



LRL

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Stormwater Management Report and Servicing Brief

Orleans Residential & Medical Facility
3996 Innes Rd, Orleans,
Ottawa, Ontario

Prepared for:

Lou Frangian

Attention: Lou Frangian

LRL File No.: 230737

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Lou Frangian to complete a Stormwater Management Analysis and Servicing Brief for the development of a proposed five (5) storeys commercial/residential building with an underground car parking on the subject property located at 3996 Innes Rd, Orleans, Ottawa, Ontario.

The subject property consists of a lot that is legally described as parts of Lot 1, concession 3 (Ottawa Front) in the township of Gloucester. The subject lots are zoned AM11 (Arterial Mainstreet).



Figure 1: Aerial View of Proposed Development

The subject property is trapezoidal shaped and measures approximately 36 m in frontage along Innes Road and 41 m in depth. The total site area is approximately **0.15 ha**.

The proposed development will be constructed in a single phase, which includes a 5-storey apartment building consisting of a total of twenty (20) units with one (1) level of underground parking. Approximately 17 outdoor surface parking spaces are also proposed at the ground level. Refer to **Site Plan** included in **Appendix F** for more details.

This report has been prepared in consideration of the terms and conditions noted above and with the civil drawings prepared for the new development. Should there be any changes in the design features, which may relate to the stormwater and servicing considerations, LRL Associates Ltd. should be advised to review the report recommendations.

2 EXISTING SITE AND DRAINAGE DESCRIPTION

The subject site measures **0.15 ha** and currently consists of a residential dwelling covering 0.05 ha of the site, which will be demolished. Elevations of existing site ranges between 90.88 m at the northwest corner to 89.40 m at the southeast corner of the subject property.

Sewer and watermain mapping, along with as-built information collected from the City of Ottawa indicate the following existing infrastructure located within the adjacent right-of-ways:

Innes Road:

- 610mm diameter DI water main
- 250mm diameter PVC sanitary sewer
- 600mm diameter concrete storm sewer
- 1200 mm diameter concrete storm sewer

3 SCOPE OF WORK

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

Stormwater management

- Calculate the allowable stormwater release rate.
- Calculate the anticipated post-development stormwater release rates.
- Demonstrate how the target quantity and quality control objectives will be achieved.

Water services

- Calculate the expected water supply demand at average and peak conditions.
- Calculate the required fire flow as per the Fire Underwriters Survey (FUS) method.
- Confirm the adequacy of water supply and pressure during peak flow and fire flow conditions.
- Describe the proposed water distribution network and connection to the existing system.

Sanitary services

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



4 REGULATORY APPROVALS

An MECP Environmental Compliance Approval is not expected to be required for installation of the proposed storm and sanitary sewers within the site. A Permit to Take Water is not anticipated to be required for pumping requirements for sewer installation. The Rideau Valley Conservation Authority will need to be consulted in order to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.

5 WATER SUPPLY AND FIRE PROTECTION

5.1 Existing Water Supply Services and Fire Hydrant Coverage

The subject property lies within the City of Ottawa 1E water distribution network pressure zone. There is an existing 610 mm watermain within Innes Road. There are currently two (2) existing fire hydrants within close proximity of the subject property.

5.2 Water Supply Servicing Design

Considering the presence of automatic sprinkler system inside the building and a recommended size to service the sprinkler system, the subject property is proposed to be serviced via a 150 mm diameter service laterals connected to the existing 610 mm diameter watermain located within Innes Rd. Refer to *Site Servicing Plan C401* in **Appendix E** for servicing layout and connection points.

Table 1 below summarizes the City of Ottawa Design Guidelines design parameters employed in the preparation of the water demand estimate.

Table 1: City of Ottawa Design Guidelines Design Parameters

Design Parameter	Value
Residential Bachelor / 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential 3 Bedroom Apartment	3.1 P/unit
Townhouse	2.7 P/unit
Other Commercial Average Daily Demand	2.8 L/m ² /d
Average Daily Demand	280 L/d/per
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
Desired operating pressure range during Maximum Day Flow	345 kPa (50 psi) and 552 kPa (80 psi)
Minimum allowable pressure during Peak Hour Flow	275 kPa (40 psi)
Minimum allowable pressure during Fire Flow Conditions	140 kPa (20 psi)

The interior layout and architectural floor plans have been reviewed, and it was determined that the building will house 6 one-bedroom units and 14 two-bedroom units. Based on the City of Ottawa Design guidelines for population projection, this translates to approximately 37.8



residents. **Table 2** summarizes the proposed development estimated population as interpreted using Table 4.1 of the City of Ottawa Design Guidelines.

Table 2: Residential Population Estimate

Proposed Unit type	Persons Per Unit	Number of Units	Population
1 Bedroom Apartment	1.4	6	8.4
2 Bedroom Apartment	2.1	14	29.4
Total Residential Population			37.8

The required water supply requirements for the residential units in proposed building have been calculated using the following formula:

$$Q = (q \times P \times M)$$

where,

q = average water consumption (L/capita/day)

P = design population (capita)

M = peak factor

The following factors were used in calculations as per Table 3-3 in the MOE Guidelines.

- Maximum Daily Demand Residential Factor = 8.7
- Peak Hour Demand Residential Factor = 13.1

Using the above-mentioned factors and design parameters listed in **Table 1**, anticipated total demands, including commercial demands, were calculated as follows:

- Average day demand is **0.13** L/s.
- Maximum daily demand is **1.08** L/s, and
- Maximum hour demand is **1.63** L/s.

Refer to **Appendix B** for water demand calculations.

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand, **Table 3** below summarizes boundary conditions for the proposed development.



Table 3: Summary of Anticipated Demands and Boundary Conditions

Demand Scenario	Anticipated Demand (L/s)	Connection @ Innes Rd* (m H ₂ O / kPa)
Average Daily Demand	0.13	130.3/56.5
Max Day + Fire Flow (per FUS)	1.08+ 133.3	128.6/54.1
Peak Hour	1.63	127.0/51.8
*Assumed ground elevation at Innes Rd = 90.54 m		

As indicated in **Table 3**, pressures in all scenarios meet the required pressure range stated in Table 1 as per City of Ottawa Design Guidelines. Refer to **Appendix A** for Boundary Conditions correspondence.

The estimated fire flow for the proposed buildings was calculated in accordance with *ISTB-2018-02*. The following parameters were adopted from the Architectural site plan, see **Appendix F**:

- Type of construction
- Total floor area (excluding basement)
- Sprinkler protection

The estimated fire flow demand was calculated to be **8,000 L/min**, see **Appendix B** for details.

There are two (2) existing fire hydrants near the proposed buildings that are available to provide the required fire flow. **Table 4** below summarizes the aggregate fire flow of the contributing fire hydrants in close proximity to the proposed development based on Table 18.5.4.3 of *ISTB-2018-02*.

Table 4: Fire Protection Summary

Building	Fire Flow Demand (L/min)	Fire Hydrants(s) within 75m	Available Combined Fire Flow (L/min)
Proposed 5-storey building	8,000	2	(2 x 5678) = 11,356

The total available fire flow from contributing hydrants is equal to **11,356 L/min** which is sufficient to provide required fire flow for the proposed development. A certified fire protection system



specialist will need to be employed to design the building's fire suppression system and confirm the actual fire flow demand.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

6 SANITARY SERVICE

6.1 Existing Sanitary Sewer Services

There is an existing 250 mm diameter sanitary sewer within Innes Road.

6.2 Sanitary Sewer Servicing Design

The proposed development will be serviced via a 200 mm dia. sanitary service to be connected to the existing 250 mm diameter sanitary sewer within Innes Road. Refer to the *Servicing Plan C401 (Appendix F)*, for the proposed sanitary servicing layout.

The parameters used to calculate the anticipated sanitary flows are:

- Residential average population per unit of 1.4 person for single units and 2.1 persons for two-bedroom units
- Residential daily demand of 280 L/p/day, a residential peaking factor of 3.8
- Commercial demand of 28000 L/ha/day, a commercial peaking factor of 1.5
- Total infiltration rate of 0.33 L/s/ha.

Based on these parameters and the total site area of 0.152 ha (including 0.036 ha commercial area), the total anticipated wet wastewater flow was estimated **0.53 L/s**. Refer to **Appendix C** for the sanitary sewer design sheet.

7 STORMWATER MANAGEMENT

7.1 Existing Stormwater Infrastructure

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer systems. As such, approvals for the proposed development within this area are under the approval authority of the City of Ottawa.

In pre-development conditions, drainage from the subject site is depicted by existing catchment areas ECA-01 (0.043 ha) and ECA-02 (0.108 ha).

- ECA-01 drains uncontrolled overland towards ECA-02.
- ECA-02 drains uncontrolled overland towards south which will eventually outlet to the existing ditch inlet catch basin located near the southeast corner of the site.

Refer to the *Pre-development Watershed Plan C701* included in **Appendix E** for pre-development drainage characteristics. There are currently an existing 600 mm dia. concrete (located easterly) and 1200 mm dia. concrete (located westerly) storm sewers within the Innes Rd ROW.



7.2 Design Criteria

The stormwater management criteria for this development are based on the pre-consultation with City of Ottawa officials, the City of Ottawa Sewer Design Guidelines (2012) as well as the Ministry of the Environment's Stormwater Management Planning and Design Manual, 2003.

7.2.1 Water Quality

The subject property lies within the Ottawa River East sub-watershed and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). It was determined that an enhanced level of treatment (80% TSS removal) is required for stormwater runoff from the proposed development.

7.2.2 Water Quantity

Based on the City requirements, the following stormwater management quantity control requirements were identified for the subject site:

- Meet an allowable release rate based on a Rational Method runoff coefficient of 0.5 or lower based on existing condition, employing the City of Ottawa IDF parameters for a 5-year storm.
- Attenuate all storms up to and including the City of Ottawa 100-year storm event on site.

Utilizing the above parameters, the total allowable storm release rate was calculated to be **17.45 L/s**. Refer to **Appendix D** for calculations.

7.3 Method of Analysis

The Modified Rational Method has been used to calculate the runoff rate from the site and to quantify the detention storage required for quantity control. Refer to the design sheets included in **Appendix D** for storage calculations.

7.4 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished using controlled catchment areas with an Inlet Control Device (ICD) to be installed at the downstream manhole (MH03). Storage required, as a result of quantity control measure, will be accomplished through a combination of parking lot surface storage and underground storage in oversized storm sewers/catch basin/manhole. Briefly, in post-development condition, the site will have six (6) catchments as outlined below.

- *Catchment CA-01* (0.007 ha) consisting of an outdoor amenity area will be captured by a catchbasin (CB01).
- *Catchment CA-02* (0.105 ha) consisting of roof and parking lot will be captured by a catchbasin manhole (CBMH02). The roof drains remain uncontrolled and flow from downspout will be directed towards the parking lot, eventually captured by CBMH02.
- *Catchment CA-03* (0.012 ha) consisting of ramp area will flow uncontrolled to the trench drain located at the bottom of the ramp. The captured flow will be connected to sump



pump through the building's mechanical system and discharged on surface towards the parking lot, eventually captured by CBMH02.

- *Catchment CA-04* (0.005 ha) consisting of grass and landscaping area in the west end of site, will flow uncontrolled off the site as it did in pre-development condition.
- *Catchment CA-05* (0.013 ha) consisting of grass and landscaping area in the south end of site, will flow uncontrolled off the site as it did in pre-development condition.
- *Catchment CA-06* (0.009 ha) consisting of grass and landscaping area in the north end of site, will flow uncontrolled off the site towards Innes Rd right-of-way.

The subject site is proposed to be serviced via CB and CBMH in the landscape and parking lot area that collect and direct runoff to MH03, where it is controlled to an allowable release rate established in Section 7.2.2 above by using an ICD Hydrovex 100 VHV-1 (or approved equivalent). A proposed 250 mm diameter free-flowing storm sewer pipe will discharge controlled flows to the proposed Oil/Grit Separator (OGS) which will eventually outlet to the existing 1200 mm diameter storm sewer within Innes Rd. The proposed servicing layout and connection points are shown on drawing C401 in **Appendix E**, and detailed calculations can be found in **Appendix D**. **Table 5** below summarizes post-development drainage areas, calculations can be found in **Appendix D**.

Table 5: Drainage Areas and Runoff Coefficient

Catchment	Area (ha)	Weighted Runoff Coefficient (C)	100 Year Weighted Runoff Coefficient (25% increase)
CA-01 (Controlled)	0.007	0.42	0.53
CA -02 (Controlled)	0.105	0.87	1.00
CA -03 (Controlled)	0.012	0.90	1.00
CA -04 (Uncontrolled)	0.005	0.20	0.25
CA -05 (Uncontrolled)	0.013	0.36	0.45
CA -06 (Uncontrolled)	0.009	0.36	0.44

Table 6 below summarizes the release rates and storage volumes required to meet the allowable release rate of **17.45 L/s** for 100-year flow rates.



Table 6: Stormwater Release Rate & Storage Volume Summary (100 Year)

Catchment	Area (ha)	100-year Release Rate (L/s)	100-Year Required Storage (m ³)	Available Surface Storage (m ³)
CA-01 to CA-03 (Controlled)	0.124	11.87	35.93	36.38
CA-04 to CA-06 (Uncontrolled)	0.027	5.57	N/A	N/A
Total	0.152	17.45	35.93	36.38

To attenuate flows to the allowable release rate of **17.45 L/s**, it is calculated that a total of **35.93 m³** of storage will be required for the 100-year storm event. The required storage is proposed to be met via surface ponding in the paved parking lot. The 100-year maximum ponding extent can be found on *Stormwater Management Plan C601* in **Appendix E**.

The required storage for 2-year storm will be accommodated underground in oversized storm sewers and catchbasin/manhole structures. As such, no surface ponding occurs during 2-year storm event. Detail calculations can be found in **Appendix D**.

To meet stormwater quality control objective, a **Stormceptor EF04** Oil/Grit Separator is proposed which will provide an enhanced level of treatment (i.e., 80% TSS removal). Refer to *Servicing Plan C401* for location of OGS and **Appendix D** for sizing report and specifications.

8 EROSION AND SEDIMENT CONTROL

During construction, erosion and sediment controls will be provided 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 catch basin and/or manholes in and around the site that may be impacted by the site construction. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS.MUNI 805. Refer to drawing C101 for erosion and sediment control details.

9 CONCLUSION

This Stormwater Management and Servicing Report for the development proposed at 3996 Innes Road presents the rationale and details for the servicing requirements for the subject property.

In accordance with the report objectives, the servicing requirements for the development are summarized below:

Water Service

- The maximum required fire flow was calculated at **8,000 L/min**, using the FUS method.
- There are two existing fire hydrants available to service the proposed development. They will provide a combined fire flow of **11,356 L/min** to the site.
- The proposed development will be serviced with a 150 mm dia. water service connection to be connected to the existing 600 mm dia. watermain within Innes Rd.
- Boundary conditions received from the City of Ottawa indicate that sufficient pressure is available to service the proposed site.

Sanitary Service

- The total anticipated wastewater design flow from the proposed development is **0.53 L/s**.
- The proposed development will discharge to the existing 250 mm dia. sanitary sewer within Innes Road via a proposed 200 mm diameter sanitary service lateral.

Stormwater Management

- An OGS is proposed to meet the required water quality control objective of 80% TSS removal.
- The stormwater release rates from the proposed development will meet calculated allowable release rate of **17.45 L/s**.
- Stormwater quantity control objectives will be met using an inlet control device and on-site storm water storage in the parking lot and underground storage in oversized storm sewers.



10 REPORT CONDITIONS AND LIMITATIONS

The report conclusions are applicable only to this specific project described in the preceding pages. Any changes, modifications or additions will require a subsequent review by LRL Associates Ltd. to ensure the compatibility with the recommendations contained in this document.

If you have any questions or comments, please contact the undersigned.

Prepared by:
LRL Associates Ltd.

Maxime Longtin

Maxime Longtin
Civil Engineering Technologist



Mohan Basnet, P.Eng.
Civil Engineer

APPENDIX A

Pre-consultation / Correspondence

Mohan Basnet

From: Fadel, Rafic <rafic.fadel@ottawa.ca>
Sent: January 3, 2024 3:31 PM
To: Maxime Longtin
Cc: Mohan Basnet; Boughton, Michael; Polyak, Alex
Subject: RE: 3996 Innes Rd (City File# D07-12-21-0209)
Attachments: RE: 3996 Innes Rd (City File# D07-12-21-0209)

Good afternoon,

Please find below the results for the water boundary conditions.

Results

Connection 1 – Innes Road

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	130.3	56.5
Peak Hour	127.0	51.8
Max Day plus Fire Flow #1	128.6	54.1

¹ Ground Elevation = 90.54 m

Notes

1. Service connection to 610 mm backbone watermain was consulted with Drinking Water Services.

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 watermain 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.



Please note that **Drinking Water Services** will need to be circulated when the application is submitted.

Thank you,

Rafic Fadel

Engineering Intern

Planning, Real Estate and Economic Development Department

Development Review - East Branch

City of Ottawa | Ville d'Ottawa

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APPENDIX B

Water Supply Calculations



Water Supply Calculations

LRL File No. 230737
 Project: 3996 Innes Rd, Orleans, ON
 Prepared by M Basnet
 Date December 22, 2023

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

Unit Type	Persons Per Unit	Number of Units	Population
1 Bedroom Apartment	1.4	6	8.4
2 Bedroom Apartment	2.1	14	29.4
Total		20	37.8

Average Water Consumption Rate	280 L/c/d		
Average Day Demand	10,584 L/d	0.12 L/s	
Maximum Day Factor	8.7	(MOE Table 3-3)	
Maximum Daily Demand	91,768 L/d	1.06 L/s	
Peak Hour Factor	13.1	(MOE Table 3-3)	
Maximum Hour Demand	138,233 L/d	1.60 L/s	

Institutional / Commercial / Industrial Demand			
Property Type	Demand (L/ha/d)	Area (ha)	Demand (L/d)
Commercial	28000	0.036	1008.0

Average Day Demand	1,008 L/d	0.012 L/s	
Maximum Day Factor	1.5	(Design Guidelines-Water Distribution Table 4.2)	
Maximum Daily Demand	1,512 L/d	0.018 L/s	
Peak Hour Factor	1.8	(Design Guidelines-Water Distribution Table 4.2)	
Maximum Hour Demand	2,722 L/d	0.032 L/s	

TOTAL DEMAND			
Average Day Demand	11,592 L/d	0.13 L/s	
Maximum Daily Demand	93,280 L/d	1.08 L/s	
Maximum Hour Demand	140,955 L/d	1.63 L/s	

Water Service Pipe Sizing

$$Q = VA$$

Where: V = velocity

A = area of pipe

Q = flow rate

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

$$\begin{aligned} \text{Minimum pipe diameter (d)} &= (4Q/\pi V)^{1/2} \\ &= 0.034 \text{ m} \\ &= 34 \text{ mm} \end{aligned}$$

$$\begin{aligned} \text{Proposed pipe diameter (d)} &= 150 \text{ mm} \\ &(\text{considering sprinkler system}) \end{aligned}$$




Fire Flow Calculations

LRL File No. 230737
 Location 3996 Innes Rd, Orleans, ON
 Method Fire Underwriters Survey (FUS)
 Prepared by M Basnet
 Date December 22, 2023

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 (A)								
2	Total area					2,413	m ²	
3	Obtain fire flow before reductions	Required fire flow (rounded to nearest 1,000 L/min)	Fire Flow = 220 x C x A ^{0.5}				L/min	9,000
Reductions or surcharge due to factors affecting burning								
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-25%	Limited combustible	-15%	L/min	7,650
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	True	-30%	L/min	4,590
			Water supply is standard for both the system and fire department hose lines	-10%	True	-10%		
			Fully supervised system	-10%	False	0%		
6	Choose separation	Exposure distance between units	North side	>30m	0%		L/min	8,033
			West side	10.1 to 20m	15%			
			East side	10.1 to 20m	15%			
			South side	10.1 to 20m	15%	45%		
Net required fire flow								
7	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000)					L/min	8,000
		Minimum required fire flow rate					L/s	133.3
		Required duration of fire flow					hr	2

APPENDIX C

Sanitary Calculations

<div><div><div>LRL</div><div>ENGINEERING INGENIERIE</div></div></div> <div><div>LRL File No.</div><div>230737</div><div>Project:</div><div>Orleans Residential & Medical Facility</div><div>Location:</div><div>3996 Innes Rd</div><div>Date:</div><div>July 19, 2024</div></div>			<div>Sanitary Design Parameters</div> <div><div>Average Daily Flow = 280 L/p/day</div><div>Commercial & Institutional Flow = 28000 L/ha/day</div><div>Light Industrial Flow = 35000 L/ha/day</div><div>Heavy Industrial Flow = 55000 L/ha/day</div><div>Maximum Residential Peak Factor = 4.0</div><div>Commercial & Institutional Peak Factor = 1.5</div></div> <div><div>Industrial Peak Factor = as per Appendix 4-B</div><div>Extraneous Flow = 0.33L/s/gross ha</div></div>			<div>Pipe Design Parameters</div> <div><div>Maximum Velocity = 3.00 m/s</div><div>Minimum Velocity = 0.60 m/s</div><div>Manning's n = 0.013</div></div>		
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LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL FLOW (l/s)	PIPE						
STREET	FROM MH	TO MH	AREA (Ha)	POP.	CUMMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	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)	RATIO Q /QFULL
					AREA (Ha)	POP.																					
	BLDG/STUB	SAN MH01	0.116	37.8	0.12	37.8	3.8	0.47	0.036	0.036						0.02	0.152	0.152	0.05	0.53	1.0	200	2.00%	PVC	46.38	1.48	0.01
Innes Road	SAN MH01	CR-03																		0.53	12.0	200	2.00%	PVC	46.38	1.48	0.01
Innes Road	CR-03	EX. SAN																		0.53	5.9	200	5.42%	PVC	76.36	2.43	0.01
NOTES Existing inverts and slopes are estimated. They are to be confirmed on-site.														Designed: MB/ML		PROJECT: Orleans Residential & Medical Facility											
														Checked: MB		LOCATION: 3996 Innes Rd											
														Dwg. Reference: C.401		File Ref.: 230737				Date: 2024-07-19				Sheet No. 1 of 1			

APPENDIX D

Stormwater Management Calculations

Hydrovex ICD

Stormceptor OGS

LRL Associates Ltd.
Storm Watershed Summary



LRL File No. 230737
Project: Orleans Residential & Medical Facility
Location: 3996 Innes Rd, Ottawa
Date: July 12, 2024
Designed: Maxime Longtin
Drawing Reference: C701/C702

Pre-Development Catchments

CATCHMENT	C = 0.2	C = 0.80	C = 0.90	Total Area (m ²)	Total Area (ha)	Combined C
ECA-01	212	0	221	433.0	0.043	0.56
ECA-02	878	0	206	1084.0	0.108	0.33
TOTAL	1090.0	0.0	427.0	1517.0	0.152	0.40

Post-Development Catchments

CATCHMENT	C = 0.20	C = 0.80	C = 0.90	Total Area (m ²)	Total Area (ha)	Combined C
CA-01 (Controlled)	47	0	22	69.0	0.007	0.42
CA-02 (Controlled)	50	0	1001	1051.0	0.105	0.87
CA-03 (Controlled)	0	0	121	121.0	0.012	0.90
CA-04 (Uncontrolled)	50	0	0	50.0	0.005	0.20
CA-05 (Uncontrolled)	104	0	30	134.0	0.013	0.36
CA-06 (Uncontrolled)	70	0	20	90.0	0.009	0.36
TOTAL	321.0	0.0	1194.0	1515.0	0.152	0.75



LRL File No. 230737
Project: Orleans Residential & Medical Facility
Location: 3996 Innes Rd
Date: July 11, 2024
Designed: M. Basnet
Drawing Ref.: C.601

**Stormwater Management
Design Sheet**

STM-100 Year

Runoff Equation

$Q = 2.78CIA \text{ (L/s)}$
 $C = \text{Runoff coefficient}$
 $I = \text{Rainfall intensity (mm/hr)} = A / (T_d + C)^B$
 $A = \text{Area (ha)}$
 $T_d = \text{Time of duration (min)}$

Pre-development Stormwater Management

$I_{100} = 1735.688 / (T_d + 6.014)^{0.820}$

A = 1735.688

B = 0.820

C = 6.014

$C = 0.40$
 $I = 178.6 \text{ mm/hr}$
 $T_c = 10 \text{ min}$
 $\text{Total Area} = 0.152 \text{ ha}$
100 Year Release Rate = 29.90 L/s
Allowable Release Rate = 17.45 L/s

(5 Year Pre-development Flow)

Post-development Stormwater Management

					$\Sigma R_{2\&5}$	ΣR_{100}
Controlled	Total Site Area =	0.152	ha	$\Sigma R =$	0.75	0.94
	CA-01 (Controlled)	0.007	ha	R =	0.42	0.53
	CA-02 (Controlled)	0.105	ha	R =	0.87	1.00
	CA-03 (Controlled)	0.012	ha	R =	0.90	1.00
	Total Controlled =	0.124	ha	$\Sigma R =$	0.85	1.00
Uncontrolled	CA-04 (Uncontrolled)	0.005	ha	R =	0.20	0.25
	CA-05 (Uncontrolled)	0.013	ha	R =	0.36	0.45
	CA-06 (Uncontrolled)	0.009	ha	R =	0.36	0.44
	Total Uncontrolled =	0.027	ha	$\Sigma R =$	0.33	0.41

Post-development Stormwater Management

100 Year Storm Event:

$I_{100} = 1735.688 / (T_d + 6.014)^{0.820}$

A = 1735.688

B = 0.820

C = 6.014

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	178.6	61.60	29.84	11.87	5.57	17.45
15	142.9	49.30	33.68	11.87	4.46	16.33
20	120.0	41.38	35.41	11.87	3.74	15.62
25	103.8	35.83	35.93	11.87	3.24	15.11
30	91.9	31.69	35.68	11.87	2.87	14.74
35	82.6	28.49	34.89	11.87	2.58	14.45
40	75.1	25.92	33.72	11.87	2.34	14.22
45	69.1	23.82	32.26	11.87	2.15	14.03
50	64.0	22.06	30.57	11.87	2.00	13.87
60	55.9	19.28	26.67	11.87	1.74	13.62
70	49.8	17.18	22.27	11.87	1.55	13.43
80	45.0	15.52	17.51	11.87	1.40	13.28
90	41.1	14.18	12.47	11.87	1.28	13.16
100	37.9	13.08	7.21	11.87	1.18	13.06
110	35.2	12.14	1.79	11.87	1.10	12.97
120	32.9	11.35	0.00	11.87	1.03	12.90

Total Storage Required = 35.93 m³
Available Surface Storage = 36.38 m³ (See DWG C601)



LRL File No. 230737
Project: Orleans Residential & Medical Facility
Location: 3996 Innes Rd
Date: July 11, 2024
Designed: M. Basnet
Drawing Ref.: C.601

Stormwater Management
Design Sheet

STM-5 Year

Runoff Equation

$$Q = 2.78CIA \text{ (L/s)}$$

C = Runoff coefficient
I = Rainfall intensity (mm/hr) = $A / (Td + C)^B$
A = Area (ha)
Td = Time of duration (min)

Pre-development Stormwater Management

$$I_s = 998.071 / (Td + 6.053)^{0.814}$$

A = 998.071 B = 0.814 C = 6.053

C = 0.40
I = 104.2 mm/hr
Td = 10 min
Total Area = 0.152 ha
5 Year Release Rate = 17.45 L/s (Allowable Release Rate)

