03	450	PVC	0.35%	34.8	168.7	1.06	0.55	0.85	91.52	91.40	93.50	93.00	1.53	1.15	1.53	5.54	0.60	1.48	0.53
WS-09	CBMH11	CBMH10	0.003	0.000	0.127	0.32	2.28	19.12	72.24	164.60	450	PVC	0.35%	21.7	168.7	1.06	0.34	0.98	91.37	91.29	93.00	93.00	1.18	1.26	1.18	3.45	0.60	1.18	0.42
WS-08, WS-07	CBMH10	MH03	0.200	0.000	0.160	0.51	2.79	19.46	71.45	199.38	450	PVC	0.35%	23.8	168.7	1.06	0.37	1.18	91.26	91.18	93.20	93.50	1.49	1.87	1.49	3.79	0.60	1.49	0.53
	MH03	MH02	0.000	0.000	0.015	0.00	5.07	14.99	83.60	423.82	825	CONC	0.29%	23.8	769	1.44	0.28	0.55	91.16	91.09	93.15	93.50	1.16	1.58	1.16	12.73	1.20	1.16	1.68
WS-15	School	MH02	0.000	0.000	0.677	1.69	1.69	10.00	104.19	72.53	375	PVC	0.47%	89.0	120.2	1.09	1.36	0.60	91.51	91.09	94.55	93.49	2.66	2.02	2.66	9.83	0.60	1.49	0.54
	MH02	MH01	0.000	0.000	0.000	0.00	6.76	15.26	82.72	632.00	900	CONC	0.25%	26.4	912.4	1.43	0.31	0.69	91.03	90.97	93.59	94.30	1.66	2.43	1.66	16.80	1.20	1.66	2.39
	MH01	CITY	0.000	0.000	0.000	0.00	6.76	15.57	81.76	625.53	1,050	CONC	0.25%	0.5	884.0	1.02	0.01	0.71	90.94	90.93	94.30	94.30	2.31	2.32	2.31				
Notes: Maximum roof flow rate shown as per SWM design sheet																										**101.37**			**14.47**

Maximum roof flow rate shown as per SWM design sheet
Peak allowable flow rate as per JL Richards Design
Invert from JL Richards Design

HWL (100 Year)	93.00
Storage(100 year)	115.84

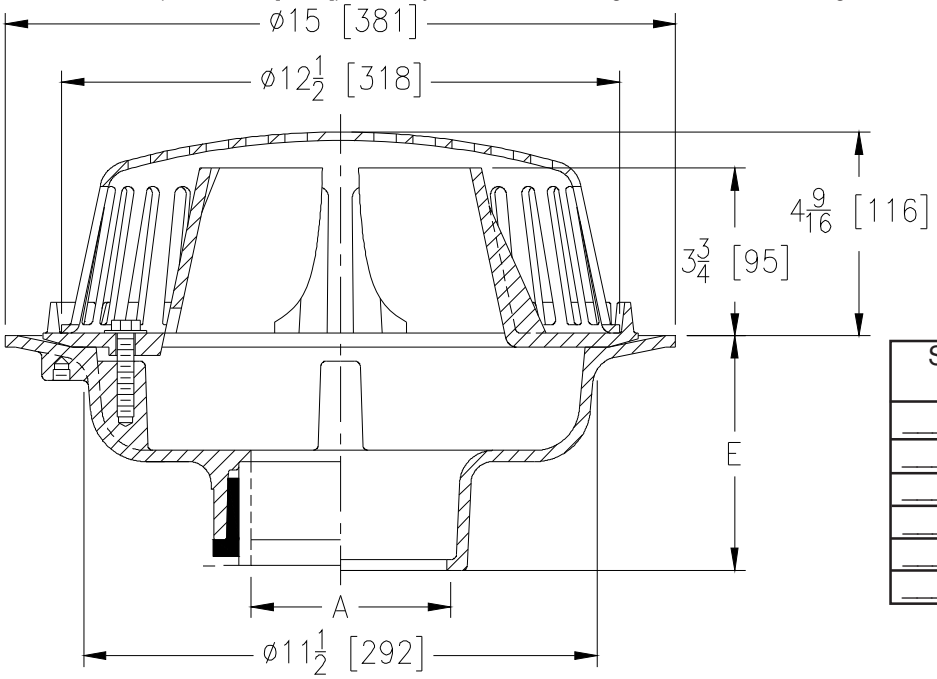
Z105

CONTROL-FLO ROOF DRAIN
W/ PARABOLIC WEIR

SPECIFICATION SHEET

TAG _____

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



Specify Number of Notches in Weir	
___-N1	One Notch
___-N2	Two Notches
___-N3	Three Notches
___-N4	Four Notches
___-N5	Five Notches
___-N6	Six Notches

A- Pipe Size In.[mm]	Approx. Wt. Lbs. [kg]	Dome Open Area Sq. In. [cm²]
2,3,4 [51,76,102]	34 [15]	103 [665]

ENGINEERING SPECIFICATION: ZURN Z105
15" [381mm] Diameter Control-Flo roof drain for dead-level roof construction, Dura-Coated cast iron body, Control-Flo weir shall be linear functioning with integral membrane flashing clamp/gravel guard and Poly-Dome. All data shall be verified proportional to flow rates. Each notch will allow 10 GPM [LPM] of flow per 1" [25mm] of rain water build up above the drain.

OPTIONS (Check/specify appropriate options)

PIPE SIZE
3, 4 [76, 102]
2 , 3, 4 [51, 76, 102]
2 , 3, 4 [51, 76, 102]

(Specify size/type) **OUTLET**
_____ IC Inside Caulk
_____ NH No-Hub
_____ NL Neo-Loc

E BODY HT. DIM.
5-1/4 [133]
5-1/4 [133]
4-9/16 [116]

PREFIXES
_____ Z D.C.C.I. Body with Poly-Dome*
_____ ZA D.C.C.I. Body with Aluminum Dome
_____ ZC D.C.C.I. Body with Cast Iron Dome

SUFFIXES
_____ -C Underdeck Clamp
_____ -DP Top-Set® Deck Plate (Replaces both -C & -R)
_____ -E Static Extension 1 [25] thru 4 [102] (Specify Ht.)
_____ -EA Adjustable Extension Assembly 2-1/8 [54] thru 3-1/2 [89]
_____ -G Galvanized Cast Iron
_____ -R Roof Sump Receiver
_____ -TC Neo-Loc Test Cap Gasket (2,3,4 [51,76,102] NL Bottom Outlet Only)
_____ -VP Vandal Proof Secured Top
_____ -10 6 [152] High Parabolic Weir for Sloped Roof (ZC or ZA)

* Regularly furnished unless otherwise specified.

Zurn Industries, LLC | **Specification Drainage Operation**
1801 Pittsburgh Avenue, Erie, PA U.S.A. 16502 · Ph. 855-663-9876, Fax 814-454-7929
In Canada | **Zurn Industries Limited**
3544 Nashua Drive, Mississauga, Ontario L4V 1L2 · Ph. 905-405-8272, Fax 905-405-1292
www.zurn.com

Rev. K
Date: 09/25/17
C.N. No. 137793
Prod. | Dwg. No. Z105

APPENDIX D

Supporting Documents

Site Servicing and Stormwater Management Report for Site Plan Control Application

Proposed New Public High School
Barrhaven Centre
4005 Strandherd Drive
Barrhaven, Ontario

Prepared for

Conseil des écoles publiques de l'Est de l'Ontario

Attention: Mrs Carolyn Jones, MRAIC

September 5, 2019
Revision 03

LRL File No.: 170364

5430 Canotek Road | Ottawa, ON, K1J 9G2 | info@lrl.ca | www.lrl.ca | (613) 842-3434

TABLE OF CONTENTS

LIST OF FIGURES

APPENDICES

1 INTRODUCTION

LRL Associates Ltd. (LRL) has been retained by the Conseil des écoles publiques de L'Est de l"Ontario (CEPEO) to prepare a site servicing and stormwater management report in support of their site plan control application for a proposed new Public High School in Barrhaven. This report presents the proposed servicing plan of the new development for water and sanitary services, as well as stormwater management.

This report has been prepared in consideration of the survey carried out by Annis O'Sullivan Vollebekk Ltd. (AOV) in August 2017 and the design brief prepared by J.L. Richards & Associates Limited and dated July 2017. Should there be any discrepancies in the existing infrastructure and/or connections to the existing services, which may relate to the site servicing considerations, LRL should be advised in order to review the report recommendations. This report should be read in conjunction with the grading and drainage, site servicing, and stormwater management plans prepared by LRL.

2 SITE DESCRIPTION

The subject property is currently vacant land and is located within the urban boundary of the City of Ottawa, Ontario. As illustrated in Figure 1, the development is located south on Strandherd Drive. The total area of the property measures approximately 4.86 ha.

Chapman Mills is to be developed and constructed by others in accordance with the design prepared by J.L. Richards & Associates Limited as part of Harmony Stage 1 Development for Minto Communities, dated July 2017.

Figure 1 - Aerial view of the location of the proposed development (Google Earth)

The proposed development is located within the proposed Minto Harmony Community area that has yet to be fully constructed by others. The land surface has a minimal grade change with elevations ranging between 92.09m and 94.57m.

The proposed development consists of a three-storey, slab-on grade, public high school with access roadway, parking areas, playground areas, a soccer field and a future portable classes area. Refer to Appendix D for the proposed site plan (Drawing C401 – Servicing Plan).

3 SCOPE OF WORK

As per applicable guidelines, the scope of work includes the following:

Water services

- Calculate the expected domestic water demands at average and peak flow conditions.
- Calculate the fire flow as per the Fire Underwriters Survey (FUS) method.
- Describe the proposed water distribution network and connection to the existing watermain.

Sanitary services

- Describe the existing sanitary sewers available to receive wastewater from the building.
- Calculate the peak flow rates from the development.
- Describe the proposed sanitary sewer system.

- Verify the available capacity in the downstream sanitary sewer.
- Verify the capacity of the existing lateral sanitary sewer

Stormwater management

- Calculate the allowable stormwater release rate.
- Calculate the anticipated post development stormwater release rates.
- Demonstrate how the target quality and quantity objectives will be achieved.
- Verify the capacity of the existing lateral storm sewer

4 WATER SUPPLY AND FIRE PROTECTION

4.1 Existing Water Supply Services

The 300mm diameter watermain on Chapman Mills Drive will be constructed by others. According to J.L. Richards & Associates Limited design, the site will have a 200mm diameter water service stub provided along Chapman Mills Drive, approximately 240m southeast of Strandherd Drive. There will be four (4) fire hydrants along Chapman Mills Drive on the east side near the proposed site. Refer to C401 – Servicing Plan for the proposed municipal infrastructure design.

4.2 Water Supply Demand

As per the AWWA Standards and the City of Ottawa Design Guidelines, the average domestic water demand was calculated using 850 equivalent fixture units and for daily and hourly peaking factors of **1.5** and **1.8**, respectively. Thus, the average daily domestic water demand for the proposed building is **12.33 L/s**, the maximum daily flow rate is **18.50 L/s** and the maximum hourly flow rate is **22.20 L/s**. Refer to Appendix A for the domestic water demand calculation sheet.

The fire flow requirement was evaluated in accordance with the Fire Underwriters Survey (FUS). This method is based on the floor area of the building to be protected, type and combustibility of the structural frame and the separation distances with adjoining buildings. The fire flow demand was calculated to be **116.7L/s**. Refer to Appendix A – Fire Flow Calculations, for the fire flow

However, to meet the minimum requirement of a 90m radius distance between the fire hydrant and the building, as required by the City of Ottawa, a private fire hydrant on the said property is added to service the building. In addition, a second private hydrant has been proposed south corner of the school for future portable expansion planning. Refer to LRL drawing C401 Rev.01 – *Servicing Plan* for the layout of the proposed water services and connections.

4.3 Water supply servicing design

The proposed building will be serviced by a 200mm dia. water service which will connect to the 200mm diameter stub along Chapman Mills Drive. The proposed service will be located on the east side of the building. Refer to LRL drawing C401 – Servicing Plan for the layout of the proposed water service.

A fire department siamese connection is proposed on the east side near the building main student entrance. The siamese connection is located adjacent to the proposed sidewalk to facilitate the access for the fire department year-round. To meet the minimum requirement of a 45m radius distance between the fire hydrant and the building main entrance, as required by the OBC, a private fire hydrant will be installed at the north-east corner of the building. Refer to LRL drawing C401 Rev.01 – *Servicing Plan* for the layout of the proposed water service connection and the private fire hydrant.

4.4 Boundary Conditions

The existing boundary conditions provided by the City of Ottawa for the site are as follow:

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	156.5	89.5
Peak Hour	144.7	72.7
Max Day Plus Fire (7,000) L/min	127.8	48.7

As the available fire flow provided by the City of Ottawa is above the minimum fire flow requirement for the proposed development, no supplementary fire protection and storage are required for the site. Refer to Appendix A for the provided city boundary conditions dated 2018-Dec-17.

5 SANITARY DRAINAGE

5.1 Municipal Sanitary Sewer Services

Along Chapman Mills Drive, a 300mm diameter sanitary sewer flowing easterly on Clarity Street will be constructed by others. J.L. Richards & Associates Limited design indicates that a 250mm diameter sanitary service stub will be provided to service this site with a total allowable flow 62.0 L/s. Refer to drawing C401 – Servicing Plan for the layout.

5.2 Sanitary Sewer Servicing Design

The new building will be serviced with a 250mm dia. sanitary service that will be installed south of the new building. A sanitary maintenance manhole, SAN MH01 will be installed just north of the property line before connecting to the 250mm stub and discharging to the municipality sewer system. The proposed 250mm PVC DR35 sanitary service will be installed at a minimum slope of 1.00%. Refer to LRL drawing C401 – Servicing Plan for the proposed sanitary servicing.

The sanitary peak load was calculated using the Ontario Building Code (2012), Part 7 – Plumbing and estimated at **12.33 L/s.**

Also, LRL used the City of Ottawa Sanitary Design Guidelines to estimate the allocated sanitary peak flow to ensure the most conservative demand is used. Using the criteria as shown in Table 1 and the City specific design parameters, the site anticipated sanitary flow was calculated at **5.58 L/s** for the 4.86 ha area. Refer to Appendix B for the site sanitary sewer design sheet. Since this estimate is lower than the total sanitary peak flow estimated using the Ontario Building Code (2012) Part 7, the total sanitary flow for the proposed elementary school was estimated at **12.33 L/s,** as this flow rate is more accurate and conservative.

Table 1 Sanitary Sewer Design Criteria

Design Parameter	Value
Minimum service connection size (diameter)	135 mm
Manning roughness coefficient (n)	0.013
Minimum velocity (full)	0.6 m/s
Maximum velocity (full)	3.0 m/s

6 STORMWATER MANAGEMENT

6.1 Municipal Stormwater Infrastructure

Along Chapman Mills Drive, a 675mm diameter storm sewer flowing easterly and draining into the 1,350mm diameter storm sewer on Clarity Street will be constructed by others. J.L. Richards

& Associates Limited show that a 1,050mm diameter storm service stub will be provided to service the site. Refer to drawing C401 – Servicing Plan for the layout.

6.2 Stormwater Management Concept

Drainage from the site will be captured by a series of roof drains, catchbasins, catchbasin manholes and perforated subdrains which will convey the stormwater to the existing 1,050mm diameter storm sewer stub on Chapman Mills Drive. Refer to LRL drawing C401 for the proposed storm servicing and drawings C301 and C702 for the grading and drainage plan and stormwater management. Refer to Appendix C – Stormwater Management Design Sheets for the proposed site storm sewer design.

6.3 Design Criteria

Stormwater quantity control measures are proposed for this site to reduce the post-development stormwater runoff to allowable levels.

6.3.1 Water Quality

Enhanced (80% Total Suspended Solids removal) quality control is to be provided by others. The stormwater retaining pond has been designed as part of Minto Harmony Community project, Phase 1 which was prepared by J.L. Richards & Associates Limited.

6.3.2 Water Quantity

All storm events up to and including the 100-year event will be controlled to the 5-year pre-development level. The site major overland flow route has been designed to ensure that storm events beyond the 100-year design storm can be safely conveyed overland towards the Chapman Mills Drive right-of-way. The minor system (storm sewer) within the site is sized to convey the 5-year storm event flows from the site to the municipal storm sewer on Chapman Mills Drive.

6.4 Method of Analysis

The Rational Method was used to calculate the runoff from the development. The Intensity-Duration-Frequency (IDF) curve formulas for the MacDonald-Cartier International Airport, in the city of Ottawa, were used to calculate the peak storm flows for the site.

6.5 Allowable Release Rate

This site is subject to stormwater management control where the allowable flow for the 5 and 100-year storm events are estimated at 1,055.8 L/s as per the design prepared by J.L. Richards & Associates Limited. The total allowable release rate will be restricted with an undersized pipe

at the outlet that will throttle the total allowable release rate to **884L/s** as per J.L. Richards & Associates Limited design sheet. Refer to Appendix D - Supporting Documents.

6.6 Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished through the use of: undersized piping to throttle the flow rate, Zurn Control-Flo roof drains, roof top water storage, pipe and maintenance holes structure underground. The proposed site storm sewer and stormwater management system are shown on drawing C401 – Servicing Plan and detailed calculations including the design sheet are attached in Appendix C.

The collected stormwater from catchment area WS-15 (0.711ha), will first be regulated using thirty-five (35) one notch Zurn Control-Flo roof drains with a total maximum release rate of **14.91 L/s*m.** With the thirty-five (35) roof drains, a maximum ponding volume of **213 m^3** of water will be stored on the roof during the 100-year storm event to minimize the water directed to MH02. The controlled roof water will be captured by the proposed storm manhole MH02 before outletting to Chapman Mills Drive. The two future expansions have been added to the design calculations in order to obtain the maximum value for the roof top ponding and flow generated by the hard surface. The roof drains will be connected downstream of the controlled manhole (MH03) to prevent a double control measurement as per the City of Ottawa guidelines. The total anticipated flow of the roof drains is **63.47L/s**.

WS-01, WS-02, WS-03, WS-04, WS-05, WS-06, WS-07, WS-08, WS-09, WS-10, WS-11, WS-12, WS-13 and WS-14 areas, (0.059ha, 0.105ha, 0.281ha, 0.221ha, 0.161ha, 0.095ha, 0.169ha, 0.201ha, 0.130ha, 1.033ha, 0.929ha, 0.333ha, 0.285ha and 0.147ha respectively) consist of parking and driving area, landscaped area and playground area. These catchments area will be captured through a number of catchbasins and subdrains before being directed to the proposed 825mm outlet on Chapman Mills Drive and controlled using an undersized 825mm diameter reinforced concrete pipe. The 825mm pipe will be installed at a 0.29% slope that has a full capacity of **769 L/s**.

In order to control the 100-year storm event, **224.25m^3** of on-site storage will be required. This storage will be provided with the use of some pipe/structure storage and an infiltration gallery up to the expected high water level of 93.00m MASL. The stormwater storage will be provided as follows: **115.84** m^3 from on-site pipes and maintenance structures and **180.31** m^3 from the infiltration gallery. Refer to C401 – Servicing Plan and Appendix C for stormwater management design details. Thus, the outlet to Chapman Mills Drive is able of achieving the required stormwater quantity control of **884L/s**.

6.7 Stormwater Quality Management

A Stormwater Management Facility Pond design by J.L. Richards & Associates Limited is located southeast of the subject site at the downstream end of Minto Harmony Community and will provide enhanced protection, 80% Total Suspended Solids removal. Hence, no stormwater quality management is required on the site. Refer to Appendix D – Supporting Documents for the location of the proposed stormwater management pond.

7 Erosion and Sediment Control

During the construction, erosion and sediment controls will be required primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Inlet sediment control devices are also to be provided in any catchbasin and/or manholes on and around the site that may be impacted by the site construction activities. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS 577. Refer to LRL drawing C101 – Erosion and Sediment Control Plan for details.

8 Conclusions

In accordance with this report objectives, the analyses for the proposed development can be summarized as follows:

Water Service

- The anticipated maximum domestic water demand for the site is 22.20 L/s.
- The required fire flow was calculated at 116.7 L/s using the FUS method.
- A new fire hydrant will be installed on-site within the m radius from the siamese connection.
- The new development will be serviced with a 200mm dia. watermain connected to the proposed 300mm dia. watermain on Chapman Mills Drive.

Sanitary Service

- The anticipated sanitary flow from the proposed development is 12.33 L/s.
- The proposed building will be serviced by a 250mm sanitary service connection to the existing 900mm dia. sanitary sewer on Chapman Mills Drive.
- A new monitoring manhole will be installed on the new 250mm sanitary service that is connected to the proposed 900mm dia. sanitary sewer on Chapman Mills Drive.

Stormwater Management

- The stormwater release rates from the proposed development will meet the pre-development allowable release rate of 884 L/s onto Chapman Mills Drive.

- Stormwater quantity control objectives will be achieved through on-site storage.
- Stormwater quality control objectives will be achieved off-site through the future Stormwater Management Pond designed by J.L. Richards & Associates Limited.

9 LIMITATIONS AND USE OF REPORT

The report conclusions are applicable only to this project described in this report. Any changes may require a review by LRL Associates Ltd. to insure compatibility with the recommendations contained in this report. We trust the information presented meets your current requirements. Please do not hesitate to contact us should you have any questions or concerns.

Prepared by:

LRL Associates Ltd.

Virginia Johnson, P.Eng
Civil Engineer

APPENDIX A

Domestic Water Demand and Fire Flow Calculations & Boundary Conditions

Domestic Water Supply Calculations

LRL File No.	170364
Project:	Public High School Barrhaven Centre
Location:	4005 Strandherd Drive, Barrhaven, Ottawa
Date:	January 16, 2019
Designed:	G. Brunet
Verified:	J.C. Lalonde

Domestic Commercial Flow Demand

Total Building Floor Area =	**5,956**	m^2	(includes existing and proposed building)		
Site Total Area =	**4.86**	ha			
Total Proposed Fixture Unit =	850				
Average Demand Per Fixture Unit =	0.8704	L/min	As per AWWA Standard		
Average Commercial Water Demand =	**740**	L/min		**12.33**	L/s
Maximum Daily Peak Factor =	1.5	* As per City of Ottawa			
Maximum Daily Commercial =	**1,110**	L/min		**18.50**	L/s
Maximum Hourly Peak Factor =	1.8	* As per City of Ottawa			
Maximum Hourly Commercial =	**1,332**	L/min		**22.20**	L/s

Therefore,		
Domestic Peak Hourly Flow Rate	**22.20**	**L/s**
Required Fire Flow rate=	**116.7**	**L/s**

Fire Flow Calculations

LRL File No. 170364
Project Public High School Barrhaven Centre
Date January 16, 2019
Method Fire Underwriters Survey (FUS)
Designed by G. Brunet

Multi-level Development	9281	
	9,281	m^2

Step	Task	Term	Options	Multiplier	Choose:	Value	unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Non-combustible construction	0.8		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area								
2	Choose type of housing	Type of housing	Single family dwelling	0	Building - no. of units per floor	1	units	
			Townhouse - no. of units	0				
			Building - no. of units per floor	1				
	Enter no. of storeys	Number of floors/storeys for the building (excluding the basement)				3	floors	
3	Enter area	Enter floor space area		1		9,281	sq.m.	
4	Obtain fire flow before reductions	Required fire flow	**Fire Flow = 220 x C x Area^0.5**				L/min	**16,955**
							L/s	282.6
Reductions or surcharge due to factors affecting burning								
5	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15		
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15			L/min	**14,412**
			Rapid burning	0.25			L/s	240.2
6	Choose reduction for sprinklers	Sprinkler reduction	Sprinklers (NFPA13)	-0.30	True	-0.3		
			Water supply is standard for both the system and fire department hose lines	-0.10	True	-0.1	L/min	**7,206**
			Fully supervised system	-0.10	True	-0.1	L/s	120.1
7	Choose separation	Exposure distance between units	North side	Over 45m	0			
			East side	Over 45m	0			
			South side	Over 45m	0		L/min	**7,206**
			West side	Over 45m	0	0	L/s	120.1
Net required fire flow								
8	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000 as per City of Ottawa)					L/min	**7,000**
		Minimum required fire flow rate					L/s	**116.7**
		Required duration of fire flow					hr	**2**

BOUNDARY CONDITIONS

Boundary Conditions For: 4005 Strandherd Dr.

Date of Boundary Conditions: 2018-Dec-17

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	739.8	12.3
Maximum Daily Demand	1,110	18.5
Peak Hour	1332	22.2
Fire Flow #1 Demand	7,000	116.7

Number of Connections: 1

Location:

BOUNDARY CONDITIONS

Results:

Pre-Configuration

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	156.5	89.5
Peak Hour	144.7	72.7
Max Day Plus Fire (7,000) L/min	127.8	48.7

[1]Elevation: **94.640 m**

Notes:

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

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

2) Both HGL and Pressures at Junction reflect the interm condition of watermain connections and not the ultimate condition of watermain connections which involves a 400 mm diameter main at Strandherd Dr. that will connect the network providing higher HGL at near by connections.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

APPENDIX B

Sanitary Servicing Calculation Sheet

LRL Associates Ltd.
Storm Design Sheet

LRL File No.	170364
Project:	Public High School Barrhaven Centre
Location:	4005 Strandherd Drive, Barrhaven, Ottawa
Date:	January 16, 2019
Designed:	G. Brunet
Verified:	J.C. Lalonde

Sanitary Design Parameters

Average Daily Flow = 350 L/p/day
Commercial & Institutional Flow = 50000 L/ha/day
Light Industrial Flow = 35000 L/ha/day
Heavy Industrial Flow = 55000 L/ha/day
Maximum Residential Peak Factor = 4.0
Commercial & Institutional Peak Factor = 1.5
Industrial Peak Factor = as per Appendix 4-B = 7
Extraneous Flow = 0.28 L/s/gross ha

Pipe Design Parameters

Minimum Velocity = 0.60 m/s
Manning's n = 0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL		INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL FLOW (l/s)	PIPE						MANHOLE	
STREET	FROM MH	TO MH	AREA (Ha)	POP.	CUMMULATIVE AREA (Ha)	CUMMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	AREA (Ha)	ACCU. AREA (Ha)	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)		LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERIAL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	UP INVERT (m)	DOWN INVERT (m)
SITE	PROP. BLDG	MH01	0.000	0.0	0.00	0.0	0.0	0.00	0.000	0.000	0.00	7.0	4.9	4.9	4.22	4.86	4.86	1.36	5.58	91.3	250	1.00%	PVC	59.47	1.21	91.43	90.52
SITE	MH01	STUB	0.000	0.0	0.0	0.0	4.0	0.00	0.000	0.000	0.00	7.0	0.0	4.9	4.22	0.00	4.86	1.36	5.58	26.8	250	1.00%	PVC	59.47	1.21	90.46	90.19
SITE	STUB	CITY	0.000	0.0	0.0	0.0	4.0	0.00	0.000	0.000	0.00	7.0	0.0	4.9	4.22	0.00	4.86	1.36	5.58	1.0	250	1.00%	PVC	59.47	1.21	90.19	90.18
																			(use 12.33 L/s)							

NOTES

Existing inverts and slopes are estimated. They are to be confirmed on-site.
Inverts provided by J.L. Richards & Associates Ltd
* Use average flow rate of 12.33 L/s for design

Designed: G.B.	PROJECT: Public High School Barrhaven Centre		
Checked: J.C.L.	LOCATION: 4005 Standherd Drive, Ottawa		
Dwg. Reference: C401 - Servicing Plan	File Ref.: 170364	Date: September-14-18	Sheet No. 1 of 1

APPENDIX C

Stormwater Management Design Sheets

LRL Associates Ltd.
Storm Design Sheet

LRL File No.	170364
Project:	Public High School Barrhaven Centre
Location:	4005 Strandherd Drive, Barrhaven, Ottawa
Date:	January 16, 2019
Designed:	G. Brunet
Verified:	J.C. Lalonde

Sanitary Design Parameters

Average Daily Flow = 350 L/p/day
Commercial & Institutional Flow = 50000 L/ha/day
Light Industrial Flow = 35000 L/ha/day
Heavy Industrial Flow = 55000 L/ha/day
Maximum Residential Peak Factor = 4.0
Commercial & Institutional Peak Factor = 1.5
Industrial Peak Factor = as per Appendix 4-B = 7
Extraneous Flow = 0.28 L/s/gross ha

Pipe Design Parameters

Minimum Velocity = 0.60 m/s
Manning's n = 0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL		INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL FLOW (l/s)	PIPE						MANHOLE	
STREET	FROM MH	TO MH	AREA (Ha)	POP.	CUMMULATIVE AREA (Ha)	CUMMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	AREA (Ha)	ACCU. AREA (Ha)	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)		LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERIAL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	UP INVERT (m)	DOWN INVERT (m)
SITE	PROP. BLDG	MH01	0.000	0.0	0.00	0.0	0.0	0.00	0.000	0.000	0.00	7.0	4.9	4.9	4.22	4.86	4.86	1.36	5.58	91.3	250	1.00%	PVC	59.47	1.21	91.43	90.52
SITE	MH01	STUB	0.000	0.0	0.0	0.0	4.0	0.00	0.000	0.000	0.00	7.0	0.0	4.9	4.22	0.00	4.86	1.36	5.58	26.8	250	1.00%	PVC	59.47	1.21	90.46	90.19
SITE	STUB	CITY	0.000	0.0	0.0	0.0	4.0	0.00	0.000	0.000	0.00	7.0	0.0	4.9	4.22	0.00	4.86	1.36	5.58	1.0	250	1.00%	PVC	59.47	1.21	90.19	90.18
																			(use 12.33 L/s)							

NOTES

Existing inverts and slopes are estimated. They are to be confirmed on-site.
Inverts provided by J.L. Richards & Associates Ltd
* Use average flow rate of 12.33 L/s for design

Designed: G.B.	PROJECT: Public High School Barrhaven Centre		
Checked: J.C.L.	LOCATION: 4005 Standherd Drive, Ottawa		
Dwg. Reference: C401 - Servicing Plan	File Ref.: 170364	Date: September-14-18	Sheet No. 1 of 1

LRL File No.	170364
Project:	Public High School Barrhaven Centre
Location:	4005 Strandherd Drive, Barrhaven, Ottawa
Date:	January 16, 2019
Designed:	G. Brunet
Verified:	J.C. Lalonde
Drawing Reference:	C701 and C702

Post-Devlopment Catchments

WATERSHED	C = 0.20	C = 0.80	C = 0.90	Total Area (ha)	Combined C
EWS-01	0.00	0.00	0.06	0.059	0.90
EWS-02	0.10	0.00	0.00	0.105	0.23
EWS-03	0.07	0.00	0.21	0.281	0.73
EWS-04	0.00	0.00	0.22	0.221	0.90
EWS-05	0.15	0.01	0.00	0.161	0.24
EWS-06	0.10	0.00	0.00	0.095	0.20
EWS-07	0.15	0.02	0.00	0.169	0.27
EWS-08	0.03	0.00	0.17	0.201	0.80
EWS-09	0.01	0.00	0.12	0.130	0.86
EWS-10	0.94	0.00	0.10	1.033	0.27
EWS-11	0.80	0.00	0.13	0.929	0.30
EWS-12	0.19	0.00	0.14	0.333	0.50
EWS-13	0.26	0.00	0.03	0.285	0.26
EWS-14	0.03	0.00	0.12	0.147	0.76
EWS-15 (ROOF)	0.00	0.00	0.71	0.711	0.90
TOTAL	2.819	0.030	2.011	4.860	0.49

LRL File No. 170364
Project: Public High School Barrhaven Centre
Location: 4005 Strandherd Drive, Barrhaven, Ottawa
Date: January 16, 2019
Designed: G. Brunet
Checked: J.C. Lalonde
Drawing Ref.: C401

Stormwater Management Design Sheet

STORM - 5 YEAR

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) $= A / (Td + C)^B$
A = Area (ha)
T_c = Time of concentration (min)

Pre-Devlopment Catchments within Development Area

Allowable Release Rate 5 Year Pre-Development Flow Rate

$I_5 =$ **998.071 / (Td + 6.053)$^{0.814}$** **a = 998.071** **b = 0.814** **C = 6.053**

Allowable Release Rate= 884.00 L/s As Per JL Richards, Harmony Stage 1 Report Dated July 2017

Post-development Stormwater Management

					$\sum R_5$	$\sum R_{100}$
	Total Site Area =	**4.860**	ha	**∑R=**	**0.49**	**0.62**
Controlled	WS-01	0.059	ha	R=	0.90	1.00
	WS-02	0.105	ha	R=	0.23	0.28
	WS-03	0.281	ha	R=	0.73	0.91
	WS-04	0.221	ha	R=	0.90	1.00
	WS-05	0.161	ha	R=	0.24	0.30
	WS-06	0.095	ha	R=	0.20	0.25
	WS-07	0.169	ha	R=	0.27	0.34
	WS-08	0.201	ha	R=	0.80	0.99
	WS-09	0.130	ha	R=	0.86	1.00
	WS-10	1.033	ha	R=	0.27	0.33
	WS-11	0.929	ha	R=	0.30	0.37
	WS-12	0.333	ha	R=	0.50	0.63
	WS-13	0.285	ha	R=	0.26	0.33
	WS-14	0.147	ha	R=	0.76	0.95
	Total Flow to Storm Stub =	**4.149**	**ha**	**∑R=**	**0.42**	**0.53**
Roof Top	WS-15 (Controlled Rooftop Area)	0.711	ha	R=	0.90	1.00
	Total Un-Contolled =	**0.711**	**ha**	**∑R=**	**0.90**	**1.00**

Post-development Stormwater Management

$I_{100} =$ **1735.688 / (Td + 6.014)$^{0.820}$** **a = 1735.688** **b = 0.82** **C = 6.014**

		Rooftop Storage			Overland Storage					
Time (min)	**Intensity (mm/hr)**	**Controlled Runoff (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Controlled Runoff** (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Uncontrolled Runoff (L/s)**	**Total Release Rate (L/s)**	**Height on Roof (m)**
10	178.6	352.94	180	52.89	1143.76	224	770.0	0.00	823	0.101
20	120.0	237.09	210	61.88	794.69	30	770.0	0.00	832	0.118
30	91.9	181.58	213	63.47	624.72	0	770.0	0.00	833	0.120
40	75.1	148.53	205	62.94	522.02	0	770.0	0.00	833	0.116
50	64.0	126.41	195	61.35	452.07	0	770.0	0.00	831	0.110
60	55.9	110.48	188	58.18	399.65	0	770.0	0.00	828	0.106
70	49.8	98.41	180	55.53	359.71	0	770.0	0.00	826	0.101
80	45.0	88.93	173	52.89	327.75	0	770.0	0.00	823	0.097
90	41.1	81.26	167	50.24	301.40	0	770.0	0.00	820	0.094
100	37.9	74.92	164	47.60	279.16	0	770.0	0.00	818	0.092
110	35.2	69.58	152	46.54	261.60	0	770.0	0.00	817	0.086
120	32.9	65.02	148	44.43	245.39	0	770.0	0.00	814	0.083
130	30.9	61.07	171	39.14	227.90	0	770.0	0.00	809	0.096

Infiltration Gallery - 280m

Pipe Storage	13.74	m^3	
Granular Storage	166.6	m^3	40% Void
Total Available Storage =	**180.31**	**m^3**	refer to Drawing C401 for detail

Rooftop Controls

Control-Flo Roof Drain Rate =	136	L/min
Max HWL =	0.150	m
Control-Flo Roof Drain Rate =	15.11	L/s·m
# of roof drains =	35	
Max Roof Storage =	212.6	m^3
Height =	0.120	m
Max Roof Rate =	63.47	L/s

Onsite Stormwater Retention

Total Storage Required =	**224.25**	**m^3**	
Rooftop Ponding =	212.61	m^3	
Pipe Storage =	104.88	m^3	refer to Storm Sewer Design Sheet
CB/MH Storage =	16.55	m^3	refer to Storm Sewer Design Sheet
Infiltration Gallery =	180.00	m^3	refer to Drawing C401
Total Available Storage =	**301.42**	**m^3**	

LRL File No. 170364
Project: Public High School Barrhaven Centre
Location: 4005 Strandherd Drive, Barrhaven, Ottawa
Date: January 16, 2019
Designed: G. Brunet
Checked: J.C. Lalonde
Drawing Ref.: C401

Stormwater Management Design Sheet

STORM - 5 YEAR

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) = A / (Td + C) ^{B}
A = Area (ha)
T_c = Time of concentration (min)

Pre-Devlopment Catchments within Development Area

Allowable Release Rate

5 Year Pre-Development Flow Rate

I_5 = **998.071 / (Td + 6.053)$^{0.814}$** **a = 998.071** **b = 0.814** **C = 6.053**

Allowable Release Rate= 884.00 L/s As Per JL Richards, Harmony Stage 1 Report Dated July 2017

Post-development Stormwater Management

					$\sum R_5$	$\sum R_{100}$
	Total Site Area =	**4.860**	ha	**∑R=**	**0.49**	**0.62**
Controlled	WS-01	0.059	ha	R=	0.90	1.00
	WS-02	0.105	ha	R=	0.23	0.28
	WS-03	0.281	ha	R=	0.73	0.91
	WS-04	0.221	ha	R=	0.90	1.00
	WS-05	0.161	ha	R=	0.24	0.30
	WS-06	0.095	ha	R=	0.20	0.25
	WS-07	0.169	ha	R=	0.27	0.34
	WS-08	0.201	ha	R=	0.80	0.99
	WS-09	0.130	ha	R=	0.86	1.00
	WS-10	1.033	ha	R=	0.27	0.33
	WS-11	0.929	ha	R=	0.30	0.37
	WS-12	0.333	ha	R=	0.50	0.63
	WS-13	0.285	ha	R=	0.26	0.33
	WS-14	0.147	ha	R=	0.76	0.95
	Total Flow to Storm Stub =	**4.149**	**ha**	**∑R=**	**0.42**	**0.53**
Roof Top	WS-15 (Controlled Rooftop Area)	0.711	ha	R=	0.90	1.00
	Total Un-Contolled =	**0.711**	**ha**	**∑R=**	**0.90**	**1.00**

5 Year Stormwater Management Calculations

I_5 = **998.071 / (Td + 6.053)$^{0.814}$** **a = 998.071** **b = 0.814** **C = 6.053**

		Rooftop Storage			Overland Storage					
Time (min)	**Intensity (mm/hr)**	**Controlled Runoff (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Controlled Runoff** (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Uncontrolled Runoff (L/s)**	**Total Release Rate (L/s)**	**Height on Roof (m)**
10	104.2	185.35	95	27.14	536.38	0	770.00	0.00	797.14	0.053
20	70.3	124.97	111	32.36	375.71	0	770.00	0.00	802.36	0.063
30	53.9	95.93	113	32.88	296.45	0	770.00	0.00	802.88	0.064
40	44.2	78.60	111	32.36	248.31	0	770.00	0.00	802.36	0.062
50	37.7	66.98	107	31.32	215.34	0	770.00	0.00	801.32	0.060
60	32.9	58.60	102	30.27	191.28	0	770.00	0.00	800.27	0.057
70	29.4	52.25	97	29.23	172.78	0	770.00	0.00	799.23	0.054
80	26.6	47.25	94	27.66	157.48	0	770.00	0.00	797.66	0.053
90	24.3	43.21	90	26.62	145.33	0	770.00	0.00	796.62	0.050
100	22.4	39.86	86	25.57	135.09	0	770.00	0.00	795.57	0.048
110	20.8	37.04	83	24.53	126.30	0	770.00	0.00	794.53	0.046
120	19.5	34.63	80	23.49	118.63	0	770.00	0.00	793.49	0.045
130	18.3	32.54	79	22.44	111.86	0	770.00	0.00	792.44	0.044
260	10.6	18.85	0	19.83	71.63	0	770.00	0.00	789.83	0.000

Onsite Stormwater Retention

Total Storage Required =	**0.00 m^3**	
Rooftop Ponding =	113.49 m^3	
Pipe Storage =	104.88 m^3	refer to Storm Sewer Design Sheet
CB/MH Storage =	16.55 m^3	refer to Storm Sewer Design Sheet
Infiltration Gallery =	180.00 m^3	refer to Drawing C401
Total Available Storage =	**301.42 m^3**	

Rooftop Controls

Control-Flo Roof Drain Rate =	136	L/min
Max HWL =	0.152	m
Control-Flo Roof Drain Rate =	14.91	L/s·m
# of roof drains =	35	
Max Roof Storage =	113.5	m^3
Height =	0.064	m
Max Roof Rate =	32.88	L/s

APPENDIX D

Supporting Documents

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

HARMONY STAGE 1
4005 STRANDHERD DRIVE
CITY OF OTTAWA
MINTO COMMUNITIES INC.
JLR NO. 24051-01

STORM SEWER DESIGN SHEET

Designed by: J.W.
Checked by: K.F.
Date: July 2017

Manning's Coefficient, n =	0.013
IDF CURVE =	2 Year

Denotes Existing Storm Sewer (Mattamy Barrhaven Mews) - Per IBI As-Constructed Drawings dated February 2010

STREET	Maintenance Hole Number		DRAINAGE AREAS											Inlet Time	In Pipe Flow Time	2 YR PEAK FLOW					5 YR PEAK FLOW					TOTAL	PLUG FLOW	SEWER DATA									Residual Capacity	UPSTREAM					DOWNSTREAM				
										Total Area		Cum. Area 2 YR (ha)	Cum. Area 5 YR (ha)			2.78AR	Cum. 2.78AR	2 Yr Intensity (mm/hr)	Peak Flow (L/s)	2.78AR	Cum. 2.78AR	5 Yr Intensity (mm/hr)	Peak Flow (L/s)	Peak Design Flow (L/s)	Peak ICD Flow (L/s)	PIPE			Slope (%)	Q full (L/s)	V full (m/s)	Length (m)	$Q_{cap} - Q_d$ (L/s)	Center Line	Obvert	Invert	Cover	Center Line	Drop	Obvert	Invert	Cover
	FROM	TO	0.30	0.53	0.72	0.75	0.76	0.80	0.90	2 Yr	5 Yr			(min.)	(min.)											Dia (mm)	H (mm)	W (mm)																	
Commercial (Block 105)	Stub	MH120							0.76		0.76	0.00	0.76	10.00	0.42					1.90	1.90	104.19	198.1	198.13	235.0	600			0.15	248.09	0.85	21.6	50.0	94.34	91.835	91.225	2.51	94.24	0.00	91.803	91.193	2.44
														10.42																													
Chapman Mills Drive	MH120	MH121			0.55						0.55	0.00	1.31	10.42	2.16					1.10	3.00	102.01	306.2	306.28	135.0	675			0.15	339.63	0.92	119.2	33.4	94.24	91.803	91.117	2.44	94.41	-0.34	91.624	90.938	2.79
														12.56																													
Future Institutional Block	Stub	MH121				4.86					4.86	0.00	4.86	10.00	0.14					10.13	10.13	104.19	1055.0	1055.80	884.0	050			0.25	1424.40	1.59	13.8	368.6	94.41	92.001	90.934	2.41	94.32	0.00	91.967	90.900	2.35
														10.14																													
Chapman Mills Drive	MH123	MH124			0.34						0.34	0.00	0.34	10.00	1.69					0.68	0.68	104.19	70.91	70.91	89.0	450			0.20	133.02	0.81	82.2	62.1	94.30	91.406	90.949	2.89	93.45	0.00	91.242	90.785	2.21
														11.69																													
High Density (Block 118)	Stub	MH125						0.32			0.32	0.00	0.32	10.00	0.19					0.71	0.71	104.19	74.15	74.15	89.0	375			0.35	108.21	0.95	10.6	34.1	94.40	91.588	91.207	2.81	94.28	0.06	91.551	91.170	2.73
Chakra (Street No. 6)	MH125	MH123			0.10					0.10		0.10	0.32	10.19	0.88	0.20	0.20	76.10	15.23		0.71	103.22	73.46	88.69	16.0	375			0.35	108.21	0.95	50.0	19.5	94.28	91.491	91.110	2.79	94.30	0.00	91.316	90.935	2.98
														11.06																													
Chapman Mills Drive	MH123	MH122			0.19						0.19	0.10	0.51	11.06	0.82		0.20	72.95	14.60	0.38	1.09	98.89	107.98	122.59	48.0	600			0.15	248.09	0.85	41.8	125.5	94.30	91.316	90.706	2.98	94.18	0.00	91.253	90.644	2.93
Chapman Mills Drive	MH122	MH121										0.10	0.51	11.88	0.63		0.20	70.26	14.06		1.09	95.20	103.95	118.02	0.0	600			0.15	248.09	0.85	32.3	130.1	94.18	91.253	90.644	2.93	94.32	-0.76	91.205	90.595	3.12
														12.52																													
Clarity (Street No. 5)	**MH121**	**MH115**			**0.34**					**0.34**		**0.44**	**6.68**	**12.58**	**1.22**	**0.68**	**0.88**	**68.13**	**60.00**		**14.23**	**92.28**	**1312.88**	**1372.88**	**54.0**	**1350**			**0.15**	**2156.55**	**1.46**	**106.5**	**783.7**	**94.32**	**91.967**	**90.595**	**2.35**	**94.22**	**0.00**	**91.807**	**90.435**	**2.41**
														13.80																													
Park (Block 117)	Stub	MH115	1.53								1.53	0.00	1.53	10.00	0.27					1.28	1.28	104.19	132.95	132.95	84.0	450			0.25	148.72	0.91	14.8	15.8	94.33	91.387	90.929	2.94	94.21	-0.46	91.350	90.893	2.86
														10.27																													
Clarity (Street No. 5)	**MH115**	**MH115A**		**0.42**	**0.41**					**0.83**		**1.27**	**8.21**	**13.80**	**0.88**	**1.44**	**2.32**	**64.76**	**150.24**		**15.50**	**87.65**	**1358.87**	**1509.12**	**66.0**	**1350**			**0.15**	**2156.55**	**1.46**	**77.3**	**647.4**	**94.22**	**91.807**	**90.435**	**2.41**	**94.10**	**-0.08**	**91.691**	**90.319**	**2.41**
														14.68																													
Waterlilly Way	MH118	MH117		0.17	0.39					0.56		0.56	0.00	10.00	1.49	1.03	1.03	76.81	79.19					79.19	62.0	600			0.20	286.47	0.98	87.5	207.3	94.50	92.214	91.604	2.29	94.30	0.00	92.039	91.429	2.26
Waterlilly Way	MH117	MH116			0.34					0.34		0.90	0.00	11.49	1.21	0.68	1.71	71.54	122.44					122.44	52.0	675			0.20	392.18	1.06	77.3	269.7	94.40	92.039	91.353	2.36	94.30	0.00	91.884	91.198	2.42
														12.70																													
Easement (Block 110)	MH116	MH115A										0.90	0.00	12.70	1.41		1.71	67.79	116.03					116.03	0.0	675			0.15	339.63	0.92	77.9	223.6	94.16	91.884	91.198	2.28	94.32	0.00	91.767	91.081	2.55
														14.11																													
Clarity (Street No. 5)	**MH115A**	**MH113**		**0.46**						**0.46**		**2.63**	**8.21**	**14.68**	**0.43**	**0.68**	**4.71**	**62.53**	**294.48**		**15.50**	**84.60**	**1311.58**	**1606.07**	**0.0**	**1500**			**0.15**	**2856.14**	**1.57**	**40.4**	**1250.1**	**94.22**	**91.767**	**90.243**	**2.45**	**94.10**	**0.00**	**91.707**	**90.183**	**2.39**
														15.11																													
Namaste (Street No. 4)	MH114	MH113		0.11	0.42					0.53		0.53	0.00	10.00	1.65	1.00	1.00	76.81	77.02					77.02	66.0	600			0.20	286.47	0.98	96.9	209.5	94.17	91.603	90.994	2.57	94.10	-0.30	91.409	90.800	2.69
														11.65																													
Clarity (Street No. 5)	**MH113**	**MH110**			**0.24**					**0.24**		**3.40**	**8.21**	**15.11**	**0.84**	**0.48**	**6.19**	**61.51**	**380.89**		**15.50**	**83.20**	**1289.87**	**1670.76**	**36.0**	**1500**			**0.15**	**2856.14**	**1.57**	**78.9**	**1185.4**	**94.10**	**91.707**	**90.183**	**2.39**	**94.02**	**0.00**	**91.588**	**90.064**	**2.43**
														15.95																													
Waterlilly Way	MH109A	EX. 21			0.13					0.13		0.13	0.00	10.00	1.65	0.26	0.26	76.81	19.99					19.99	18.0	300			0.35	59.68	0.82	80.8	39.7	94.60	92.393	92.088	2.21	94.77	0.00	92.110	91.805	2.66
Waterlilly Way	EX. 21	MH109			0.17		0.18			0.35		0.48	0.00	11.65	0.96	0.72	0.98	71.01	69.65					69.65	--	300			0.33	57.95	0.80	45.9	-11.7	94.77	92.110	91.805	2.66	95.00	0.45	91.959	91.654	3.04
Lilithe (Street No. 3)	MH109	MH110			0.22					0.22		0.70	0.00	12.60	1.27	0.44	1.42	68.07	96.74					96.74	34.0	450			0.35	175.96	1.07	81.7	79.2	95.00	91.508	91.051	3.49	94.02	-0.37	91.222	90.765	2.80
														13.87																													
Lilithe (Street No. 3)	MH112	MH111										0.00	0.00	10.00	1.30									0.00	0.0	375			0.25	91.46	0.80	62.7		94.14	91.545	91.164	2.59	93.80	0.00	91.388	91.007	2.41
Lilithe (Street No. 3)	MH111	MH110		0.27	0.53					0.80		0.80	0.00	11.30	1.16	1.46	1.46	72.14	105.23					105.23	84.0	600			0.16	256.22	0.88	60.9	151.0	93.80	91.388	90.779	2.41	94.02	-0.30	91.291	90.681	2.73
														12.46																													
Clarity (Street No. 5)	**MH110**	**MH110A**										**4.90**	**8.21**	**15.95**	**0.34**		**9.07**	**59.61**	**540.82**		**15.50**	**80.61**	**1249.67**	**1790.49**	**0.0**	**1500**			**0.15**	**2856.14**	**1.57**	**31.6**	**1065.6**	**94.02**	**91.588**	**90.064**	**2.43**	**93.68**	**0.00**	**91.541**	**90.017**	**2.14**
Clarity (Street No. 5)	**MH110A**	**MH106**			**0.23**					**0.23**		**5.13**	**8.21**	**16.29**	**0.47**	**0.46**	**9.53**	**58.89**	**561.37**		**15.50**	**79.62**	**1234.34**	**1795.71**	**34.0**	**1500**			**0.15**	**2856.14**	**1.57**	**44.0**	**1060.4**	**93.68**	**91.541**	**90.017**	**2.14**	**93.94**	**-0.04**	**91.475**	**89.951**	**2.46**
														16.75																													
Octave (Street No. 2)	MH108	MH107		0.33						0.33		0.33	0.00	10.00	1.30	0.49	0.49	76.81	37.34					37.34	0.0	375			0.25	91.46	0.80	62.7	54.1	94.02	91.769	91.388	2.25	93.75	0.00	91.612	91.231	2.14
Octave (Street No. 2)	MH107	MH106			0.56					0.56		0.89	0.00	11.30	1.33	1.12	1.61	72.14	115.94					115.94	90.0	525			0.16	179.46	0.80	64.3	63.5	93.75	91.612	91.079	2.14	93.94	0.00	91.510	90.976	2.43
														12.64																													
Clarity (Street No. 5)	**MH106**	**MH102**		**0.40**	**0.24**					**0.64**		**6.66**	**8.21**	**16.75**	**0.73**	**1.07**	**12.21**	**57.91**	**707.11**		**15.50**	**78.29**	**1213.69**	**1920.81**	**36.0**		**1585**	**2495**	**0.15**	**5749.47**	**1.87**	**82.2**	**3828.7**	**93.94**	**91.513**	**89.913**	**2.43**	**93.86**	**0.00**	**91.390**	**89.790**	**2.47**
														17.49																													
Waterlilly Way	MH109	EX. 20										0.00	0.00	10.00	0.16									0.00	--	300			0.33	57.95	0.80	7.7		95.00	91.960	91.656	3.04	94.96	-0.03	91.935	91.630	3.03
Waterlilly Way	EX. 20	EX. 19			0.16		0.17			0.33		0.33	0.00	10.16	1.40	0.68	0.68	76.19	51.77					51.77	--	375			0.24	89.05	0.80	67.4	37.3	94.96	91.961	91.580	3.00	94.68	0.04	91.801	91.420	2.88
Waterlilly Way	EX.19	MH101										0.33	0.00	11.57	1.59		0.68	71.27	48.43					48.43	--	375			0.28	96.96	0.85	81.2	48.5	94.68	91.761	91.380	2.92	93.94	0.36	91.533	91.152	2.41
Hamsa (Street No. 1)	MH101	MH102			0.19					0.19		0.52	0.00	13.16	1.42	0.38	1.06	66.49	70.46					70.46	28.0	450			0.25	148.72	0.91	77.2	78.3	94.00	91.171	90.714	2.83	93.86	-0.41	90.978	90.521	2.88
														14.58																													
Hamsa (Steet No. 1)	**MH102**	**MH103**			**0.22**					**0.22**		**7.40**	**8.21**	**17.49**	**0.33**	**0.44**	**13.71**	**56.46**	**774.00**		**15.50**	**76.29**	**1182.80**	**1956.79**	**32.0**		**1585**	**2495**	**0.15**	**5749.47**	**1.87**	**36.6**	**3792.7**	**93.86**	**91.390**	**89.790**	**2.47**	**93.37**	**-0.38**	**91.335**	**89.735**	**2.04**
														17.82																													
Hamsa (Street No. 1)	MH105	MH103		0.32	0.25					0.57		0.57	0.00	10.00	1.89	0.97	0.97	76.81	74.65					74.65	40.0	525			0.16	179.46	0.80	91.0	104.8	93.95	91.107	90.574	2.84	93.40	-0.75	90.961	90.428	2.44
														11.89																													
Easement (Block 116)	**MH103**	**MH104**										**7.97**	**8.21**	**17.82**	**0.33**		**14.68**	**55.83**	**819.72**		**15.50**	**75.44**	**1169.60**	**1989.32**	**0.0**	**1950**			**0.15**	**5749.47**	**1.87**	**36.4**	**3760.1**	**93.37**	**91.716**	**89.735**	**1.65**	**93.50**	**0.00**	**91.661**	**89.680**	**1.84**
Easement (Block 116)	**MH104**	**Pond**										**7.97**	**8.21**	**18.14**	**0.24**		**14.68**	**55.23**	**810.82**		**15.50**	**74.61**	**1156.77**	**1967.59**	**0.0**	**1950**			**0.15**	**5749.47**	**1.87**	**26.7**	**3781.9**	**93.50**	**91.661**	**89.680**	**1.84**	**93.50**	**0.00**	**91.621**	**89.640**	**1.88**
														18.38																												**INVERT @ POND =**	**89.640**