Post-development Stormwater Management

					$\Sigma R_{2.85}$
Controlled	Total Site Area =	0.152	ha	$\Sigma R =$	0.75
	CA-01 (Controlled)	0.007	ha	R =	0.42
	CA-02 (Controlled)	0.105	ha	R =	0.87
	CA-03 (Controlled)	0.012	ha	R =	0.90
	Total Controlled =	0.124	ha	$\Sigma R =$	0.85
Uncontrolled	CA-04 (Uncontrolled)	0.005	ha	R =	0.20
	CA-05 (Uncontrolled)	0.013	ha	R =	0.36
	CA-06 (Uncontrolled)	0.009	ha	R =	0.36
	Total Uncontrolled =	0.027	ha	$\Sigma R =$	0.33

Post-development Stormwater Management

5 Year Storm Event:

$$I_s = 998.071 / (Td + 6.053)^{0.814}$$

A = 998.071 B = 0.814 C = 6.053

		Storage Required				
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m ³)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.2	30.38	11.11	11.87	2.60	14.48
15	83.6	24.37	11.24	11.87	2.09	13.96
20	70.3	20.49	10.34	11.87	1.75	13.63
25	60.9	17.76	8.83	11.87	1.52	13.39
30	53.9	15.73	6.93	11.87	1.35	13.22
35	48.5	14.15	4.78	11.87	1.21	13.09
40	44.2	12.89	2.43	11.87	1.10	12.98
45	40.6	11.85	0.00	11.87	1.01	12.89
50	37.7	10.98	0.00	11.87	0.94	12.81
60	32.9	9.61	0.00	11.87	0.82	12.70
70	29.4	8.57	0.00	11.87	0.73	12.61
80	26.6	7.75	0.00	11.87	0.66	12.54
90	24.3	7.08	0.00	11.87	0.61	12.48
100	22.4	6.53	0.00	11.87	0.56	12.43
110	20.8	6.07	0.00	11.87	0.52	12.39
120	19.5	5.68	0.00	11.87	0.49	12.36

Total Storage Required = 11.24 m³



LRL File No. 230737
Project: Orleans Residential & Medical Facility
Location: 3996 Innes Rd
Date: July 11, 2024
Designed: M Basnet
Drawing Ref.: C.601

**Stormwater Management
Design Sheet**

STM-2 Year

Runoff Equation

$$Q = 2.78CIA \text{ (L/s)}$$
$$C = \text{Runoff coefficient}$$
$$I = \text{Rainfall intensity (mm/hr)} = A / (T_d + C)^B$$
$$A = \text{Area (ha)}$$
$$T_d = \text{Time of duration (min)}$$

Pre-development Stormwater Management

$$I_2 = 732.951 / (T_d + 6.199)^{0.810}$$

A = 732.951

B = 0.810

C = 6.199

C = 0.40
I = 76.8 mm/hr
T_c = 10 min
Total Area = 0.152 ha
2 Year Release Rate = 12.86 L/s

Post-development Stormwater Management

					ΣR _{24h}
Controlled	Total Site Area =	0.152	ha	ΣR=	0.75
	CA-01 (Controlled)	0.007	ha	R=	0.42
	CA-02 (Controlled)	0.105	ha	R=	0.87
	CA-03 (Controlled)	0.012	ha	R=	0.90
	Total Controlled =	0.124	ha	ΣR=	0.85
Uncontrolled	CA-04 (Uncontrolled)	0.005	ha	R=	0.20
	CA-05 (Uncontrolled)	0.013	ha	R=	0.36
	CA-06 (Uncontrolled)	0.009	ha	R=	0.36
	Total Uncontrolled =	0.027	ha	ΣR=	0.33

Post-development Stormwater Management

2 Year Storm Event:

$$I_2 = 732.951 / (T_d + 6.199)^{0.810}$$

A = 732.951

B = 0.810

C = 6.199

Time (min)	Intensity (mm/hr)	Storage Required			Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)	*Controlled Release Rate (L/s)		
10	76.8	22.40	9.88	5.94	1.92	7.85
15	61.8	18.01	10.87	5.94	1.54	7.48
20	52.0	15.17	11.08	5.94	1.30	7.24
25	45.2	13.17	10.85	5.94	1.13	7.06
30	40.0	11.68	10.33	5.94	1.00	6.94
35	36.1	10.52	9.62	5.94	0.90	6.84
40	32.9	9.58	8.75	5.94	0.82	6.76
45	30.2	8.82	7.78	5.94	0.75	6.69
50	28.0	8.18	6.72	5.94	0.70	6.64
60	24.6	7.16	4.41	5.94	0.61	6.55
70	21.9	6.39	1.90	5.94	0.55	6.48
90	18.1	5.29	0.00	5.94	0.45	6.39
110	15.6	4.54	0.00	5.94	0.39	6.33
130	13.7	3.99	0.00	5.94	0.34	6.28
150	12.3	3.57	0.00	5.94	0.31	6.24
170	11.1	3.24	0.00	5.94	0.28	6.21

* Controlled release rate reduced to 50% for underground storage calculations

Total Storage Required = 11.08 m³
Available Underground Storage = 11.53 m³

Underground Storage

Oversized Pipe	dia (m)	A(m ²)	L(m)	V(m ³)
STM Sewer (CB01-CBMH02)	0.525	0.216	17.8	3.85
STM Sewer (CBMH02-MH03)	0.525	0.216	14.3	3.10
			Total	6.95
CBMH	dia (m)	A(m ²)	H(m)	V(m ³)
MH03	1.2	1.131	1.82	2.06
CBMH02	1.2	1.131	1.72	1.95
CB01	0.6*0.6	0.360	1.60	0.58
			Total	4.58

LRL Associates Ltd.
Storm Design Sheet



LRL File No. 230737
Project: Orleans Residential & Medical Facility
Location: 3996 Innes Rd, Ottawa
Date: July 12, 2024
Designed: M. Basnet
Drawing Reference: C.401

Storm Design Parameters

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)

Runoff Coefficient (C)

Grass 0.20
Gravel 0.80
Asphalt / rooftop 0.90

Ottawa Macdonald-Cartier International Airport IDF curve
equation (5 year event, intensity in mm/hr)

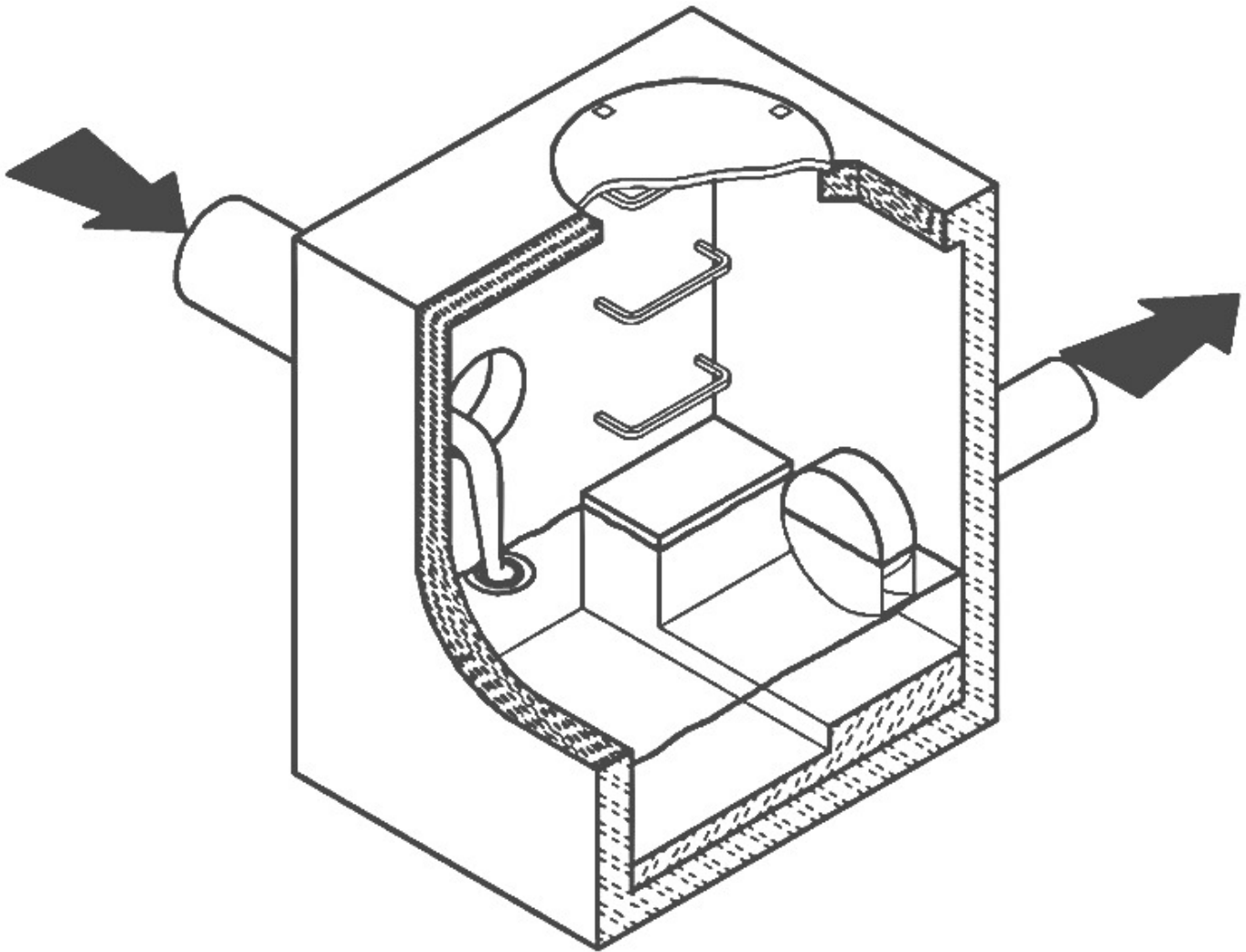
$$I_5 = 998.071 / (Td + 6.053)^{0.814}$$

Min. velocity = 0.80 m/s
Manning's "n" = 0.013

LOCATION			AREA (ha)			FLOW						STORM SEWER							
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)	Controlled 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})
CA-01	CB01	CBMH02	0.005	0.000	0.002	0.008	0.01	10.00	104.2	0.85		525	PVC	0.50%	17.8	304.1	1.40	0.21	0.00
CA-02 & CA-03	CBMH02	MH03	0.005	0.000	0.112	0.284	0.29	10.21	103.1	30.06		525	PVC	0.50%	14.3	304.1	1.40	0.17	0.10
	MH03	OGS					0.29	10.38	102.2	29.81	11.87	250	PVC	1.00%	1.9	59.5	1.21	0.03	0.20
	OGS	Ex. STM					0.29	10.41	102.1	29.77	11.87	250	PVC	1.00%	19.0	59.5	1.21	0.26	0.20



[®] HYDROVEX[®] VHV / SVHV Vertical Vortex Flow Regulator



JOHN MEUNIER

HYDROVEX® VHV / SVHV VERTICAL VORTEX FLOW REGULATOR

APPLICATIONS

One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration. In a combined sewer system, the wastewater treatment plant may also experience significant increases in flows during storms, thereby losing its treatment efficiency.

A simple means of controlling excessive water runoff is by controlling excessive flows at their origin (manholes). **John Meunier Inc.** manufactures the **HYDROVEX® VHV / SVHV** line of vortex flow regulators to control stormwater flows in sewer networks, as well as manholes.

The vortex flow regulator design is based on the fluid mechanics principle of the forced vortex. This grants flow regulation without any moving parts, thus reducing maintenance. The operation of the regulator, depending on the upstream head and discharge, switches between orifice flow (gravity flow) and vortex flow. Although the concept is quite simple, over 12 years of research have been carried out in order to get a high performance.

The **HYDROVEX® VHV / SVHV** Vertical Vortex Flow Regulators (refer to **Figure 1**) are manufactured entirely of stainless steel, and consist of a hollow body (1) (in which flow control takes place) and an outlet orifice (7). Two rubber "O" rings (3) seal and retain the unit inside the outlet pipe. Two stainless steel retaining rings (4) are welded on the outlet sleeve to ensure that there is no shifting of the "O" rings during installation and use.

1. BODY

2. SLEEVE

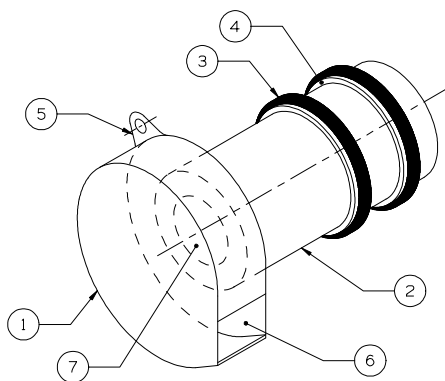
3. O-RING

4. RETAINING RINGS
(SQUARE BAR)

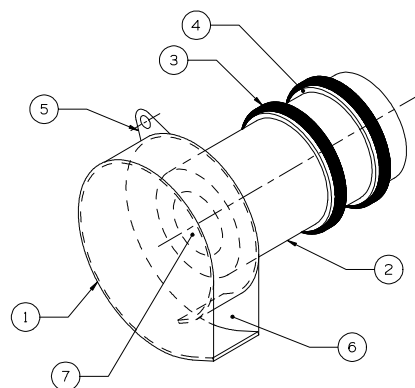
5. ANCHOR PLATE

6. INLET

7. OUTLET ORIFICE



VHV



SVHV

FIGURE 1: HYDROVEX® VHV-SVHV VERTICAL VORTEX FLOW REGULATORS

ADVANTAGES

- The **HYDROVEX® VHV / SVHV** line of flow regulators are manufactured entirely of stainless steel, making them durable and corrosion resistant.
- Having no moving parts, they require minimal maintenance.
- The geometry of the **HYDROVEX® VHV / SVHV** flow regulators allows a control equal to an orifice plate, having a cross section area 4 to 6 times smaller. This decreases the chance of blockage of the regulator, due to sediments and debris found in stormwater flows. **Figure 2** illustrates the comparison between a regulator model 100 SVHV-2 and an equivalent orifice plate. One can see that for the same height of water, the regulator controls a flow approximately four times smaller than an equivalent orifice plate.
- Installation of the **HYDROVEX® VHV / SVHV** flow regulators is quick and straightforward and is performed after all civil works are completed.
- Installation requires no special tools or equipment and may be carried out by any contractor.
- Installation may be carried out in existing structures.

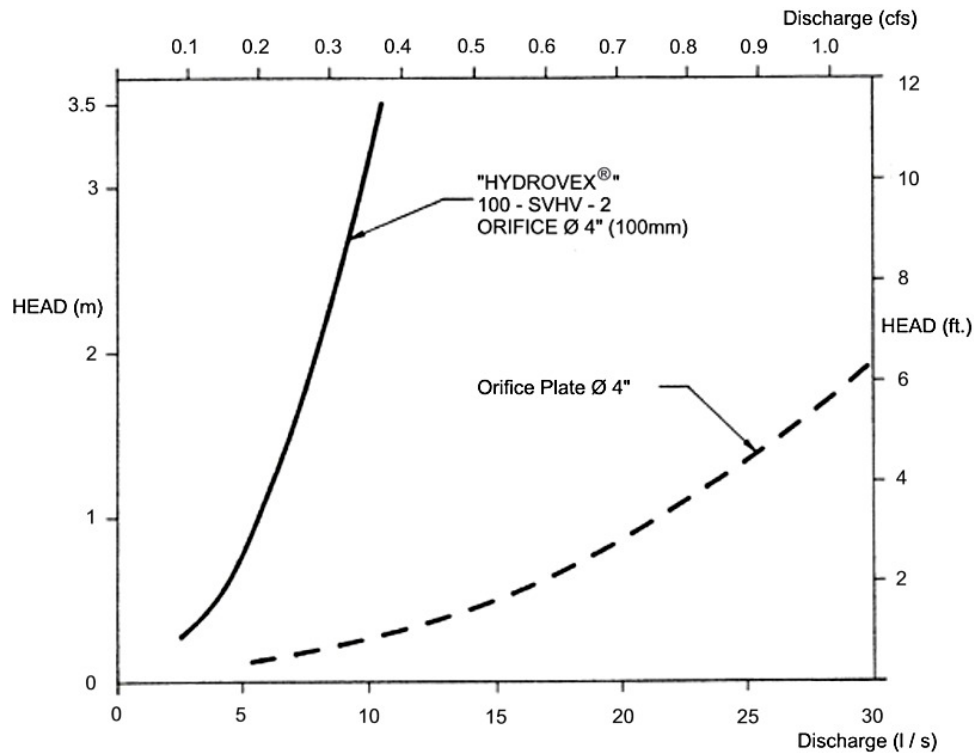


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

Selection of a **VHV** or **SVHV** regulator can be easily made using the selection charts found at the back of this brochure (see **Figure 3**). These charts are a graphical representation of the maximum upstream water pressure (head) and the maximum discharge at the manhole outlet. The maximum design head is the difference between the maximum upstream water level and the invert of the outlet pipe. All selections should be verified by John Meunier Inc. personnel prior to fabrication.

Example:

- ✓ Maximum design head 2m (6.56 ft.)
- ✓ Maximum discharge 6 L/s (0.2 cfs)
- ✓ Using **Figure 3** - VHV model required is a **75 VHV-1**

INSTALLATION REQUIREMENTS

All **HYDROVEX® VHV / SVHV** flow regulators can be installed in circular or square manholes. **Figure 4** gives the various minimum dimensions required for a given regulator. *It is imperative to respect the minimum clearances shown to ensure easy installation and proper functioning of the regulator.*

SPECIFICATIONS

In order to specify a **HYDROVEX**[®] regulator, the following parameters must be defined:

- The model number (ex: 75-VHV-1)
- The diameter and type of outlet pipe (ex: 6" diam. SDR 35)
- The desired discharge (ex: 6 l/s or 0.21 CFS)
- The upstream head (ex: 2 m or 6.56 ft.) *
- The manhole diameter (ex: 36" diam.)
- The minimum clearance "H" (ex: 10 inches)
- The material type (ex: 304 s/s, 11 Ga. standard)

* *Upstream head is defined as the difference in elevation between the maximum upstream water level and the invert of the outlet pipe where the **HYDROVEX**[®] flow regulator is to be installed.*

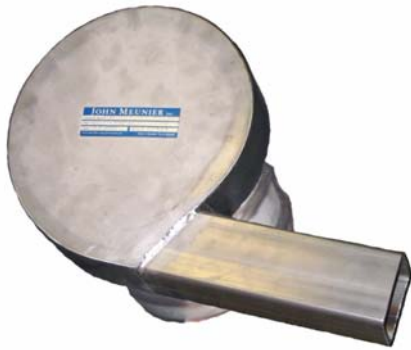
PLEASE NOTE THAT WHEN REQUESTING A PROPOSAL, WE SIMPLY REQUIRE THAT YOU PROVIDE US WITH THE FOLLOWING:

- *project design flow rate*
- *pressure head*
- *chamber's outlet pipe diameter and type*



Typical VHV model in factory

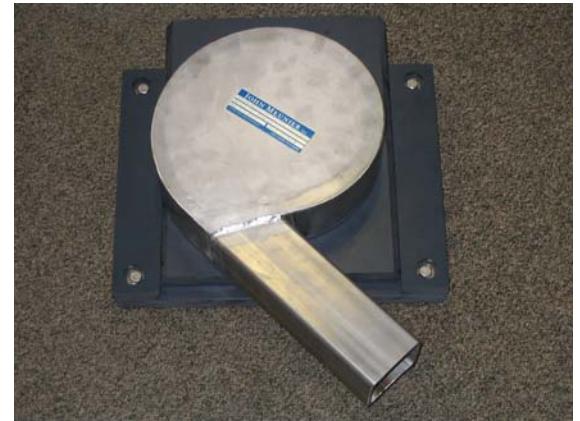
OPTIONS



VHV-1-O (standard model with odour control inlet)



FV – SVHV (mounted on sliding plate)



FV – VHV-O (mounted on sliding plate with odour control inlet)



VHV with Gooseneck assembly in existing chamber without minimum release at the bottom



VHV with air vent for minimal slopes



VHV Vertical Vortex Flow Regulator

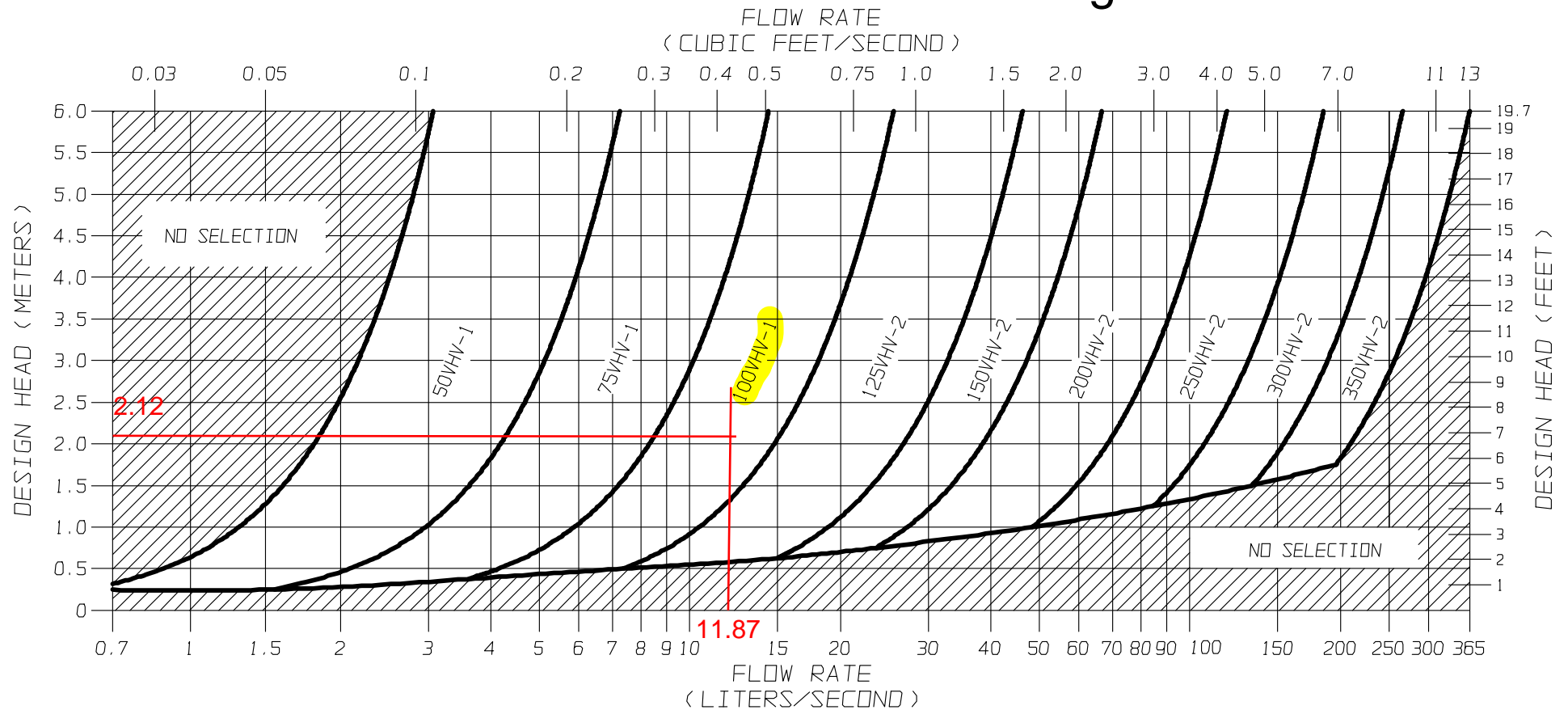
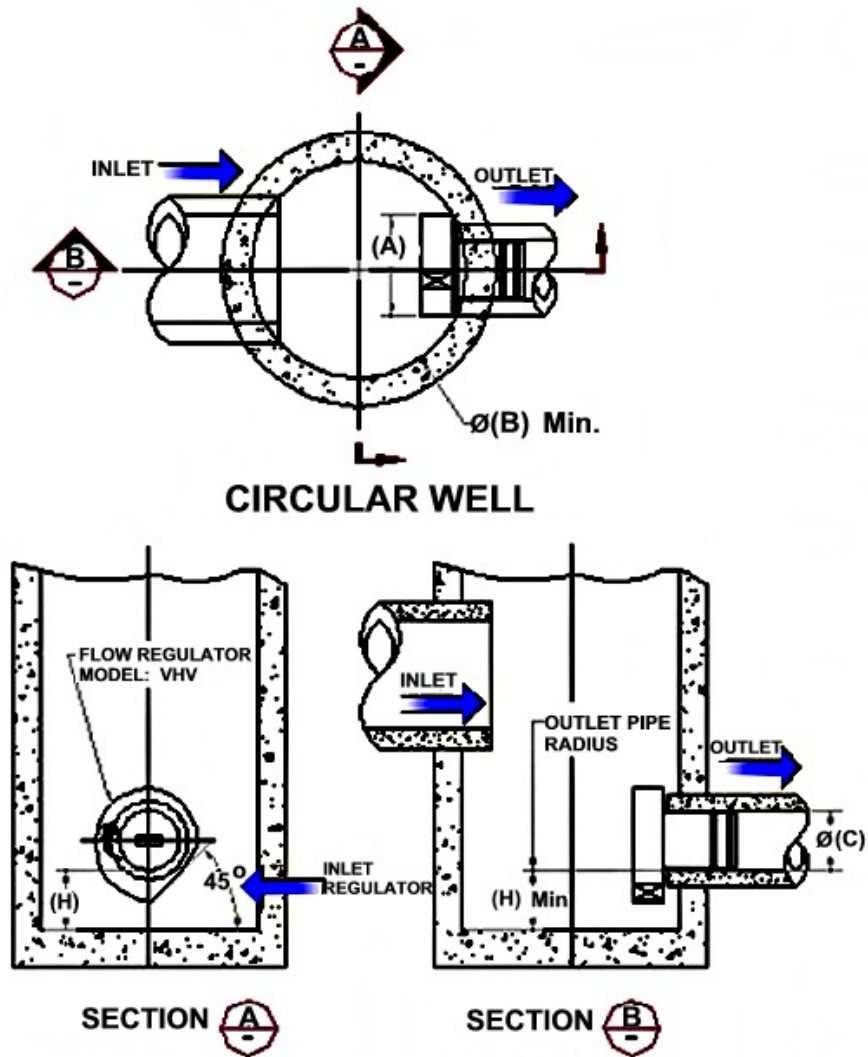


FIGURE 3 - VHV

JOHN MEUNIER

FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL VHV)

Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	A (in.)	B (mm)	B (in.)	C (mm)	C (in.)	H (mm)	H (in.)
50VHV-1	150	6	600	24	150	6	150	6
75VHV-1	250	10	600	24	150	6	150	6
100VHV-1	325	13	900	36	150	6	200	8
125VHV-2	275	11	900	36	150	6	200	8
150VHV-2	350	14	900	36	150	6	225	9
200VHV-2	450	18	1200	48	200	8	300	12
250VHV-2	575	23	1200	48	250	10	350	14
300VHV-2	675	27	1600	64	250	10	400	16
350VHV-2	800	32	1800	72	300	12	500	20



INSTALLATION

The installation of a **HYDROVEX**[®] regulator may be undertaken once the manhole and piping is in place. Installation consists of simply fitting the regulator into the outlet pipe of the manhole. **John Meunier Inc.** recommends the use of a lubricant on the outlet pipe, in order to facilitate the insertion and orientation of the flow controller.