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

HARMONY STAGE 1
4005 STRANDHERD DRIVE
CITY OF OTTAWA
MINTO COMMUNITIES INC.
JLR NO. 24051-001

SANITARY SEWER DESIGN SHEET

Designed by: J.W.
Checked by: K.F.

Date : May 2017

Single Family	3.4	pers/unit	q =	350	L/cap/day
Semi-Detached/Townhouse (row)	2.7	pers/unit	I =	0.280	L/s/ha
			Inst. =	50000	L/ha/day
Manning's Coeff. N =	0.013				

Denotes Existing Sanitary Sewer (South Nepean Collector) - In accordance with City of Ottawa Drawings Contract No. ISD14-2033
Denotes Existing Sanitary Sewer (Mattamy Barrhaven Mews) - Per IBI As-Constructed Drawings dated February 2010
Denotes Future External Lands (Refer to South Nepean Collector - Phase 2 & 3 Sanitary Sewer Design Sheet prepared by Novatech, dated August 2015)

STREET	M.H. #		RESIDENTIAL							INSTITUTIONAL/COMMERCIAL					SEWER DATA					RESIDUAL	UPSTREAM					DOWNSTREAM				
			NUMBER OF UNITS			CUMULATIVE		PEAKING	POPUL.				PEAK EXTR.	PEAK DES.																
			SING.	MULT.	AREA	POPUL.	AREA	FACTOR	FLOW	AREA	CUMM. AREA	INST. FLOW	FLOW	FLOW	DIA.	SLOPE	CAPAC.	VEL.	LENGTH	CAP.	Center	Obvert	Invert	Cover	Center	Obvert	Obvert	Invert	Cover
	FROM	TO			ha	peop.	ha		l/s	ha	ha	l/s	l/s	l/s	mm	%	l/s	m/s	m	l/s	Line				Line	Drop			
Hamsa Street (Street No. 1)	MH1	MH2	10	0	0.48	34	0.48	4.00	0.55	0.00	0.00	0.00	0.13	0.69	200	0.35	20.2	0.62	64.5	19.56	94.06	92.191	91.988	1.87	93.86	1.00	91.965	91.762	1.89
Hamsa Street (Street No. 1)	MH5	MH3	15	0	0.69	51	0.69	4.00	0.83	0.00	0.00	0.00	0.19	1.02	200	0.35	20.2	0.62	88.9	19.22	93.88	91.462	91.259	2.42	93.47		91.151	90.947	2.32
Hamsa Street (Street No. 1)	MH3	MH2	5	0	0.26	68	0.95	4.00	1.10	0.00	0.00	0.00	0.27	1.37	200	0.35	20.2	0.62	37.0	18.87	93.47	91.151	90.947	2.32	93.86	0.06	91.021	90.818	2.84
Clarity Street (Street No. 5)	**MH2**	**MH6**	**4**	**0**	**0.25**	**116**	**1.68**	**4.00**	**1.87**	**0.00**	**0.00**	**0.00**	**0.47**	**2.34**	**200**	**0.35**	**20.2**	**0.62**	**76.1**	**17.90**	**93.86**	**90.961**	**90.758**	**2.90**	**93.94**		**90.695**	**90.491**	**3.25**
Octave Street (Street No. 2)	MH8	MH7	12	0	0.51	41	0.51	4.00	0.66	0.00	0.00	0.00	0.14	0.80	200	0.35	20.2	0.62	62.6	19.44	94.07	91.194	90.991	2.88	93.77		90.975	90.772	2.79
Octave Street (Street No. 2)	MH7	MH6	10	0	0.41	75	0.92	4.00	1.21	0.00	0.00	0.00	0.26	1.47	200	0.35	20.2	0.62	63.1	18.77	93.77	90.975	90.772	2.79	93.94	0.06	90.755	90.551	3.19
Clarity Street (Street No. 5)	**MH6**	**MH10A**	**4**	**0**	**0.24**	**204**	**2.84**	**4.00**	**3.31**	**0.00**	**0.00**	**0.00**	**0.80**	**4.10**	**200**	**0.35**	**20.2**	**0.62**	**51.0**	**16.14**	**93.94**	**90.695**	**90.491**	**3.25**	**93.76**		**90.516**	**90.313**	**3.24**
Clarity Street (Street No. 5)	**MH10A**	**MH10**	**0**	**0**	**0.00**	**204**	**2.84**	**4.00**	**3.31**	**0.00**	**0.00**	**0.00**	**0.80**	**4.10**	**200**	**0.35**	**20.2**	**0.62**	**25.4**	**16.14**	**93.76**	**90.516**	**90.313**	**3.24**	**94.02**		**90.427**	**90.224**	**3.59**
Lilith Street (Street No. 3)	MH9	MH10	0	14	0.46	38	0.46	4.00	0.61	0.00	0.00	0.00	0.13	0.74	200	0.35	20.2	0.62	65.5	19.50	95.00	92.343	92.139	2.66	94.02	1.69	92.113	91.910	1.91
Lilith Street (Street No. 3)	MH12	MH11	10	0	0.46	34	0.46	4.00	0.55	0.00	0.00	0.00	0.13	0.68	200	0.35	20.2	0.62	62.8	19.56	94.15	90.919	90.716	3.23	93.84		90.699	90.496	3.14
Lilith Street (Street No. 3)	MH11	MH10	9	0	0.41	65	0.87	4.00	1.05	0.00	0.00	0.00	0.24	1.29	200	0.35	20.2	0.62	60.5	18.95	93.84	90.699	90.496	3.14	94.02	0.06	90.487	90.284	3.53
Clarity Street (Street No. 5)	**MH10**	**MH13**	**0**	**6**	**0.27**	**323**	**4.44**	**4.00**	**5.23**	**0.00**	**0.00**	**0.00**	**1.24**	**6.47**	**200**	**0.35**	**20.2**	**0.62**	**78.5**	**13.77**	**94.02**	**90.427**	**90.224**	**3.59**	**94.10**		**90.153**	**89.949**	**3.95**
Namaste (Street No. 4)	MH14	MH13	14	0	0.69	48	0.69	4.00	0.77	0.00	0.00	0.00	0.19	0.96	200	0.35	20.2	0.62	97.1	19.28	94.20	90.552	90.349	3.65	94.10	0.06	90.213	90.009	3.89
Clarity Street (Street No. 5)	**MH13**	**MH15**	**0**	**17**	**0.59**	**416**	**5.72**	**4.00**	**6.74**	**0.00**	**0.00**	**0.00**	**1.60**	**8.34**	**200**	**0.35**	**20.2**	**0.62**	**117.4**	**11.90**	**94.10**	**90.153**	**89.949**	**3.95**	**94.22**	**-0.05**	**89.742**	**89.538**	**4.48**
Park (Block 117)	MH16	MH15	0	0	1.67	0	1.67	4.00	0.00	0.00	0.00	0.00	0.47	0.47	150	0.50	11.2	0.62	12.9	10.77	94.32	90.357	90.205	3.96	94.22	0.50	90.293	90.140	3.93
Clarity Street (Street No. 5)	**MH15**	**EX. CM 4**	**0**	**12**	**0.46**	**449**	**7.85**	**4.00**	**7.26**	**0.00**	**0.00**	**0.00**	**2.20**	**9.46**	**300**	**2.00**	**142.7**	**1.96**	**106.9**	**133.21**	**94.22**	**89.793**	**89.488**	**4.43**	**94.32**	**0.01**	**87.655**	**87.350**	**6.66**
Future Institutional (Block 127)	STUB	EX. CM 4	0	0	0.00	0	0.00	4.00	0.00	4.86 *	4.86	4.22	1.36	5.58	250	1.00	62.0	1.22	15.7	56.46	94.41	90.431	90.177	3.98	94.32	2.63	90.274	90.020	4.05
Upstream Mixed Use Development	--	EX. CM 1	--	--	105.84	10974	105.84	2.91	129.56	175.19	175.19	152.07	78.69	360.33															
Chapman Mills Drive	EX. CM 1	EX. CM 2	0	0	0.16	10974	106.00	2.91	129.56	0.00	175.19	152.07	78.73	360.37	900	0.10	597.2	0.91	60.9	236.85	95.03	87.833	86.918	7.20	94.43		87.772	86.857	6.66
Future Commercial (Block 105)	STUB	EX. CM 2	0	0	0.00	0	0.00	4.00	0.00	0.76	0.76	0.66	0.21	0.87	250	1.00	62.0	1.22	15.0	61.17	94.53	90.624	90.370	3.91	94.43	2.70	90.474	90.220	3.96
Chapman Mills Drive	EX. CM 2	EX. CM 3	0	0	0.16	10974	106.16	2.91	129.56	0.00	175.95	152.73	78.99	361.29	900	0.10	597.2	0.91	47.4	235.94	94.43	87.772	86.857	6.66	94.41		87.724	86.810	6.69
Waterlilly Way	EX. 22A	17	0	22	0.56	59	0.56	4.00	0.96	0.00	0.00	0.00	0.16	1.12	200	1.00	34.2	1.06	84.2	33.10	94.59	92.702	92.499	1.89	94.40	0.55	91.860	91.657	2.54
Waterlilly Way	17	EX. CM 3	5	17	0.70	122	1.26	4.00	1.98	0.00	0.00	0.00	0.35	2.33	250	1.00	62.0	1.22	105.6	59.70	94.40	91.310	91.056	3.09	94.41	2.53	90.254	90.000	4.16
Chapman Mills Drive	EX. CM 3	EX. CM 4	0	0	0.21	11096	107.63	2.91	130.79	0.00	175.95	152.73	79.40	362.93	900	0.10	597.2	0.91	76.1	234.30	94.41	87.724	86.810	6.69	94.32		87.648	86.734	6.67
Chapman Mills Drive	EX. CM 4	EX. CM 5	0	0	0.09	11545	115.57	2.89	135.27	0.00	180.81	156.95	82.99	375.21	900	0.10	597.2	0.91	32.0	222.01	94.32	87.648	86.734	6.67	94.20		87.616	86.702	6.58
Chapman Mills Drive	EX. CM 5	EX. CM 6	0	0	0.11	11545	115.68	2.89	135.27	0.00	180.81	156.95	83.02	375.24	900	0.10	597.2	0.91	42.3	221.98	94.20	87.616	86.702	6.58	94.30		87.574	86.660	6.73
High Density Residential (Block 118)	STUB	18	0	24	0.32	65	0.32	4.00	1.05	0.00	0.00	0.00	0.09	1.14	200	0.35	20.2	0.62	9.0	19.10	94.39	90.090	89.887	4.30	94.27	0.00	90.059	89.855	4.21
Chakra Street (Street No. 6)	18	EX. CM 6	0	0	0.10	65	0.42	4.00	1.05	0.00	0.00	0.00	0.12	1.17	300	4.00	201.8	2.77	46.8	200.60	94.27	90.059	89.754	4.21	94.30	0.61	88.185	87.880	6.11
Chapman Mills Drive	EX. CM 6	EX. CM 7	0	0	0.21	11610	116.31	2.89	135.92	0.00	180.81	156.95	83.19	376.06	900	0.10	597.2	0.91	74.0	221.16	94.30	87.574	86.660	6.73	93.40	0.01	87.500	86.586	5.90
Future Residential Development	STUB	EX. CM 7	0	0	8.83 *	1430 **	8.83	3.69	21.41	5.35	5.35	4.64	3.97	30.02	250	0.25	31.0	0.61	12.0	1.00	93.61	87.434	87.180	6.18	93.40	-0.09	87.404	87.150	6.00
Chapman Mills Drive	EX. CM 7	EX. CM 8	0	0	0.00	13040	125.14	2.84	149.99	0.00	186.16	161.59	87.16	398.75	900	0.10	597.2	0.91	25.7	198.48	93.40	87.490	86.576	5.91	93.38		87.464	86.550	5.92
																											INV =	**86.550**	

Notes:
* Institutional, Commercial and Residential Area taken from Draft Plan of Subdivision prepared by Annis, O'Sullivan, Vollebekk Ltd. (Residential Area inclusive of Future Transit Corridor (2.279 Ha) and Servicing Easement (0.112 Ha))
** Cumulative Population based on Medium Density Residential Land Use (162 pers/ha) as per Novatech's South Nepean Collector - Phase 2 & 3 Sanitary Sewer Design Sheet dated August 2015

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

HARMONY STAGE 1
4005 STRANDHERD DRIVE
CITY OF OTTAWA
MINTO COMMUNITIES INC.
JLR NO. 24051-001

SANITARY SEWER DESIGN SHEET

Designed by: J.W.
Checked by: K.F.

Date : May 2017

Single Family	3.4	pers/unit	q =	350	L/cap/day
Semi-Detached/Townhouse (row)	2.7	pers/unit	I =	0.280	L/s/ha
			Inst. =	50000	L/ha/day
Manning's Coeff. N =	0.013				

Denotes Existing Sanitary Sewer (South Nepean Collector) - In accordance with City of Ottawa Drawings Contract No. ISD14-2033
Denotes Existing Sanitary Sewer (Mattamy Barrhaven Mews) - Per IBI As-Constructed Drawings dated February 2010
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STREET	M.H. #		RESIDENTIAL							INSTITUTIONAL/COMMERCIAL					SEWER DATA					RESIDUAL	UPSTREAM					DOWNSTREAM				
			NUMBER OF UNITS			CUMULATIVE		PEAKING	POPUL.				PEAK EXTR.	PEAK DES.																
			SING.	MULT.	AREA	POPUL.	AREA	FACTOR	FLOW	AREA	CUMM. AREA	INST. FLOW	FLOW	FLOW	DIA.	SLOPE	CAPAC.	VEL.	LENGTH	CAP.	Center	Obvert	Invert	Cover	Center	Obvert	Obvert	Invert	Cover
	FROM	TO			ha	peop.	ha		l/s	ha	ha	l/s	l/s	l/s	mm	%	l/s	m/s	m	l/s	Line				Line	Drop			
Hamsa Street (Street No. 1)	MH1	MH2	10	0	0.48	34	0.48	4.00	0.55	0.00	0.00	0.00	0.13	0.69	200	0.35	20.2	0.62	64.5	19.56	94.06	92.191	91.988	1.87	93.86	1.00	91.965	91.762	1.89
Hamsa Street (Street No. 1)	MH5	MH3	15	0	0.69	51	0.69	4.00	0.83	0.00	0.00	0.00	0.19	1.02	200	0.35	20.2	0.62	88.9	19.22	93.88	91.462	91.259	2.42	93.47		91.151	90.947	2.32
Hamsa Street (Street No. 1)	MH3	MH2	5	0	0.26	68	0.95	4.00	1.10	0.00	0.00	0.00	0.27	1.37	200	0.35	20.2	0.62	37.0	18.87	93.47	91.151	90.947	2.32	93.86	0.06	91.021	90.818	2.84
Clarity Street (Street No. 5)	**MH2**	**MH6**	**4**	**0**	**0.25**	**116**	**1.68**	**4.00**	**1.87**	**0.00**	**0.00**	**0.00**	**0.47**	**2.34**	**200**	**0.35**	**20.2**	**0.62**	**76.1**	**17.90**	**93.86**	**90.961**	**90.758**	**2.90**	**93.94**		**90.695**	**90.491**	**3.25**
Octave Street (Street No. 2)	MH8	MH7	12	0	0.51	41	0.51	4.00	0.66	0.00	0.00	0.00	0.14	0.80	200	0.35	20.2	0.62	62.6	19.44	94.07	91.194	90.991	2.88	93.77		90.975	90.772	2.79
Octave Street (Street No. 2)	MH7	MH6	10	0	0.41	75	0.92	4.00	1.21	0.00	0.00	0.00	0.26	1.47	200	0.35	20.2	0.62	63.1	18.77	93.77	90.975	90.772	2.79	93.94	0.06	90.755	90.551	3.19
Clarity Street (Street No. 5)	**MH6**	**MH10A**	**4**	**0**	**0.24**	**204**	**2.84**	**4.00**	**3.31**	**0.00**	**0.00**	**0.00**	**0.80**	**4.10**	**200**	**0.35**	**20.2**	**0.62**	**51.0**	**16.14**	**93.94**	**90.695**	**90.491**	**3.25**	**93.76**		**90.516**	**90.313**	**3.24**
Clarity Street (Street No. 5)	**MH10A**	**MH10**	**0**	**0**	**0.00**	**204**	**2.84**	**4.00**	**3.31**	**0.00**	**0.00**	**0.00**	**0.80**	**4.10**	**200**	**0.35**	**20.2**	**0.62**	**25.4**	**16.14**	**93.76**	**90.516**	**90.313**	**3.24**	**94.02**		**90.427**	**90.224**	**3.59**
Lilith Street (Street No. 3)	MH9	MH10	0	14	0.46	38	0.46	4.00	0.61	0.00	0.00	0.00	0.13	0.74	200	0.35	20.2	0.62	65.5	19.50	95.00	92.343	92.139	2.66	94.02	1.69	92.113	91.910	1.91
Lilith Street (Street No. 3)	MH12	MH11	10	0	0.46	34	0.46	4.00	0.55	0.00	0.00	0.00	0.13	0.68	200	0.35	20.2	0.62	62.8	19.56	94.15	90.919	90.716	3.23	93.84		90.699	90.496	3.14
Lilith Street (Street No. 3)	MH11	MH10	9	0	0.41	65	0.87	4.00	1.05	0.00	0.00	0.00	0.24	1.29	200	0.35	20.2	0.62	60.5	18.95	93.84	90.699	90.496	3.14	94.02	0.06	90.487	90.284	3.53
Clarity Street (Street No. 5)	**MH10**	**MH13**	**0**	**6**	**0.27**	**323**	**4.44**	**4.00**	**5.23**	**0.00**	**0.00**	**0.00**	**1.24**	**6.47**	**200**	**0.35**	**20.2**	**0.62**	**78.5**	**13.77**	**94.02**	**90.427**	**90.224**	**3.59**	**94.10**		**90.153**	**89.949**	**3.95**
Namaste (Street No. 4)	MH14	MH13	14	0	0.69	48	0.69	4.00	0.77	0.00	0.00	0.00	0.19	0.96	200	0.35	20.2	0.62	97.1	19.28	94.20	90.552	90.349	3.65	94.10	0.06	90.213	90.009	3.89
Clarity Street (Street No. 5)	**MH13**	**MH15**	**0**	**17**	**0.59**	**416**	**5.72**	**4.00**	**6.74**	**0.00**	**0.00**	**0.00**	**1.60**	**8.34**	**200**	**0.35**	**20.2**	**0.62**	**117.4**	**11.90**	**94.10**	**90.153**	**89.949**	**3.95**	**94.22**	**-0.05**	**89.742**	**89.538**	**4.48**
Park (Block 117)	MH16	MH15	0	0	1.67	0	1.67	4.00	0.00	0.00	0.00	0.00	0.47	0.47	150	0.50	11.2	0.62	12.9	10.77	94.32	90.357	90.205	3.96	94.22	0.50	90.293	90.140	3.93
Clarity Street (Street No. 5)	**MH15**	**EX. CM 4**	**0**	**12**	**0.46**	**449**	**7.85**	**4.00**	**7.26**	**0.00**	**0.00**	**0.00**	**2.20**	**9.46**	**300**	**2.00**	**142.7**	**1.96**	**106.9**	**133.21**	**94.22**	**89.793**	**89.488**	**4.43**	**94.32**	**0.01**	**87.655**	**87.350**	**6.66**
Future Institutional (Block 127)	STUB	EX. CM 4	0	0	0.00	0	0.00	4.00	0.00	4.86 *	4.86	4.22	1.36	5.58	250	1.00	62.0	1.22	15.7	56.46	94.41	90.431	90.177	3.98	94.32	2.63	90.274	90.020	4.05
Upstream Mixed Use Development	--	EX. CM 1	--	--	105.84	10974	105.84	2.91	129.56	175.19	175.19	152.07	78.69	360.33															
Chapman Mills Drive	EX. CM 1	EX. CM 2	0	0	0.16	10974	106.00	2.91	129.56	0.00	175.19	152.07	78.73	360.37	900	0.10	597.2	0.91	60.9	236.85	95.03	87.833	86.918	7.20	94.43		87.772	86.857	6.66
Future Commercial (Block 105)	STUB	EX. CM 2	0	0	0.00	0	0.00	4.00	0.00	0.76	0.76	0.66	0.21	0.87	250	1.00	62.0	1.22	15.0	61.17	94.53	90.624	90.370	3.91	94.43	2.70	90.474	90.220	3.96
Chapman Mills Drive	EX. CM 2	EX. CM 3	0	0	0.16	10974	106.16	2.91	129.56	0.00	175.95	152.73	78.99	361.29	900	0.10	597.2	0.91	47.4	235.94	94.43	87.772	86.857	6.66	94.41		87.724	86.810	6.69
Waterlilly Way	EX. 22A	17	0	22	0.56	59	0.56	4.00	0.96	0.00	0.00	0.00	0.16	1.12	200	1.00	34.2	1.06	84.2	33.10	94.59	92.702	92.499	1.89	94.40	0.55	91.860	91.657	2.54
Waterlilly Way	17	EX. CM 3	5	17	0.70	122	1.26	4.00	1.98	0.00	0.00	0.00	0.35	2.33	250	1.00	62.0	1.22	105.6	59.70	94.40	91.310	91.056	3.09	94.41	2.53	90.254	90.000	4.16
Chapman Mills Drive	EX. CM 3	EX. CM 4	0	0	0.21	11096	107.63	2.91	130.79	0.00	175.95	152.73	79.40	362.93	900	0.10	597.2	0.91	76.1	234.30	94.41	87.724	86.810	6.69	94.32		87.648	86.734	6.67
Chapman Mills Drive	EX. CM 4	EX. CM 5	0	0	0.09	11545	115.57	2.89	135.27	0.00	180.81	156.95	82.99	375.21	900	0.10	597.2	0.91	32.0	222.01	94.32	87.648	86.734	6.67	94.20		87.616	86.702	6.58
Chapman Mills Drive	EX. CM 5	EX. CM 6	0	0	0.11	11545	115.68	2.89	135.27	0.00	180.81	156.95	83.02	375.24	900	0.10	597.2	0.91	42.3	221.98	94.20	87.616	86.702	6.58	94.30		87.574	86.660	6.73
High Density Residential (Block 118)	STUB	18	0	24	0.32	65	0.32	4.00	1.05	0.00	0.00	0.00	0.09	1.14	200	0.35	20.2	0.62	9.0	19.10	94.39	90.090	89.887	4.30	94.27	0.00	90.059	89.855	4.21
Chakra Street (Street No. 6)	18	EX. CM 6	0	0	0.10	65	0.42	4.00	1.05	0.00	0.00	0.00	0.12	1.17	300	4.00	201.8	2.77	46.8	200.60	94.27	90.059	89.754	4.21	94.30	0.61	88.185	87.880	6.11
Chapman Mills Drive	EX. CM 6	EX. CM 7	0	0	0.21	11610	116.31	2.89	135.92	0.00	180.81	156.95	83.19	376.06	900	0.10	597.2	0.91	74.0	221.16	94.30	87.574	86.660	6.73	93.40	0.01	87.500	86.586	5.90
Future Residential Development	STUB	EX. CM 7	0	0	8.83 *	1430 **	8.83	3.69	21.41	5.35	5.35	4.64	3.97	30.02	250	0.25	31.0	0.61	12.0	1.00	93.61	87.434	87.180	6.18	93.40	-0.09	87.404	87.150	6.00
Chapman Mills Drive	EX. CM 7	EX. CM 8	0	0	0.00	13040	125.14	2.84	149.99	0.00	186.16	161.59	87.16	398.75	900	0.10	597.2	0.91	25.7	198.48	93.40	87.490	86.576	5.91	93.38		87.464	86.550	5.92
																											INV =	**86.550**	

Notes:
* Institutional, Commercial and Residential Area taken from Draft Plan of Subdivision prepared by Annis, O'Sullivan, Vollebekk Ltd. (Residential Area inclusive of Future Transit Corridor (2.279 Ha) and Servicing Easement (0.112 Ha))
** Cumulative Population based on Medium Density Residential Land Use (162 pers/ha) as per Novatech's South Nepean Collector - Phase 2 & 3 Sanitary Sewer Design Sheet dated August 2015

APPENDIX E

Engineering Drawings

EROSION AND SEDIMENT CONTROL MEASURES:

** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES **

1. PRIOR TO START OF CONSTRUCTION:

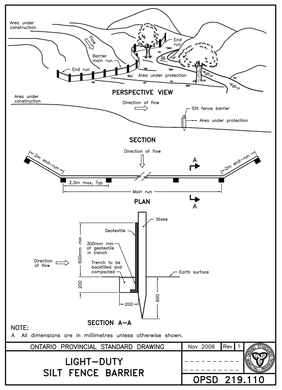
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES
- INSTALL SILTSACK FILTERS IN ALL CONCRETE CATCH BASINS STRUCTURES
- INSPECT MEASURES IMMEDIATELY AFTER INSTALLATION.

2. DURING CONSTRUCTION:

- WORK TO BE DONE IN THE VICINITY OF MAJOR WATERWAYS TO BE CARRIED OUT FROM JULY TO SEPTEMBER ONLY.
- MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE.
- PROTECT DISTURBED AREAS FROM RUNOFF.
- PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILITATED WITHIN 30 DAYS.
- INSPECT SILT FENCES, FILTER CLOTHS AND CATCH BASIN SUMPS WEEKLY AND AFTER EVERY MAJOR STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY.
- CONSTRUCT SWALES AS PER DETAIL.
- PLAN TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION
- EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES.
- DO NOT LOCATE TOPSOIL PILES AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE THE PILE IS REMOVED. ALL TOPSOIL PILES ARE TO BE SEEDED IF THEY ARE TO REMAIN ON SITE LONG ENOUGH FOR SEEDS TO GROW (LONGER THAN 30 DAYS).
- CONTROL WIND-BLOWN DUST OFF SITE TO ACCEPTABLE LEVELS BY SEEDING TOPSOIL PILES AND OTHER AREAS TEMPORARILY (PROVIDE WATERING AS REQUIRED).
- ALL EROSION CONTROL STRUCTURE TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.
- NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THIS CONSULTING ENGINEER AND THE CITY DEPARTMENT OF PUBLIC WORKS.
- CONTRACTOR RESPONSIBLE FOR CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING ETC. AT THE END OF EACH WORK DAY.
- PROVIDE GRAVEL ENTRANCE WHEREVER EQUIPMENT LEAVES THE SITE TO PREVENT MUD TRACKING ONTO PAVED SURFACES. GRAVEL BED SHALL BE A MINIMUM OF 15m LONG, 4M WIDE AND 0.3m DEEP AND SHALL CONSIST OF COARSE (50mm) CRUSHERT-RUN LIMESTONE) MATERIAL. MAINTAIN GRAVEL ENTRANCE IN CLEAN CONDITION.
- DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPED.
- ANY MUD/MATERIAL TRACKED ONTO THE ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER.
- TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ABUTTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.
- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE. DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

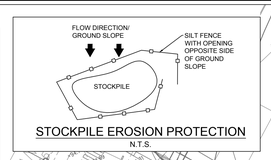
3. AFTER CONSTRUCTION:

- PROVIDE PERMANENT COVER CONSISTING OF TOPSOIL AND SEED TO DISTURBED AREAS.
- REMOVE STRAW BALE FLOW CHECK DAMS, SILT FENCES AND FILTER CLOTHS ON CATCH BASINS AND MANHOLE COVERS AFTER DISTURBED AREAS HAVE BEEN REHABILITATED AND STABILIZED.
- INSPECT AND CLEAN CATCH BASIN SUMPS AND STORM SEWERS.

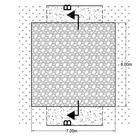


NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev. 1
LIGHT–DUTY SILT FENCE BARRIER		OPSD 219.110



STOCKPILE EROSION PROTECTION
N.T.S.



TYPICAL MUD TRACKING PAD – PLAN VIEW
N.T.S.

TYPICAL MUD TRACKING PAD – PROFILE VIEW
N.T.S.

NOTES:
THE CONTRACTOR SHALL INSPECT MUD TRACKING PAD WEEKLY AS WELL AS AFTER ANY RAINFALL EVENT GREATER THAN 13mm. IF THE PAD IS NOT FUNCTIONING AS INTENDED OR HAS BECOME SILTED, THE CONTRACTOR SHALL REPLACE THE CLEAR STONE IMMEDIATELY. LOCATION AND WIDTH OF CONSTRUCTION ENTRANCES TO BE DETERMINED BY CONTRACTOR AND APPROVED BY THE ENGINEER.

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AS PER L-001
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED CHAIN LINK FENCE
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED GRASS AS PER L-001 (FUTURE PARKING LOT AREA)
- PROPOSED INFILTRATION GALLERY
- +50.00 PROPOSED ELEVATION
- +50.00HP PROPOSED HIGH POINT ELEVATION
- +50.00 PROPOSED ELEVATION
- +50.00BC PROPOSED BOTTOM OF CURB ELEVATION
- +50.00TC PROPOSED TOP OF CURB ELEVATION
- +50.00TS PROPOSED TOP OF SIDEWALK ELEVATION
- +50.00BS PROPOSED BOTTOM OF SIDEWALK ELEVATION
- +50.00ST PROPOSED STRANDHERD ELEVATION TO BE COMPLETE BY 2022
- +50.00EX MATCH INTO EXISTING ELEVATION
- +76.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- SUB — SUB — PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM — STM — PROPOSED STORM SEWER
- SAN — SAN — PROPOSED SANITARY SEWER
- WTR — WTR — PROPOSED WATERMAIN
- HYD-WTR — PROPOSED HYDRANT LEAD
- STM — STM — EXISTING STORM SEWER
- SAN — SAN — EXISTING SANITARY SEWER
- WTR — WTR — EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED STC300
- PROPOSED CURB STOP
- PROPOSED FIRE HYDRANT
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX — WATERSHED NAME
- CONTROLLED — RUNOFF COEFFICIENT
- AREA — RUNOFF — AREA IN HECTARES

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no.	date	revision / issue	by
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06	2019/07/03	ISSUED AS PER CITY COMMENTS	G.B.
05	2019/05/28	ISSUED AS PER COMMENTS	G.B.
04	2019/05/13	ISSUED FOR PERMIT	G.B.
03	2018/12/21	RE-ISSUED FOR SPA	G.B.
02	2018/10/01	RE-ISSUED FOR SPA	G.B.
01	2018/09/25	ISSUE FOR SPA	G.B.

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professional stamp

project title
NOUVELLE ÉCOLE SECONDAIRE BARRHAVEN
Barrhaven Ontario

drawing title
EROSION AND SEDIMENT CONTROL PLAN

date	25/01/2018	job.no.	1817
scales	1:400		
drown	M.L.	drawing no.	C101
approved	J.C.L.		
plot date	25/01/2018		

1 DO NOT SCALE THIS DRAWING.
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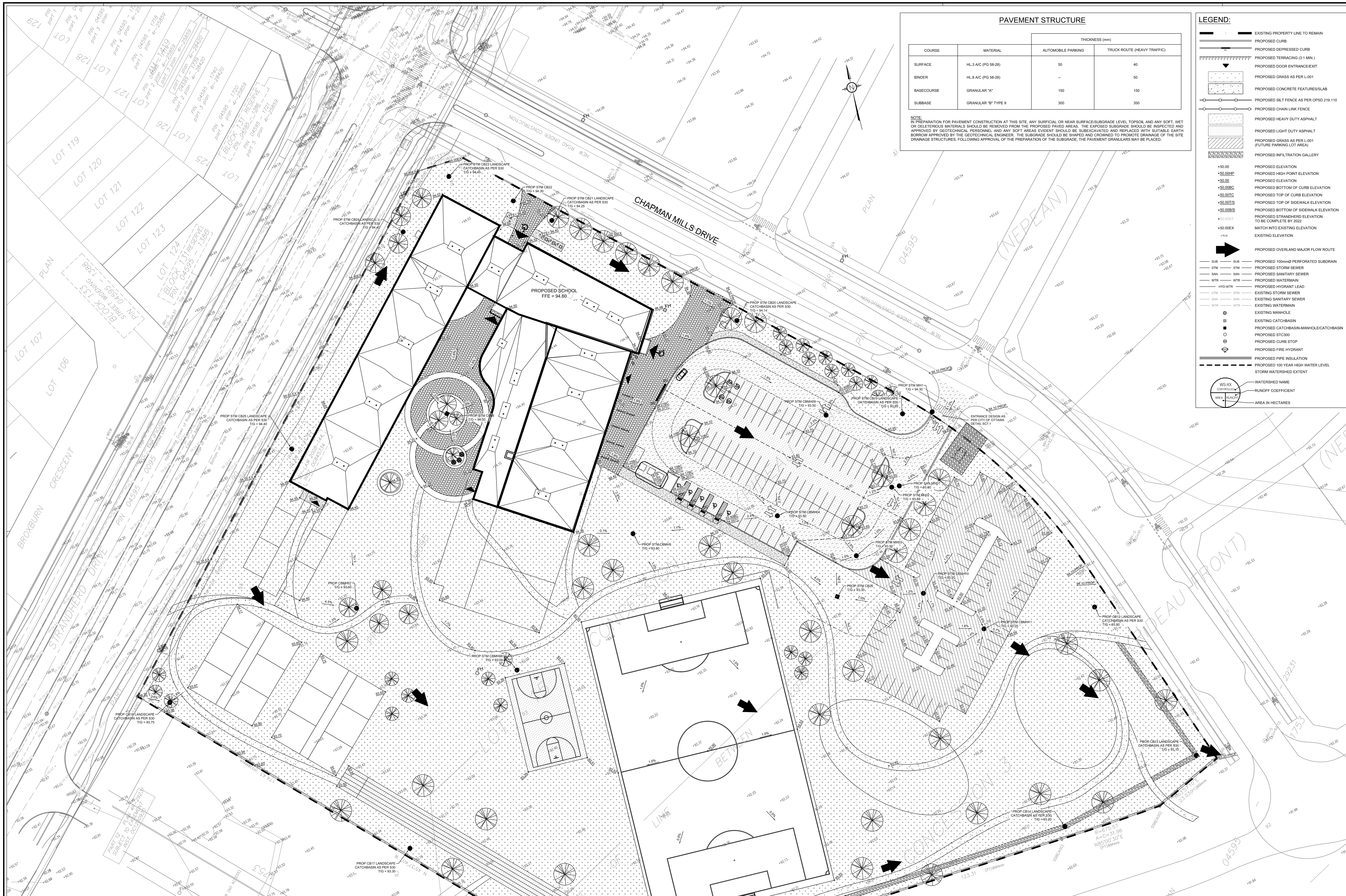

PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL.3 A/C (PG 58-28)	50	40
BINDER	HL.8 A/C (PG 58-28)	--	50
BASECOURSE	GRANULAR "A"	150	150
SUBBASE	GRANULAR "B" TYPE II	300	350

NOTE:
IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED.

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- DC — PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AS PER L-001
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED CHAIN LINK FENCE
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED GRASS AS PER L-001 (FUTURE PARKING LOT AREA)
- PROPOSED INFILTRATION GALLERY
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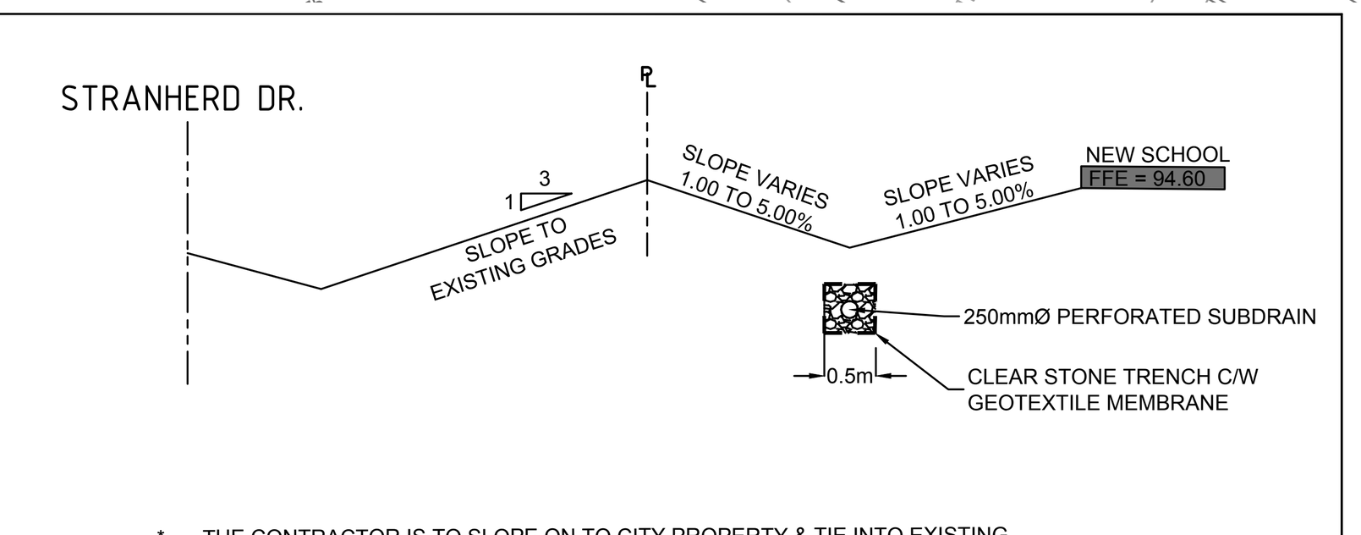

* THE CONTRACTOR IS TO SLOPE ON TO CITY PROPERTY & TIE INTO EXISTING GROUND PRIOR TO THE CITY WORK COMPLETION ON STRANHERD DRIVE. THE CITY IS TO MATCH PROPOSED GRADES WHEN COMPLETING THE SIDEWALKS AND LANDSCAPING PROPOSED ALONG STRANHERD DRIVE.

STRANHERD DRIVE TIE-IN - TYPICAL SECTION

(N.T.S.)

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professional stamp
LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
Sept 5, 2019
PROVINCE OF ONTARIO

project title
NOUVELLE ÉCOLE SECONDAIRE BARRHAVEN
Barrhaven Ontario

drawing title
GRADING AND DRAINAGE PLAN

date	25/01/2018	job.no.	1817
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drawn	M.L.	drawing no.	C301
approved	J.C.L.		
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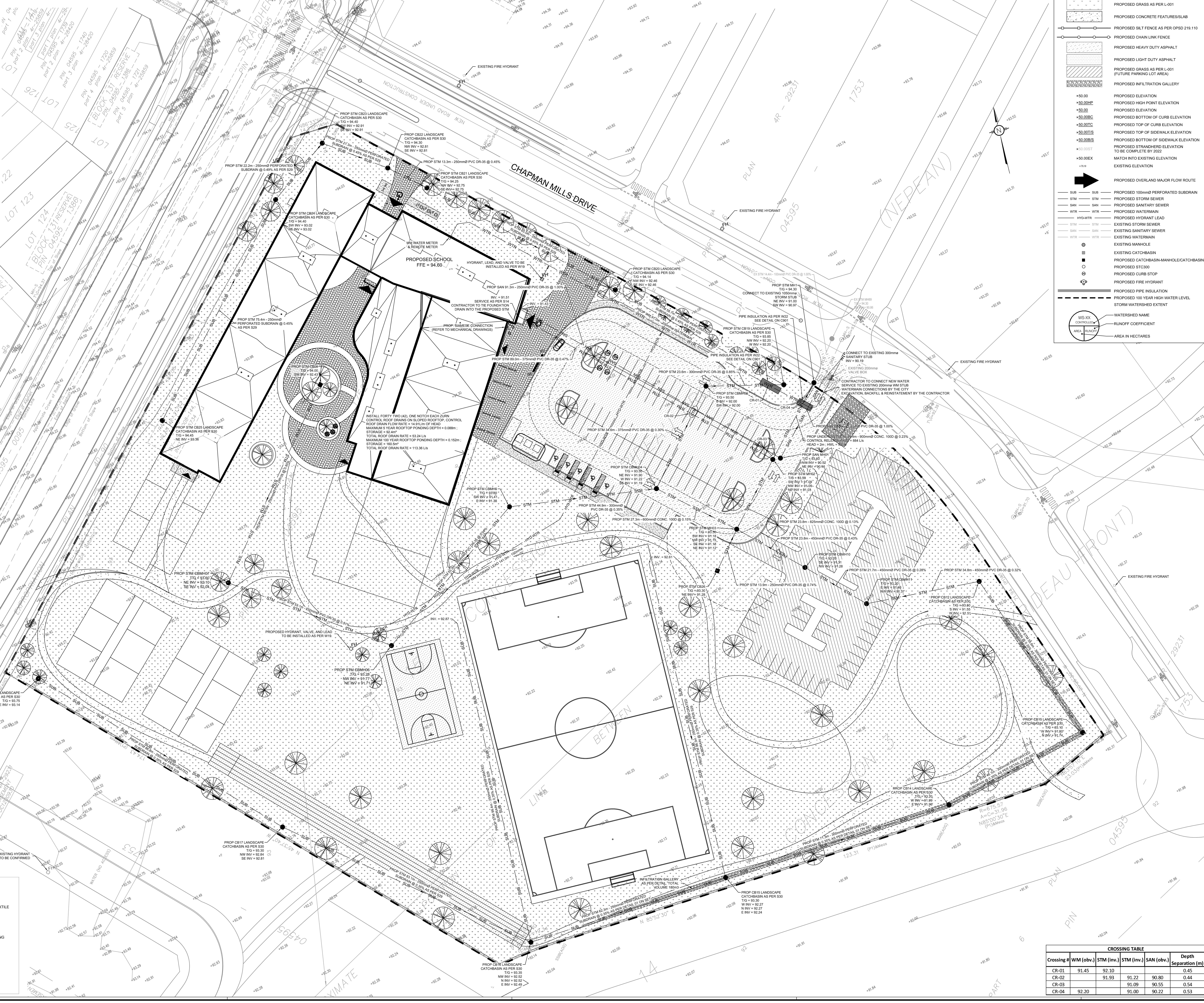
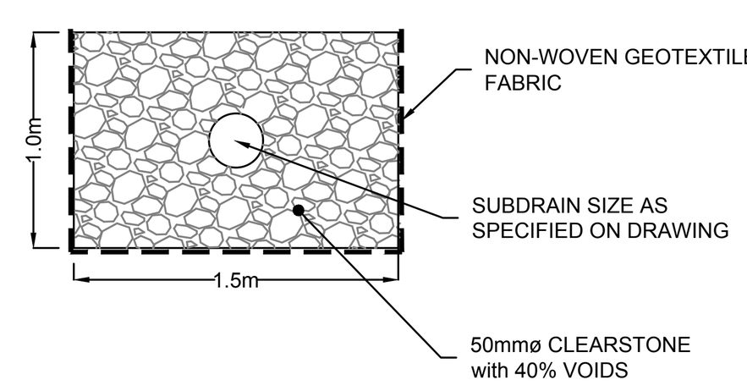
NOTES: GENERAL

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
2. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
3. JOB BENCH MARK - CONFIRM WITH LRL PRIOR TO UTILIZATION.
4. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE, CATCH BASIN OUTLETS AND/OR STORM DETENTION AREAS ARE PROVIDED.
5. STRIP AND REMOVE ALL TOPSOIL FROM IMPROVED AREAS.
6. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
7. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A CLEAN STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 500mm WIDTH MINIMUM.
8. CURBS TO BE BARRIER, CONSTRUCTED AS PER OPSD 600.110.
9. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. CONSTRUCTION TO OPSS 206, 310 & 314. MATERIALS TO OPSS 1001, 1003 & 1010.
10. ABUTTING PROPERTY GRADE TO BE MATCHED.
11. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION.
12. MINIMIZE DISTURBANCE TO EXISTING VEGETATION DURING THE EXECUTION OF ALL WORKS.
13. FILTER FABRIC TO BE INSTALLED AND MAINTAINED BETWEEN THE FRAME AND COVER OF ALL CATCHBASINS, CATCHBASIN MANHOLES AND MANHOLES DURING THE CONSTRUCTION PERIOD TO MINIMIZE SEDIMENTS ENTERING THE STORM SEWER SYSTEM. ALL GRASSED AREAS MUST BE COMPLETED PRIOR TO THE REMOVAL OF THE FILTER FABRIC IN THE DRAINAGE STRUCTURES.
14. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE DIRECTED FROM THE ENGINEER. EXCAVATE AND REMOVE ALL ORGANIC MATERIAL AND DEBRIS, IF ANY, LOCATED WITHIN THE PROPOSED BUILDING, PARKING AND ROADWAY LOCATIONS.
15. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS REQUIRED TO COMPLETE A CONSTRUCTION PROJECT, SUCH AS BUT NOT LIMITED TO; ROAD CUT PERMITS, SEWER PERMITS, WATER PERMIT, ETC.
16. AT PROPOSED UTILITY CONNECTION POINTS AND CROSSINGS (I.E. STORM SEWER, SANITARY SEWER, WATER, ETC.) THE CONTRACTOR SHALL DETERMINE THE PRECISE LOCATION AND DEPTH OF EXISTING UTILITIES AND REPORT ANY DISCREPANCIES OR CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.
17. ALL SIDEWALK CONSTRUCTION TO BE AS PER OPSD 310.010 & OPSD 310.050.