MAINTENANCE

HYDROVEX[®] regulators are manufactured in such a way as to be maintenance free; however, a periodic inspection (every 3-6 months) is suggested in order to ensure that neither the inlet nor the outlet has become blocked with debris. The manhole should undergo periodically, particularly after major storms, inspection and cleaning as established by the municipality

GUARANTY

The **HYDROVEX**[®] line of **VHV / SVHV** regulators are guaranteed against both design and manufacturing defects for a period of 5 years. Should a unit be defective, **John Meunier Inc.** is solely responsible for either modification or replacement of the unit.

John Meunier Inc.

ISO 9001 : 2008

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Stormceptor®EF Sizing Report

Imbrium® Systems

ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

02/07/2024

Province:	Ontario	Project Name:	3996 Innes Rd, Ottawa
City:	Ottawa	Project Number:	230737
Nearest Rainfall Station:	OTTAWA CDA RCS	Designer Name:	Jessica Steffler
Climate Station Id:	6105978	Designer Company:	Forterra Pipe & Precast
Years of Rainfall Data:	20	Designer Email:	jessica.steffler@RinkerPipe.com
		Designer Phone:	519-239-6958
Site Name:	3996 Innes Rd, Ottawa	EOR Name:	Mohan Basnet
		EOR Company:	LRL Engineering
Drainage Area (ha):	0.13	EOR Email:	mbasnet@lrl.ca
Runoff Coefficient 'c':	0.85	EOR Phone:	613-229-6819
Particle Size Distribution:	Fine		
Target TSS Removal (%):	80.0		
Required Water Quality Runoff Volume Capture (%):	90.00		
Estimated Water Quality Flow Rate (L/s):	3.57		
Oil / Fuel Spill Risk Site?	Yes		
Upstream Flow Control?	Yes		
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	12.61		
Peak Conveyance (maximum) Flow Rate (L/s):			
Influent TSS Concentration (mg/L):	200		
Estimated Average Annual Sediment Load (kg/yr):	151		
Estimated Average Annual Sediment Volume (L/yr):	123		

Net Annual Sediment (TSS) Load Reduction Sizing Summary	
Stormceptor Model	TSS Removal Provided (%)
EFO4	97
EFO6	99
EFO8	100
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model:	EFO4
Estimated Net Annual Sediment (TSS) Load Reduction (%):	97
Water Quality Runoff Volume Capture (%):	> 90

Stormceptor®EF Sizing Report

THIRD-PARTY TESTING AND VERIFICATION

► **Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

► **Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

► The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor®EF Sizing Report

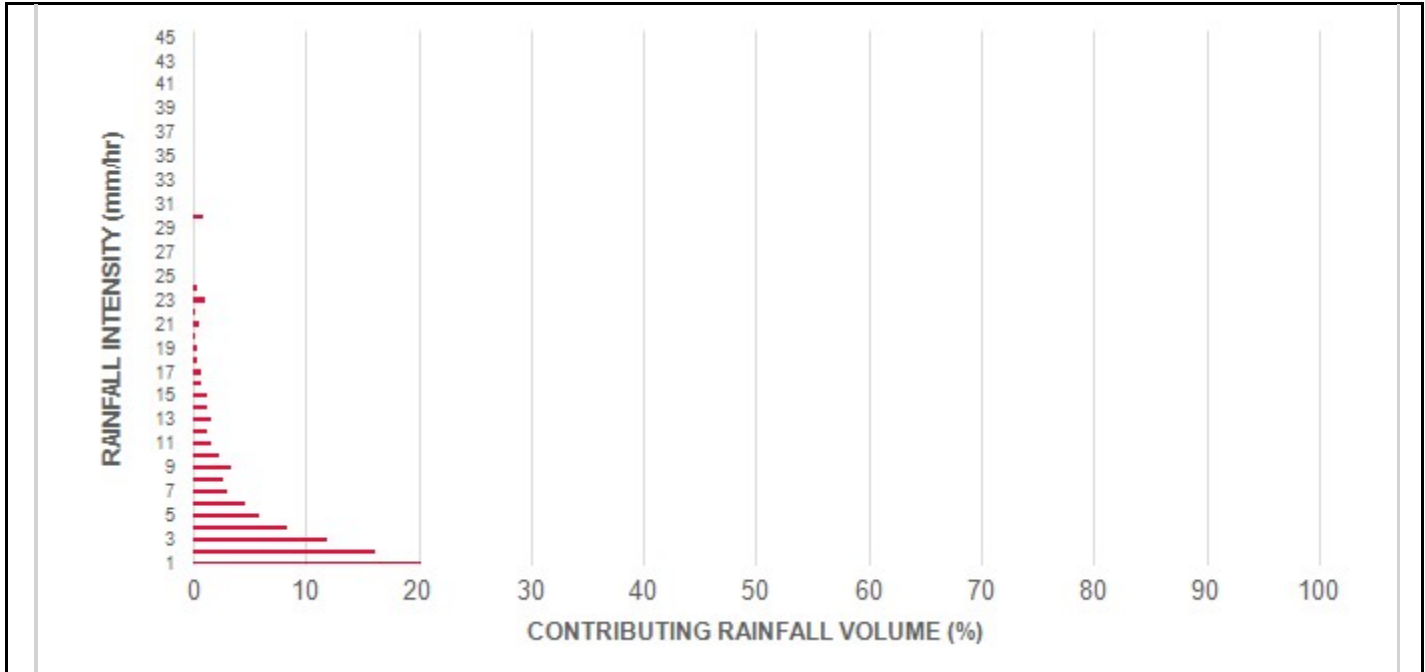
Upstream Flow Controlled Results

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.15	9.0	8.0	100	8.6	8.6
1.00	20.3	29.0	0.31	18.0	15.0	100	20.3	29.0
2.00	16.2	45.2	0.61	37.0	31.0	100	16.2	45.2
3.00	12.0	57.2	0.92	55.0	46.0	100	12.0	57.2
4.00	8.4	65.6	1.23	74.0	61.0	100	8.4	65.6
5.00	5.9	71.6	1.54	92.0	77.0	100	5.9	71.6
6.00	4.6	76.2	1.84	111.0	92.0	97	4.5	76.1
7.00	3.1	79.3	2.15	129.0	108.0	96	2.9	79.0
8.00	2.7	82.0	2.46	147.0	123.0	93	2.6	81.6
9.00	3.3	85.3	2.76	166.0	138.0	92	3.1	84.6
10.00	2.3	87.6	3.07	184.0	154.0	89	2.1	86.7
11.00	1.6	89.2	3.38	203.0	169.0	88	1.4	88.1
12.00	1.3	90.5	3.69	221.0	184.0	86	1.1	89.2
13.00	1.7	92.2	3.99	240.0	200.0	83	1.4	90.6
14.00	1.2	93.5	4.30	258.0	215.0	83	1.0	91.6
15.00	1.2	94.6	4.61	276.0	230.0	82	0.9	92.6
16.00	0.7	95.3	4.92	295.0	246.0	81	0.6	93.2
17.00	0.7	96.1	5.22	313.0	261.0	80	0.6	93.7
18.00	0.4	96.5	5.53	332.0	276.0	80	0.3	94.1
19.00	0.4	96.9	5.84	350.0	292.0	79	0.3	94.4
20.00	0.2	97.1	6.14	369.0	307.0	78	0.2	94.6
21.00	0.5	97.5	6.45	387.0	323.0	78	0.4	94.9
22.00	0.2	97.8	6.76	405.0	338.0	77	0.2	95.1
23.00	1.0	98.8	7.07	424.0	353.0	76	0.8	95.9
24.00	0.3	99.1	7.37	442.0	369.0	76	0.2	96.1
25.00	0.9	100.0	7.68	461.0	384.0	75	0.7	96.8
30.00	0.9	100.9	9.22	553.0	461.0	71	0.7	97.4
35.00	-0.9	100.0	10.75	645.0	538.0	68	N/A	96.8
40.00	0.0	100.0	12.29	737.0	614.0	65	0.0	96.8
45.00	0.0	100.0	13.00	780.0	650.0	64	0.0	96.8
Estimated Net Annual Sediment (TSS) Load Reduction =								97 %

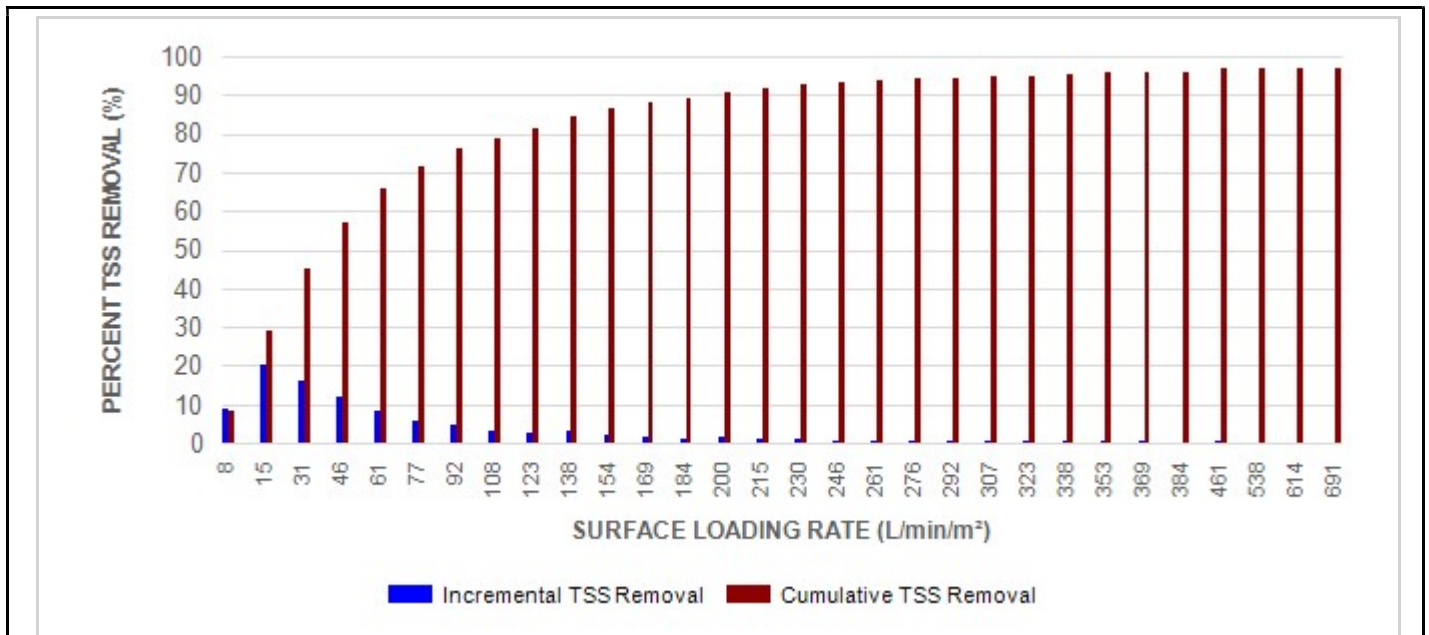
Climate Station ID: 6105978 Years of Rainfall Data: 20

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RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

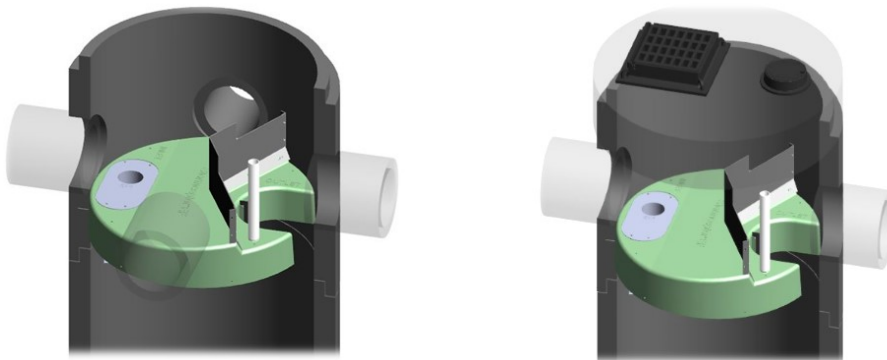
► **Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

DESIGN FLEXIBILITY

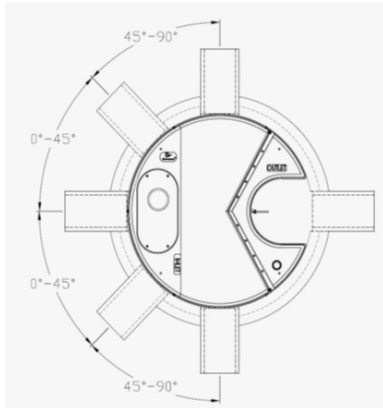
► **Stormceptor® EF and EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

► While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.



Stormceptor®EF Sizing Report



INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1.

For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit <http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef>

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit <http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef>



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STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m ³ sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m ³ sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m ³ sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m ³ sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m ³ sediment / 2,476 L oil

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PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m² to 1400 L/min/m², and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m² and 1400 L/min/m² shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m² shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m². No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m².

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m² shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m², and shall be calculated using a simple proportioning formula, with 1400 L/min/m² in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m².

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in

Stormceptor®EF Sizing Report

accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**.

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m².

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators**, with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m² to 2600 L/min/m²) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

APPENDIX E
Civil Engineering Drawings

GENERAL NOTES

1. ALL WORKS MATERIALS SHALL CONFIRM TO THE LAST REVISION OF THE STANDARDS AND SPECIFICATIONS FOR THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), WHERE APPLICABLE. LOCAL UTILITY STANDARDS AND MINISTRY OF TRANSPORTATION STANDARDS WILL APPLY WHERE REQUIRED.
2. THE CONTRACTORS SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTORS SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION , TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION, ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTORS TO CONFIRM UTILITY LOCATIONS AND POSSIBLY ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT CONTRACTORS EXPENSE.
4. ANY AREA BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE. RELOCATING OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR DETECTED BY THE ENGINEER AT THE EXPENSE OF DEVELOPERS.
5. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 'OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS'. THE GENERAL CONTRACTORS SHALL BE DEEMED TO BE THE 'CONTRACTOR' AS DEFINED IN THE ACT.
6. ALL THE CONSTRUCTION SIGNAGE MUST CONFIRM TO THE MINISTRY OF TRANSPORTATION OF ONTARIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES PER LATEST AMENDMENT.
7. THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THE CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES TO PREVENT CONFLICTS.
8. ALL DIMENSIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
9. THERE WILL BE NO SUBSTITUTION OF MATERIALS UNLESS PRIOR WRITTEN APPROVAL IS RECEIVED FROM THE ENGINEER.
10. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL REPORT.
11. FOR DETAILS RELATING TO STORMWATER MANAGEMENT AND ROOF DRAINAGE REFER TO THE SITE SERVICES AND STORMWATER MANAGEMENT REPORT.
12. ALL SEWERS CONSTRUCTED WITH GRADES LESS THAN 1.0% SHALL BE INSTALLED USING LASER ALIGNMENT AND CHECKED WITH LEVEL INSTRUMENT PRIOR TO BACKFILLING.
13. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND TO BEAR THE COST OF THE SAME.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADDITIONAL BEDDING, OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH AS SPECIFIED BY OPSD IS EXCEEDED.
15. ALL PIPE/CULVERT SECTION SIZES REFER TO INSIDE DIMENSIONS.
16. SHOULD DEEPLY BURIED ARCHAEOLOGICAL REMAINS BE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES, THE HERITAGE OPERATIONS UNIT OF THE ONTARIO MINISTRY OF CULTURE MUST BE NOTIFIED IMMEDIATELY.
17. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO ANY TREE CUTTING/REMOVAL.
18. DRAWINGS SHALL BE READ ON CONJUNCTION WITH ARCHITECTURAL SITE PLAN.
19. THE CONTRACTOR SHALL PROVIDE THE PROJECT ENGINEER ON SET OF AS CONSTRUCTED SITE SERVICING AND GRADING DRAWINGS.
20. BENCHMARKS: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE SITE BENCHMARK(S) HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION DEPICTED ON THIS PLAN.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL

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 .

THE CONTRACTOR ACKNOWLEDGES THAT SURFACE EROSION AND SEDIMENT RUNOFF RESULTING FROM THEIR CONSTRUCTION OPERATIONS HAS POTENTIAL TO CAUSE A DETRIMENTAL IMPACT TO ANY DOWNSTREAM WATERCOURSE OR SEWER, AND THAT ALL CONSTRUCTION OPERATIONS THAT MAY IMPACT UPON WATER QUALITY SHALL BE CARRIED OUT IN MANNER THAT STRICTLY MEETS THE REQUIREMENT OF ALL APPLICABLE LEGISLATION AND REGULATIONS.

AS SUCH, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CARRYING OUT THEIR OPERATIONS, AND SUPPLYING AND INSTALLING ANY APPROPRIATE CONTROL MEASURES, SO AS TO PREVENT SEDIMENT LADEN RUNOFF ENTERING ANY SEWER OR WATERCOURSE WITHIN OR DOWNSTREAM OF THE WORKING AREA.

THE CONTRACTOR ACKNOWLEDGES THAT NO ONE MEASURE IS LIKELY TO BE 100% EFFECTIVELY FOR EROSION PROTECTION AND CONTROLLING SEDIMENT RUNOFF AND DISCHARGES FROM THE SITE. THEREFORE, WHERE NECESSARY THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES ARRANGED IN SUCH MANNER AS TO MITIGATE SEDIMENT RELEASE FROM THE CONSTRUCTION OPERATIONS AND ACHIEVE SPECIFIC MAXIMUM PERMITTED CRITERIA WHERE APPLICABLE. SUGGESTED ON-SITE MEASURES MAY INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING METHODS: SEDIMENT PONDS, FILTER BAGS, PUMP FILTERS, SETTLING TANKS, SILT FENCE, STRAW BALES, FILTER CLOTHS, CATCH BASIN FILTERS, CHECK DAMS AND/OR OTHER RECOGNIZED TECHNOLOGIES AND METHOD AVAILABLE AT THE TIME OF CONSTRUCTION. SPECIFIC MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF OPSS 577 WHERE APPROPRIATE, OR IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

WHERE, IN THE OPINION OF THE CONTRACT ADMINISTRATOR OR REGULATORY AGENCY, THE INSTALLED CONTROL MEASURES FAIL TO PERFORM ADEQUATELY, THE CONTRACTOR SHALL SUPPLY AND INSTALL ADDITIONAL OR ALTERNATIVE MEASURES AS DIRECTED BY THE CONTRACT ADMINISTRATOR OR REGULATORY AGENCY. AS SUCH, THE CONTRACTOR SHALL HAVE ADDITIONAL CONTROL MATERIALS ON SITE AT ALL TIME WHICH ARE EASILY ACCESSIBLE AND MAY BE IMPLEMENTED BY HIM AT THE MOMENTS NOTICE.

PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL SUBMIT TO THE CONTRACT ADMINISTRATOR SIX COPIES OF A DETAILED EROSION AND SEDIMENT CONTROL PLAN (ESCP). THE ESCP WILL CONSIST OF WRITTEN DESCRIPTION AND DETAILED DRAWINGS INDICATING THE ON-SITE ACTIVITIES AND MEASURES TO BE USED TO CONTROL EROSION AND SEDIMENT MOVEMENT FOR EACH STEP OF THE WORK.

CONTRACTOR'S RESPONSIBILITIES

THE CONTRACTOR SHALL ENSURE THAT ALL WORKERS, INCLUDING SUB-CONTRACTOR, IN THE WORKING ARE ARE AWARE OF THE IMPORTANCE OF THE EROSION AND SEDIMENT CONTROL MEASURES AND INFORMED OF THE CONSEQUENCES OF THE FAILURE TO COMPLY WITH THE REQUIREMENTS OF ALL REGULATORY AGENCIES.

THE CONTRACTOR SHALL PERIODICALLY, AND WHEN REQUESTED BY THE CONTRACT ADMINISTRATOR, CLEAN OUT ACCUMULATED SEDIMENT DEPOSITS AS REQUIRED AT THE SEDIMENT CONTROL DEVICES, INCLUDING THOSE DEPOSITS THAT MAY ORIGINATE FROM OUTSIDE THE CONSTRUCTION AREA. ACCUMULATED SEDIMENT SHALL BE REMOVED IN SUCH A MANNER THAT PREVENTS THE DEPOSITION OF THIS MATERIAL INTO THE SEWER WATERCOURSE AND AVOIDS DAMAGE TO CONTROL MEASURES. THE SEDIMENT SHALL BE REMOVED FROM THE SITE AT THE CONTRACTOR'S EXPENSE AND MANAGED IN COMPLIANCE WITH REQUIREMENTS FRO EXCESS EARTH MATERIAL, AS SPECIFIED ELSEWHERE IN THE CONTRACT.

THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE CONTRACT ADMINISTRATOR ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO EITHER THE WATERCOURSE OR THE STORM SEWER SYSTEM. FAILURE TO REPORT WILL BE CONSTITUTE A BRACH OF THIS SPECIFICATION AND THE CONTRACTOR MAY ALSO BE SUBJECT TO THE PENALTIES IMPOSED BY THE APPLICABLE REGULATORY AGENCY. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.

THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE CONTRACT ADMINISTRATOR, THE MEASURE OR MEASURES, IS NO LONGER REQUIRED. NO CONTROL MEASURE MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE CONTRACT ADMINISTRATOR. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED IN A MANNER THAT AVOIDS THE ENTRY OF ANY EQUIPMENT, OTHER THAN HAND-HELD EQUIPMENT, INTO ANY WATERCOURSE, AND PREVENTS THE RELEASE OF ANY SEDIMENT OR DEBRIS INTO ANY SEWER OR WATERCOURSE WITHIN OR DOWNSTREAM OF THE WORKING AREA. ALL ACCUMULATED SEDIMENT SHALL BE REMOVED FROM THE WORKING AREA AT THE CONTRACTOR'S EXPENSE AND MANAGED IN COMPLIANCE WITH THE REQUIREMENTS FOR EXCESS EARTH MATERIAL.

WHERE, IN THE OPINION OF EITHER THE CONTRACT ADMINISTRATOR OR A REGULATORY AGENCY, ANY OF THE TERMS SPECIFIED HEREIN HAVE NOT BEEN COMPLIED WITH OR PERFORMED IN A SUITABLE MANNER, OR YAT ALL, THE CONTRACTOR ADMINISTRATOR OR A REGULATORY AGENCY HAS THE RIGHT TO IMMEDIATELY WITHDRAW ITS PERMISSION TO CONTINUE THE WORK BUT MAY REVENY ITS PERMISSION UPON BEING SATISFIED THAT THE DEFAULTS OR DEFICIENCIES IN THE PERFORMANCE OF THIS SPECIFICATION BY THE CONTRACTOR HAVE BEEN REMEDIED.

SPILL CONTROL NOTES

1. ALL CONSTRUCTION EQUIPMENT SHALL BE RE-FUELED, MAINTAINED, AND STORED NO LESS THAN 30 METRES FROM WATERCOURSE, STREAMS, CREEKS, WOODLOTS, AND ANY ENVIRONMENTALLY SENSITIVE AREAS, OR AS OTHERWISE SPECIFIED.
2. THE CONTRACTOR MUST IMPLEMENT MEASURES TO PREVENT FUEL LEAKS, DISCHARGES OR SPILLS OF POLLUTANTS, DELETERIOUS MATERIALS, OR OTHER SUCH MATERIALS OR SUBSTANCES WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT.
3. IN THE EVENT OF A LEAK, DISCHARGE OR SPILL OF POLLUTANT, DELETERIOUS MATERIAL OR OTHER SUCH MATERIAL OR SUBSTANCE WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT, THE CONTRACTOR SHALL:
 - 3.1. IMMEDIATELY NOTIFY APPROPRIATE FEDERAL, PROVINCIAL, AND LOCAL GOVERNMENT MINISTRIES, DEPARTMENTS, AGENCIES, AND AUTHORITIES OF THE INCIDENT IN ACCORDANCE WITH ALL CURRENT LAWS, LEGISLATION, ACTS, BY-LAWS, PERMITS, APPROVALS, ETC.
 - 3.2. TAKE IMMEDIATE MEASURES TO CONTAIN THE MATERIAL OR SUBSTANCE, AND TO TAKE SUCH MEASURES TO MITIGATE AGAINST ADVERSE IMPACTS TO THE NATURAL ENVIRONMENT.
 - 3.3. RESTORE THE AFFECTED AREA TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION.

MUD MAT NOTES

1. THE GRANULAR MATERIAL WILL REQUIRE PERIODIC REPLACEMENT AS IT BECOMES CONTAMINATED BY VEHICLE TRAFFIC.
2. SEDIMENT SHALL BE CLEANED FROM PUBLIC ROADS AT THE END OF EACH DAY.
3. SEDIMENT SHALL BE REMOVED FROM PUBLIC ROADS BY SHOVELING OR SWEEPING AND DISPOSED OR PROPERLY IN A CONTROLLED SEDIMENT DISPOSAL AREA.

SITE GRADING NOTES

1. PRIOR TO THE COMMENCEMENT OF THE SITE GRADING WORKS, ALL SILTATION CONTROL DEVICES SHALL BE INSTALLED AND OPERATIONAL PER EROSION CONTROL PLAN.
2. ALL GRANULAR AND PAVEMENT FOR ROADS/PARKING AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH GEOTECHNICAL ENGINEERS RECOMMENDATIONS.
3. ALL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD AND PARKING AREAS ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
4. CONCRETE CURB SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. SC1.1 PROVISION SHALL BE MADE OR CURB DEPRESSIONS AS INDICATED ON ARCHITECTURAL SITE PLAN. CONCRETE SIDEWALK SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD SC1.4. ALL CURBS, CONCRETE ISLANDS, AND SIDEWALKS SHOWN O THIS DRAWING ARE TO BR PRICED IN SITE WORKS PORTION OF THE CONTRACT.
5. PAVEMENT FOR REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. R10 AND OPSD 509.010 AND OPSS 310.
6. GRANULAR 'A' SHALL BE PLACED TO A MINIMUM THICKNESS OF 30MM AROUND ALL STRUCTURES WITHIN THE PAVEMENT AREA.
7. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 30MM LIFTS.
8. ALL WORK ON THE MUNICIPAL RIGHT OF WAY AND EASEMENTS TO BE INSPECTED BY THE MUNICIPALITY PRIOR BACKFILLING.
9. CONTRACTOR TO OBTAIN A ROAD OCCUPANCY PERMIT 48 HOURS PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL ROAD ALLOWANCE, IF REQUIRED BY THE MUNICIPALITY.
10. ALL PAVEMENT MARKING FEATURES AND SITE SIGNAGE SHALL BE PLACED PER ARCHITECTURAL SITE PLAN. LINE PAINTINGS AND DIRECTIONAL SYMBOLS SHALL BE APPLIED WITH A MINIMUM OF TWO COATS OF ORGANIC SOLVENT PAINT.
11. REFER TO ARCHITECTURAL SITE PLAN FOR DIMENSIONS AND SITE DETAILS.
12. STEP JOINTS ARE TO BE USED WHERE PROPOSED ASPHALT MEETS EXISTING ASPHALT. ALL JOINTS MUST BE SEALED.
13. SIDEWALKS TO BE 13MM X BEVELED AT 2:1 OR 6MM WITH NO BEVEL REQUIRED BELOW THE FINISHED FLOOR SLAB ELEVATION AT ENTRANCES REQUIRED TO BE BARRIER-FREE, UNLESS OTHERWISE NOTED. ALL IN ACCORDANCE WITH OBC 3.8.1.3 & OTTAWA ACCESSIBILITY DESIGN STANDARDS.
14. WHERE APPLICABLE THE CONTRACTOR IS TO SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. SHOP DRAWINGS MUST BE SITE SPECIFIC, SIGNED AND SEALED BY A LICENSED STRUCTURAL ENGINEER. THE CONTRACTOR WILL ALSO BE REQUIRED TO SUPPLY AND GEOTECHNICAL CERTIFICATION OF THE AS-CONSTRUCTED RETAINING WALL TO THE ENGINEER PRIOR TO FINAL ACCEPTANCE.

ROADWORK SPECIFICATIONS

1. ROADWORK TO BE COMPLETED IN ACCORDANCE WITH GEOTECHNICAL REPORT, PREPARED BY LRL ASSOCIATES, DATED NOVEMBER 2020.
2. AL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND STOCK PILED ON SITE AS DIRECTED BY NATIONAL MUNICIPALITY.
3. THE SUBGRADE SHALL BE CROWNED AND SLOPED AT LEAST 2% AND PROOF ROLLED WITH HEAVY ROLLERS.
4. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'A', TYPE II COMPACTED IN MAXIMUM 300MM LIFTS.
5. ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO MINIMUM OF 100% STANDARD PROCTOR DENSITY MAXIMUM DRY DENSITY (SPMD0).
20. CONCRETE RAMP C/W TACTILE WALKING SURFACE INDICATORS COMPONENT AS PER OPSD 310.039. TACTILE WALKING SURFACE INDICATORS TO BE INSTALLED AT ALL RAMPS. MATERIAL TO BE POLYMER COMPOSITE, COLOR GREY.

SANITARY, FOUNDATION DRAIN, STORM SEWER AND WATERMAIN NOTES

GENERAL

1. LASER ALIGNMENT CONTROL TO BE UTILIZED ON ALL SEWER INSTALLATIONS.
2. CLAY SEALS TO BE INSTALLED AS PER CITY STANDARD DRAWING S6. THE SEALS SHOULD BE AT LEAST 1.5M LONG (IN THE TRENCH DIRECTION) AND SHOULD EXTEND FROM TRENCH WALL TO TRENCH WALL. THE SEALS SHOULD EXTEND FROM THE FRONT LINE AND FULLY PENETRATE THE BEDDING, SUB-BEDDING, AND COVER MATERIAL. THE BARRIERS SHOULD CONSIST OF RELATIVELY DRY AND COMPATIBLE BROWN SILTY CLAY PLACED IN MAXIMUM 225MM LIFTS AND COMPACTED TO A MINIMUM OF 95% SPMD0. THE CLAY SEALS SHOULD BE PLACED AT THE SITE BOUNDARIES AND AT 60M INTERVALS IN THE SERVICE TRENCHES.
3. SERVICES TO BUILDING TO BE TERMINATED 1.0M FROM THE OUTSIDE FACE OF BUILDING UNLESS OTHERWISE NOTED.
4. ALL MAINTENANCE STRUCTURE AND CATCH BASIN EXCAVATIONS TO BE BACKFILLED WITH GRANULAR MATERIAL COMPACTED TO 98% STANDARD PROCTOR DENSITY. A MINIMUM OF 300MM AROUND STRUCTURES.
5. 'MODULOG' OR APPROVED PRE-CAST MAINTENANCE STRUCTURE AND CATCH BASIN ADJUSTERS TO BE USED IN LIEU OF BRICKING. PARGE ADJUSTING UNITS ON THE OUTSIDE ONLY.
6. SAFETY PLATFORMS SHALL BE PER OPSD 404.02.
7. DROP STRUCTURES SHALL BE IN ACCORDANCE WITH OPSD 1003.01, IF APPLICABLE.
8. THE CONTRACTOR IS TO PROVIDE CCTV CAMERA INSPECTIONS OF ALL SEWERS, INCLUDING PICTORIAL REPORT, ONE (1) CD COPY AND TWO (2) VIDEO RECORDING IN A FORMAT ACCEPTABLE TO ENGINEER. ALL SEWERS ARE TO BE FLUSHED PRIOR TO CAMERA INSPECTION. ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS AND NECESSARY REPAIRS HAVE BEEN COMPLETED TO THE SATISFACTION OF THE ENGINEER.
9. CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPSS 407. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE CONSULTANT FOR REVIEW AND APPROVAL PRIOR TO PLACEMENT OF WEAR COURSE ASPHALT.

SANITARY

10. ALL SANITARY SEWER INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE CITY OF OTTAWA AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
11. ALL SANITARY GRAVITY SEWER SHALL BE PVC SDR 35, IPEX 'RING-TITE' (OR APPROVED EQUIVALENT) PER CSA STANDARD B182.2 OR LATEST AMENDMENT, UNLESS SPECIFIED OTHERWISE.
12. EXISTING MAINTENANCE STRUCTURES TO BE RE-BENCHED WHERE A NEW CONNECTION IS MADE.
13. SANITARY GRAVITY SEWER TRENCH AND BEDDING SHALL BE PER CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' BEDDING, UNLESS SPECIFIED OTHERWISE.
14. SANITARY MAINTENANCE STRUCTURE FRAME AND COVERS SHALL BE PER CITY OF OTTAWA STD. S24 AND S25.
15. SANITARY MAINTENANCE STRUCTURES SHALL BE BENCHED PER OPSD 701.021.
16. 100MM THICK HIGH-DENSITY GRADE 'A' POLYSTYRENE INSULATION TO BE INSTALLED IN ACCORDANCE WITH CITY STD W22 WHERE INDICATED ON DRAWING SSP-1.

STORM

17. ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2, OR LATEST AMENDMENT. ALL NON-REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1, OR LATEST AMENDMENT. PIPE SHALL BE JOINED WITH STD. RUBBER GASKETS AS PER CSA A257.2, OR LATEST AMENDMENT.
18. ALL STORM SEWER TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
19. ALL PVC STORM SEWERS ARE TO BE SDR 35 APPROVED PER C.S.A. B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE SPECIFIED.
20. CATCH BASIN SHALL BE IN ACCORDANCE WITH OPSD 705.010.
21. CATCH BASIN LEADS SHALL BE IN 200MM DIA. AT 1% SLOPE (MIN) UNLESS SPECIFIED OTHERWISE.
22. ALL CATCH BASINS SHALL HAVE 600MM SUMPS, UNLESS SPECIFIED OTHERWISE.
23. ALL CATCH BASIN LEAD INVERTS TO BE 1.5M BELOW FINISHED GRADE UNLESS SPECIFIED OTHERWISE.
24. THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED ABOVE. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED, THE CONTRACTOR IS REQUIRED TO PROVIDE AND SHALL BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.
25. ALL ROAD AND PARKING LOT CATCH BASINS TO BE INSTALLED WITH ORTHOGONALLY PLACED SUBDRAINS IN ACCORDANCE WITH DETAIL. PERFORATED SUBDRAIN FOR ROAD AND PARKING LOT CATCH BASIN SHALL BE INSTALLED PER CITY STD R1 UNLESS OTHERWISE NOTED.
26. PERFORATED SUBDRAIN FOR REAR YARD AND LANDSCAPING APPLICATIONS SHALL BE INSTALLED PER CITY STD S29, S30 AND S31, WHERE APPLICABLE.
27. RIP-RAP TREATMENT SEWER AND CULVERT OUTLETS PER OPSD 810.010.
28. ALL STORM SEWER/ CULVERTS TO BE INSTALLED WITH FROST TREATMENT PER OPSD 803.031 WHERE APPLICABLE.
29. ALL STORM MANHOLES WITH PIPE LESS THAN 900MM IN DIAMETER SHALL BE CONSTRUCTED WITH A 300MM SUMP AS PER SDG, CLAUSE 6.2.6.

WATERMAIN

30. ALL WATERMAIN INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE CITY OF OTTAWA AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
31. ALL PVC WATERMAINS SHALL BE AWWA C-600 CLASS 150, SDR 18 OR APPROVED EQUIVALENT.
32. ALL WATER SERVICES LESS THAN OR EQUAL TO 50MM IN DIAMETER TO BE TYPE 'K' COPPER.
33. WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17. UNLESS SPECIFIED OTHERWISE, BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER.
34. ALL PVC WATERMAINS, SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWOJ OR RWJ TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W.36.
35. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS PER CITY OF OTTAWA STD.25.5 AND W25.6.
36. VALVE BOXES SHALL BE INSTALLED PER CITY OF OTTAWA STD W24.
37. WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS PER CITY OF OTTAWA STD.25.5 AND W25.6.
38. THRUST BLOCKING OF WATERMAINS TO BE INSTALLED PER CITY OF OTTAWA STD. W25.3 AND W25.4.
39. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS, BLOW-OFFS, AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
40. WATERMAIN CROSSING OVER AND BELOW SEWERS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. W25.2 AND W25, RESPECTIVELY.
41. WATER SERVICES ARE TO BE INSULATED PER CITY STD. W23 WHERE SEPARATION BETWEEN SERVICES AND MAINTENANCE HOLES ARE LESS THAN 2.4M.
42. THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER/UTILITY IS 0.6M PER MCE GUIDELINES. FOR CROSSING UNDER SEWERS, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWER IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING TO ENSURE THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.
43. ALL WATERMAINS SHALL HAVE A MINIMUM COVER OR 2.4M, OTHERWISE THERMAL INSULATION IS REQUIRED AS PER STD DWG W22.
44. GENERAL WATER PLANT TO UTILITY CLEARANCE AS PER STD DWG R20.
45. FIRE HYDRANT INSTALLATION AS PER STD DWG W19, ALL BOTTOM OF HYDRANT FLANGE ELEVATIONS TO BE INSTALLED 0.10M ABOVE PROPOSED FINISHED GRADE AT HYDRANT. FIRE HYDRA ST LOCATION AS PER STD DWG W19.
46. BUILDING SERVICE TO BE CAPPED 1.0M OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED AND MUST BE RESTRAINED A MINIMUM OF 12M BACK FROM STUB.
47. ALL WATERMAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES UNLESS OTHERWISE DIRECTED. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED.
48. ALL WATERMAINS SHALL BE BACTERIOLOGICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES. ALL CHLORINATED WATER TO BE DISCHARGED AND PRETREATED TO ACCEPTABLE LEVELS PRIOR TO DISCHARGE. ALL DISCHARGED WATER MUST BE CONTROLLED AND TREATED SO AS NOT TO ADVERSELY EFFECT ENVIRONMENT. IT IS RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MUNICIPAL AND/OR PROVINCIAL REQUIREMENTS ARE FOLLOWED.
49. ALL WATERMAIN STUBS SHALL BE TERMINATED WITH A PLUG AND 50MM BLOW OFF UNLESS OTHERWISE NOTED.

USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE USE AND INTENT OF THE DRAWING. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR AGREEMENTS, CONDITIONS OF THE CONTRACT, THE SPECIFICATIONS, ADDENDA, AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT. THESE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ANY ONE SHALL BE BINDING AS IF REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND INSTALLED UNLESS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR CONFIRMS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

AS INSTRUMENTS OF SERVICE, ALL DRAWINGS, SPECIFICATIONS, CAD FILES OR OTHER ELECTRONIC MEDIA AND COPIED THERE OF FURNISHED BY THE ENGINEER ARE HIS PROPERTY. THEY ARE TO BE USED ONLY FOR THIS PROJECT AND ARE NOT TO BE USED ON ANY OTHER PROJECT, INCLUDING REPEATS OF THE PROJECT. CHANGES TO THE DRAWINGS MAY ONLY BE MADE BY THE ENGINEER.

UNLESS THE REVISION TITLE IS 'ISSUED FOR CONSTRUCTION', THESE DRAWINGS SHALL BE CONSIDERED PRELIMINARY AND SHALL NOT BE USED AS A CONSTRUCTION DOCUMENT.

THESE DRAWINGS ILLUSTRATES THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THESE DRAWINGS EXPRESSED OR IMPLIED CHANGES THIS CONDITION. CONTRACTOR SHALL DETERMINE ALL CONDITIONS AT THE SITE AND SHALL BE RESPONSIBLE FOR KNOWING HOW THEY AFFECT THE WORK. SUBMITTAL OF A BID TO PERFORM THIS WORK IS A KNOWLEDGEMENT OF THE RESPONSIBILITIES, AND THAT THEY HAVE BEEN FULLY CONSIDERED IN PLANNING OF THE WORK, AND THE BID PRICE, NO CLAIMS FOR EXTRA CHARGES DUE TO THESE CONDITIONS WILL BE FORTICOMING.

UNAUTHORIZED CHANGES

IN THE EVENT THE CLIENT, THE CLIENT'S CONTRACTORS OR SUBCONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY LRL ASSOCIATES LTD. (LRL) WITHOUT OBTAINING LRL'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

IN ADDITION, THE CLIENT AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS LRL FROM ANY DAMAGES, LIABILITIES OR COST, INCLUDING REASONABLE ATTORNEY'S FEES AND COST OF DEFENSE, ARISING FROM SUCH CHANGES.

IN ADDITION, THE CLIENT AGREES TO INCLUDE IN ANY CONTRACTS FOR CONSTRUCTION APPROPRIATE LANGUAGE THAT PROHIBITS THE CONTRACTOR OR ANY SUBCONTRACTORS OF ANY TIER FROM MAKING ANY CHANGES OR MODIFICATIONS TO LRL'S CONSTRUCTION DOCUMENTS WITHOUT THE PRIOR WRITTEN APPROVAL OF LRL AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH LRL AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

GENERAL NOTES

EXISTING SERVICES AND UTILITIES SHOWN ON THESE DRAWINGS ARE TAKEN FROM THE BEST AVAILABLE RECORDS, BUT MAY NOT BE COMPLETE OR TO DATE. CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF PIPES AND CHECK WITH THE UTILITY COMPANIES BEFORE DIGGING OR PERFORMING WORK.

CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS BEFORE START OF CONSTRUCTION.

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS AND THE DESIGN INTENT, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEERS GUIDELINES, OR FROM ANY ERRORS, OMISSIONS, INCONSISTENCIES AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED.

CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.



04	RE-ISSUED FOR APPROVAL	M.L.	06 NOV 2024
03	RE-ISSUED FOR APPROVAL	M.L.	19 JUL 2024
02	RE-ISSUED FOR APPROVAL	M.L.	29 MAY 2024
01	ISSUED FOR APPROVAL	M.L.	08 FEB 2024

No.	REVISIONS	BY	DATE
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NOT AUTHENTIC UNLESS SIGNED AND DATED



CLIENT		
LOU FRANGIAN		
DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

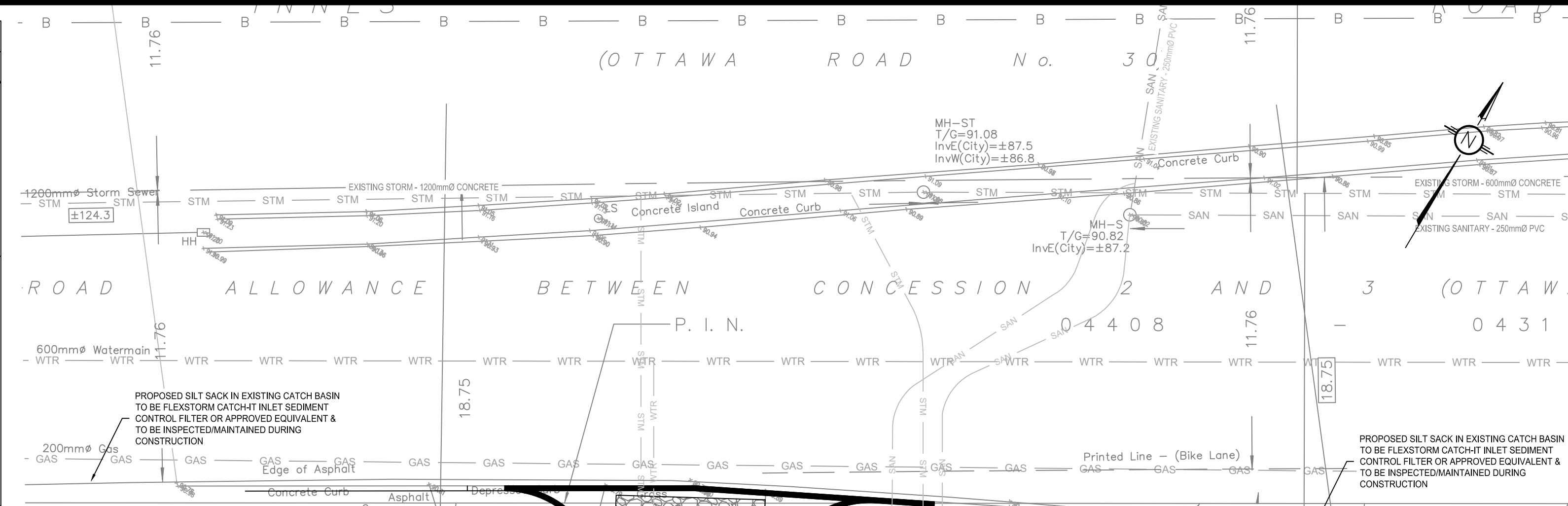
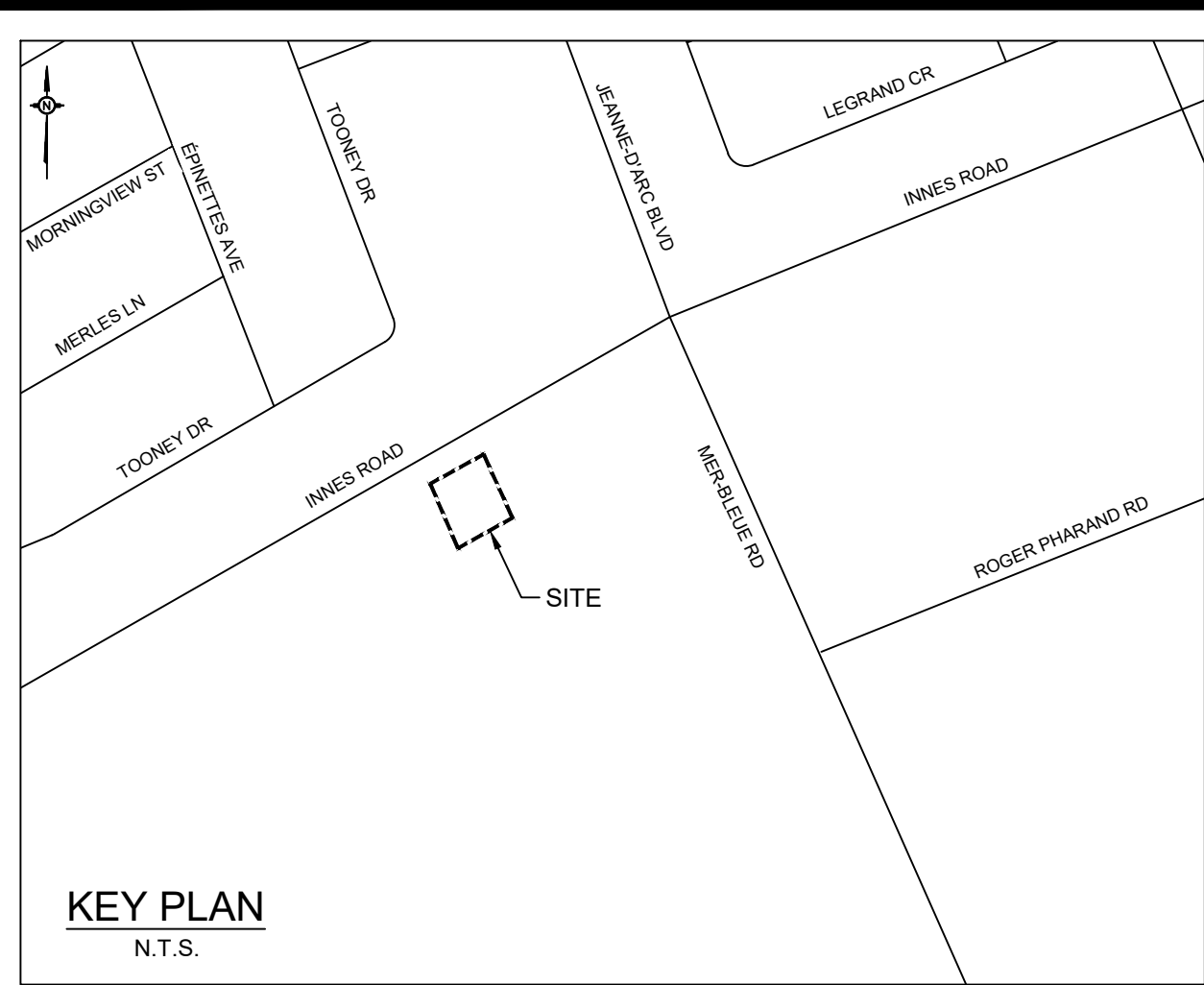
PROJECT		
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ORLEANS RESIDENTIAL & MEDICAL FACILITY
3996 INNES RD, OTTAWA, ON.

DRAWING TITLE

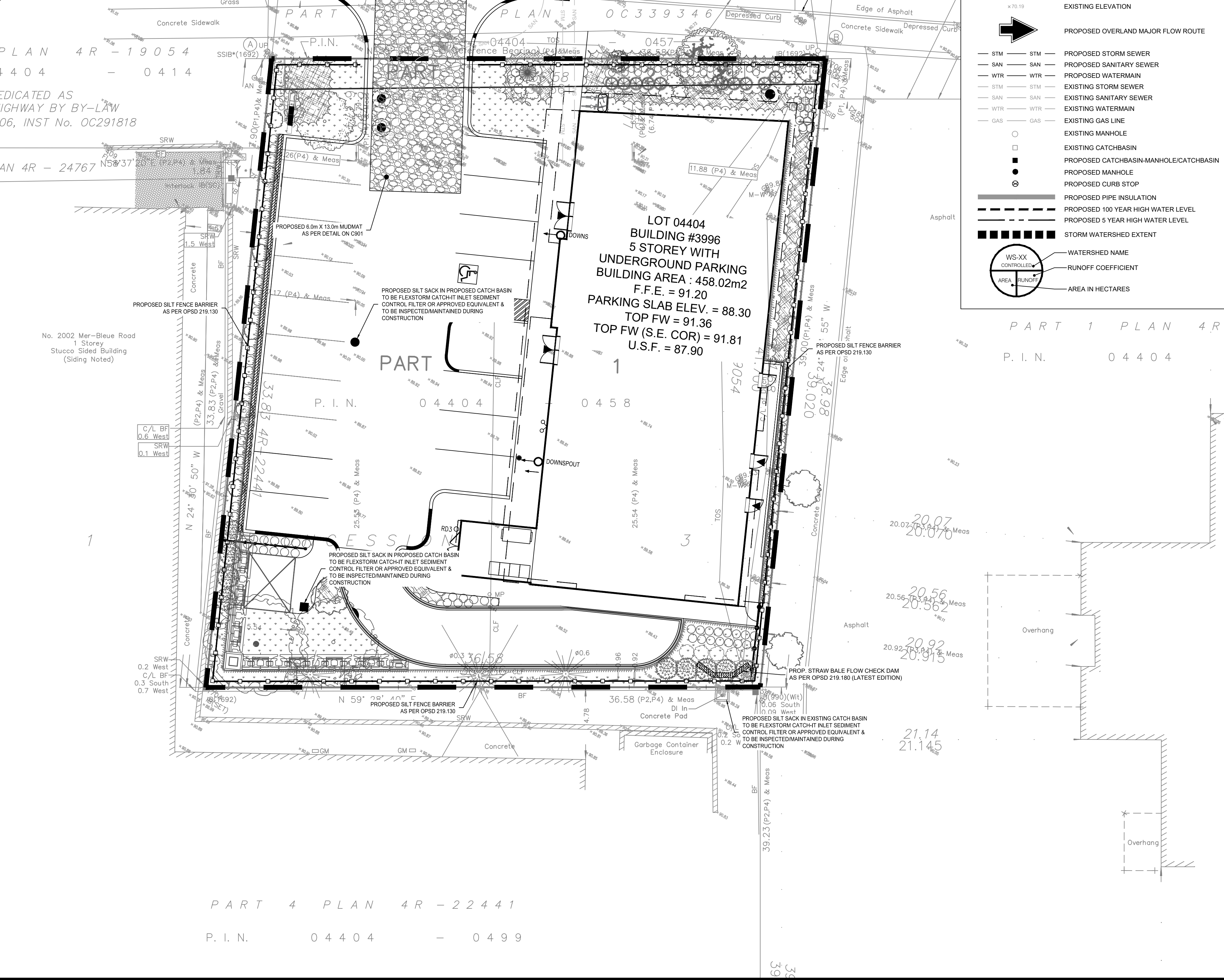
GENERAL NOTES

PROJECT NO: 230737	C001
DATE NOVEMBER 2023	



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.130
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED ELEVATION
- PROPOSED HIGH POINT ELEVATION
- PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- PROPOSED TOP OF CURB ELEVATION
- PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- PROPOSED TOP OF RETAINING WALL
- MATCH INTO EXISTING ELEVATION
- EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- PROPOSED 5 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES



USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE THE INTENT OF THE DRAWING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

IN ADDITION, THE CLIENT AGREES TO INCLUDE IN ANY CONTRACTS FOR CONSTRUCTION APPROPRIATE LANGUAGE THAT PROHIBITS THE CONTRACTOR OR ANY SUBCONTRACTORS OF ANY TIER FROM MAKING ANY CHANGES OR MODIFICATIONS TO LRL'S CONSTRUCTION DOCUMENTS WITHOUT THE PRIOR WRITTEN APPROVAL OF LRL AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH LRL AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

GENERAL NOTES:

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CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS BEFORE START OF CONSTRUCTION.

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED.

CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

3.0m 1.5 0 3.0 6.0m
SCALE: 1:150

SUBJECT FOR APPROVAL

No.	REVISIONS	BY	DATE
04	RE-ISSUED FOR APPROVAL	M.L.	06 NOV 2024
03	RE-ISSUED FOR APPROVAL	M.L.	19 JUL 2024
02	RE-ISSUED FOR APPROVAL	M.L.	29 MAY 2024
01	ISSUED FOR APPROVAL	M.L.	08 FEB 2024

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT: LOU FRANGIAN

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

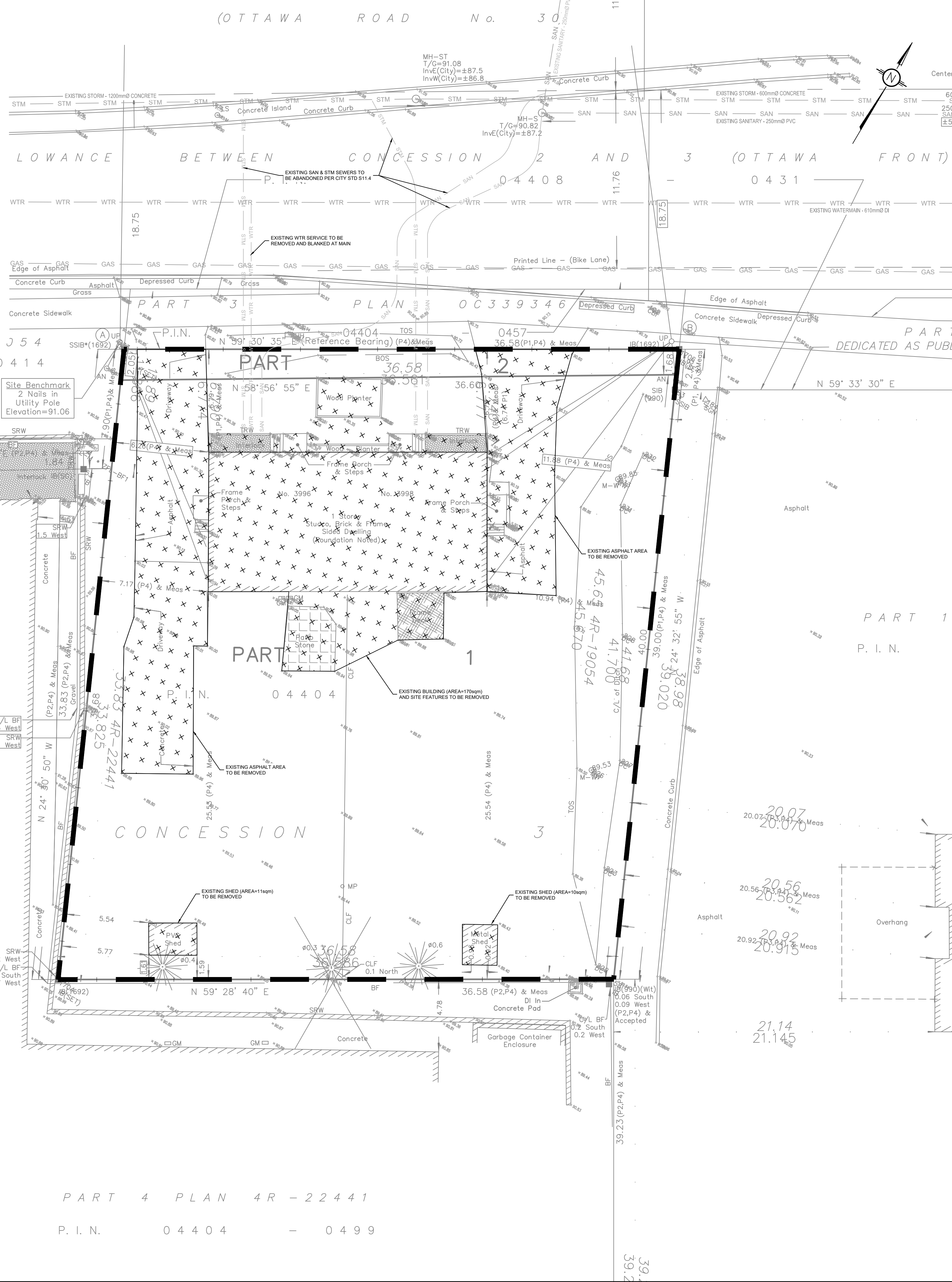
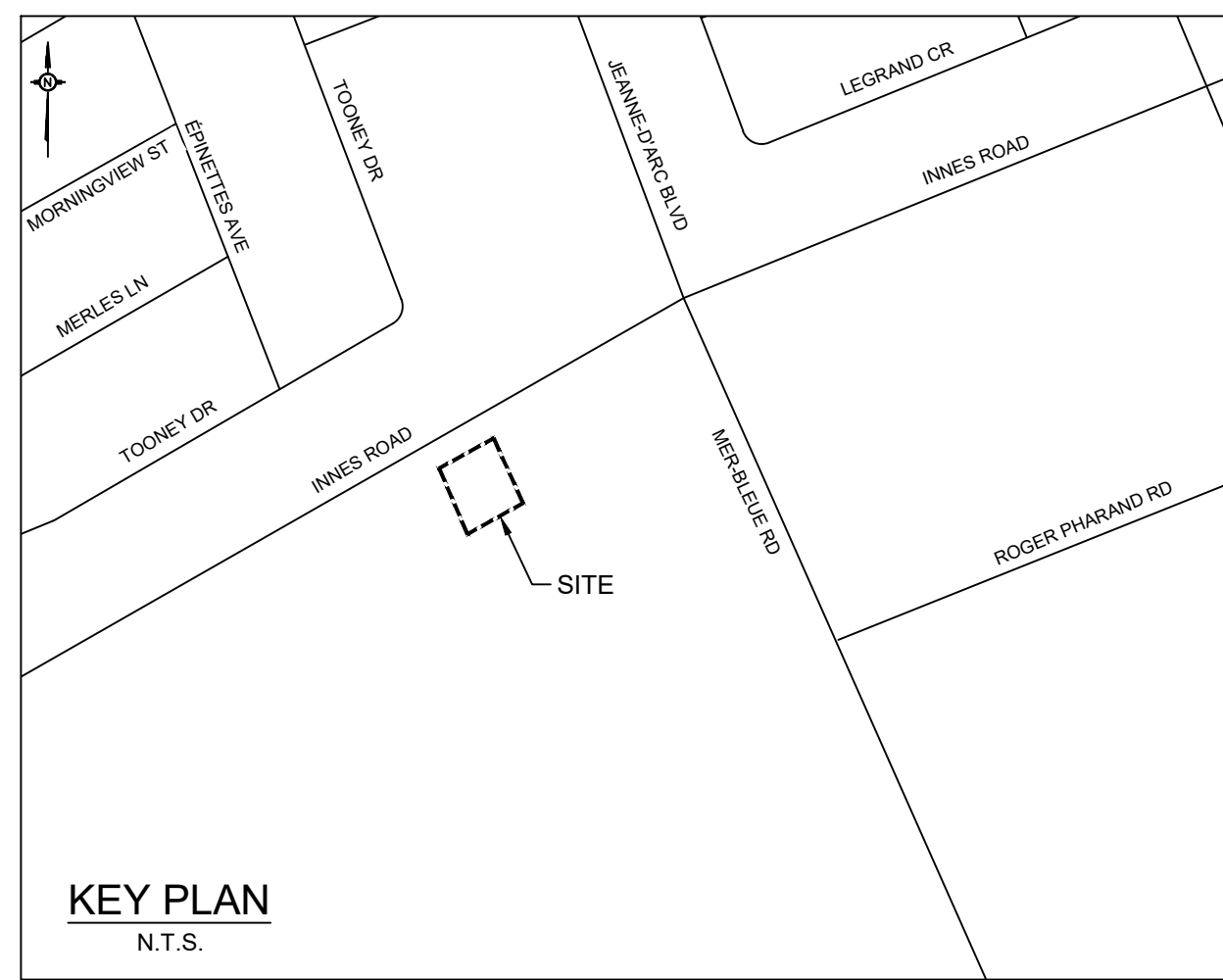
PROJECT: ORLEANS RESIDENTIAL & MEDICAL FACILITY
3996 INNES RD, OTTAWA, ON.

DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO: 230737
DATE: NOVEMBER 2023

C101

#18675



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.130
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED ELEVATION
- PROPOSED HIGH POINT ELEVATION
- PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- PROPOSED TOP OF CURB ELEVATION
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- MATCH INTO EXISTING ELEVATION
- EXISTING ELEVATION
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- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
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- EXISTING SANITARY SEWER
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- PROPOSED CURB STOP
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- PROPOSED 100 YEAR HIGH WATER LEVEL
- PROPOSED 5 YEAR HIGH WATER LEVEL
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- RUNOFF COEFFICIENT
- AREA IN HECTARES

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3.0m 1.5 0 3.0 6.0m
SCALE: 1:150

SUBJECT FOR APPROVAL

No.	REVISIONS	BY	DATE
04	RE-ISSUED FOR APPROVAL	M.L.	06 NOV 2024
03	RE-ISSUED FOR APPROVAL	M.L.	19 JUL 2024
02	RE-ISSUED FOR APPROVAL	M.L.	29 MAY 2024
01	ISSUED FOR APPROVAL	M.L.	08 FEB 2024

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT: LOU FRANGIAN

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT: ORLEANS RESIDENTIAL & MEDICAL FACILITY
3996 INNES RD, OTTAWA, ON.

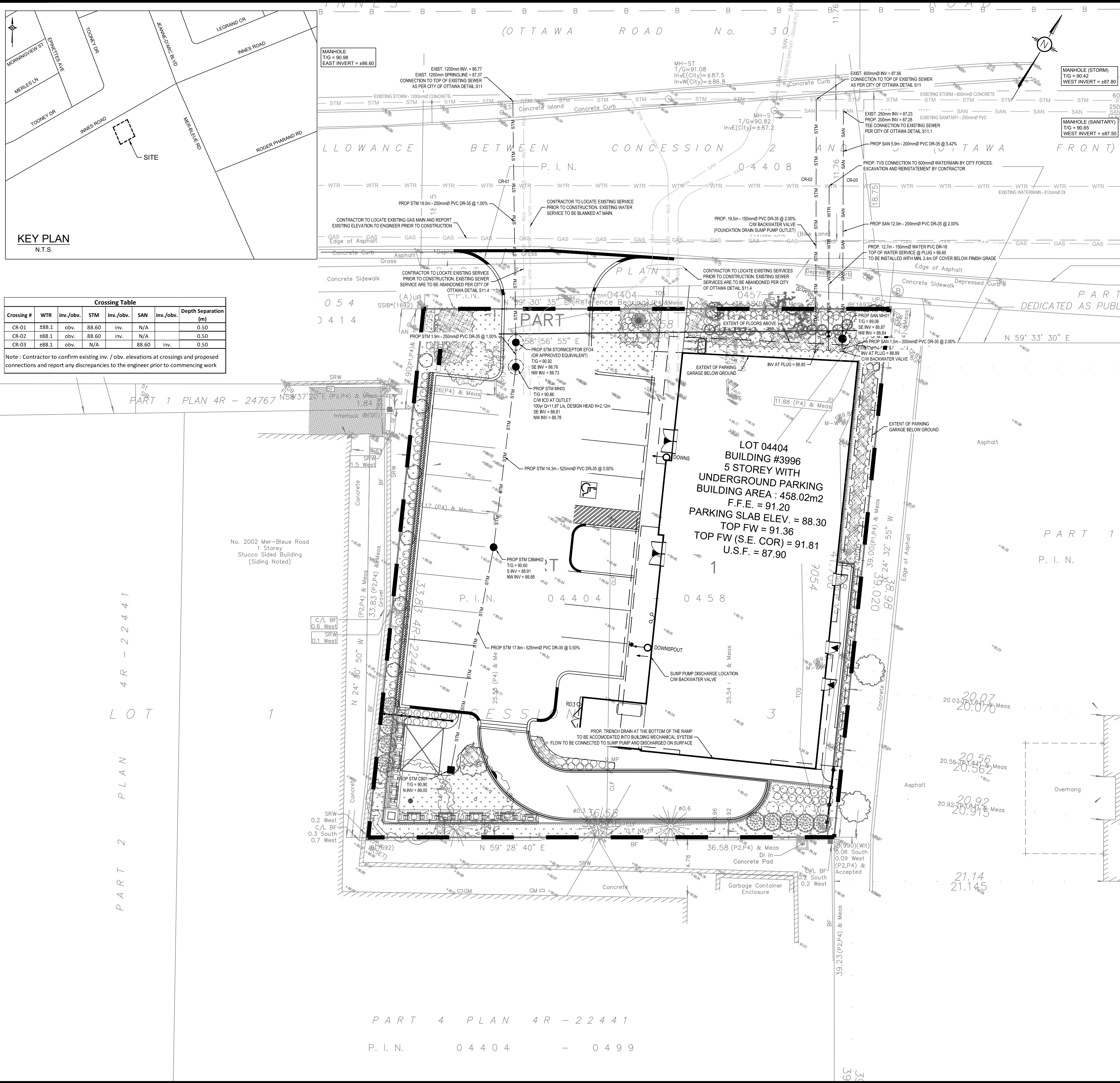
DRAWING TITLE: DEMOLITION PLAN

PROJECT NO: 230737
DATE: NOVEMBER 2023

C102

#18675

[illegible]



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.130
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3.0m 1.5 0 3.0 6.0m
SCALE: 1:150

SUBJECT FOR APPROVAL

No.	REVISIONS	BY	DATE
04	RE-ISSUED FOR APPROVAL	M.L.	06 NOV 2024
03	RE-ISSUED FOR APPROVAL	M.L.	19 JUL 2024
02	RE-ISSUED FOR APPROVAL	M.L.	29 MAY 2024
01	ISSUED FOR APPROVAL	M.L.	08 FEB 2024

No. 2002 Mer-Bleue Road
1 Storey
Stucco Sided Building
(Siding Noted)

No. 4030
1 Storey
Brick Sided Building
(Foundation Noted)

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

CLIENT: **LOU FRANGIAN**

DESIGNED BY: **M.L.** DRAWN BY: **M.L.** APPROVED BY: **M.B.**

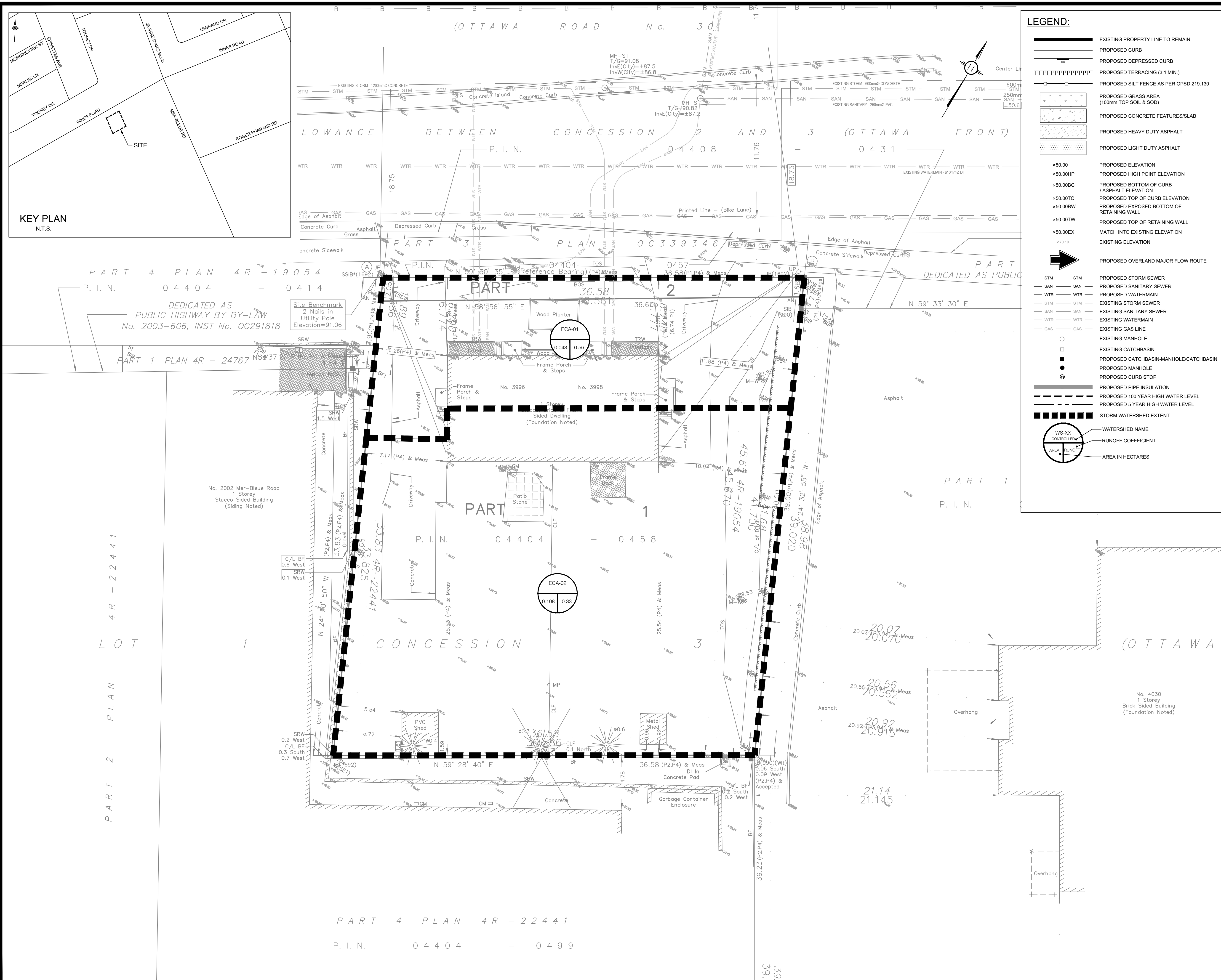
PROJECT: **ORLEANS RESIDENTIAL & MEDICAL FACILITY
3996 INNES RD, OTTAWA, ON.**

DRAWING TITLE: **SERVICING PLAN**

PROJECT NO: **230737**
DATE: **NOVEMBER 2023**

C401

#18675



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
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3.0m 1.5 0 3.0 6.0m
SCALE: 1:150

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No.	REVISIONS	BY	DATE
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NOT AUTHENTIC UNLESS SIGNED AND DATED

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CLIENT: **LOU FRANGIAN**

DESIGNED BY: **M.L.** DRAWN BY: **M.L.** APPROVED BY: **M.B.**

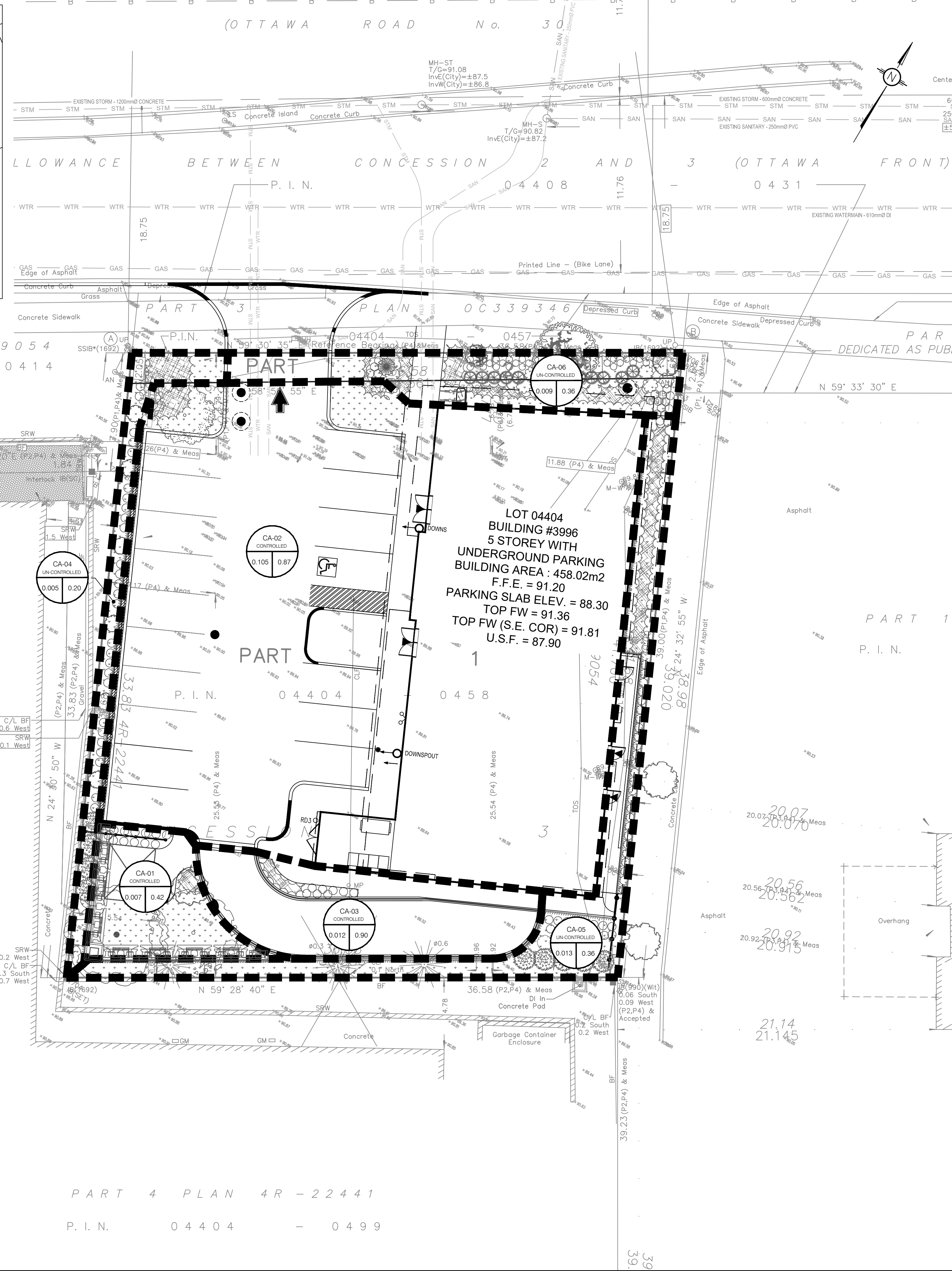
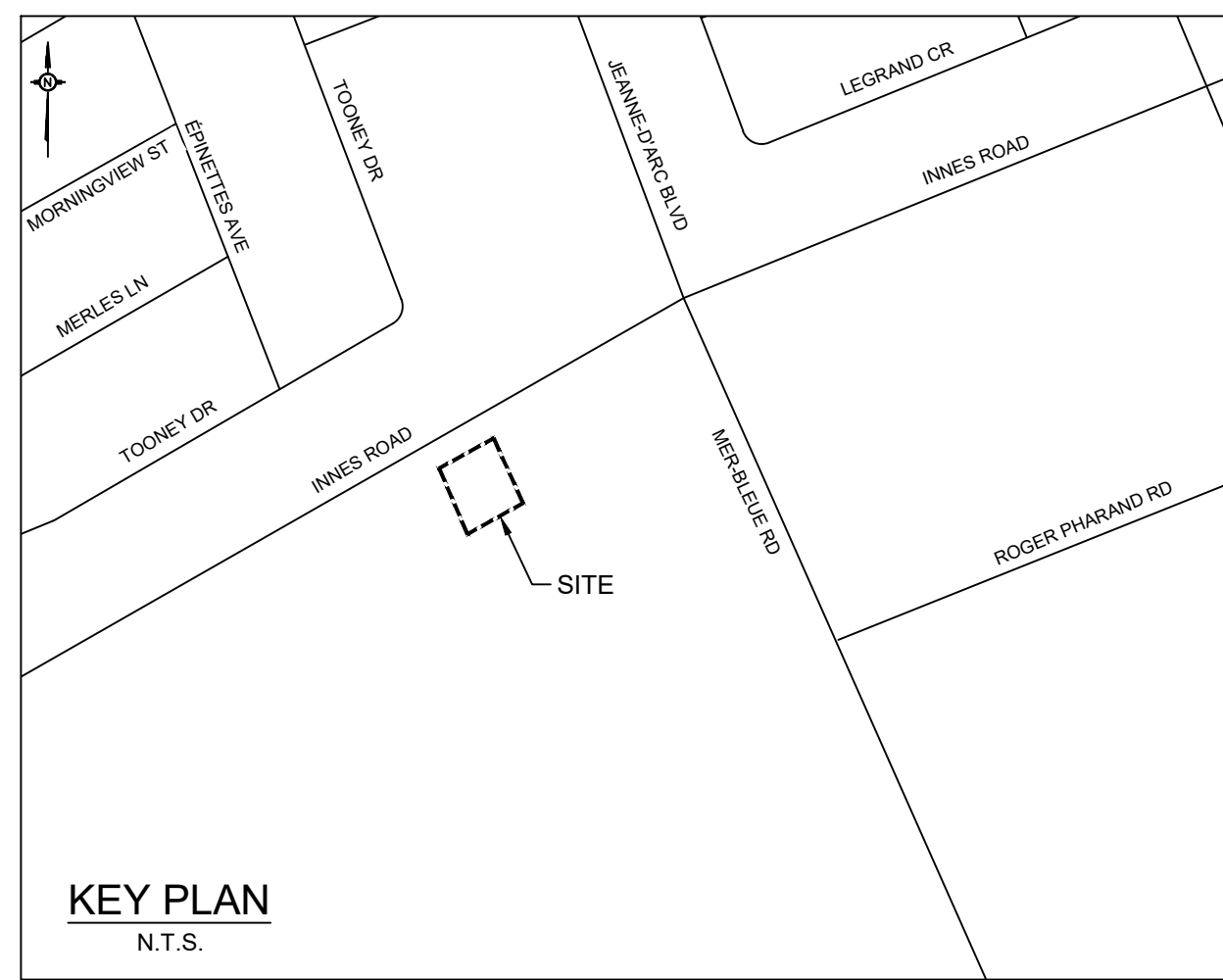
PROJECT: **ORLEANS RESIDENTIAL & MEDICAL FACILITY
3996 INNES RD, OTTAWA, ON.**

DRAWING TITLE: **PRE-DEVELOPMENT
WATERSHED PLAN**

PROJECT NO: **230737**
DATE: **NOVEMBER 2023**

C701

#18675



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
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IN ADDITION, THE CLIENT AGREES TO INCLUDE IN ANY CONTRACTS FOR CONSTRUCTION APPROPRIATE LANGUAGE THAT PROHIBITS THE CONTRACTOR OR ANY SUBCONTRACTORS OF ANY TIER FROM MAKING ANY CHANGES OR MODIFICATIONS TO LRL'S CONSTRUCTION DOCUMENTS WITHOUT THE PRIOR WRITTEN APPROVAL OF LRL AND THAT FURTHER REQUIRES THE CONTRACTOR TO NOTIFY BOTH LRL AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

GENERAL NOTES:

EXISTING SERVICES AND UTILITIES SHOWN ON THESE DRAWINGS ARE TAKEN FROM THE BEST AVAILABLE RECORDS, BUT MAY NOT BE COMPLETE OR TO DATE. CONTRACTOR SHALL VERIFY IN FIELD FOR LOCATION AND ELEVATION OF PIPES AND CHECK WITH THE UTILITY COMPANIES BEFORE DIGGING OR PERFORMING WORK.

CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS BEFORE START OF CONSTRUCTION.

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS AND THE DESIGN INTENT; FROM EXCESSIVE, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED.

CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

3.0m 1.5 0 3.0 6.0m
SCALE: 1:150

SUBJECT FOR APPROVAL

No.	REVISIONS	BY	DATE
04	RE-ISSUED FOR APPROVAL	M.L.	06 NOV 2024
03	RE-ISSUED FOR APPROVAL	M.L.	19 JUL 2024
02	RE-ISSUED FOR APPROVAL	M.L.	29 MAY 2024
01	ISSUED FOR APPROVAL	M.L.	08 FEB 2024

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT: **LOU FRANGIAN**

DESIGNED BY: **M.L.** DRAWN BY: **M.L.** APPROVED BY: **M.B.**

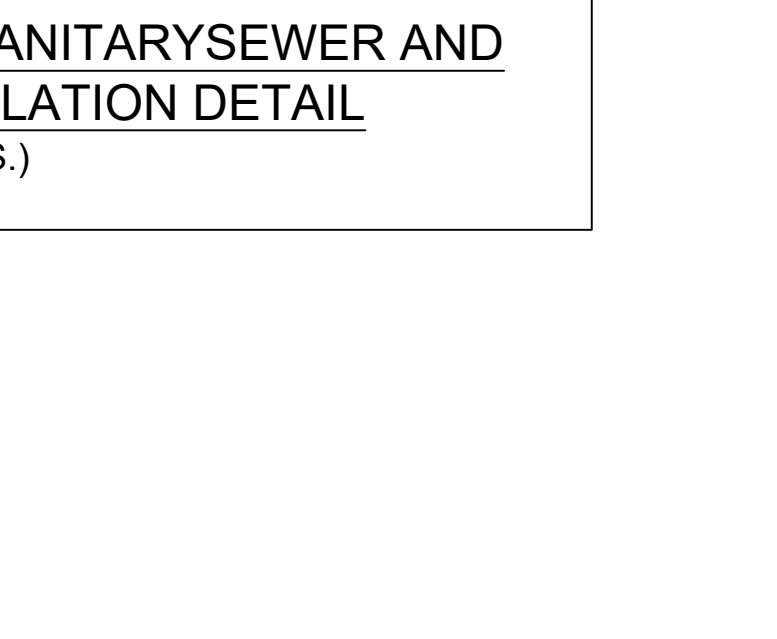
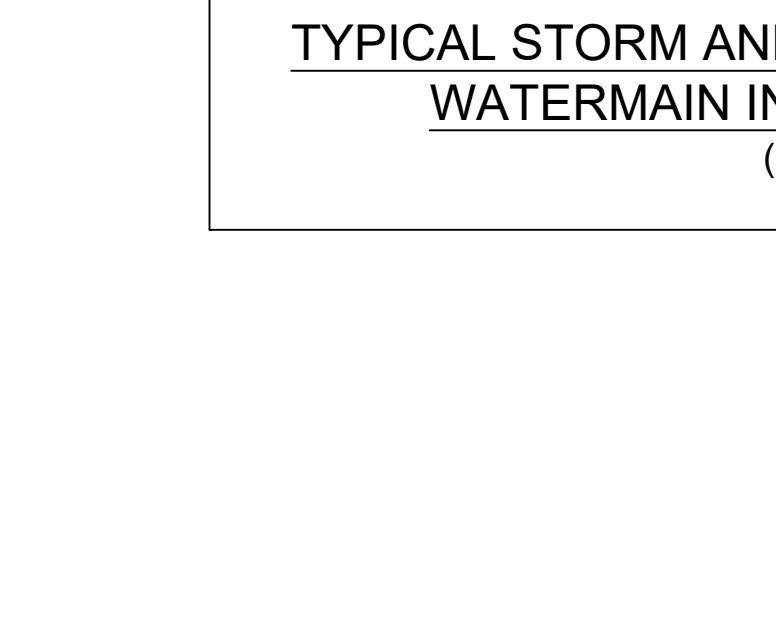
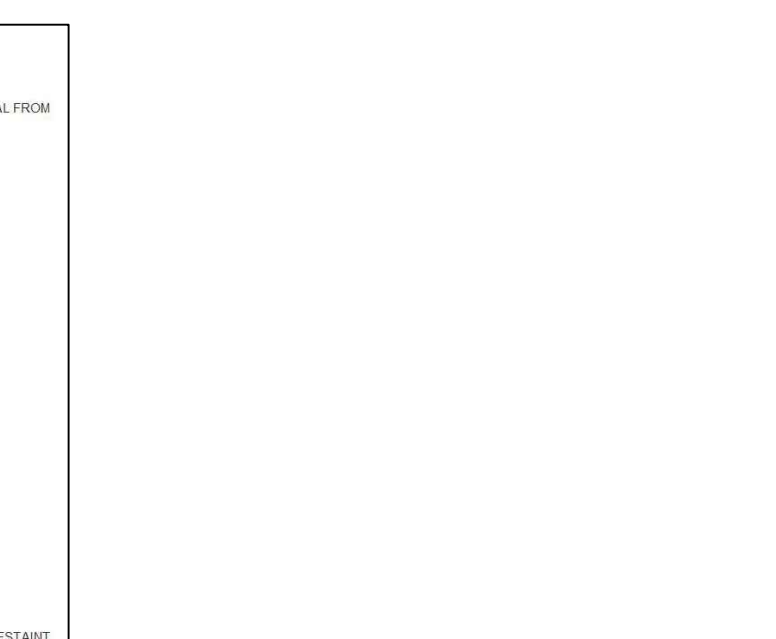
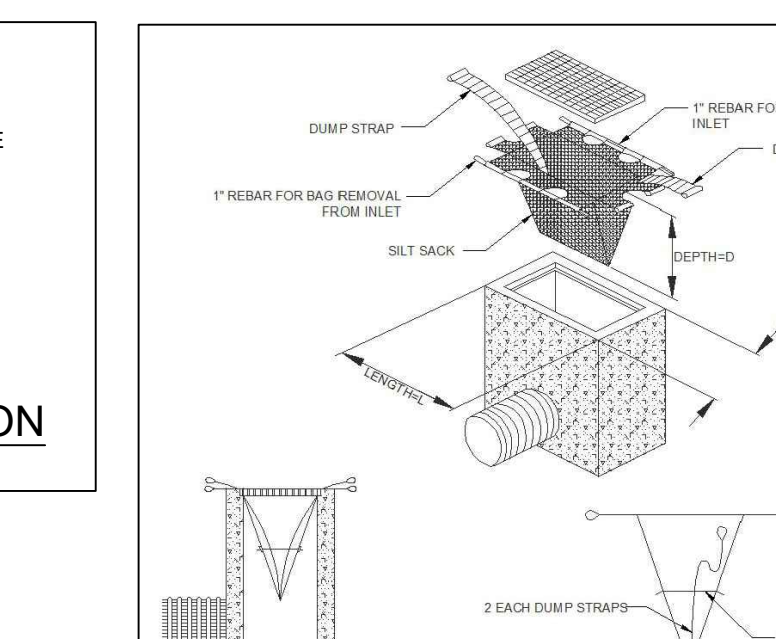
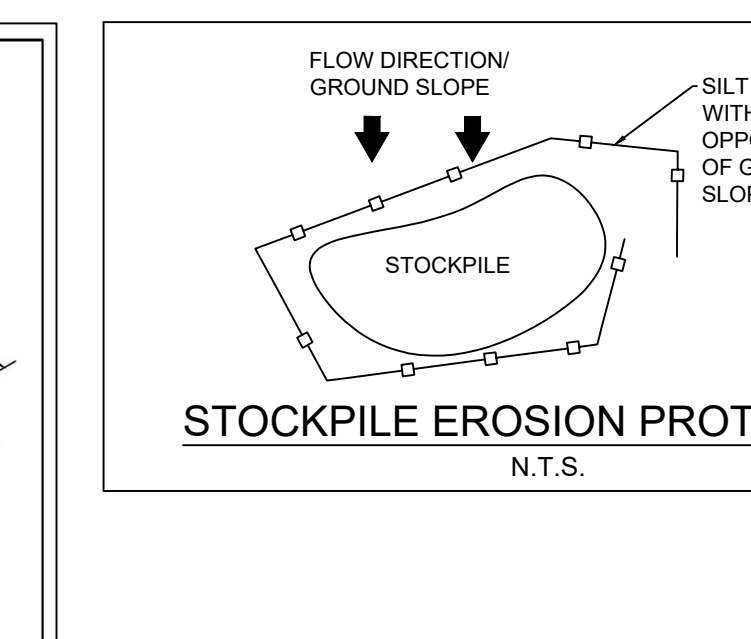
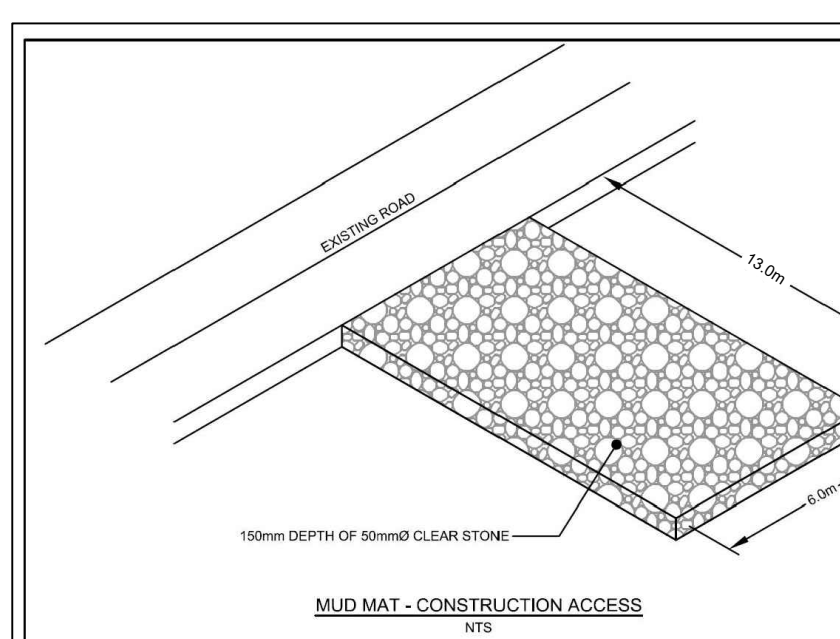
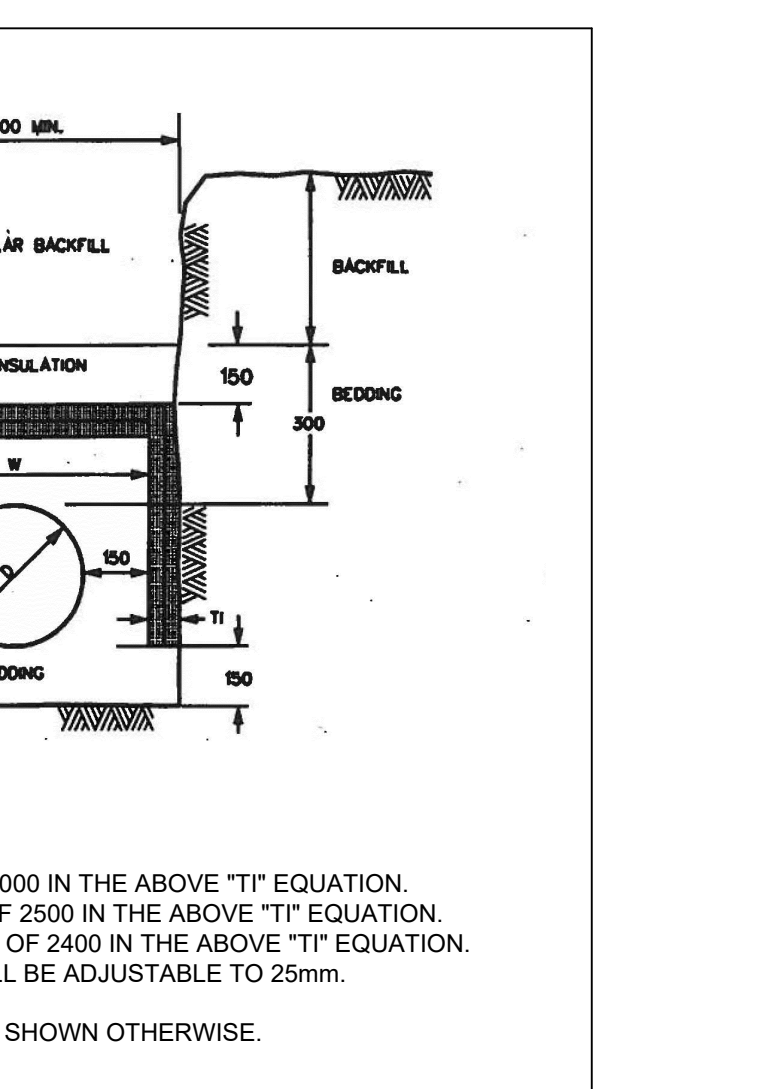
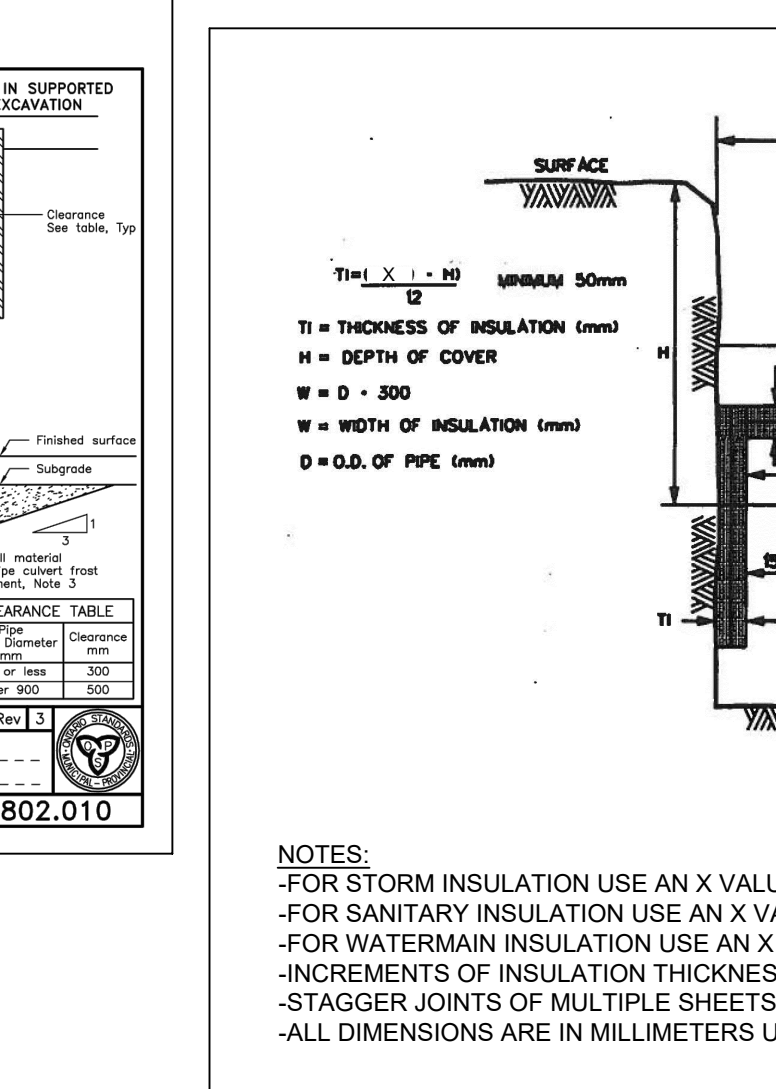