NOTES: SEWERS

1. SEWER BEDDING AS PER TRENCH DETAIL WITH GRANULAR 'A' BEDDING COMPACTED TO 95% OF ITS SPMDD.
2. ALL WORK SHALL BE PERFORMED, AS APPLICABLE IN ACCORDANCE WITH OPSS 407, AND 410.
3. CONTRACTOR TO CONFIRM ELEVATION OF EXISTING SEWERS AT PROPOSED CONNECTION POINTS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING ANY WORK.
4. ALL SEWERS WITH LESS THAN 2.0m OF COVER ARE SUBJECT TO INSULATION DETAIL.





DETAIL 01 - INFILTRATION GALLERY DETAIL
(N.T.S.)

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AS PER L-001
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED CHAIN LINK FENCE
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED GRASS AS PER L-001 (FUTURE PARKING LOT AREA)
- PROPOSED INFILTRATION GALLERY
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00 PROPOSED ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00T/S PROPOSED TOP OF SIDEWALK ELEVATION
- ×50.00B/S PROPOSED BOTTOM OF SIDEWALK ELEVATION
- ×50.00ST PROPOSED STRANDHERD ELEVATION TO BE COMPLETE BY 2022
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- SUB PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM PROPOSED STORM SEWER
- SAN PROPOSED SANITARY SEWER
- WTR PROPOSED WATERMAIN
- HYD-WTR PROPOSED HYDRANT LEAD
- STM EXISTING STORM SEWER
- SAN EXISTING SANITARY SEWER
- WTR EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED STC300
- PROPOSED CURB STOP
- PROPOSED FIRE HYDRANT
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX / CONTROLLED / AREA / RUNOFF: WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES

CROSSING TABLE					
Crossing #	WM (obv.)	STM (inv.)	STM (inv.)	SAN (obv.)	Depth Separation (m)
CR-01	91.45	92.10			0.45
CR-02		91.93	91.22	90.80	0.44
CR-03			91.09	90.55	0.54
CR-04	92.20		91.00	90.22	0.53

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05	2019/05/28	ISSUED AS PER COMMENTS	G.B.
04	2019/05/13	ISSUED FOR PERMIT	G.B.
03	2018/12/21	RE-ISSUED FOR SPA	G.B.
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north point

professional stamp
LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
Sept 5, 2019
PROVINCE OF ONTARIO

project title
NOUVELLE ÉCOLE SECONDAIRE BARRHAVEN
Barrhaven Ontario

drawing title
SERVICING PLAN

date	25/01/2018	job.no.	1817
scales	1:400		
drawn	M.L.	drawing no.	C401
approved	J.C.L.		
plot date	25/01/2018		

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V. JOHNSON
100510576
Sept 5, 2019
PROVINCE OF ONTARIO

project title
NOUVELLE ÉCOLE SECONDAIRE BARRHAVEN
Barrhaven Ontario

drawing title
PRE-DEVELOPMENT WATERSHED PLAN

date	25/01/2018	job.no.	1817
scales	1:400		
drawn	M.L.	drawing no.	C701
approved	J.C.L.		
plot date	25/01/2018		

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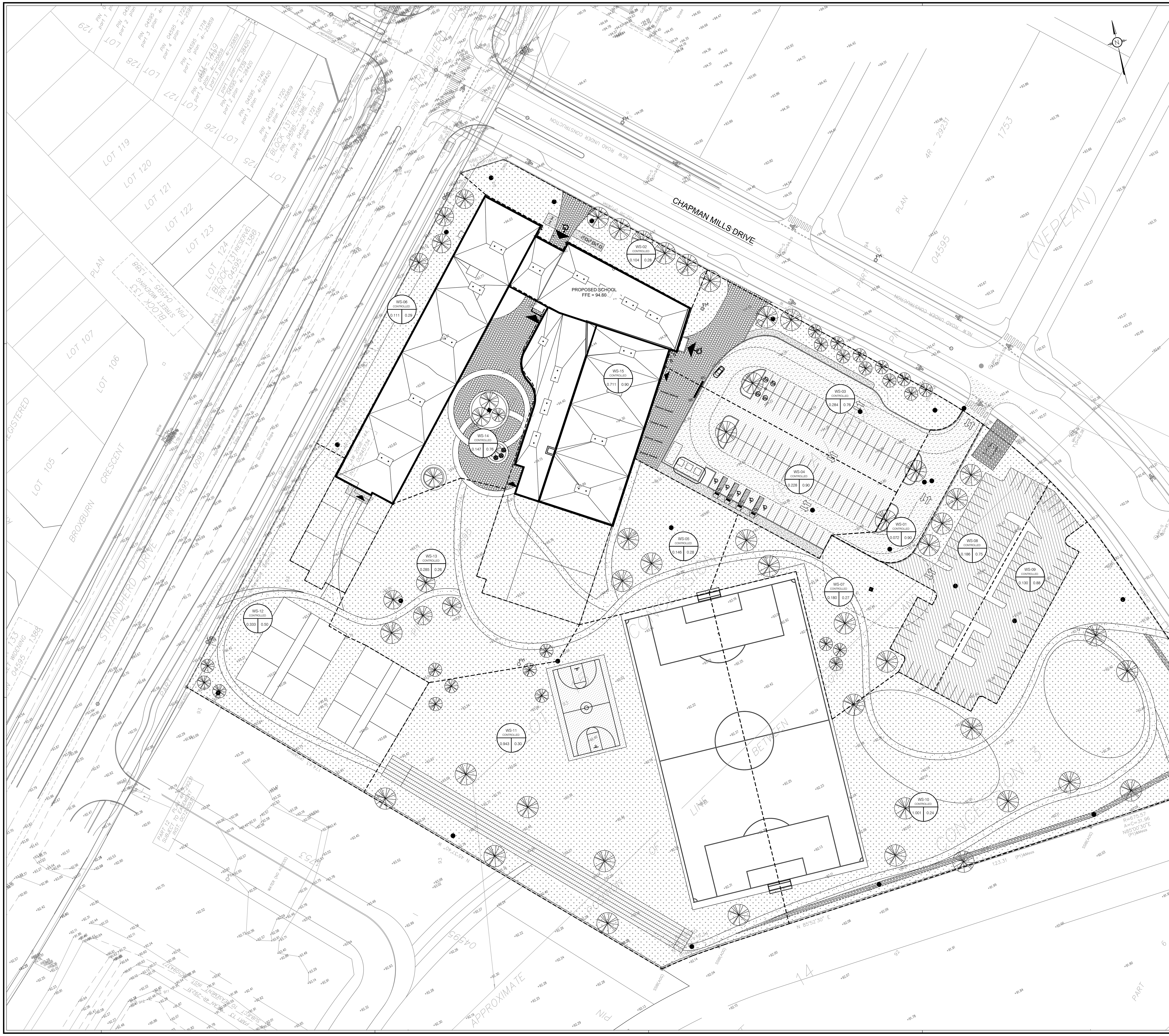

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AS PER L-001
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED CHAIN LINK FENCE
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED GRASS AS PER L-001 (FUTURE PARKING LOT AREA)
- PROPOSED INFILTRATION GALLERY
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00 PROPOSED ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
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- ×50.00B/S PROPOSED BOTTOM OF SIDEWALK ELEVATION
- ×50.00ST PROPOSED STRANDHERD ELEVATION TO BE COMPLETE BY 2022
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- SUB PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM PROPOSED STORM SEWER
- SAN PROPOSED SANITARY SEWER
- WTR PROPOSED WATERMAIN
- HYD-WTR PROPOSED HYDRANT LEAD
- STM EXISTING STORM SEWER
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- PROPOSED CURB STOP
- PROPOSED FIRE HYDRANT
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL STORM WATERSHED EXTENT
- WS-XX CONTROLLED: WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES

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V. JOHNSON
100510576
Sept 5, 2019
PROVINCE OF ONTARIO

project title
NOUVELLE ÉCOLE SECONDAIRE BARRHAVEN
Barrhaven Ontario

drawing title
POST-DEVELOPMENT WATERSHED PLAN

date	25/01/2018	job.no.	1817
scales	1:400		
drawn	M.L.	drawing no.	C702
approved	J.C.L.		
plot date	25/01/2018		

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- +50.00EX MATCH INTO EXISTING ELEVATION
- +XX.XX EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- SUB — SUB — PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM — STM — PROPOSED STORM SEWER
- SAN — SAN — PROPOSED SANITARY SEWER
- WTR — WTR — PROPOSED WATERMAIN
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- STM — STM — EXISTING STORM SEWER
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- STORM WATERSHED EXTENT
- WS-XX (CONTROLLED) / AREA / RUNOFF — WATERSHED NAME, RUNOFF COEFFICIENT, AREA IN HECTARES

CUP LEGEND:

- BELL — BELL — PROPOSED UNDERGROUND BELL CABLE
- GAS — GAS — PROPOSED UNDERGROUND GAS CABLE
- HYDRO — HYDRO — PROPOSED UNDERGROUND HIGH VOLTAGE
- G — PROPOSED GAS METER LOCATION
- PROPOSED BELL PEDESTAL LOCATION

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V. KRISHNA
2019/09/25
PROVINCE OF ONTARIO

project title
NOUVELLE ÉCOLE SECONDAIRE BARRHAVEN
Barrhaven Ontario

drawing title
COMPOSITE UTILITY PLAN

date	25/01/2018	job.no.	1817
scales	1:400		
drawn	M.L.	drawing no.	C801
approved	J.C.L.		
plot date	25/01/2018		

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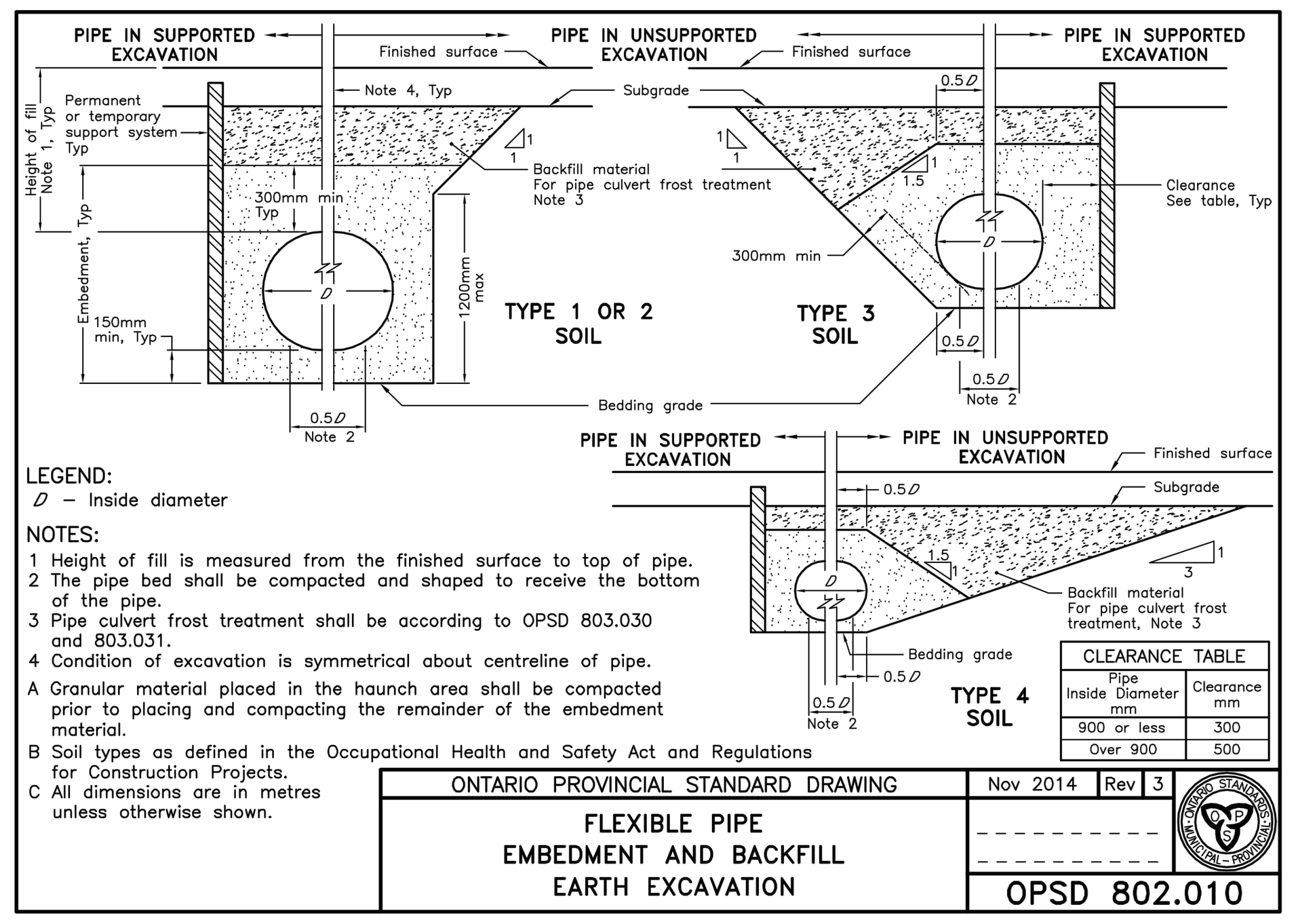