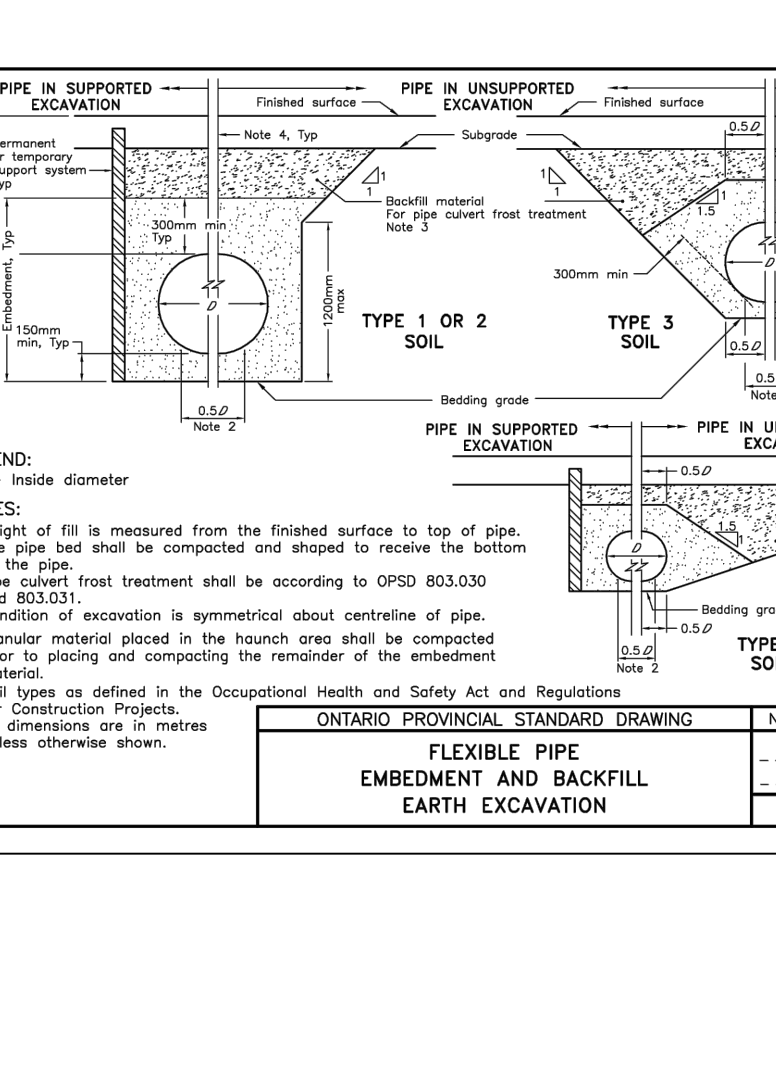
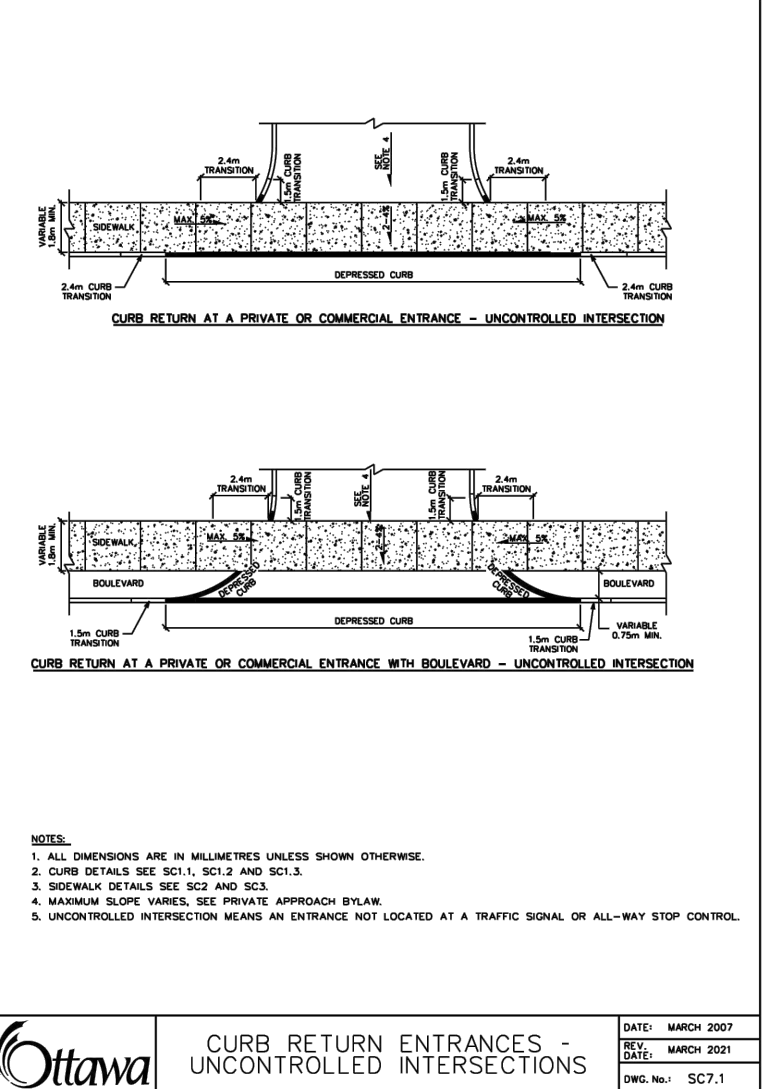
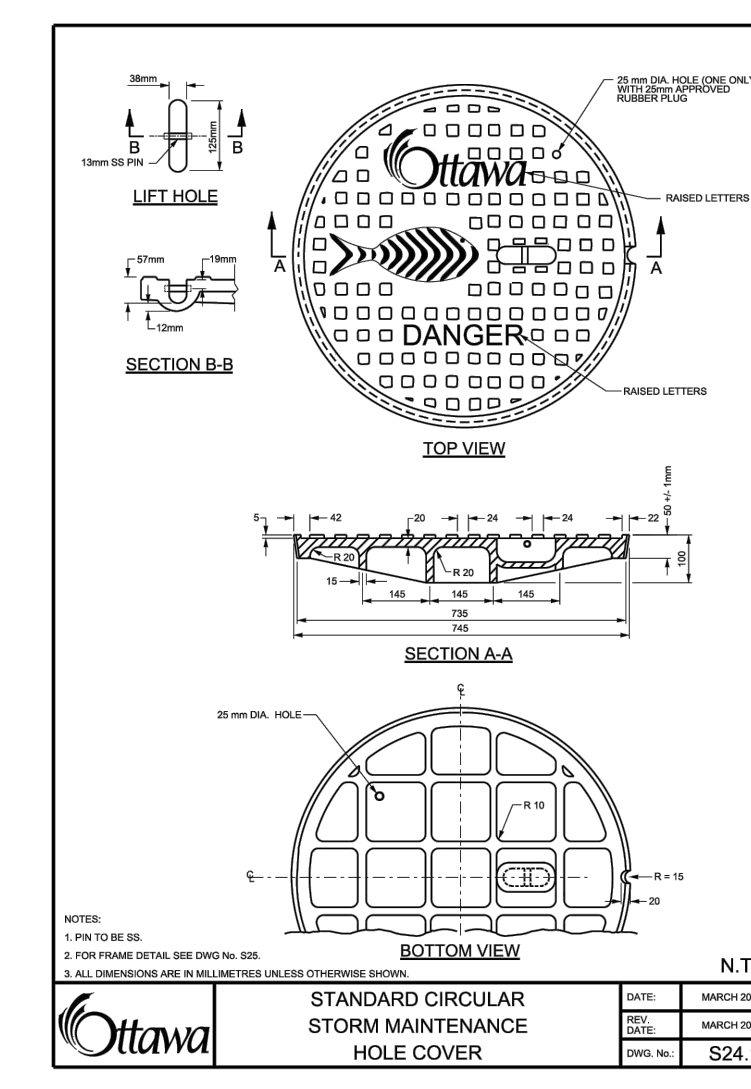
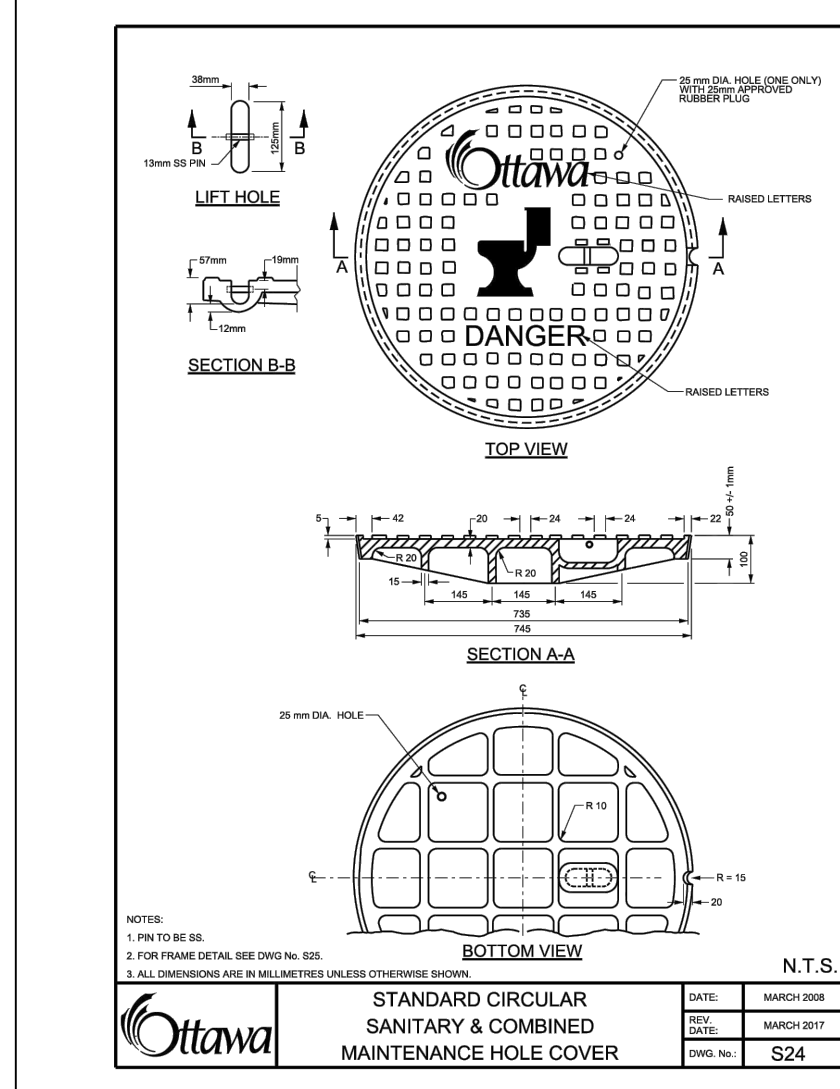
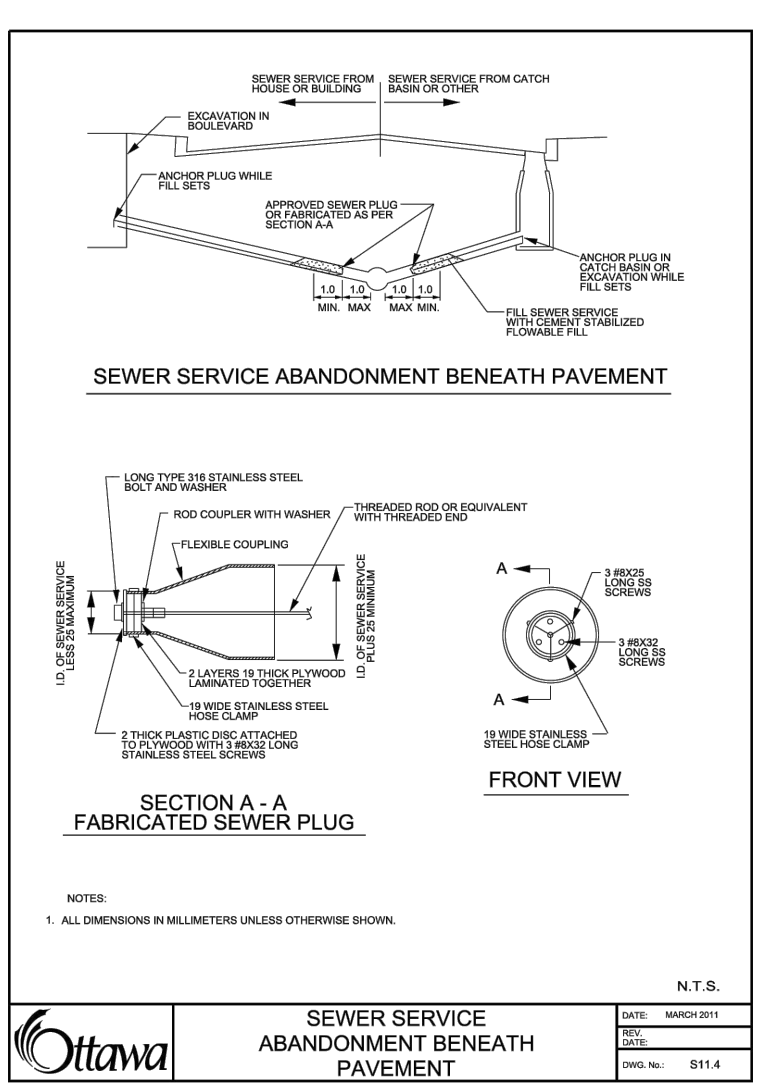
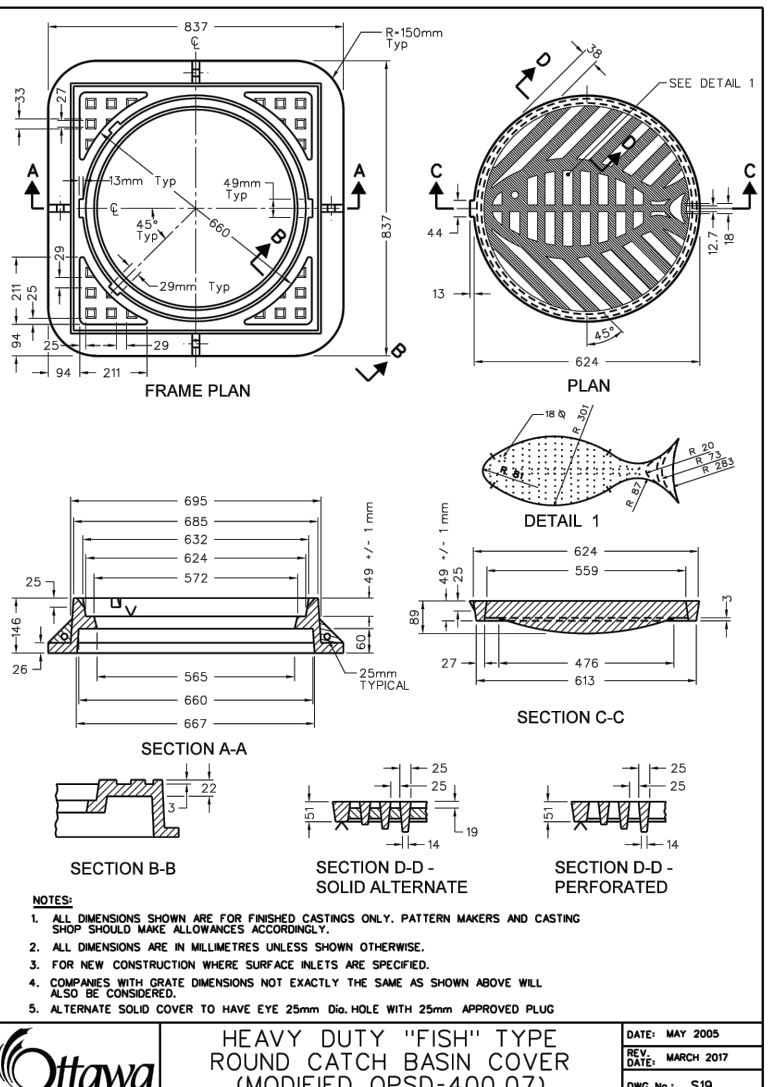
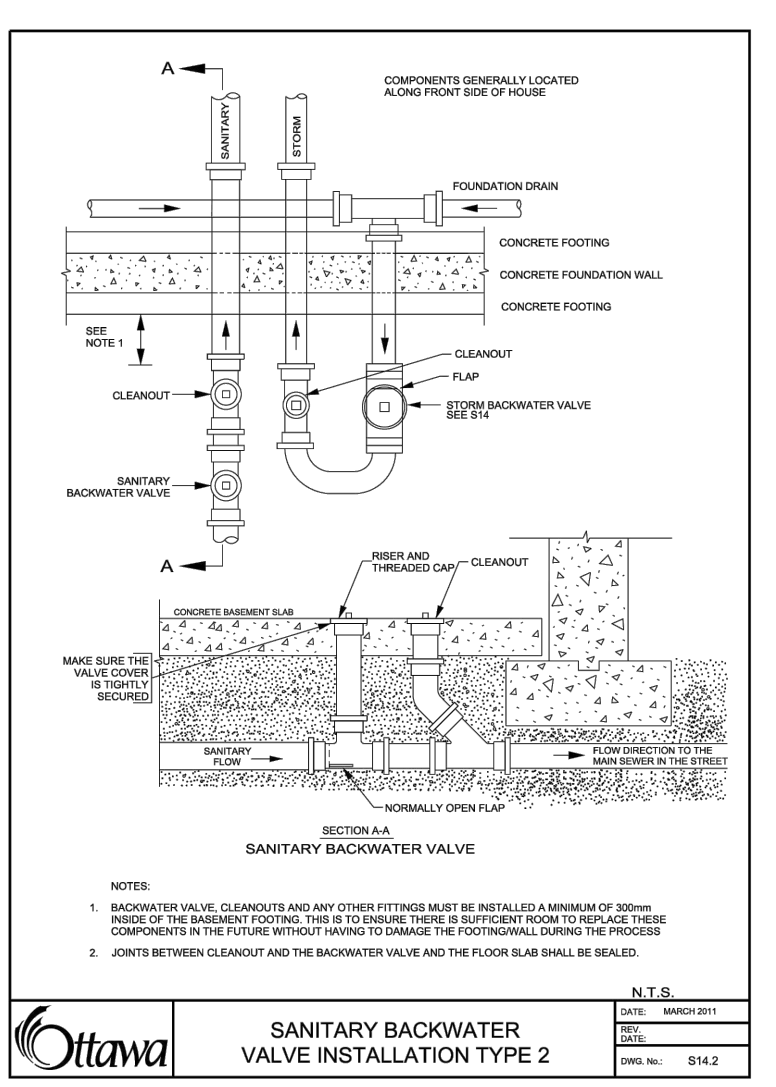
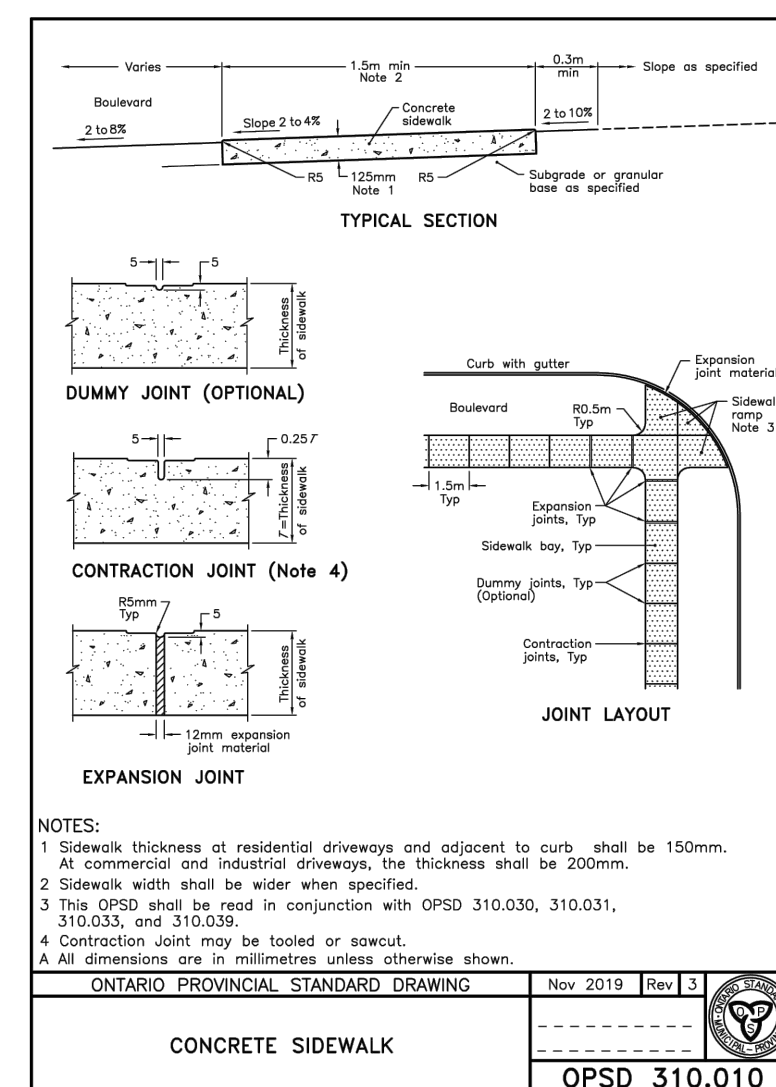
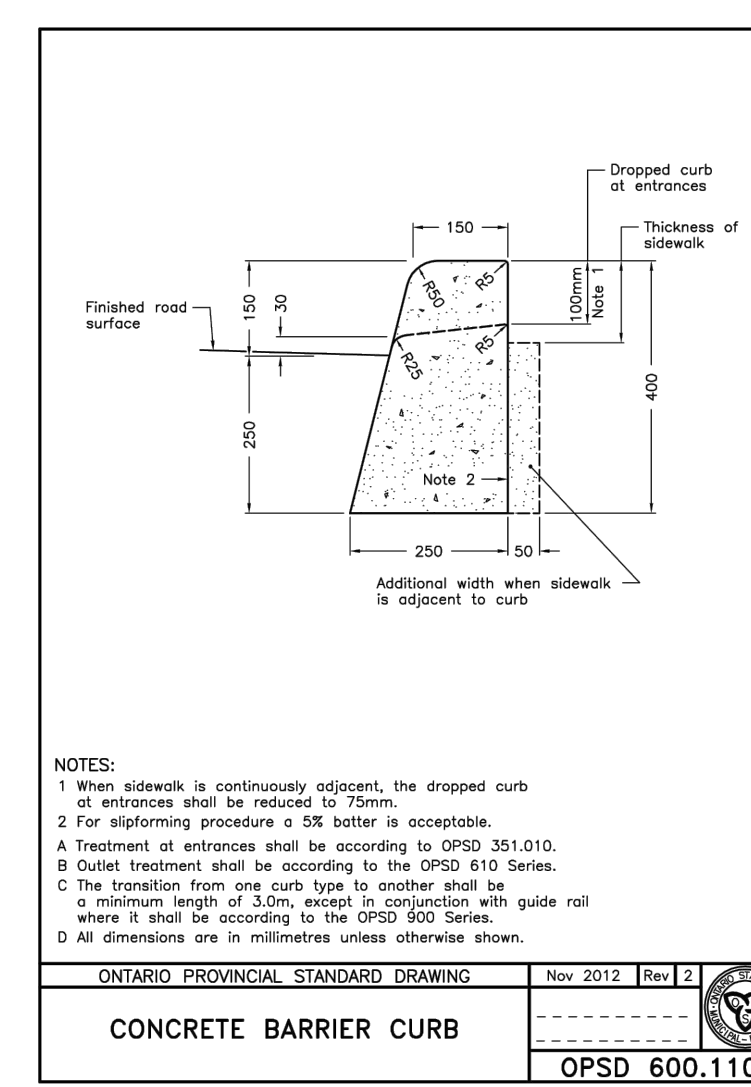
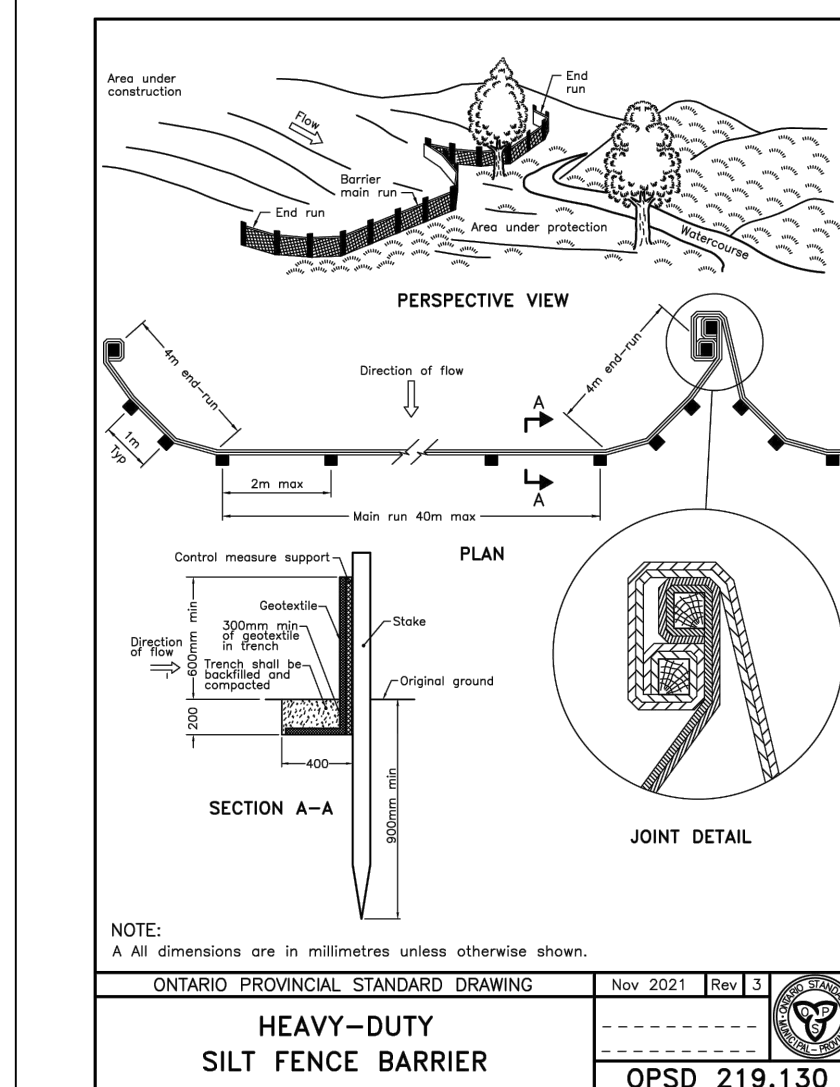
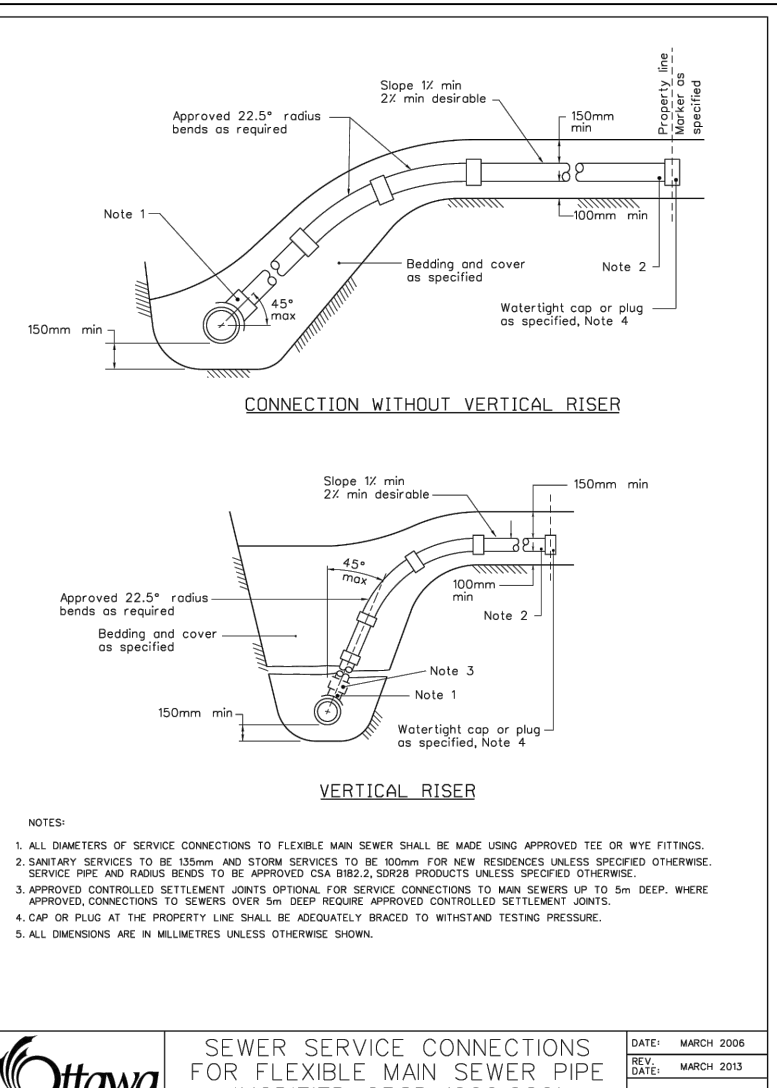
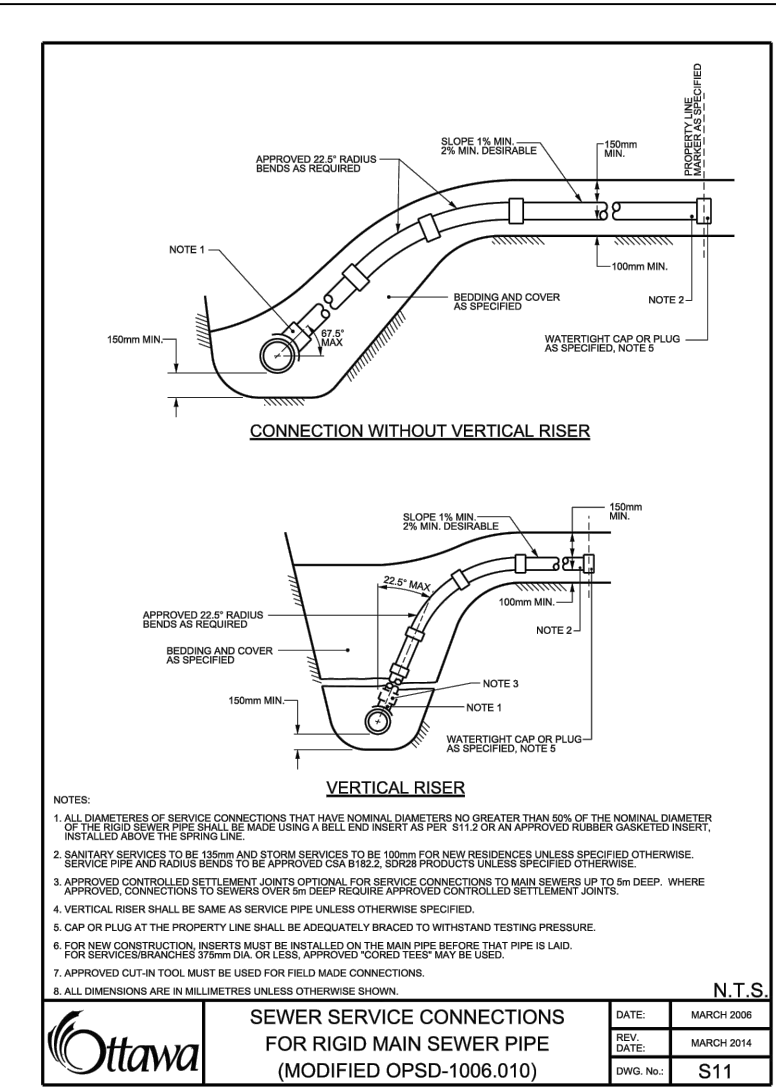
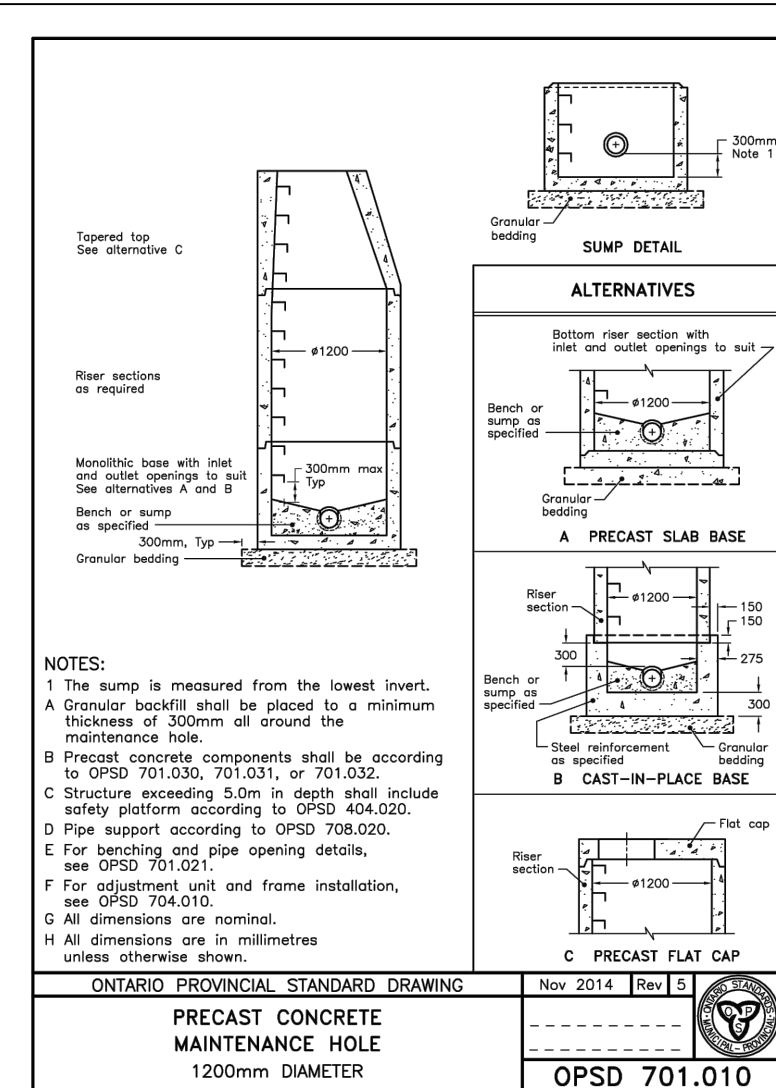
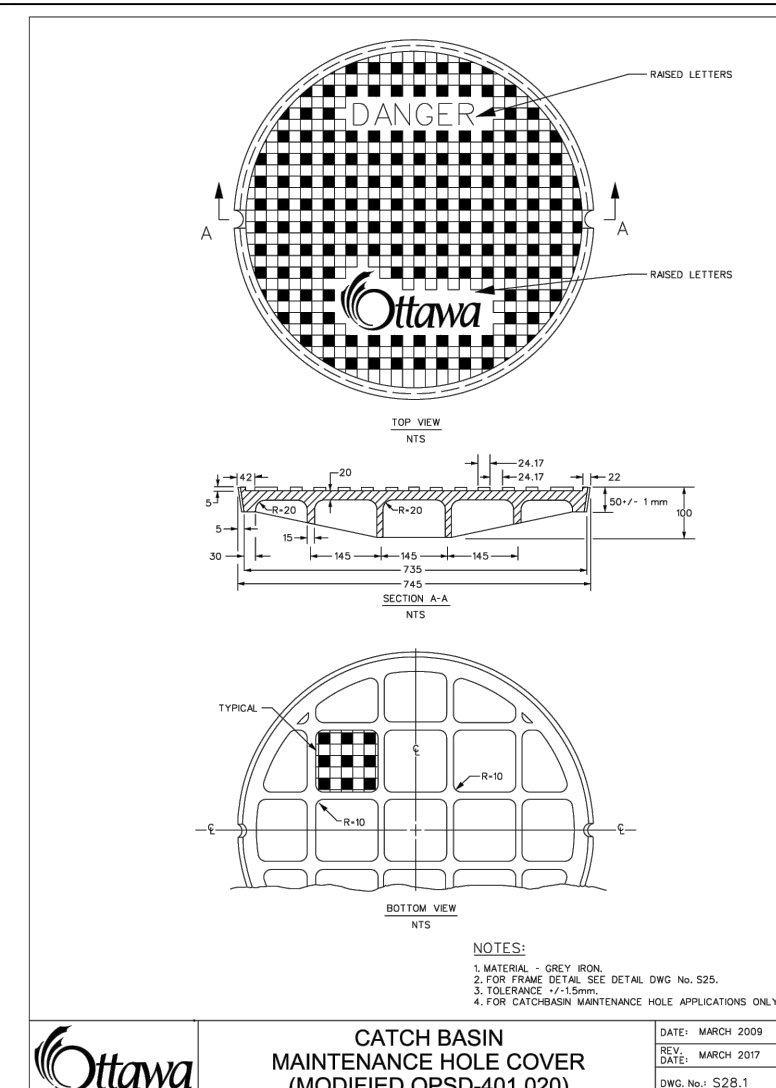
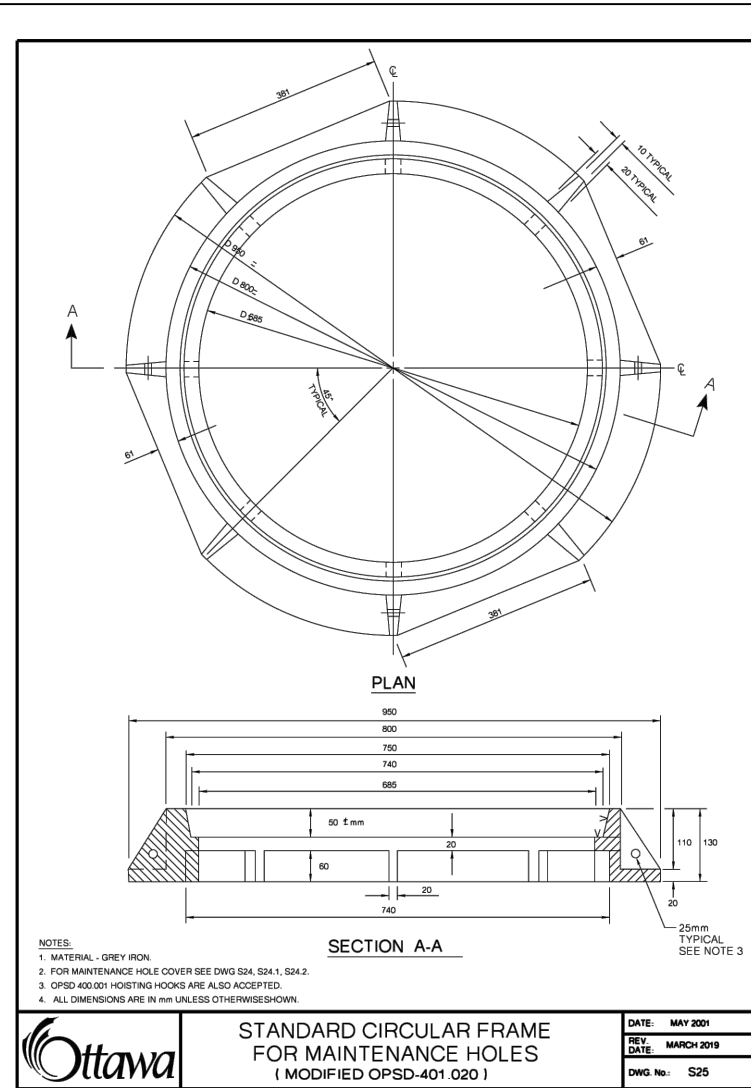
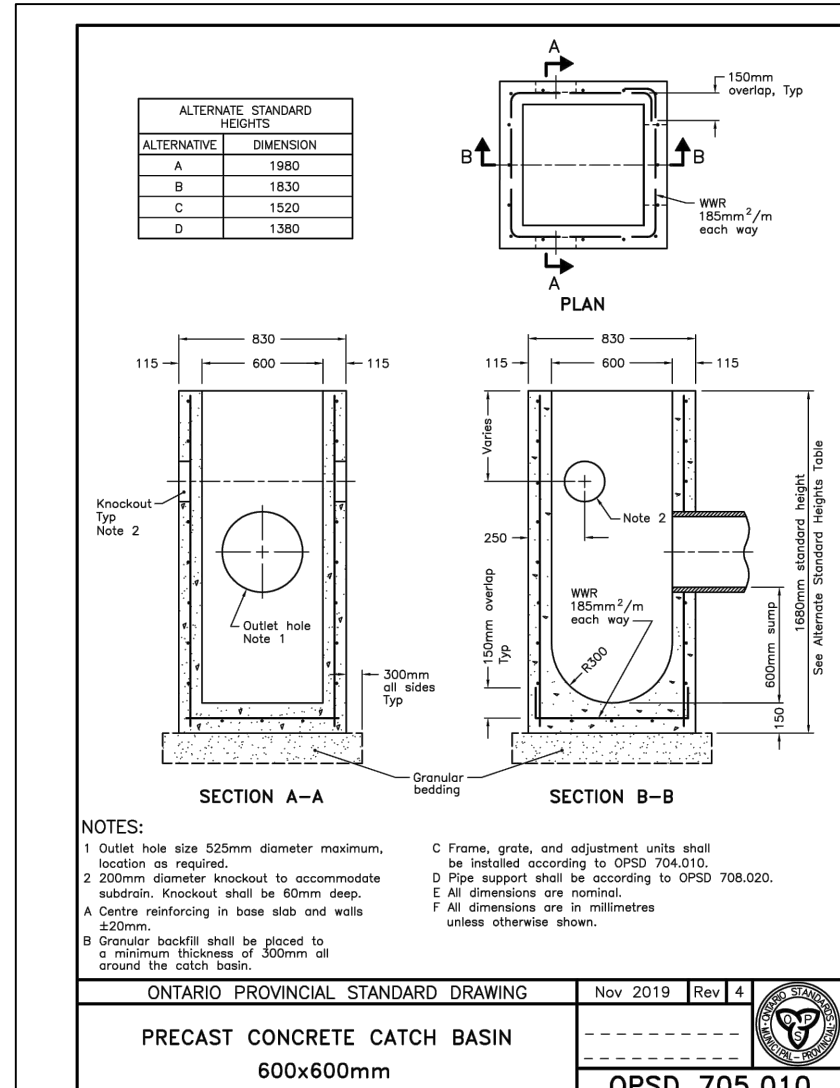
PROJECT: **ORLEANS RESIDENTIAL & MEDICAL FACILITY
3996 INNES RD, OTTAWA, ON.**