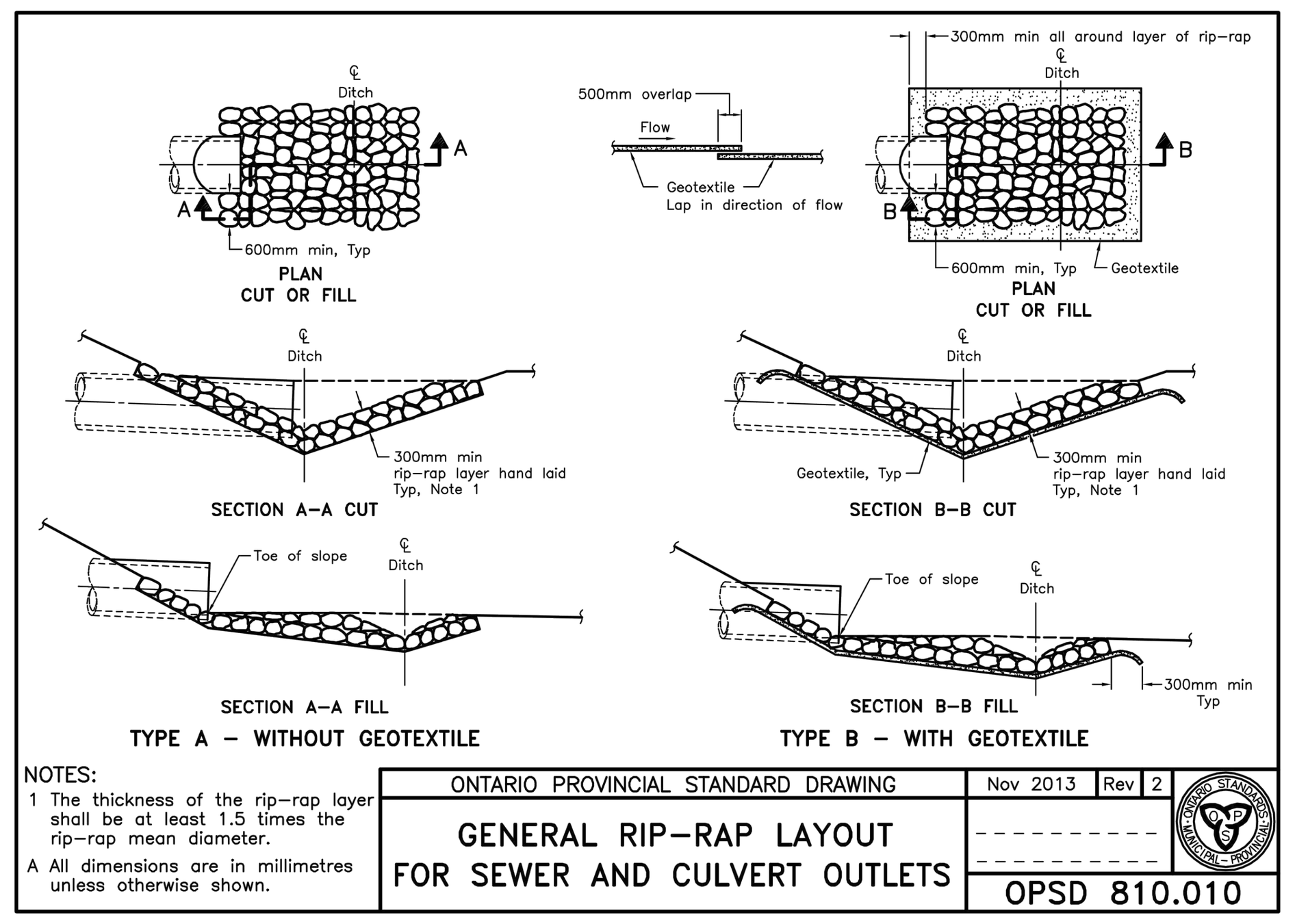

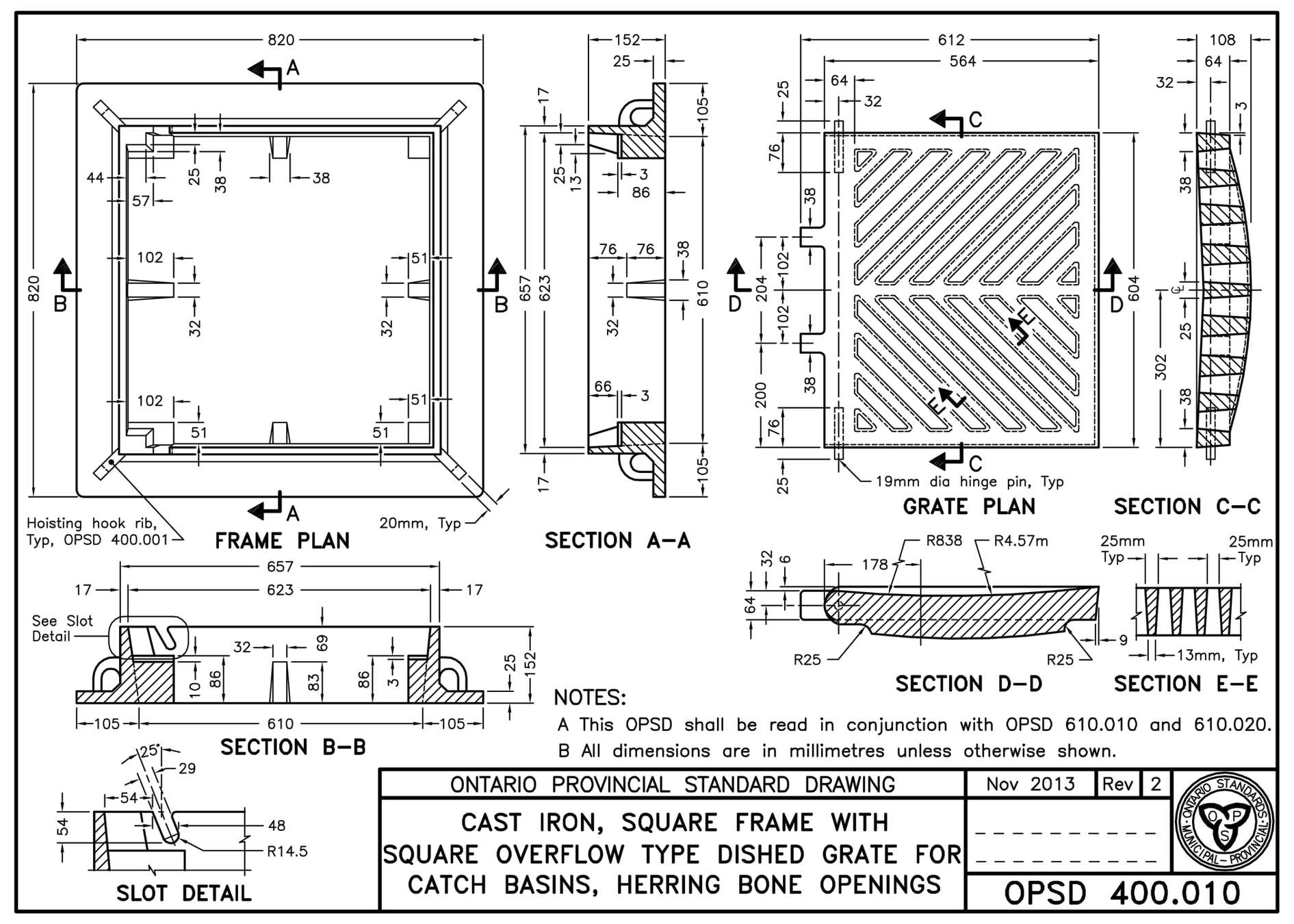

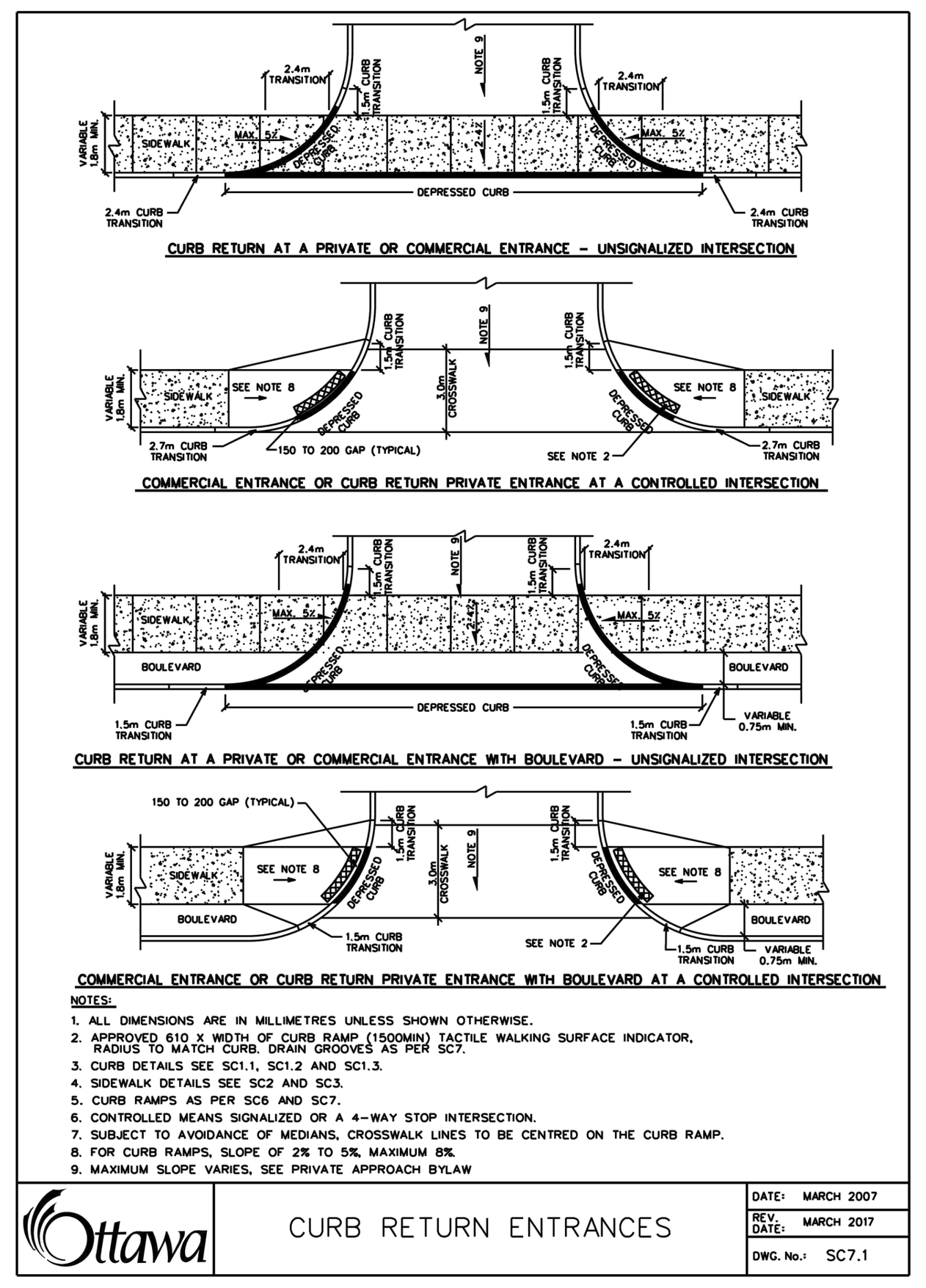

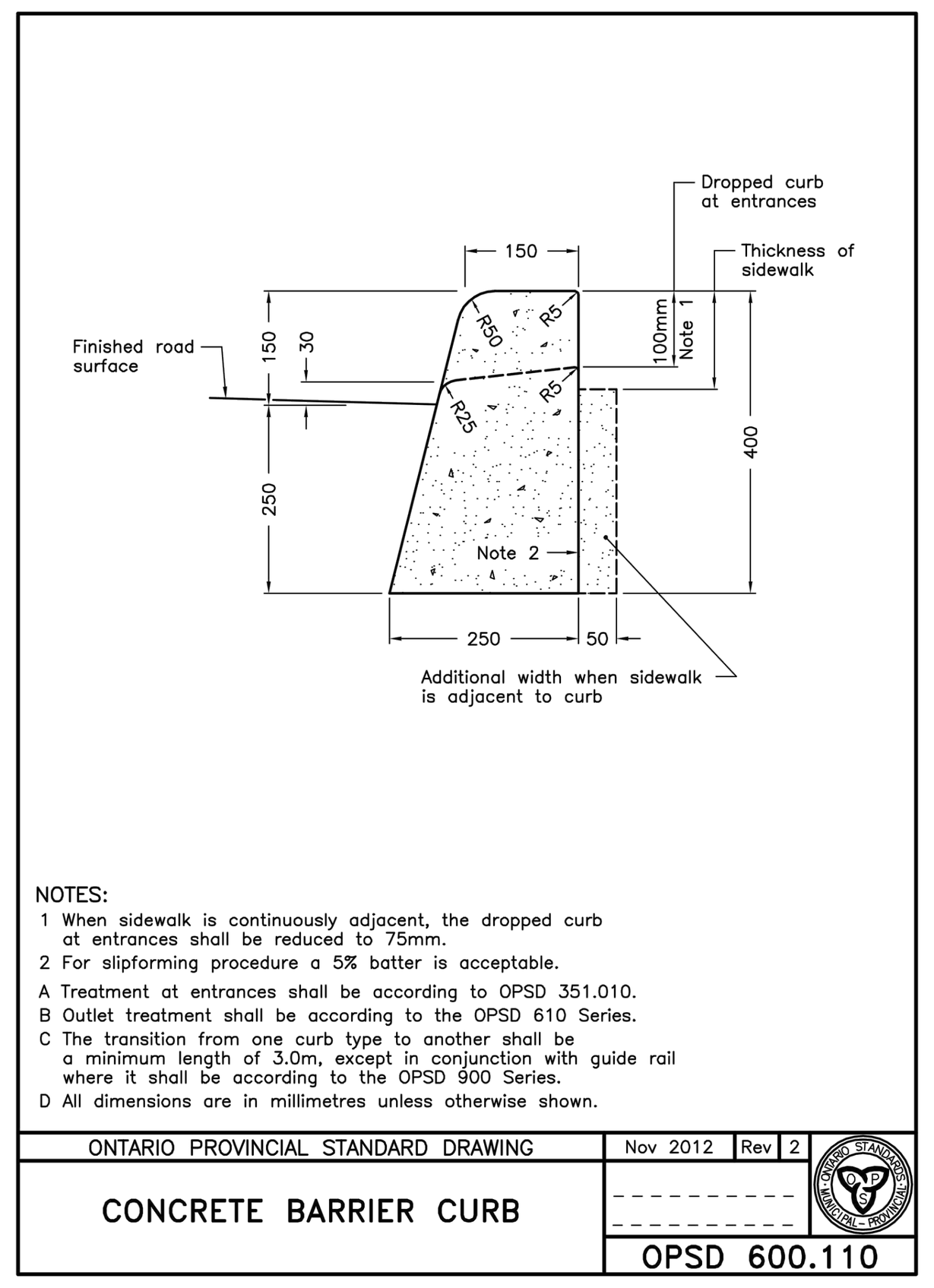

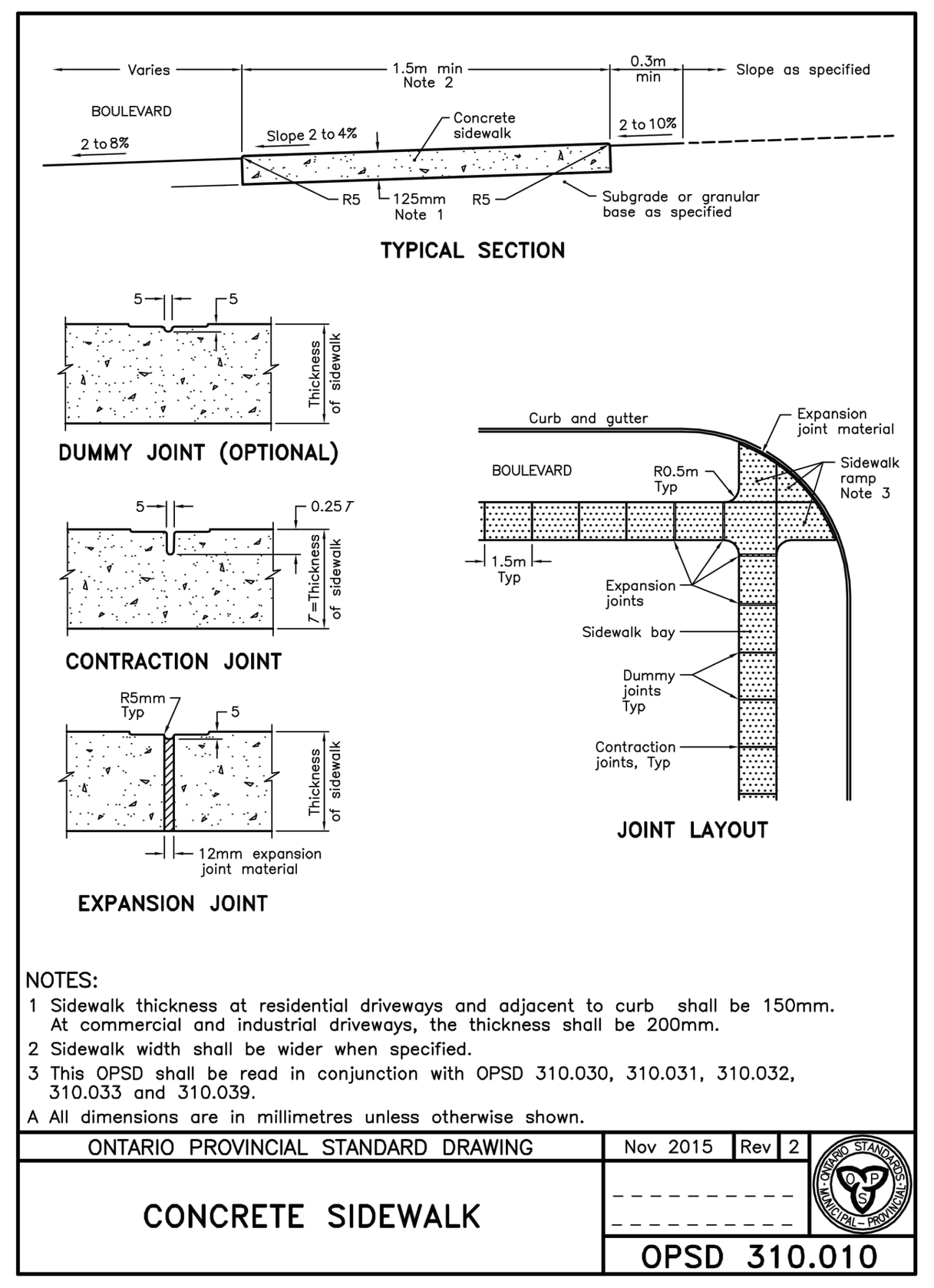

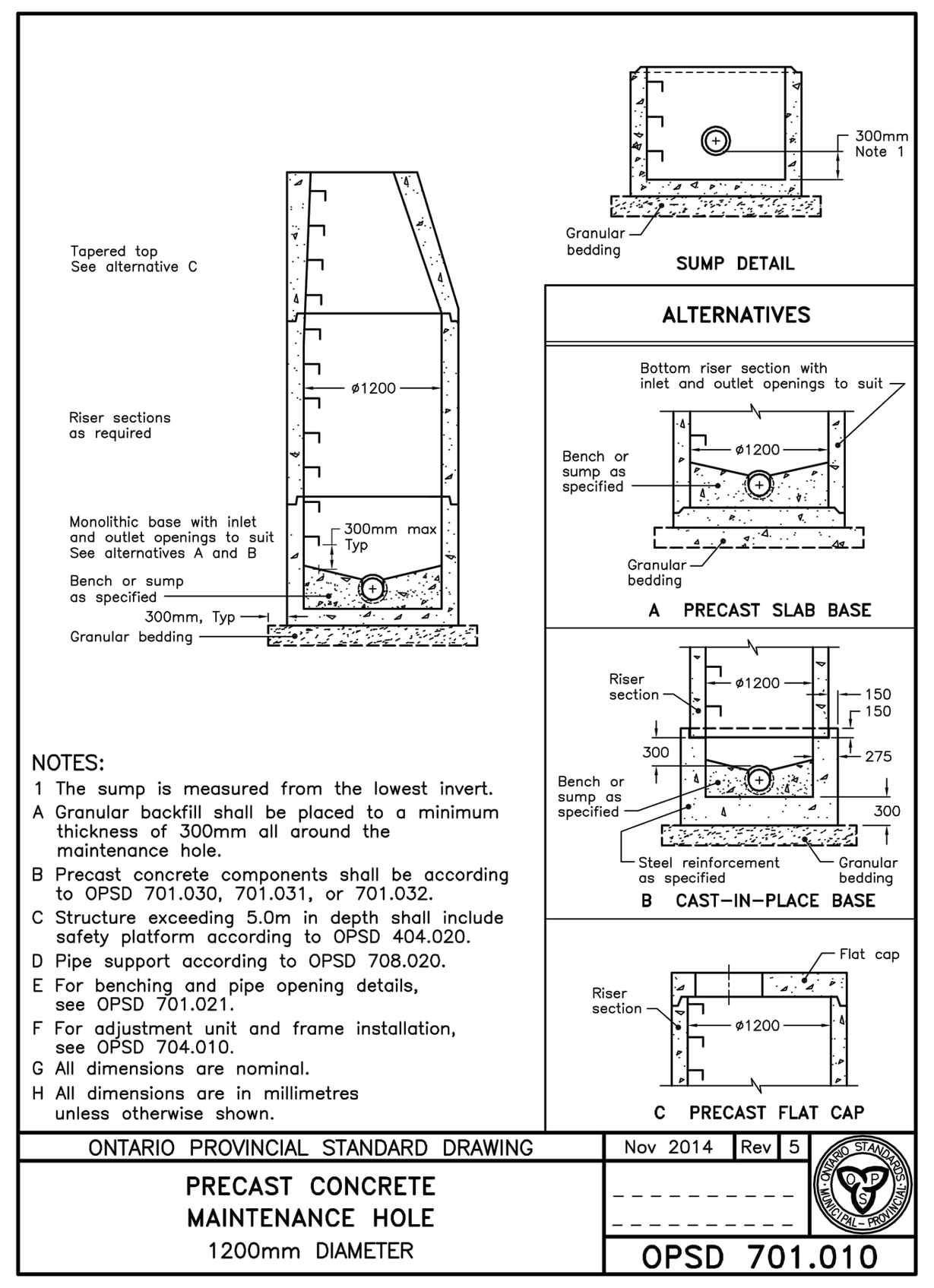

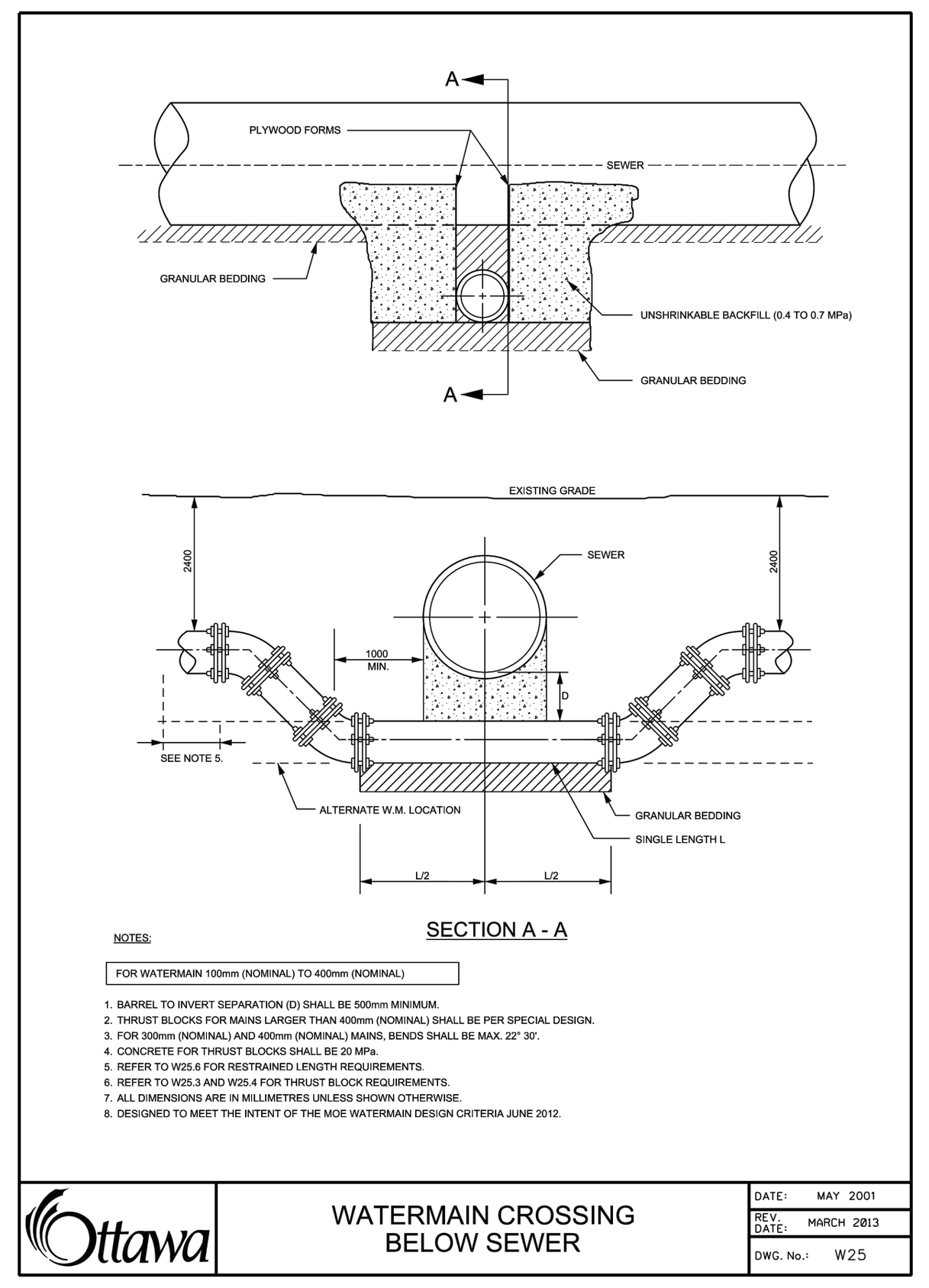

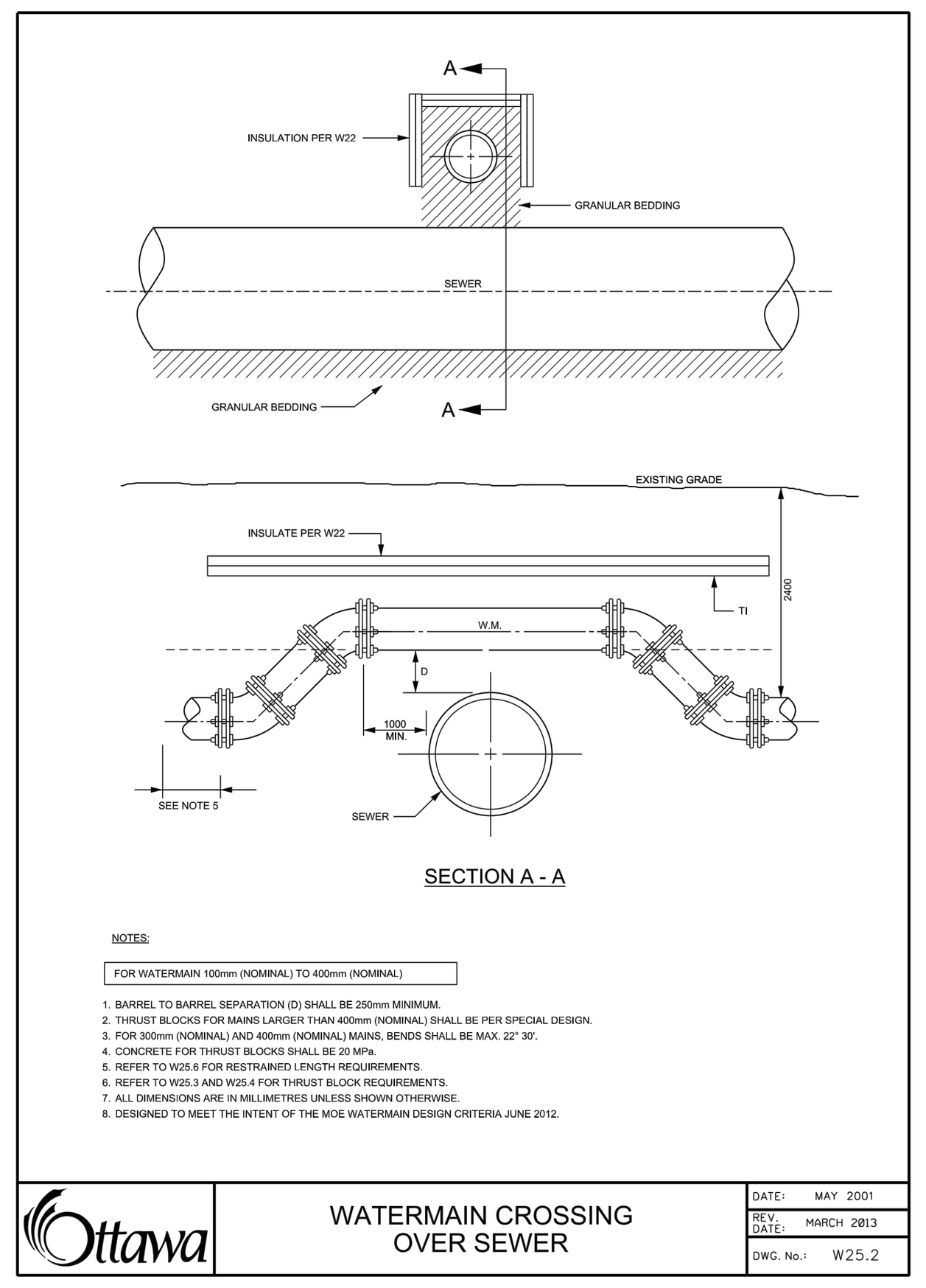

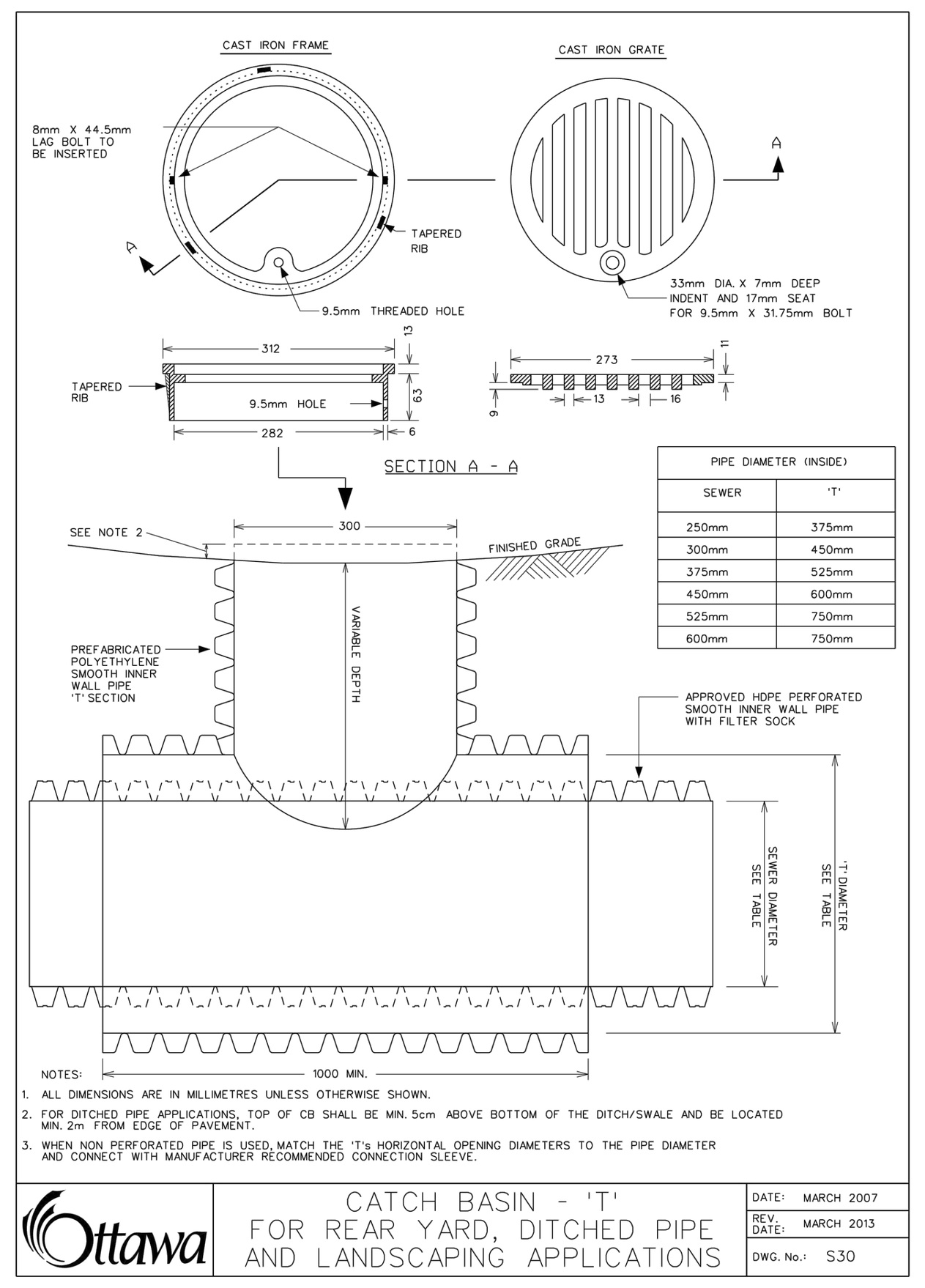

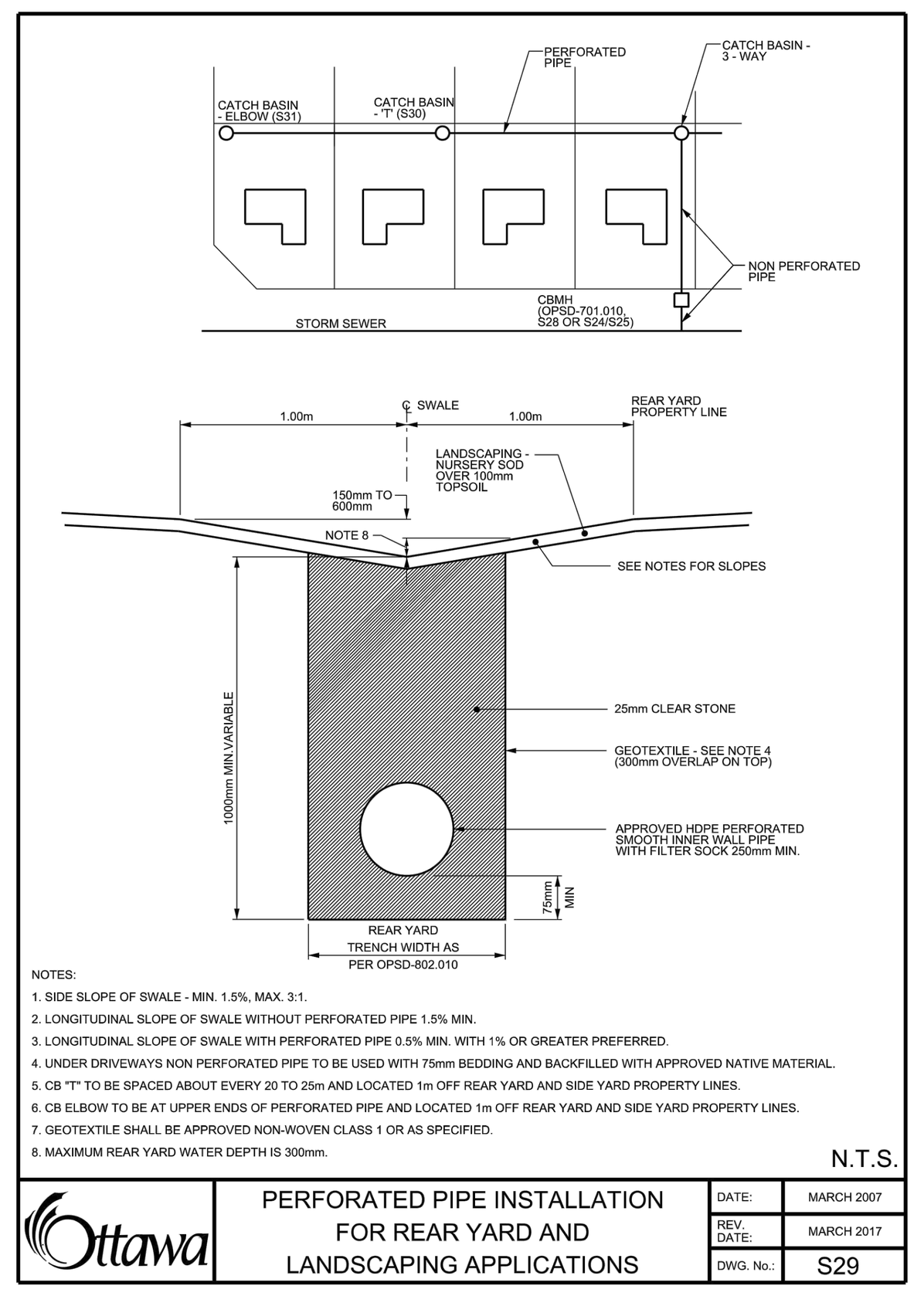

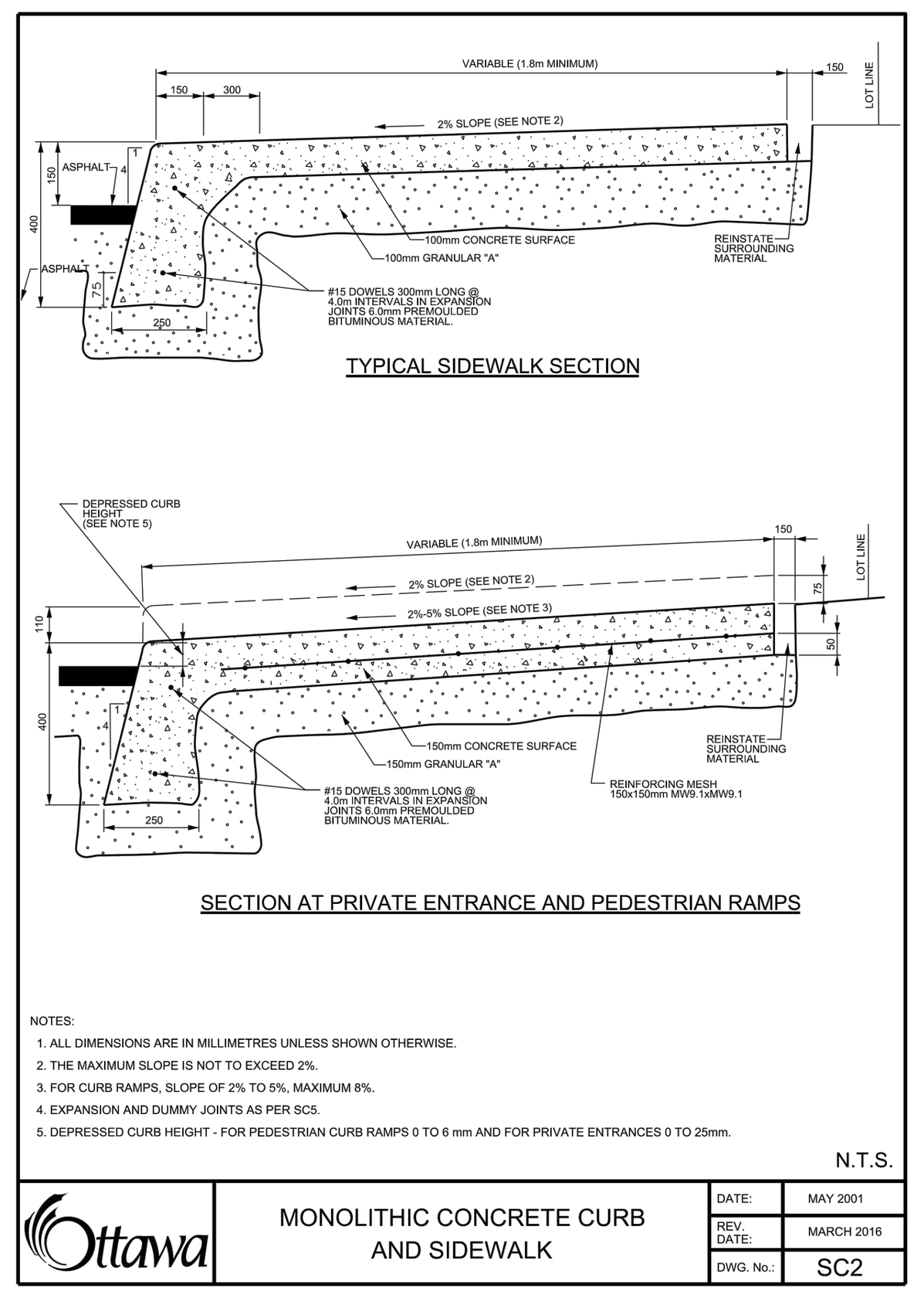

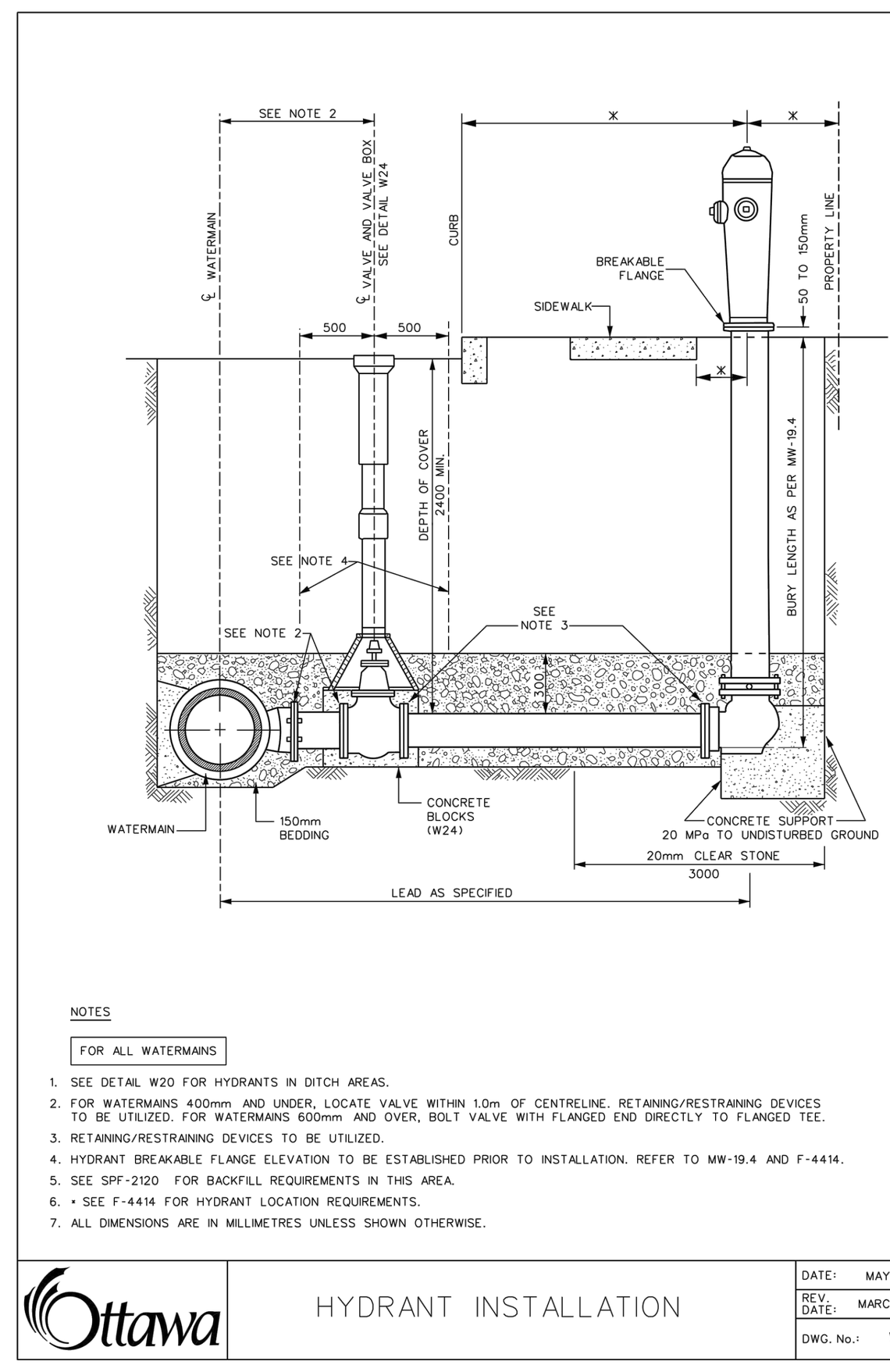

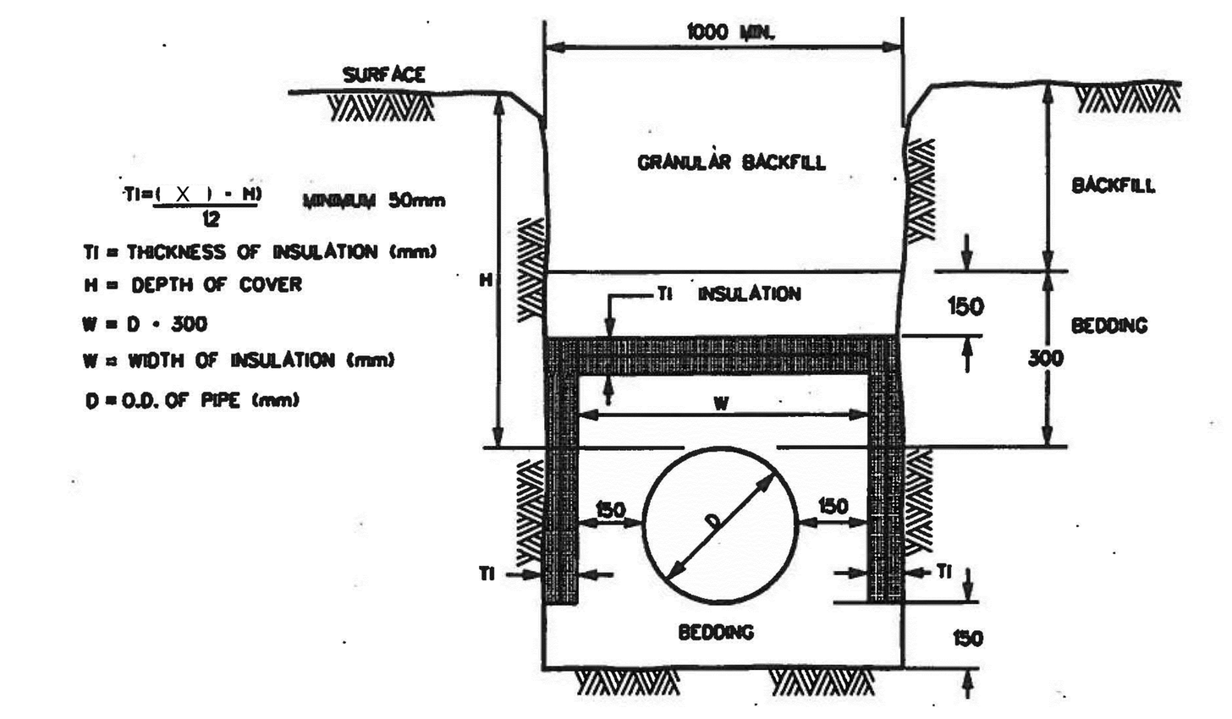

NOTES:
-FOR STORM INSULATION USE AN X VALUE OF 2000 IN THE ABOVE "TI" EQUATION.
-FOR SANITARY INSULATION USE AN X VALUE OF 2500 IN THE ABOVE "TI" EQUATION.
-FOR WATERMAIN INSULATION USE AN X VALUE OF 2400 IN THE ABOVE "TI" EQUATION.
-INCREMENTS OF INSULATION THICKNESS SHALL BE ADJUSTABLE TO 25mm.
-STAGGER JOINTS OF MULTIPLE SHEETS.
-ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

TYPICAL STORM AND SANITARYSEWER AND WATERMAIN INSULATION DETAIL
(N.T.S.)

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06	2019/07/03	ISSUED AS PER CITY COMMENTS	G.B.
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LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
Sept 5, 2019
PROVINCE OF ONTARIO

project title
NOUVELLE ÉCOLE SECONDAIRE BARRHAVEN
Barrhaven Ontario

drawing title
CONSTRUCTION DETAILS PLAN

date	25/01/2018	job.no.	1817
scales	1:400		
drawn	M.L.	drawing no.	C901
approved	J.C.L.		
plot date	25/01/2018		

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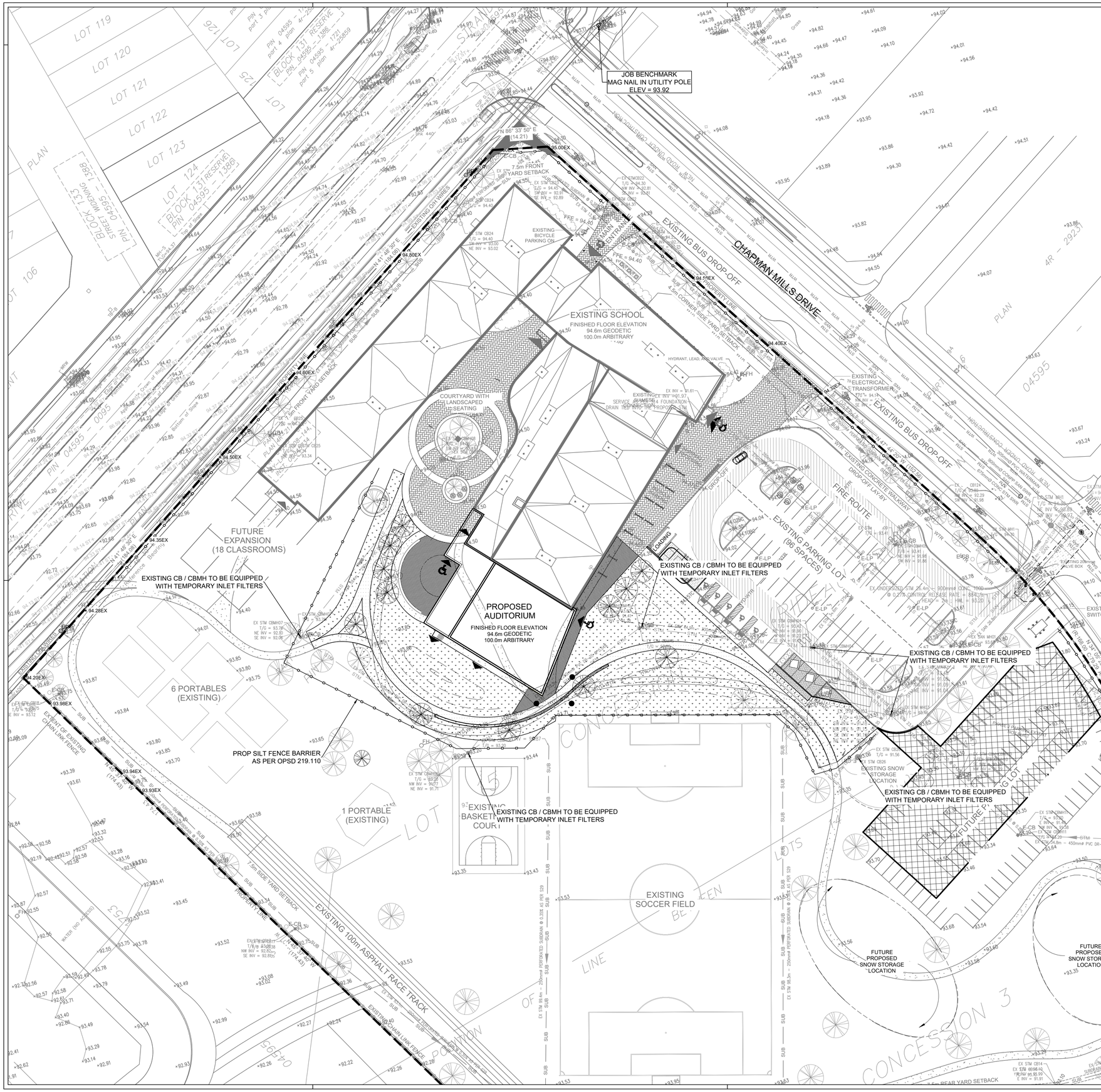
APPENDIX E

Engineering Drawings



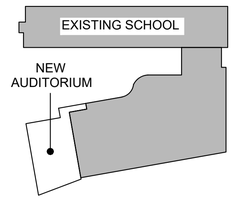
LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- ×50.00 PROPOSED ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00BW PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- ×50.00TW PROPOSED TOP OF RETAINING WALL
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- WTR WTR PROP. WATER SERVICE
- STM STM EXISTING STORM SEWER
- SAN SAN EXISTING SANITARY SEWER
- WTR WTR EXISTING WATERMAIN
- SUB SUB EXISTING SUBDRAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED / UNCONTROLLED — WATERSHED NAME
- AREA — RUNOFF — RUNOFF COEFFICIENT
- AREA IN HECTARES

Conseil des écoles publiques de l'Est de l'Ontario

Conseil des école publique de l'Est de l'Ontario

key plan



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3	2026.03.19	ISSUED FOR SPC	K.H.
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architecture

PROVENCHER_ROY

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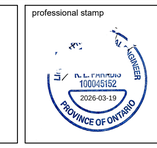
CUNLIFFE & ASSOCIATES CONSULTING STRUCTURAL ENGINEERS

LRL ENGINEERING / INGÉNIERIE

northpoint

professional stamp



project title

AUDITORIUM ADDITION

ESP PAUL-DE-BLOIS - 1310 CHAPMAN MILLS DR., OTTAWA, ON K2J 3T9

drawing title

EROSION & SEDIMENT CONTROL PLAN

date	Issue Date	job. no.	220512
scale	1 : 500		
drawn	K.H.	drawing no.	C101
approved	M.B.		
plot date	2025-12-19 12:30 PM		

1. DO NOT SCALE FROM THIS DRAWING
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PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL.3 A/C (PG 58-34)	50	40
BINDER	HL.8 A/C (PG 58-34)	--	50
BASECOURSE	OPSS GRANULAR "A"	150	150
SUBBASE	OPSS GRANULAR "B" TYPE II	300	350

NOTE:
IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED.

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- ×50.00 PROPOSED ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00BW PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- ×50.00TW PROPOSED TOP OF RETAINING WALL
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- WTR PROP. WATER SERVICE
- STM EXISTING STORM SEWER
- SAN EXISTING SANITARY SEWER
- WTR EXISTING WATERMAIN
- SUB EXISTING SUBDRAIN
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- EXISTING CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED PIPE INSULATION
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- STORM WATERSHED EXTENT
- WS-XX CONTROLLED / AREA / RUNOFF — WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES

JOB BENCHMARK
MAG NAIL IN UTILITY POLE
ELEV = 93.92

EXISTING SCHOOL
FINISHED FLOOR ELEVATION
94.6m GEODETIC
100.0m ARBITRARY

PROPOSED AUDITORIUM
FINISHED FLOOR ELEVATION
94.6m GEODETIC
100.0m ARBITRARY

EXISTING PAVING STONE WALKWAY TO BE REMOVED TO ACCOMMODATE NEW ADDITION. ANY DISTURBED SURFACE WITHIN THE COURTYARD TO BE REINSTATED TO EXISTING OR BETTER CONDITION.

PROPOSED NEW ASPHALT TO TIE INTO EX. SIDEWALK

PROPOSED NEW PLANTINGS AS PER LANDSCAPE PLAN

PROPOSED NEW PAVING STONE SIDEWALK AS PER LANDSCAPE PLAN

EXISTING SIDEWALK TO BE REMOVED AND REINSTATED W/ MIN 100mm TOPSOIL & SOD.REFER TO ARCHITECTURAL DEMOLITION PLAN FOR GREATER DETAIL.

ALL GRASSED AREA DISTURBED DURING PROPOSED WORK TO BE REINSTATED W/ MIN 100mm TOPSOIL & SOD.

PROPOSED NEW ASPHALT TO TIE INTO EX. SIDEWALK

PROPOSED GRASS BERM

PROP. CONCRETE STEPS & RAILING AS PER ARCH. PLANS. 4 RISERS @ 0.175m EA

PROPOSED NEW ASPHALT SIDEWALK AS PER LANDSCAPE PLAN

EXISTING SIDEWALK TO BE REMOVED AND REINSTATED W/ MIN 100mm TOPSOIL & SOD.REFER TO ARCHITECTURAL DEMOLITION PLAN FOR GREATER DETAIL.

SMALL PRECAST CONCRETE OR SEGMENTAL CONCRETE BLOCK GRAVITY RETAINING WALL APPROX LENGTH ± 50m MAX WALL HEIGHT < 0.6m

EXISTING GOAL POSTS TO BE REMOVED PRIOR TO START OF WORKS, AND REINSTATED AFTER COMPLETION.

PROPOSED FENCE TO BE INSTALLED WITHIN PROP. RETAINING WALL, AS PER ARCHITECTURAL SITE PLAN.

PROPOSED NEW PAVING STONE SIDEWALK AS PER LANDSCAPE PLAN

EXISTING GARBAGE PAD AND BINS TO BE REMOVED. ±100m² OF SURFACE TO BE REINSTATED WITH HEAVY DUTY ASPHALT AS PER PAVEMENT STRUCTURE PROVIDED.

CONTRACTOR TO REINSTATE ±17m OF CONCRETE BARRIER CURBS. BARRIER CURBS AS PER CITY OF OTTAWA STANDARD DETAIL SC1.1.

PROPOSED CONCRETE GARBAGE ENCLOSURE PAD AS PER ARCHITECTURAL SITE PLAN.

PROPOSED NEW FENCE AS PER ARCHITECTURAL SITE PLAN.

CONTRACTOR TO REINSTATE ±23m OF CONCRETE BARRIER CURBS. BARRIER CURBS AS PER CITY OF OTTAWA STANDARD DETAIL SC1.1, AND ±20m² CONCRETE SIDEWALK AS PER CITY OF OTTAWA DETAIL SC4.

EXISTING FENCE TO BE REMOVED. ANY DISTURBED GRASS AREA IS TO BE REINSTATED W/ 100mm TOPSOIL & SOD.

CONTRACTOR TO REINSTATE ALL ASPHALT PAVEMENT REMOVED FOR NEW WATER SERVICE INSTALLATION. ±150m² OF SURFACE TO BE REINSTATED WITH HEAVY DUTY ASPHALT AS PER PAVEMENT STRUCTURE PROVIDED.

PROPOSED LOCATION FOR SITE OFFICE & STAGING AREA. ALL CBMH'S TO BE PROTECTED DURING STAGING, AND EQUIPPED WITH TEMPORARY INLET FILTER INSERTS. AREA TO BE REINSTATED TO EXISTING CONDITION.

±12m of CONCRETE CURB TO BE REMOVED TO ACCOMMODATE NEW STAGING AREA. CONCRETE CURB TO BE REPLACED WITH NEW BARRIER CURB AS PER CITY OF OTTAWA STANDARD DETAIL SC1.1 POST CONSTRUCTION. ANY DAMAGED ASPHALT TO BE REINSTATED TO EXISTING OR GREATER CONDITION.