DRAWING TITLE: **POST-DEVELOPMENT
WATERSHED PLAN**

PROJECT NO: **230737**
DATE: **NOVEMBER 2023**

C702

#18675



USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE USE AND INTENT OF THE DRAWING. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR AGREEMENTS, CONDITIONS OF THE CONTRACT, THE SPECIFICATIONS, ADDENDA, AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT. THESE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ANY ONE SHALL BE BINDING AS IF REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND INSTALLED SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR CONFIRMS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

AS INSTRUMENTS OF SERVICE, ALL DRAWINGS, SPECIFICATIONS, CAD FILES OR OTHER ELECTRONIC MEDIA AND COPIES OF THEM FURNISHED BY THE ENGINEER ARE HIS PROPERTY. THEY ARE TO BE USED ONLY FOR THIS PROJECT AND ARE NOT TO BE USED ON ANY OTHER PROJECT, INCLUDING REPEATS OF THE PROJECT. CHANGES TO THE DRAWINGS MAY ONLY BE MADE BY THE ENGINEER.

UNLESS THE REVISION TITLE IS "ISSUED FOR CONSTRUCTION", THESE DRAWINGS SHALL BE CONSIDERED PRELIMINARY AND SHALL NOT BE USED AS A CONSTRUCTION DOCUMENT.

THESE DRAWINGS ILLUSTRATE THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THESE DRAWINGS EXPRESSED OR IMPLIED CHANGES THIS CONDITION. CONTRACTOR SHALL DETERMINE ALL CONDITIONS AT THE SITE AND SHALL BE RESPONSIBLE FOR KNOWING HOW THEY AFFECT THE WORK. SUBMITTAL OF A BID TO PERFORM THIS WORK IS ACKNOWLEDGEMENT OF THE RESPONSIBILITIES, AND THAT THEY HAVE BEEN FULLY CONSIDERED IN PLANNING OF THE WORK, AND THE BID PRICE, NO CLAIMS FOR EXTRA CHARGES DUE TO THESE CONDITIONS WILL BE FORTHCOMING.

UNAUTHORIZED CHANGES:

IN THE EVENT THE CLIENT, THE CLIENT'S CONTRACTORS OR SUBCONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY LRL ASSOCIATES LTD. (LRL) WITHOUT OBTAINING LRL'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

SUBJECT FOR APPROVAL

No.	REVISIONS	BY	DATE
04	RE-ISSUED FOR APPROVAL	M.L.	06 NOV 2024
03	RE-ISSUED FOR APPROVAL	M.L.	19 JUL 2024
02	RE-ISSUED FOR APPROVAL	M.L.	29 MAY 2024
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NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT: LOU FRANGIAN

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT: ORLEANS RESIDENTIAL & MEDICAL FACILITY
3996 INNES RD, OTTAWA, ON.

DRAWING TITLE: CONSTRUCTION DETAIL PLAN

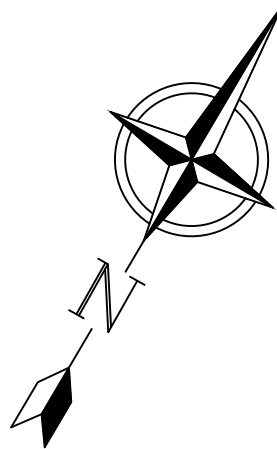
PROJECT NO: 230737
DATE: NOVEMBER 2023

C901

#18675

DRAWINGS/FIGURES

**Proposed Site Plan
Legal Survey
As-builts**



Unit 275, 30 COLONNADE ROAD, OTTAWA, ONTARIO K2E 7J6
TEL. (613) 727-8226 E-mail: fsdsurveys@bellnet.ca

SCALE 1:100

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SIDE ELEVATION

[illegible]

TREATED WOOD BEAM

100

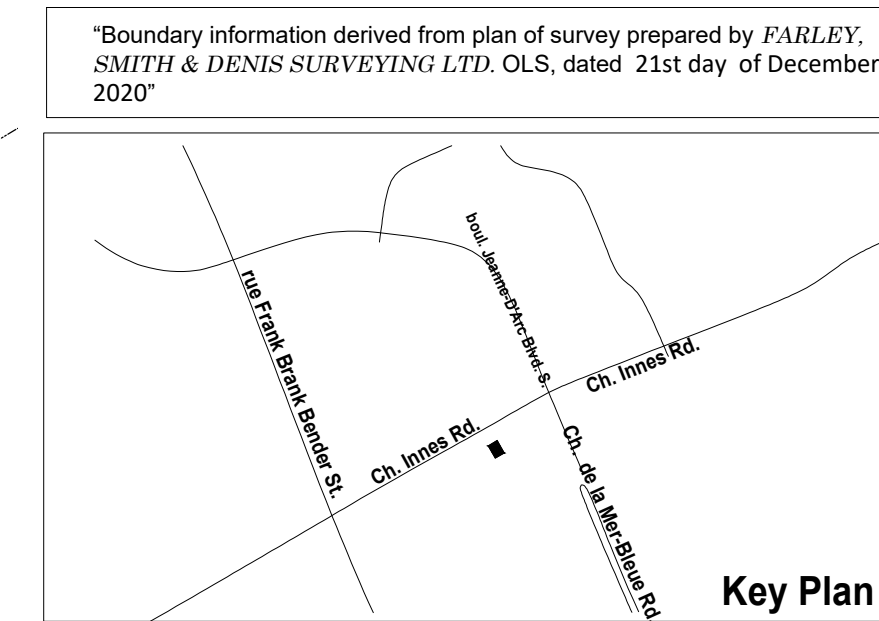
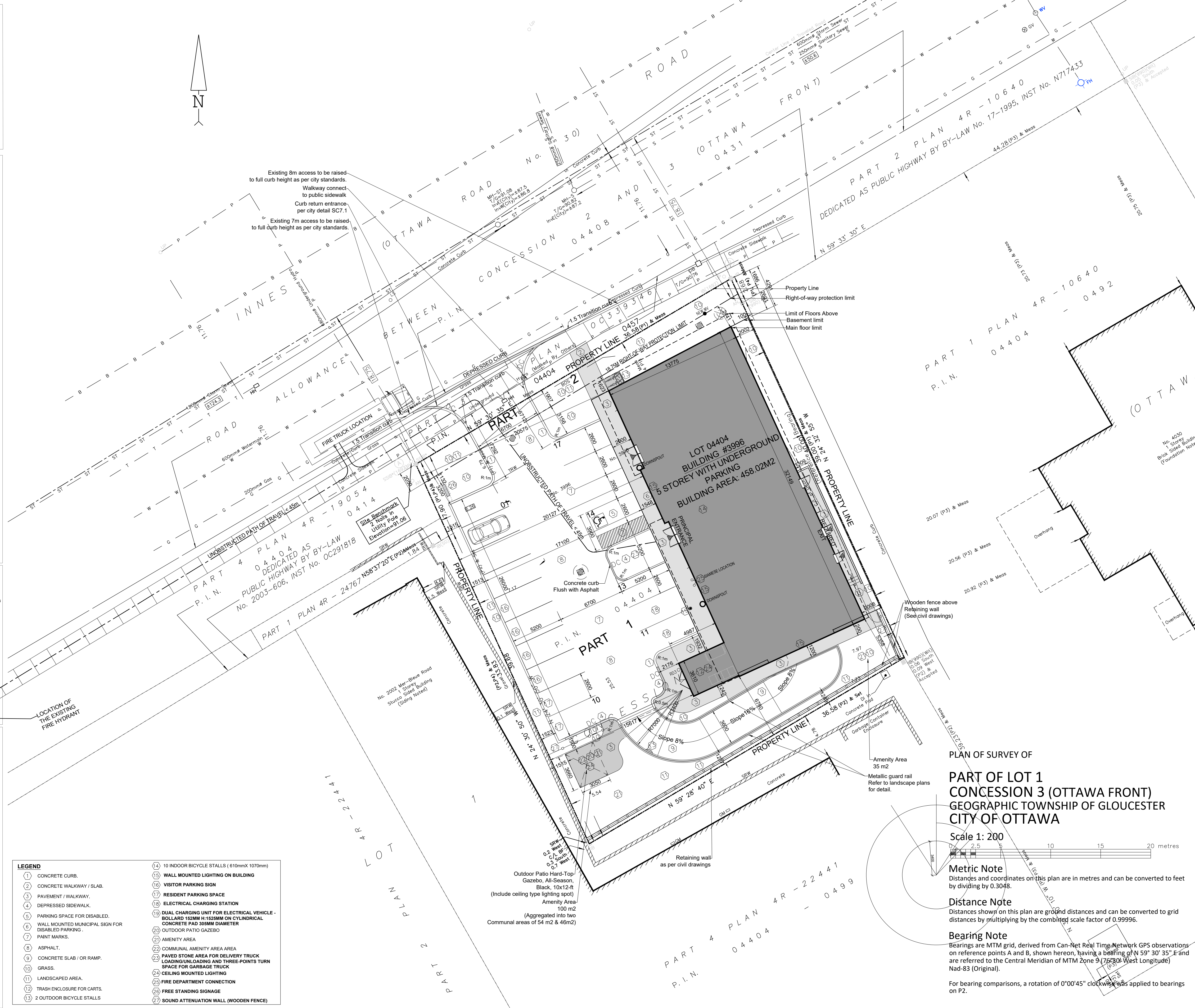
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50

706

Technical drawing of a signage post. The cross-section shows a diameter of 405mm. The side view shows a dimension of 5mm.

BACK VIEW



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BUILDING CODE ANALYSIS

- 5 STOREYS MIXED USE BUILDING WITH BASEMENT FACING 1 STREET

- PART 3 OF OBC 2017. USE: GROUP "E", "D", "C" & F3 CLASSIFICATION

3.2.2.43 Group D, up to 6 Storeys, Sprinklered

3.2.2.51 Group C, up to 6 Storeys, Sprinklered

3.2.2.57 Group E, up to 6 Storeys, Sprinklered

3.2.2.74 Group F, Division 3, up to 6 Storeys

- NON-COMBUSTIBLE CONSTRUCTION

- REQUIRED SPRINKLER AND STANDPIPE SYSTEM.

- OCCUPANCY:

- BASEMENT - CAR PARK.

- 1ST FLOOR - PHARMACY AND MEDICAL FACILITY.

- UPPER FLOORS - RESIDENTIAL.

- BUILDING AREA : 458.02 m².

- FLOOR AREA INCLUDE EXTERIOR WALLS :

- BASEMENT : 568.70 m² 1ST FLOOR 458.02 m² TYPICAL FLOORS 514.13 m² 5TH, 6TH, 7TH 412.6 m²

- TOTAL FLOOR AREA 2981.77 m² 130065.5 sq.ft.

- FIRST FLOOR FIRE SEPARATION : 2H FIRE-RESISTANCE REQUIRED CW VERTICAL STRUCTURAL COMPONENTS.

- SECOND FLOOR FIRE SEPARATION : 2H FIRE-RESISTANCE RATING REQUIRED BETWEEN GROUPE "E" AND GROUP "C" CW VERTICAL STRUCTURAL COMPONENTS.

- FIRE SEPARATION RATING FOR TYPICAL FLOORS : 1H FIRE RATING CW VERTICAL STRUCTURAL COMPONENTS.

- 3/4H R.F.R. 90 STC REQUIRED BETWEEN PUBLIC CORRIDOR AND THE RESIDENTIAL UNITS.

- 1H FIRE-RESISTANCE AND 55 STC REQUIRED REQUIRED BETWEEN ELEVATOR AND THE RESIDENTIAL UNITS.

- FIRE RESISTANCE FOR ROOF: NOT REQUIRED FOR NONCOMBUSTIBLE CONST.

- PLUMBING EQUIPMENTS.

- 100% MIN. FIRE RESIDENTIAL UNIT REQUIRED AND ONE PUBLIC HANDICAP

- 2 WASHROOM PROPOSED FOR FIRST FLOOR RETAIL AND MEDICAL FACILITY THAT

- 1 FLOOR HANDICAPS.

- 2 STANDARD WASHROOM ARE PROPOSED FOR EMPLOYEES ONLY.

- BARRIER FREE PATH OF TRAVEL PROVIDED FOR ALL FLOORS ACCORDING TO SECTION 3.8.

GROSS FLOOR AREA (WITHOUT EXTERIOR WALLS)
BASEMENT : 542.9m². 1ST FLOOR :418.1m² INCLUDE :
COMMERCIAL AREA : (RETAIL/PHARMACY: 169.5m², CLINIC: 153.7m²)
RESIDENTIAL ENTRANCES, LOBBY /STAIR: 94.9m²
RESIDENTIAL FLOORS: 1,828.8 M2

GROSS FLOOR AREA OF RESIDENTIAL SUITES			
SUITE 201, 301, 401	SUITE 203, 303, 403	SUITE 205, 305, 405	SUITE 501
74.17M2	71.1M2	74.9M2	175.4M2
SUITE 202, 302, 402	SUITE 204, 304, 404	SUITE 206, 306, 406	SUITE 502
74.17M2	71.1M2	74.9M2	175.4M2

17.24M/2	6U.15M/2	01.2M/2	1/3.1M/2
AREA (C) OF SCHEDULE A1 ZONING BY-LAW NO.2008-205			
PARKING TYPE	RATE	UNIT	PARKING REQUIRED
DWELLING UNITS IN MIXED-USE BUILDINGS (TABLE 10-101R)	1 Stall/dwelling unit	20 units	20 Stalls
VISITOR PARKING (TABLE 102)	0.2 Stall/dwelling unit	20 units	4 Stalls
MEDICAL FACILITY (TABLE 101-N51)	4 stalls / 100m ²	153.7 m ²	6 Stalls
RETAIL USE (PHARMACY)	3.4 Stalls/ 100m ²	169.5 m ²	6 Stalls
SHARED PARKING REDUCTION	25% of visitor parking	1	-2 Stalls
STANDARD PERSONNEL	-15% of retail store	0.8	-
TOTAL REQUIRED PARKING REQUIRED			34 Stalls

ZONING MECHANISMS : AM ZONE		
DESCRIPTION	REQUIREMENTS	PROVIDED
MINIMUM LOT AREA	NO MINIMUM	1,524.64m ²
MINIMUM LOT WIDTH	NO MINIMUM	36.5 m
FRONT YARD	NO MINIMUM	1.62 m
MINIMUM INTERIOR SIDE YARD	NO MINIMUM	2 m & 15.62 m
MINIMUM REAR YARD	NO MINIMUM	5.36 m
MAXIMUM BUILDING HEIGHT	25M	19m
MAXIMUM FLOOR SPACE INDEX : (FSI)	2 or 3.5 <small>P. 10 IN PARAGRAPH 32.01 OF CODE</small>	1.83
MINIMUM FLUSH OF LANDSCAPED AREA AROUND A PARKING LOT ABUTTING A STREET	3m	3.15m
MINIMUM BIRTH OF LANDSCAPED AREA AROUND A PARKING LOT NOT ABUTTING A STREET	1.5m	1.51m
AMENITY SPACE REQUIREMENTS FOR MIXED USE DEVELOPMENT, SEC.107.12.1.5. .10L.50% COVERABLE AMENITY AREA	6 m ² per dwelling unit and 100 m ² per Commercial 100 m ²	135 m ² include Commercial 100 m ²
MINIMUM LANDSCAPED AREA REQUIREMENT	15% of 615 m ²	92.25 m ² (16%)

BYCICLE PARKING SPACE TABLE	
PARKING TYPE	PARKING REQUIRED
MEDICAL FACILITY ()	1 per 1000m ² of GFA
RETAIL STORE (PHARMACY)	1 per 250m ² of GFA
DWELLING UNITS IN A MIXED-USE BUILDING (TABLE 101-R15)	0.5 / dwelling unit
TOTAL	12 Spaces

ISSUED FOR				REVISION			
No	DATE	DESCRIPTION	App.	No	DATE	DESCRIPTION	App.
	2021.11.23	SITE PLAN CONTROL APPLICATION	P.T.		2022.04.11	CITY COMMENTS 11 MARCH 2022	P.T.
			P.T.		2022.07.08	CITY COMMENTS 29 APRIL 2022	P.T.
					2022.09.14	COORDINATION WITH NEW CIVIL DRAWINGS	P.T.
					2023.01.09	CITY COMMENTS 22 NOVEMBER 2022	P.T.
					2023.04.24	CITY COMMENTS 14 FEBRUARY 2023	P.T.
					2023.07.13	CITY COMMENTS 17 MAY 2023	P.T.

Consultants:
EAU STRUCTURAL ENVIRONMENTAL SERVICES
DERRICK CLARK PEng.
TEL. (613) 869-0523, DERRICK.R.CLARK@ROGERS.COM

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Stamps

PTabet
architecte

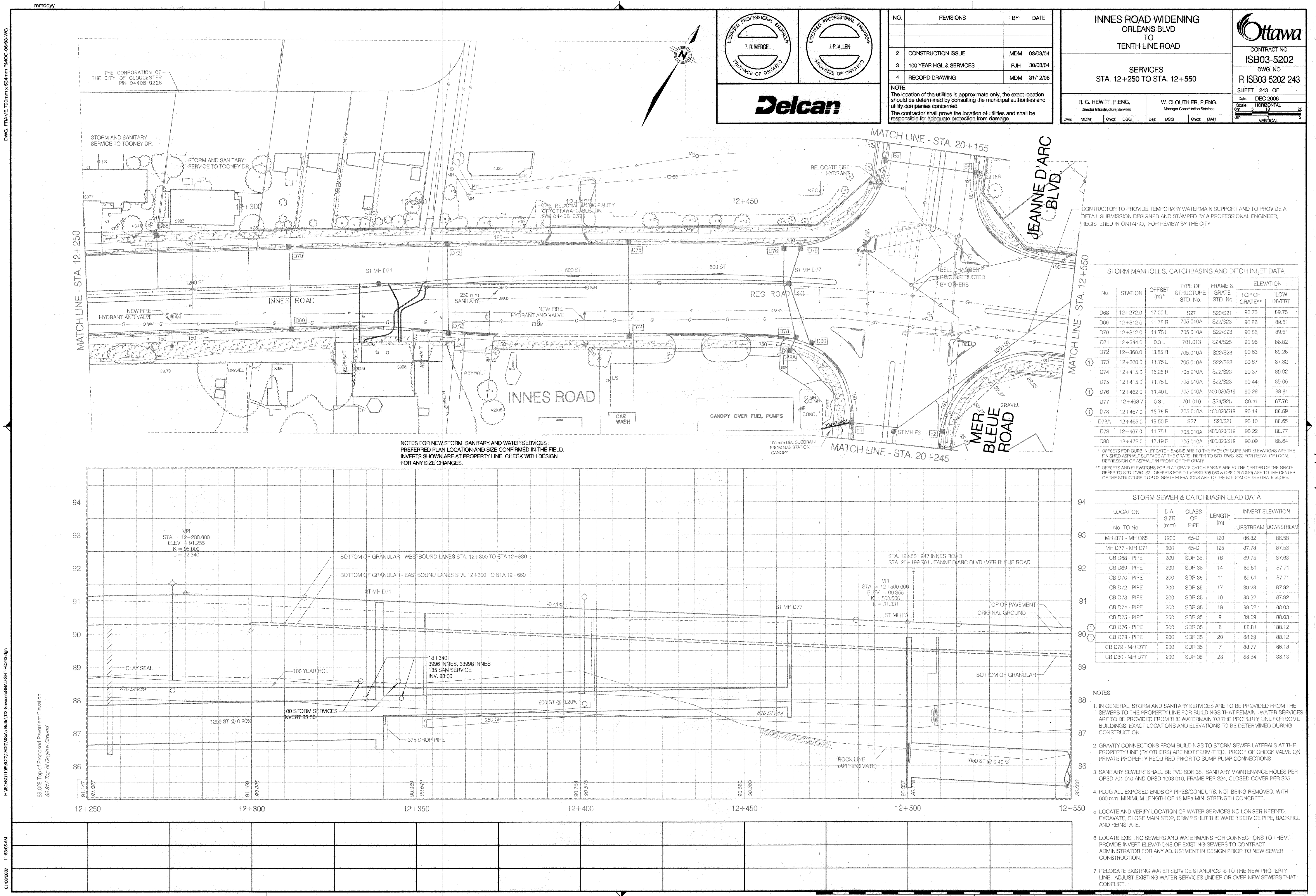
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Gatineau QC J8T 5L6
t.: 819.566.3994
c.: 613.757.5375
pierretabetarchitecte.com

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Project		ORLEANS RESIDENTIAL & MEDICAL FACILITY 3996 INNES RD, OTTAWA ON.	
Title		Scale:	1:200
PROPOSED SITE PLAN		Sheet:	1
Date: 2021/11/23	Drawn / : A. Aldu.	Drawing No. A-100	
Revision: 5	Verify / : P. Tabet		



REGISTERED PROFESSIONAL ENGINEER
P.R. MERGEL
PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER
J.R. ALLEN
PROVINCE OF ONTARIO

Delcan

NO.	REVISIONS	BY	DATE
2	CONSTRUCTION ISSUE	MDM	03/08/04
3	100 YEAR HGL & SERVICES	PJH	30/08/04
4	RECORD DRAWING	MDM	31/12/06

NOTE:
The location of the utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned.
The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

INNES ROAD WIDENING
ORLEANS BLVD
TO
TENTH LINE ROAD

SERVICES
STA. 12+250 TO STA. 12+550

Contract No.
ISB03-5202

DWG. NO.
R-ISB03-5202-243

SHEET **243** OF

R. G. HEWITT, P.ENG.
Director Infrastructure Services

W. CLOUTHIER, P.ENG.
Manager Construction Services

Date: DEC 2006

Scale: HORIZONTAL
0m 5 10 20

Scale: VERTICAL
0m 5 10 20

STORM MANHOLES, CATCHBASINS AND DITCH INLET DATA									
No.	STATION	OFFSET (m)*	TYPE OF STRUCTURE STD. No.	FRAME & GRATE STD. No.	ELEVATION				
					TOP OF GRATE**	LOW INVERT			
D68	12+272.0	17.00 L	S27	S20/S21	90.75	89.75			
D69	12+312.0	11.75 R	705.010A	S22/S23	90.86	89.51			
D70	12+312.0	11.75 L	705.010A	S22/S23	90.86	89.51			
D71	12+344.0	0.3 L	701.013	S24/S25	90.96	86.82			
D72	12+360.0	13.85 R	705.010A	S22/S23	90.63	89.28			
D73	12+360.0	11.75 L	705.010A	S22/S23	90.67	87.32			
D74	12+415.0	15.25 R	705.010A	S22/S23	90.37	89.02			
D75	12+415.0	11.75 L	705.010A	S22/S23	90.44	89.09			
D76	12+462.0	11.40 L	705.010A	400.020/S19	90.26	88.81			
D77	12+463.7	0.3 L	701.010	S24/S25	90.41	87.78			
D78	12+467.0	15.78 R	705.010A	400.020/S19	90.14	88.69			
D78A	12+465.0	19.50 R	S27	S20/S21	90.10	88.65			
D79	12+467.0	11.75 L	705.010A	400.020/S19	90.22	88.77			
D80	12+472.0	17.19 R	705.010A	400.020/S19	90.09	88.64			

* OFFSETS FOR CURB INLET CATCH BASINS ARE TO THE FACE OF CURB AND ELEVATIONS ARE THE FINISHED ASPHALT SURFACE AT THE GRATE. REFER TO STD. DWG. S22 FOR DETAIL OF LOCAL DEPRESSION OF ASPHALT IN FRONT OF THE GRATE.
** OFFSETS AND ELEVATIONS FOR FLAT GRATE CATCH BASINS ARE AT THE CENTER OF THE GRATE. REFER TO STD. DWG. S22. OFFSETS FOR D11 (OPS0-705.030 & OPS0-705.040) ARE TO THE CENTER OF THE STRUCTURE. TOP OF GRATE ELEVATIONS ARE TO THE BOTTOM OF THE GRATE SLOPE.

STORM SEWER & CATCHBASIN LEAD DATA					
LOCATION		DIA. SIZE (mm)	CLASS OF PIPE	LENGTH (m)	INVERT ELEVATION
No. TO No.					UPSTREAM DOWNSTREAM
MH D71 - MH D65		1200	65-D	120	86.82 86.58
MH D77 - MH D71		600	65-D	125	87.78 87.53
CB D68 - PIPE		200	SDR 35	16	89.75 87.63
CB D69 - PIPE		200	SDR 35	14	89.51 87.71
CB D70 - PIPE		200	SDR 35	11	89.51 87.71
CB D72 - PIPE		200	SDR 35	17	89.28 87.92
CB D73 - PIPE		200	SDR 35	10	89.32 87.92
CB D74 - PIPE		200	SDR 35	19	89.02 88.03
CB D75 - PIPE		200	SDR 35	9	89.09 88.03
CB D76 - PIPE		200	SDR 35	6	88.81 88.12
CB D78 - PIPE		200	SDR 35	20	88.69 88.12
CB D79 - MH D77		200	SDR 35	7	88.77 88.13
CB D80 - MH D77		200	SDR 35	23	88.64 88.13

- NOTES:
- IN GENERAL, STORM AND SANITARY SERVICES ARE TO BE PROVIDED FROM THE SEWERS TO THE PROPERTY LINE FOR BUILDINGS THAT REMAIN. WATER SERVICES ARE TO BE PROVIDED FROM THE WATERMAIN TO THE PROPERTY LINE FOR SOME BUILDINGS. EXACT LOCATIONS AND ELEVATIONS TO BE DETERMINED DURING CONSTRUCTION.
 - GRAVITY CONNECTIONS FROM BUILDINGS TO STORM SEWER LATERALS AT THE PROPERTY LINE (BY OTHERS) ARE NOT PERMITTED. PROOF OF CHECK VALVE ON PRIVATE PROPERTY REQUIRED PRIOR TO SUMP PUMP CONNECTIONS.
 - SANITARY SEWERS SHALL BE PVC SDR 35. SANITARY MAINTENANCE HOLES PER OPSD 701.010 AND OPSD 1003.010, FRAME PER S24, CLOSED COVER PER S25.
 - PLUG ALL EXPOSED ENDS OF PIPES/CONDUITS, NOT BEING REMOVED, WITH 600 mm MINIMUM LENGTH OF 15 MPa MIN. STRENGTH CONCRETE.
 - LOCATE AND VERIFY LOCATION OF WATER SERVICES NO LONGER NEEDED, EXCAVATE, CLOSE MAIN STOP, CRIMP SHUT THE WATER SERVICE PIPE, BACKFILL AND REINSTATE.
 - LOCATE EXISTING SEWERS AND WATERMAINS FOR CONNECTIONS TO THEM. PROVIDE INVERT ELEVATIONS OF EXISTING SEWERS TO CONTRACT ADMINISTRATOR FOR ANY ADJUSTMENT IN DESIGN PRIOR TO NEW SEWER CONSTRUCTION.
 - RELOCATE EXISTING WATER SERVICE STANDPOSTS TO THE NEW PROPERTY LINE. ADJUST EXISTING WATER SERVICES UNDER OR OVER NEW SEWERS THAT CONFLICT.