PROPOSED NEW ASPHALT TO TIE INTO EX. SIDEWALK

FUTURE PROPOSED SNOW STORAGE LOCATION

FUTURE PROPOSED SNOW STORAGE LOCATION

EXISTING SNOW STORAGE LOCATION

EXISTING 100m ASPHALT RACE TRACK

EXISTING SOCCER FIELD

EXISTING BASKETBALL COURT

6 PORTABLES (EXISTING)

1 PORTABLE (EXISTING)

EXISTING BUS DROP-OFF

CHAPMAN MILLS DRIVE

EXISTING ELECTRICAL TRANSFORMER

EXISTING HYDRO SWITCHGEAR

FUTURE PARKING LOT

EXISTING CONCRETE WALKWAY

EXISTING CHAIN LINK FENCE

EXISTING OH WIRES

EXISTING BICYCLE PARKING ON

EXISTING SIAMESE CONNECTION

COURTYARD WITH LANDSCAPED AREA SEATING

7.5m FRONT YARD SETBACK

7.5m SIDE YARD SETBACK

4.5m CORNER SIDE YARD SETBACK

PROPERTY LINE

LOT 119
LOT 120
LOT 121
LOT 122
LOT 123
LOT 124
BLOCK 131 RESERVE
PIN 04595 - 1386
BLOCK 135
PIN 04595 - 1388

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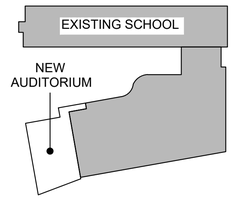
key plan



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CUNLIFFE & ASSOCIATES CONSULTING STRUCTURAL ENGINEERS

LRJ ARCHITECTS + ENGINEERS

northpoint

professional stamp

LJC Inc. — K.L. PARADIS — 100045152 — 2026-03-19 — PROVINCE OF ONTARIO — ENGINEER

project title

AUDITORIUM ADDITION

ESP PAUL-DE-BLOIS - 1310 CHAPMAN MILLS DR., OTTAWA, ON K2J 3T9

drawing title

GRADING & DRAINAGE PLAN

date	Issue Date
scale	1 : 500
drawn	K.H.
approved	M.B.
plot date	2025-12-19 12:30 PM

job. no. **220512**

drawing no. **C301**

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Proposed Watermain Schedule

Location	Station	Min. Obv	Grade	Notes
North WM Connection Line				
Connection to City WM	0+000.0	Match Ex WM OBV	93.55	
SAN Crossing	0.003.2	90.45	93.58	SAN OBV = ±86.75
STM Crossing	0.004.4	90.30	93.57	STM INV = ±90.88
Valve	0+020.6	90.95	93.35	
Elbow Fitting 1	0+021.7	91.00	93.40	
Elbow Fitting 2	0+022.7	91.00	93.40	
Tee Fitting	0+024.7	91.03	93.43	*branches into existing watermain line, approx STA 0+022.6

JOB BENCHMARK
MAG NAIL IN UTILITY POLE
ELEV = 93.92

INSTALL FIVE (5) ZURN FLOW CONTROL ROOF DRAINS
WITHIN THE NEW AUDITORIUM ADDITION.
SINGLE NOTCH SETTING @ 15.11 L/s*m
TOTAL ROOFTOP PROVIDED 100yr STORAGE = 186.0 m^3
TOTAL ROOFTOP 100yr ROOF DRAIN REL. RATE =70.72 L/s

WATER, SANITARY AND STORM SERVICING FOR THE PROPOSED ADDITION ARE TO BE ROUTED THROUGH THE EXISTING SCHOOL BUILDING. PLEASE REFER TO THE MECHANICAL ENGINEERING PLANS FOR GREATER DETAIL.

EXISTING PERIMETER DRAIN ALONG THE SW FACE OF THE EXISTING SCHOOL TO BE REMOVED WITH THE DEVELOPMENT OF THE NEW ADDITION.

CONTRACTOR TO INSTALLL NEW PERIMETER DRAIN FOR PROPOSED AUDITORIUM, AND TIE TO THE EXISTING SCHOOL PERIMETER DRAIN.
±100.5m - 150mmØ PERFORATED SUBDRAIN W/ FILTER SOCK.
PERIMETER DRAIN DEPTH AS PER ARCHITECTURAL ELEVATION PLANS.

REFER TO DETAIL PROVIDED FOR PROPOSED ROOF DRAINS AND EXTENTS OF ROOFTOP PONDING. AUDITORIUM ROOF DRAINS & PLUMBING TO BE TIED TO EXISTING SCHOOL PLUMBING, AS PER THE MECHANICAL ENGINEERING PLANS

STORM LINE TO BE RE-ROUTED TO ENSURE NO CONFLICT WITH THE PROPOSED ADDITION, BASKETBALL COURT & EXISTING HYDRANT WATER SERVICE

PROPOSED VALVE CHAMBER AS PER CITY OF OTTAWA DWG W3

MAIN LINE WATER CONNECTION AS PER CITY OF OTTAWA STANDARDS

WTR-SAN CROSSING
SAN OBV = ±86.75
WTR OBV = 90.45

WTR-STM CROSSING
STM OBV = ±90.88
WTR OBV = 90.30

PROP VALVE AND VALVE BOX AS PER CITY DWG W24

PROP 24.7m - 250mmØ PVC DR-18 CLASS 150 WATER SERVICE. SERVICE TO BE BURIED MIN. 2.4m BELOW GRADE.

TEE FITTINGS
45° ELBOW FITTINGS

PROP MH05A
T/G = 94.30
NE INV = 91.53
S INV = 91.56

PROP 7.0m - 250mmØ PVC DR35 STM @ 0.34% SLOPE

PROP MH05B
T/G = 93.70
N INV = 91.58
W INV = 91.61

PROP 9.3m - 250mmØ PVC DR35 STM @ 0.34% SLOPE

PROP MH05C
T/G = 94.40
E INV = 91.64
SW INV = 91.67

EX STM CBMH05
T/G = 93.80
NW INV = 91.41
NE INV = 91.38

EX STM CBMH06
T/G = 93.20
NW INV = 91.77
NE INV = 91.77

EXISTING SCHOOL
FINISHED FLOOR ELEVATION
94.6m GEODETIC
100.0m ARBITRARY

PROPOSED AUDITORIUM
FINISHED FLOOR ELEVATION
94.6m GEODETIC
100.0m ARBITRARY

EXPANSION
(18 CLASSROOMS)

6 PORTABLES
(EXISTING)

1 PORTABLE
(EXISTING)

EXISTING BASKETBALL COURT

COURTYARD WITH LANDSCAPED SEATING

EXISTING BICYCLE PARKING ON

EXISTING SOCCER FIELD

EXISTING PARKING LOT (98 SPACES)

FUTURE PARKING LOT

FUTURE PROPOSED SNOW STORAGE LOCATION

FUTURE PROPOSED SNOW STORAGE LOCATION

EXISTING SNOW STORAGE LOCATION

EXISTING 100m ASPHALT PATH

EXISTING BUS DROP-OFF

CHAPMAN MILLS DRIVE

FIRE ROUTE

LOADING

PROPERTY LINE

7.5m FRONT YARD SETBACK

7.5m SIDE YARD SETBACK

2.5m CORNER SIDE YARD SETBACK

LEGEND:

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- PROPOSED CURB
- PROPOSED SILT FENCE AS PER OPSD 219.110
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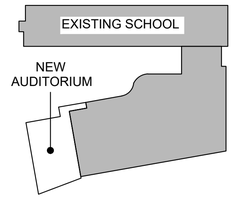

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CUNLIFFE & ASSOCIATES CONSULTING STRUCTURAL ENGINEERS

LRJ ENGINEERING | REVIEWED

northpoint

professional stamp

LICENSED PROFESSIONAL ENGINEER
K.L PARKIS
100045152
2026-03-19
PROVINCE OF ONTARIO

project title

AUDITORIUM ADDITION

ESP PAUL-DE-BLOIS - 1310 CHAPMAN MILLS DR., OTTAWA, ON K2J 3T9

drawing title

SERVICING PLAN

date	Issue Date	job. no.	220512
scale	1 : 400		
drawn	K.H.	drawing no.	C401
approved	M.B.		
plot date	2025-12-19 12:30 PM		

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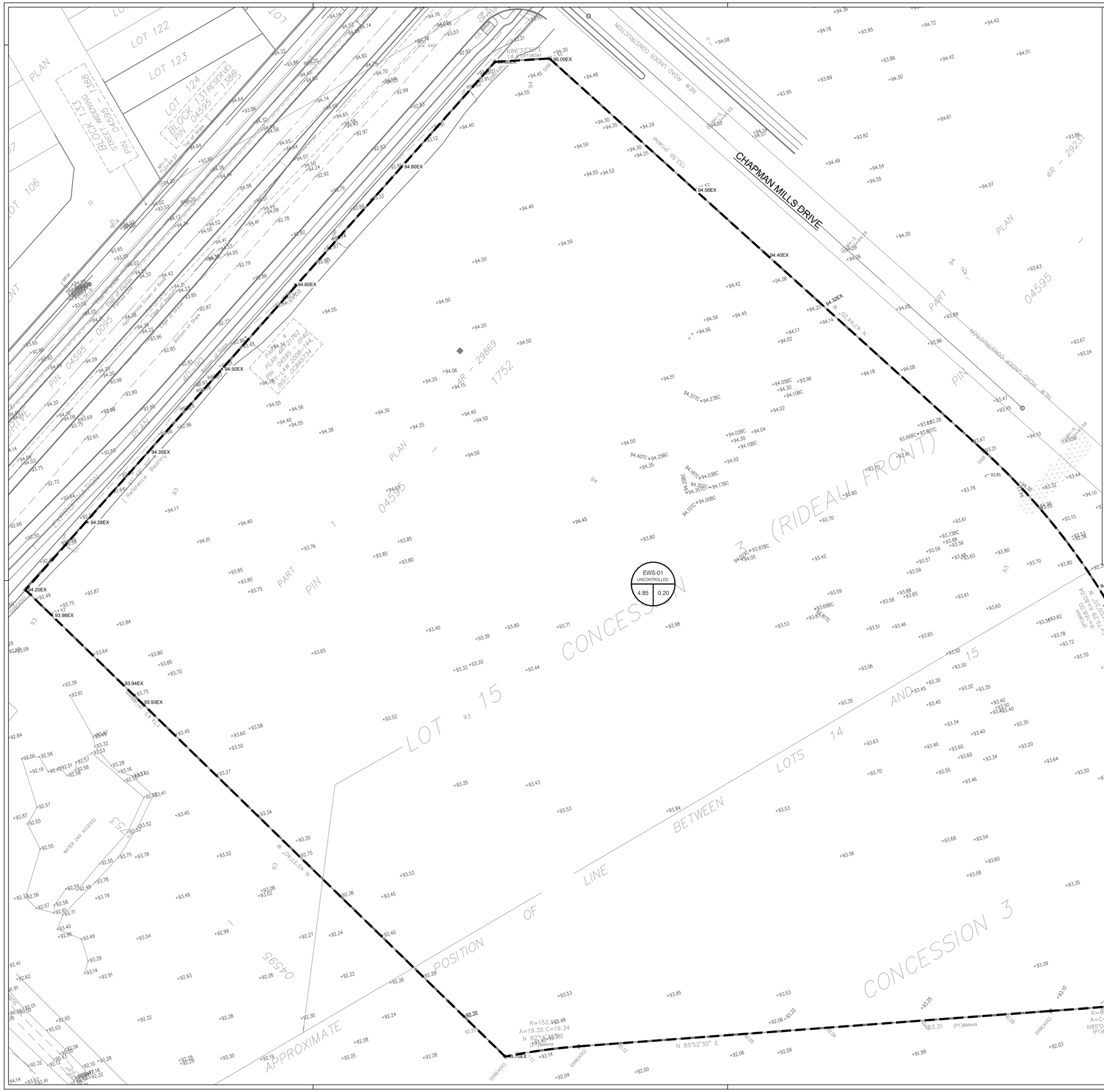

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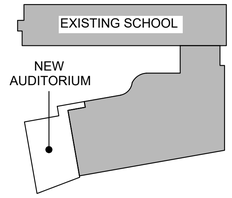

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LRJ ENGINEERING / INGÉNIERIE

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LICENCE — K. L. PARADIS — 100045152 — 2026-03-19 — PROVINCE OF ONTARIO

project title

AUDITORIUM ADDITION

ESP PAUL-DE-BLOIS - 1310 CHAPMAN MILLS DR., OTTAWA, ON K2J 3T9

drawing title

PRE-DEVELOPMENT WATERSHED PLAN

date	Issue Date	job. no.	220512
scale	1 : 500		
drawn	K.H.	drawing no.	C701
approved	M.B.		
plot date	2025-12-19 12:30 PM		

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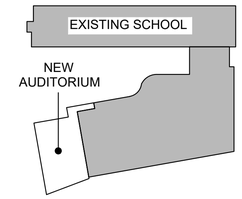

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CUNLIFFE & ASSOCIATES CONSULTING STRUCTURAL ENGINEERS

LRJ ENGINEERING | INGÉNIERIE

northpoint

professional stamp

LICENSED — K. L. PARADIS — 100045152 — 2026-03-19 — PROVINCE OF ONTARIO

project title

AUDITORIUM ADDITION

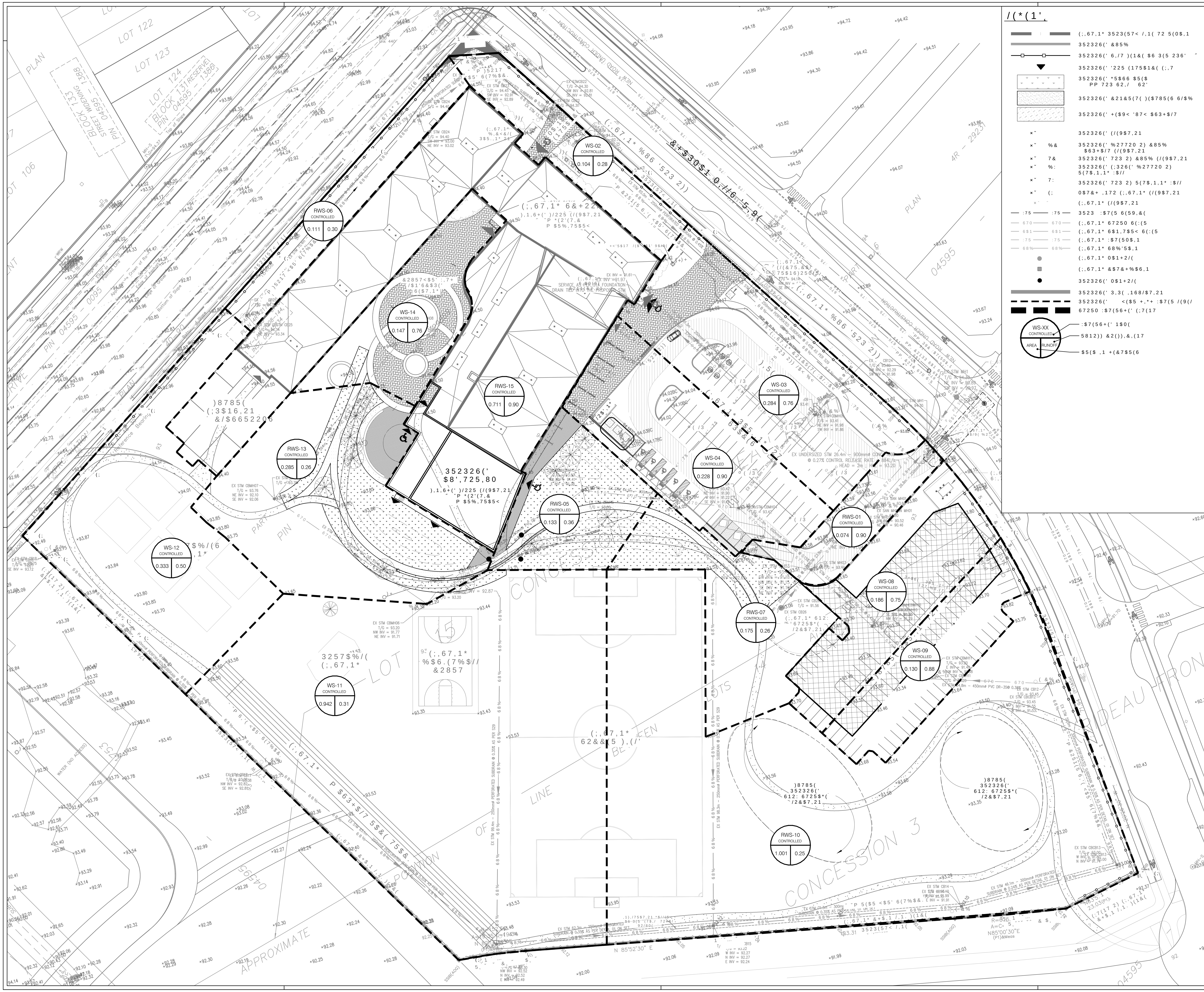
ESP PAUL-DE-BLOIS - 1310 CHAPMAN MILLS DR., OTTAWA, ON K2J 3T9

drawing title

POST-DEVELOPMENT WATERSHED PLAN (PRE-ADDITION)

date	Issue Date	job. no.	220512
scale	1 : 500		
drawn	K.H.	drawing no.	C702
approved	M.B.		
plot date	2025-12-19 12:30 PM		

1. DO NOT SCALE FROM THIS DRAWING
2. CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ARCHITECT OF ANY DISCREPANCIES BEFORE WORK COMMENCES
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE FOLLOWING DRAWINGS: STRUCTURAL, MECHANICAL, ELECTRICAL



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QRUWKSRLQW

SURIHVVLRQDO VWDPS

LICENSED PROFESSIONAL ENGINEER K. L. PARADIS 100045152 2026-03-19 PROVINCE OF ONTARIO

SURMHFW WLWOH

AUDITORIUM ADDITION

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GUDZLQJ WLWOH

POST-DEVELOPMENT WATERSHED PLAN (POST-ADDITION)

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GUDZQ . +	GUDZLQJ QR C703
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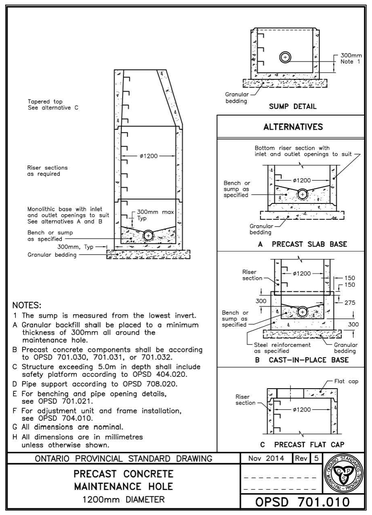
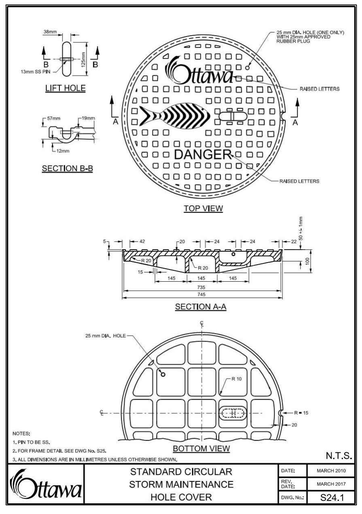


NOTES:

1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

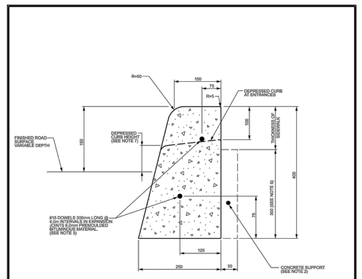
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER			
	OPSD 701.010		



NOTES:
1. PIN TO BE SS.
2. FOR FRAME DETAIL SEE DWG No. S25.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

N.T.S.

Ottawa	STANDARD CIRCULAR STORM MAINTENANCE HOLE COVER	DATE:	MARCH 2010
		REV. DATE:	MARCH 2017
		DWG. No.:	S24.1

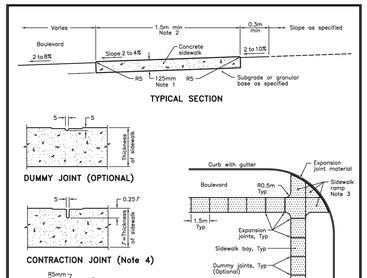


CONCRETE BARRIER CURB

NOTES:
1. THE FULL CURB DEPTH SHALL BE CARRIED THROUGH THE DEPRESSED ACCESS CROSSING.
2. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
3. IF AN EXTRUSION CURBING MACHINE IS USED, THE #15 DOWELS ARE TO BE PLACED AT THE END OF THE EXTRUSION.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
5. DUMMY JOINTS SHALL BE 25mm DEEP, FRONT, BACK AND TOP OF SECTION AT 4m SPACING OR MATCH JOINTING WHERE SIDEWALK IS ADJACENT.
6. FOR DEPRESSED CURB AT ENTRANCES USE 200.
7. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13mm.

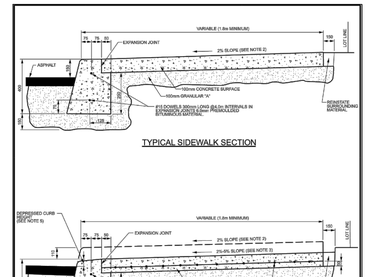
N.T.S.

Ottawa	CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD-600.110)	DATE:	JANUARY 2003
		REV. DATE:	MARCH 2021
		DWG. No.:	SC1.1



NOTES:
1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.
2 Sidewalk width shall be wider when specified.
3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.033, and 310.039.
4 Contraction joint may be tooled or sawcut.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev	3
CONCRETE SIDEWALK			
	OPSD 310.010		



NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. THE MAXIMUM SLOPE IS NOT TO EXCEED 2%.
3. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 6%.
4. EXPANSION AND DUMMY JOINTS AS PER SCS.
5. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13 mm.

N.T.S.

Ottawa	CONCRETE BARRIER CURB WITH SIDEWALK	DATE:	JANUARY 2003
		REV. DATE:	MAY 2021
		DWG. No.:	SC1.4

CONDITION	SEWER	SERVICES
EARTH	150 Min.	150 Min.
ROCK	300 Min.	150 Min.

NOTES:

1.

PIPE INSIDE DIAMETER (mm)	CLEARANCE (mm)
900 OR LESS	CONC 450 PVC 450
OVER 900	500

2. FINAL BACKFILL - APPROVED NATIVE MATERIAL OR SELECT SUBGRADE IN ACCORDANCE WITH F-2120.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
4. INITIAL BACKFILL MATERIAL
   - CONCRETE PIPE - GRANULAR 'A', GRANULAR 'B',
   - OR SELECT SUBGRADE MATERIAL WITH 100% PASSING THE 37.5 mm SIEVE
   - PVC PIPE - GRANULAR 'A'
5. WHEN APPROVED BY THE CONTRACT ADMINISTRATOR, POOR SOILS SHALL BE EXCAVATED TO CREATE A FOUNDATION THAT SHALL BE FILLED TO THE BOTTOM OF THE BEDDING WITH GRANULAR 'B'.

N.T.S.

Ottawa	SINGLE TRENCH (SEWER & SEWER SERVICES)	DATE:	MAY 2021
		REV. DATE:	MARCH 2021
		DWG. No.:	S6

OPTION B
TYPICAL PIPE INSULATION DETAIL

T = (2400+H) / 12 MINIMUM 50mm
T = THICKNESS OF INSULATION (mm)
W = D + 2(2400xH) OR D + 600 WHICHEVER IS GREATER
W = WIDTH OF INSULATION (mm)
D = O.D. OF PIPE (mm)
H = DEPTH OF COVER

NOTES:
1. THE INSULATION MATERIAL SHALL BE EXTRUDED POLYSTYRENE ACCORDING TO MW-15.15 WITH:
   A MINIMUM COMPRESSIVE STRENGTH OF 275 KPA,
2. MINIMUM INSULATION THICKNESS SHALL BE 50MM,
3. JOINTS SHALL BE STAGGERED FOR MULTIPLE INSULATION SHEETS.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN,

Ottawa	INSULATION FOR SHALLOW SEWERS	DATE:	MARCH 2023
		REV. DATE:	—
		DWG. No.:	S35

NOTES:
FOR VALVES ON 300mm (NOMINAL) WATERMAINS.

1. CLEARANCE AROUND PIPE AT CHAMBER WALL TO BE 50mm MINIMUM
2. VALVE CHAMBERS IN LIEU OF SCICS ON WATERMAINS SMALLER THAN 300mm ONLY TO BE USED, IF APPROVED BY THE CONTRACT ADMINISTRATOR.
3. REFER TO MW-15.1 FOR ADDITIONAL REQUIREMENTS
4. REFER TO MW-15.15 FOR APPROVED MANUFACTURERS
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE.
6. CATHODIC PROTECTION MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH M35, M40 AND M42.
7. TRACER WIRE REQUIRED FOR PVC, PDX AND HDPE WATERMAIN PIPE ONLY AS PER M36. TRACER WIRE TO BE CONNECTED TO VALVE BOLT AS PER M36 AND SECURED TO TOP OF CHAMBER.

Ottawa	CIRCULAR CHAMBER GATE VALVES	DATE:	MAY 2001
		REV. DATE:	MARCH 2021
		DWG. No.:	W8

NOTES:
FOR AUXILIARY, SERVICES AND ISOLATION VALVES.

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE
2. FOR 200 AND 250mm VALVES, ADD SECOND SEG ON THE CONCRETE BLOCKS AS REQUIRED TO RAISE BOLT HIGH ENOUGH TO PREVENT CONTACT INTO THE VALVE BONNET

Ottawa	VALVE BOX ASSEMBLY	DATE:	MAY 2001
		REV. DATE:	MARCH 2021
		DWG. No.:	W24

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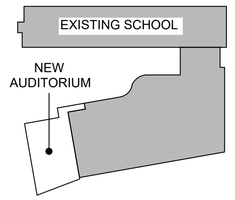
Conseil des école publique de l'Est de l'Ontario

key plan



no.	date	revision/issue	by
3	2026.03.19	ISSUED FOR SPC	K.H.
2	2026.01.16	ISSUED FOR SPC	K.H.
1	2025.12.19	33% COORDINATION	K.H.

architecture

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LICENSED PROFESSIONAL ENGINEER
K.L. PARKINS
100045152
2026-03-19
PROVINCE OF ONTARIO

project title

AUDITORIUM ADDITION

ESP PAUL-DE-BLOIS - 1310 CHAPMAN MILLS DR., OTTAWA, ON K2J 3T9

drawing title

CONSTRUCTION DETAILS PLAN

date	Issue Date	job. no.	220512
scale			
drawn	K.H.	drawing no.	C901
approved	M.B.		
plot date	2025-12-19 12:30 PM		

1. DO NOT SCALE FROM THIS DRAWING
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